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THE MONIST.

MR. A. R. WALLACE ON PHYSIOLOGICAL SELECTION.*

IN 1886 I published a paper entitled "Physiological Selection: an additional suggestion on the origin of species," (Zoölogical Journal of the Linnean Society, Vol. XIX, p. 337). The view there expressed is, briefly, as follows.

Given the facts of heredity and variability, the whole theory of organic evolution becomes neither more nor less than a theory of the causes which determine the breeding of like with like, to the exclusion of unlike. For the more firmly that we believe in heredity with variability as the fundamental principle of organic evolution, the stronger must become our persuasion that segregate breeding (or exclusive mating of like with like) must lead to divergence, while indiscriminate breeding (or free intercrossing of all varieties) must lead to uniformity. So long as there is free intercrossing, heredity makes in favor of fixity of type—or, at most, can permit change only in a single line, where successive generations undergo a continuous improvement, which may give rise to a

* In a private letter to the editor of this magazine Professor Geo. J. Romanes writes: "The article refers to a completely new departure in the theory of evolution, striking in the principle of homogamy, the root-principle of the whole, and in physiological selection, one of the main branches. Yet neither principle has so far been perceived except by Mr. Gulick . . . . The theory of physiological selection has been better understood in America than in this country; and I should like the naturalists there, who have taken such a warm and appreciative interest in it, to see my reply to Mr. Wallace published in an American periodical."

ladder-like series of species in time. But in order that there should be a tree-like multiplication of species in space, or a simultaneous divergence of type, it is essential that free intercrossing be prevented at the origin, and throughout the development, of each branch. In other words, it is only when assisted by some form of segregation—which determines exclusive breeding of like with like—that heredity can effect arborescent or polytypic, as distinguished from catenated or monotypic, evolution. For the sake of greater clearness, I will call segregation in this sense *homogamy*, or the exclusive mating of individuals which belong to the same variety.

Now homogamy may be secured in a very great number of different ways. Of these the most important, from every point of view, is natural selection. Here the exclusive breeding of like with like is determined by general fitness, and is effected by extermination of the unlike—i. e., the comparatively unfit. Moreover, this process leads to a continuous improvement in the way of adaptation, and in this important respect it stands alone among all the forms of homogamy. Nevertheless, we must note that, unless assisted by some other form of homogamy, natural selection can only produce monotypic evolution; never polytypic. Successive generations may thus continuously mount to higher stages of adaptation on the steps supplied by their own dead selves; but although they may thus give rise to a linear series of species in time, they can never thus give rise to a multiplication of species in space. In order to effect such multiplication, or *divergence* of types, natural selection must be supplemented by some other form of homogamy, which can prevent intercrossing between the equally fit at the origin, and throughout the development, of every separate branch.

Well, as I have said, these other forms of homogamy are very numerous. First we may notice geographical isolation. When a comparatively small portion of a species is thus separated from the rest of its kind, intercrossing is effectually prevented between the two sections; and inasmuch as the general average of specific characters in the isolated section will be somewhat different from that of the other section, heredity will determine that the two sections shall not run parallel in their subsequent lines of evolutionary

history: there will arise an increasing divergence between them, as was first pointed out by the mathematician Delbœuf, subsequently by the naturalist Weismann, and more recently, with greater emphasis, by Mr. Gulick as well as myself.

Again, there is homogamy that arises as a result of sexual preference, or, as I have called it, "psychological selection." It is a matter of observation that the breeding of like with like is often determined among the higher vertebrata by individuals of each variety preferring to mate with other individuals of their own variety; and this is homogamy.

Not to occupy space with any attempt at enumerating all the many forms of homogamy* I will at once pass on to the form which constitutes the subject-matter of the present paper—and the form which, in my opinion, is probably of more importance than any other in the multiplication of species. This is the form of homogamy which I have termed Physiological Selection, or Segregation of the Fit, and Mr. Gulick—who independently perceived the principle—has called Segregate Fecundity.

As my object on the present occasion is to answer criticisms which have been passed on my enunciation of this principle, I do not propose to go into further detail by way of explanation than is necessary in order to render intelligible both the criticisms and my reply thereto. Moreover, this reply is only an abstract of a fuller one which has been prepared for publication in a forthcoming book. Therefore it deals only with the main points. Lastly, I may remark that the criticisms which have hitherto appeared have all been derived from the same source, viz., from Mr. A. R. Wallace; for, although many other naturalists have expressed themselves as more or less opposed to the new theory, or "additional suggestion on the origin of species," they have all done so on the grounds, or for the reasons supplied by Mr. Wallace. Therefore, in dealing with Mr. Wallace's objections, I shall be dealing with the only objections which have thus far been advanced.

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* This has been done in a most careful and exhaustive manner by Mr. Gulick in his papers which have succeeded mine in the publications of the Linnean Society

In order at once to restate the theory of physiological selection, and to do so in a form which cannot be suspected of being in any way influenced by Mr. Wallace's more recent criticisms, I will begin by reproducing the main features of the theory in the words which were employed for this purpose more than three years ago, when I supplied an article to the *Nineteenth Century* in answer to one by him in the *Fortnightly Review*. Moreover, for the most part this restatement of the theory is quoted *verbatim* from my original paper—the differences being due only to the conditions imposed by limits of an article.

The following, then, is quoted from the *Nineteenth Century* for January, 1887:

"According to the Darwinian theory [which, as elsewhere fully explained, the present theory is in no way capable of supplanting, but only of supplementing, and this among other ways, by explaining why it is that some degree of mutual infer-ility is so general a phenomenon as between allied species—a phenomenon which Darwin expressly regarded as not explicable by the theory of natural selection], it is for the most part only those variations which happen to have been useful that have been preserved: yet, even as thus limited, the principle of variability is held able to furnish sufficient material out of which to construct the whole adaptive morphology of nature. How immense, therefore, must be the number of unuseful variations. Yet these are all, for the most part, still-born, or allowed to die out immediately by intercrossing. Should such intercrossing be prevented, however, there is no reason why unuseful variations should not be perpetuated by heredity quite as well as useful ones when under the nursing influence of natural selection—as, indeed, we see to be the case in our domesticated productions. Consequently, if from any reason a section of a species is prevented from intercrossing with the rest of its species, new varieties of a trivial or unuseful kind might be expected to arise within that section. And this is just what we find. Oceanic islands, for example, are well known to be extraordinarily rich in peculiar species; and this can best be explained by considering that a complete separation of the fauna and flora on such an island permits them to develop varietal histories of their own, without interference by intercrossing with their originally parent forms. We see the same principle exemplified by the influence of geographical barriers of any kind, and also by the consequences of migration. Therefore, given an absence of overwhelming intercrossing, and the principle of what I term independent variability may be trusted to evoke new species, without the aid of natural selection. [Homogamy.]

"Were it not for the very general occurrence of some degree of sterility between even closely allied species and were it not also for the fact, that closely

allied species are not always—or even generally—separated from one another by geographical barriers, we might reasonably attribute all cases of species-formation by independent variability to the prevention of intercrossing by geographical barriers or by migration. But it is evident that these two facts can no more be explained by the influence of geographical barriers, or by migration, than they can be by the influence of natural selection.

"Now, of all parts of those variable objects which we call organisms, the most variable is the reproductive system; and the variations may be either in the direction of increased or diminished fertility. Consequently, variations in the way of greater or less sterility frequently take place both in plants and animals; and probably, if we had adequate means of observing this point, we should find that there is no one variation more common. But, of course, whenever it arises—whether as a result of changed conditions of life, or, as we say, spontaneously—it immediately becomes extinguished, seeing that the individuals which it affects are less able (if able at all) to propagate the variation. If, however, the variation should be such that, while showing some degree of sterility with the parent form, it continues to be as fertile as before within the limits of the varietal form, it would neither be swamped by intercrossing nor die out on account of sterility.

"For example, suppose the variation in the reproductive system is such that the season of flowering, or of pairing, becomes either advanced or retarded. Whether this variation be "spontaneous," or due to change of food, climate, habitat, etc., does not signify. The only point we need attend to is that some individuals, living on the same geographical area as the rest of their species, have demonstrably varied in their reproductive systems, so that they are perfectly fertile *inter se*, while absolutely sterile with the rest of their species. By inheritance there would thus arise a variety living on the same geographical area as its parent form, and yet prevented from intercrossing with that form by a barrier quite as effectual as a thousand miles of ocean; the only difference would be that the barrier, instead of being geographical, is physiological. And now, of course, the two sections of the physiologically divided species would be able to develop independent histories of their own without intercrossing; even though they are living together on the same geographical area, their physiological isolation would lead to their taking on distinct specific characters by independent variations, [or homogamy,] just as is the case with sections of a species when separated from each other by geographical isolation.

"To state this suggestion in another form, it enables us to regard many, if not most, species as the records of variations in the reproductive systems of ancestors. When variations of a non-useful kind occur in any of the other systems or parts of organisms, they are, as a rule, immediately extinguished by intercrossing. But whenever they happen to arise in the reproductive system in the way here suggested, they must tend to be preserved as new natural varieties, or incipient species. At first the difference would only be in respect of the reproductive systems;

but eventually, on account of independent variation, other differences would supervene, and the new variety would take rank as a true species.

"The principle thus briefly sketched in some respects resembles, and in other respects differs from, the principle of natural selection, or survival of the fittest. For the sake of convenience, therefore, and in order to preserve analogies with already existing terms, I have called this principle Physiological Selection, or Segregation of the Fit.

"Let it be noted that we are not concerned either with the causes or the degrees of the particular kind of variation on which this principle depends. Not with the causes, because in this respect the theory of physiological selection is in just the same position as that of natural selection; it is enough for both that the needful variations are provided, without its being incumbent on either to explain the causes which in all cases underlie them. Neither are we concerned with the degrees of sterility which the variation in question may in any particular case supply. For whether the degree of sterility with the parent form be originally great or small, the result of it will be in the long run the same; the only difference will be that in the latter case a greater number of generations would be required in order to separate the varietal from the parent form. [In other words, homogamy due to such physiological isolation is cumulative.]

"The object of this paper being that of furnishing a general answer to criticisms on the hypothesis of physiological selection, I will not occupy space by detailing evidence of that hypothesis, further than is needful for the object just mentioned.* This evidence abundantly proves that the particular kind of variation which the theory of physiological selection requires does take place, (*a*) in individuals, (*b*) in races, and (*c*) in species. Next, the evidence goes on to show that the facts of organic nature are such as they ought to be, supposing it true that this variation has played any considerable part in the differentiation of specific types. In particular, it is shown that the general association between the one primary, or relatively constant, specific distinction (mutual sterility), and the innumerable secondary, or relatively variable, distinctions (slight morphological changes which may effect *any* parts of *any* organisms), of itself indicates that the former has been the original condition to the occurrence of the latter, in all cases where free intercrossing has not been otherwise prevented. For even in cases where the secondary distinctions may be supposed to have induced the primary,—or where morphological changes taking place in other parts of an organic type have exercised a reflex influence on the reproductive system, such that the changed organism is no longer fertile with its unchanged parent form,—even in such cases the theory of physiological selection is available to explain the association in question. For even in these

* The evidence, so far as yet published, may be read by any one who cares to purchase the original paper, which can be obtained from the Linnean Society in a separate form.

cases, notwithstanding that the secondary changes are historically the prior changes, they still depend for their preservation on the principles of physiological selection. These principles have, in all such cases, *selected* the particular kinds of secondary distinction which have proved themselves capable of so reacting on the reproductive system as to bring about the primary distinction, and thus to protect themselves against the destructive power of free intercrossing."

Now for Mr. Wallace's criticism of this theory, as presented in his recently published work on "Darwinism."

Briefly put, he furnishes a numerical calculation, showing that when "the physiological peculiarity is not correlated with any external differences of form or color, or with inherent peculiarities of likes or dislikes leading to any choice as to pairing," even when so large a proportion as ten per cent. of the exceptional variety arises every year in the midst of the species, "it is unable to increase its numbers much above its starting-point, and remains wholly dependent on the continued renewal of the variety for its existence beyond a few years."

This, it must be observed, is a reproduction of the criticism which I answered in 1888; but, as Mr. Wallace ignores that answer, I must now repeat it.

The criticism does not dispute the fact that the required variation in the way of "selective sterility" occurs. Indeed, Mr. Wallace allows that it certainly must be of very general occurrence as between incipient species (or pronounced varieties in a state of nature), seeing that it is of such general occurrence as between allied species when fully differentiated as such. In other words, this variation in the way of selective sterility must be recognised as a very general *fact*, even if it be not regarded as a *condition*, or a *cause*, of specific differentiation. Which is merely another way of saying that the particular variation which is required by the theory in question is admittedly a variation which does occur; and occurs, moreover, in very frequent association with the origin of a new species. But Mr. Wallace's objection to regarding this variation as itself a cause of (or condition to) the origin of a new species is, as we have seen, that the changes must always be greatly against the similar variations of the opposite sexes meeting—i. e., of the "phys-

iological complements" happening to pair. Now, I have already shown, in the *Nineteenth Century* of three years ago, that this criticism can only apply to species the sexes of which unite for every birth; but as Mr. Wallace continues to ignore this important consideration, I will now present it in somewhat more detail.

In considering any "supplementary theory" of the origin of species, it is obviously absurd to disregard the realm of organic nature as a whole, and to fasten attention exclusively upon the part of it where a particular difficulty against the theory may be supposed to lie. As will presently be shown, Mr. Wallace is entirely mistaken in supposing that his particular difficulty does lie against the theory in any part of organic nature; but, even if this could not have been shown, it would not have followed that the theory of physiological selection is inapplicable to *all* the classes of the animal and vegetable kingdoms, because it is taken to be inapplicable to *some*. One might just as well argue against Mr. Darwin's theory of sexual selection on the ground that it cannot be held to apply to the coloration and the sculpture of shells. If either sexual selection or physiological selection were put forward as an *exclusive* theory of the origin of *all* species, this kind of argument would, of course, have been valid; but as the matter actually stands, it is largely irrelevant.

I say *largely* irrelevant, because I do not dispute that there is this much force in it. If the theory of physiological selection can be proved inapplicable to Birds and Mammals (which are the only classes that Mr. Wallace considers in connection with it), its applicability to all other divisions, both of the animal and vegetable kingdoms, would be rendered doubtful; seeing that the process of species-formation appears to have been *everywhere* more or less associated with the occurrence of "selective sterility"; and hence, if in any division of organic nature it could be shown that selective sterility cannot possibly have been a cause of specific differentiation, we might well doubt whether it has been such a cause elsewhere—just as we may doubt whether sexual selection has been a cause of the brilliant colors of birds and butterflies, because we know, that it cannot have been a cause of the equally brilliant

colors of corals and flowers. But, as far as physiological selection is concerned, no such question can arise, as I will presently proceed to show.

First of all, however, it is desirable briefly to indicate the strength of this theory in the parts of organic nature where Mr. Wallace's sole criticism cannot possibly be held to apply—viz., the larger part of the vegetable kingdom, where ovules are fertilised either by insects or by the wind. Here the phenomena of "prepotency" are highly suggestive—not to say, in my opinion, virtually demonstrative—of physiological selection; seeing that, as Mr. Darwin remarks in another connexion:

"There can be no doubt that if the pollen of all these species (of Compositae) could be simultaneously or successively placed on the stigma of any one species, this one would elect with unerring certainty its own pollen. This elective capacity is all the more wonderful, as it must have been acquired since the many species of this great group of plants branched off from a common progenitor."*

Darwin is here speaking of elective affinity in its more fully developed form, as this so often obtains between fully differentiated species. But we meet with all lower degrees of its development—sometimes between "incipient species," or varieties, and at other times between closely allied species. It is then known as "prepotency" of the pollen belonging to the same variety, or species, over the pollen of the other variety or species, when both sets of pollen are applied to the same stigma. This is one form of what I have called physiological selection, and in my view it serves to explain why it is that hybrids between closely allied forms growing on common areas (whether they be called "species" or "constant varieties") are so comparatively rare in nature, even in cases where there is no difficulty in producing hybrids artificially by an intentional exclusion of the pollen belonging to the same form. And I allude to these facts in the present connexion for two reasons. In the first place, they serve to show how entirely irrelevant Mr. Wallace's whole criticism is to the vegetable kingdom, as well as to the majority of aquatic animals. In the next place, they serve to

* *Variation*, etc., Vol. ii.

show how entirely unwarranted is his statement, that "we have at present no evidence whatever" in support of my belief that a physiological incompatibility may affect a whole race or strain. Not only have we the multitudinous cases of prepotency, where the incompatibility is *partial* (or in course of becoming, as Mr. Darwin says in the above quotation, "acquired"); but we have also multitudinous cases where the incompatibility has become *absolute*, both as between closely allied species, and even as between varieties of the same species growing on common areas—as M. Jordan has experimentally proved. Therefore in the above remark we have but an additional example of Mr. Wallace's entire forgetfulness, in the present connexion, of any organisms other than those which belong to the class of Birds or of Mammals.*

Turning, then, to the only parts of organic nature where his criticism can even appear to apply, I have here the sufficiently easy task of proving, that this appearance of application arises wholly and entirely out of Mr. Wallace's misapprehension of the theory against which the criticism is directed. In other words, he is not criticising the theory of physiological selection at all, but merely his own travesty of it. For, as repeatedly stated in my original paper, and again reiterated three years ago in the *Nineteenth Century*, it constitutes no part of my theory to deny the co-operation of other forms of segregate breeding or homogamy. On the contrary, I have always insisted—and Mr. Gulick has proved by calculation—that the more efficient the co-operation of other forms of homogamy, the *greater* must become the importance of the physiological form. Yet, as I trust has already been made fully apparent,

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* It seems scarcely worth while to add that Mr. Wallace is doubly mistaken where he says, "Mr. Romanes's theory of Physiological Selection—which assumes sterility or infertility between first crosses as the fundamental fact in the origin of species—does not accord with the general phenomena of hybridism in nature." In the first place, as shown above, "infertility between the first crosses" is by no means out of accord with "the general phenomena of hybridism in nature"—seeing that all degrees of such infertility, from the slightest perceptible amount of prepotency up to absolute sterility, are of the most general occurrence in nature. In the second place, why Mr. Wallace should suppose that in my view physiological selection can only act as regards first crosses, and not also as regards hybrid progeny, I have no means of surmising.

the whole of Mr. Wallace's criticism (even as regards Birds and Mammals) goes upon the supposition that Mr. Gulick and I believe that, if physiological selection ever acts in any case *at all*, it must necessarily act *alone*. For reasons afterwards to be given, I do indeed believe that in some cases it may act alone (in this differing from Mr. Gulick); but, clearly, whether or not there are any such cases, is a question quite distinct from that touching the validity of a criticism which attributes to our theory the absurd dogma, that segregate breeding which arises from physiological isolation, can never be associated with segregate breeding that may arise from any other form of isolation. And that the whole of Mr. Wallace's criticism collapses when once this correction has been supplied, is proved most effectually by the curious fact that, *after having himself supplied the correction, he reproduces our theory as an original one of his own.* How he can have supposed that I did not entertain the possibility of physiological selection being associated with natural selection, "psychological selection," or any other known form of isolation (excepting only the geographical), I am quite at a loss to understand; seeing that from end to end of my paper I continually refer to such association—especially as regards natural selection. And, if possible, I am still less able to understand Mr. Wallace's carelessness in this connection with reference to Mr. Gulick's paper; because there the belief is repeatedly and most clearly expressed, that without such association, "segregate fecundity" *can never act at all*—which is precisely the theory which Mr. Wallace proceeds to elaborate on his own account.

It is now time to show, by means of quotations, how unequivocal and complete is Mr. Wallace's adoption of our theory:

"The simplest case to consider will be that in which two forms or varieties of a species, occupying an extensive area, are in process of adaptation to somewhat different modes of life within the same area. If these two forms freely intercross with each other, and produce mongrel offspring which are quite fertile *inter se*, then the further differentiation of the forms into two distinct species will be retarded, or perhaps entirely prevented; for the offspring of the crossed unions will be, perhaps, more vigorous on account of the cross, although less perfectly adapted to the conditions of existence than either of the pure breeds; and this would cer-

tainly establish a powerful antagonistic influence to the further differentiation of the two forms.

Now, let us suppose that a partial sterility of the hybrids between the two forms arises, in correlation with the different modes of life and the slight external or internal peculiarities that exist between them, both of which we have seen to be real causes of infertility. The result will be that, even if the hybrids between the two forms are still freely produced, these hybrids will not themselves increase so rapidly as the two pure forms; and as these latter are, by the terms of the problem, better suited to their conditions of life than are the hybrids between them, they will not only increase more rapidly, but will also tend to supplant the hybrids altogether whenever the struggle for existence becomes exceptionally severe. Thus, the more complete the sterility of the hybrids the more rapidly will they die out and leave the two parent forms pure. Hence it will follow that, *if there is greater infertility between the two forms in one part of the area than the other, these forms will be kept more pure wherever this greater infertility prevails*, will therefore have an advantage at each recurring period of severe struggle for existence, and will thus ultimately supplant the less infertile or completely fertile forms that may exist in other portions of the area. It thus appears that, in such a case as here supposed, natural selection would preserve those portions of the two breeds which were most infertile with each other, or whose hybrid offspring were most infertile; and would, therefore, if variations in fertility continued to arise, tend to increase that infertility. It must particularly be noted that this effect would result, not by the preservation of the infertile variations on account of their infertility, but by the inferiority of the hybrid offspring, both as being fewer in numbers, less able to continue their race, and less adapted to the conditions of existence than either of the pure forms. It is this inferiority of the hybrid offspring that is the essential point; and as the number of these hybrids will be permanently less where the infertility is greatest, therefore those portions of the two forms in which infertility is greatest will have the advantage, and will ultimately survive in the struggle for existence."

We have here a full acceptance of the theory of physiological selection. For it is represented, as Mr. Gulick and I have represented, that, if "two forms or varieties" occupying a common area are to undergo further differentiation at the hands of natural selection, it becomes a highly favoring condition to the process that some degree of segregate fecundity should arise (if it has not already arisen) between these two forms or varieties; seeing that "if these two forms freely intercross with each other, and produce mongrel offspring which are quite fertile *inter se*, then the further differentiation of the forms into two distinct species will be retarded, or perhaps entirely prevented." Here the importance of

segregate fecundity, or physiological selection, as a factor in the differentiation of specific types on common areas is *fully recognised;* and the *only* respect in which Mr. Wallace alleges that his view of the matter differs from the view of Mr. Gulick and myself, is in drawing special attention to the part which is played by the infertility, or other "inferiority," of the mongrels. But clearly, this infertility, or other inferiority, of the mongrels, in all cases where it occurs, *is part and parcel of the segregate fecundity of the parent forms.* Whether the segregate fecundity has reference to first crosses alone, or likewise to second crosses, it is segregate fecundity all the same; and the only difference is that for the same degree of segregate fecundity in first crosses, the process of physiological selection will become the more effective in proportion to the degree in which the infertility extends also to second crosses. But I think it is very doubtful whether such infertility (or inferiority) on the part of mongrels can react upon the sexual system of their parent forms, so as directly to increase whatever degree of segregate fecundity may have already arisen between these forms. Does the high sterility of mules and mutes, for instance, tend to diminish the degree of fertility that obtains between horses and asses? The only way in which even an absolute degree of sterility (or other inferiority) on the part of mongrels or hybrids may clearly be seen to operate in this direction, is as a negative condition; not as an active cause. In the proportion that mongrels are impotent with one another, they will not so much compete with their parent forms for food, etc.; and in the proportion that they are impotent with their parent forms, they will not counteract any tendency which the latter may continue to develop in the direction of a still further segregation. If the mongrels are fully vigorous and fully fertile, both *inter se* and with their parent forms, the effect will be to retard, if not altogether to prevent, any further progress of physiological separation between the parent forms; because the free intercrossing of the mongrels with one another, and also with their parent forms, will be continually supplying progeny in which the physiological peculiarity is either attenuated or altogether abolished. But this is quite a different thing from supposing that infertility (or inferiority) of the

mongrels can react upon the generative system of the parent forms, so as to increase in them the physiological peculiarity on which their segregate breeding depends: infertility (or inferiority) of the mongrels is but a negative condition which favors the preservation of further degrees of this segregate breeding, if such further degrees should be induced by any other causes.

Now, it does not appear that Mr. Wallace has clearly perceived this important distinction, because he throughout speaks of "this inferiority of the hybrid offspring as the essential point." Obviously, however, the essential point is the physiological variation in the parent forms, i. e., the original occurrence and subsequent development of infertility between the first crosses. Granting to Mr. Wallace, for the sake of argument, that this development could not proceed at all, were it not for the inferiority of the mongrels; still the inferiority of the mongrels need not be the cause of this development. Therefore it is most incorrect to say, "it must be particularly noted that this effect (i. e., increase of infertility between the parent forms) would result, not by the preservation of the infertile variations on account of their infertility, but by the inferiority of the hybrid offspring." "This effect" must be due to causes which act upon the generative systems of the parent forms, even though such causes might be *counteracted* by the *withdrawal* of the negative condition in question.

I trust, then, it has now been rendered sufficiently clear that, no matter how infertile the hybrid progeny may become, and no matter at how great a disadvantage they may thus (or otherwise) be placed in their struggle for existence with the parent varieties, it is not apparent that their infertility (or their extinction) can ever become the cause of a further increase of infertility arising between their parent forms. Consequently, although this is the cause assigned by Mr. Wallace, when he comes to "the essential point" of showing how it is to act so as to increase cross-sterility between the parent forms, he naïvely substitutes the sentence which I have printed in italics—which assumes a "greater infertility between the two forms" as arising through any other causes that we may choose to suppose. The very thing that his entire argument professes to

explain (i. e., the rise and development of cross-sterility between the parent varieties) is slipped in as granted, or given by other causes than those which are said to explain it.*

Having thus endeavored to make it as clear as I can, that the causes of segregate fecundity, both in its origin and subsequent "increase," must be causes acting on the physiology of the segregating forms themselves, and not the effects of these causes in the character of their mongrel offspring; I must next comment upon the extraordinary idea which underlies the whole of Mr. Wallace's exposition, and which in one place he expressly states. This extraordinary idea is that the theory of physiological selection, as held both by Mr. Gulick and myself, takes no cognizance of the possible effects of cross-sterility in leading to infertility or inferiority on the

* The only conceivable way in which infertility (or other inferiority) of hybrids could react on the sexual system of their parent forms, is one which Mr. Wallace appears to have missed: at all events he has nowhere stated it. This way is as follows. Suppose A and B to be two varieties which produce comparatively infertile hybrids. In the proportion that the hybrids are infertile, or otherwise inferior, it must be a disadvantage to both varieties for individuals belonging to one to cross with individuals belonging to the other, because by so doing they are wasting their time and their energy in propagating comparatively poor offspring—thereby failing to impress their characters on the next generation as effectually as they might have done by pairing homogamously. Hence, those individuals which do pair homogamously will leave a larger number—or better quality—of offspring to the next generation, than is left by those which fail to pair homogamously. Hence, also, in the course of many generations a selective premium will be set on the homogamous pairing, A plus A, B plus B, whether such pairing be due to a sexual instinct or to a sexual incompatibility. For example, if horses and asses were to occupy the same area for a sufficient length of time, it is conceivable that the instinct which many horses now present of preferring asses to their own kind would become obsolete; because the horses or mares which have such an instinct would always fail to leave progeny that could transmit it, while such would not be the case with the horses and mares which preferred to pair homogamously, and so it might be if a physiological instead of a psychological character were concerned. But now observe, if this consideration were adduced, I should not be concerned to dispute it. For, even if such a principle of segregation does obtain, to what category does the principle belong? Clearly it does not belong to natural selection, inasmuch as a mere failure to impress individual characters on the next generation is not a matter of life and death in the struggle for existence. But, no less clearly, it does belong to physiological selection; and therefore, if it be an active principle in nature, it is an additional cause of segregate fecundity in first crosses. Moreover, such a principle, if it ever acts, presupposes some considerable degree of sexual differentiation as already given by some other cause.

part of mongrel progeny. I call this an extraordinary idea, because it appears to me most extraordinary that Mr. Wallace can have read our papers, and then have supposed that he was adding anything to our theory by arguing the points which he does argue in the above quotation. When once this argument is correctly stated, it amounts, as we have just seen, to nothing more than pointing out how a segregate fecundity of first crosses will have a better chance of increasing, if the mongrel progeny are infertile or inferior. But surely this goes without saying; or, if it be said, let it be added that physiological selection, when it thus extends to second crosses, is really or ultimately due to physiological selection as regards the first crosses. If the segregate fecundity of the first crosses is of such a kind, that, besides tending to a physiological isolation of the parent forms, it leads to inferiority of the mongrel progeny; this is merely a further expression of the segregate fecundity in question. Its effect is that of so far extinguishing the influence of progeny in the subsequent history of parental segregation: therefore, its effect is just the same as if, owing to a somewhat higher degree of segregate fertility in the first instance (i. e., in the first crosses), a proportionately smaller number of mongrel offspring had been produced at all. In either case the result (physiological differentiation) is equally due to causes acting on the sexual system of the parent forms; and whether this effect is brought about by a suppression of progeny as to their numbers alone, or likewise as to their efficiency, is quite immaterial to the theory of physiological selection. Which shows once more how wide of the mark is Mr. Wallace's statement, that "the inferiority of the hybrid offspring is the essential point" in any process of sexual segregation. The "essential point" must always be the original occurrence and subsequent "preservation of the infertile variations" arising between the parent forms, whether these variations are only in the direction of producing a smaller number of mongrels, or also in that of suppressing their efficiency when produced.

Upon the whole, then, it is surely the oddest of misconceptions on Mr. Wallace's part that has led him to present the above-quoted "argument" as a substitute for the theory of physiological selec-

tion. As far as it goes, and as far as it is sound, it is the theory of physiological selection pure and simple—neither adding to, nor detracting from it one iota. Nevertheless, the "argument" has not yet gone far enough to embody some of the other elements of the theory. Therefore I will now continue the quotation :

"The differentiation of the two forms into distinct species, with the increase of infertility between them, would be greatly assisted by two other important factors in the problem. It has already been shown that, with each modification of form and habits, and especially with modifications of color, there arises a disinclination of the two forms to pair together ; and this would produce an amount of isolation which would greatly assist the specialisation of the forms in adaptation to their different conditions of life. Again, evidence has been adduced that change of conditions or of mode of life is a potent cause of disturbance of the reproductive system, and, consequently, of infertility. We may therefore assume that, as the two forms adopted more and more different modes of life, and perhaps acquired also decided peculiarities of form and coloration, the infertility between them would increase or become more general ; and as we have seen that every such increase of infertility would give that portion of the species in which it arose an advantage over the remaining portions in which the two varieties were more fertile together, all this induced infertility would maintain itself, and still further increase the general infertility between the two forms of the species."

Here we perceive that Mr. Wallace, after having adopted the theory of physiological selection in its main elements, next proceeds to supplement that theory (as Mr. Gulick and myself had previously done), by showing how greatly the principle of physiological selection must be assisted by any association with other forms of isolation, or segregate breeding. The only difference between Mr. Wallace and ourselves here is, that while he instances but three or four forms of segregate breeding (or homogamy) with which physiological selection may be associated, I had previously considered several others in addition to these, while Mr. Gulick had gone into the matter still more exhaustively. Therefore, here as elsewhere, I can only account for the character of Mr. Wallace's criticism by supposing that he read our papers inattentively in the first instance, and was afterwards influenced by "unconscious memory" in his subsequent cogitations upon the problem of cross-sterility.

And now, finally, in order to show this still more completely, I

may quote the whole paragraph which concludes his long discussion of that problem:

> The preceding argument, it will be seen, depends entirely upon the assumption that some amount of infertility characterises the distinct varieties which are in process of differentiation into species; and it may be objected that of such infertility there is no proof. This is admitted; but it is urged that facts have been adduced which render such infertility probable, at least in some cases, and this is all that is required. It is by no means necessary that all varieties should exhibit incipient infertility, but only some varieties; for we know that, of the innumerable varieties that occur, but few become developed into distinct species; and it may be that the absence of infertility, to obviate the effects of intercrossing, is one of the usual causes of their failure. All I have attempted to show is, that when incipient infertility does occur in correlation with other varietal differences, that infertility can be, and in fact must be, increased by natural selection; and this, it appears to me, is a decided step in advance in the solution of the problem."

This serves to convey a very accurate summary of the whole "preceding argument"; and it is likewise an admirably concise restatement of the theory of physiological selection. The only points in it to which I object—considered as an epitome of my own paper—are as follows. First, Mr. Wallace has not proved quite so good an advocate as he might have proved, had he looked more closely into the evidence "that some amount of infertility characterises the distinct varieties which are in process of differentiation into species." For although he says, properly enough, that his "preceding argument"— i. e., the theory of physiological selection—"depends entirely upon the assumption" that such infertility does "characterise distinct varieties which are in process of differentiation into species"; still he is wrong in saying it is "admitted" that in favor of this assumption there is "no proof" beyond what he has himself "urged" in the way of "facts which render such infertility probable": there are many other facts which not only render such infertility probable, but prove it to be actual. Secondly, although I quite agree with Mr. Wallace in holding that natural selection must often, as I said in my original paper, "co-operate" with physiological selection, still I must point out that the particular form of segregate breeding to which he here alludes is not natural selection at all; but (as explained in the foot-note to page 15) physiological selection pure and simple

My objections, however, with regard to these two points have no reference to the validity of Mr. Wallace's restatement of my views; and the fact that this restatement has been given with the most incomprehensible unconsciousness that it is a restatement, does not appear to me to detract from the significance of the argumentative suicide in which his entire criticism is thus found to terminate.*

With the self-destruction of this criticism I am left without any other to answer; and I should not have occupied so much space in dealing with this one, were it not that the high estimation in which Mr. Wallace is so deservedly held by all other naturalists is calculated to render almost incredible the peculiar position to which he has eventually gravitated with reference to my views—professing hostility on the one hand, while reproducing them as original on the other. The misunderstanding of my ideas which this state of matters represents, might have led me to wonder whether I could

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*I am the more surprised that Mr. Wallace did not perceive his almost complete adoption of my views in this latest publication of his own, because I had previously had occasion to point out a partial adoption of them in an earlier publication of his on the same subject. The following is what I said upon that occasion—viz., in the *Nineteenth Century*, January, 1888:

"One very obvious and probably frequent instance of what may be termed collective variation in the reproductive system—or a variation due to a common cause acting on many individuals simultaneously—is actually quoted from my paper by Mr. Wallace himself, namely, changes in the season of flowering or of pairing, which insure that any section of a species so affected shall be fertile only within itself. Collective variation of this kind may be directly due to the incidence of some common cause, such as changed conditions of life with respect to food, climate, station, etc.; or, as in the case of bud-variation, it may be due to a single "sport" affecting all the blossoms growing upon the same branch. But besides such direct action of a common cause, it is easy to see that natural selection, use and disuse, etc., by operating in the production of organic changes elsewhere, may not unfrequently react on the sexual system indirectly, and so induce the sexual change required in a number of individuals simultaneously."

Now, in his *Darwinism*, Mr. Wallace again reproduces this instance of "physiological selection," without even yet appearing to perceive that both in my original paper upon the subject and in my answer to his criticism as above quoted, I adduce this particular instance of physiological selection as a typical one. Therefore, when he now says:—"Another mode of isolation is brought about by the variety—either owing to habits, climate, or constitutional change—breeding at a slightly different time from the parent species: this is known to produce complete isolation in the case of many varieties of plants": he is merely restating what I have repeatedly given as an unquestionable case of physiological selection.

possibly have rendered my meaning more clear in the first instance, were it not that this misunderstanding extends in an even greater measure to Mr. Gulick's paper than it does to mine. For seeing that the whole criticism is founded on the erroneous idea that our theory supposes physiological selection always to act alone, the misconception becomes positively ludicrous in its relation to Mr. Gulick's views; seeing that, as previously stated, Mr. Gulick not only agrees with me in holding that physiological selection must be greatly fortified by being associated with any other form of homogamy, but even goes so far as to agree with Mr. Wallace that, unless it is so fortified, it can never act at all. So that, as far as physiological selection is concerned, Mr. Gulick's theory is precisely identical with that of Mr. Wallace, and differs from his statement of it only in recognising a number of forms of homogamy, in addition to natural selection, sexual selection, etc., with which the principle of physiological selection may be associated.

GEORGE J. ROMANES.

THE IMMORTALITY OF INFUSORIA.

THE ingenious hypothesis that Weismann, the eminent Freiburg professor, promulgated several years ago regarding the vitality of all unicellular beings, but more especially of the Protozoans, is undoubtedly widely known. Weismann maintained that the Protozoans were distinguished from the Metazoans, or organisms composed of a number of cells, by the curious property they possessed of exemption from decay and death. The Protozoans exhibited, in the very words of the German savant, an instance of potential immortality;* that is to say, a natural physiological death did not exist for them; if they perished, it was by accident or chance, extraneous to the laws of their organisation. A great many authors have written upon this subject since Weismann, either in support of his opinion, or in refutation of it, and of them we may mention principally Goette,† Minot,‡ and M. Delboeuf.§

It is to be observed that this idea of potential immortality is not the exclusive property of Weismann. We find it clearly indicated by Ehrenberg. And, moreover, as Bütschli remarks, it is so natural that it ought to occur of itself to the mind of every tolerably thoughtful observer that has devoted his time to the study of the biology of these minute creatures.‖

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* *Ueber die Dauer des Lebens.* Jena, 1882.

† *Ueber den Ursprung des Todes*, 1883.

‡ *La Mort et l'Individualité. (Bulletin Scientifique du Nord*, 1884–85.)

§ *La Matière Brute et la Matière Vivante.* Paris 1887.

‖ *Gedanken über Leben und Tod (Zoologische Anzeige*, Vol. v, 1882), cited by M. Maupas in *Multiplication des Infusoires Ciliés—Arch. de Zool. Experimen.*, No. 2, 1888.

Weismann founded his theory in part upon metaphysical, or at least theoretical, considerations, which we deem it useless to discuss at this point. But it is also supported by observed facts, and these facts it will be profitable to recapitulate from the very onset. The idea of the immortality of Infusoria occurs naturally to the mind when one examines with care what happens when an Infusorian reproduces. We know that the reproduction consists in a bipartition of the body of the animal, and that consequently the parent does not die but lives in the two products of its bipartition. In subsequent multiplications the same phenomenon is always observed to occur, so that the entire substance of the parent is found preserved and living in the individuals to which it gives birth. This process Weismann expressed by the emphatic statement: In multiplication by division there are no corpses. It is wholly otherwise with the metazoans, and the reason of this fundamental difference is easily explained by the comparison of the organisation of the body of a metazoan with that of a protozoan. Whereas the protozoan is represented by a single cell that comprehends all the vital functions, the functions of reproduction as well as those of nutrition and relation, the metazoan, on the other hand, is composed of an aggregation, of a colony of distinct cells, among which a division of labor has been effected varying in complexity with the height that the animal has attained in the classificatory scale. It results from this division of labor that in the metazoan certain cells only—those namely which are called the sexual cells—are entrusted with the office of the conservation of the species, while the various other cells are more especially adapted to the conservation of the individual. When a metazoan reproduces, the sexual cells alone enter into activity, and after having suffered various modifications, the principal one of which is fecundation, the sexual cells become the seat of numerous segmentations that go to constitute a new animal distinct from the one that gave it birth. The moment the parent individual ceases to be blended with the individual it produces, it can perish without imperilling the conservation of the species, and thus it is that death appears in the animal kingdom as a logical consequence of division of labor.

We also know that Weismann, in developing these interesting facts, was led with many other naturalists to establish the doctrine that every metazoan may be considered as made up of two entirely distinct groups of cells: 1) of somatic cells, which represent the individual, and which are invested with the care of its nourishment, its sense-mechanism, its movements, and all the functions that have to do with individual life; and 2) of sexual cells, charged with the office of the maintenance of the species in time. Whereas the somatic cells are destined to perish, the sexual cells on the contrary, multiplying by division after the mode of the reproduction of micro-organisms, represent the protozoan type, which is immortal; and, by the intermediary agency of the fecundated ovum, the sexual cells pass from generation to generation, thus forming a material bond between successive generations. Though we have to succumb to death, there is at least a portion of us that ought not to die, from the fact that it is transmittible to our descendants. Naegeli expressed this idea in a felicitous form, when he compared the species to a creeping branch that sent out at successive points annual buds. The buds, which die, are the individuals—that is the somatic group; while the branch that survives after the death of the buds, and which represents the species, is the system of sexual cells. Weismann, finally, has described the same phenomenon by the expression 'continuity of the germinative plasm.'

A great many discussions have arisen with regard to this germinative plasm; for everything touches upon this domain, and Weismann has conceived a theory that endeavors to explain not only the phenomenon of fecundation, but also that of heredity. I cannot mention here the numerous works upon this subject, and refer the inquisitive reader for a knowledge of the same to a series of lectures by Professor Balbiani that I have epitomized in the *Revue Philosophique* for December 1889.

The theory of the potential immortality of the Infusoria has recently been attacked by M. Maupas, whose observations tend to show that natural death, caused by senescence, does obtain among the Infusoria, and that it is comparable in many points of view to the natural death of the metazoans. The researches of M. Maupas

upon the multiplication of ciliate Infusoria are of a relatively recent date, having appeared in 1888 in Vol. VI. of the "Archives de Zoologie Expérimentale."

It is scarcely necessary to say that the ciliate Infusoria can propagate without previous coition. The agamic mode of reproduction appears to be almost the same, save in a few details, as that which follows coition. It consists in a bipartition or division of the body of the animal along a plan usually perpendicular to the grand axis of the nucleus, and it is a matter of course that that element takes part in the division at the same time with the protoplasm. These phenomena of reproduction it is possible to study upon a grand scale by supplying Infusoria kept in captivity with abundance of nourishment. The easiest way is to produce a putrid fermentation by means of vegetable fragments crushed and macerated in water. The Infusoria contained in this water find abundant food furnished by the bacteria developed in it, and they therefore multiply in great numbers. By means of appropriate methods of treatment and isolation we are able to follow the phenomenon step by step and to examine what the animal actually becomes after each agamic bipartition.

Weismann, when he laid the foundation of his theory of the immortality of Infusoria, supposed that the development of the Infusoria by bipartition had no limits and could be prolonged indefinitely without injury to the vitality of the protoplasm. Various authors had already made observations which were directly in contradiction with this view. M. Balbiani, in 1860, in a communication entitled, "Observations and Experiments upon the Phenomena of Fissiparous Reproduction among Ciliate Infusoria,"* concludes thus: "one of the most important questions . . . . has been to determine whether this mode of propagation is really unlimited, or whether, after being continued throughout a greater or lesser number of generations, it becomes by degrees enfeebled, finally to disappear completely. . . . . We have established that this mode of propagation has its limits, and ends invariably in one of the

* *C. R. Acad. des Sciences.* Vol. iv. p. 1191.

three following ways: either by the *natural* and almost simultaneous *death* of all the individuals belonging to the same cycle, or by the recurrence of sexual generation leading to the termination of one of the cycles and the commencement of a new cycle, or finally by the phenomenon of encystment, which in fact brings about only a momentary interruption of the process of reproduction by fissiparity." M. Balbiani, apropos of this subject, has called attention to a curious observation made by the celebrated Danish micrographer O. F. Müller, who lived in the last century. Müller had observed that the individuals of any one species most ordinarily found in coition were almost all of small stature But he took them for the young individuals of the species. Now these individuals of small size are in reality the oldest, that is to say, they are the ones that are the result of a great number of successive bipartitions; and it is to be observed, that, in a great many species, in proportion as the bipartitions increase the size of the Infusoria decreases.

In fine, without further concerning ourselves with the history of this question, we see that according to M. Balbiani the agamic reproduction of Infusoria has its limits, and that, when coition, that is to say fecundation, does not intervene, it may terminate by the natural death of the individuals or in certain species by encystment.

The chief new element contained in the recent researches of M. Maupas, which were made twenty years after the date of the preceding investigations, consists in his study of the various phenomena of senescence that the Infusoria after a long series of bipartitions present. M. Maupas has established that there exists in the Infusoria no part, no element, that by itself and by its own faculties, can live and be maintained indefinitely. The first outward sign of degeneration is manifested in a reduction of size. The individuals, according as the number of generations increases, become smaller and smaller. With *Stylonichia pustulata*, which in the normal state measures one hundred and sixty μ, the size of the body is seen gradually to fall to one hundred and thirty-five, one hundred and ten, seventy, and even to forty μ. When the effects of senescence

become marked, the animal in its external organs undergoes atrophies and new and more profound degenerations. In *Stylonichia pustulata* the vibratile buccal apparatus becomes gradually atrophied and partly disappears, and in all species the body is reduced and becomes more and more shrunken, assuming forms and contours very far removed from the specific type. The degeneration of the nuclear apparatus at once begins. The first modifications affect the accessory or attendant nucleus, a cut of which will be found at page 118 of my work on Micro-organisms,* and of which the principal function seems to be the maintenance and conservation of the species, and which, therefore, ought to be considered as the real substratum of the immortal plasma. Far from enjoying the attribute of eternal youth, the accessory nucleus seems on the contrary to be affected with a weakness greater and more premature than that of the other parts of the organism. In fact it is this organ that is first atrophied and that disappears under the influence of senile degenerescence. Then, in its turn, the principal nucleus is affected. It takes, according to the species, a different form. Now it diminishes in volume, now it divides into two minute bodies that assume irregular contours, and at other times it assumes a ribbon-like shape.

It is interesting to note that even after the disappearance of the accessory nucleus, whenever the principal nucleus still subsists, the Infusoria continue to live and divide by fission. This life, says M. Maupas, has some features of abnormality about it, since it has become wholly purposeless. The animals still live an individual life, but they are dead to the life of the species.†

In concluding upon this point, I must mention the reservations that may be entertained with regard to the exactitude of the preceding observations and the value of the method employed in their attainment. A competent critic has remarked that it is difficult to assume that nine hundred and thirty-five specimens of the genus *Stylonichia* could find the gases necessary for the support of life,

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* English translation by The Open Court Pub. Co., Chicago. Longmans & Co., London. † Page 262.

seeing that M. Maupas kept them under the same stage where they only had at their disposal a mass of water equal to one hundred cubic millemetres; and it may thus be asked whether the phenomena of senescence produced under these special conditions were not pathological. This criticism seems to be especially strengthened by the fact, that according to M. Maupas, the animalcula placed beneath the shield, all finally congregate at the edge of the preparation, evidently to seek there the air of which they are in need.

If we took our stand, however, upon the facts before cited we could conclude without hesitation that the celebrated thesis of Weismann regarding the immortality of the ciliate Infusoria had been overthrown. But the phenomena are not presented with this simplicity. When the vitality of the Infusoria has become weakened by a considerable number of agamic reproductions, and the animalcule is upon the point of dying a natural death, a new biological phenomenon can intervene, rejuvenating the animal and rendering it capable of reproducing itself anew for a long series of generations. That phenomenon is fecundation.

* * *

In our work upon Micro-Organisms we have spoken at length of the material process of fecundation in ciliate Infusoria, and of the phenomena preliminary to it, following as our guide the observations of Balbiani, Gruber, Bütschli, and Engelmann. It will be necessary to recur here to that subject and to supplement our preceding exposition with some important details. Moreover, recent researches, added to other older ones, afford us interesting information with regard to the conditions and determining causes of conjugation and also of the significance of fecundation itself.

We have seen above that according to M. Balbiani an active period of agamic bipartition in Infusoria can terminate in a period of conjugation; a circumstance which produces in effect a cyclical alternation between agamic generations and a sex-generation. The very word cycle is used in the observations of M. Balbiani. M. Maupas elevated this observation of M. Balbiani to the rank of a method; using, in order to procure the great number of coitions necessary for his investigations, the following process. He

placed the Infusoria in water in which he had produced a putrid fermentation. The Infusoria, thanks to the abundance of the nutriment developed in great numbers. While thus swarming they were lifted out with a drop of water, which was kept upon the stage in a moist chamber. The Infusoria there continued to grow larger and multiply ; but by reason of their great numbers it was not long before they exhausted the food brought with them in the drop of water. When the last remains of their nutriment had disappeared they were seen in the majority of cases to seek each other and to copulate.

According to M. Maupas, it is not solely the weakness produced by a series of bipartitions, but, in addition to that and more particularly, the scarcity of food, that excites in the ciliate Infusoria the conjugal appetite. The epidemics of conjugation of which the authors speak, are not otherwise explainable. M. Maupas even says, that when a number of pairs are about to copulate, it is only necessary to give them food to put an end to their conjugation. Scarcity, that author further remarks, ought evidently not to modify in any essential the internal organic state of the Infusoria in question ; no more indeed than the opposed condition, that is, an abundance of rich food (page 403 of his memoir). But in the first case they copulate without any ado ; in the second, they refuse to do so entirely. Rich alimentation deadens the conjugal appetite ; fasting, on the contrary awakens and excites it. There exists moreover, according to the author last mentioned, in ciliate Infusoria, a particular period beyond which fecund coitions cannot take place. It is what he calls the period of karyogamic maturity. Thus, in *Leucophrys*, for example, fecund coitions are observed to take place only after the three-hundredth generation. Before that time the Infusoria may be placed in all the other conditions favorable to copulation, without being seen to contract a single union. On the other hand, beyond that time, a period extends in which numerous coitions are obtained. Although, indeed, the cyclical alternation of agamic generations and copulations is indisputable, further researches are still necessary to obtain a thorough knowledge of the extent of these cycles. It is certain that their duration varies in the

different species, and perhaps, in conditions as yet imperfectly known, may in any one species be considerably abridged.

We are now come to the preliminaries of copulation. We have described them in our work, making use of the observations of Balbiani, Gruber, and of Engelmann, some of which we found confirmed by Bütschli. M. Maupas, who has recently again taken up this question, believes he has discovered in his predecessors, or rather in the observations of M. Balbiani, grave errors. I shall transcribe the passage in question: "When a numerous group of Infusoria of the same species are found in the conditions that determine copulation, these animalcula abandon themselves to certain movements, and exhibit an agitation the significance of which has been much exaggerated. Balbiani, who in fact always seeks analogies with the higher animals, has given us an animated description of these movements, to which a poetical imagination has contributed at least as much as exact and scientific observation. This description has met with a most favorable reception among certain philosophers and psychologists who have taken up with it in the belief that they could thereby reveal in microzoans the rudiments of the instincts and psychic faculties of higher-organized beings. As there is very much inexactitude and exaggeration in all that, it is time to calm this enthusiasm and to refer the facts and their explanation to some more exact criterion." (Page 413.)

I believe it useless to occupy my time in dealing with the aggressive tone that this author has seen fit to assume towards me, and which seems to be habitual with him when he criticises the works of people with whom he does not agree. I shall carefully examine his observations and seek to derive from them some profit, to the improvement and correction of my work upon the Psychic Life of Micro-Organisms, if it is true that I have committed the grave errors of which he speaks. Besides, the question of the preliminaries of copulation is so interesting in itself that I have no fear of turning to it a second time.

It is necessary, here, clearly to distinguish two things: the facts and their explanations. In that which concerns observed facts, the errors that M. Maupas endeavors to point out in the

descriptions of M. Balbiani appear to me to be capable of a reduction to a matter of so little significance—admitting that it comes at all from error—that if I had not been apprised of it, I should have regarded the researches of the first author as a confirmation in most details of those of the second. It is to be observed, in fact, that M. Maupas gives almost the same description that Balbiani does of the movements of *Paramœcium aurelia*. "I have followed animals of that species a number of times," he says, "during the preparations for copulation. They exhibit at that moment a very great agitation. They are seen to go and come, rapidly changing their direction. They approach and throw themselves against their congeners, halt in front of them, feel them an instant with their cilia, then leave them, assume the most varied positions, and, finally, when two individuals equally ready for union chance to meet each other, they face about by their anterior extremities so that the two bodies come together and join, with the exception of the posterior extremities, along their whole extent; the union is thus definitively effected."

Up to this point, let it be observed, our author's description is but a paraphrase of that of M. Balbiani, which we have given on page 69 of our work; and a simple comparison of the two suffices to prove this. The divergences of fact extend, as it seems to me, to the two following points only: The duration of the preliminaries, and the existence of an epidemic of copulation. M. Maupas thinks that the movements in question never last very long, at the most a quarter of or half an hour among individuals that have arrived at karyogamic maturity. Whereas M. Balbiani has observed these same movements last for several days. I do not know which of these two observations is the more exact; in fact, I do not think it necessary to choose between them, since both may be exact, the duration of the phenomenon generally being dependent upon conditions subject to great change, while M. Maupas himself remarks that the ciliate Infusoria in the variability of all their biological phenomena are veritable thermometers of a very great sensibility. However that may be, whether the movements that precede copulation in *Paramœcium* last a quarter of an hour, half an hour, or several

days, that fact does not change their real character. The second divergence relates to the epidemics of copulation in the case of *Paramœcium aurelia;* observed by M. Balbiani and denied by M. Maupas. "All the individuals of a group," says M. Maupas, "are never found simultaneously in this condition. Hence the tentative preliminaries of copulation, that fail in their object and end in the individuals going to seek elsewhere another partner." I confess, I do not understand this statement, involving, as it does, M. Maupas in a contradiction; for two pages before this he speaks of the mode of the appearance of copulation as in the epidemic form. All observers, he says, that have occupied themselves with this phenomenon, state that it is suddenly developed in the little aquariums in which the animals are contained, and very rapidly becomes general (page 41).

To this then the divergences of fact are reduced—a matter entirely insignificant; and I believe it useless to dwell upon it longer. The question of interpretation remains. I shall also say a few words with reference to this, although the disagreement is at bottom not much more serious.

We have seen, that, according to M. Maupas, the Infusoria do not seek each other and copulate until after a fast of considerable duration caused by exhaustion of the store of food in the medium in which they live. The author concludes from this that scarcity of food is the sole and real cause of the great agitation in which they are then seen. "When an infusion thickly populated begins to get exhausted, the animalcula congregate together, always forming those whitish cloud-spots that we have described as the prelude to copulation. . . . Not until afterwards do the actual movements of copulation occur, which never last very long." Accordingly, there is first an agitation produced by hunger, and only in consequence of that are the preliminaries of copulation brought about. Admitting this interpretation as exact, which is indeed a question that I reserve, I conclude that M. Maupas completely accepts the facts of the preliminaries of copulation, distinguishing them from other phenomena that precede them. He says, moreover, and these are his own words, that the sexual impulse does indeed exist in these little creatures. Unquestionably he is right in adding that this sexual impulse pre-

sents in the ciliate Infusoria manifestations much simpler than in the higher animals, and that it is otherwise in accord with their simplicity of organisation. That is evident, and no one I believe has ever maintained the contrary.

Finally, the author refuses to admit that the sexual manifestations of the Infusoria can be compared with the phenomena of *rut*. "Rut," he says, "the external and psychic manifestations of which we know with any degree of exactitude only in mammals, is a reflex phenomenon concomitant with and consecutive to the maturation of the Graafian vesicles. It is therefore an especial phenomenon peculiar to the females of the highest group of the animal series. Males are not subject to rut, but are always ready to experience the sexual excitation whenever they find themselves in contact with females that are fallen into that condition" (page 414).

Naturalists will certainly read with great astonishment this definition of rut, which is wholly new and personal to the author. Hitherto the word rut has not been reserved for mammals; it has been applied to all classes of animals, even to the lowest, and Duvernoy, for example, has devoted an article to the rut of zoöphytes.

We now come, following the chronological order of the phenomena, to the material processes of conjugation, otherwise called fecundation, in the ciliate Infusoria. It is needless to take up in its entirety a question that we have already examined, and which will be found treated of at page 65 of our work. But it is certainly interesting to dwell upon the general significance of the question of fecundation. It is known that all ciliate Infusoria, excepting some species such as *Opalina*, a parasitic infusory of the frog, exhibit in their protoplasm two kinds of nuclear corpuscles. First a nucleus, a principal nucleus, which the authors designate by the names endoplast and macronucleus; this element is in some ways comparable to the nucleus of the cells of tissues. Besides this the ciliate Infusoria possess a smaller nuclear element than the former, called by the authors nucleolus, or endoplastule, or attendant nucleus, or finally micronucleus. This micronucleus comprises in its evolution the internal phenomena of the process of conjugation. The principal nucleus plays in the process but an accessory rôle,

for it is a wasted element destined to be replaced by a nucleus of new formation; when it undergoes more or less complete elimination. The attendant nucleus passes through a series of complicated modifications which vary much in detail for each species. First, there are stages of division destined to prepare the way for the elimination of the used up corpuscles. But the most important fact is that at a given moment there exists in the protoplasm of each ciliate Infusory in conjugation, two corpuscles derived from the nucleus; then an exchange is effected between the two individuals in copulation; each transmits to the other one of the corpuscles, which copulates with the remaining corpuscle left in the interior of the body. These two little nuclei that play parts so different are, according to M. Maupas, completely identical with one another and do not show the least difference either in form, volume, or structure. "In the twelve species in which I have succeeded in closely studying these organs," says that author, "I have always seen them act with the most perfect similitude under the influence of coloring and fixitive re-agents." Nevertheless, in view of the future condition of these two elements, M. Maupas is led to give them the very significant names of male pronucleus and female pronucleus. The female pronucleus is the one that remains immobile in the body of the parent gamete; while the other, the male, is exchanged and passes into the body of the other gamete.

In what does the real nature of the copulation of these two pronuclei consist? Does it consist in a fusion of the elements mentioned, or, indeed, do the latter preserve their original independence and autonomy in the midst of the new mixed nucleus, standing in juxtaposition with and moving in and about one another? This is the question that M. Maupas immediately proceeded to examine. The recent researches of M. Ed. Van Beneden upon the internal mechanism of fecundation in *Ascaris megalocephala* are well known. We have published in the *Revue Philosophique*, following M. Balbiani, a résumé of these important investigations, and we may be permitted to reproduce here a few passages therefrom; for nothing is more interesting than the evolution followed by our ideas in that which concerns fecundation.

The notions that were formed of this phenomenon only took definite and precise shape from the time when the existence of the two elements of fecundation, the spermatozoön and the ovum, could be established. It was at first believed that the spermatozoön impregnated the ovum by the exercise of a purely physical action—an action of contact and influence. But observation demonstrated that something more took place, namely, an actual conjugation, a union, a blending of the spermatozoön and the ovule. A further step was made in 1875, when it was discovered, in studying the ova of Echinoderms, that but one single part of the ovule, the germinative vesicle, conjugated with but one part of the spermatozoön, namely the head, and that since these two elements have each the value of a nucleus, fecundation consisted in the conjugation of two nuclei. But there was still an element of obscurity in this idea, simple as it was. If the nuclei were vesicles like soap-bubbles they might burst, the one within the other; but the nucleus contains a great number of differentiated elements, the chromatic reticulated substance, the nuclear substance, the nucleoli, etc.: what becomes of all these elements during the conjugation of the two nuclei? In 1881, Flemming made a new advance in the question. He determined more precisely the nature of the fusion of the two pronuclei, establishing that it consisted in the blending of their chromatic substances. This he observed in the ova of the Echinoderms. According to the very recent works of M. Van Beneden upon *Ascaris megalocephala*, the great nematoid of the horse, there is no fusion whatever between the two pronuclei. They always remain distinct. Each passes through, separately, all the phases of karyokinesis, when the fecundated ovum divides. In this connection the recent observations of M. Balbiani confirm the opinion of Van Beneden, who had been sharply attacked by Carnoy and Zacharias. First, in each of the two pronuclei each reticulate substance is observed to present the initial phases of karyokinesis; the net-works form into a skein that contracts and thickens; the ribbon-like body thus formed divides into two segments, which bend so as to form acute-angled crooks or loops. There are thus produced two loops in the male pronucleus, and two in the female pronucleus. Then the two

male loops approach the two female loops in a manner such that a sort of star is formed with eight branches turned towards the periphery of the ovum (nuclear or equatorial disk). Then the fecundated ovum begins to divide into segments. Now at every new equatorial stage of the subsequent divisions of the ovum these four loops are seen to reappear in such a manner that fusion never takes place between the male element and the female element. Each of the four primitive chromatic loops divides by longitudinal division into two secondary loops, whence result two equatorial semi-disks, each formed of four secondary loops, of which two come from the male pronucleus and two from the female pronucleus. Each of the two new nuclei contains therefore a certain number of male and female chromatic loops, and consequently presents an hermaphroditic constitution.

For Van Beneden, therefore, fecundation consists essentially in the presence in the ovum of two nuclei, one male and one female. The conjugation of the two nuclei is a phenomenon of no importance; it may take place, or it may not. The physiological signification of fecundation is a process of rejuvenation, in which the ovum replaces its old male element with a new male element, the spermatozoön.*

M. Maupas remarks that the pronuclei of the Infusoria by reason of their complicated structures do not admit of these difficult investigations. Nevertheless he mentions the fact that these pronuclei are, in the elements mentioned, composed of two distinct substances, hyaloplasm and chromatin. He puts forth the opinion that the hyaloplasm constitutes an accessory portion, and that the chromatin is endowed with the fecundative properties. Which means that in certain ciliate Infusoria the male pronucleus at the moment of its migration is composed solely of chromatin. Finally, M. Maupas arrives at the conclusion that the supreme end of fecundationis the renovation, the reconstitution, of a rejuvenated nucleus formed by the copulation of two fecundative nuclei having distinct origins

* *Recherches sur la Maturation de l'Œuf, etc. Arch. de Biol. Vol. iv. 1883. Nouvelles Recherches sur la Fécondation. Bul. de l'Acad. Roy. des Sciences de Belgique, 3 Série, Vol. xiv. 1887.*

and of which the chromatin elements represent the essential part (page 434).

* * *

It is now time to return a moment to the theory of Weismann and to see if it has not been shaken by the new data that we have just placed before the reader. Accepting the results of the experiments of M. Maupas, who, as a matter of fact, has arrived at the same conclusions as M. Balbiani, we are led to the admission that when a ciliate Infusorian multiplies by agamic division a great number of times, the offspring that appear after from 50 to 100 bipartitions has not the same physiological value as its original progenitor; and that agamic multiplication ends in exhaustion and in natural death. But it must, on the other hand, be taken into account that this process of senescence is counteracted by that of conjugation, which consists in a nuclear renovation; and since the substance, the protoplasm, of the rejuvenated individual escapes death, a new argument might be found in these last mentioned facts for the theory of the immortality of Infusoria.

The question is, at bottom, whether the individual after conjugation is identically the same as before conjugation, or whether it constitutes a new animal. In that the solution rests. Now, the new element that the individual acquires by the act of conjugation is the male pronucleus of its partner. In addition it loses the greater part of its old accessory nucleus and the whole of its old principal nucleus. In return, by way of compensation, it preserves the integrity of its protoplasm and of its other organs. M. Gruber believes that physical identity persists in spite of these modifications. M. Maupas maintains the contrary.

It seems to us that a question of this character does not admit of a satisfactory solution, and this opinion will be shared by all who have considered the idea of physical identity. It is a notion obscure, uncertain, and full of contradictions. We have formed it because it answers our practical needs. But it is certainly evident that it corresponds to no well defined external phenomenon. In fact, we understand by physical identity the constant reunion of certain elements in a certain order. If the order of these elements is very

slightly modified, or if a very small number of these elements is replaced by others, we do not hesitate to say that the physical identity in question has not been altered by these insignificant modifications. If, on the other hand, the order has been almost totally destroyed, if the greater portion of the elements has been renewed, we should, on the contrary, say that the identity of the thing in question had been lost in these alterations and that a new object had replaced the old. Replace a stone in a house and the latter remains the same house; rebuild the house upon a new plan and with different materials retaining very little of the first construction, and it is a different house. But between these two extreme cases there is a whole series of possible intermediate changes, and we are not able to establish clearly by any exterior mark the point where physical identity ends. This is a matter of personal estimation; I might even say of caprice; and all the discussions raised upon these questions appear to me wholly idle.

I believe, accordingly, that the thesis of Weismann regarding the immortality of Infusoria eludes a direct refutation. It is neither confirmed nor overturned by observed facts.

ALFRED BINET.

ON THE MATERIAL RELATIONS OF SEX IN HUMAN SOCIETY.

MUCH interest is displayed at present in the development of woman, both as to her personal characteristics, and in her relations to her surroundings in human society. It is justly said that the civilisation of a nation may be measured by the degree of humanity displayed by its men towards its women. This is for the reason that, since women are the weaker sex, man has only ethical reasons for self-restraint in his treatment of her. Nowhere is the sex-interest under better ethical control than in the United States; and it is in this country also that we hear the most of reforms which are necessary in order that woman may attain a further development, and assume a higher position in relation to the state. This being the case, it is extremely important that the foundation facts, or in other words the necessary natural conditions, under which the sexes co-operate in society, should be fully understood. That they are not understood, or that they are intentionally ignored in some quarters, is evident to any one who reads the current literature of the subject.

The relation of the male man to his environment involves the usual struggle for existence more or less active. His *pièce de resistance* is the mineral and vegetable world and its atmosphere, and his antagonist is his fellow man. The former generally yields more or less abundantly to his solicitations. What he gets from his fellow man is acquired through the necessities of the latter, and the benefit may be mutual, or it may be all on one side. His best friend may unconsciously and unintentionally, in the regular order

of trade, reduce him to beggary, or compel him, as an alternative, to emigrate to a distant land. Such results are more frequent as population increases. To maintain himself against the destructive forces of nature, such as cold, heat, rains, tempests, fires, blights, etc., is his necessary occupation. If he pursue a profession, or if he be in trade, he must supply the actual needs of his fellow man, and beware that competition and monopoly do not deprive him of all return for his labor.

Woman, considered by herself, is subject to identical conditions. Her needs are the same and her environment is the same. But she is not so well endowed as man to supply the one or to meet the other. Her disabilities are of two kinds, physical and mental. The physical are: first, inferior muscular strength, and secondly, childbearing. The latter means more or less incompetence for active work at monthly periods, or several months of gestation and lactation, and some years of care of children. The mental disabilities are: first, inferior power of mental co-ordination; and secondly, greater emotional sensibility, which interferes more or less with rational action.*

From these facts it is evident that, were woman of the same sex as man, that is, were she simply another kind of man, she would soon be eliminated from the earth under the operation of the ordinary law of the survival of the fittest. This need not be through any agencies different from those now actually in operation among men under the circumstances of peaceful trade. And such is often the actual history of male men who possess marked feminine characteristics. It does not follow from this, that some women might not sustain themselves apart from men, in agriculture, trade, and the professions. This is especially possible where the struggle is not very severe; but in the cases which exist, few are really independent of male assistance, which has furnished the capital, either of cleared land, money, or as an appointing power. The general result, as above stated, is self-evident from the facts.

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* This is, of course, only true where the sexes of the same subspecies or race are compared.

Remedies for this disability are frequently proposed. A higher education, while an unquestioned advantage, does not remove it. The ballot would only result in removing any disability of an artificial character which might exist, but could not effect those imposed by nature. There is no method of human contrivance by which the natural difficulty may be overcome.

But Nature has supplied a most effective remedy. Woman not being of the same sex as man, supplies a necessity which is almost universal, so that she is placed, if she exercise reasonable care, in a position better than that of man in relation to the struggle for existence. The antagonist of man, his fellow man, is eliminated from the list of the antagonists of woman, and that is an advantage which cannot be overestimated. Not only is man removed from the field as a competitor, but he becomes an active helper in resisting the forces of nature. More than this, he is willing under the circumstances, to divide with her what he extracts from both man and nature. Were these the only benefits that woman derives from man they would constitute a sufficient reason for the usual preference which she displays for his protection, rather than for a life of independence. But she is herself possessed of a sex-interest which is satisfied by such a relation. Not only this, but her love of children constitutes a further inducement, which is highly effective in bringing about her customary relation with man.

It is self-evident then that any system which looks to a career for women independent of man, such as man pursues, is abnormal, and injurious to her interests.

The support and protection given by man to woman is then clearly rendered as an equivalent for the services she renders him in the capacity of a wife. It is universally implied, if not distinctly stated in the contract between them, that she shall not be the wife of some other man, and that the children she bears shall be also those of the male party to the contract, or the husband. It is not necessary that any such obligation should be entered into by the man, for the obvious reason that he does not bear children. If the woman violates this contract, the man is under no moral or legal obligation to support her. If the man has other wives he does not

thereby forfeit protection and support of the wife, since she has none to offer him. This general fact would not prevent a woman possessed of wealth who supported a husband, from withdrawing such support in case he should become polygamous. But such a situation is so exceptional as to deserve but a passing notice in a consideration of the whole question.

It is frequently insisted that responsibility of man to woman in the matter of monogamic relations, is ethically the same as that of woman to man. This has not been the view of mankind generally, and it is distinctly negatived by the facts in the case. The marriage relation is clearly a contract in which the consideration on one side is support and protection, and the consideration on the other is monogamic wifehood, or the definite paternity of children and their care and education. The immediate reason why particular men and women marry particular women and men, is, or ought to be, love and affection; but these admirable sentiments, are the offspring of natural conditions of sex, without which woman, and especially man, would not marry at all. And these natural conditions are clearly satisfied by the maintainance of the contract as above described. In order to further enforce this position I merely refer to the well-known fact that man cannot commit marital infidelity in the same sense that woman can, on account of his physical diversity. His unfaithfulness introduces no new blood into a family, and makes no defect in the inheritance, as does the same act on the part of the woman. The woman is in a position of trust, precisely like the responsible officers of a bank. It is in the power of both to defraud those who trust them. Hence it is that woman has been always held to stricter account in this matter than man, and always must be. For this reason the jealousy displayed by husbands is more justifiable than that displayed by wives; and the result of marital infidelity on the part of wives is usually more disastrous to the offending parties. It is in consequence of these facts that there exists some difference in the ethical feelings of the sexes on this question. It is undoubtedly true that there are more women willing to live in polygamy than men willing to live in polyandry, in spite of the verbal objections that women make to such a system in modern times.

I do not now refer to promiscuity, in which the affections are in no wise concerned. In this everyway inferior relation, men are the most numerous offenders. It is for the reasons above stated that women are more monogamous in their tendencies than men. Not only does the question of support and protection during child-bearing and at other times make it more to their interest to be so, but they are more inclined to attach themselves to particular persons than men, on account of their superior affectional endowments. This is an inevitable result of their occupation in the family and with the family for countless ages, and is as much a product of their evolution, as is the superior rationality and self-control of the male sex.

The above picture may seem to some persons of progressive views on "the woman question" somewhat onesided. But the relation of man to the contract is not yet completely described. Meanwhile I refer to a sentiment attributed to a single woman, a teacher in a girls' school, I believe near Pittsburg, quoted by a lady writer in the *Popular Science Monthly*, several months ago. This lady, believing that the strength of the emotional elements of character in women constitutes a disability, and stands in the way of her so-called equality with man, had resolved to suppress that part of her nature, and to live a life free from its consequences. She hoped thus to attain a condition not only equal, but superior to that of men, and was prepared to teach the girls committed to her care that this was their duty to themselves and to the world. For this reason she would not marry. The fallacy in this reasoning consists in the omission of certain important premises. The principal one of these is, that neither she nor any other woman can exterminate in a life-time, the heritage which woman has derived from the entire history of the human species, to say nothing of the inheritance from the ancestors of mankind, where the same traits exist in the diminished ratio of a smaller mentality. In order to accomplish this change in female character, it would be necessary that the same course should be pursued by many successive generations of women; how many, it is impossible to calculate. This would require that such women should marry, which is what the lady whose views are referred to above, desired to avoid. In fact it is typical women

who will marry, and typical women will be therefore produced to the end of time, unless some new system of sex relations shall be introduced.

It is sometimes suggested that a change in intersex relations is desirable in order to effect a fuller emancipation of women from present conditions. With the remark in passing, that the natural restraints imposed by the present marriage system on woman are not greater than those imposed on man, although different, we may refer to the alternative arrangement which has been sometimes adopted. This is that woman should be free from all obligation to fidelity to any particular man, and that man should be free from the obligation to support any particular woman. In other words it is sometimes proposed that we return to the primitive state of human society. Such a system has descended to us from ancient times, and it only needs to be mentioned to satisfy us that woman is the loser by it to a degree that is disastrous to the interests of society in every respect. It is only a being devoid of the developed traits of womanhood who could succeed in a polyandrous career, since she must renounce the pleasures of family life, even if she is exceptionally able to accumulate the means of support for her self and children in later years.

A second alternative, that woman may secure the support of one man, while her marital relations are polyandrous, is an impossible dream of the imagination. This could be only possible under the condition that the child-bearing sex should be the stronger sex, and fully capable of self-support and self-protection; a condition which is not found in mankind.

A third alternative is the communistic relation where the state supports women and children, without inquiry as to parentage, and without reference to the monogamic or promiscuous relation of the sexes. Such a system, could it continue long enough, would result in the breaking up of the sentiment of conjugal affection which now characterises our race, and the destruction of marital fidelity. The question is whether or not this system would be preferable to that of monogamic marriage above described. As it is a proposition for the amelioration of the present condition of women, the decision

should rest with them. The women of the white race would probably declare against it by a very large majority, were a vote to be taken. This vote would be, however, largely influenced by custom, and not by a deliberate conclusion derived from experience. Since experience of such system cannot be had at present, we are compelled to rely on such knowledge as we possess in the premises.

It may be safely assumed that the monogamic tendency is constitutional with the majority of women. In spite of curiosity and other inducements, the idea of love for a single person is deeply ingrained in her nature. It is an ideal to be realised somehow and at some time, and anything short of it is a disaster only to be endured through some irresistible necessity. No normal woman would hazard the risks to person and property involved in indefinite matrimonial relations. The idea of the family becomes the more fixed in proportion as it is realised in actual experience. In spite of pessimists and unfortunates, the mutual love of man and woman is a sentiment deeply seated in the nature of both. Its strength is attested by the enormous popularity of the literature of which it forms the theme, and of the drama where its history and vicissitudes are depicted. Men and women who underrate its power, or who attempt to resist its effects, are like dead leaves before the winds. Would men and women be satisfied with a system which should place these affections in constant suspense, and which should afford no safeguard for the protection of inexperience, or defense against the temporary effects of superficial attractions and repulsions? I suspect not, for more would be lost than gained by such possibilities. Relief from unfortunate connections is certainly proper, but this can be had in such a way as to render it certain that the best interests of both parties are subserved, by a system of time contracts of marriage, such as I crudely suggested in *The Open Court* for November 1888. But the emotions of sex cannot be safely left without safeguards derived from the experience of mankind. This is not only on account of the force of these passions themselves, but because of the material necessities which are so intimately involved with them. The element of paternal interest will have to be eliminated from the man, and of conjugal fidelity from the woman be-

fore a communal system can be possible. And the absence of these traits is only characteristic of some of the lower races of men at the present time. Evolution has not weakened, but has greatly strengthened them, and it is not likely that our race will go backward in this respect.

Of course it may be asserted that this evolution has taken the wrong direction, and is not an improvement. I think the contrary may be shown to be true. The paternal instinct is as important to the adolescent stages of man as the maternal is for the period of infancy. Paternity stimulates the man to labor for the support and education of his children, and for their general well-being. Without such support many would die, reach an imperfect development, or become feeble members of society. The fidelity of the woman develops the same trait in man, and it stimulates him to the greatest exertions to secure her well-being also. Such forces as these cannot be withdrawn from society without infinite loss. It is the knowledge that this is *my* wife and that these are *my* children, that sustains more than half of human industry. With a communistic system these inducements would be withdrawn, and mankind would sink into comparative apathy, were it possible for the system to endure long enough.

It is evident that monogamic and polygamic systems are the only ones possible to modern society. The polygamic requires little notice because the general equality in numbers of the sexes deprives it of foundation. It is only possible where women are in excess, and where they are willing to sustain it. No man who is successfully married is likely to incur the additional obligations which it imposes. It may be therefore dismissed from notice with the further remark that it is not on the other hand deserving of the obloquy cast upon it by certain persons who are evidently "compounding for sins they have a mind to by damning those they're not inclined to."

The monogamic relation having been defined in the preceding paragraphs I recur to some of its obligations. I have spoken of the infidelity of woman as of a higher degree of criminality than that of man, and have shown the basis of justice on which this general sen-

timent rests. But it must not be forgotten that while he who hires a murderer, and he who receives stolen goods does not commit the actual crime, he is highly culpable, and shares in the condemnation which should follow it. In the case of the marital infidelity of the woman, he may be the greater criminal of the two, as the instigator to a deed which would not have been otherwise even suggested. In any case his folly is extraordinary, as he takes his life in his hands, and risks that of his partner; for men are wont to preserve their family rights by summary process. It would be incredible that such risks should be taken were it not that history and contemporary literature offer many examples. The few cases where palliating circumstances could be claimed would chiefly occur in countries where divorce laws do not exist.

The advantages to woman, arising from the monogamic relation, are then, support and protection, and undivided affection if she deserve it, together with the satisfaction of the conjugal and maternal instincts. In order to secure these advantages she must pursue a course towards her husband in some degree comparable to that by which her husband secures the confidence and esteem of his fellow man. Faithfulness in adhering to contracts, and personal complaisance cover much of the ground. As regards the man, he must see to it, that he does nothing that tends to the disintegration of the family relations of other men. The ill disguised laudation of the infidelity of wives which is so prominent in French literature, is a mark of a low civilisation, and it rightly excites the disgust of all men who have any respect for their own rights. It looks as though certain French literature had been written by boys. Men who are responsible for such invasion of the rights of others, cannot expect better treatment themselves, and they must not be surprised if they are repaid in their own coin. While the preservation of the rights of the marriage contract lies primarily with woman, for natural reasons; man is held by his fellow man to a strict accountability, and he attempts any invasion of them at his personal peril.

The principles above laid down are those out of which have grown our laws on the subject. Some women and men appear to think them unjust to women. It is true that in some respects,

woman is at a disadvantage. This disadvantage is, however, of natural origin and cannot be overcome. On the other hand, she has a full equivalent in the advantages which she also derives from the natural order of things. The result is that there is no real cause of complaint, unless it be that sometimes the gallantry of men towards women whom they do not know, leads them to do injustice to man in cases of dispute. And here is an advantage to women which is an offset to the injustice which they sometimes experience from the same source. The correction of these faults is a part of the process of ethical development which is going on in human society. And perhaps the most effective agency in this development is the relation of the members of the family to each other, where affection takes the place of force, since it is the source of our deepest pleasures and our severest pains.

E. D. Cope.

THE ANALYSIS OF THE SENSATIONS.

ANTIMETAPHYSICAL.

I.

THE great results that physical research in the last centuries has achieved, not only in its own domain, but also, by the assistance it has afforded, in the domain of other sciences, have brought it about that physical ways of thinking and physical methods of procedure have everywhere attained to especial prominence, and that the greatest expectations are associated with their employment. In conformity with this drift of modern research the physiology of the senses, gradually leaving the paths that had been entered upon by men like Goethe, Schopenhauer, and others, but especially with the greatest success by Johannes Müller, has also almost exclusively assumed a physical character. This tendency must appear to us as not exactly the proper and the desirable one, when we reflect that physics despite its considerable development nevertheless constitutes but a *portion* of a greater collective body of knowledge, and that it is incompetent with its limited intellectual methods, created for especial and limited purposes, to exhaust the entire material of the province now under consideration. However, without renouncing the support of the science of physics, it is possible for the physiology of the senses not only to continue its own special development, but also to afford physical science itself valuable assistance. The following simple considerations will serve to illustrate this relation.

II.

Colors, sounds, temperatures, pressures, spaces, times, and the like, are united with one another in the most manifold ways; and to these are joined moods of mind, feelings, and wills. Out of this complication, that which is relatively the more fixed and the more permanent stands prominently forth, engraves itself in the memory, and expresses itself in language. As relatively more permanent appear, first, *complexes* of colors, sounds, pressures, and so forth, that are connected in time and space, that therefore receive special names, and are designated as *bodies*. Such complexes are by no means absolutely permanent.

My table is now brightly and now darkly lighted. It may be warmer or colder. It may receive an ink stain. One of its legs may get broken. It can be repaired, polished, and replaced part for part. But for me, amid all, it remains the table at which I daily write.

My friend can put on a different coat. His countenance can assume a serious or joyful expression. The complexion of his face, under the effects of light or of emotion, can change. His shape can be altered by a movement, or can be permanently transformed. But the sum total of the permanent, as compared with gradual alterations of this kind, always remains so great, that the latter vanish. It is the same friend with whom I take my daily walk.

My coat can receive a stain, a tear. The very manner of my expression indicates that the gist of the thing is a quantity of permanency, to which the new element is added and from which that which is lacking is subsequently deducted.

Our greater intimacy with this quantity of permanency, and its preponderance as contrasted with the changeable, impel us to the partly instinctive, partly voluntary and conscious economy of mental representation and designation which is expressed in ordinary thought and speech. That which has been *once* perceptually represented receives *a single* designation, *a single* name.

As relatively permanent, is exhibited, further, that complex of memories, moods, and feelings, joined to a particular body (the

human body), which is denominated the "I" or "Ego." I can be engaged with this subject or with that subject, I can be quiet or animated, excited or ill-humoured. Yet—pathological cases not considered—enough that is permanent remains to recognise the ego as the same. Moreover, the ego also is only of relative permanency.

* * *

The apparent permanency of the ego consists pre-eminently in the fact of its *continuity*, and in its slow change. The many thoughts and plans of yesterday that are continued to-day, and of which our environment in waking hours continually reminds us (and therefore in dreams the ego can be very indistinct, doubled, or entirely wanting), and the little habits that are unconsciously and involuntarily kept up for longer periods of time, constitute the fundamental root of the ego. There can hardly be greater differences in the ego of different people, than occur in the course of years in *one* person. When I recall to-day my early youth, I should take the boy that I then was, with the exception of a few single features, for a different person, did not the chain of memories that make up my personality now lie before me. Many a treatise that I myself wrote twenty years ago, now makes upon me a very strange impression. The very gradual character of the changes of the body also contributes to the permanency of the ego, but in a much less degree than people imagine. Such things are much less analysed and noticed than the intellectual and the moral ego. Individually, personally, people have a very poor knowledge of themselves.

Once, when a young man, I espied in the street a face in profile that was very displeasing and repulsive to me. I was not a little taken aback when a moment afterwards I found that it was my own, which, in passing by a place where mirrors were sold, I had perceived reflected from two mirrors that stood at the proper inclination to each other.

Not long ago, after a trying railway journey by night, being much fatigued, I got into an omnibus just as another gentleman appeared at the other end. "What degenerated pedagogue is that, who has just entered," thought I. It was myself: opposite me

hung a large mirror. My ordinary dress, accordingly, was more familiar to me than my travelling attire.

The ego is as little absolutely permanent as bodies. That which we so greatly fear in death, the annihilation of our permanency, actually occurs in life in abundant measure. That which is most valued by us, remains preserved in countless copies, or, in cases of exceptional excellence, as a rule preserves itself. In the best human being, however, there are individual traits the loss of which neither he himself nor others need regret. Indeed, at times, death, viewed as liberation from individuality, can even become a pleasant thought.

* * *

After the first survey has been obtained, by the formation of the concepts of substance, "body" "ego" (matter, soul), the will is impelled to a more exact examination of the *changes* that take place in this relatively permanent existence. The changeable element in bodies and in the ego, indeed, is the very thing that moves the will. Now, for the first time, do the constituent elements of the complex stand forth as properties of the same. A fruit is sweet; but it can also be bitter. So, too, other fruits can be sweet. The red color that is sought is found in many bodies. The neighborhood of some bodies is pleasant, that of others unpleasant. Thus, gradually, do different complexes appear to be composed of common constituent elements. The visible, the audible, the tangible, are separated from bodies. The visible is broken up into color and into form. Out of the manifold constitution of colors issue, again, in lesser numbers, certain other constituent elements—the primary colors, and so forth. The complexes are disintegrated into *elements*.

III.

The proper and useful habit of designating that which is permanent by a *single* name, and of comprehending the same in a *single* thought, without analysing at each operation its constituent parts, is liable to come into singular conflict with the tendency to separate these constituent parts. The obscure image formed of the permanent, which does not perceptibly change when one or another constituent part is taken away, appears to be something existent *by itself*.

Inasmuch as it is possible to take away *singly* every constituent part without effecting the capacity of the image formed to *represent* the totality involved, or effecting its subsequent recognition, it is imagined that it is possible to take away *all* these parts and yet have something remaining. Thus arises the monstrous idea of a *thing of itself*, different from, and incognisable with relation to, its "phenomenal" existence.

Thing, body, matter, are nothing apart from this complex of colors, sounds, and so forth—apart from their so-called marks, or characteristics. That Protean, illusory philosophical problem of a *single* independent thing with *many* properties, arises from the misunderstanding of the fact, that extensive comprehension and accurate separation, although both are temporarily justifiable and profitable for a number of purposes, can not and must not be employed *simultaneously*. A body is *single* and unchangeable so long as it is not required to take details into consideration. Thus both the earth and a billiard ball are *spheres* so long as we disregard all minor deviations from the spherical form, and greater exactitude is not necessary. But if we are compelled to carry on investigations in orography or microscopy both bodies cease to be spheres.

IV.

Man possesses in pre-eminence the power to determine arbitrarily and consciously his point of view. He can at one time disregard the most salient features, and immediately afterwards take into account the smallest trifles; now regard a current of electricity as fixed, without consideration of its contents, and now determine the width of a Frauenhofer line in the solar spectrum; he can rise, at will, to the most general abstractions, or bury himself in the minutest particulars. The animal possesses this capacity in a much less degree. It does not assume a point of view, but usually is brought to it by impressions. The baby that does not recognise its father with his hat on, the dog that is perplexed at the new coat of its master, have succumbed in the conflict of points of view. Who has not been thus worsted in similar cases? Even the man of phi-

losophy at times succumbs, as the fantastic problem above referred to, shows.

Indeed, do not certain circumstances actually appear to furnish a justification of that problem? Colors, sounds, the odors of bodies are evanescent. But the tangible part, as a sort of constant, durable nucleus, not easily liable to annihilation, remains behind; appearing as the vehicle of the more fugitive properties annexed to it. Habit firmly affixes our thought to this central nucleus, even where the knowledge has found its way, that seeing, hearing, smelling, and *touching* are intimately akin in character. Added to this, also, comes the fact, that in consequence of the singularly extensive development of mechanical physics a kind of *higher reality* is ascribed to Space and Time than to colors, sounds, and odors. Agreeably to which, the junction in space and time of colors, sounds, and odors appears *more real* than colors, sounds, and odors themselves. The physiology of the senses, however, demonstrates, that spaces and times can with as much justice be termed sensations, as colors and sounds.

V.

Also the ego, as well as the relation of bodies to the ego, occasions the rise of analogous seeming-problems, the character of which may be briefly presented in the following manner.

The complexes of colors, sounds, and so forth, that are commonly called bodies, we shall designate for the sake of simplicity by $A\ B\ C\ldots$; the complex that is known as our own body, and which constitutes a part of the former, we shall call $K\ L\ M\ldots$; the complex composed of volitions, memory-images, and the like, we shall represent by $\alpha\ \beta\ \gamma$. Usually, now, the complex $\alpha\ \beta\ \gamma\ldots K\ L\ M\ldots$ is opposed as ego, to the complex $A\ B\ C\ldots$ regarded as world of substance; sometimes, too, $\alpha\ \beta\ \gamma\ldots$ is comprehended as ego, and $K\ L\ M\ldots A\ B\ C\ldots$ comprehended as world of substance. Now $A\ B\ C\ldots$ first appears as independent of the ego. But this independence is only relative, and gives way before closer inspection. Much, it is true, may change in the complex $\alpha\ \beta\ \gamma\ldots$ without much becoming noticeable in $A\ B\ C\ldots$; and so *vice versa*. But many changes in $\alpha\ \beta\ \gamma\ldots$ pass, by way of changes in $K\ L\ M\ldots$,

over to *A B C . . .*; and *vice versa.* (As, for example, when vivid ideas break forth into acts, or our environment brings about perceptible changes in our body.) At the same time *K L M . . .* appears to be more closely connected with $\alpha\ \beta\ \gamma$ . . . and *A B C . . .* respectively, than the latter do with one another; relations that find their commonest expression in thought and speech.

Closely examined, however, it appears that *A B C . . .* is *always* determined with and by *K L M.* A die, when seen close at hand, looks large; when seen at a distance, small; it looks different with the right eye from what it does with the left; sometimes it appears double; with closed eyes it is invisible. The properties of the same body, therefore, appear as modified by our own body; they appear as conditioned by it. But where, pray, is this *same* body that phenomenally appears so *different?* All that can be said is, that different *A B C . . .* are annexed to different *K L M.**

We see an object with a point *S.* If we touch *S,* that is bring it into relation with our body, we receive a prick. We can see *S,* without feeling the prick. But as soon as we feel the prick we find *S.* The visible point therefore is a *permanent fact* or *nucleus,* to which the prick is annexed, according to circumstances, as something accidental. From the frequency of occurrences analogous to this we ultimately accustom ourselves to regard *all* properties of bodies as "effects" proceeding from permanent persistent nuclei and conveyed to the ego through the mediation of the body; which effects we call *sensations.* By this very operation, however,

* I expressed this thought many years ago (in the *Vierteljahrsschrift für Psychiatrie,* Leipsic and Neuwied, 1868: *Ueber die Abhängigkeit der Netzhautstellen von einander)* as follows: The expressions "sense-deception" and "illusion of the senses" prove, that we are not yet fully conscious, or at least that we have not yet found it necessary to incorporate this consciousness into our ordinary terminology, *that the senses represent things neither wrongly nor correctly.* All that can be truly said of the sensory organs is, that, *under different circumstances they produce different sensations and perceptions.* Since these "circumstances" are of so extremely manifold a character, being partly external (inherent in the objects), partly internal (inherent in the sensory organs), and partly interior (having the seat of their activity in the central organs), it would naturally seem, especially when attention is paid only to external circumstances, that an organ acts differently under like conditions. And it is customary to call the unusual effects, deceptions or illusions.

these imagined nuclei lose their entire sensory content, and become mere mental symbols. The assertion is correct then that the world consists only of our sensations. In which case we have knowledge *only* of sensations, and the assumption of the nuclei mentioned, as well as of a reciprocal action between the same, from which sensations might be supposed originally to proceed, turns out to be wholly idle and superfluous. Such a view can only suit a halting realism or a half-matured philosophic criticism.

VI.

Ordinarily the complex $\alpha\ \beta\ \gamma\ \ldots$ K L M . . . is opposed as ego to the complex $A\ B\ C$. Those elements only of $A\ B\ C\ \ldots$ that more actively alter $\alpha\ \beta\ \gamma\ \ldots$, as a prick, a pain, are we accustomed to comprehend in the ego. Afterwards, however, through observations of the kind above mentioned, it appears that the right to annex $A\ B\ C\ \ldots$ to the ego at no point ceases. In conformity to which the ego can be so extended as ultimately to comprehend the entire world.

* * *

When I say that the table, the tree, and so forth, are sensations of mine, there is contained in this, as contrasted with the method of representation of the ordinary man, an actual extension of my ego. And so, too, upon the emotional side, such extensions actually occur; as for the virtuoso, who possesses as perfect a mastery of his instrument as he does of his own body; for the skilful orator in whom the eyes of an audience converge, and who controls the thoughts of his hearers; for the energetic politician who directs with ease his party; and so on. In conditions of depression, on the other hand, such as nervous people often have to endure, the ego contracts and shrinks. A wall seems to separate it from the world.

* * *

The ego is not sharply defined, its limits are very indefinite, and arbitrarily displaceable. Only by mistaking this, and by unconsciously narrowing these limits, as well also as by enlarging

them, do metaphysical difficulties, in the conflict of points of view, arise.

As soon as we have recognised that the supposed unities "body" and "ego" are only make-shifts for a *provisional* survey and for certain practical ends (that we may apprehend bodies, protect *ourselves* from pain, and so forth), we are obliged, in many thorough-going scientific investigations, to abandon them as insufficient and inappropriate. The opposition between ego and world, sensation (or phenomenon) and thing, then vanishes, and we are brought to deal simply with the *connection and relation of the elements* $\alpha\ \beta\ \gamma\ \ldots\ A\ B\ C\ \ldots\ K\ L\ M\ \ldots$, for which indeed this very opposition was only a partially appropriate, imperfect expression. This connection is nothing more than the combination of those elements with other homologous elements (time and space). This connection science has simply to *accept*, and set itself aright with regard to it, without attempting to explain its existence.

Upon superficial examination the complex $\alpha\ \beta\ \gamma\ \ldots$ appears to consist of much more *evanescent* elements than $A\ B\ C\ \ldots$ and $K\ L\ M\ \ldots$, in which two last the elements appear to be joined with *more stability* and *in a more permanent manner* (being joined to solid nuclei as it were). Although upon closer inspection the elements of all complexes appear as *homologous*, yet even in spite of the recognition of this fact, the ancient notion of an opposition of body and spirit easily creeps in. The spiritualist feels, at times, the difficulty of imparting the necessary solidity to his world of substance created by mind: the materialist is at a loss what to do when called upon to animate and endow with sensation the world of matter. The *monistic* point of view that reflection and reason have evolved, is easily overcast by the older and more powerful instinctive notions.

VII.

The difficulty described is especially felt in the following considerations. In the complex $A\ B\ C\ \ldots$, which we have designated as the material world, we find as part, not only our own body $K\ L\ M\ \ldots$, but also the bodies of other persons (or animals) $K'\ L'\ M'$

. . ., K'' L'' M'' . . ., annexed to which, after the analogy of the complex α β γ . . ., we conceive similar α' β' γ' . . ., α'' β'' γ''. As long as we deal with K' L' M' . . ., we find ourselves in a thoroughly familiar province, at every point sensorially accessible to us. But when we inquire after the sensations or feelings that belong to the body K' L' M' . . ., we no longer find in the province of sense the elements we seek: but we add them in thought. Not only is the domain into which we now enter much less familiar to us, but also the transition to it is relatively unsafe. We are possessed of a feeling as if we were about to plunge into an abyss. They that always pursue this direction of thought and this direction *only*, will never get completely rid of the feeling of insecurity that is very productive as a source of apparent problems.

But we are not limited to this way of reasoning. Let us consider first the reciprocal relation of the elements of the complex A B C . . ., without regarding K L M . . . (our body). Every physical investigation is of this kind. A white bullet falls upon a bell; a sound is heard. The bullet turns yellow before a sodium lamp, red before a lithium lamp. Here the elements (A B C . . .) appear to be connected only *among each other* and to be independent of our body (K L M . . .). But if we take santonine the bullet turns yellow again. If we turn one eye sidewise we see two bullets. If we close our eyes entirely we see no bullet at all. If we sever our auditory nerve no sound is heard. The elements A B C . . ., therefore, are not only connected among each other, but also with K L M. To this extent and to this extent *only* do we call A B C . . . *sensations*, and regard A B C . . . as belonging to the ego. In this way, accordingly, we do not meet with the gap between bodies and sensations before described, between that which is without and that which is within, between the material and the spiritual world.* All elements A B C . . . K L M . . . constitute but *one single* coherent mass, which when any one element in it is disturbed *all* is put in motion; except that a disturbance has a more

* Compare my *Grundlinien der Lehre von den Bewegungsempfindungen*. Leipsic. Engelmann, 1875, p. 54.

extensive and profound action in *K L M* . . ., than in *A B C*. A magnet in our neighborhood disturbs the particles of iron near it; a falling boulder shakes the earth; but the severing of a nerve sets in motion the *entire* system of elements. Quite involuntarily does this relation of things suggest the picture of a viscous mass, at certain places (as in the ego) more firmly coherent than at others.

* * *

When I first came to Vienna from the country, as a boy four or five years of age, and was taken by my father upon the walls of the city's fortifications, I was very much surprised to see people below in the moat and could not understand how, regarded from my point of view, they could have gotten down there; for the thought of another possible way never occurred to me. I remarked the same amazement, once afterwards in life, in the case of a three-year old boy of mine, while taking a walk with him upon the walls about Prague. I recall this feeling to mind every time I engage myself with the reflection above referred to, and I frankly confess that this accidental experience of mine greatly helped to strengthen the opinion upon this point that I adopted a long time ago. The habit of pursuing the same ways in material and psychical things operates to confuse greatly our field of survey. A child forcing its way through a wall in a house in which it has long dwelt, can experience an actual enlargement of its view of the world, and a slight scientific hint can bring much enlightenment.

VIII.

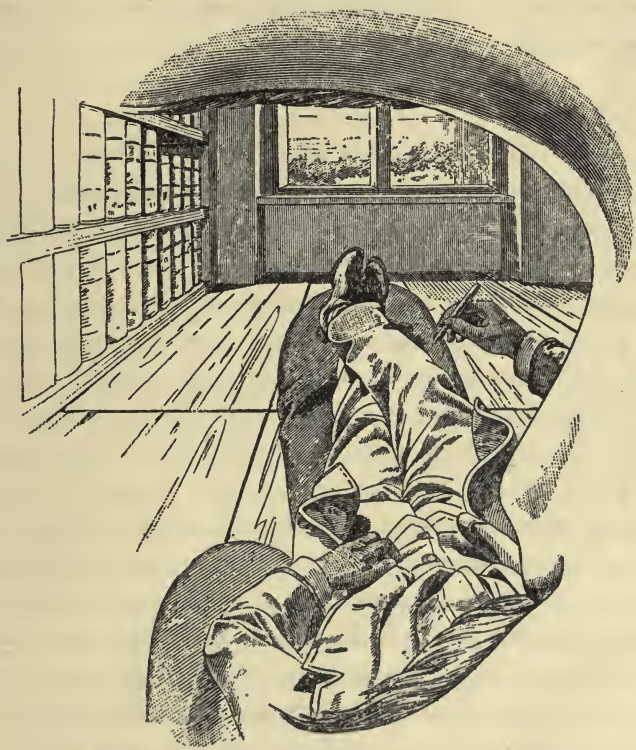
Accordingly, the great chasm between physical and psychological research exists only for the common stereotyped method of observation. A color is a physical object when, for example, we regard its dependence upon its luminous source (upon other colors, upon heat, upon space, and so forth). Regarding however its dependence upon the retina (the elements *K L M* . . .), it becomes a psychological object, a sensation. Not the subject-matter, but the direction of our investigation is different in the two domains.

When, from the observation of the bodies of other men or animals, we infer their sensations, as well also as when we investigate

the influence of our own body upon our own sensations, we are forced to complete observed facts by analogy. This work of completion by analogy is done with much more accuracy and facility, when it relates, let us say, to nervous processes, which cannot be fully observed in our own bodies—that is when it occurs in the more familiar physical domain—than when the completion relates to psychical processes. Otherwise there is no material difference.

IX.

The thoughts presented gain greatly in fixity and vividness if in addition to simply expressing them in abstract form we bring ourselves face to face with the facts from which they arise. For



example, I lie upon my sofa. If I close my right eye the picture represented in the accompanying cut is presented to my left eye. In a frame formed by the ridge of my eyebrow, by my nose, and by

my moustache, appears a part of my body, so far as it is visible, and also the things and space about it. *My* body differs from other human bodies—leaving out of account the fact that every vivid motory idea immediately passes into movement and that contact with it determines more perceptible changes than contact with other bodies—by the circumstance, that it is only partly seen, and, especially, is seen without a head. If I observe an element *A* within my field of vision, and investigate its connection with another element *B* within the same field, I go out of the domain of physics into that of physiology or psychology, if *B*, to use the apposite expression that a friend* of mine employed upon seeing this drawing, passes through my skin. Reflections like that for the field of vision may be made with regard to the province of touch and the perceptual domains of the other senses.

X.

Reference has already been made to the different character of the groups of elements that we have designated by *A B C* . . . and $\alpha\ \beta\ \gamma$. As a matter of reality, when we *see* a green tree before us, or *remember* a green tree, that is *conceive* a green tree to ourselves, we know right well how to distinguish these two cases. The imaged tree has a much less determinate, a much more changeable form; its green is much paler and more evanescent; and, what is of especial note, it distinctly appears in a *different* sphere. A movement that we *propose* to execute is always only a *conceived* movement, and appears in a different field or sphere from that of the executed movement, which moreover always takes place where the image becomes vivid enough. The statement that the elements *A* or α appear in a different sphere, means, if we go to the bottom of it, nothing more than that they are united with divers other elements. To this extent, accordingly, the *basal component parts* in *A B C* . . ., $\alpha\ \beta\ \gamma$ . . . would be *the same* (colors, sounds, spaces, times, motory sensations, innervations . . . .), and only the character of their union different.

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* J. Popper of Vienna.

Pain and pleasure are ordinarily regarded as different from sensory sensations. Yet not only tactile sensations, but also all other kinds of sensations, can gradually pass into pleasure and pain. Pleasure and pain can also justly be called sensations. Only they are not so well analysed and so familiar as sensory sensations. Sensations of pleasure and pain, however faint the mode of their appearance, make up indeed the real content of all so-called feelings. Thus perceptions, as well as ideas, volition, and feelings, in short the entire inner and outer world, are composed of a small number of homologous elements united in relations now more evanescent and now more lasting. These elements are commonly called sensations. But since vestiges of a one-sided theory now inhere in this term, we prefer to speak simply of *elements*, as we have already done. All research aims at the resolution of the union of these elements.*

XI.

That out of this complex of elements which at bottom is simply *one*, the limits of bodies and the ego do not admit of being fixed in a manner certain and sufficient for all cases, has already been said. The composition of the elements, intimately connected with pleasure and pain, into an ideal mental-economical unity, the ego, is a work of the highest significance for the intellectual functions that act in the service of the pain-avoiding, pleasure-seeking will. The formation of the ego by this process of circumscription and delimitation is therefore instinctively effected, it grows familiar and natural, and fixes itself perhaps through heredity. By their high *practical* value, not only for the individual, but also for the entire race, the composites "ego" and "body" instinctively assert their existence, and operate with the power of original elements. In *special* circumstances, however, in which practical ends are not concerned, but knowledge becomes an object in itself, this delimitation often turns out to be insufficient, obstructive, and untenable.

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* Compare the remarks appended to my treatise: *Die Geschichte und die Wurzel des Satzes der Erhaltung der Arbeit.* Prague. Calve. 1872.

Professional *esprit de corps*, and even professional bias, the sentiment of nationality, the most narrow-minded local patriotism may also have a high value, for certain *purposes*. But such conceptions will not characterise the far-sighted investigator, at least not in the moment of research. All these egoistic conceptions are adequate for practical purposes only. Of course, even the investigator can succumb to custom. Trifling scholastic fiddle-faddle, the cunning appropriation of others' labor and perfidious silence with regard to it, the numerous objections and complaints when unavoidably compelled to give recognition, and the scanty illumination of others' performances on such occasions, abundantly show that the scientist and scholar have also to fight the battle of existence, that the ways of science yet lead to the mouth, and that the *pure* quest of knowledge amid our present social relations is still an ideal.

* * *

The primary fact is not the *I*, the ego, but the elements (sensations). The elements *constitute* the *I*. *I* perceive the sensation green, means, that the element green occurs in a given complex of other elements (sensations, memories). When *I* cease to perceive the sensation green, when *I* die, then the elements no longer occur in their customary, common way of association. That is all. Only an ideal mental-economical unity, not a real unity, has ceased to exist.

* * *

The ego is not an unchangeable, definite, sharply-defined unity. The important factor is not *unchangeability*, not determinate *distinguishability* from other things, and not accurate *limitation;* for all these factors even vary within the sphere of individual life itself, and their alteration is even *sought* by the individual. *Continuity* alone is important. This view admirably accords with that to which Weismann recently attained by biological investigations ("Regarding the Immortality of Unicellular Beings," *Biolog. Centralbl.*, Vol. IV, Nos. 21, 22; compare especially pp. 654 and 655, where the division of the individual into two *equal* halves is spoken of). But this continuity is only a *means* to dispose and to assure the content of the ego. This *content* and not the *ego* is the principal thing. But

this content is not confined to the individual. With the exception of insignificant, valueless, personal memories or reminiscences, it remains preserved in *others* even after the death of the individual. The *ego* is unsavable. It is partly the discernment of this fact, partly the fear of the same, that leads to the most extravagant pessimistic and optimistic, religious and philosophical absurdities. We shall not be able in the long run to close our eyes to this simple truth, the immediate result of psychological analysis. We shall then no longer place so high a value upon the ego which even during individual life greatly changes, and which, indeed, in sleep or during absorption in some conception or in some thought, just in our happiest moments, may be partially or wholly absent. We shall then gladly renounce individual immortality, and shall not place more value upon the accessory elements than upon the principal. We shall in this way arrive at a freer and a *more enlightened* conception of life, which will exclude the neglect of other egos and the over-estimation of our own.

* * *

If, now, the knowledge of the connection of the elements (sensations) does not suffice us, and we must ask *Who, What,* possesses this connection of sensations, *Who, What,* perceives sensations? we have succumbed, we may be sure, to our old habit of arranging every element (every sensation) within some *unanalysed* complex, and we are falling back imperceptibly to an older, lower, and more limited point of view.

* * *

The habit of treating the unanalysed ego-complex as an indivisible unity is often scientifically presented in peculiar ways. First, the nervous system is separated from the body as the seat of sensations. In the nervous system again the brain is selected as fitted for the performance of this function, and finally, to save the pretended psychical *unity,* a further *point* is sought in the brain as the seat of the soul. But rough conceptions like these are hardly adapted to trace out even in the crudest lines the ways that future research will follow in investigating the connection of the physical and the psychical. The fact that the different organs of sensation and memory

are physically *connected* with one another, and can be easily *excited* by one another is probably the foundation of the "psychical unity."

I once heard the question seriously discussed of "How the percept of a very large tree found room in the little head of a man?" Now though this "problem" does not exist, yet we perceive by the question the absurdity that is so easily committed in conceiving sensations to exist spacially in the brain. When I speak of the sensations of *another* person, these sensations of course present no activity in my optical space or my physical space generally; they are mentally added, and I conceive them to be *causally* annexed, not spacially, to the brain observed or represented. When I speak of *my* sensations, these sensations do not exist spacially in my head, but rather my "head" *shares* with them the same spacial field, as was explained above (compare what was said regarding the cut).

* * *

Let there be no mention of the so-called unity of consciousness. Since the apparent opposition of the *real* and the *perceived* world exists only in the mode according to which it is viewed, and no real chasm exists, a multiplex interconnected content of consciousness is in no respect more difficult to understand than the multiplex interconnection of the world.

If we are determined to regard the ego as an actual unity, we cannot extricate ourselves from the following dilemma: either to set over against it—viz., the ego—the world of incognisable substances (which would be wholly idle and purposeless), or to regard the whole world, the egos of other people included, as only contained in our own ego (to which, seriously, we could hardly make up our minds).

But if we take the ego merely as a *practical* unity, composed for purposes of provisional survey; in fact, take it as a more strongly coherent group of elements, which is less strongly connected with other groups of this kind; questions like these will not arise and research will have a free outlook.

In his philosophical notes Lichtenberg says: "We become conscious of certain ideas that are not dependent upon us; and there are other ideas that, at least as we think, are dependent upon

us. Where is the border-line? We know only the existence of our sensations, percepts, and thoughts. We should say, *It thinks*, just as we say, *It lightens*. It is going too far to say *cogito*, when we translate it by *I think*. Assuming the *I*, postulating it, is merely practical necessity." Though the method by which Lichtenberg arrives at this result is somewhat different from our own, we must nevertheless give our assent to the conclusion itself.

XII.

Bodies do not produce sensations, but complexes of sensations (complexes of elements) form bodies. If bodies appear to the physicist as that which is permanent, that which is real, and sensations as their evanescent transitory semblance, the physicist forgets that all bodies are but thought-symbols for complexes of sensation (complexes of elements). The *elements* designated also form here the real, immediate, and ultimate foundation which physiological research has now further to investigate. Through the discernment of this, many things in psychology and physics assume more distinct and economical forms, and many imagined problems are disposed of.

The world therefore does not consist for us of mysterious substances, which through their interaction with another equally mysterious substance, the ego, produce sensations as solely accessible. Colors, sounds, spaces, times, . . . are for us the ultimate elements, whose given connection it is our task to investigate. In this investigation we dare not allow ourselves to be hindered by the composites and circumscriptions (body, ego, matter, mind . . .) that have been formed for especial, practical, provisional, and limited purposes. On the contrary, the appropriate and best adapted forms of thought must arise within research itself, as happens in every special science. In the place of the traditional instinctive conception must come a freer, fresher view, conforming with developed experience.

* * *

I have always felt it as a special good fortune, that early in my life, at about the age of 15, I came across in the library of my

father Kant's "Prolegomena to Any Future Metaphysic." The book made at that time a powerful, ineffaceable impression upon me, that I never afterwards experienced to the same degree in any of my philosophical reading. Some two or three years later I suddenly discovered the superfluous rôle that "the thing in itself" plays. On a bright summer day under the open heavens the world together with my ego all at once appeared to me as *one* coherent mass of sensations, but in the ego more strongly coherent. Although the actual working out of this thought did not occur until a later time, yet this moment became decisive for my whole view.

Moreover I had still to struggle long and hard before I was able to retain, in my own special department, the conception I had acquired. With what is valuable in physical doctrines we necessarily absorb a good dose of false metaphysics, which it is very difficult to separate from that which must be preserved, especially where these doctrines have become current and familiar. So, too, the traditional, instinctive conceptions often arose with great power and placed impediments in my way. Only by alternate studies in physics and the physiology of the senses and by historico-physical investigations, since about 1863, after having endeavored in vain to settle the conflict by a physico-psychological monadology, did I acquire in my views any considerable firmness. I make no pretensions to the title of philosopher. I only wish to adopt in physics a point of view that need not be instantly changed the moment our glance is carried into the domain of another science; since indeed, ultimately, all must form one whole. The molecular physics of to-day does certainly *not* meet this demand. What I say I have probably not been the *first* to say. I also do not wish to hold forth this exposition of mine as a special performance. It is rather my belief that every one will collaterally adopt the same view, who in a reflective manner holds survey in any province of science that is not too limited.*

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* I have recently (1886) propounded these views in a pamphlet *Beiträge zur Analyse der Empfindungen*. Avenarius, with whom I recently became acquainted, approaches my point of view *(Philosophie als Denken der Welt nach dem Princip des kleinsten Kraftmasses*, 1876). Hering, too, in his treatise upon Memory *(Almanach*

XIII.

Science always arises through a process of adaptation of thoughts to a certain department of experience. The results of this process are thought-elements, which represent the entire department. The result, of course, is different according to the character and extent of the province surveyed. If the province of experience in question is extended, or if several provinces hitherto separated become united, the traditional, familiar thought-elements no longer suffice for the province thus extended. In the struggle of acquired habit with the effort after adaptation, *problems* arise, which disappear when the adaptation is completed, to give way to others that have sprung up in the mean time.

To the physicist, pure and simple, the idea of a body facilitates the acquisition of a comprehensive survey in his department, and does not operate as a disturbance. So, also, the person that pursues purely practical ends, is materially assisted by the concept of of the *I* or Ego. For, unquestionably, every form of thought that has been voluntarily or involuntarily constructed for some especial purpose, possesses for that particular purpose a *permanent* value. As soon, however, as physics and physiology touch, the ideas held in the one domain are discovered to be untenable in the other. From the striving after an adaptation of the one to the other arise the various atomic and monad theories—which are unsuccessful, however, in the attainment of their object. If we regard *sensations*, taken in the sense above defined, as *world-elements* or elements of the All, the problems referred to are practically removed, and the *first* and most important adaptation therefore effected. This basal notion (without any pretension to being a philosophy for all eternity) can at present be adhered to with respect to all provinces

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der Wiener Akademie, 1870, p. 258; also published in Nos. 6 and 7 of *The Open Court*), and J. Popper in his beautiful book, "The Right to Live and the Duty to Die" (Leipsic 1878, p. 62), have advanced similar thoughts. Compare also my paper *Ueber die ökonomische Natur der physikalischen Forschung (Almanach der Wiener Akademie*, 1882, p. 179, note). Finally let me also refer here to the introduction to W. Preyer's *Reine Empfindungslehre*, and to Riehl's *Freiburger Antrittsrede*, p. 14. I should probably have to cite much additional matter that is in some way related to my line of thought if I possessed a more extensive bibliographical knowledge.

of experience; it is consequently the one that accommodates itself with the least expenditure, that is, more economically than any other, to the present *temporary state of collective science*. Moreover, in the consciousness of its purely economical office, this basal notion acts with most perfect tolerance. It does not obtrude itself into provinces in which the current conceptions are still adequate. It will ever be ready, upon subsequent extensions of the domain of experience, to give way to a better one.

The philosophical point of view of the average man—if that term may be applied to the naïve realism of the ordinary individual—has a claim to the highest consideration. It has arisen in the progress of immeasurable time without the purposed assistance of man. It is a product of nature, and is preserved and sustained by nature. Everything that philosophy has accomplished—the *biological* title of every advance, nay of every error, admitted—is, compared with *it*, but an insignificant and ephemeral product of art. And in reality, we see every thinker, every philosopher, the moment he is forced away from his one-sided intellectual occupation by some practical necessity, immediately fall back upon the universal point of view that all men hold in common.

We seek by no means to discredit this point of view. The task that we have set ourselves is simply to show *why* and to what *purpose* for the greatest part of our life we occupy this point of view, and *why* and for what *purpose* we are provisorily obliged to abandon it. No point of view has an absolute *permanent* validity. Each has an importance but for some one given end.

Ernst Mach.

THE ORIGIN OF MIND.

WE must distinguish between two kinds of facts; viz., given facts or data, and deduced facts or inferences. With regard to the facts of soul-life we recognise that the former class, that of given facts, necessarily consists of states of consciousness only; they are feelings of any description, varying greatly in their nature. They are different in the rhythmical forms of their vibrations, in their intensity, and in their distinctness. The latter class, that of inferences, is deduced from the former, and serves no other purpose than that of explanation. This class is mostly representative of external facts, and knowledge of external facts exists only in so far as external facts are represented in deduced facts. What a thinking being would call external facts is nothing but the contents of certain deduced facts.

Given facts and deduced facts.

Deduced facts, and among them the conception of external facts (wherever they exist), have been produced by the effort of accounting for given facts—viz., the elementary data of consciousness and their relations. Deduced facts are the interpretation of given facts. They are, so to say, conjectures concerning their causes as well as their interconnections.

The organised totality of deduced facts, as it is developed in feeling substance, is called mind. Feelings are the condition of mind. From feelings alone mind can grow. But there is a difference between feelings and mind. Feelings develop into mind, they grow to be mind by being interpreted, by becoming representative. Representative feelings are mind. Accordingly, we characterise mind as the representativeness of feelings.

Definition of mind.

Although deduced facts are an interpretation of given facts, this "interpretation" is not expressly designed. These inferences from given facts are not invented with a premeditated purpose; they are not constructed with foresight or intention. Deduced facts grow naturally and spontaneously from given facts, which are the elements of sense-activity. There is not an agent that oversees their fabrication; there is not a devising "subject" that surmises the existence of external facts and thus matures their conception into deduced facts. Deduced facts are rather the natural product of a certain group of given facts. Deduced facts issue from a co-operation of a number of feelings. They are the result of an organisation of certain repeated sense-impressions which produce a disposition not only to receive sense-impressions of the same kind, but also to react upon them in a certain way. Mind is not the factor that organised the given facts of mere sense-impressions so that they became representations. There was no mind as long as feelings remained unorganised. Feelings acquire meaning; and as soon as they have acquired meaning they are what we call "deduced facts," representations —especially representations of external facts. Deduced facts are the elements of mind; and mind is not their root, but their fruit.

The growth of mind

The whole domain of mind-activity (i. e., of the representativeness of feelings) is called subjective; while the totality of all facts that are represented in the mind is called objective. Subjective existence consists of feelings and of states of consciousness; objective existence is represented as things that are in motion. Motion and feeling are quite different things, yet in spite of their radical difference experience teaches us that both spheres are intimately interwoven. Subjective existence constantly draws upon objective existence. Not only do states of consciousness exist as they are by virtue merely of the objects represented, but also that group of facts called our body, the action of which appears in a constant connection with and as a condition of our consciousness, is kept in running order only through a constant renewal of its waste products out of the resources of objective existence.

Subjective and objective existence.

We distinguish between our body and external facts; but the boundary between both provinces is not distinct. There is constantly an exchange of substance taking place, proving that our body is in kind not different from the substance of which external facts consist. It must be regarded as a group of the same kind as external facts, existing in a constant interaction with and among the external facts. In other words, the body of the thinking subject is an object in the objective world.

The origin of feeling from the elements of subjective existence.

Concerning the subjective sphere of existence we recognise that consciousness does not act uninterruptedly; there are moments when consciousness is lost. If they are normal, we call them sleep; if they are abnormal, swoons or trances. Former conscious states can be revived; they form a chain of memories which is very limited in comparison with the extension of the objective world. There is a time in the past beyond which our memory does not reach. Moreover we have reason to believe, that there will be a time when the chain of conscious states will be broken forever. This consummation is called death. In short the subjective world is transient; it grows by degrees; its existence is very precarious; it flickers like a candle in the wind and will disappear again. The objective world however is eternal, it is indestructible. Experience teaches that it constantly undergoes changes, but that in its totality it is imperishable.

Feeling with the help of memory acquires meaning

The objective world is in a certain sense a part of the subject. In another sense, we must say that the subject is a part of the objective world. Indeed these two sentences represent the same truth, only viewed from two standpoints. The subjective world being transient and the objective world being eternal, the question presents itself, "How does the subject originate in or among the objects of the objective world?"

The problem is complicated and we must approach it step by step. First, we are inevitably driven to the conclusion, that the subjective world of feelings forms an inseparable whole together with a special combination of certain facts of the objective world, namely our body. It originates with this combination, and disappears as soon as that combination breaks to pieces. And, secondly,

we must assume that the conditions for building up such material dispositions as have the power of developing the subjectivity of consciousness are an intrinsic quality of the objective world. Subjectivity cannot originate out of nothing; it must be conceived as the product of a co-operation of certain elements which are present in the objective world. In other words, the elements of the subjective world are features that we must suppose to be inseparably united with the elements of the objective world, which are represented in our mind as motions. This leads to the conclusion that feeling has to be considered not as a simple but as a complex phenomenon. Feelings originate through a combination of elements of feeling; and the presence of the elements of feeling must be supposed to be an intrinsic property of the objective world.* The objective elements, the action of which is accompanied with the elements of feeling, arrange themselves, we suppose, into such combinations as display actual feelings, in exact agreement with the laws of molar and molecular mechanics. This, we must assume, takes place with the same spontaneity as, for instance, an acid and a base combine into a salt. To use another example, it takes place with the same necessity as, under special conditions, a certain amount of molar motion is transformed into the molecular motion of ether-waves, called electricity. Motions are not transformed into feelings, but certain motions (all being separately accompanied with elements of feeling), when co-operating in a special form, are accompanied in that form with actual feelings.

Neither feeling nor mind can be considered as incidental phenomena.

There is a certain class of philosophers who look upon feeling as an incidental effect, as a fortuitous by-play of the interacting elements of matter. This conception has little if anything in its favor. On the contrary, if the elements of feeling are throughout inseparably connected with the elements of objective existence, it must appear natural that wherever the conditions fitted for organised life appear, irritable substance will originate. We may fairly assume that feeling will

* For further details see the author's article *Feeling and Motion;* published first in *The Open Court*, Nos. 153 and 154.

arise on the cooled surface of a planet with the same necessity as, for instance, a collision between non-luminous celestial bodies will cause them to blaze forth in the brilliant light of a nebula containing all the elements for the production in the course of ages of a planetary system.

Wherever a combination of substances originates that displays the quality of feeling, it will form a basis for given facts of soul-life. Feeling substance having been exposed to a special stimulus, or having performed a certain function, has thereby undergone a rearrangement in its molecular parts. The structure has suffered a change in its configuration, the form of which is preserved in the general flux of matter, and there is thus produced in the feeling substance a disposition to respond more quickly to impressions of the same kind. The feeling accompanying a subsequent impression of the same nature is coincidently felt to be a revival of a former feeling, similar or the same in kind. In other words, feeling substance, preserving the forms of its functions, is possessed with memory.* The preservation of form in a function which is accompanied with feeling makes it possible that the feeling accompanying a special form of function will become a mark of signification. By being felt to be the same in kind as a former feeling it will come to denote a certain condition of feeling tissues. A feeling that is felt to be the same as or similar in kind to a former feeling, the revival or memory of which it causes, is in this way endowed with meaning; by which we understand the awareness of the congruence or similarity of two or several feelings. Thus in the lapse of time, by constantly renewed experience, one special feeling, whenever repeated, will naturally become the indicator showing the presence of certain external facts that cause it. An isolated feeling is naturally meaningless; yet through a preservation of form, viz., through memory, it is by repetition necessarily changed into a symbol of representative value.

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* Memory is no mysterious power; it is the preservation of form in feeling organisms. See Ewald Hering's treatise on Memory, English translation in Nos. 6 and 7 of *The Open Court*. Compare also the author's article *Soul-life and the Preservation of Form*, in No. 143 of *The Open Court*.

Feelings, accordingly, in the course of time, necessarily acquire meaning; they naturally and spontaneously develop mind. They can as little avoid co-ordinating into a mental organism, as water at a low temperature can escape congealing into ice; or as a seed can keep from sprouting when it is exposed, with sufficient moisture, to the light. Mind, accordingly, is the necessary outcome of a combination of feelings. It is as necessary an effect of special causes, as, for example, a triangle is the product of a combination of three lines. The first step in the organisation of feeling, which will throughout remain the determining feature of its development, is the fact that with the help of memory the different sets of feeling acquire meaning, and in this way the mere feelings are transformed from given facts into deduced facts.

* * *

Subjectivity and objectivity.

The nature of given facts is subjectivity, while the character of inferred facts is objectivity. The latter having grown out of the former will nevertheless, so far as they are states of consciousness, always remain subjective; yet they contain representations of that which is delineated by certain given facts. Thus they contain an element which stamps upon them the nature of objectivity. They represent objects, the existence of which the feeling subject cannot help assuming, because this is the simplest way of indicating certain changes that are not caused within the realm of its own subjectivity.

Objectivity, accordingly, does not mean absolute objectivity. Objectivity means subjective states, i. e, given facts or feelings representative of outside facts, i. e., of facts that are not subjective, but objective.

The projection of objective facts.

The sense-impression of a white rectangle covered with little black characters is a given fact; yet the aspect of a sheet of paper is an inferred fact. The former is a subjective state within; the latter is the representation of an objective thing without. The process of representing is a function of the subject, but the fact represented is projected as it were into the objective world, where experience has taught us to expect it. And the practice of projection grows so naturally by inherited adaptation and

repeated experience that the thing represented appears to us to be external. We no longer feel a sensation as a state of consciousness but conceive it as an independent reality.

Projection, an economy of labor.

The practice of projecting subjective sensations into the outside world is not an act of careless inference, but the inevitable result of a natural law. This natural law is that of the "economy of labor." When a blind man has undergone a successful operation, he will first have the consciousness of vague color-sensations taking place in his eye. Experience will teach him the meaning of these color-sensations and his motions will inform him where to find the corresponding outside facts. His consciousness will more and more be concentrated upon the meaning of the sensations. The less difficulty he has in arriving at their proper interpretation, the more unconscious his sense-activity will become and at length consciousness will be habitually attached to the result of the sensation alone, i. e., to its interpretation.

In the same way, every one who learns to play an instrument will first feel that part only which his hand touches. By and by, however, he will acquire a consciousness of the effects produced by the slightest touch. Constant practice forms in the brain of an expert certain living structures which are correspondent to the action of the instrument and represent it with great accuracy. Whenever these structures are stimulated, the action of the instrument is felt to take place. In this way consciousness is projected into the work performed by the instrument. The touch of the hand has become purely automatic, and the operator now feels the full effects of his manipulation although he is not in direct contact with all the parts of his instrument. The instrument becomes as if alive under his treatment, he feels it as a part of himself; for its action stands *en rapport* with his brain-activity.

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The subject-superstition and agnosticism.

States of consciousness, collectively considered, have been termed "subject," and we have also employed the phrase "subjective world." But we must not forget the fact, that the adoption of the name "subject" is based upon a misconception. Subject means "that which underlies," and the

subject was supposed to be that something which formed the basis of all the states of consciousness present in any one special case—in you or in me, or in any person like you and me. The subject was considered as a being that was in possession of sense-impressions, of feelings, of thoughts, of intentions, etc.; and the existence of this subject was proved by Descartes's famous syllogism *Cogito ergo sum.* The subject was supposed to produce the states of consciousness, while in fact (as we have explained above) it is exactly the opposite. Feelings change into mind, they produce the subject which thinks. The subject is nothing underlying but rather overlying. It is the growth out of and upon feelings. It is the sum of many feelings in a state of organisation.

The fallacy of Descartes's dictum has been pointed out by Kant. The existence of states of consciousness, or the fact *cogito*, does not prove the existence of something that underlies the states of consciousness. It simply proves the existence of feelings and thoughts. There are certain sense-impressions, there are perceptions, there are ideas. Ideas develop from perceptions, and perceptions develop from sense-impressions. States of consciousness are nothing but the awareness or the feeling that is connected with certain perceptions and ideas.

Descartes's subjectivism is a transitory phase leading from the authoritative objectivism of the middle ages to the critical objectivism of modern times. The authoritative philosophy of the Schoolmen yielded to the arbitrary philosophy of metaphysical subjectivity, commencing as a matter of principle with doubt, instead of commencing with positive data, and establishing anarchy through lack of any objective method of arriving at truth. The reaction against the arbitrary authority of scholasticism was indispensable to further progress. But we must not rest satisfied with its negative result. We cannot commence a business without capital and without making a start. So we cannot begin philosophy with nothing. Knowledge is not possible without positive facts to serve as a basis to stand upon.

The negative features of Descartes's philosophy naturally found their ultimate completion in agnosticism. The assumption of the

existence of a subject led to the doctrine, that this subject is unknowable. Moreover, the assumption of something that underlies the acts of thought leads to the assumption of something that underlies objective existence, and thus it begets the theory of things in themselves. This theory involves us in innumerable contradictions and thus it ends ultimately in the proposition that things in themselves are unknowable.

There are few who know the historical meaning of agnosticism; but those who can survey philosophical thought in its evolution, its growth, and decay, know that agnosticism means failure in philosophy. The word is a foreign-sounding name for "knownothingism," denoting a half-concealed confession of bankruptcy. The philosophy of the future, in order to escape from the fatal consequences of agnosticism, has to discard the subject-superstition inherited from Descartes. Descartes was a great thinker, a star of first magnitude in the realm of thought, but it is time that, without returning to the authoritative philosophy of the Schoolmen, we should free ourselves from the errors of his one-sided subjectivism.

Let us not forget, that all subjective states contain an objective element. Objectivity is no chimera, and we are very well enabled to establish the truth or untruth of objective facts. The philosophy of the future, accordingly, will be a philosophy of facts, it will be *positivism;* and in so far as a unitary systematisation of facts is the aim and ideal of all science, it will be MONISM.

From the standpoint of positivism, the subject, in the old sense, does not exist, and things in themselves do not exist either. Their existence is an unwarranted assumption, a superstition of philosophy, and we can retain the word subject only on the condition of a complete change of its meaning. The word subject, accordingly, (which has acquired a place in philosophical language and is for several purposes quite an appropriate expression,) must be corrected so as to mean, not an underlying substratum, nor an agent which does the thinking, but simply a collective term designating a certain group of sense-impressions, perceptions, ideas, and volitions. These sense-impressions, perceptions, ideas, and volitions, which form, simultaneously as well as successively, the elements of

soul-life, carrying consciousness upon the waves of many subconscious states, make up the reality of the subject; they are the facts of its existence, and it is the states of consciousness only, not an underlying something, the existence of which is beyond all doubt. They form the basis of all knowledge.

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The objective element in subjective states.

We must bear in mind that states of feeling are not empty feelings, but always feelings of a certain kind. There is no consciousness pure and simple, but only consciousness of a certain state. Let us suppose, for instance, the consciousness of a certain pressure. What is it but a feeling of being pressed in a certain direction and with a certain intensity? If a certain pressure is resisted, the feeling indicates a state of active reaction against pressure, and experience teaches by comparison with other pressures how much counterpressure is necessary to resist or overcome it.

Among the states of consciousness there are accordingly some that represent an awareness of *receiving* impressions, and there are others of *making* impressions. There are some feelings of a passive nature, which are felt to be produced by impacts from a something that is not the subject, and there are other feelings of an active nature, which are felt to produce effects on something that is not the subject. This something that is not the subject is called "object." It is represented as lying outside the subject, although the latter stands in a close and inseparable relation to the object, which, so far as this relation is considered, forms a part of the subject. A given subjective state possesses a definite form; it exists as it is on account of the object only; for its form has been produced by its relation to the object, and it represents this relation. The object, therefore, is no unimportant part of, and indeed is an essential element in, the constitution of the subjective state.

All data are states of subject-objectness.

Idealist philosophers are apt to say that the subject alone is known to us, while the existence of the object must forever remain a vague hypothesis. This, however, is incorrect. It involves an unjustifiable deprecation of the objective element in the given facts of conscious states, and is based on

a misconception of the entire state of things. The data of knowledge are not mere subjective states, they are relations between subject and object. Neither the subject is given, nor the object; but an interaction between subject and object. From this interaction we derive by a very complicated process of abstraction both concepts, the subject as well as the object. It is true that the subjective world of feelings and of representative feeling is very different from the objective world of things. Nevertheless they are one. The subject together with all objects forms one inseparable whole of subject-object-ness.

Every special object, accordingly, must be conceived as a part of this inseparable whole—of the All; it is a certain set of facts, represented in a certain group of experiences, and is to be described as that something which in a special way affects the subject and can again in a special way be reacted upon by the subject.

Here we have the clue for the proper meaning of objectivity. What is a piece of lead but something that at a definite distance from the centre of the earth exerts a certain pressure proportionate to its mass; that is seen to become liquid at a certain temperature; etc., etc.? If it is treated in a particular way, it will be observed to suffer certain changes. What lead is has been established by experience; i. e., by systematic observation through sense-impressions.

Idealism and realism.

From this standpoint the differences between the schools of idealism and realism appear as antiquated. The questions whether matter is real, whether objects exist, and whether there is any reality at all, have lost their meaning. That which produces effects upon the subject and against which the subject does or can react, is called object. The sense-effects produced by the object upon the subject, and also the reactions of the subject upon the object, are realities; and every name of a special object signifies a certain group of such effects and their respective reactions. Thus, for instance, the word lead comprises a certain set of experiences that have always been found combined with certain whitish objects.

Some philosophers have denied not only the existence of objects, but also the reality of space. What is space but a certain

group of experiences? The conception of space originates by moving and by being moved about. The conception of space is the consciousness that by moving, or by being moved, a change is effected; that is, a certain object serving as a point of reference is either approached or left at a greater distance. The acts of approach or withdrawal are as much realities as are any other acts of the subject. Discussions concerning the reality of space accordingly become mere verbal quibbles as soon as we understand by space the condition common to all motion-experiences.

Space and Reality.

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The mental state in which through contact with external facts one or several of the senses are affected so as to produce a direct awareness of their presence, is called perception. The effects of external facts upon the sense of touch appear as different forms of resistance. To the other senses they appear as odors, tastes, sounds, and images. All these sensations are so many subjective methods of representing certain objective processes. Perceptions represent immediate reality because the objects perceived, i. e., the objects represented by an image in the eye, a taste on the tongue, etc., are in an immediate contact with our senses. The feeling subject is directly conscious of their existence by their present effects. They are our *Anschauung*, i. e., the living presence of objective reality.

Perception and concepts.

Besides this living presence of objective reality, of which our immediate surroundings consist,—besides our *Anschauung*—, man is in possession of more general representations, which comprise all the memories of a certain class of percepts. We call them concepts. Man alone through the mechanism of word-symbols has been able to form concepts. Abstract reasoning as well as scientific thought will grow with the assistance of concepts in the course of a higher development.

The higher we rise in the evolution of representative feelings, i. e., in the development of mind, the more numerous are the opportunities for going astray. A scientific hypothesis, if erroneous, is more sweeping in its fallacies than a single

Hallucinations and errors

hallucination, which is a misinterpretation merely of certain feelings. The subjective part of an hallucination, namely the feeling itself, is real; but the objective part, the representative element of the feeling, is not real; that which it is supposed to mean, does not exist. The interpretation of the feeling is erroneous in a hallucination.

Hallucinations are possible, and in the more abstract domains of mental activity errors are possible also; and will be ever more frequent. Nevertheless the reality of outside facts in the sense stated above can as little be doubted as the reality of immediate perception; and all the facts established by science, if they are but true, are as much realities as is the resistance of the table to the pressure of my hand or the perception of the sheet of paper by my eye.

Inferential facts, if true, are real.

Facts established by science are those observations which are made with all the necessary exactness as well as completeness from certain groups of experiences, and formulated with precision. The theory of atoms, for instance, is true in so far as all elements combine in certain proportions, which shows that the ultimate particles of which the elements consist are of a definite mass. Atoms, if the word is understood in this sense, are realities. The theory of atoms, however, is not proved in the sense that atoms are ἄτομοι; or single, isolated, minute bodies of a peculiar individuality—separate, indivisible, and eternal entities. Whether they are concrete things or certain forms of motion in a continuous substance, whether they are vortices or whirls of a certain density and velocity in an ether ocean, or whatever else be their character, is not yet known. If we exclude from the concept "atoms" all hypothetical views and confine their meaning strictly to the formulation of certain experiences, we have to deal with facts that are real. Theories are true in so far as they comprehend in a formula a certain group of facts, and a hypothesis becomes reliable to the extent that it agrees with facts. The slightest actual disagreement with facts is sufficient to overthrow the most ingenious hypothesis.

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This leads us to the question, What is meant by *true?* What is truth?

Facts and reality. Truth and mind.

The epitheton "true" has reference to representative states only. A representation is true, if it conforms to, or agrees with, experience; in other words, if it is an interpretation of given facts, is free from contradiction, and nowhere collides with any one of the given facts and their consistent interpretation. There is no sense in speaking of mere feelings as being true. We can never meet, in our own experience, with given facts that are nothing but meaningless feelings; for we (as thinking beings) are incapable of bringing meaningless feelings into the scope of consciousness, since in the very act of thinking we comment upon the given facts of our feelings. But supposing there are mere given facts, mere meaningless feelings void of any representative element, the application of the word true to such non-representative feelings would be improper. States of consciousness become true or untrue only by being representative of objective conditions or things. There is no trace of truth in mere feelings, but only in representative feelings. Truth and error are the privilege of mind. A representation is true, if all the various experiences concerning a certain thing or state of things agree with the representation; it is untrue if they do not agree.

We observe that certain classes of facts, in spite of all variety, exhibit in one or another respect a sameness, and science attempts to express the sameness in exact formulas. These formulas we call natural laws. If a natural law covers all cases of a class that have come or even that possibly can come within the range of our experience, if it agrees with every one of them, we call it a truth.

"Truth" accordingly is not at all identical with "fact." These two words are often used as synomyms, but properly employed they are quite distinct. Truth is the agreement of a representation with the facts represented. The fall of a stone is a fact; it is an inferred fact deduced from certain sense-impressions. In so far as the inference is made with necessity as the only proper and simplest explanation of a certain given fact or sense-impression, it must be

considered as a fact or as real. The law of gravitation, however, is not a fact, but a truth.

Facts are real. There is no sense in speaking of facts as being true. Representations of facts are true or untrue. Reality is the characteristic feature of all facts, but truth is a quality that can reside in mind alone.

Facts and truth.

Facts are always single, concrete, and individual. Every fact is a *hic* and *nunc*. It is in a special place, and it is as it is, at a certain time. It is definite and of a particular kind. Yet a truth, although representing certain objects or their relations, is never a concrete object, nor is it a *hic* and a *nunc*. It possesses a generality applicable to all instances wherever and whenever the objects in their particular relation appear represented in that truth. Truth accordingly possesses as it were an ubiquity; it is omnipresent and eternal.

Truth in one sense is objective; it represents objects or their relations conceived in their objectivity, in their independence of the subject. This means that the representation of certain objective states will under like conditions agree with the experiences of all subjects—i. e., of all feeling beings having the same channels of information.

Truth in another sense is subjective. Truth exists in thinking subjects only. Truth affirms that certain subjective representations of the objective world can be relied upon, that they are deduced from facts and agree with facts. Based upon past experience, they can be used as guides for future experience. If there were no subjective beings, no feeling and comprehending minds, there would be no truth. Facts in themselves, whether they are or are not represented in the mind of a feeling and thinking subject, are real, yet representations alone, supposing they agree with facts, are true.

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The problem of the origin of mind.

Mind, or the representation of facts in feeling substance, is the creation of a new and a spiritual realm above the facts of material existence. By spiritual we understand feelings that are representative; and we say that it is a new creation because it does not exist in the isolated facts of the world. It is formed

under special conditions. It rises from certain combinations of facts; being built upon those facts which produce in their co-operation the subjective state of feeling. The activity of mind if methodically disciplined is called science. Science attempts to make the mental representations correct: it is the search for truth. The object of all the sciences and of philosophy is to systematise knowledge, i. e., all the innumerable data of experience, so that we can understand and survey the facts of reality in their harmonious interconnection. The most important problem of philosophy has always been the problem of the origin of mind; for we are anxious to comprehend how it is possible that feeling can spring up in a universe of not-feeling objects, and that thinking beings can originate in a world of not-thinking elements.

Dualism assumes that the gulf between the two empires, the thinking and feeling on one side and the not-thinking and not-feeling on the other side, is insurmountable; Monism however maintains that there is no gulf, for there is no reason for such an assumption. Both realms, the feeling and thinking on the one hand, and the unfeeling and unthinking on the other hand, are not at all distinct and separate provinces. The transition from the one to the other takes place by degrees, and there is no boundary line between them. The atoms of oxygen which we inhale at present are not engaged in any action that is accompanied with feeling, but some of them will be very soon active in the generation of our best thought accompanied with most intense consciousness. After that they are thrown aside in the organism and pass out as waste products in the shape of carbonic acid.

Telepathy.

The spiritual originates from and disappears into the non-spiritual not otherwise than light originates out of, and dissolves again into, darkness. Light is usually considered as the emblem of mind, for light also discloses to our eye those objects which are so far away that we can never expect to touch them with our hands. So mind, the representation of the objective world in feeling substance, unveils the riddles of the universe and shows the secret connections of most distant things and events.

Spiritualists discuss with great enthusiasm the problem of telep-

athy. Telepathy means "far-feeling." Mental activity exhibits in all its elements instances of telepathy in the literal sense of the word. We do not feel our sense-organs; but in and through our sense-organs objects outside of us are felt. In and through our eyes most distant stars are seen. If telepathy has no other but its natural and proper meaning we must confess that the whole activity of the mind rests upon telepathy.

However, we cannot recognise telepathy in the sense in which the word is often employed by spiritualists. With many it denotes a process of such far-feeling as is not caused in the natural way and as stands in contradiction to the mechanical interconnection of causes and effects in the universe. It is supposed to supersede the order of nature. We recognise telepathy fully in the sense that feelings represent distant events and that mind can thus penetrate into the remotest regions of time and space, but not in any other sense that stands in contradiction with the universal order of mechanical causation.

What is the soul but a telepathic machine! It is an organised totality of representations in feeling substance employed for the purpose of reacting appropriately upon the stimuli of external things. Man is a part of the cosmos, he consists of a certain group of facts, belonging to and being in intimate connection with the whole universe. Man's mind is the cosmos represented in this special group of facts. A correct representation of the cosmos includes a proper adaptation. Accordingly the human soul is a microcosm and its function is the endeavoring to conform to the macrocosm.

Mind and light.

Light is a most wonderful phenomenon; and yet we know that the objective process taking place in luminous bodies and thence transmitted through ether vibrations to our eye where it causes the sensation of light, is a mode of motion that can be produced mechanically by changing simple or mechanical motion (i. e., change of place) through friction into molecular motion. As light originates out of darkness, being a special mode of motion, so feeling originates out of the not-feeling. The not-feeling accordingly contains the conditions of feeling in a similar way as potential energy contains the potentiality of kinetic energy,

or as molar motion contains potentially the molecular motion of heat, light, and electricity.

Mind sheds light upon the interconnection of all things and gives meaning to the world. If the world consisted of purely objective facts only, it would remain a meaningless play of forces. Mind and the whole realm of spiritual existence rises from most insignificant beginnings; yet is it so grand and divine because it represents the world in its wonderful harmony and cosmic order.

Continuity in the transient.

The function of spiritual activity appears to us as transient; but mind is not as transient as it seems. The continuous light of a flame depends in every instance upon the conditions of the moment. But the continuity of mind shows a preservation of mind-forms, the corresponding spiritual activity of which is called memory. Memory or the mind-form of former states is the most important factor in the determination of the representative value of present states of mind. The continuity thus effected makes it possible for mind to represent not only things and processes distant in space, but also those distant in time.

The continuation of form in feeling substance, not merely in the life of single individuals, but also in the life of the race, produces the growth, the development, and evolution of mind. Thus facts can be represented in their connections, and the necessity of their connection can be understood. To use Spinoza's phrase: The world can be viewed *sub specie æternitatis.*

Mind and Eternity.

The fulfilment of mind is truth, or a correct representation of facts, not as they are now and here, but as, according to conditions which constitute a given state of things, they must be here and everywhere. Mind expands in the measure that it contains and reflects the eternity of truth.

The activity of mind is in one respect as transient a process as is the phenomenon of light. Yet in other respects mind is able to grasp eternity within the narrow span of the moment.

PAUL CARUS.

THE MAGIC MIRROR.

THE famous time-honored saying of Rabbi Ben Akiba, "There is nothing new under the sun," has often been verified to our astonishment in the history of the sciences. No observation is proclaimed that has not been made before, no position upheld that has not been before maintained. The more extensive the survey that one acquires over any given province of science, and the more deeply one penetrates into the past history of that science, the more surely will one arrive at the conviction, that even that which is apparently very new is at bottom old.

But the unceasing progress of the natural and mental sciences, on the other hand, is an indisputable fact; and the true characteristic of this progress must consequently be sought in some other element than in the accession of new material. The subject-matter with which science deals, remains almost unchanged throughout prolonged periods of time; the treatment of that material alone changes. Accordingly, the factor that determines the extension of our knowledge is pre-eminently the growing comprehension that proceeds from the illumination of that which was before in our possession. Apples fell from trees in all ages, but Newton was the first who placed the event in its proper light, thereby creating a tangible principle by means of which a great number of other phenomena were successfully apprehended. Our system of scientific ideas was increased by the addition of one conception that illuminated phenomena hitherto but half or not at all explained.

Even the most enthusiastic advocate of the present state of

knowledge cannot maintain that it is perfect. On the contrary, he will recognise that an advance of the barriers that separate that which is now understood from what is not understood, is not only possible, but even on his part devoutly to be wished. Indeed, a very large province of knowledge—that of superstition—still remains almost wholly unworked. It is absurd to imagine that all the tales of magic and demonology are founded entirely in deception. For how could it happen that in all historical epochs, and among all the peoples of the earth, the same phenomena should be uniformly reported, if something true and real were not concealed behind it all! The illuminate, of course, looking upon our present code of ideas as ultimate, shrugs his shoulders with a superior air and banishes what to him is "supernatural" into the realm of fables; the cautious observer, on the other hand, refrains from passing judgment thus prematurely, for he knows that departments formerly very extensive have passed out of the realm of superstition into the kingdom of science, and that in the future the same will also occur. Thus the divine summons in the mediæval trial by ordeal have turned out to be effects of suggestion, and the majority of the performances of witches have proved to be the effects of hysterical temperament. So that we are now in a position to comprehend the tales of the Magic Mirror* in their true light and to bring them, without constraint, into accord with the doctrines of a developed science of psychology.

A brief recountal of the most important of the stories of this kind, must be prefaced by the paradoxical statement that the Magic Mirror need not by any means be a mirror. People are also reported to have seen future and distant things in shining metal surfaces, in rock-crystals, and in glasses filled with water. The Old Testament mentions a divination made by the radiance of *gems*—where it speaks of Urim and Thummim, the breast-ornament of six bright and six dark stones which the high priest donned to receive revelations from Jehovah. In a like manner, too, in *dactylo-*

*The Japanese "Magic Mirrors" consist of ingenious physical contrivances and are in no way concerned with our present subject.

mancy (divination by rings) the abnormal condition is said to have been induced by fixedly gazing at the stones of finger-rings. Likewise in the Bible we find an instance of divination by means of polished metal cups; for according to the Septuagint, the cup that Joseph caused to be placed in the sack of Benjamin, was the cup from which he was wont to divine. Instead of cups, use was also made of metal balls, arrows, swords, knives, and metal mirrors. Even Jacob Böhme practised the art of clairvoyance by the help of the "lovely jovial lustre" of a tin cup, "with the result that he was now introduced into the innermost depths or centre of recondite nature, and was enabled to look into the hearts and innermost character of all creatures."

When gold and silver leaves marked with mysterious characters were thrown into a basin filled with water, and it was sought by gazing at the surface thus furnished, to arouse the "higher powers," the art was called *lecanomancy*. If the surface of the water alone was gazed at, it was called *hydromancy;* a method which communicated oracles by means of the images that appeared in the water.

The only distinction between hydromancy and *gastromancy* was, that in the latter case the water was poured into distended vessels. Cardanus has minutely described some gastromantic experiments that came under his observation. A bottle filled with holy water was placed in the sun upon a white-covered table; over the mouth of the bottle two olive leaves were laid crosswise; three lighted wax candles were then placed about the leaves and fumigated with incense, during which performance a prayer to Saint Helena was uttered. Very soon the mantic adepts standing in the background saw forms in the water; once a man with a bald head, slightly inclined forward; a second time a man dressed in scarlet. Cardanus himself could see nothing more than a disturbance in the water, as if produced by the motes of a sunbeam, and a peculiar generation of bubbles.

The same principle lies at the foundation of *onychomancy*, where the thumb-nail of some suitable person, or the palm of the hand was annointed with oil and soot, and the images appeared in the shining surface illuminated either by the rays of the sun or by a

candle.* Ink was often poured into the palm of the bent hand and divination made from the reflecting surface of the ink.

It will appear from the very enumeration of these multifarious methods of procedure that the effect does not depend upon the especial character or constitution of the "magic mirror." It is a remarkable trait of human thought, however, that it first endeavors to trace all phenomena back to external facts before it seeks the cause of the same within itself: the child of nature sees in all his thoughts the inspirations of good or evil spirits, and even the modern believer finds the source of all extraordinary enlightenment not in himself but in another—the Highest Being. A very high degree of culture is requisite for man approximately to comprehend what marvellous forces slumber within him, and to what a great extent, in the truest sense of the word, he is the creator of his own perceptions and emotions. And thus it was that throughout the long space of three thousand years people did not clearly discover that in the case of magic mirrors the most important factor was the *person that saw*, and not the instruments of seeing. If we will use the word "superstition," therefore, we can justly do so with reference to the improper disposition of the two factors involved.

This incorrect interpretation of the phenomenon, as being necessarily dependent in its origin upon the material object employed, then called forth the fables regarding some particularly rare and miraculous mirror which was kept in a certain family as a holy relic, and whose possession admitted people to a knowledge of the secrets of nature and of the future. Countless sacrifices of money and human life have been made to these extravagant fancies. Indeed, even today, certain English business-houses deal in magic mirrors "manufactured after the best prescripts," and certainly derive much profit from their traffic. In all the treatises upon occult science, in those

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* The facts cited are taken from Karl Kiesewetter's essay *Hypnotisches Hellsehen*, in *Sphinx*, I, 130, 1886. Perty's work on the Magical Phenomena of Human Nature, and Adolf Bastian's treatise *Psychische Beobachtungen bei Naturvölkern* in No. 2 of the *Schriften der Gesellschaft für Experimental-Psychologie* (Leipsic, Ernst Günther, 1890), may also be consulted.

of ancient Egypt as well as in those of the present time,—and the literature of divination by mirrors (cátoptromancy) fills whole libraries,—in all I say are found directions for the manufacture of especially effective glass or metal mirrors. True, in addition to this, there is now and then a presentiment to be detected of the importance of personality. Tradition prefers in such experiments chaste maidens, pure boys, or pregnant women—a choice that despite its material faultiness at any rate pursues the correct principle of emphasising individual character.

Mirror-gazing was formerly, and is to-day, most extensively practised in the Orient. We possess an account written by Lane in 1834 of an adventure he had in Egypt in company with the English Consul Salt. The magician in charge of the ceremonies first wrote upon a slip of paper invocations summoning his two Genii; and then a few verses from the Koran, "to open the boy's eyes in a supernatural manner, ... to make his sight pierce into what is to us the invisible world." The slip of paper was thrown into a chafing-dish containing live charcoal, frankincense, coriander seed, and benzoin. A boy eight or nine years of age had been chosen at random from a number who happened to be passing in the street, and the magician, taking hold of his right hand, drew in the palm of it a magic square, that is to say, one square inscribed within another, and in the space between certain Arabic numerals; then, pouring ink in the centre, bade the boy look into it attentively. At first the boy could only see the face of the magician, but proceeding with his inspection, while the other continued to drop written invocations into the chafing-dish, he at length described a man sweeping with a broom, then a scene in which flags and soldiers appeared, and finally when Lane asked that Lord Nelson should be called for, the boy described a man in European clothes of dark blue, who had lost his *left* arm, but added, on looking more intently, "No, it is placed to his breast." Lord Nelson generally had an empty sleeve attached to the breast of his coat, but as it was the *right* arm he had lost, Lane, without saying that he suspected the boy had made a mistake, asked the magician whether the object appeared in the ink as if actually before the eyes, or as if in a glass, which makes the right

appear left. He answered they appeared as in a mirror; and this rendered the divination faultless.

A counterpart to this in more recent times may be cited. When Seringapatam was stormed by General Harris and Sir David Baird, the unfortunate Tippoo Saib retired to discover by means of divination by a cup what the future prospects were for the continuance of his rule. After he had remained seated for a long time deeply absorbed in meditation, he suddenly sprang up and in despair rushed into the foremost ranks of the combatants and fell covered with wounds; so deeply had the fatal aspect of the image in the cup moved him.

In Europe, during the period of classic antiquity, hydromancy was especially practised. The Byzantine Andronicus Comnenus also put his faith concerning the knowledge of future things, in water. Christianity denounced the practice of these magic arts as the work of the devil. St. Thomas Aquinas says that the gift of seeing visions possessed by children, is not to be ascribed to any power of innocence but to evil influences. Despite this however the art did not perish. Indeed, in the sixteenth century, under the protection of physicians and University professors, it attained the acme of its development.

The celebrated humanist Pico de Mirandola was firmly convinced of the power of magic mirrors, and declared that it was sufficient in order to read in a magic mirror the past, the present, and the future, simply to construct one under a favorable constellation and at the proper temperature.

But the most successful of all in the practice of crystallomancy was Dr. Dee, who flourished from 1527 to 1608. His seer or scryer was a man named Kelly, who could hardly be described as "unpolluted" or as "one that had not known sin," for he had been the perpetrator of so many villainies that as a testimony of his character both his ears had been cut off. A crystal served as the vehicle of the ecstatic revelations, to which according to the conception of the times numerous spirits were attached, who made themselves intelligible to Kelly by dramatic scenes and often by sounds. The Shew-Stone, or Holy Stone, was round and rather large; it is said

to have come into Dee's hands in a very wonderful manner. The large folio volume of the English mathematician upon crystallomancy was very probably used later by Cagliostro, although the latter practised a somewhat different method and used a carafe of water instead of the stone. The prophecy of the magician who predicted the regency of the Duke of Orleans through the death of the Prince, is to be noticed as the last historical case of the use of the magic mirror.

In our century Courts and Universities no longer form the stage upon which the drama of crystal-gazing is enacted, but almost exclusively the circles of the Spiritists, or, as they are commonly called, Spiritualists. Spiritualism has artfully confiscated a great quantity of psychological data, and has made an impartial examination of phenomena very difficult by always presenting the data to the novice in connection with spirit-theories. Having learned much from evil experience, the public has assumed a sceptical position with regard to everything that comes from spiritualistic quarters, and easily overlooks what is actual and real beneath the cover of uncritical drivel. I shall also introduce here one or two instances which plainly show that after the stupendous advances which made chemistry an exact science the cause of these phenomena was no longer sought in the properties of stones and mirrors, but was attributed to ghosts and spirits, by which still greater confusion was produced.

In Justinus Kerner's "Magikon" we read: "Questions are put to the unsubstantial beings that appear in shining objects and the seer hears the answer in dull tones. These beings also make signs and often appear in great numbers, but again only three at a time,—and within five or ten minutes in the case of practised scryers, but in the case of the unpractised not until a longer space has elapsed. The objects described appear in a few seconds and vanish when they are no longer needed. In Athens a female seer of this description is said to have seen a sick person in Vienna and everything described in minutest detail was confirmed by the next post. A boy who beheld absent persons and their acts in a medicine glass

filled with water is said to have discovered by this means unknown thieves."

Barth gives the following directions for crystal-gazing: "When the crystal has been ground and polished it is dedicated to some spirit or other; this is called its consecration. Before being used it is 'charged'; that is, an invocation is made to the spirit, wherein a vision is requested of the things that one wishes to experience. Ordinarily a young person is chosen to look into the glass and behold the prayed for vision. After a little time the crystal becomes enveloped in a cloud, and a tiny vision appears which represents in miniature the persons, scenes, and things that are necessary to supply the required information. When the information has been obtained the crystal is 'discharged,' and after receiving thanks for the services he has performed the spirit is dismissed."

Perty from whom I take this citation aptly adds, "One's own spirit, accordingly, is here invoked as a stranger."

The recent reports of Anglo-American Spiritualists are less crude, yet are similarly permeated by ghost-hypotheses. For example, a Mr. Rogers relates that he had put a crystal into the hands of a lady who knew nothing at all of its magical powers, yet who a short time afterwards very minutely described a scene in which a lecturer, evidently of English nationality, was addressing a foreign audience, while behind his chair the shade of a North-American Indian stood—the source of his inspiration. A few months later the lady was by chance introduced to the United States Consul at Trebizond whom she immediately recognised as the principal character of her vision, and who upon being questioned declared that at the time mentioned he had given an address at that place, and moreover, that according to the declaration of Spiritualist mediums he was controlled by the spirit of a North-American Indian.

In Germany the best known work is probably the "Visionen im Wasserglass," by Frau Adelma Von Vay, née Countess Wurmbrand. She reports in her little book some ninety experiments that were made in the years from 1869 to 1875. Frau Von Vay sees her pictures without difficulty, at times in their natural colors, at times in shades between white and black; often they are of only momen-

tary duration, then again they persist for some time or gradually melt into confused and nebulous spots. The lady dictates to her husband the description of what is presented to her gaze; the "Spirit" furnishes commentaries and supplementary interpretations, and the fulfilment or non-fulfilment of the prophecies and divinations is carefully noted down.

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Before passing on from the history of this subject to the presentation of a number of systematic experiments, and to the development of the theory underlying them, I shall briefly consider the part that the magic mirror has played in poetry and fiction. For we often find here, especially in popular poetry, fairy tales, and traditions, an artistic anticipation of ideas that only the advanced knowledge of later centuries is able scientifically to verify. The illumined eye of genius prematurely seizes upon what in the distant future becomes the conscious property of all humanity. And this is true of the half-unconscious art of the individual poet. The imagination of the poet, borne aloft by the immediate sense of truth and the self-consciousness of typical humanity, casts flashes of illumination very frequently into the dark regions of our inner world. In the facts inherent in popular instinct it discovers intuitively a multitude of combinations, long before they possess for the average perception creditable possibility, or even possible reality. The minute analysis, however, of symbolic art belongs to the most difficult problems of comparative psychology.

To present at once from the multitude of examples a singularly striking one, "The History of the Youthful King Zein Alasnam and the Prince of Spirits" may be chosen. Zein Alasnam, who possesses eight statues of great value, is in quest of a ninth of marvellous beauty, which the Prince of Spirits promises him as soon as "thou shalt bring me a young maiden who shall be at least fifteen years of age and of perfect beauty; the maiden shall not be vain of her beauty and shall have never spoken an untruth." With the help of his magic mirror, Zein, after many vain attempts,—for the mirror was always murky when he looked into it in the presence of a girl,—

finally found a maiden in whose presence a brilliant image shone forth from the mirror. By strategy Zein brought the noble girl, with whom in the mean time he had fallen passionately in love, to the Prince of Spirits—but it must be confessed that it was only at the earnest entreaty of his faithful servant, for he would have very much liked to possess the maiden himself. The Prince of Spirits thanked him and told him to return to his home where he would find the ninth statue that was promised him upon a golden pedestal in the centre of the others. Zein hastened to his palace and flew into his treasure-chamber. Upon the ninth pedestal there stood attired in silk of roseate hue, with modest blushing countenance, an immovable statue. Zein Alasnam, dazzled by the brilliancy of the other forms, stepped into the glittering circle to behold his treasure close at hand, when behold! the statue suddenly descended from its pedestal and fell into his arms. It was the same beautiful and virtuous maiden that he had conducted into the presence of the Prince of Spirits. She wept tears of joy and Zein Alasnam wept with her.

The factor here emphasised—namely, a mirror that only exhibits a clear surface to its possessor when a chaste maiden is in its presence—is not at all as fabulous as at first sight appears. It depends of course upon the person gazing whether the reflecting surface will appear murky or not; for it is a question here merely of subjective perception, and not of an objective blurring of the glass. In the case in which the girl made no impression upon the youth,—that is where the soul unconsciously passed an unfavorable judgment,—the picture will have been dimly perceived and will thus have expressed in a strangely roundabout way, that which lay slumbering in the depths of his heart. The mirror furnishes no other information than that which we put into it; but it communicates it to our every-day consciousness which knows little or nothing of the recondite processes of our inner life. The fabulous performances of other magic mirrors may be similarly explained if we discard the unnecessary adornment in which they are generally set forth. The "buch aller verbotenen kunst" (published in 1455), a mediæval collection of stories of this character, is supplied with marginal

annotations of moral purport that possess some historical value. We shall therefore transcribe a passage illustrative of its character.

"Die maister und iregleichen die treiben die kunst pyromancia auch in ainem schlechten spiegel und lassen kinder darein sehen die sie dan auch vast beswern und in auch verporgne wort einraunen und mainent vast vil darin zu erfragen. das ist alles ein ungelaub und des boesen tewfels gespenst und verfuerung. huet dich du christen, ich warn dich gar treulich. auch treibt man die sach in ainem schönen glanzen pulierten swert . . . In der kunst pyromancia sind auch gar vil ander ungelauben, und nemlich ainer der sol des gewiss sein, der ist der allerschnoedest und boesest, wann so man ie vester gelaubt an soelich zauberey so si ie mer is sünd. das stueck gat zu, das die knaben kuenftige und alle ding suellen sehen in ainem cristallen. das stueck treiben die valschen verzweifelten und verzagten cristen, den dann lieber ist des tiuefels gespenst und trugnuss, dan die warheit gottes in maniger hand weis. ettlich haben gar ain lautern schoenen gepulierten cristallen oder parillen, den lassen sie waihen und halten in gar rain und lesen dazu weirrauch, mirren und desgleichen, und wann sie die kunst treiben woellen, so warten si uf gar ainen schoen tag oder haben ain rain gemach und darin gar vil geweichter kerzen; die maister gan den gen bad und nemen dann das rain chind mit in und beclaiden sich dan in raines weiss gewand, und sitzen nider und sprechen in zauber bact, und prennen den ir zauberopfer und lassen dan den knaben in den stain sehen und raunen im in seine oren verporgen wort die suellen vast hailig sein, warlich, die wort sind tewflisch."*

Exactly one hundred years after this, a similar *pot-pourri* appeared, intermingled with references to modern affairs and Christian

* "The Masters and their like also practice the art Pyromancia in a wretched mirror, and make children look into it, whom they then do conjure and also whisper secret words in their ears, and fancy they get much information thereby. But it is all a heresy, the work and allurement of the wicked devil. Christian, have a care! I give thee honest warning. They practise the thing, too, in a beautiful, shining, polished sword. . . . In the art Pyromancia there is also much other heresy, and especially there is one that is so, the worst and wickedest of all: and the firmer one's belief in it is, the greater is his sinfulness. Here, young boys are said to behold future things and all things in a crystal. Base, desperate, and faint-hearted Christians practise it, to whom the shadow and the phantom of the devil are dearer than the truth of God. Some take a clear and beautifully polished crystal or beryl, which they consecrate and keep clean, and treat with incense, myrrh, and the like. And when they propose to practise their art, they wait for a clear day, or select some clean chamber in which are many candles burning; the masters then bathe, and take the pure child into the room with them, and clothe themselves in pure white garments, and sit down and speak in magic sentences, and then burn their magic offering, and make the boy look into the stone, and whisper in his ears secret words, which have, as they ween, some holy import: verily, those words are of the Devil."

Ethics, entitled the "Neupolierte Geschicht-Kunst- und Sitten-spiegel ausländischer Völker." Wherein we may read this:

"Es ist bekannt | dass | in manchen Staedten | bey uns | unterweilen alte Weiber | auch wol zu zeiten Männer | den Leuten | welchen GOtt eine Straffe schuldig ist | in Spiegeln und Krystallen weisen | was sie zu wissen begehren. Also hat | fuer einigen Jahren | zu Elbingen in Preussen | einer sich aufgehalten | welcher | aus einem solchen Wahrsager-Spiegel | die Verborgenheiten verkuendiget | und den Fuerwitzigen angedeutet hat. Mit dem Krystall-Gucken | wird zwar mancher | von den alten Sagen-Sprecherinnen | getaeuscht | und falsche Mutmassungen | oder behende Augenblendungen | ihm fuer eine Gewissheit verkauft: weil solche Vetteln vielmals | unter dem Schein der Wahrsager-Kunst | ihren Betrug spielen | und weder Gutes noch Boeses wissen. Nichts destoweniger stehen dennoch auch viel solcher alten Sibyllen mit dem schwarzen Kaspar in guter Vertraulichkeit und koennen | in den Spiegeln | oder Krystallen | durch Huelfe und Vermittelung dieses boesen Geistes | den Erfolg kuenfftiger Begebenheiten fuerbilden. Wie dessen Herr Johannes Rist ein merkliches Exempel erzaehlet welches er | in seiner Jugend | mit seinen leiblichen Augen | gesehen | in einer grossen Stadt: darin er sich damals | bei fuernehmen Leuten | aufgehalten | die einen feinen wohlgearteten Sohn gehabt | welcher nachgehends zu hohen Ehren-Aemtern gestiegen."*

Again, we have a "Denckwuerdige Geschichte von der Krystall-Guckery," which makes skilful use of all the fabulous elements of the magic mirror legends. It tells of a mirror that always reveals to its possessor the truth, and by means of which the future may be divined. A prominent feature of the nursery tales of to-day is discoverable in it—that if children look at night into a mirror an

*"It is known that in many of our towns old women, possibly at times men, sojourn, who show to people to whom God owes punishment that which they want to know, by means of mirrors and crystals. Some years ago one such person was staying in Elbingen, in Prussia, who predicted hidden truths by the help of a divining mirror of this kind, and announced them to his curious customers. Many indeed are deceived in crystal-seeing by the old fortune-tellers that practice it, and baseless guesses and cunning deceptions of the eye are often sold them for certainties: for these hags frequently practise their impostures only under the cover and semblance of the art of divination, knowing neither good nor bad. Nevertheless, many of these old Sibyls stand upon terms of intimacy with Black Kaspar, and are able with the assistance and intermediation of this evil spirit to foreshow in their mirrors and crystals the issue and outcome of future events. Such was the remarkable case that Herr Johannes Rist tells of, which he saw in his youth with his own corporeal eyes; it was in a great city wherein at the time he was staying with very distinguished people who had a handsome and well-mannered son who afterwards rose to high offices of honor."

ugly, forbidding face will gaze out upon them. The book, however, presents few interesting details, and we may therefore pass it and others of the same period by in order to hasten on to the present.

And to whom would not the name of Hoffmann at once occur! He who delighted to employ, and weave in the magic web of his fiction, all that was marvellous and mysterious, will undoubtedly have dealt with the subject we now have in hand. In fact the magic mirror has three times figured in his works: once in "Der Goldene Topf," again in the "Lebensansichten des Kater Murr," and finally in the novel "Das öde Haus." A few passages may be taken from the last-mentioned novel as illustrations of the point we are considering.

A small forsaken cottage bears an evil name; it hides a secret from the world.

"This was what people said in the town, and I who tell this story could get no rest with thinking of it; daily I walked by the house with the curtained windows. Once, as I was passing, I saw the curtain move and a beautifully-shaped hand adorned with a brilliant diamond ring place a crystal carafe upon the window-sill. The memory of this picture aroused in my mind a visionary dream, and on the following day when I looked up to the window at which the hand had appeared, the countenance of the vision I had seen was regarding me with a look of sorrowful entreaty. I seated myself upon a bench opposite, the back of which was turned to the house, so that by leaning over the arm I could gaze without disturbance at the fatal window and the lovely maiden. Absorbed in contemplation, I failed to observe an Italian pedlar who was offering me his wares. But being seized by the arm I at last gave attention to the importunities of the pedlar, who, with the words 'I have other beautiful things here,' pulled out the lower drawer of his box, and held at a short distance before me, at an angle, a little round pocket-mirror that lay in the drawer among a number of other trinkets. I beheld the desolate house behind me, the window, and, marked in the distinctest outlines, the lovely angelic form of my vision. I quickly purchased the little glass, which now made it possible for me, in easy posture and without attracting the attention of the neighbors, to look towards the window of my hopes. . . . The little mirror that so deceptively reflected the lovely form, I had now devoted to domestic purposes. I was in the habit of tying my cravat before it. And so it happened once, while I was in the act of performing this important duty, that it appeared tarnished to me. With a view to brightly polishing it, I breathed upon it in the usual manner. My pulse ceased its beating, my heart trembled with delight and dismay. Delight and dismay! Yes, thus I must

describe the emotion that overpowered me, as, when my breath fell upon the mirror, I beheld in a bluish mist the lovely face that had looked upon me with that sorrowful, heart-penetrating glance!—You laugh?—Denounce me, believe me an incurable dreamer! But say and think what you will—it is enough—the fair one gazed upon me from the mirror, and as soon as the breath disappeared her face vanished in the darkness of the glass.

"But I will not weary you, I will not tell all that came of this. Only this much will I say, that I again and again renewed my experiments with the mirror, that I was often successful in calling forth by my breath the picture I so loved, but that oftentimes my most strenuous efforts were in vain. . . . I lived only in the thought of her; all else was dead to me; I neglected my friends and my studies. . . . Often when that picture grew pale and wan, a physical indisposition seized me, the figure came forth as never before with such life-like reality and brilliancy that I almost fancied I could seize it. And then it seemed to my horror that I myself was the figure, veiled and encompassed by the mists of the glass. A sharp pain in my breast and then total apathy terminated this torturing condition, which invariably left me exhausted, and shaken to my inmost core. In these moments every attempt with the mirror miscarried; but when I had become strengthened, and the picture appeared again from the mirror in life-like form, I cannot indeed deny that a peculiar physical charm otherwise foreign to me was united with it. . . ."

We see what brilliantly colored creations tradition and fiction have woven about the magic mirror. It is now the duty of science to cull from these shining husks, by sober investigation, the kernels of truth; and that, it will be seen, can be done only by experiment. Unfortunately I myself am unable to report any successful experiments; for, despite repeated attempts, I have been unsuccessful in obtaining any images whatever from mirrors, or crystals, or reflecting surfaces of any kind. Similarly several members of the Berlin Society of Experimental Psychology have only had exclusively negative results to recount. But on the other hand, a member of the English Society for Psychical Research has been enabled to report a great number of pertinent observations. And although to my regret I am not permitted to publish the name of the lady* in question, yet every doubt as to the truth of her utterances is excluded, and the material she has furnished forms a valuable enrichment of psychological literature. I shall, accordingly, collect from the com-

* I afterwards received permission to publish her name: it is Miss A. Goodrich of London.

munications of this lady, who is a friend of Professor and Mrs. Henry Sidgwick, several cases which appear to me especially adapted to throw light upon the nature of the strange phenomena we are examining.

The lady made more than seventy experiments of her own, of which—a fact of the greatest value for passing upon their exactness—she always made notes at once, or at the most never more than an hour afterwards. She employed various means for the production of the hallucinations. At first she used the colored balls that are hung upon Christmas trees, or the back of a gold watch; but it turned out that both these objects tried the eyes by their strong brilliancy and grotesquely distorted the visions that were evoked. A glass filled with water proved to be inconvenient to handle, especially in the dark; while mirrors also possessed many disturbing peculiarities. A magnifying glass set on a dark background proved to be very effective, especially by daylight; as did also a black-framed photograph placed upon the wall of the room opposite the light. The gaze and the attention, however, were best concentrated upon a well-polished rock-crystal. The method of procedure—since happily all the appurtenances of mysticism were discarded—was very simple. The lady draped the crystal in black, placed it where none of the surrounding objects could be reflected in it, and waited for whatever might happen.

What occurred? The simplest instance is perhaps No. 7, which we here introduce:

"I find in the Crystal a bit of dark wall, covered with white jessamine, and I ask myself, 'Where have I walked to-day?' I have no recollection of such a sight, not a common one in the London streets, but to-morrow I will repeat my walk of this morning, with a careful regard for creeper-covered walls. To-morrow solves the mystery. I find the very spot, and the sight brings with it the further recollection that at the moment we passed this spot I was engaged in absorbing conversation with my companion, and my voluntary attention was preoccupied."

This is a very simple case. A visual image, recently yet unconsciously received, springs up from the subterranean strata of the soul into which it had sunk. No. 68 affords a similar instance:

"I had carelessly destroyed a letter without preserving the address of my correspondent. I knew the county, and searching in a map, recognised the name of

the town, one unfamiliar to me, but which I was sure I should know when I saw it. But I had no clue to the name of the house or street, till at last it struck me to test the value of the crystal as a means of recalling forgotten knowledge. A very short inspection supplied me with 'Hibbs House' in grey letters on a white ground, and having nothing better to suggest from any other source, I risked posting my letter to the address so strangely supplied.

"A day or two brought me an answer, headed 'Hibbs House' in grey letters on a white ground."

Tricks of the memory like these appear still more strange when they are due merely to an indirect excitation. It may happen that one is suddenly reminded of a friend who is long since dead, by the accidental sight of his favorite dish. No direct excitation is here presented, but the image of the friend remembered is indirectly revived through a certain concatenation of ideas. This we find in the eleventh experiment:

"One of my earliest experiences was of a picture, perplexing and wholly unexpected—a quaint oak chair, an old hand, a worn black coat-sleeve resting on the arm of the chair,—slowly recognised as a recollection of a room in a country vicarage, which I had not entered and but seldom recalled since I was a child of ten. But whence came this vision, what association has conjured up this picture? What have I done to-day? . . . At length the clue is found. I have to-day been reading Dante, first enjoyed with the help of our dear old vicar many a year ago."

The process here carried on, which takes place for the most part outside of the sphere of consciousness, is therefore the following: The reading of Dante revives the image 'Vicar'; the image 'Vicar' produces the image of the room; the latter image is externalised.

But we can penetrate *consciously* into these processes. There are any number of people who, with their eyes closed, can produce phantasy-pictures surprisingly realistic; and geniuses especially have command of rich powers in this direction. George Sand's biographer tells us, that sitting at the feet of her mother before the chimney fire, she would often watch the old green-colored fire-guard in order to form from the reflections of the flames figures and scenes. And this is the case of our English lady. Just as an imaginative child tells itself stories, so she, to while away the time, builds in the twilight hours groups of figures, and projects them into her crystals; and so strange is the unconscious "I" to the conscious "I," that oft-

entimes the miniature drama that is unfolded is the source of the greatest surprises to its own creator. This independence of our consciousness in two spheres, is exhibited with surprising distinctness where especial aids and expedients must be employed to decipher the visions. Thus :

"On March 20th, I happened to want the date of Ptolemy Philadelphus, which I could not recall, though feeling sure that I knew it, and that I associated it with some event of importance. When looking in the Crystal some hours later, I found a picture of an old man with long white hair and beard, dressed like a Lyceum Shylock, and busy writing in a large book with tarnished massive clasps. I wondered much who he was, and what he could possibly be doing, and thought it a good opportunity of carrying out a suggestion which had been made to me, of examining objects in the Crystal with a magnifying glass. The glass revealed to me that my old gentleman was writing in Greek, though the lines faded away as I looked, all but the characters he had last traced, the Latin numerals LXX. Then it flashed into my mind, that he was one of the Jewish Elders at work on the Septuagint, and that its date, 277 B. C., would serve equally well for Ptolemy Philadelphus! It may be worth while to add, though the fact was not in my conscious memory at the moment, that I had once learnt a chronology on a mnemonic system which substituted letters for figures, and that the memoria technica for this date was 'Now Jewish Elders indite a Greek copy.'" (No. 74.)

The employment of a magnifying glass, which by reason of external difficulties is seldom possible, is a convincing proof of the degree of independence of the two personalities within us. Anything more marvellous than the fact before us can hardly be imagined. We create something which is immediately wrested from our control and which leads a totally independent life ; we produce something which becomes for our own selves a mute enigma, and which can only be aroused by artificial means out of its ghost-like silence.

> "The rent that gapes throughout creation,
> Goes also through the human heart."

And thus it may happen that our second "I" actually mystifies at times our first and principal "I."

Once a number of letters appeared to her in the crystal, each letter seen separately, of a bright red color. At first they seemed to be absolutely meaningless, but it was at length discovered that they composed words, spelt backwards, in the following fashion :—

d e t n a w a e n o e m o s o t n i o j a e t a v i r p e l c r
i c t s u m e b g n i l l i w o t e v i g s e v l e s m e h t p
u o t e h t t c e j b u s

and the message at length became intelligible as follows :—

"Wanted a someone to join a private circle, must be willing to give themselves up to the subject."

We now come to a third group of experiments in which an entirely new element enters into play. Whereas hitherto we have seen things revealed in the magic mirror which were demonstrably or presumably already present in the brain of the operator, or, where this was not the case, in any event possessed no external significance, we now hear of experiments in which unknown events are said to have been presented. I should take no notice whatever of this class of reports regarding clairvoyance in space and time, if our informant did not give the impression of being thoroughly conscientious and scientific. The English lady possesses, as I believe I have discerned from our correspondence, a highly critical mind, and is well acquainted with the common sources of error in this department of investigation, and her testimony is in my opinion more valuable than that of all the early authors together. It were indeed more acceptable if the results of recent investigations had been to show that all the phenomena of crystallomancy were referable to the hitherto misunderstood dominance of the soul of the individual gazing ; but since a number of cases remain that will not fit into this explanation, we must as honest people openly acknowledge the fact. Accordingly, without attempting any detailed explanation, I shall select a few cases as illustrations, leaving it to the reader to discard them as "accidental" or to retain them as worthy of consideration :

"On Saturday, March 9th, I had written a somewhat impatient note to a friend, accusing her of having, on her return from a two months' absence on the Continent, spent ten days in London without paying me a visit. I was not, therefore, surprised, when on Sunday evening she appeared before me in the Crystal, but could not understand why she should hold up, with an air of deprecation, what appeared to be a music portfolio. On Monday I received an answer, written the previous day, pleading guilty to my charge, but urging, in excuse, that she was attending the Royal Academy of Music, and was engaged there during the greater

part of every day. This intelligence was to the last degree unexpected, for my friend is a married woman, who has never studied music in any but amateur style, and who, according to the standard of most ladies of fashion, had "finished her education" some years ago. I have since ascertained that she, in fact, carries a portfolio corresponding with the sketch I made of that seen in the vision." (No. 64.)

The simplest explanation of this case would be the assumption that our informant had at some time or other cursorily heard of her friend having again taken up music. The whole thing would then be a revived memory; and the agreement in appearance of the portfolio seen with the real portfolio, an accidental coincidence. But this presumption being excluded, psychologists who believe in the possibility of telepathic communication might propose a different explanation. In this way. The lady's friend, in writing her note of excuse, is vividly thinking of her work, which is to her to a certain extent represented by her portfolio, and conveys this picture to the receptive sub-consciousness of the other lady. There the image lies latent until it is translated into sensory life through the agency of the magic mirror—the very process with which we have at a previous place become acquainted, and will more exactly explain further on. The question, therefore, is reduced simply to the truth of the premise first assumed—namely, telepathic communication; and all that we can at present say, is, that it is considered as an actual fact, upon the basis of personal experience, by many prominent investigators, but is rejected by the majority as undemonstrated. For our part, we admit that an hypothesis of this kind would prove to be very useful, since reports similar to the last mentioned one, have recently been published in great numbers. We select as an illustration the following note by Mrs. L. M., from the Proceedings of the American Society for Psychical Research:

"I was anxious to see a Mr. H., but was uncertain on what day he would call. On the 19th [July, 1887] I was called out of the office, and, before going out, I put on the door a card having these words on it, 'Will return soon.' I was absent about an hour. On my return I came upstairs, but did not ask the elevator boy if any one had called; nor did he tell me any one had done so. As I came within a short distance of the door, I saw some characters written upon the card I had left, and just below the printed words 'Will return soon,' I stooped down and read, 'Mr.

H. has been here, and will return.' As I looked the words faded away. I entered the office, and in a very short time Mr. H. came in. He had left no name or message. He had impressed my face upon his mind very strongly, with the intention of seeing if I would be in any way affected by it, or conscious of his approach."

If the fact of accident, intensified by the strained expectation of Mrs. M., cannot be accepted as a satisfactory explanation, it is to be considered that the white surface of the card in this case acted in the same externalising manner as the crystal in the instance given just above. The remotely-operative excitation penetrated the soul unobserved, and was first translated into a conscious image at the moment when the glance at the card favored the formation of hallucinations.

Finally a number of other cases are to be mentioned, in which even these suppositions seem insufficient; and for the reason that the events seen were not to happen until some future time. But that which has not yet happened, and which is not to be foreseen in detail, can neither originate in the repositories of memory, nor from the telepathic influence exercised by another person. We should in that case be obliged to accept some hypothesis of clairvoyance in time—*granting of course that all sources of error are excluded.* The reader may judge for himself:

"In January last I saw in the Crystal the figure of a man crouching at a small window, and looking into the room from the outside. I could not see his features, which appeared to be muffled, but the Crystal was particularly dark that evening, and the picture being an unpleasant one, I did not persevere. I concluded the vision to be a result of a discussion in my presence of the many stories of burglary with which the newspapers had lately abounded, and reflected with a passing satisfaction, that the only windows in the house divided into four panes as were those of the Crystal-picture, were in the front attic and almost inaccessible. Three days later a fire broke out in that very room, which had to be entered from outside through the window, the face of the fireman being covered with a wet cloth, as a protection from the smoke which rendered access through the door impossible." (No. 36.)

Is this a case of prevision? Granting that the agreement of the facts with the vision is not due to mere accident, the possibility yet remains of a falsification of memory; that is, the possibility that a vision originally *similar* to the event afterwards observed, was

subsequently taken to be the *same* as that event. Such obscurations and falsifications of memory are very frequent. Indeed they get to be epidemic, the moment a second factor, that of *expectation*, is added. We need only have a foreboding that something will eventually happen, and we shall inevitably form certain indefinite notions of its particular character. If now the event actually happens, our obliging memory is at once at hand with the lie, '*Exactly* as I knew before.' 'I told you so,' is the assertion. And it is therefore no accident that in the literature of clairvoyance, the arrival of letters of this or that tenor plays so great a part; for expectation has a broad and acceptable arena in this very connection. The extent to which the falsification of memory and intense expectation take part in the observation which we shall now cite, it would be hardly possible to determine accurately:

"On the evening of March 11th, being tired, I was about to go early to my room, when it occurred to me to wait for the last post, already late, that I might not be again disturbed by having the letters brought to my room. I took up the Crystal rather to pass the time than with much expectation of seeing anything; for as a rule, when one is tired, the concentration of attention necessary to Crystal-vision is somewhat difficult to attain. However, I perceived a white object on a dark ground, soon becoming more clearly defined as a letter in a very large envelope torn at the edges, as if not sufficiently strong to hold its contents. Another envelope, of ordinary size, lying at the top, concealed the address, and the writing on the smaller one was too much blurred to decipher. The vision was momentary only, or I might have applied the test of the magnifying glass, which is sometimes, though not always, of use in such cases. I thought it possible that the vision might be merely the result of expectation, but it seemed at least worth while, after making a note of the fact,—my invariable rule whenever possible,—to test its significance. As a matter of fact, the letters were lying on a seat in the hall, showing white against the dark polished wood—placed there possibly by some one leaving the house who had met the postman before he had time to ring. The letters were two,—the lower one, which had burst the envelope, was the size of a sheet of letter-paper not folded, and was for myself, the upper one, the usual size of a note, and not for me, which may have accounted for my inability to read the address." (No. 66.)

I repeat it—with accounts of this character, though in the highest degree acceptable, science cannot at present deal; and in proceeding now to attempt an explanation of the phenomena illustrated by the experiments of the English communication mentioned,

I shall entirely leave out of consideration the cases that point to telepathic causes or clairvoyance in time and space.

We have already made the acquaintance of some few theories which have arisen historically. Formerly, and even at the present day in fact, certain objects and qualities of objects were made accountable for the occurrence of striking hallucinations. The great cycle of legends that adhere to the magic mirror, has thus arisen. Often a pentahedronal quartz-crystal, often the fusion of the seven ancient metals into polished surfaces was supposed to possess especial virtue. Gregory, of Edinburgh, asserted that the phenomena were most easily produced by looking into a double-convex plate of zinc into the centre of which a small polished copper disk had been set. We now know that in the importance attached to these and similar directions the salient point was missed and an incidental factor pushed into the foreground. But in any event it is worthy of remark, that through belief in notions of this kind the seer gained a greater confidence in the success of his experiments. Even incorrect theories prove to be useful. When any one finally came into the possession of a famous magic stone, his firm belief in its powers induced a disposition to visions that perhaps never before existed in his organism to the same degree.

A second hypothesis regards the phenomena as manifestations of the Devil or the work of spirits. Dr. Dee gives a very minute description of his regular spirit visitors. He tells of an old woman in a red petticoat, and of a pretty little girl with her hair rolled up in front and hanging down very long behind. This constant personification is very significant, since it indicates the approach of recognised forms of mental alienation; however, the "Daimon" of Socrates proves that it does not in every case necessarily lead to this. We are come, here, into a border-land, from which some roads lead into the dark regions of insanity and others up to the luminous heights of inspired genius: but in every case we are concerned with a region in *our own* mind, and no natural propensity to externalisation must be allowed to deceive us with regard to it. The intrusion of foreign "spirits" into our psycho-physical organism, the assumption that incorporeal beings influence our nervous

system so as to produce external effects, violently contradicts all human experience. If the spiritist doctrine could be mathematically proved it would be the most interesting solution imaginable of all these problems; and I must confess, the establishment of the existence of intelligent incorporeal beings would in my opinion eclipse all other events of our time. But the probability of this is at present *very* small.

A third theory, of modern origin, seeks the explanation of the question in a species of magic power inherent in man, as yet unfathomed, which is manifested especially in ecstatic conditions. The vehicles of the *magic gaze* are shining mirrors or reflecting surfaces, which forming a means of attraction for individuals of the proper constitution induce that peculiar state of alienation from every other subject, that concentration in the innermost self, which often rises to insensibility and unconsciousness, or even to cataleptic torpidity, wherein the consciousness of All-existence is liberated. Future events and distant occurrences are seen in pictures which appear to be reflected in the mirror or the fluid employed, but which in reality exist in the person gazing and are represented by projection outwards. Thus Perty.

Other philosophers speak of the "transcendental" capacities and powers of the human soul, or of the liberation of a metaphysical essentiality within us.

But these theories and suppositions are plainly the outcome of a premature simplification of our difficult problem. People are always too ready to thrust forward a new "power" or "force" to unify with dispatch and celerity uncomfortable phenomena of the present sort, and overlook the fact that every single phenomenon demands an exact investigation and explanation. Nothing is accomplished by calling phenomena "magical" or "transcendental." The work demanded is, to ascertain the connection and relation of the phenomena in question with the province of soul-life as a whole. To put an x in the place of a y contributes nothing to the solution of a problem. We cannot be too closely upon our guard against comprehensive syntheses of this character; for their splendid appearance dazzles woefully the eye of research.

Much nearer the truth is the position that hypnosis merely is concerned here. A well-known author, Louis Maury, who wrote in the middle part of this century, says :

"Among the principal methods of divination a great number aim at producing a sort of vertigo by acting upon the eyes and consequently upon the brain, in a manner something like that in which shining bodies act in hypnotism."

Mrs. De Morgan speaks in a similar strain :

"Crystal-vision is a well attested fact, having its laws and conditions like other phenomena in this world of known and hidden causes, and a little careful observation may clear away some of that obscurity which has kept it as the property of witches and sorcerers. The Crystal . . . . seems to produce on the eye of the seer an effect exactly like what would ensue under the fingers of a powerful mesmeriser. The person who looks at it often becomes sleepy. Sometimes the eyes close. At other times tears flow."

Mrs. De Morgan's very description renders it doubtful whether we have to deal here with true, developed hypnotism. Other accounts are also calculated to shake this assumption. Cahagnet, for example, required only a moment of mental concentration for his eyes to become fixed ; he lost all sight of the objects he had a moment before gazed upon, and those which he wished to call up appeared between him and the former. All spontaneous visions were fulfilled. When voluntarily evoked, but seven out of ten were true. When he wanted to produce the visions he fixed his eyes upon the first fit object, and he often saw hundreds and thousands of persons running hither and thither in one little shining point. Or he beheld a great city distinctly drawn in a mirror but one inch in diameter. This is not very easily reconciled with our conceptions of the character of hypnotism. Nor less so—to close our list of examples—the observations of an experimenter mentioned by Mrs. De Morgan, that the perceptions of crystal-vision are not interfered with by those of normal vision, but that the percipient could discontinue her observation at will, and returning would find the scene as she left it.

There is evidently involved here the condition of mind called "temporary" or "momentary" hypnosis, or what Eduard Von

Hartmann more aptly calls "masked somnambulism." It is not fully developed hypnosis, but simply its incipient forms—hypnoid states of manifold variations. Now the question arises, Of what do these states consist? What are their essential characteristics? And how are they to be psychologically explained? For even our appeal to hypnotism simply puts a new empty name into the place of an old one. If we do not understand hypnosis, its production for the explanation of the magic mirror profits us very little. The task, accordingly, presents itself of referring, in connection with some psychological theory of hypnotism, the well-established facts at our disposal to one and the same cause.

The theory from which I shall proceed in attempting an explanation, has already been frequently touched upon in the course of this article; for certain observations indicated it so clearly that mention of it was not to be avoided. It is the doctrine of the double consciousness of the human soul.* Acts are done in the course even of our every-day life, which presuppose for their origin and execution all the faculties of the soul, yet nevertheless occur without the knowledge of the individual; they require a sort of consciousness and a separate memory beyond the *cognisance* of the normal person. One of the most frequent cases in practical experience is where the thoughts of a person reading aloud wander and become occupied with an entirely different subject; and where despite this aberration the person in question reads correctly with the proper emphasis and expression, turns the leaves, and in short performs acts which without intelligent control are hardly conceivable. An English psychologist, Mr. Barkworth, has acquired such expertness in the practice of this, that during an animated debate he can rapidly and correctly add long columns of figures without having his attention diverted in the least. This points not only to an unconscious intelligence, but—which is of still greater consequence—

* Compare my treatise *Das Doppel-Ich*, the first number of the "Publications of the Society of Experimental Psychology of Berlin," Leipsic 1890, Ernst Günther. I must refer here, moreover, to an acute criticism of my views by Adolf Bentivegni, published as No. 4 of the above-named series, and entitled *Die Hypnose und ihre civilrechtliche Bedeutung*, Leipsic, 1890. The views set forth in the present article will be found in the German magazine *Vom Fels zum Meer*.

to an unconscious memory. Mr. Barkworth must keep two series of figures in his mind in order to obtain from them a third; this latter sum he is again obliged to retain in order to add to it a newly acquired fourth; and so on. The latter chain of memories, let it be remarked, performs its office entirely independently of that upon which the recollection of the debate is constructed; and it may therefore be reasonably maintained that there exists beyond the cognisance of the individual, both consciousness and memory; and if the essential components of the ego are found in these two last-mentioned factors, then every person conceals within himself the germs of a second personality. I designate the two halves of consciousness that thus operate in greater or less independence of each other,—in a figurative sense of course,—as super- and sub-consciousness, and comprehend the whole as the doctrine of double consciousness or the double ego.

The division very clearly appears in the opposition between waking and dreaming. Even when we very accurately remember a dream which we have just had,—which happens very seldom,—we feel the difference of the two states of consciousness with unmistakable distinctness. We have no power over the tricks that phantasy plays with us in our sleep, and in spite of the often present belief that it is all but a dream, yet every power fails us of penetrating into its independent activity. Moreover the images are generally of a very definite signification, since they are merely reproduced from the store-house of impressions that have sunk into the unfathomable depths of our soul. In this way many a dream reveals to us the true character of our Self; in this manner subbasal dream-images exhibit the thoughts and emotions that principally occupy us in our innermost heart. Closer investigation teaches further, that in dreams, states of intoxication, in somnambulistic and epileptic attacks, not only does a consciousness different from the normal consciousness rule, but that also between separate successive periods memory-links of greater or lesser stability are wont to form. But this is most strikingly exhibited in the case of hypnosis. The hypnotic state is nothing more than an artificially produced ascendancy of the secondary or subordinate ego. All its

peculiarities are explainable from this; for psychology endows the dream-consciousness prevailing in this state, with sensibility and suggestibility, the waking consciousness on the other hand with the inhibitory ideas that represent reality. It has established, moreover, that our fully conscious soul-life rests upon an automatically operating substratum of hallucinatory character, in which images, long since forgotten, have their abode. By virtue of these properties the subconsciousness becomes the source of bold and fantastic creations, while the superconsciousness is made the vehicle of our psychic life-work, laboriously sustaining and regulating itself in its relations with the outside world.

To this conception, which explains crystal-visions as a *form of the activity of the subconsciousness*, it will be variously objected, that such a simultaneous coexistence of two divisions of consciousness does not possess the same degree of probability as an alternation of states of consciousness. But how, upon this latter supposition, could the "Hibbs House" case be explained? In this instance, two psychical groups do not alternate, but one operates during the existence of the other.

Further, the propriety in general is questioned of speaking of half-conscious or unconscious ideas and mental processes. It is the opinion of the Göttingen philosopher G. E. Müller, that just as every excitation of the brain immediately occasioned by a sensory stimulus is not competent to produce a sensation, so also all reproduced nervous excitations are not necessarily accompanied by perceptual images. In the cases mentioned, and in many others, there is no reason why groups of true *psychical* states should be admitted, which, in contradistinction to other psychical states, only lack consciousness; on the contrary, we have to deal with simply a series of nervous excitations, which, as distinguished from other excitations, are not accompanied by corresponding states of our consciousness.

This conception of soul-life, which has been of late very favorably received, Hugo Münsterberg has formulated thus—that the psychical phenomenon is to a certain extent the subjective internal aspect of a thus and thus constituted objective physical phenom-

enon. We are to bear in mind that the succession of the physical processes is nowhere interrupted, and that in addition certain of these physical processes, those namely which are carried on with a certain intensity in particular apparatuses of the brain, possess a psychical internal aspect; so that this excitation of the nervous cells is, without losing thereby anything in physical effect, the condition of the appearance of certain sensations in consciousness.

But by the side of the physiological theory legitimately exist as possibilities a psychological one and a psycho-physical one. It is the doctrine of the latter theories that not only are physical vestiges left behind in the cortex of the brain after every perception, but also psychical dispositions to the formation of ideas and images; and that it is possible for images of all kinds to continue to exist without distinctly attaining to consciousness. These theories distinguish between degrees of luminosity in our percepts and images, the three most important degrees of which I have designated as consciousness, subconsciousness, and unconsciousness. There exists a gradation of degrees of consciousness, and the fully-conscious course of mental representation is everywhere conditioned by its connection with the obscured spheres beyond. Our attention surveys but a small area, on the boundary lines of which the altitudes of consciousness decrease, and finally approach the zero point. I say *approach*, for they never reach it. Our experiments with the magic mirror in fact show us how the oldest impressions, and impressions of ridiculous insignificance, after long long years awake as it were from the slumber of the fabled Sleeping Beauty. If our millions of perceptions were to live on in *consciousness* we should no longer have a past, but live in a continuous celestial present; but were the operation of consciousness so limited that it destroyed great numbers of images, the very facts upon which the belief in supernatural powers rests, would lose their only rational explanation. One result of our study of crystal-visions is assuredly this, that we shall have to erase the word "forgotten" with all its derivatives from the dictionary, and at the most employ the phrase "not remembered." With more ardent yearning than ever before will we long for a river of Lethe,

and join with our whole hearts in the cry of Themistocles, "O that some one might teach me the art of forgetting!"

Along with the inner process the outward form of the hallucination still requires a brief explanation. The circumstance, namely, which lends magic-mirror phenomena their salient feature, is the sensory reproduction of the images that have sprung up from the subconsciousness The subterranean ideas produced do not reach the surface as thoughts, but as pseudo-perceptions. To refer the latter to the place to which they belong, I shall first remind the reader of the well-known after-images which arise when an excitation produced in the sensory organ and in the sensory nerves does not immediately disappear with the cessation of the excitatory action. By gazing at the sun we can at once obtain this effect. But despite the fact that the last-mentioned class of images possesses the full distinctness of real sensations as distinguished from mere memory and imagination images, they still bear no relation to our subject on account of their union with *recently* occurring sensory impressions. Still less do the repetition-sensations in the dark field of vision—as of revolving wheels—belong here; or illusions. There remain accordingly only *hallucinations*, which are withdrawn from all conscious control, and which possess the exact character of sensory perceptions externally awakened, without any object or objective stimulation actually being present in the outer world to correspond to them.

Hallucinations, the production of which are facilitated by the fixation of shining surfaces, do not occur with all persons; and there may be a kernel of truth in the tradition which designates women and children as endowed with especial capacities in this respect. The investigations of Fechner upon the varying vividness of after-images; the statistics of Galton upon hallucinatory phantasms in artists; and the extensive statistical work of the Society for Psychical Research, appear to point to a connection of this character. Miss Goodrich told me that her dreams were few in number and colorless. I must confess that I was surprised at this; but she added that all her recollections of places were accompanied with the vividness of actual sensory impressions. If, for example, she

desires to describe a room in a friend's house, she returns in recollection to the occasion of her last visit; she again occupies the same chair; the carpet at her feet becomes visible, then the furniture nearest her, then the walls and ceiling, until a true picture of the whole room is extended before her mind's eye. Crystal-visions are distinguished from internal visions of this character only by the single circumstance that they are projected outwards to or upon a reflecting point. These visions often consist of a room that Miss Goodrich has lately seen, or a street sign, or of some movement that has startled her, as of a servant letting a plate fall, or of a dog running under a wagon. No consideration that the objects are not before her is of avail; the force of out-rushing memory-formations and the acquired established connection of the elements of soul-life are reduced to the primitive state that obtains in the soul of a child, to whom life is in reality a dream without definite limits. I well remember from the period of my early boyhood, the peculiar sensation of a state flickering between reality and fancy, and I understand the condition of those primitive tribes with whom dreamland and life intermingle in the strangest way; but capacities in this direction have disappeared down to the striking want of a normally developed faculty for colors.

* * *

Summing up then, we may say, that with regard to their *contents* the phenomena produced by the agency of the magic mirror proceed from the realm of subconsciousness; and that with regard to their *form* they belong to the category of hallucinations. Their contents, not regarded as a performance of memory, appear to possess no great value—so grotesque and ordinary are the few ideas brought up from this invisible storehouse. But they often supply us with a deep view into the secrets of character, and inculcate with terrible emphasis the truth that nothing is lost in the realms of the soul, any more than in the external world which is ruled by the law of the conservation of energy. Every thought that ever traversed our brain, every emotion that has ever thrilled our heart, every wish that has ever animated for a fleeting moment our breast—has all been entered in ineffaceable characters in the day-book of our earthly

existence. Would that this knowledge could strengthen our feeling of moral responsibility!

Thus does the expansion of our psychological conceptions not infrequently lead to an enrichment of our notions of morality. But whether we place a higher value upon this aspect last mentioned, or upon the purely scientific object to which we referred at the beginning of our article, or finally upon a factor connected therewith, namely the enlightenment of society—at any rate we must confess that in the much abused "magic mirror" a rich and attractive source of treasures has been opened.

MAX DESSOIR.

HÖFFDING ON THE RELATION OF THE MIND TO THE BODY.

FEW topics are of greater speculative or indeed practical interest than that of the relation of the body to the mind. Rarely has the subject been treated with such perspicuity and at the same time with such candor and avoidance of hasty dogmatism as by Professor Harald Höffding, of Copenhagen, in his "Psychology" (translated into German from the Danish and published in Leipsic, Reisland). A leading American professor of philosophy remarked to me recently that this for its size (the volume contains 452 pages) was the best all-around work on Psychology; and an examination of the section entitled *Seele und Körper* (Mind and Body) certainly gives countenance to the statement.

Professor Höffding does not indeed oppose himself to metaphysical speculation; he believes that the human mind will never consent to being shut out from the task of searching after the ultimate principles of the universe, of which it is a part. But his standpoint in this work is the purely empirical one, as one's standpoint must be in every positive science. Positive science deals with the facts of experience; metaphysics with their ultimate explanation. He regards it as a misfortune to confuse the two, as popular thinking in psychology does; and scientific thinking in this realm is characterised by the effort to avoid the confusion and keep solely to the facts of observation and experience. Accordingly both materialism and spiritualism are excluded from the field—each theory involving a transcending of the realm of experience, i. e., being metaphysical.

There are two subdivisions of the realm of experience according to Professor Höffding,—one coextensive with psychical phenomena, such as feelings, thoughts, and volitions, the other with physical phenomena, i. e., with what moves in space. They may be called respectively inner experience and outer experience. Each must be grasped in its distinct features; and only after doing so can we feel the *problem* involved in the question of their relation to or connection with one another. For it happens that one set of outer experiences stands in an indisputably peculiar relation to the phenomena of consciousness, namely, the set which we describe by the term "body" and, more particularly, by that of "nervous system" or "brain." Much of what we call the physical world stands in relation to consciousness as the thing known to the knower; but a part of the physical world (i. e., the body or brain) seems a part of the knower as well—a body or nervous system of some kind seems an indispensable requirement or at least concomitant of anything like feeling, or thought, or act of volition.

Now, different as the movements of the nervous system, the processes of the brain are from the phenomena of consciousness, there are a number of resemblances between them. Professor Höffding specifies six: (1) As the nervous system is the central, unifying organ of the body, so does consciousness bring together into a unity all the varied phenomena of experience, scattered though they be in time and space. (2) Just as a change is necessary that consciousness may be awakened, (an absence of contrasts tending in the direction of unconsciousness,) so a stimulus is necessary that the nerves may act. (3) A stimulus may produce a commotion in the nervous system out of all proportion to its immediate efficacy, just as a spark may act on a magazine of powder; so a simple sensation may set in motion a whole train of ideas and emotions, owing to the complicated structure and multitudinous inner relations of consciousness. (4) The movements of the body are slow in proportion as they are conscious; now the nerves which appear to be closely related to consciousness act more slowly than those which direct purely physiological (i. e., unconscious) processes. (5) The lower nerve-centres form a system comparatively independent of the

higher ones; corresponding to this is the fact that many bodily processes go on unconsciously and only make us aware of them when the circumstances attending them are particularly favorable or unfavorable. The *consciousness* of the physical state corresponds to the excitation of the higher nerve-centres. Similarly the action of the will has its physiological counterpart; in the struggle between "the flesh and the spirit," the lower nerve-centres with their reflex and involuntary actions correspond to the flesh, the higher centres to the spirit. (6) The construction of the nervous system is similar to the constitution of consciousness; just as consciousness is at once receptive and active, with more or less of intervening reflection or thought, so the nervous system has both sensory and motor organs, with an intervening sphere.

Not only are there these formal resemblances, there is a real connection, according to Professor Höffding, as is shown by the fact that with the evolution of the nervous system go higher and higher forms of consciousness, that irritation on the surface of an organism must be communicated to the brain that conscious sensations may arise, and that when arterial blood fails to reach the brain unconsciousness supervenes. What hypothesis do these facts conduct to us? All of them must be born in mind that any special hypothesis may be legitimated. There are only four possibilities: (1) Either consciousness and the brain, mind and body, act upon one another as two separate things or substances; (2) or the mind is only a form or product of the body; (3) or the body is only a form or product of one or more mental substances; (4) or mind and body, consciousness and the brain, grow and develop as different manifestations of one and the same substance. It must be admitted that the author at this point somewhat deserts the empirical standpoint to which he declared at the outset that he should keep. The *facts* of correspondence or parallelism are all that come within the realm of experience; their *explanation* must be more or less a matter of inference and theoretical construction and involves a departure in the direction of metaphysics. Professor Höffding is aware of this and says that these hypotheses belong to the border-land between positive science and metaphysics. Moreover, he confesses

that any conclusion he may reach will have only a provisional value and may need revision, before it can serve as a final part of a philosophical system. He will, however, follow as closely as possible the leadings of experience, as indeed he says we should do in all metaphysical speculation.

In considering the first hypothesis, (namely, that mind and body act on one another as two things,) Professor Höffding shows that it is inconsistent with the law of the conservation of energy. For, at the point where the nervous process is converted into mental activity, one sum of physical energy would disappear without being replaced by another sum of the same kind. As matter of fact no disappearance of energy takes place on account of the arising of a conscious state. The chain of psychical causation is not broken; its completeness no more suffers than if states of consciousness did not arise at all. Nor on the other hand does consciousness affect the sum of physical energy; it is hardly conceivable that it should even change the *direction* of such energy (the sum supposably remaining constant, as is sometimes held), since to do this it must itself become a physical force. Moreover, if there is a relation of cause and effect between the brain and consciousness it would seem as if an interval of time must elapse between the process in the brain and the rising of the conscious state, a view to which the teachings of physiology lend no likelihood.

The second hypothesis regards matter as the real or actual thing and mind as an effect or form of it. Such materialism is certainly older than the now prevalent doctrine of the interaction of two distinct things. Homer and the earliest Greek philosophers held to it. Similar views prevailed among the early Christian fathers before Augustine. Modern materialists, however, regard the mind, not in the earlier fashion as semi-corporeal, but as a function or form of the corporeal. Yet when we closely consider the matter, we find that to conceive of the function of a bodily organ is simply to conceive of that organ as in activity. As Goethe said, "Function is das Dasein in Thätigkeit gedacht." But a bodily organ in activity is just as much corporeal as one at rest, and anything without corporeal attributes can no more be the function of such

an organ than it can be the organ itself. The conception of function (in the physiological sense) as truly as that of matter implies something that exists in spacial form; while thoughts and feelings are without spacial form.

In dealing with the third hypothesis, (namely, that body is a form or product of mind,) Professor Höffding does not so much criticise it as explain a modified and interesting form in which Lotze held it. It is not, however, the view which he adopts.

To the fourth hypothesis he gives his adhesion. The parallel and proportional relations between consciousness and brain-activity point, according to him, to an underlying identity between the two. One and the same principle, he says, has found its expression in a two-fold form. The physical interaction between the elements of which the nervous system is composed, is an outward form of the inner ideal unity of consciousness. What we immediately experience as thoughts, feelings, volitions, has its physical representation in certain brain-processes, which as such are under the law of the conservation of energy, though this law has no application to the relation between brain-processes *and* consciousness. It is as if one and the same content were expressed in two languages.

This conclusion, however, he repeats, is but an empirical formula and has provisional value only. One substance, he says, acts in both consciousness and the bodily organism, but what kind of a substance is this, and why does it have this twofold form of manifestation? These are questions, he replies, beyond the reach of our knowledge. We can simply make a statement which seems to be required by the facts, namely, that the same thing which lives, grows, and takes on form in the outward world, apprehends itself inwardly as thinking, feeling, and willing. No opinion is thereby ventured as to whether mind or matter is the more original form of existence. By no means is metaphysical speculation upon this question excluded. The hypothesis of identity (for so Professor Höffding terms it) is consistent with philosophical idealism and also with the view that the innermost nature of being is not identical with consciousness. He simply claims for it that it is the most natural conclusion with regard to the relation between two

empirical sciences, physiology and psychology. These sciences, according to the hypothesis, treat of the same material viewed from two different sides, and there can be no more conflict between them than between one person who looks on the convex side of a circle and another who looks on the concave side (to borrow an illustration used by Fechner).

On another occasion I may give my own views, and content myself now with saying that I have followed with the greatest interest and with much (if not unlimited) satisfaction the treatment of the subject at the hands of the genial, large-minded Danish professor.

W. M. SALTER.

LITERARY CORRESPONDENCE.

FRANCE.

THE work of M. Fouillée which I announced in my last communication (to your other magazine), bears the title of *L'Evolutionnisme des Idées-Forces*. It is a voluminous work; and it contains a great many things—perhaps too many. We have from M. Fouillée, the promise of a constructive work—*La Psychologie des Idées-Forces*, in two volumes; but his present book is chiefly devoted to the labor of demolition. As contemporaneous psychology has its weak sides, and as M. Fouillée is a skilful critic, you may imagine that his attacks upon Wundt, Herbert Spencer, Taine, Ribot, W. James, and numbers of others, both living and dead, are conducted with spirit. The successful fulfilment of the task he has set himself would necessitate the ruin of the hypothesis, avowed or concealed, that has supported psychological research as well as furnished occasional excellent conclusions; for it is the aim of M. Fouillée to overthrow what he has ingeniously termed the theory of "idea-reflexes," and the place once cleared, to substitute for it the theory of "idea-forces."

The chief feature of the book is therefore M. Fouillée's criticisms of the theories "that make consciousness the intermittent illumination of a mechanism"; of the theories "that reduce the sentiments and the emotions to simple reverberations of organic movements and even of expressive movements"; of those finally "that make of desire and the feeling of effort, simple passive muscular sensations, the reflexions of movements already executed." Solid

objections are not wanting in these pages. M. Fouillée does not refrain from playing when he has a good hand.

So far so good. But—we ask—would psychology have ever made any advances if it lacked the hypothesis that M. Fouillée condemns? And, as a matter of fact, are the majority of psychologists really thus irretrievably bent upon establishing a mechanical explanation of life, a theory of "man as automaton"? The truth of the matter is that the opposed point of view has rendered no results, and that in taking consciousness for our central position we too easily go astray in fanciful speculations. On the other hand, by the endeavor to grasp the bonds of mind through the medium of the body, it *has* been found possible to throw some light upon unobserved facts. It would not do to let this be too quickly forgotten; and if some have seen fit to pass beyond and to attempt to reduce the Universe to a mechanism, imprudent saltations of this character into open materialistic metaphysics concern them alone.

Will M. Fouillée be more fortunate in his reduction of the world to idealism? It yet appears doubtful. The definition of 'idea-forces' presents at the outset elements of embarrassment. That every idea, every mental image, however absolutely an image it may be, of emotions or of passions, always contains some motor elements, and consequently acts like a force, is easily comprehended, and every body allows it. When physiologists speak of the power of ideas, they mean nothing else. But beyond that we cannot go. The idea, in M. Fouillée's sense, is every state of consciousness. Now, all the facts of consciousness are reducible to the following elementary connected process: sensation, perceptual excitation, reaction; and the three factors of this process cannot be separated or reduced to one. Every idea, or state of consciousness, is accordingly the source of motion since it contains desire. Desire is basal to the nervous act; the nervous act does not precede and does not explain the higher states that psychologists, viewing things from a different point of view, have regarded as epiphenomena. The essence, not only of man, but also of the world, is desire. The idea-force, "the abridged formula of the appetitive

process," becomes the shaper of universal evolution, and, in a word, the physical is a reflection of the psychical.

Such are, if I am not deceived, the chief propositions of the work, put into a logical form, from which no doubt you will judge that the facts do not correspond without evident hiatus.

You do not believe in absolute truth, and I no more hope for it. The mind does not escape certain illusions, which come from what it necessarily places in the reality that it wishes to know, or which it acquires from itself. Meanwhile both the opposing doctrines triumph, seeing that there is always something in each that cannot be explained; but let them not be too severe on each other, and not forget that if they succeed in explaining something, it is perhaps as well that they resign themselves to not explaining everything.

I had intended to give in this letter a detail of the theory of Mme. Clémence Royer, in order to compare it with that of M. Fouillée; I had prepared it from certain published memoirs, as her great manuscript work has unfortunately not found a publisher. But *The Open Court* has given a résumé of it sufficiently complete to excuse me from returning to the subject. Whatever service can be rendered by the hypothesis of Mme. Clémence Royer, or, more strictly whatever use can be made of the mathematical formulæ which explain them, or which are deducible from them, it will belong to special scientists to inform us. She begins the explanation of the world by physics, and M. Fouillée by psychology. It is a difference in the point of departure. Let us add that M. Fouillée appears to imagine an activity without substance, a mind without muscles, if it can be thus expressed; on the contrary, in that which she calls world-stuff Mme. Clémence Royer distinguishes a hyperethereal or vital state, and she assigns for the substratum of life this simple state of the cosmical substance.

Opposed as may be the character of the minds of these two authors, the two theories seem to coincide in the notion of a living and conscious monad. We meet it when they are farthest apart! Thus, for Mme. Clémence Royer, life and consciousness are everywhere, they are in the atom, and from the beginning. There, in the great "romance of being," is a scene which reappears almost

always the same. As to the ultimate explanation we have no great choice, and each of the hypotheses that we form almost produces the other. All the value of a system of philosophy is really in the help it lends to scientific curiosity or to the conduct of life.

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M. Ernest Naville is one of those who cannot comprehend moral conduct in life apart from spiritualism. He endeavors, accordingly, in a work called *La Physique Moderne*, to prove that the study of the phenomena of matter does not imply materialism and does not necessarily lead to atheism. The argument of M. Naville is well worn. We shall grant to him only that "it is necessary to avoid implicitly solving questions by saying that we do not deal with them at all." On the whole, this pledges to nothing. Practically, and in good faith, abstention is nevertheless a solution.

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I have now to point out *L' Esthétique d' Aristote et de ses Successeurs*, by M. Ch. Benard, an *Etude sur Francois Bacon* by M. J. Barthelemy St. Hilaire, and *L' Anthropologie Criminelle et ses Récents Progrès*, by M. Cesare Lombroso. M. Bénard is one of the good old masters, who, what they do know, know well, and his book is one of those that it is profitable to possess. The study of M. Barthélemy St. Hilaire is followed by the Report on the Memoirs presented to the Academy of Moral and Political Sciences, which had proposed as a subject "The Philosophy of Bacon." As to M. Lombroso, the celebrated Italian criminologist, he has wished to reply to the objections that have been made to his views, especially by the French medical alienists at the Congress of 1889, and this is why he has written on this occasion in our language: he supports by new facts the notion, hitherto contested, of a "criminal type."

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The last work of which I have to speak, is the *Souvenirs de M. Charles Mismer*,* of which the third volume which recently appeared, has for its title *Souvenirs de la Martinique et du Mexique pen-*

*In course of publication by Hachette. The other works mentioned are published by Alcan.

dant l'Intervention Francaise. There is in these volumes no express philosophy, as this term is understood, but they are the work of an observing, reflecting mind, and in these pages one sees a man living and growing. In the course of his adventurous existence, M. Mismer, already instructed by experience, by chance acquired knowledge of the *Cours* of August Comte ; he became attached to it, and found there an opening into sociology, a tie by which to link together his personal ideas. He afterwards published several articles* in the Review conducted by M. Littré, and he records to-day in his *Souvenirs* the valuable observations which he has had occasion to make on very different races of men and strongly opposed social states. He is one of those whom the philosophic spirit has led to a philosophic life, and the persons who read his work will thank me for having made them acquainted with a unique and worthy character.

LUCIEN ARREAT.

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* A part of these articles formed a volume entitled *Principes Sociologiques.*

BOOK REVIEWS.

THE WAY OUT OF AGNOSTICISM, or, THE PHILOSOPHY OF FREE RELIGION. By *Francis Ellingwood Abbott*, Ph. D., Boston: Little, Brown & Co.

"This book aims to show that, in order to refute agnosticism and establish en-"lightened theism, nothing is now necessary but to philosophise that very scientific "method which agnosticism barbarously misunderstands and misuses . . . It aims to "develop the philosophy which must (consciously or unconsciously) underlie any "and every free religious movement or institution: namely the philosophy which "results from the faithful application of the scientific method to the universe as a "whole."

The author further observes that "nothing is more common or more confusing than a loose vague and indeterminate use of this phrase" [scientific method] and that his object is "to give definiteness and scientific precision to a much abused expression by showing that the Scientific Method . . . is neither more nor less than the SCIENTIFIC THEORY OF UNIVERSALS APPLIED IN PRACTICE TO THE ACQUISITION OF KNOWLEDGE."

Now whether or not the identification of the scientific method with the practical application of the theory mentioned, will give the much needed definiteness and precision, depends very much upon the definiteness and precision of that theory itself.

The Scientific Theory of Universals, the author tells us, receives "no adequate exposition" in this book. We are in possession, however, of several other publications of the author, one of which—"Scientific Theism"—is largely devoted to that purpose.

We will endeavor in a spirit of studious candor and fidelity, to state as well as we can the essentials of that theory. We must protest, however, that we cannot undertake to clear up the obscurity that must necessarily involve any theory that is stated by the aid of such shifty and inconstant terms, as objective, subjective, knowledge, relation, existence, reality, etc., when the same are used without rigorous definitions of the respective senses thereof that are intended.

The Scientific Theory of Universals affirms, that objectively real individuals do exist, that objectively real genera do exist, that objectively real relations do exist, that the objectively real genera are in every instance constituted as such by that

set of objectively real relations uniquely appropriate to it; that in every instance of a genus the objectively real relations "reproduce" themselves *in specie* in the mind separate from aught of the objective realities that are brought into relation by them, that these "reproduced" relations in the mind constitute the subjective concept that is designated by the word appropriate thereto, and that the single objective Universal is *at once* and integrally the objective genus, the subjective concept, and the term or word. The Universe is the *summum genus*, concept and word, which is, means, and expresses the correlated totality of all genera together.

Dr. Abbott neglects reference to genera of purely mental existences, and relies for proof of his theory upon the single argument that no postulate is used that Science has not taken for granted, and proved by the finding that the facts are in agreement with the postulates.

Now "the only possible justification of any theory is that it makes things clear and reasonable." In this theory the central and controlling position is that the objectively real relations invade the mind in person and there obtain as the concept.—This doctrine is so far as we can see the original idea of Dr. Abbott and must be considered as his contribution to philosophy. It is by this that his work is to be tested. Does the addition of this new postulate clear up any obscurity?—Is this new postulate one of the assumptions of Science?

The truth about this whole matter of universals seems to be that it belongs to the theory of notation primarily, and then to psychology and ontology.

The mind proceeds to obtain correspondence with its alternative by analysis and synthesis. The recognition of difference or otherness is an indispensable condition of consciousness itself. One phase of the recognition of difference is that activity called abstraction. But along with difference comes the recognition of what is different from difference, or likeness in all its grades and involutions. The sense of relation, and the impulse of generalisation also arise, and altogether these mentalities become effectual in virtue of some system or some plexus of systems of notation. Long before man ever began to reflect upon his mental operations and the means or tools employed on that behalf, his mental manners and customs had become a second mental nature. What warrant have we for taking these mental manners and customs as the same are reflected in ordinary language as adequate criteria for the world-problems, or even as representative of the very constitutional laws of thought itself? Just as philosophy found it profitable to postpone ontology to psychology, so it is submitted may it again find it profitable to postpone psychology to a study not merely of language but of notation generally, of which the notation of mathematics will undoubtedly be found the most significant. Here we have distinction, abstraction, assimilation, relation, and generalisation carried on and carried out with unchecked thoroughness, and systems of universals ascertained that not only correspond exactly with every acquired and incoming item of our experience, but are also in respect to one another continuous throughout the whole of their range. It will be impossible for any one who once appreciates the

nature and competence of mathematical notation to regard any theory of universals relating to ordinary language as a solution of its problem that does not conform to the perfect models set in mathematics.

Dr. Abbott claims that *scientific method* is neither more nor less than the application of his theory. Granting that science makes the same presumptions, can scientific method be said to be neither more nor less than the application of his theory in any other sense than it could be said to be neither more nor less than the application of the theory of the existence of matter, energy, ether, and mind?

The scientific method consists not in its data but in the ways in which it deals with its data, in other words it consists in its logic. It observes and infers. It never stops to inquire if what it observes are the "things in themselves" or only phenomena. That is an utterly inconsequential question to it. It tests the validity of inductive and hypothetical inferences by comparison with experience, and phenomenal experience is every whit as good a criterion for it as any other. It has a metaphysics of its own which is mathematics and which it acknowledges as the supreme and unquestionable arbiter over whatever of its presumptions and theories that arbiter may undertake to govern.

No philosophy that neglects to comprehend and apply the now supremely important methods and results of mathematics can be anything but an ineffectual attempt. No doubt this will seem to most of those who affect philosophy a statement worthy only of scorn. Prof. Crystal, at the close of his article on "Parallels," in the ninth edition of the Encyclopedia Britannica "calls the attention of those who busy themselves with mental philosophy" to that geometrical subject and its affiliations "as one of the results of modern mathematical research which they cannot afford to overlook." We can imagine with what an air of conscious eminence one or more of our dilettanti philosophers may have perused this suggestion, wondering what in the world parallels and measurement have to do with philosophy.

But, nevertheless, so it is that a new departure in philosophy has been made inevitable by the stupendous researches of modern mathematics and this the philosophical world is just beginning to find out. It seems to us, that the incomplete view taken by Dr. Abbott will prevent that success for his theory which his most distinguished ability might otherwise achieve, and which his devoted efforts well merit.

F. C. R.

RACES AND PEOPLES: LECTURES ON THE SCIENCE OF ETHNOGRAPHY. By *Daniel G. Brinton*, A.M., M.D., etc., etc. New York: N. D. C. Hodges.

These lectures, which are dedicated to Mr. Horatio Hale, the veteran philologist and ethnographer to the United States exploring expedition in 1832–42, go over a very wide ground. The ground traversed is, indeed, so extensive that Dr. Brinton feels bound to apologise for being often superficial, as otherwise he could not have compressed into so small a space the subjects of which he treats. This apology must necessarily to some extent disarm the critic, although it should do so

only where a conclusion is not supported by sufficient evidence. Where a statement made is not merely unsupported by, but is contrary to, the best evidence available, the author must expect to be called to account. We were prepared to act on this principle, thinking that possibly confession like charity would be found to cover a multitude of sins, but we must admit that with certain exceptions, the chief of which are to be found in the lecture on "the psychical elements of Ethnography," we were mistaken.

We do not propose to follow the author in his classification of the varieties of mankind, or in his views of the origin of the various races into which they are divided, both of which will meet with keen opposition from most of the anthropologists of Western Europe, although those of Germany may receive them with more favor. We are concerned chiefly with the opening and the closing chapters of the work before us, from which we may draw some conclusions bearing on the race question, that disturbs the minds of so many people in this country. Dr. Brinton remarks that the physical traits of man are correlated to the physiological functions in such a manner as profoundly to influence the destiny of nations. He adds that from the physical point of view, the pure white is weaker than the dark races, worse prepared for the combat of life, with inferior viability; but in the white this is more than compensated by the development of the nervous system and intellectual power. The white "can bear greater mental strain than any other race, and the activity of his mind supplies him with means to overcome the inferiority of his body, and thus places him at the head of the whole species." It might be supposed that a mixture of races having these different qualities, would result in the formation of a hybrid race, superior to either of the parent stocks.

Dr. Brinton, who is strongly opposed to the practice of miscegenation, endorses the opinion that the offspring of a cross between the white and the black races are deficient in physical vigor, and that such hybrids gradually die out. He admits, however, that it was not so within the African area in early times, and he suggests that special causes are now at work to affect the results of race-mixture. One of these is the fact that the white blood is derived exclusively from the father, and the dark blood exclusively from the mother. Now, if it be true, as is supposed, that physical qualities are derived chiefly from the father and the psychical qualities chiefly from the mother, we may reasonably expect, as is indeed recognised, that the children of such unions will be physically superior to members of the black stock, although inferior to those of the white race. It is admitted, moreover, that mulattoes are, as a rule, intellectually superior to pure negroes; so that miscegenation is undoubtedly of relative advantage to the immediate offspring, whatever may be its result on their descendants. What Dr. Brinton and other writers of the same opinion object to, however, is the deterioration of the white stock. If there was any reason to believe this possible, the objection would have weight. But it supposes miscegenation to become general, which, in the first place, is an event which could never happen, unless the women of this country descended to the level

of a Messalina. And in the second place, Dr. Brinton admits that "in the earlier conditions of social life, no such debility attended the crossing of the Eurafrican [white race] and African race as seems at present to be the case." It is possible, therefore, that if the mixture of the two races became general, and were regarded as perfectly legitimate, the present physical and intellectual debility attending such unions might disappear. We do not advocate miscegenation, but we wish to point out, that those who oppose it under the present limitations of our knowledge, do so either on insufficient grounds, or because they are influenced, consciously or unconsciously, by sentimental considerations.

We are glad to see that Dr. Brinton does not endorse the views so prevalent among English Ethnologists as to the existence of "communal marriage" among the lower races of mankind. In his recent work on "The Origin and Development of Marriage and Kinship," Mr. C. Staniland Wake has dealt exhaustively with that subject, and shown that the "marriage law" is fully recognised among the most savage peoples. We cannot accept Dr. Brinton's statements where he says that the Australian aborigines are led to associate "by much the same motives as prompt buffaloes to gather in a herd," or when he speaks of the "rare" custom of polyandry, or declares that mutual affection has no existence among the Australians and many other tribes, and that romantic love is practically absent among the African and Mongolian races. Our author is equally at fault when he says that no Asiatic nation respects truth telling, and that "the idea of independent personal ownership does not exist among them." These errors, and such mistatements as that "the excellent results of the extension of the Slavonian supremacy in Central Asia have been studiously ignored by British writers," which are due to Dr. Brinton's preference for Continental authorities, are serious blemishes. Nevertheless, his book is an excellent one, and we can heartily recommend it as an introductory Manual of Ethnology. Ω.

STUDIES IN HEGEL'S PHILOSOPHY OF RELIGION. With a Chapter on Christian Unity in America. By *J. Macbride Sterrett*, D. D., Professor of Ethics and Apologetics in Seabury Divinity School. New York: D. Appleton & Co.

These studies in Hegel's Philosophy of Religion, except Chapters III and VIII, claim to be something more than a mere expository paraphrase of Hegel, although following Hegel's argument in Chapter IV. The author's purpose is strictly theological and *apologetic*. His work is written with faith, and in the interest of "the faith." In fact, in England and America the theological rather than philosophical interest taken in the study of Hegel has mainly been called forth by the supposed intimate relation of his thought to religion and to Christianity regarded as the absolute, full, and final religion. To this pseudo-Hegelian school of England and America, Hegel, above all, is radically a *theologian;* all his thoughts beginning and ending in that of divinity. It regards Hegel's Philosophy of Religion as the very

heart of his thinking, as "the highest bloom of his philosophy." It is supposed to reconcile Christian theology with the modern science of religion (or comparative religion), with anthropology, and with the classification of positive, pre-Christian religions. American students of Hegelian philosophy, as a rule, do not desire to be regarded as Hegelians. "Bound to swear in the name of no master in philosophy, and only in the name of Christ in religion, would better characterise them all. They are simply using his *method* . . . . they are getting great help, and looking for still greater from the method, which was greater than even Hegel's own employment of it." Hegel's method is thus declared to be greater than himself, and is received like an article of faith. In these studies, while freely discussing and criticising all that Hegel has thought or said upon the subject of the philosophy of religion, the author entirely omits to enter into a critical discussion of precisely the most important point; namely, the absolute value of Hegel's philosophical *method.* He overlooks the interesting fact, that all that is permanently true and great in Hegel was really reached by Hegel himself, and understood, from a point of view that was *diametrically opposed to his own accepted method;* in glaring contrast to his evolution of the logical idea, and to his theory of "pure thought" or "reines Denken." "To reconcile reason with religion, by finding reason in religion and religion in reason," is doubtless a correct Hegelian statement, yet, at the same time, it only expresses an exclusive, one-sided aspect of the system.

There was a time when the Hegelian system ranked as a foremost intellectual phenomenon. It was, perhaps, the highest that philosophy ever had achieved; but its manifest fault consisted in its being a purely philosophical and *a priori* system. A philosophy that existed in external opposition to the sciences remained only an empty abstraction, just as force when severed from the phenomenon, or Deity when opposed to the outside world. Hegel's philosophy ultimately recognised, that force only is or exists in the phenomenon; that the internal itself constitutes the external, the Deity is only present in the universe, the infinite in the finite. Any philosophy proclaiming all this must be said to have succumbed with a vengeance to its own dialectic process.

A philosophy of this kind would seem to have signed its own death-warrant—or according to the popular German saying, "hat selbst den Stab über sich gebrochen!" And thus it really happened to Hegelianism—we mean to *genuine German* Hegelianism. From that moment it forfeited its claim to be regarded as the highest truth. It was compelled to step forth out of its one-sided exclusiveness, out of its opposition to empirical science. Hegelianism was not expected to effect any kind of compromise or reconciliation with empirical science, because any yielding on its own part would have been illogical, and could only have brought about a momentary truce, but no lasting peace. On the contrary, Hegelianism had to suffer the infinitely bitter pang of self-immolation. It had deliberately to commit suicide, in order thereupon to be welded with empirical science into a much higher and more comprehensive *unity*. In other words,—in fact *in Hegel's own words* —

"when the old principle thus reappears, it is no longer what it was before, for it is changed and purified by the higher element into which it is now taken up."

The Hegelian system was thus compelled to acknowledge, that not only must philosophy agree with experience, but moreover, the creation of a philosophical science premises as an indispensable condition the hypothesis of an empirical science, which itself implies that the ideas of space, of time, of movement, and of matter cannot be obtained *a priori*,—that is before the experience of the things themselves,—or be purely evolved, according to the Hegelian method, from the logical idea. To attempt to reconcile reason with religion by finding reason in religion and religion in reason, is simply to evolve *a priori* a philosophy of religion from the logical idea. This is believed to be possible by means of the mystic factors—"the Hegelian method" and the "Logos." The original contents of eternal reason itself—of the *logos*—are supposed to exist within our mind in a form that constitutes our inmost truth; our spontaneous logical thinking coincides with the innate eternal reason in form and contents, and thus attains to the full revelation of itself.

But all this is purely an hypothesis, or a kind of belief in reason, "der Glaube an die Vernunft!" Hegel himself in conclusion was forced to admit that philosophy must closely observe the method of nature. (See Encycl. III, 22.) The editor of Hegel's Philosophy of History (Gans, page XV) says, "Hegel did not wish to personate the deity that creates or evolves history, but to be a man who contemplates created rational history"; and Hegel himself says (page 13), "we must take history as it is; we have to proceed according to an historical, empirical method. . . . . Only from the study of history itself are we allowed to infer that historical events are really rational events." And in Hegel's "Naturphilosophie," (page 24,) and elsewhere there are to be found perfectly analogous passages.

It cannot be denied, that the author of this work on Hegel's philosophy of religion has made a deep study of all the vast details of the Hegelian system; but his one-sided theological criticism exclusively aims at representing Hegel himself as a theologian. This American pseudo-Hegelianism may probably have had the effect of stimulating American thinkers, but in other respects it has only retained the phantom and empty shadow of Hegelianism, playing fast and loose with the old system under the captious name of the "Hegelian method," and making a free use of its obscure, obsolete phraseology. The cry "back to Kant" by English Neo-Kantianism, is declared to mean a speedy return to Hegel's method, and to be only the first step of the protest "against temporary, materialistic, and psychological thought."

The last chapter, in the form of an appendix, is devoted to the discussion of "Christian Unity." The author deplores the current abstract conceptions of the church, and regards them as the main obstacle to its visible organic unity. The Hegelian ideas on religion and the state are believed to suggest a more concrete, historical view, and to destroy the abstract conception. γνῶν.

THE PHILOSOPHY OF NECESSITY; OR, LAW IN MIND AS IN MATTER. By *Charles Bray*. Third edition, revised and abridged. London and New York: Longmans, Green, & Co.

This work was originally published in 1841, and comprised an Exposition of the Doctrine of the Philosophy of Necessity, or the Law of Consequences, first, in its relation to Mental Science, secondly, in its relation to Ethics, and thirdly, an application of its principles to the social questions of the day. The third part has been omitted from the present edition, as being out of date, but many of its statistics and observations are given as an Appendix. In a prefatory note it is stated as a reason for preserving in an accessible form the conclusions arrived at by Mr. Bray, that he "worked out for himself a theory as to the purpose of existence that satisfied his own mind, and became to him a cheerful philosophy which intensified his enjoyment of all things good and pleasant, helped him to bear the troubles of life, and to meet the end in a spirit as bright as it was resigned"—a statement which those who knew him personally will heartily endorse.

Mr. Bray's theory is embodied in the title of the work under review, and its key-note is "order in nature." His object is to show "that the mind of man is not an exception to nature's other works; that like everything else it has received a determinate character; that all our knowledge of it is precisely of the same kind as that of material things, and consists in the observation of *its order* of action, or of the relation of cause and effect." According to this view we can know the real nature of neither matter nor mind, Nature herself having fixed the boundaries beyond which human knowledge cannot extend. It would be a mistake, however, to suppose that Mr. Bray regarded Nature as something apart, giving to man laws from the operation of which it is itself free. A little consideration shows that such is not his idea. Nature is with Mr. Bray only another name for God. Moreover, man is nothing, God is all; "individuality, or anything separate from Him, is a mode of thought, and has no real existence." Electricity, heat, light, and other forces of nature are modes of the Unknowable, and are transformable into each other and into the other modes which we distinguish as sensation, emotion, thought. The qualities or properties of matter are mere force or power, and as they are qualities of God, the assumption of the existence of matter is not necessary. God "is the Universal Being, of which all things are the manifestations. Every thing is a mode of God's attribute of extension; every thought, wish, or feeling, is a mode of His attribute of thought."

To Mr. Bray the only *reality* is God, the great Unknown, and as He is also the Unknowable, we have in the Philosophy of Necessity a system of Agnosticism. And yet Mr. Bray is hardly consistent with himself. For, unlike Mr. Herbert Spencer, he speaks of God in terms of Spirit, which becomes in his system identical with force. When, moreover, he declares that "the whole sensitive existence is but the innumerable individual eyes with which the Infinite World Spirit beholds Himself," we have a kind of Monism. This view however recognises God as "the

only real and efficient power in the universe," and, as the Great First Cause and the Great Last Cause of all things, a Divine Being. Mr. Bray does not enter into the question of the personality of God, but that he supposes the Deity to possess consciousness is evident from his reference to the Great Soul of Nature, and his statement that the operation of its forces is governed by thought. His ideas are summed up in the words, "we feel ourselves a part

> "Of that stupendous whole,
> Whose body nature is, and God the Soul."

Holding this opinion, Mr. Bray could not be otherwise than a Necessitarian and an Utilitarian in his practical views. These are well shown in his treatment of the question of the freedom of will, as to which he accepts the opinion of Locke that a man is free within the range of the preferences or directions of his own mind. Mr. Bray's own conclusion is: "Since, then, the only freedom we have is limited to action in accordance with our natural powers and capacities, our aim must be to develop fully these powers and capacities, and to remove all impediments, external and internal, to their free and complete action. There must be no external compulsion from physical impediment, or internal compulsion from defect in the mind itself; no obstacle to the full exercise of our natural powers both of body and mind. Education in its full meaning is the developing and perfecting of all these powers."

Ω.

Geschichte der Ethik in der Neueren Philosophie. By *Friedrich Jodl.* Volume II. Kant and the Ethics of the Nineteenth Century. Stuttgart: J. G. Cotta.

In this volume Professor Jodl continues his history of theoretical ethics; starting with Kant and coming down to contemporary philosophers. His work is thus mainly concerned with the classical philosophy of Germany till Feuerbach's time, and the spiritualistic and positivist philosophy of France and England down to the time of Cousin, Jouffroy, and Mill. Professor Jodl has been obliged to forego his original intention of appending to his work an epitome of the logical constructive results of his investigations, and has exclusively applied himself to the investigation and historical presentment of the fundamental and central principles of the ethical thought of the past century. He has therefore ever held in view the economical and historical purpose of his work, and avoided on the one hand an exposition of all systems in which originality of principles is lacking, and on the other abstained from the critical examination of the systems of his contemporaries. Thus he has aspired, by the constant emphasis of central basal principles and of the points whereon all have agreed, to refute the belief that the history of his science is a chaotic mass of contradictory views, and that ethical opinion presents in its historical expression only diversity, and never community of mental possession. Professor Jodl has only collaterally dealt with the non-ethical literature and tendencies of the times of which he treats, and he has disclaimed all intention of portraying the effects and influence that ethical systems have produced and exerted in

practical spheres; France and England being the only instances in which, for manifest reasons, the discussion of literature and politics has preceded the criticism and analysis of philosophies. Nevertheless, his work throughout is interspersed with many well-judged and apposite thoughts upon the effective, though not always apparent, influence of a nation's intellectual activity upon its practical conduct of affairs; as well as, also, regarding the lamentable fact that, often, a people are violently and dangerously engaged in the solution of questions that their thinkers have solved decades before.

Let us look at Professor Jodl's examination of the historical position of Kantian Ethics. The element of non-interest in ethical judgment we find not to have been first emphasised by Kant. Whatever the success and worth of their speculations, a great many of Kant's predecessors sought to realise this very factor in their systems; thus it was with Plato as opposed to Protagoras, with Shaftesbury and Butler as opposed to Hobbes, Locke, and Hume; while Cudworth, Clarke, Wollaston, and Price were similarly actuated by the purely speculative consideration. Kant's real and original advance upon previous systems of ethics, was his emphasis of the element of conscious volition in ethical judgment and the statement of its imperative character. It was just in this last respect that his ethical philosophy formed so marked a contrast to the eudæmonism of the seventeenth and eighteenth centuries. The imperative and absolute nature of duty, eudæmonism neglected to inculcate; Kant aroused the conscience of his time, and presented in contrast to the moral weakness then prevalent the strength and earnest grandeur of an absolute conception of duty.

So too in the conflict between the metaphysics of ethics and the practical postulates, wherein the great philosopher displayed so much ingenuity, Professor Jodl is unable to distinguish Kant's position very sharply from that of the English intellectualists when in a similar plight. Not that the idea of the practical postulates is valueless; this Professor Jodl afterwards explains. Our historian merely shows that Kant had not yet gotten clear of the ancient conflict that had agitated the Schoolmen of the Middle Ages as well as the utilitarian and rationalistic theologians of more modern times. Yet despite the mysticism that inheres in Kant's argument for the practical existence of God, the kernel of the truth he emphasises in the alliance of ethics with religion still remains; namely that religious ideas are essentially ethical, that in this relation only have they meaning, and that religious ideas which are ethically valueless are to be uncompromisingly discarded.

Especial attention should be called to Professor Jodl's estimate of Feuerbach, whose merits have been strangely neglected. Feuerbach's ethical system, in perfect form, has not been independently set forth in his works, but is intermingled with the subjects dealt with in his religious treatises. Yet he left few of the fundamental questions of ethics untouched and his works contain a great store of most excellent and pertinent thoughts which must be characterised, says our author, in the widest sense of the term, as the real foundation in ethics of modern scientific empiricism.

With regard to the presentment of English and French ethical philosophy, Professor Jodl's work, it is claimed, is the first historical exposition in the German language of this special department of thought in its connection with the universal intellectual progress of these two countries. His analysis of Bentham and Mill is very accurate and full.

Professor Jodl exhibits an extensive acquaintance with English philosophical literature ; indeed, he has even discovered the little book known as "Kant's Ethics," by Dr. Noah Porter, whom he calls the "Nestor" of American philosophy.

Unity of execution, and the skilful employment of historical perspective in dealing with the various phases of ethical thought, may be characterised as prominent merits of Professor Jodl's performance. In the books of its class it stands unique. *μκρκ.*

ETHIK. Eine Darstellung der ethischen Principien und deren Anwendung auf besondere Lebensverhältnisse. By Dr. *Harald Höffding*, Professor an der Universität zu Kopenhagen. Unter Mitwirkung des Verfassers aus dem Dänischen übersetzt von F. Benedixen. Leipsic : 1888.

Harald Höffding, Professor at the University of Copenhagen, is a representative thinker among ethical scholars. Unhesitatingly he takes his stand upon the real facts of life and attempts to construct a system of ethics which shall be a science among the other sciences. Professor Höffding says in his preface :

"If we see the snow-covered peaks of a mountain range from a far distance, "they seem to hover in the air. Not until we approach do we discover plainly that "they rest upon solid ground. It is the same with ethical principles. In the first "enthusiasm one imagines that a place should be assigned to them above the reality "of nature and life. On further reflection and after a longer experience, which "must perhaps be dearly bought, we discover that the ethical principles can regu- "late life only if they have really proceeded from life."

Professor Höffding is in a certain sense a utilitarian. The influence of utilitarian systems upon his mode of thought can be traced throughout the whole work, and it is this influence perhaps to which the Danish Professor owes his positive standpoint as well as the scientific method of his procedure. Nevertheless he differs from the ordinary utilitarian school and prefers to characterise his system as an ethics of general welfare. He says :

"The so-called utilitarianism,—that ethical conception which has been founded "mainly by Bentham,—has the merit of having for the first time energetically pro- "pounded the principle of welfare. Yet Bentham has detracted from his cause by "proceeding from a psychological theory which considers consciousness as a sum "of ideas and feelings, and dissolves society into a number of individuals. The "import of pleasurable and painful feelings for the continuous and general welfare "cannot be established by a mere process of calculation." (P. 37.)

Professor Höffding opens the first chapter of his work with the following sentence:

"Ethical judgments contain a valuation of human actions. . . . The criterion "of the ethical valuation is the contents of ethics."

If life consisted of isolated sovereign moments, every one of them would have an equal right, and no one would be obliged to resign in favor of any other moment. No valuation, no discrimination would be required. But the life of each individual, as well as the life of society, makes up a "life-totality," and we possess a conception of this life-totality. "If the state of feeling in a single moment agrees with the conception of the life-totality, a new feeling arises which is determined by this mutual relation. . . . The ethical valuation is conditioned by this feeling." (p. 27.) Taking this ground, Professor Höffding defines good and bad in the following way:

"'Good' accordingly becomes that which preserves the life-totality and gives "fulness and life to its contents; 'bad,' on the contrary, that which has more or "less the tendency to dissolve or to limit the life-totality and its contents. Bad "accordingly is the single moment, the separate impulse in its revolutionary isola-"tion from the rest of life. . . . ." (P. 29.)

"The Bad, therefore, is egotism in its various degrees and various forms. "And the verdict about it will be the severer the more conscious this egotism is."

Utilitarianism as a rule has been hedonistic. Utilitarians have proposed as the criterion of an ethical valuation the consequences of an act; if the consequences give more pleasure than pain, is is said to be good; if they are attended with more pain than pleasure, it is said to be bad. In the above quoted definitions by Prof. Höffding there is no trace of hedonism, and I should consider an ethical system based upon these definitions as being in strong opposition to hedonism. But Prof. Höffding appears to have been so strongly biased by the influence of hedonistic utilitarianism, that he introduces again its fundamental idea, which identifies the good with the pleasurable. Although he objects to employing the terms "utility" and "happiness," "because they are liable to lead to misunderstandings and have indeed done so"; although he declares that "momentary feelings of pleasure and pain are no sure criterion for the total state" (p. 37); although for such reasons he proposes the word welfare, saying, "by the word 'welfare' I think of everything which serves to satisfy the wants of human nature in its whole entirety": still Prof. Höffding again returns to hedonism by limiting the idea "welfare" to the hedonistic conception of goodness. He defines welfare as "a continuous state of pleasurable feelings." (P. 98.)

Thus we are presented with two definitions of what constitutes the criterion of an ethical valuation: (1) that which promotes the life-totality, and (2) that which produces a continuous state of pleasurable feeling.

These two definitions are in many respects harmonious, but on the other hand they may come into conflict; and if they come into conflict, which of the two is to be sacrificed? Supposing that a contemplation of the evolution of organised life

should teach us that the development of a "life-totality" is not at all a pleasurable process; that on the contrary it is attended with excessive and innumerable pains. Inorganic nature so far as we can judge is free from pain. The isolated atom, we may assume, exists in a state of indifference. Supposing now that pain could be proved to increase, the higher we rise in the development of a life-totality; supposing that the growth of a life-totality had to be bought with pain, what would be the consequence? I will not here enter into the subject, but I may mention that this supposition is not at all without foundation. Assuming that it were so, would not, in such a case, the good be as Schopenhauer, Hartmann, and Mainlaender propose, that which destroys the life-totality of consciousness and with it the whole world of civilised humanity, built up of the innumerable consciousnesses of individuals?

Professor Höffding has seen this difficulty, which arises from a conflict of the two criteria of ethical valuation (1) the hedonistic principle and (2) the principle of progress, i. e., the constant evolution of a higher life-totality. He says:

"John Stuart Mill has declared that it is better to be a dissatisfied man than a "satisfied pig, a dissatisfied Socrates than a satisfied fool. He bases this assertion "upon the fact that even if the pig and the fool were of a contrary mind, their "opinion would have to be rejected, since they possess no knowledge of the "higher point of view from which man and Socrates consider life, whereas man "knows the needs of the pig and Socrates fathoms the fool. We must be regulated "by the judgment of those that know the two kinds of needs in question and that "are consequently able to institute an estimation of the value of the same.

"But I feel obliged to put in a word for the pig and the fool. The difficulty is "greater than Mill imagines. Man, it is true, knows all the wants of the pig, and it "would not be difficult for a Socrates to comprehend those of the fool. But man "does not have the wants of the pig, nor Socrates those of the fool, as his *sole and* "*only dominant* wants. And yet this is the very circumstance that determines the "matter. Man cannot transform himself into a pig without ceasing to be a man, "and a Socrates will hardly be able so to identify himself with a fool as to lose "completely his Socratic wants. If, now, the pig can attain the *complete* satisfac- "tion of all *his* wants, is not his happiness greater than that of man whose desires "and whose longings are never wholly satisfied? And the fool, who does not "nourish many thoughts and makes no great demands upon life, is he not happier "than Socrates who spends his whole life in striving to know himself and to stimu- "late others, only finally to declare that death is really preferable to life?"

Professor Höffding's solution of the difficulty is summed up in the following paragraph:

"Welfare is an illusion if we understand by it a passive condition of things, "created once for all. It must consist in *action*, work, development. Rest can "only mean a termination for the time being, the attainment of a new level, upon "which it is possible for a new course of development to proceed."

Thus it appears that Professor Höffding decides in favor of the second prin-

ciple. The evolution of the life-totality is considered higher than a continuous state of pleasurable feeling. Nevertheless Professor Höffding adds:

"On that account, however, we are not obliged to retract our first definition of "welfare as that of a continuous state of pleasurable feeling. That which must be "rejected is only the notion of a passive state."

Truly, as Professor Höffding says, "the difficulty is greater than Mr. Mill imagined." The difficulty is great enough to undermine the whole basis upon which welfare is defined as "a state of continuous pleasurable feeling." If, as Professor Höffding declares, welfare is to be interpreted as activity, work, development; if this kind of active welfare is the greatest good, whatever admixture of pain and whatever absence of pleasurable feeling it may have; if the greatest amount of a state of continuous pleasurable feeling is not welfare in an ethical sense, what becomes of the utilitarian definition of welfare as pleasurable feeling? If, however, welfare is "the state of a continuous pleasurable feeling," how can we declare that the life of a pessimistic philosopher is preferable to that of a joyful fool?

Must not the ultimate reason of this conflict be sought in Professor Höffding's statement that—

"The proposition of a purpose presupposes in the subject which makes the pro-"position feelings of pleasure and displeasure." (P. 30.)

Should we not rather say that the proposition of a purpose presupposes an expression of *will* in the subject which makes the proposition? Wherever there is will, there is also approval and disapproval, but approval is not always pleasurable and disapproval is not always attended with displeasure. Does it not often happen that we cannot help disapproving of things which please us?

We have mainly limited our review to some topics of the first division entitled "The Conditions of Ethics," because we have regarded them as most important in a representation of the ethical principles. The doubts we have raised as to the consistency of the author are less noticeable in the remaining chapters, which contain an unusual store of ideas presented with great lucidity. The doctrine of the freedom of will is excellently treated (chap. v.). Social ethics, family life, marriage, the position of woman, and the education of children are separately and exhaustively discussed, and there is no chapter which even if we cannot always give assent to the author's views, does not richly repay a careful perusal.

P. C.

KURZGEFASSTE LOGIK UND PSYCHOLOGIE. By *Dr. K. Kroman*. Translated from the second edition of the Original by F. Bendixen. Leipsic: O. R. Reisland.

Dr. Kroman is professor of philosophy at the University of Copenhagen. He has sought to present in this book of three hundred and eighty nine pages the elements of Logic and Psychology. The work was principally intended for the use of the general reader and the beginner, although its author hopes it will not

be altogether without interest to the specialist, and that it will find its way into the schools of pedagogy (the subject of the art of education being also incidentally dealt with in its pages).

Dr. Kroman's method of presentation is concise and lucid; the elements of logic occupy but some one hundred and four pages, and form a good introduction to the common phases of that science.

But his psychology is, from our standpoint, more open to objection; or rather his philosophy. He says: "Unless we assume the law of causation, research is impossible; but assuming this, it is impossible to stop with states of consciousness, we must assume a subject and *real* objects." What Dr. Kroman means by *real* is seen from the following. "Our senses give us knowledge only of *properties* of things, not of *things*. We do not perceive the apple, but only its form, color, etc. But all these sensations thus derived form an interconnected whole; and the law of causality forces us to the assumption of a *thing* behind these sensory manifestations. Yet, our belief that we know this *thing in itself* has only a practical value; in reality it is an unknown quantity. It is a single point, a nucleus, of which *direct and positive* knowledge is unobtainable; yet exist it must if our assumption of the law of causation is to be upheld." Thus Dr. Kroman shows in an admirable manner how our everyday conceptual life *is* formed; but it is the office of philosophy, in our view, to point out how this same conceptual life *should be* formed. However, Dr. Kroman supplements this explanation—which we have much abbreviated—by considerations that lead one to believe that he seeks only to demonstrate the reality of existence and has collaterally accepted the doctrine of the independent, 'outside' thing in itself. We may refer our readers, regarding this question, to Prof. Mach's article in this number of *The Monist*. μκρκ.

Einleitung in die Psychologie nach kritischer Methode. By *Paul Natorp*. Freiburg: J. C. Mohr.

In this exhaustive monograph Dr. Paul Natorp does not deal with psychology itself, but proceeding from a number of novel points of view he opens up the road by which the principles of psychology may be reached. The author frankly assumes that psychology even as yet has not absolutely and clearly defined its own *fundamental problem*, and that this is chiefly the reason why we still disagree concerning the significance and value of many of the results of psychology. Before we approach the solution of the special problems, psychology *itself* must be laid down as a problem. The author, therefore, in the first part of his introductory task has sought to indicate the *objects* of psychology,—namely, what it will and rationally can pursue; and in the second part, he points out the only correct *method* according to which psychology can accomplish its aims.

Since Descartes, says our author, real and possible consciousness constitutes the true limits of the province of psychic research, the fundamental problem of psychology, and the characteristic distinction between the old and new philosophy

But, in order to find out, whether this tendency of the new philosophy has been entirely successful, it will be necessary to examine more closely the nature of the fundamental psychic phenomenon, and the problem that it involves.

In the fact of consciousness we can distinguish several elements which really are inseparable, but which in the study of the problem ought to be separated. There is the content of which one is conscious, and secondly, the consciousness thereof, or its relation to the ego; and, by a further abstraction, this relation itself might be distinguished from the total fact of consciousness. The relation to the ego, in ever varied contents, is one and the same; it makes up both the common and specific element of consciousness, and as the third abstract element of consciousness (Bewusstsein) it might aptly be called self-consciousness (Bewusstheit). The ego, being a common point of relation to all contents of consciousness, cannot itself become the content of consciousness, because it represents a contrast to any idea of content. We do not correctly conceive consciousness as a thing, a cause, a force, an explanatory principle, but simply as a phenomenon—the fundamental phenomenon of psychology. We thereupon ask, what contains this phenomenon, and by what is it characterised? It is, above all, characterised by *subjective* experience. This denotes, that it is *I* who am conscious of a content. The reflective expression "I am conscious" implies a "subject" that is conscious. Without this reflective relation to the ego, consciousness no longer conveys any meaning Consciousness denotes *self*-consciousness. This reflective relation is therefore the only distinctive mark of all conscious phenomena.

Content we call anything that can be related to the ego. In the language adopted by psychologists, a feeling or a desire can also be regarded as content of consciousness. But our investigation cannot proceed beyond this reflective relation. If we attempt a *representation* of the ego, we should turn it into *object*, and we should have ceased to regard it as *ego*. The ego is never an object—not even to itself.

It is not denied, that in every consciousness there can be distinguished two elements—the existence of a content, and its relation to the ego; but it is denied, that this relation can be made objective, even to itself. This correctly describes the character of consciousness, as content and activity, and moreover, precisely delimits the domain of the psychical and determines the *positive* task of psychology. Those, who assume a consciousness of consciousness, ought logically to admit the consciousness of a consciousness of consciousness, etc.; as indeed some metaphysicians have done.

It may be maintained, however, that the distinction of the activities of consciousness, of sensation, representation, and thinking, is indispensable in psychology; but, at any rate, there are no different *kinds*, or even degrees or stages of consciousness. The consciousness of any simple sensation in kind is not different from the consciousness of a world; the factor of consciousness in both is the same;

the difference lies exclusively in the content. This also applies to clear and obscure consciousness.

In order to determine the positive task of psychology, we ought to discover in every content and in every repeated act of consciousness, a certain common characteristic. Perception, as such, does not constitute consciousness, but merely denotes the presence of a multiple content; apperception, on the other hand, indicates only consciousness in the definite sense of a "unity" of that multiple content. This unity of consciousness properly does not appear, or only appears in the connection of the contents. That peculiarity of consciousness which we call apperception, is psychologically only apparent in the contents of consciousness; it does not constitute an object of psychology, but forms only its extreme limits. The common characteristic of every content of consciousness is therefore really to be found in the *connection* (Verbindung) in which the simple contents are represented in the repeated acts of consciousness. This connection exists only subjectively, irrespective of all objective meaning or value.

The existence of phenomena purely as phenomena, their subjective existence irrespective of object, constitutes their psychic existence or that side of the phenomenon from which it becomes an object of psychological research. Under this head come all those phenomena to which science denies an objective value: illusions of the senses, mental hallucinations, and the normal non-scientific representations of things, the creations of the imagination in music and in art, the entire subjective life of feeling and of aspiration, regarded only as a particularly characteristic association of representation, irrespective of all objective truth, which lies beyond the limits of psychology as such.

The characteristic, accordingly, is found in the *unity* in which the content represents itself in the single or reiterated acts of consciousness. In each act of consciousness the content is simply present, and no time is distinguished. When we distinguish time, a plurality of consciousness also must be distinguished. It may seem difficult to understand how two or more original acts of consciousness are again united into one act; but in reality this takes place. The idea of unity is thus enlarged, and becomes the consciousness of a multiplicity, the necessary unity of a multiple, a successive connection in time, and a simultaneous connection. All consciousness (representation) depends on connection, as is indirectly shown by trying to discover whether the elementary contents of consciousness can be represented in absolute isolation.

Abstract consciousness is thus found to be the relation of given contents to an ego, and connection constitutes the manner in which a multiple content appears or is represented in the reiterated relation to one and the same ego. Connection is the *concrete expression* of that relation itself, through which consciousness attains its definite and positive value. Abstract consciousness seems poor, but the multiplicity of a definite connection of contents affords a vast field of psychological re-

search, for on that connection depends the concrete significance of the ego, which to us is not subject in general, but above all, is our own particular subject.

And finally at this point there spontaneously arises the question of a theory of the psychic phenomena. Every theory essentially presupposes an *objective* tendency, while consciousness, as the expression of the purest *subjectivity* of phenomena, cannot be rendered objective. It clearly follows, therefore, that the *method* of psychology must be radically different from all methods of the objective sciences.

γνλν.

DER GENIALE MENSCH. By *Cesare Lombroso.* German Translation by Dr. M. O. Fraenkel. Hamburg: Verlagsanstalt und Druckerei-Actien-Gesellschaft (vormals J. F. Richter).

The French edition of Lombroso's "Man of Genius" has already appeared The work is introduced by a preface written by M. Charles Richet, which reviews the subject with great clearness. All in all, this is an admirable book, well stocked with interesting facts and incidents, and well adapted to obtain a large number of readers outside of scientific circles. There is necessarily a dearth of abundant and well-authenticated facts in this subject,—historians until lately not having occupied themselves with the psychological phases of life; and accordingly there is great danger in universal generalisation from those that we have. This, however, Prof. Lombroso has recognised.

Genius, the author claims, is a variety of psychòsis, an instance of degeneration. Degeneration of certain parts is the condition of the acquisition of others; thus the loss of a number of ribs and muscles, of a tail, etc., has in man been compensated by the acquisition and development of the brain; and so in the genius the possession of very great intellectual or emotional faculties has been counterbalanced by the loss of equilibrium in the other parts. Moreover, there are no exceptions in nature; the occurrence of insanity, abnormalities, and eccentricities in a few cases leads us inevitably to the conclusion that there are correspondent defects in all others. And this we find to be true in all historical instances. Popular speech and tradition have identified genius and demency: in Hebrew and Sanskrit the words prophet and insane are synonymous; and so we have the proverbs—'Children and fools speak the truth,' 'Un fol avise bien un sage,' 'Saepe etiam est morio valde opportune locutus.' The line of demarcation between the two is hardly traceable. Genius is the exception, a deviation from the common type of humanity, and nature avenges the aberration by denying it permanency and inflicting upon it abnormality. Whether degeneration or progression, genius is unusual and unstable. But one thing distinguishes genius from mental alienation, and it is this—that genius possesses the power of inhibition, of concentration, of *critique*, and far-sightedness, while demency has no control of the ideas it has formed; both possess the swift and unerring power of origination; the one can command what it has originated, the other cannot.

It must be admitted that the method employed for the verification of this thesis, is not absolutely safe. Wherever an eccentricity in a man of genius is found, it is accredited to psychosis, even though the genius in question be upon the whole more normal than the average "normal" man; as, for instance, Goethe. If the same method were applied to all men, would not normality be the exception and abnormality the rule? *μκρκ.*

Das Bewusstsein und sein Object. By *Dr. Joh. Wolff*, Professor of Philosophy at the University of Freiburg (Switzerland). Berlin: Mayer & Müller.

This is a huge closely printed volume of six hundred and twenty pages. It is the enlargement and development of a treatise offered several years ago to the faculty of the University of Bonn, upon application by Dr. Wolff for a University instructorship, and contains the results of the author's thoughts and researches since that time upon the subject there dealt with.

Among many valuable isolated speculations and suggestions, we find fundamental theses with which it is impossible for us to agree. Thus, Dr. Wolff says that when he speaks of soul he means 'a substance, a substratum, a vehicle, a cause of psychical phenomena, and not a phenomenon or sum of phenomena'; and he says it is no more a pre-judgment or prejudice on *his* part to begin with this thesis than it is on the part of those who hold a different view to begin with the opposed one,—in fact less so, since he starts from the notion which all men hold in common, while the others do not.

Does the mathematician, in propounding a new method, or a physicist in explaining an unsolved problem, proceed from the mathematical and physical notions all men hold in common? And if the soul is made an object of scientific research, why should an exception be made of *it?* It is not so much what we begin with as what we end with, and it is perhaps superfluous to say that Dr. Wolff has ended where he began—with the simplicity, the substantiality, the unity, and the permanency of the ego. *μκρκ.*

PHILOSOPHY IN AMERICAN COLLEGES AND UNIVERSITIES.

WE had originally intended, in this first number of *The Monist*, to present to our readers a comprehensive statement of the courses announced by American Universities in the departments of Philosophy, Ethics, and Psychology; first, in order to supply students proposing to pursue these studies and others interested, with information at first-hand, and secondly to give the non-academic world, which is considerable, an insight into what our higher professional schools are doing in these branches.

Since then *The American Journal of Psychology* has published a very full and gratifying account of the state of psychological research in our Universities, made up of the reports of the professors at the head of these departments; and we therefore refer our readers for information regarding this branch to the article entitled "Psychology in American Universities," published in Vol. III, No. 2, of that ably-conducted magazine.

It was also difficult to obtain the required information: most of our professors, in the last few months, having been absent from the university towns.

But reports from the most representative universities in different parts of the country have been obtained. They are intended merely to exhibit the general nature and extent of philosophical instruction in America and do not profess to be complete.

* * *

A review of the Registers, Catalogues, and Programmes of a large number of our colleges has led us to the conviction that the acquiring in America of a broad philosophical training is not the fault of the *professions* of our academical authorities. The courses offered are set forth in our college catalogues at very great length; they are very exhaustive; and their specification is accompanied with analyses of the work of the various departments and with bibliographical schedules that in point of thoroughness leave nothing to be desired. This fulness of exposition is noticeable in all the departments.

But under the obligatory system of study, the separate departments, or rather the professions of the separate departments, must certainly conflict: and the question arises in the mind of the observing outsider, To which is justice done?

And, except where a specialty is exclusively followed, wherein under the professed conditions, does the elective system differ from the obligatory? Only that in the one case, the student is made the author of his embarrassment, and in the other the victim of it. However, in the absence of a decided educational sentiment in our nation, and in the lack of a uniformity of opinion as to what must be *demanded* of our schools instead of a submissive acquiescence in what they give us, the question whether a college has fulfilled what it has professed, must be left to the faithful individual student who is forced to devote the best years of his life to the solution of it. It seems impossible to determine it otherwise. And yet, except in the case of our foremost institutions, to which all of us cannot go, this is true.

We have observed, too, that the extension of the departments of philosophy proper is not keeping pace with that of many other departments—as, for instance, the departments of history and economics.

Perhaps this is inevitable; the last-mentioned sciences having been until of late very much neglected.

But the tendency threatens to overbalance the curriculum; and where pretensions to universality are made, it is not justified.

On the other hand, the firm hold that experimental psychology has obtained in some of our foremost schools, is gratifying; though enthusiasm may also lead too far in this direction.

Lack of co-operation in cognate branches is, with very few notable exceptions, universal. Preparatory training is not emphasised. At least, where so much is said of the character and method of instruction, and where the elective system prevails, we should expect some mention of it. But it is not found.

Philosophy would seem to be something that is to be obtained only in the lecture-rooms of the "philosophical department," and in most cases it is sought nowhere else. The study of Mathematics, Physics, Natural Science, and Philology, is greatly neglected. Philosophy becomes an aim and a means in itself, and the student at the close of his course often discovers himself in the quest of philosophy, but with no means of finding it.

This necessity of co-operation has been fully recognised, for instance, at Harvard. "When a student applies for Honors," says Professor Palmer, "we require from him not merely an acquaintance with technical philosophy but *also with the subjects most nearly adjacent to the special philosophical field he has chosen.*"

And so it is in other of our advanced and enlightened schools. Yet in the majority of cases, the *foundations* of philosophical culture are not insisted upon, but left to chance and the uncertainties of a universal elective curriculum.

Lastly, philosophy at some institutions exhibits a sectarian and theological complexion.

This, one thinks, might be left to the theological seminaries. But it is not.

We have Baptist Philosophy, and Presbyterian Philosophy, and denominational philosophies of divers other descriptions.

A president of a prominent Eastern University, (a gentleman to whom the philosophic spirit of this country is greatly indebted for inspiration and expansion,) has taken,—let it be remarked in this connection,—a much more liberal step, and urged the necessity of establishing a school of *American* Philosophy.

This is laudable; and in harmony with the present resuscitation of American patriotism in———matters of learning.

It was this spirit that dictated the witty proposition of a Chicago gentleman to found a "school" of American *Geometry*.

* * *

We hope that the appended syllabuses of courses in philosophy will afford a general idea of the scope of philosophical teaching in America. The professors who have supplied us with the information we requested, we thank for their courtesy and obligingness.

UNIVERSITY OF MICHIGAN.

The Philosophical Courses of the University of Michigan may be conveniently classified under three heads:—

I. BEGINNING.

1. Elementary Logic, in which there are two courses, one general covering the rudiments of syllogistic and deductive logic in which Jevons is used as the basis, the other in inductive logic, intended especially for scientific students, in which Fowler is used.

2. Elementary Psychology. The main facts regarding modern scientific researches and methods, and the various attempts at their philosophic interpretation. Dewey's Psychology is the book used in connection with this course.

3. Introduction to Philosophy. A course of lectures on the main problems and principles of the theory of knowledge and reality. Each of the foregoing courses is for one semester.

II. INTERMEDIATE COURSES.

1. History of Philosophy. Ancient and Modern. Lectures and readings designed to give information regarding both the historical development of thought, and the main problems developed in its course. The department of philosophy owns a large number of copies of the chief thinkers in modern philosophy, Locke, Descartes, etc., etc., and these are assigned to members of the class for readings and reports. Each student thus becomes acquainted with at least half-a-dozen of the leading writers at first-hand.

The course runs through the year.

2. Ethics, Theoretical (one-half year) and Social (Political Philosophy, one-half year also). The theoretical course attempts to arrive at an account of the ethical ideal by means of a critical consideration of the principal modern ethical theories, especial attention being paid to Utilitarianism, Evolutionary Ethics, and Kantianism. The second division of the course discusses the ethical basis and value of society and the state, law and rights, in connection with an account of the political theories of Plato, Aristotle, Grotius, Hobbes, Locke, Kant, Rousseau, Hegel, etc

3. ÆSTHETICS. This course, like the previous one, unites the historical and theoretical treatment of æsthetic doctrines and results. It is designed largely to aid students in the interpretation and criticism of literature. It is a half-year course, and is followed by a half-year course (given in the English Department) on the Principles and Methods of Literary Criticism.

4. PHYSIOLOGICAL PSYCHOLOGY. Lectures, assigned readings and elementary experiments, and demonstrations. There is established, as yet, no separate psycho-physical laboratory, but the new-equipped physiological laboratory of the University is, through the courtesy of the Professor of Physiology, at the disposal of students in this line. Half-year course.

5. SCIENCE AND PHILOSOPHY OF RELIGION. Lectures, readings, etc., designed to give an account of the chief methods employed and results achieved in the modern historical and comparative study of religions. And also an account of the principal theoretical interpretations of religion. Half-year course.

III. ADVANCED COURSES.

1. KANT'S CRITIQUE OF PURE REASON. A study of Kant's masterpiece at first-hand. This is accompanied by a shorter subsidiary course, treating of the development of the Kantian system, and criticisms upon it. Caird's Critical Philosophy of Kant, is read and discussed in connection with the latter course. Half-year course.

2. HEGEL'S LOGIC. A study of Wallace's translation of the lesser Logic of Hegel. Half-year course.

3. THE LOGIC OF SCIENTIFIC METHODS. A lecture course taking up the study of the Logic of Science, and intended to make the hearers acquainted with the standpoint and spirit of such authors as Lotze, Sigwart, Wundt, Mill, Jevons, Bradley, Bosanquet, and the modern movement in logic generally. Half-year course.

4. PROBLEMS IN HIGHER ÆSTHETICS. A brief course for graduate students in Æsthetics.

5. SEMINARY IN ETHICS. Discussion of the treatment of some main ethical problems by the chief modern ethical writers.

The Elementary courses are conducted mainly by text-books and recitations; the Intermediate courses by lectures and assigned readings, reports and essay-writings. The Advanced courses are pursued by class discussions, conversations, etc. on basis of work done independently by the student.

The teaching is carried on by John Dewey, J. H. Tufts, and F. N. Scott.

JOHN DEWEY.

HARVARD UNIVERSITY.

The courses at Harvard are, we believe, the most complete offered in any American University. They consist (for 1890–91) of four groups:

I. INTRODUCTORY COURSES.

IN LOGIC, METAPHYSICS, AND PSYCHOLOGY.

II. SYSTEMATIC COURSES

PSYCHOLOGY, COSMOLOGY, ETHICS, PHILOSOPHY OF RELIGION, THE PSYCHOLOGICAL BASIS OF RELIGIOUS FAITH, AND THE CONTENT OF CHRISTIAN FAITH.

III. HISTORICAL COURSES.

Including lectures on Comparative Religion, Greek Philosophy, Descartes-Spinoza-Leibnitz, English Philosophy from Hobbes to Hume, The Movement of German Thought from 1770–1830, Contemporary Systems and Applied Ethics.

IV. COURSES OF ORIGINAL RESEARCH.

Including the Psychological, Metaphysical, and Ethical Seminaries. These do not include the additional and auxilliary courses in other subjects, which are required for Honors.

"Holding that there is one best way for the young student to begin his philosophical study," says Prof. G. H. Palmer, "we have planned a single introductory course and have given it variety by setting three instructors to teach it. When these elementary matters have been mastered, we offer the student a choice among half-a-dozen dogmatic courses, or among as many more historical. These last two sets of courses are open alike to graduates and to undergraduates. For graduate specialists three or four lines of Seminary work are provided, with a view to giving the most advanced students ample opportunity to develop their individual powers. . . . . But the chief aim of our Honors is to test powers rather than acquirement."

In Harvard there are six instructors engaged in the department of philosophy alone: Prof. G. H. Palmer, Prof. C. C. Everett, Prof. W. James, Prof. F. G. Peabody, Prof. J. Royce, and Dr. G. Santayana. A dozen or more courses of philosophical content are offered, and acquaintance with auxilliary branches is necessary to take Honors.

UNIVERSITY OF CALIFORNIA.

The instruction given in the various branches of philosophy at this institution is conducted according to the following scheme:

1. Propædeutic to Philosophy. Empirical psychology, including formal logic, deductive and inductive. Four times a week.

2. Introduction to Philosophy. History of European philosophy, in outline. Four times a week.

3. Elementary Ethics, including Civil Polity. Sketch of the history of ethical and political theories; critique of the conflict between perfectionism and hedonism, freedom and necessity, optimism and pessimism; investigation of the nature of a state, and of its bearing on the limits of liberty and allegiance. Four times a week.

4. First Alternating Course. Exposition of some principal movement or conflict in the history of philosophy, by a critical study of its leading participants; or the like, the subject being changed from year to year. Twice a week.

5. Second Alternating Course. Some additional topic, similar to that of Course IV., and similarly changed, but drawn, preferably, from the field of practical philosophy. Four times a week.

6. Graduate Course. First-hand study of certain philosophic masterpieces, such as Plato's *Parmenides*, *Theætetus* and *Sophist*, Aristotle's *De Anima*, Kant's *Kritiken*, or Hegel's *Phænomenologie des Geistes*; etc. Four times a week throughout the year.

Courses 1, 2, and 3, in this scheme are permanent, and are repeated from year to year in substantially the same form; Course 4 is continued throughout a whole

year; the rest throughout a single term. Courses 4 and 5 are projected with the intention of furnishing a variety of topics, a new one being usually presented each year; though a subject is sometimes continued, if it proves to excite the special interest or meet the particular wants of the incoming Senior class. Course 6, provided for graduate students only, is sufficiently described in its sub-title.

The specific subjects for the ensuing year 1890–91, under these courses with varying topics, will be as follows:

Course 4. Philosophy from Kant to Hegel. The Development of Rationalistic Idealism, from its negative and partial to its complete and positive form. Twice a week.

Text-Books: (1) Watson's Philosophy of Kant; (2) Everett's Fichte's Science of Knowledge; (3) Watson's Schelling's Transcendental Idealism; (4) Caird's Hegel; (5) Hegel's Logic, translated by Wallace. With the standard works of reference.

Course 5. Higher Ethics. Based on a criticism of Sidgwick and Martineau. Four times a week during the second term.

Text-Books: (1) Sidgwick's Methods of Ethics; (2) Martineau's Types of Ethical Theory.

Course 6. Graduate Course. The Dialektik and Methodenlehre in Kant's Kritik, followed by Hegel's Lesser Logic in Wallace's translation. Four times a week throughout the year.

From this statement it will be seen that some important text covering each topic is in the hands of each student. The object of this is to furnish an actual historical basis for the discussion of the subject, which is conducted by the professor's lectures. These proceed from a criticism, partly appreciative, partly destructive, of the texts chosen, to a constructive and positive presentation of the subject, according to the reasoned views of the lecturer.

The interest in philosophical studies is steadily increasing in this institution. The instruction in them was opened in the academic year 1884–85, and the growth of interest is well indicated by the fact that the number of students now annually electing these courses is more than double the number during the first and second year.

G. H. Howison.

UNIVERSITY OF PENNSYLVANIA.

The Courses offered in Logic, Psychology, Ethics, and Philosophy, at this institution for the year 1890–91, are as follows:

UNDERGRADUATE COURSES.

1. An Elementary Course in Logic. Two hours a week.
2. The Elements of Psychology. One hour a week.
3. Scientific Methods in Psychology. Lectures with Laboratory Work. Two hours.
4. Experimental Psychology. Lectures with Laboratory Work. Two hours.
5. A Course in Ethics. Two hours.
6. A Course on the Philosophy of Ethics. One hour.
7. A Course on the History of Philosophy. Two hours.
8. A Course on the Development of Idealism. Two hours.

GRADUATE COURSES.

1. Comparative, Social, and Abnormal Psychology. Two hours.

2. Special Psychological Problems. Lectures with Laboratory Work. Two hours.

3. Advanced Psychology. Two hours.

4. Ethical Theories. One hour.

5. History of Modern Philosophy. Two hours.

Each course of undergraduate lectures will extend through half the year. Courses 1, 2, 3, and 7, will be delivered during the first term; Courses 4, 5, 6, and 8 during the second. Of the graduate lectures, Courses 1 and 2 will be given during the first and second terms respectively. Courses 3, 4, and 5 will extend throughout the year. The psychological laboratory is open at all hours to students engaged in special researches.

In addition to these courses, mention may be made of those delivered on Physiological, Abnormal, and Comparative Psychology in the Biological and Medical Schools of the University; and of the numerous courses, more or less directly ethical, which are delivered in the field of Sociology. In several of these there is a purposed effort to bring out the significance for ethics of the subject treated.

Geo. S. Fullerton.

CLARK UNIVERSITY.

From the well-classified and thorough courses offered at Clark University, (conducted by Dr. Hall, Prof. Donaldson, Dr. Sanford, Dr. Boas, Dr. Cook, Dr. Strong, and others,) we select, for its uniqueness, an account of the instruction at that institution in—

APPLIED ETHICS.

Under this head, come among others, the different forms of abnormal and pathological humanity. The most extreme form is treated of in Criminal Anthropology, which takes up the study of man as criminal. As an introduction, the acts that would be considered criminal in man's case, are investigated, as they appear in the whole realm of nature. This division we call Criminal Embryology.

The other divisions to be considered in the lectures are: the Anthropometry, Craniology, Physiognomy, Cerebrology, Psychology, Sociology, Teratology, and Prophylaxis of criminals; also criminality in relation to Psychiatry and Psychiatrical Anthropology. The general relation of Ethics to Criminal Anthropology, is one of degree; crime being an exaggerated form of wrong. We can illustrate the method of application in this way: If a nerve of a normal organism is cut, the organs in which irregularities are produced, are those which the nerve controls. In this way the office of a nerve in the normal state may be discovered. The criminal is, so to speak, the severed-nerve of society; and the study of him is a very practical way (though indirect) of studying normal men. And since the criminal is seven-eights like other men, such a study is also a direct inquiry into normal humanity.

The lesser degrees of abnormal and pathological cases will be discussed under the head of Charitology. These are represented by the different kinds of benevolent institutions, such as almshouses, asylums for the insane, imbecile, and epileptic; for the deaf, dumb, and blind; hospitals, dispensaries, and infirmaries; homes for truants, orphans, and for the friendless and aged.

The characteristics of inmates of such institutions and the methods of treatment and prevention, will be the main considerations. The facts gathered, and the principles underlying such institutions, will be utilised in an attempt to give a

scientific basis to ethics. The problems of right, duty and freedom, will be carefully considered.

Accepting the sociological truism, that the community is more important than any individual in it, the ethical standpoint of the lecturer is: *that the idea of wrong depends upon the moral, intellectual, physical or financial danger or injury, which a thought, feeling, willing or acting, brings to humanity.*

The decision, as to what thoughts, feelings, actions, etc., are dangerous or injurious, will depend upon the results from the application of the scientific method to the different departments of knowledge.

The direct practical object of the course, will be the study of preventatives, based on a thorough diagnosis.

Visitations and practical investigations of charitable and penal institutions will be made as occasion shall offer.

The lectures will be delivered in the latter part of the year.

ARTHUR MACDONALD.

UNIVERSITY OF WISCONSIN.

Besides the comprehensive courses in psychology, the following are offered:

1. HISTORY OF GREEK PHILOSOPHY. A brief survey of the development of philosophical thought in Greece. Zeller's Hand-book of Greek Philosophy is the reference book. Twice a week. Elective. (Prof. Jastrow.)

2. THE HISTORY OF MODERN ENGLISH PHILOSOPHY. Three times a week. Elective. (Prof. Stearns.)

3. ETHICS. Four times a week. Elective. (Prof. Stearns.)

4. ÆSTHETICS. In addition to the study of the physiological and psychological basis of æsthetics an elementary knowledge of the history of art and the principles of art criticism is given by lectures and discussions. Five times a week. Elective. (Prof. Stearns.)

5. ELEMENTARY LOGIC, DEDUCTIVE AND INDUCTIVE. The analysis of arguments, the construction and elaboration of syllogisms; the symbolic and diagrammatic methods of representing logical operations, and modern and ancient systems of logic will form the main topics of the deductive logic; while in inductive logic special emphasis will be laid upon the methods of scientific reasoning, the logic of chance, the detection of fallacies, and the estimation of evidence. Daily in winter term. (Prof. Jastrow.)

6. ADVANCED LOGIC. Special attention paid to the logic of the sciences; to mathematical logic as introduced by Boole and developed by Venn, Peirce, Schroeder and others; to the theory of probabilities, and the history of logical doctrines. Twice weekly. Elective. (Prof. Jastrow.)

7. MILL'S LOGIC. A general course upon the philosophy of reasoning and the principles of inductive science. Killick's Handbook to Mill's Logic used. Three times weekly. (Prof. Jastrow.) Each course extends over a single term only.

In Ethics an effort is made to introduce the students to three phases of the subject, the historical, theoretical, and practical. The first is at present limited to a brief review, by lectures, of the chief English ethical theories. In the second Prof. Fowler's Progressive Morality is made the basis of the instruction. The third is pursued chiefly in the form of topics, relating generally to current ethical questions, which are assigned for special study to members of the class, and their presentation is, when desirable, made the basis of general discussion.

J. W. STEARNS.

BOSTON UNIVERSITY.

The following are the courses for the present year, at Boston University, under the direction of Prof. B. P. Bowne and Dean Huntington.

PSYCHOLOGY. Thought studied as a fact; its forms and laws investigated; Current Theories expounded and criticised. Five hours.

LOGIC. Thought studied not as a fact, but as an instrument of knowledge. Investigation of the laws, forms, aims, and methods of mental activity. Five hours.

THEORY OF KNOWLEDGE. The study of thought as a process supplemented by the study of knowledge as its product. Knowledge defined, and the conditions, subjective and objective, of its validity investigated. The claims of scepticism, agnosticism, etc., considered at length. Three hours.

METAPHYSICS. Modifications of ontological and cosmological ideas in the light of rational criticism. Four hours.

PHILOSOPHY OF THEISM. The logical value and foundation of Theism considered. Four hours.

HISTORY OF ETHICAL THOUGHT. Christian Ethics. Text-book and lectures. Five hours.

PHILOSOPHY OF ETHICS. Critical and constructive review of ethical theories. Psychological questions as to the nature and origin of moral faculty ruled out as irrelevant. Two hours.

HISTORY OF PHILOSOPHY. From Descartes to the present time. Five hours.

The Philosophical Club, organised in 1886, has since that time maintained stated meetings for the furtherance of its members in philosophical studies.

Last year, under the auspices of the University, a special course of five lectures on Educational Psychology was given before large audiences by William T. Harris, LL. D. The topics treated were as follows:

1. Introspection contrasted with external Sense Perception.
2. Mental Pictures *versus* General Ideas.
3. The Logical Constitution of Sense Perception.
4. Physiological Psychology.
5. The Psychology of Mathematics, Æsthetics, and Ethics.

The courses are for single terms only. B. P. BOWNE.

JOHNS HOPKINS UNIVERSITY.

The Undergraduate instruction in philosophy provides five hours a week of required work for one year:

1) IN DEDUCTIVE AND INDUCTIVE LOGIC; 2) IN PSYCHOLOGY; 3) IN ETHICS.

The courses are unified and thorough. A voluntary course in the History of Philosophy is given; and advanced courses will be offered this year in Modern Philosophy from Descartes to Kant, and in English Ethics from Hobbes to Stephen. The instructors are Professors Griffin and Emmot.

PERIODICALS.

MIND. July 1890. No. LIX.

CONTENTS:

Our Space-Consciousness. In this article Mr. Herbert Spencer replies to criticisms, by adherents of Kantian doctrine, of objections contained in §§ 326–335 of *The Principles of Psychology*. He objects that the disciples of Kant "cannot imagine how it is possible that our space-consciousness can have arisen out of that which was not originally a space-consciousness."

Volkmann's Psychology. Shows that the really important point in Volkmann's doctrine of "psychological mechanism" is its theory of the interaction of contemporaneous presentations, and of the existence among them of unconscious presentations. Herbartian psychology is strictly scientific system, but when its superfluous mechanism is cleared away, its explanations become those of associationism.

In *The Logic of the Ethic of Evolution*, Mr. William Mitchell points out that the two conditions of an ethical end are that it be the motive of individual action, and that it furnish a critical system of universal laws; and further that those conditions are fulfilled by the end variously propounded in the ethic of evolution only if it be represented, not as an external limit forcing itself on men, but as presenting a more desirable character and medium to the individual than any other. The end and means of moral progress given by the Ethic of Evolution are perfectly true, but they do not express the essence of the matter.

The Antinomy of Thought. This paper investigates an antinomy which infects all our thought of reality that is not intuitive. The source of error is the confusion of the judgment with the consciousness or intuition of reality.

In the article on *Mental Tests and Measurements*, Prof. J. McK. Cattell describes certain tests which are used in the Psychological Laboratory of the University of Pennsylvania, with the object of providing data for the discovery of the

rules which govern the constancy of mental processes, their interdependence, and their variations under different circumstances.

The Evolution of Inductive Thought. A primary element in all experience is its inductive quality. The struggle of existence awakens experience to the thought-stage where it knows and directs itself, but this very slowly. Development precedes self-development, and this precedes a self-development which is self-conscious. This conclusion is confirmed by some analyses of thought in the divisions of conception, judgment, and reasoning.

The Genesis of the Cognition of Physical Reality. This is a criticism by Mr. Julius Pikler of Mr. Stout's criticism on Mill, which appeared in the January number of *Mind*. His opinion is that Mr. Strong's statements are simply negations of Mill's theory, and as such prove nothing.

Some newly-discovered Letters of Hobbes. These letters, seventeen in number, were written to the French physician Sorbière, and have been discovered by Dr. F. Tönnies in the National Library at Paris. All of them, with related letters of Sorbière and others, are given at length in the *Archiv f. Gesch. d. Phil.* iii. 58-71, 192–232, and the first nine, which are the only ones of real importance, are set out in this number of *Mind*. They have reference to the important period of Hobbes's life and work that led up to *Leviathan* in 1651. (London: Williams & Norgate.)

REVUE PHILOSOPHIQUE. No. 175. July 1890.

CONTENTS:

M. Fonsegrive in *L'Homogénéité morale* points out the necessity of a proper system of education for developing in the mind of the young a moral homogeneity to replace the heterogeneity which psychologists find in the nature of man.

In *Contributions psycho-physiques a l'Etude esthétique*, M. G. Sorel continues his studies on the psychology of æsthetics, and concludes that experimental psychology and especially psycho-physics form the base of practical æsthetics.

M. H. Joly in *La Folie de J. J. Rousseau* points out that the problem of the agreement of genius with insanity, so far as concerns Rousseau, is reduced to small dimensions.

La Perception des Longueurs et des Nombres ches quelques petits Enfants by M. Alfred Binet, describes certain original experiments which indicate that young children have an accurate perception of differences in length, but that their perception of number is very limited. (Paris: F. Alcan.)

REVUE PHILOSOPHIQUE. No. 176. August 1890.

CONTENTS:

Revue des Periodiques Russes.

Correspondance: "Les Manuscrits de M. de Biran."

In *Les Origines de la Technologie* M. Espinas aims at giving a history of philosophy in action. The present paper is devoted to physico-theological technology, and concludes with the observation that it was undoubtedly a progress to conceive the technical arts as a whole, as a divine gift in like manner as the fruits of the earth and the beneficent phenomena of *nature*, since this conception by opposition gave rise to the idea of *art*, that is of human initiative acting differently according to diversity of circumstances.

In *L'Inhibition dans les Phénomènes de Conscience* M. Alfred Binet explains certain phenomena by showing that under various circumstances certain images and sensations cannot coexist with others in the same field of consciousness; the presence of one excludes that of another. Antagonism and exclusion are the two simple facts which explain the phenomena in question.

La Géométrie Générale et les Jugements Synthétiques a priori is a reply by M. G. Lechalas to an article by M. Renouvier in the *Critique Philosophique* criticising M. Calinon's theory of geometrical spaces embodied in the system of "general geometry." While showing that spaces with three dimensions are rationally included in a space with four dimensions, M. Lechalas recognises the impossibility of establishing such a geometry, seeing that we have no figure that answers to what a four-dimensional space would be, as well as the purely formal character of the presentations of non-Euclidian figures. (Paris: F. Alcan.)

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. I, No. 2.

CONTENTS:

The results of Mr. Schaefer's researches are that for the localisation of the vibrations of two tones, in the case of their unequal relative intensity, the direction and distance of the relatively louder tone are determinate. If the relative intensity of the primary tones is equal, the vibrations are heard to proceed from the region between the two sounding points. Differential tones are heard between the ears, when the sounding sources are in the median plane; but when both primary tones come from the same side, in or immediately before the ear on that side; and in case of unequal intensity, when both come from different sides, on the side of the softer sound.

Prof. Münsterberg concludes that there is no *successive* association of ideas; when successively appearing, they are received singly into the memory.

The letters of Fechner are continued from No. 1.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. 1, No. 3.

CONTENTS:

Die Æsthetischen Gefuehle. By *A Döring.*

Besprechungen: (1) A. Mosso's und A. Maggiora's "Ueber die Gesetze der Ermüdung." (2) Münsterberg's "Beitraege zur Experimentellen Psychologie."

Literatur-Bericht.

Dr. Uhthoff, in order to determine the least visual angle of perception, has employed a grating in a pure-monochromatic spectral field. His results were that the angles in the different parts of the spectrum are essentially equal.

Æsthetic emotions, Mr. Döring contends, proceed from the unhindered play of the functions of psychical faculties; their contrary, from the inhibition of the same.

This periodical is edited by H. Ebbinghaus and A. König, with H. Aubert, S. Exner, H. v. Helmholtz, E. Hering, J. v. Kries, Th. Lipps, G. E. Müller, W. Preyer, and C. Stumpf as collaborators. It appears every two months. The review of the literature of its special department of research is very comprehensive. (Hamburg and Leipsic: L. Voss.)

LA NUOVA FILOSOFIA.

Ragioni e Ideali. By *La Direzione.*

La sensazione e la sua conoscibilita. By *R. Ardigo.*

J. E. Alaux's Le probleme religieux au XIXe siècle. By *A. Torre.*

Economia scientifica ed economia utopista. By *A. Loria.*

P. Leroy-Beaulieu's L'Etat moderne et ses fonctions. By *F. S. Nitti.*

C. Jannet's Le socialisme d'Etat et la reforme sociale. By *F. S. Nitti.*

Lombroso's and Laschi's Il delitto politico e le rivoluzioni. By *G. Fioretti.*

Critica Letteraria.

A. Angiulli—A. Saffi—F. Petruccelli della Gattina. (Memorie.) By *A. Torre.*

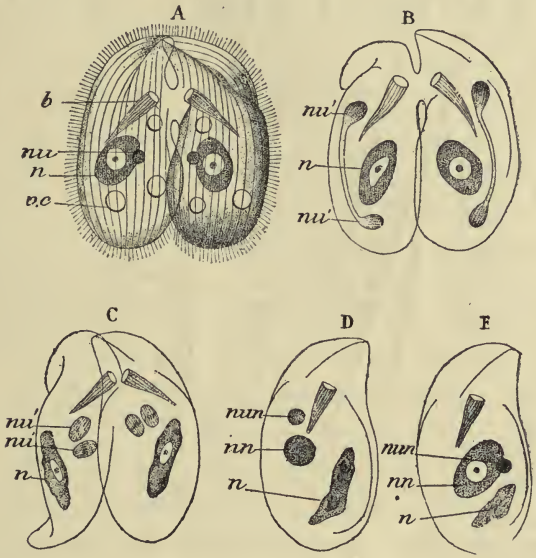
La Politica.

Questioni e Problemi. La responsabilità filosofica, secondo *Paolo Janet.*

This is the first number of *La Nuova Filosofia* which is established, under the editorship of Dr. Andrea Torre, to diffuse in Europe and America the best results of contemporary culture, in relation especially to the life and development of society. (Naples: Dr. Andrea Torre, Vico Lungo Avvocata, 66.)

APPENDIX.

Cut exhibiting modifications that affect the accessory nucleus. Referred to on page 26 of this number of *The Monist*, in M. Binet's article "The Immortality of Infusoria."



CONJUGATION OF CHILODON CUCULLULUS.

A, beginning of conjugation; *b*, mouth; *n*, nucleus; *nu*, nucleolus; *v. c.*, multiple contracticle vesicles.

B, division of the nucleolus into two segments, *nu'*, *nu'*; the nucleus *n* begins to show signs of regression.

C, each of the two individuals in conjugation contains two nucleolar segments, brought near together, of which one probably comes from the individual opposite in course of exchange, and will fuse with the segment not exchanged, to form a compound segment (Maupas).

D, division of the segment into two portions which grow to unequal sizes; the larger, *nn*, will become the new nucleus, the smaller, the nucleolus of the new formation, *nun*.

E, the old nucleus, *n*, reduced to a small pale and rumpled mass, is replaced by the new nucleus *nn*, near by which is seen the new nucleolus *nun*.

VOL. I. JANUARY, 1891. NO. 2.

THE MONIST.

THE ARCHITECTURE OF THEORIES.

OF the fifty or hundred systems of philosophy that have been advanced at different times of the world's history, perhaps the larger number have been, not so much results of historical evolution, as happy thoughts which have accidently occurred to their authors. An idea which has been found interesting and fruitful has been adopted, developed, and forced to yield explanations of all sorts of phenomena. The English have been particularly given to this way of philosophising; witness, Hobbes, Hartley, Berkeley, James Mill. Nor has it been by any means useless labor; it shows us what the true nature and value of the ideas developed are, and in that way affords serviceable materials for philosophy. Just as if a man, being seized with the conviction that paper was a good material to make things of, were to go to work to build a *papier mâché* house, with roof of roofing-paper, foundations of pasteboard, windows of paraffined paper, chimneys, bath tubs, locks, etc., all of different forms of paper, his experiment would probably afford valuable lessons to builders, while it would certainly make a detestable house, so those one-idea'd philosophies are exceedingly interesting and instructive, and yet are quite unsound.

The remaining systems of philosophy have been of the nature of reforms, sometimes amounting to radical revolutions, suggested by certain difficulties which have been found to beset systems previously in vogue; and such ought certainly to be in large part the motive of any new theory. This is like partially rebuilding a house.

The faults that have been committed are, first, that the dilapidations have generally not been sufficiently thoroughgoing, and second, that not sufficient pains has been taken to bring the additions into deep harmony with the really sound parts of the old structure.

When a man is about to build a house, what a power of thinking he has to do, before he can safely break ground! With what pains he has to excogitate the precise wants that are to be supplied! What a study to ascertain the most available and suitable materials, to determine the mode of construction to which those materials are best adapted, and to answer a hundred such questions! Now without riding the metaphor too far, I think we may safely say that the studies preliminary to the construction of a great theory should be at least as deliberate and thorough as those that are preliminary to the building of a dwelling-house.

That systems ought to be constructed architectonically has been preached since Kant, but I do not think the full import of the maxim has by any means been apprehended. What I would recommend is that every person who wishes to form an opinion concerning fundamental problems, should first of all make a complete survey of human knowledge, should take note of all the valuable ideas in each branch of science, should observe in just what respect each has been successful and where it has failed, in order that in the light of the thorough acquaintance so attained of the available materials for a philosophical theory and of the nature and strength of each, he may proceed to the study of what the problem of philosophy consists in, and of the proper way of solving it. I must not be understood as endeavoring to state fully all that these preparatory studies should embrace; on the contrary, I purposely slur over many points, in order to give emphasis to one special recommendation, namely, to make a systematic study of the conceptions out of which a philosophical theory may be built, in order to ascertain what place each conception may fitly occupy in such a theory, and to what uses it is adapted.

The adequate treatment of this single point would fill a volume, but I shall endeavor to illustrate my meaning by glancing at several sciences and indicating conceptions in them serviceable for philos-

ophy. As to the results to which long studies thus commenced have led me, I shall just give a hint at their nature.

We may begin with dynamics,—field in our day of perhaps the grandest conquest human science has ever made,—I mean the law of the conservation of energy. But let us revert to the first step taken by modern scientific thought,—and a great stride it was,—the inauguration of dynamics by Galileo. A modern physicist on examining Galileo's works is surprised to find how little experiment had to do with the establishment of the foundations of mechanics. His principal appeal is to common sense and *il lume naturale*. He always assumes that the true theory will be found to be a simple and natural one. And we can see why it should indeed be so in dynamics. For instance, a body left to its own inertia, moves in a straight line, and a straight line appears to us the simplest of curves. In *itself*, no curve is simpler than another. A system of straight lines has intersections precisely corresponding to those of a system of like parabolas similarly placed, or to those of any one of an infinity of systems of curves. But the straight line appears to us simple, because, as Euclid says, it lies evenly between its extremities ; that is, because viewed endwise it appears as a point. That is, again, because light moves in straight lines. Now, light moves in straight lines because of the part which the straight line plays in the laws of dynamics. Thus it is that our minds having been formed under the influence of phenomena governed by the laws of mechanics, certain conceptions entering into those laws become implanted in our minds, so that we readily guess at what the laws are. Without such a natural prompting, having to search blindfold for a law which would suit the phenomena, our chance of finding it would be as one to infinity. The further physical studies depart from phenomena which have directly influenced the growth of the mind, the less we can expect to find the laws which govern them "simple," that is, composed of a few conceptions natural to our minds.

The researches of Galileo, followed up by Huygens and others, led to those modern conceptions of *Force* and *Law*, which have revolutionised the intellectual world. The great attention given to

mechanics in the seventeenth century soon so emphasised these conceptions as to give rise to the Mechanical Philosophy, or doctrine that all the phenomena of the physical universe are to be explained upon mechanical principles. Newton's great discovery imparted a new impetus to this tendency. The old notion that heat consists in an agitation of corpuscles was now applied to the explanation of the chief properties of gases. The first suggestion in this direction was that the pressure of gases is explained by the battering of the particles against the walls of the containing vessel, which explained Boyle's law of the compressibility of air. Later, the expansion of gases, Avogadro's chemical law, the diffusion and viscosity of gases, and the action of Crookes's radiometer were shown to be consequences of the same kinetical theory; but other phenomena, such as the ratio of the specific heat at constant volume to that at constant pressure require additional hypotheses, which we have little reason to suppose are simple, so that we find ourselves quite afloat. In like manner with regard to light, that it consists of vibrations was almost proved by the phenomena of diffraction, while those of polarisation showed the excursions of the particles to be perpendicular to the line of propagation; but the phenomena of dispersion, etc., require additional hypotheses which may be very complicated. Thus, the further progress of molecular speculation appears quite uncertain. If hypotheses are to be tried haphazard, or simply because they will suit certain phenomena, it will occupy the mathematical physicists of the world say half a century on the average to bring each theory to the test, and since the number of possible theories may go up into the trillions, only one of which can be true, we have little prospect of making further solid additions to the subject in our time. When we come to atoms, the presumption in favor of a simple law seems very slender. There is room for serious doubt whether the fundamental laws of mechanics hold good for single atoms, and it seems quite likely that they are capable of motion in more than three dimensions.

To find out much more about molecules and atoms, we must search out a natural history of laws of nature, which may fulfil that function which the presumption in favor of simple laws fulfilled in

the early days of dynamics, by showing us what kind of laws we have to expect and by answering such questions as this: Can we with reasonable prospect of not wasting time, try the supposition that atoms attract one another inversely as the seventh power of their distances, or can we not? To suppose universal laws of nature capable of being apprehended by the mind and yet having no reason for their special forms, but standing inexplicable and irrational, is hardly a justifiable position. Uniformities are precisely the sort of facts that need to be accounted for. That a pitched coin should sometimes turn up heads and sometimes tails calls for no particular explanation; but if it shows heads every time, we wish to know how this result has been brought about. Law is *par excellence* the thing that wants a reason.

Now the only possible way of accounting for the laws of nature and for uniformity in general is to suppose them results of evolution. This supposes them not to be absolute, not to be obeyed precisely. It makes an element of indeterminacy, spontaneity, or absolute chance in nature. Just as, when we attempt to verify any physical law, we find our observations cannot be precisely satisfied by it, and rightly attribute the discrepancy to errors of observation, so we must suppose far more minute discrepancies to exist owing to the imperfect cogency of the law itself, to a certain swerving of the facts from any definite formula.

Mr. Herbert Spencer wishes to explain evolution upon mechanical principles. This is illogical, for four reasons. First, because the principle of evolution requires no extraneous cause; since the tendency to growth can be supposed itself to have grown from an infinitesimal germ accidentally started. Second, because law ought more than anything else to be supposed a result of evolution. Third, because exact law obviously never can produce heterogeneity out of homogeneity; and arbitrary heterogeneity is the feature of the universe the most manifest and characteristic. Fourth, because the law of the conservation of energy is equivalent to the proposition that all operations governed by mechanical laws are reversible; so that an immediate corollary from it is that growth is not explicable by those laws, even if they be not violated in the process of growth.

In short, Spencer is not a philosophical evolutionist, but only a half-evolutionist,—or, if you will, only a semi-Spencerian. Now philosophy requires thoroughgoing evolutionism or none.

The theory of Darwin was that evolution had been brought about by the action of two factors: first, heredity, as a principle making offspring nearly resemble their parents, while yet giving room for "sporting," or accidental variations,—for very slight variations often, for wider ones rarely; and, second, the destruction of breeds or races that are unable to keep the birth rate up to the death rate. This Darwinian principle is plainly capable of great generalisation. Wherever there are large numbers of objects, having a tendency to retain certain characters unaltered, this tendency, however, not being absolute but giving room for chance variations, then, if the amount of variation is absolutely limited in certain directions by the destruction of everything which reaches those limits, there will be a gradual tendency to change in directions of departure from them. Thus, if a million players sit down to bet at an even game, since one after another will get ruined, the average wealth of those who remain will perpetually increase. Here is indubitably a genuine formula of possible evolution, whether its operation accounts for much or little in the development of animal and vegetable species.

The Lamarckian theory also supposes that the development of species has taken place by a long series of insensible changes, but it supposes that those changes have taken place during the lives of the individuals, in consequence of effort and exercise, and that reproduction plays no part in the process except in preserving these modifications. Thus, the Lamarckian theory only explains the development of characters for which individuals strive, while the Darwinian theory only explains the production of characters really beneficial to the race, though these may be fatal to individuals.* But more broadly and philosophically conceived, Darwinian evolution is evolution by the operation of chance, and the destruction of

* The neo-Darwinian, Weismann, has shown that mortality would almost necessarily result from the action of the Darwinian principle.

bad results, while Lamarckian evolution is evolution by the effect of habit and effort.

A third theory of evolution is that of Mr. Clarence King. The testimony of monuments and of rocks is that species are unmodified or scarcely modified, under ordinary circumstances, but are rapidly altered after cataclysms or rapid geological changes. Under novel circumstances, we often see animals and plants sporting excessively in reproduction, and sometimes even undergoing transformations during individual life, phenomena no doubt due partly to the enfeeblement of vitality from the breaking up of habitual modes of life, partly to changed food, partly to direct specific influence of the element in which the organism is immersed. If evolution has been brought about in this way, not only have its single steps not been insensible, as both Darwinians and Lamarckians suppose, but they are furthermore neither haphazard on the one hand, nor yet determined by an inward striving on the other, but on the contrary are effects of the changed environment, and have a positive general tendency to adapt the organism to that environment, since variation will particularly affect organs at once enfeebled and stimulated. This mode of evolution, by external forces and the breaking up of habits, seems to be called for by some of the broadest and most important facts of biology and paleontology; while it certainly has been the chief factor in the historical evolution of institutions as in that of ideas; and cannot possibly be refused a very prominent place in the process of evolution of the universe in general.

Passing to psychology, we find the elementary phenomena of mind fall into three categories. First, we have Feelings, comprising all that is immediately present, such as pain, blue, cheerfulness, the feeling that arises when we contemplate a consistent theory, etc. A feeling is a state of mind having its own living quality, independent of any other state of mind. Or, a feeling is an element of consciousness which might conceivably override every other state until it monopolised the mind, although such a rudimentary state cannot actually be realised, and would not properly be consciousness. Still, it is conceivable, or supposable, that the quality of

blue should usurp the whole mind, to the exclusion of the ideas of shape, extension, contrast, commencement and cessation, and all other ideas, whatsoever. A feeling is necessarily perfectly simple, *in itself*, for if it had parts these would also be in the mind, whenever the whole was present, and thus the whole could not monopolise the mind.*

Besides Feelings, we have Sensations of reaction; as when a person blindfold suddenly runs against a post, when we make a muscular effort, or when any feeling gives way to a new feeling. Suppose I had nothing in my mind but a feeling of blue, which were suddenly to give place to a feeling of red; then, at the instant of transition there would be a shock, a sense of reaction, my blue life being transmuted into red life. If I were further endowed with a memory, that sense would continue for some time, and there would also be a peculiar feeling or sentiment connected with it. This last feeling might endure (conceivably I mean) after the memory of the occurrence and the feelings of blue and red had passed away. But the *sensation* of reaction cannot exist except in the actual presence of the two feelings blue and red to which it relates. Wherever we have two feelings and pay attention to a relation between them of whatever kind, there is the sensation of which I am speaking. But the sense of action and reaction has two types: it may either be a perception of relation between two ideas, or it may be a sense of action and reaction between feeling and something out of feeling. And this sense of external reaction again has two forms; for it is either a sense of something happening to us, by no act of ours, we being passive in the matter, or it is a sense of resistance, that is, of our expending feeling upon something without. The sense of reaction is thus a sense of connection or comparison between feelings, either, *A*, between one feeling and another, or *B*, between feeling and its absence or lower degree; and under *B* we have, First, the sense of the access of feeling, and Second, the sense of remission of feeling.

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* A feeling may certainly be compound, but only in virtue of a perception which is not that feeling nor any feeling at all.

Very different both from feelings and from reaction-sensations or disturbances of feeling are general conceptions. When we think, we are conscious that a connection between feelings is determined by a general rule, we are aware of being governed by a habit. Intellectual power is nothing but facility in taking habits and in following them in cases essentially analogous to, but in non-essentials widely remote from, the normal cases of connections of feelings under which those habits were formed.

The one primary and fundamental law of mental action consists in a tendency to generalisation. Feeling tends to spread ; connections between feelings awaken feelings ; neighboring feelings become assimilated ; ideas are apt to reproduce themselves. These are so many formulations of the one law of the growth of mind. When a disturbance of feeling takes place, we have a consciousness of gain, the gain of experience ; and a new disturbance will be apt to assimilate itself to the one that preceded it. Feelings, by being excited, become more easily excited, especially in the ways in which they have previously been excited. The consciousness of such a habit constitutes a general conception.

The cloudiness of psychological notions may be corrected by connecting them with physiological conceptions. Feeling may be supposed to exist, wherever a nerve-cell is in an excited condition. The disturbance of feeling, or sense of reaction, accompanies the transmission of disturbance between nerve-cells or from a nerve-cell to a muscle-cell or the external stimulation of a nerve-cell. General conceptions arise upon the formation of habits in the nerve-matter, which are molecular changes consequent upon its activity and probably connected with its nutrition.

The law of habit exhibits a striking contrast to all physical laws in the character of its commands. A physical law is absolute. What it requires is an exact relation. Thus, a physical force introduces into a motion a component motion to be combined with the rest by the parallelogram of forces ; but the component motion must actually take place exactly as required by the law of force. On the other hand, no exact conformity is required by the mental law. Nay, exact conformity would be in downright conflict with the law ; since

it would instantly crystallise thought and prevent all further formation of habit. The law of mind only makes a given feeling *more likely* to arise. It thus resembles the "non-conservative" forces of physics, such as viscosity and the like, which are due to statistical uniformities in the chance encounters of trillions of molecules.

The old dualistic notion of mind and matter, so prominent in Cartesianism, as two radically different kinds of substance, will hardly find defenders to-day. Rejecting this, we are driven to some form of hylopathy, otherwise called monism. Then the question arises whether physical laws on the one hand, and the psychical law on the other are to be taken—

(*A*) as independent, a doctrine often called *monism*, but which I would name *neutralism;* or,

(*B*) the psychical law as derived and special, the physical law alone as primordial, which is *materialism;* or,

(*C*) the physical law as derived and special, the psychical law alone as primordial, which is *idealism.*

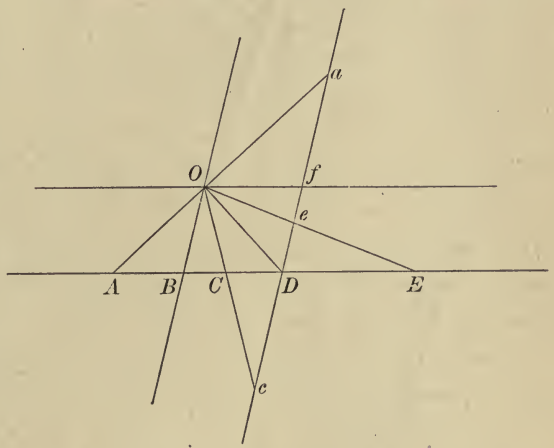
The materialistic doctrine seems to me quite as repugnant to scientific logic as to common sense; since it requires us to suppose that a certain kind of mechanism will feel, which would be a hypothesis absolutely irreducible to reason,—an ultimate, inexplicable regularity; while the only possible justification of any theory is that it should make things clear and reasonable.

Neutralism is sufficiently condemned by the logical maxim known as Ockham's razor, i. e., that not more independent elements are to be supposed than necessary. By placing the inward and outward aspects of substance on a par, it seems to render both primordial.

The one intelligible theory of the universe is that of objective idealism, that matter is effete mind, inveterate habits becoming physical laws. But before this can be accepted it must show itself capable of explaining the tridimensionality of space, the laws of motion, and the general characteristics of the universe, with mathematical clearness and precision; for no less should be demanded of every Philosophy.

Modern mathematics is replete with ideas which may be ap-

plied to philosophy. I can only notice one or two. The manner in which mathematicians generalise is very instructive. Thus, painters are accustomed to think of a picture as consisting geometrically of the intersections of its plane by rays of light from the natural objects to the eye. But geometers use a generalised perspective. For instance, in the figure let *O* be the eye, let *A B C D E* be the edgewise view of any plane, and let *a f e D c* be the edgewise view of another plane. The geometers draw rays through *O* cutting both these planes, and treat the points of intersection of each ray with one plane as representing the point of intersection of the same ray with the other plane. Thus, *e* represents *E*, in the painter's way. *D* represents itself. *C* is represented by *c*, which is further from the eye; and *A* is represented by *a* which is on the other side of the eye. Such generalisation is not bound down to sensuous images. Further, according to this mode of representation every point on one plane represents a point on the other, and every point on the latter is represented by a point on the former. But how about the point *f* which is in a direction from *O* parallel to the represented plane, and how about the point *B* which is in a direction parallel to the representing plane? Some will say that these are exceptions; but modern mathematics does not allow exceptions which can be annulled by generalisation. As a point moves from *C* to *D* and thence to *E* and off toward infinity, the corresponding point on the other plane moves from *c* to *D* and thence to *e* and toward *f*. But this second point can pass through *f* to *a*; and when it is there the first point has arrived at *A*. We therefore say that the first point has passed *through infinity*, and that every line joins in to itself somewhat like an oval. Geometers



talk of the parts of lines at an infinite distance as points. This is a kind of generalisation very efficient in mathematics.

Modern views of measurement have a philosophical aspect. There is an indefinite number of systems of measuring along a line; thus, a perspective representation of a scale on one line may be taken to measure another, although of course such measurements will not agree with what we call the distances of points on the latter line. To establish a system of measurement on a line we must assign a distinct number to each point of it, and for this purpose we shall plainly have to suppose the numbers carried out into an infinite number of places of decimals. These numbers must be ranged along the line in unbroken sequence. Further, in order that such a scale of numbers should be of any use, it must be capable of being shifted into new positions, each number continuing to be attached to a single distinct point. Now it is found that if this is true for "imaginary" as well as for real points (an expression which I cannot stop to elucidate), any such shifting will necessarily leave two numbers attached to the same points as before. So that when the scale is moved over the line by any continuous series of shiftings of one kind, there are two points which no numbers on the scale can ever reach, except the numbers fixed there. This pair of points, thus unattainable in measurement, is called the Absolute. These two points may be distinct and real, or they may coincide, or they may be both imaginary. As an example of a linear quantity with a double absolute we may take probability, which ranges from an unattainable absolute certainty *against* a proposition to an equally unattainable absolute certainty *for* it. A line, according to ordinary notions, we have seen is a linear quantity where the two points at infinity coincide. A velocity is another example. A train going with infinite velocity from Chicago to New York would be at all the points on the line at the very same instant, and if the time of transit were reduced to less than nothing it would be moving in the other direction. An angle is a familiar example of a mode of magnitude with no real immeasurable values. One of the questions philosophy has to consider is whether the development of the universe is like the increase of an angle, so that it proceeds forever

without tending toward anything unattained, which I take to be the Epicurean view, or whether the universe sprang from a chaos in the infinitely distant past to tend toward something different in the infinitely distant future, or whether the universe sprang from nothing in the past to go on indefinitely toward a point in the infinitely distant future, which, were it attained, would be the mere nothing from which it set out.

The doctrine of the absolute applied to space comes to this, that either—

First, space is, as Euclid teaches, both *unlimited* and *immeasurable*, so that the infinitely distant parts of any plane seen in perspective appear as a straight line, in which case the sum of the three angles of a triangle amounts to 180°; or,

Second, space is *immeasurable* but *limited*, so that the infinitely distant parts of any plane seen in perspective appear as a circle, beyond which all is blackness, and in this case the sum of the three angles of a triangle is less than 180° by an amount proportional to the area of the triangle; or,

Third, space is *unlimited* but *finite*, (like the surface of a sphere,) so that it has no infinitely distant parts; but a finite journey along any straight line would bring one back to his original position, and looking off with an unobstructed view one would see the back of his own head enormously magnified, in which case the sum of the three angles of a triangle exceeds 180° by an amount proportional to the area.

Which of these three hypotheses is true we know not. The largest triangles we can measure are such as have the earth's orbit for base, and the distance of a fixed star for altitude. The angular magnitude resulting from subtracting the sum of the two angles at the base of such a triangle from 180° is called the star's *parallax*. The parallaxes of only about forty stars have been measured as yet. Two of them come out negative, that of Arided (α Cycni), a star of magnitude 1½, which is $-0.''082$, according to C. A. F. Peters, and that of a star of magnitude 7¾, known as Piazzi III 422, which is $-0.''045$ according to R. S. Ball. But these negative parallaxes are undoubtedly to be attributed to errors of observation; for the

probable error of such a determination is about $\pm 0.''075$, and it would be strange indeed if we were to be able to see, as it were, more than half way round space, without being able to see stars with larger negative parallaxes. Indeed, the very fact that of all the parallaxes measured only two come out negative would be a strong argument that the smallest parallaxes really amount to $+0.''1$, were it not for the reflexion that the publication of other negative parallaxes may have been suppressed. I think we may feel confident that the parallax of the furthest star lies somewhere between $-0.''05$ and $+0.''15$, and within another century our grandchildren will surely know whether the three angles of a triangle are greater or less than $180°$,—that they are *exactly* that amount is what nobody ever can be justified in concluding. It is true that according to the axioms of geometry the sum of the three sides of a triangle are precisely $180°$; but these axioms are now exploded, and geometers confess that they, as geometers, know not the slightest reason for supposing them to be precisely true. They are expressions of our inborn conception of space, and as such are entitled to credit, so far as their truth could have influenced the formation of the mind. But that affords not the slightest reason for supposing them exact.

Now, metaphysics has always been the ape of mathematics. Geometry suggested the idea of a demonstrative system of absolutely certain philosophical principles; and the ideas of the metaphysicians have at all times been in large part drawn from mathematics. The metaphysical axioms are imitations of the geometrical axioms; and now that the latter have been thrown overboard, without doubt the former will be sent after them. It is evident, for instance, that we can have no reason to think that every phenomenon in all its minutest details is precisely determined by law. That there is an arbitrary element in the universe we see,—namely, its variety. This variety must be attributed to spontaneity in some form.

Had I more space, I now ought to show how important for philosophy is the mathematical conception of continuity. Most of what is true in Hegel is a darkling glimmer of a conception

which the mathematicians had long before made pretty clear, and which recent researches have still further illustrated.

Among the many principles of Logic which find their application in Philosophy, I can here only mention one. Three conceptions are perpetually turning up at every point in every theory of logic, and in the most rounded systems they occur in connection with one another. They are conceptions so very broad and consequently indefinite that they are hard to seize and may be easily overlooked. I call them the conceptions of First, Second, Third. First is the conception of being or existing independent of anything else. Second is the conception of being relative to, the conception of reaction with, something else. Third is the conception of mediation, whereby a first and second are brought into relation. To illustrate these ideas, I will show how they enter into those we have been considering. The origin of things, considered not as leading to anything, but in itself, contains the idea of First, the end of things that of Second, the process mediating between them that of Third. A philosophy which emphasises the idea of the One, is generally a dualistic philosophy in which the conception of Second receives exaggerated attention; for this One (though of course involving the idea of First) is always the other of a manifold which is not one. The idea of the Many, because variety is arbitrariness and arbitrariness is repudiation of any Secondness, has for its principal component the conception of First. In psychology Feeling is First, Sense of reaction Second, General conception Third, or mediation. In biology, the idea of arbitrary sporting is First, heredity is Second, the process whereby the accidental characters become fixed is Third. Chance is First, Law is Second, the tendency to take habits is Third. Mind is First, Matter is Second, Evolution is Third.

Such are the materials out of which chiefly a philosophical theory ought to be built, in order to represent the state of knowledge to which the nineteenth century has brought us. Without going into other important questions of philosophical architectonic, we can readily foresee what sort of a metaphysics would appropriately be constructed from those conceptions. Like some of the most ancient and some of the most recent speculations it would be a Cosmogonic

Philosophy. It would suppose that in the beginning,—infinitely remote,—there was a chaos of unpersonalised feeling, which being without connection or regularity would properly be without existence. This feeling, sporting here and there in pure arbitrariness, would have started the germ of a generalising tendency. Its other sportings would be evanescent, but this would have a growing virtue. Thus, the tendency to habit would be started; and from this with the other principles of evolution all the regularities of the universe would be evolved. At any time, however, an element of pure chance survives and will remain until the world becomes an absolutely perfect, rational, and symmetrical system, in which mind is at last crystallised in the infinitely-distant future.

That idea has been worked out by me with elaboration. It accounts for the main features of the universe as we know it,—the characters of time, space, matter, force, gravitation, electricity, etc. It predicts many more things which new observations can alone bring to the test. May some future student go over this ground again, and have the leisure to give his results to the world.

CHARLES S. PEIRCE.

ILLUSTRATIVE STUDIES IN CRIMINAL ANTHROPOLOGY.

I.

"LA BÊTE HUMAINE" AND CRIMINAL ANTHROPOLOGY.

IF I had to be the judge of M. Zola I could be only a very partial judge. To me the books of Zola are, with those of Dostoyewski and Tolstoï, the only ones which have struck a fresh tone in the literary monotony of this quarter of a century, in which it is said the political levelling and the general abasement of character extend even to the republic of letters. Thus I am partial to Zola, for, as the chief of a school which pushes the science of psychiatry far into the field of psychology and of sociology, I find in Zola an ally the more valuable that he has not been sought and that he reigns in a very different empire. To the scientific charlatans who deny, as does M. Colajanni, the importance and the gravity of alcoholism, its associations with crime and degeneracy, "L'Assommoir" is perhaps the best of refutations. "Germinal" and "La Fortuné des Rougon" give us the demonstration of that cruelty which is born for the crowd and in the crowd, and both prove the influence that criminals and lunatics have in rebellions. Zola is the only one of the Latin race who endeavors to introduce the scientific method into literary work.

His romances are modern histories which are founded upon living data, as histories in general are on dead data. And in history he knows also how to employ soberness, by contenting himself with a very simple sketch, disdaining the vulgar tricks which are as easy to invent as they are far from the truth.

I ought to be still more partial to "La Bête Humaine"; for, with a generosity not very frequent in men of letters, M. Zola avows that he had recourse to my "Homme Criminel" and my "Homme de Génie" for the material for his romance. Nevertheless, I cannot forbear mixing some criticism with the praises merited by this work, for I do not find satisfied by it that which I regard more than my personal vanity: my love of truth. In "La Bête Humaine" all those artifices which the romanticists had accustomed us to, and from which Zola was freed, reappear, and that alas too often!

In the first place, it is a sufficiently strange fatality that the same knife that was given as a mark of conjugal love should be by turns the instrument of every murder committed, and that all the assassinations, derailments, and suicides invariably occur at the Croix-de-Maufras, where the first lewd practices of the President Grandmorin took place. That a great number of criminals should be congregated in the small enclosure of a second-rate railway station and of its approaches, is in itself a strange fact, but it is still more strange that every crime always derives its character from that accursed place which already bears a fateful and dismal name. This is contrary to the laws of probability; for we know by statistics that the number of criminals, as well as of crimes, is always the same for a certain number of people, or a certain number of square miles, or years, and cannot be massed and restricted to a small space of ground, to so few individuals, and so short a time. This is an atavistic reversion, or, we might say, a return to the old ways of romance, in which fatal events always followed each other in certain fatal localities, or through particular men and by certain fated weapons, etc. In "La Fortune des Rougon," also, there is a certain musket which serves for the murder of gendarmes by a grandfather and his nephew, and of the nephew by gendarmes; as if the cause of the fatality was not the hereditary instinct, but this silent and unconscious instrument.

However, the greatest fault is not here; but rather in the delineation of character. Zola, who, in my opinion, has admirably depicted people poisoned by alcohol, and the common middle classes of the towns and of the country, has not studied criminals accord-

ing to nature: undoubtedly because the latter are not so easily met with; nor allow themselves to be studied even in prisons. Zola's figures of criminals give me the false pictorial effect produced by certain photographs taken from portraits, and not from the living subjects. For this reason it is then that I, who have studied thousands and thousands of criminals, should not know how to class his Roubaud, a good clerk and a good husband, who on accidentally discovering the secret of the old amours of his wife with Grandmorin, which were not yet done with, throws himself upon her, wishes to kill her, finally changes his mind, and ends by deciding on the murder of the pseudo-adulterer, with the complicity of his wife. Can he be called a criminal through passion? But then it is *she* that he should have killed, or at least the adulterer being killed he should have repented of it. And again, criminals through passion are, like Roubaud, very good and respectable people, but in their crimes they rush blindly and headlong forward, without accomplices, without premeditation, and without artifices. And they repent, they confess: they are the only criminals who feel remorse. He has no remorse; for some time he leads a life of revenge, and, afterwards, suddenly, he gives himself up to vice, to wine, to gambling, and forgets his wife, and he is jealous of her no more; on the contrary, indifferent, he assists in her infidelities. Can he be called a born criminal, a *bête?* But then how explain that he had lived so long without vices, free from debauchery, and that he had been so good a clerk? He could still be a criminal incidentally; but for a correct, steady, quiet man, as a railway official ought to be, would the discovery of the old amour of his wife be a proportionate reason for him to commit a premeditated murder, the greatest of crimes? And then, as we shall see, criminaloids are born criminals in part; they have many of the latters' psychological and physical characteristics. Now Roubaud has a full beard, red hair, and quick eyes: the only anomalies are meeting eyebrows, a low forehead, and a flat head: nothing is said of hysterical or epileptical ancestors.

According to Henry Héricourt (*Revue Bleue*, p. 14), M. Zola was inspired by a recent trial, that of the apothecary Fenayron, who is said to have had much resemblance to Roubaud. Marin

Fenayron, the apothecary, was a man of forty-one, intelligent, steady, and industrious. He had married, twelve years before, the youngest daughter of his old employer, whom he had succeeded. His wife, who was eighteen years old at the time of her marriage, and who had consented to the union only with repugnance, was not slow to deceive him, and soon formed an intimacy with his assistant. This triangular relation lasted a time, not precisely stated by the proceedings, but sufficiently long for Gabrielle Fenayron, tired of her first lover, to take the opportunity to replace him by several others. The husband, who during this time has become a gambler and idle fellow, is informed of the misconduct of his wife. Although he did not put much credit in this at first, yet in the quarrels which followed and were continually renewed he ended by abusing her, striking her, and menacing her with death: and at last he obtained from her the confession of her relations with his old assistant Aubert, then himself established as a chemist. According to her recital, the woman could obtain the pardon of her husband only by the promise that she would assist him in his plans of revenge, and she had consented through shame without protesting. Then, by the order of her husband, she writes several letters to her old lover, renews relations with him, and finally, under the pretext of a country excursion, draws him into an ambush where she aided her husband in killing him with a hammer. It will be remembered that Aubert, after the first blow, turned round, recognised his murderer, and prepared to defend himself: but his mistress threw herself on him, twined her arms about him, and the husband could thus finish his work in safety.

After the crime there was no remorse on the part of either the one or the other. Far to the contrary. The criminal pair delivered themselves anew to their accustomed distractions with the most perfect tranquillity, and the performance appeared without doubt very natural to Fenayron, for one day, meeting his mother-in-law, he accosted her, saying, "'Well, Mother, it is done. I have killed Aubert."

But let it be remarked how this Marin Fenayron, who figures as an occasional criminal, this time reveals himself a criminal by habit, meditating and premeditating his vengeance, waiting two

long months before putting it into execution, surrounding himself with every precaution to secure immunity for the crime. Such a one certainly is not the violent man whom passion blinds and who is instantaneously inflamed with anger. It is rather the degenerated man with whom predisposition has found the opportunity to reveal and to develop itself. It is necessary to add that Marin had a brother feeble in mind: an hereditary defect.

The true *bête humaine*, Jacques Lantier, possesses the anatomical characters of the born criminal; "his thick black locks were curled, like his moustaches, so heavy and dark that they increased greatly the natural paleness of his complexion." Moreover, the inclination to crime in him was justified by inheritance. And this passion for murder which supplants the sensual passion is truly intoxicating. Where the author has gone astray is where he makes Jacques find pleasure for a considerable time with Séverine without any thought of murder; while these unfortunates, at least all that I have studied, do not experience sexual pleasure except in murder. On the other hand, the vertigo of epileptic amnesia which Zola often causes Jacques to suffer, is based on fact and actually accords with the most recent observations:

"He had finally found himself on the brink of the Seine without being able to explain to himself how. That of which he retained a very clear impression, was of having thrown from the top of the bank the knife that his hand held clutched in his pocket. Then he knew no more, stupefied and absent of mind, out of which the other, and the knife too, had entirely vanished. . . . . He was in his narrow chamber in the Rue Cardinet, fallen across his bed, fully dressed. Instinct had brought him back there, as a worn out dog crawls to his kennel. Besides he remembered neither having ascended the stairs, nor of having slept. He awoke from a heavy sleep, scared to re-enter abruptly into possession of himself, as after a profound fainting fit. Perhaps he had slept three hours, perhaps three days."

Never have I found a more perfect description of that which I have termed criminal, epileptoid vertigo. But here again is a mistake of fact arising from a velleity not content with knowledge. It is that the novelist several times explains these bloodthirsty sexual instincts by a peculiar kind of atavism: the tendency, namely, to avenge the evil that women had done to his race; the spite accumulated from male to male since the first deceit in the depths of

caverns. This is an error of fact. Primitive women have never done wrong to men. More feeble than men, they have always been their victims. These bloodthirsty sexual instincts are explained by a quite different atavism, which goes back to inferior animals, to the conflict between the males for the conquest of the female, who remained for the strongest; and by the blows that were inflicted on the woman in order to reduce her to conjugal slavery, conflicts of which traces still remain in Roman history (the Rape of the Sabines), and in the nuptial rites of almost all European countries, and in those of New Zealand, where the husband knocks down his wife before carrying her off to the matrimonial bed.

Another technical defect is, that a man who has arrived at the degree of degeneracy that Jacques has, ought to have still other vices: as great violence of character, impulsiveness without cause, profound immorality; while, as a matter of fact, except in moments of sexual fury, he appears as a good and honorable man. However, even recognising the force of his bloody sexual monomania, I find that instinctive aversion, characteristic of the good man, to be proper which Jacques feels at the thought of killing some one who is not a young and beautiful woman; for instance, to killing his rival, notwithstanding the favorable circumstances and the suggestions of Séverine.

"'To kill that man, my God! Had he the right to do it? When a fly troubled him he would crush it with a blow. One day when a cat had got between his legs, he had broken its back with a kick. But to kill this man, his fellow-creature! He must reason with himself, he must prove his right to murder; the right of the strong whom the weak are troublesome to. . . . But afterwards that appeared to him monstrous, impracticable, impossible. The civilised man revolted in him, the acquired force of education, the slow and indestructible concretion of inherited ideas. His cultivated brain, filled with scruples, repelled murder with horror, as soon as he began to reason about it. Yes, to kill in a case of necessity, in a transport of rage! But to kill voluntarily by design, and from interest, no never, never could he do it!"

All that is very true. Where the author has certainly copied after nature is in the personality of Séverine. She is not a true criminal; sensual, depraved though still young, experiencing love only in adultery. Though deceitful, she is nevertheless a good wife and a good housekeeper up to the day where chance had thrown her

into evil doing. She is united to her husband, and for that reason she becomes his accomplice in crime, without horror or dread; but afterwards, seized with love for Jacques, she experiences dislike for her husband and wishes to turn the lover into his murderer.

"The need increased in her of having Jacques for herself, all for herself, to live together, days and nights, without ever more parting. Her hatred of her husband grew greater, the mere presence of this man threw her into a morbid and intolerable condition of excitement. Tractable, and with all the amiability of a delicate woman, she became enraged at everything in which he was concerned; she flew into a passion at the least obstacle he put to her wishes. . . . The stupid tranquillity in which she saw him, the indifferent glance and manner with which he received her anger, his round back, his enlarged stomach, all that greasy dullness which has the appearance of happiness, made her exasperation complete. Oh! to go far away from him. . . . One day when he returned, pale and livid, to say that in passing before a locomotive he had felt the buffer graze his elbow, she thought to herself that if he were dead she would be free. . . . She would go with Jacques to America. . . . She who at other times so rarely went out now conceived a passion for going to see the steamships sail. She would go to the pier, and would lean on her elbow watching the smoke of the departing vessels. . . . [And at the decisive moment] she threw herself passionately on Jacques's neck. She fastened her burning lips to his. How she loved him and how she hated the other! Oh! if she had dared, twenty times already would she have done the deed . . . but she felt herself too gentle, it required the hand of a man. And this kiss which would never come to an end, was all that she could communicate to him of her courage, the full possession that she promised him, the communion of her body. When she finally withdrew her lips nothing more was left to her; she believed that she had passed completely into him."

And is this, then, the woman criminal, the criminaloid, as I have called her (Vol. II of my "Uomo Delinquente")? A criminal who, when she is not urged onward by opportunities, (and these opportunities always have love for their origin,) is not capable of any true crime, and who when she commits it always makes use of the arm of another; and this latter is always her lover, for she finds herself too feeble to accomplish it herself. Her anatomical characters, as well as her physiognomy, if not those of the born criminal, have at least some features which those of other females have not, and which unite her with the animal. "She had very black and very thick hair, which stood like a helmet on her forehead, a long face, a strong mouth, and large blue-green eyes."

M. Héricourt justly finds that many features of this woman are to be met with in Gabrielle Fenayron, the accomplice of her husband. Gabrielle Fenayron is about thirty years of age: she is a tall dark woman with a very pale complexion; her hair is very black, the oval of her face elongated, and her eyes have a certain hardness that accentuate the projecting and unsightly cheek-bones. Gabrielle Fenayron, as we know, pretended to have been terrorised by the threats which her husband had uttered against her, and to have been infatuated, on the other hand, by the love that she felt for him; she had thus submitted her will in order to repair her fault. In the appreciation of this system of defence, the bill of indictment stated that the energy and the coolness exhibited by this woman in the preparation of assassination, the facilities that she had during the course of the long premeditation which had preceded the murder to warn Aubert without danger to herself, induced the belief that she had in the commission of the crime yielded to a profound hatred against her old lover. But this interpretation appears to me, psychologically, to be a clumsy and a forced one. It is not necessary to have recourse to motives left mysterious in order to explain the absolutely strange conduct of some women.

Perhaps Zola would have completed his picture if he had known Gabrielle Gompard; who allies and unites the passion of murder with prostitution when she attaches herself to a wicked man, but who grows animated for virtue and denounces herself an accomplice when she becomes the mistress of a virtuous man. These women change their personality in changing a lover, and then make a point of playing a rôle in the miserable world where their fickle passions destroy them.

Less happy, perhaps, has Zola been in the case of Flora, "fair, strong, with thick lips, and great greenish eyes, with low forehead set beneath heavy hair." According to the plot of the novel, she should be a criminal of passion. A good woman throughout her whole life, she commits a crime through jealousy. But the method of the crime (the derailment of a train with a view to striking her rival and her lover) is not that which is chosen by criminals of passion, who are unable to meditate long on their crimes, and

who kill in day-light without premeditation. It is true that it is natural to the mind of female criminals to deal indirect and very complicated blows, and without proportion to the end to be attained: but all this is only the effect of their weakness. In a virago as strong as Flora is depicted, (a bellicose maid with the strong and hard arms of a boy,) this reason fails to satisfy us; and when she meditates her crime she is urged much less by thoughts of revenge, than by a necessity to commit the wrong in order to become cured of her own; she is then a born criminal, an epileptic rather than a creature of passion; and in this sense the attribute that he gives to Flora of a monstrous muscular force, that is observed very frequently in born criminals, would be reasonable. Thus the girl who always wore masculine clothes had a remarkable muscular power. Her weapon was a hammer, and with it she struck down many men.

I knew at Turin a murderess, a courtesan, who when a model in Paris, killed for money and love an artist, whose portrait she carried tattooed on her arm. This unfortunate woman fought two or three times with the five wardens of her prison. When liberated she was the head of all the scoundrels of Turin, challenging them to contest. One day even I found her in a red shirt, with epaulettes on. "It is my ensign," said she to me, "I am the captain of the scoundrels of Turin." But all these women are very different from Flora. Of course, a single and only love is wanting in their case.

It will finally be said, that the propensity which casts the two criminaloid women into the arms of the born criminal, the *bête humaine*, is copied from nature. As a matter of fact, there does exist a true elective affinity which unites the two sexes of these unfortunates; a cause that gives rise to criminal families, which form the nucleus of gangs. Nevertheless, the demonstration of it in this instance is not evident, for in crowding a large number of criminals into so narrow a space, great liberty of choice is excluded.

II.

CRIMINAL ANTHROPOLOGY AND PSYCHIATRY.

Secretions.—Dr. Ottolenghi* has made in my laboratory a number of observations with 15 born criminals and 3 occasional criminals, for the purpose of ascertaining the proportional quantities of urea, chlorides, and phosphates eliminated under the same alimentary conditions. Here are the average results:

		GRAMMES.
Urea per 100 grammes of the weight of the body	Born criminals	0·39
	Occasional criminals	8·53
Phosphates.....do.....	Born criminals	0·024
	Occasional criminals	0·0195
Chlorides.....do.....	Born criminals	0·28
	Occasional criminals	0 29

There is therefore amongst the born criminals a diminution in the elimination of urea; and an augmentation in that of phosphates, while the elimination of chlorides does not vary. He has obtained the same results in the case of psychical epilepsy; while the occasional criminal offers no anomaly.

In connection with this it may be stated, that, on the other hand, Mr. Rivano† found amongst epileptics on the days of paroxysm a greater quantity of urea and less phosphates.

Power of Smell.—Dr. Ottolenghi has also studied the power of smell amongst criminals. He has contrived with this object in view an osmometer, containing 12 aqueous solutions of the essence of cloves varying from 1 part in 50,000 to 1 part in 100. He made his observations in several series, one each day only; the conditions of ventilation being about the same, and the solutions being renewed for each observation, to avoid errors caused by evaporation. He looked first for the lowest degree at which olfactory perception began. In former experiments he proceeded differently. He disarranged the different bottles, and requested the subject to replace

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* *Journal of the Medical Academy of Turin*, 1888. *Archiv. di Psichiatria, Scienze penali ed Antropologia Criminale*, Turin, 1888, x, Lombroso.

† *Archiv. di Freniatria*, Turin, 1889.

the same in the order of the intensity of their odor. He has divided the errors of disposition which resulted into serious and less serious errors, according as, in the order of the solutions, there occurred a distance of several or only one degree. He examined 80 criminals (50 men, 30 women) and 50 normal persons (30 men, mostly chosen amongst the prison warders, and 20 respectable women). Here are the results :

While amongst the normal males the average power of smell varied between the third and fourth degree of the osmometer, amongst the criminals it varied from the fifth to the sixth degree ; 44 individuals had no power of smell at all. While the honest men made an average of three errors in the disposition of the bottles, the criminals made five, of which three were so-called serious ones.

The normal women touched the fourth degree of the osmometer, the criminal women the sixth degree ; with two the power of smell was wanting entirely. While the normal women made an average of four faults in the disposition, the criminal women made five.

In eight cases of anosmia (loss of the sense of smell), presented in a certain set of criminals, two cases were due to nasal deformities ; the others were a kind of smell-blindness ; the subjects were susceptible to odoriferous excitations, but were unable to specify them and still less to classify them.

To verify what was really true in the assertion,* that criminal offenders against morality and customs have a highly developed power of smell, he examined this power in 30 ravishers and 40 prostitutes. In the former he found olfactory blindness in the ratio of 33 to 100 ; the remainder possessed an average power corresponding to the fifth degree of the osmometer. Arranging, then, the different solutions according to their intensity, he observed three so-called serious errors. In 19 per cent. of the girls submitted, he found olfactory blindness ; and for the others an average acuteness correspond-

* Krafft-Ebing, *Psychopatia sexualis*, 4th ed., Stuttgart, 1889.—*Archiv. di Psichiatria*, 1889.

ing to the fifth degree of the osmometer. Comparing these results with those obtained for the normal subjects and for regular criminals, the power of smell appears much less developed in the class just considered.

Taste.—Dr. Ottolenghi has also examined the sense of taste of 100 criminals (60 born criminals, 20 occasional criminals, and 20 criminal women). He compared them with 20 men taken from the lower classes, 20 professors and students, 20 respectable women, and 40 prostitutes. These series of experiments were made with 11 solutions of strychnine (graduated $\frac{1}{80000}$ to $\frac{1}{50000}$) and of saccharine (from $\frac{1}{100000}$ to $\frac{1}{10000}$), and 10 of chloride of sodium ($\frac{1}{500}$ to $\frac{3}{100}$). The criminals showed remarkable obtuseness. The lowest degree of acuteness was found in the proportion of 38 to 100 in born criminals, 30 to 100 in occasional criminals, 20 to 100 in criminal women; while we found it in 14 per cent. of the professors and the students, in 25 per cent. of the men from the lower classes, in 30 per cent. of the prostitutes, and finally in 10 per cent. of the respectable women.

Walk.—A study which I have made with Perachia,* shows us that, contrary to the case of normal men, the step of the left foot of criminals is generally longer than that of the right; besides they turn off from the line of the axis more to the right than to the left; their left foot, on being placed on the ground, forms with this line an angle of deviation more pronounced than the angle formed by their right foot; all these characteristics are very often found among epileptics.

Gestures.—It is an ancient habit among criminals to communicate their thoughts by gestures. Avé-Lallemant describes a set of gestures used among German thieves,—a real language executed solely with the fingers, like the language of the deaf. Vidocq says that pickpockets, when they are watching a victim, give each other the signal of Saint John, which consists in putting their hand to their cravat or even in taking off their hat. But Pitré especially has published the most important information on this point. In his "Usi e Costumi della Sicilia" (Usages and Customs of Sicily,)

* *Sur la Marche suivant la Méthode de Gilles de la Tourette.*

he describes 48 special kinds of gestures employed by delinquents. This phenomenon is explained by the exaggerated mobility with which born criminals are endowed, as is the case with children.

MORPHOLOGICAL ANOMALIES.

The Skeleton.—Mr. Tenchini, having made studies upon 63 skeletons of criminals, has found in the proportion of 6 out of 100 cases, the perforation of the olecranon (the bony prominence at the back of the elbow) which one observes in 36 out of 100 Europeans, and in 34 out of 100 Polynesians; he likewise observed additional ribs and vertebræ in 10 cases out of 100 of them, and also too few, in the same proportion; which reminds us of the great variableness of these bones in the lower vertebrates. Lately he has even found in a criminal 4 sacral vertebræ too few, made up by 4 supplementary cervical vertebræ.

Madame Tarnorosky in her study of prostitutes, female thieves, and peasant women has demonstrated,* that the cranial capacity of prostitutes is inferior to that of female thieves and peasant women and particularly to that of women of good society;† *vice versa*, the zygomas (bones of the upper jaw) and the mandibles (lower jaw) were more developed among the prostitutes, who also exhibited a greater number of anomalies, in the proportion of 87 to 100, while the proportion of the female thieves showing anomalies was 79 to 100, and the proportion of peasant women was 12 to 100. The prostitutes had 33 in 100 of their parents addicted to drink, while the female thieves had 41 in 100 and the peasant women 16 in 100. Mr. De Albertis has found tattooing among 300 prostitutes of Genoa

* MEASUREMENTS.	50 PROSTITUTES.	100 PROSTITUTES.	100 FEMALE THIEVES.	50 PEASANT WOMEN. (NORTH.)	50 PEASANT WOMEN. (SOUTH.)	50 LADIES OF GOOD SOCIETY.
Anteropost. diam	17·7	17·8	17·9	18·3	18	18·3
Max. trans. diam	13·9	14·4	14·9	14·5	14·5	14·5
Max. circumference	52·9	53·3	53·5	52·7	53·6	58·8
Zygomatic dist	11·4	11·3	11·2	10·9	11·4	11·3
Mandib. biang. distance	10·1	10·18	9·1	9·1	9·9	9·8

† *Archiv. di Psichiatria*, Mierjeivki, 1887.—Ibid., 1888, p. 196.

in the enormous proportion of 70 in 100.* He has also found the tactile sensibility of the women very much diminished : 3·6 millimetres to the right and 4 millimetres to the left.

Among criminal women, Saloalto has made studies altogether new ; he has recognised among 130 female thieves the degenerative character, anomalies of the skull and of the physiognomy, in a less degree than among the men ; he has found brachycephaly in 7, oxycephaly in 29, platycephaly in 7, the retreating forehead in 7, strabismus in 11, protruding ears in 6 ; the sense of touch was normal in 2 out of 100, the reflexions of the tendons decreasing in 4 out of 100, exaggerated in 12 out of 100.

Marro and Marselli have explained by sexual selection this enormous difference, which one also finds among epileptics and particularly in insane people ; the men in fact do not choose ugly women with degenerative characters, while the women have no choice, and very often an ugly man, criminal, but vigorous, for this reason triumphs over all obstacles ; sometimes he is even preferred. (Flaubert, "Correspondance," 1889.) Let us add that the cares of maternity soften the character of women, and augment in them the sentiment of pity.

Dr. Ottolenghi † has studied in my laboratory the wrinkles of 200 criminals and 200 normal persons (workingmen and peasants), and he has found that they occur earlier and much more frequently among the criminals ; in fact, two to five times more so than among normal persons, with predominance of the zygomatic wrinkle (situated in the middle of each cheek), which wrinkle may well be called the wrinkle of vice, and is the characteristic wrinkle of criminals.

In criminal women (80) also, wrinkles have been found more frequent than in normal women, although here the difference is not so marked. One calls to mind at once the wrinkle of the sor-

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* *Arch. di Psichiatria*, x, 1889.

† LOCATION.	UNDER 25 YEARS. NORMAL. p. 100.	UNDER 25 YEARS. CRIMINAL. p. 100.	BETWEEN 25 AND 50 YEARS NORMAL. p. 100.	BETWEEN 25 AND 50 YEARS CRIMINAL. p. 100.
Wrinkles of the forehead	7·1	34	62	86
Nasolabial wrinkles	22	69	62	78
Zygomatic wrinkles	0	16	18	33

cerers. It is enough to look at the bust of the celebrated Sicilian woman poisoner, preserved in the National Museum of Palermo, and whose face is one heap of wrinkles.

Dr. Ottolenghi, studying with me the frequency of canities (turning grey) and baldness in people, has demonstrated either absence or lateness of the same among criminals,* as also among epileptics and among cretins. Among the first, swindlers only tend to approach more the normal type.† On the other hand, among 280 criminal women canities was found more frequently, and baldness less frequently, than in the case of 200 honest workingmen.

We shall not terminate this part of our discussion without making mention of the beautiful discovery that we owe—it pleases us to state—to a lawyer, Mr. Anfosso. The tachyanthropometer which he has constructed is a real automatic measurer. (Archiv. di Psych., Art. IX. p. 173.) We might name it,—if the word did not possess a little too much local color,—an anthropometric guillotine; so quickly and with the precision of a machine, does it give the most important measurements of the body, which makes the practice of anthropometry very easy, even to people who are entire strangers to the science; and it facilitates, moreover, the examination of the description of individual criminals, the perfection of which will always remain one of the most glorious distinctions of M. Bertillon. And at the same time that this instrument renders services to the administration of justice, it permits on a grand scale observations which hitherto were only obtainable by the learned.

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* *La Calvizie, la Canizie e le Rughe nei normali, nei criminali negli epiletis e nei cretini. Archiv. di Psichiatria*, 1889, x.

† CLASSES.	WITH CANITIES. p. 100.	WITH BALDNESS. p. 100.
400 Normal people	62·5	19
80 Epileptics	31·5	12·7
40 Cretins	11·7	13·5
490 Criminals	25·9	48
Thieves	24·4	2·6
Swindlers	47	13·1
Maimers	23·7	5·3
80 Criminal women	45	9·7
200 Honest women	60	13

Experiments were made a short time ago by Mr. Rossi, who studied the result of these measurements in 100 criminals (nearly all thieves). He found the breadth of the span of the arms to be greater than the height of body in 88; and in 11 to be less. In 30 he found the right foot larger; in 58 he found the left foot larger; in 12 both feet equal. The right arms of 43 per cent. were longer than the left, and the left in 54 per cent. longer than the right. Which confirms to a marvellous degree the *gaucherie*, mancinism, or structural misproportion, that had before been indicated by dynamometry and the study of the walk of criminals.*

The very frequent recurrence of anatomical misproportion and *gaucherie* could not be better confirmed; and there are in this atavistic symptoms, for Rollet has observed in 42 anthropoids the left humerus to be longer than the right, in the proportion of 60 to 100, while among men the proportion is only 7 out of 100. (*Revue Scientifique*, 1889.)

This anatomical misproportion I have very recently verified with Mr. Ottolenghi by measurements of the two hands, the middle fingers, and the feet, right and left, in 90 normal persons and in 100 born criminals.† (Archiv. di Psichiatria, X. 8.)

Tattooing—I was under the belief that in this respect nothing more was to be said after the beautiful studies of Messrs. Lacassagne and Marro, and after my own.‡

However, the researches made by Messrs. Severi, Lucchini, and Boselli on 4,000 new criminals have given results of a high importance and first of all a proportion eight fold greater than that of

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* *Archiv. di Psichiatria*, 1889, Vol. x. p. 191.

† TYPES:	HAND LONGER. RIGHT.	HAND LONGER. LEFT.	MIDDLE FINGER. RIGHT.	MIDDLE FINGER. LEFT.	FOOT. RIGHT.	FOOT. LEFT.
	PER CENTUM.		PER CENTUM.		PER CENTUM.	
Normal persons	14·4	11	16.6	15·5	38·5	15·6
Criminals	5	25	10	27	27	35
Swindlers	4·3	13	13	21·7	21·7	26
Ravishers	7	14·2	14·2	28·4	35·7	35·7
Maimers	15	25	5	25	20	55
Thieves	0	34·8	13	30·4	26	26·6
Pickpockets	0	35	5	30	35	25

‡ See *Nouvelle Revue*; also my *Uomo Delinquente*, 4th ed., 1889.

the alienists of the same district (Florence and Lucca). The prevalency of this practice is enormous; it amounts to 40 in 100 among military criminals and to 33 in 100 among criminals under age; the women give a proportion of only 1·6 in 100, but this would be increased to 2 in 100 if we included certain kinds of fly-tattooing (*tatouages mouches*) resembling beauty spots, which are found even in high life prostitution.

What chiefly astonishes us in these researches, next to the frequency of the phenomena, is the specific character of the tattooings: their obscenity, the vaunting of crime, and the strange contrast of evil passions and the highest sentiments.

M. C. . . ., aged 27 years, convicted at least fifty times for affrays, and the assaulting and wounding of men and horses, has the history of his crimes literally written on his skin; and in this respect, let us note that the infamous De Rosny, who only lately committed suicide in Lyons, had her body covered with tattooings in the form of erotic figures; one could read there the list of her lovers and the dates at which she left them.

F. L. . . ., a carrier, aged 26 years, several times convicted, bears on his breast a heart pierced by a poniard (the sign of vengeance), and on his right hand a female singer of a *café chantant*, of whom he was enamoured. By the side of these tattooings, and others which propriety forbids us to cite,* one sees with surprise the picture of a tomb with the epitaph: "To my beloved father." Strange contradictions of the human mind!

A certain B. . ., a deserter, has on his chest a St. George and the cross of the Legion of Honor, and on the right arm a woman, very little dressed, who drinks with the inscription: "Let us wet the interior a little."

Q. A. . ., a laborer, convicted many times for theft, expelled from France and Switzerland, has on his chest two Swiss gendarmes with the words "Long live the Republic!" On his right arm he has a heart pierced through, and at the side the head of a fish—a mackerel, to signify that he will poniard a bully, his rival.

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*See *Atlas de L'Homme Criminel*. 1888. Alcan.

We have seen on the left arm of another thief, a pot with a lemon tree, and the initials V. G. (*vengeance*); which in the strange language of the criminals means: treason, and, afterwards, revenge. He did not conceal from us the fact that his constant thought was to revenge himself on the woman who loved him and then abandoned him. His desire was to cut off her nose. His brother offered to perform the operation for him, but this he refused, reserving for himself the pleasure of executing his purpose when he should ultimately be liberated.

One sees, therefore, from these few examples, that there is among criminals a kind of hieroglyphical writing, but which is not regulated or fixed. The system is founded on daily happenings and slang, as would be the case among primitive mankind. Very often, in fact, a key signifies among thieves the silence of secrecy; and a death's-head (the bare skull), revenge. Sometimes points are used instead of figures. In this way one criminal marked himself with 17 points, which means, to his mind, that he proposes to inflict injury on his enemy seventeen times, whenever he meets with him.

The criminal tattooers of Naples have the habit of making long inscriptions on their bodies; but initials are used instead of words. Many Camorrists of Naples carry a tattooing which represents iron bars, behind which there is a prisoner and underneath the initials Q. F. Q. P. M.; which means: "Quando finiranno queste pene? Mai!" (When will these pains end? Never!) Others bear the epigraph C. G. P. V., etc., which means: "Courage, galeriens, pour voler et piler; nous devons tout mettre à sang et à feu!" (Courage, convicts, to steal and to rob; we must put all to the sword and fire!) We see here at once that certain forms of tattooing are employed by criminal federations, and serve as a sort of rallying-call. In Bavaria and in the South of Germany, the pickpockets, who are united together in real alliances, recognise each other by the epigraphic tattooing "T und L," which means *Thal und Land* (valley and country); words which they must exchange in a low voice when they meet each other, in order not to be denounced to the police. A thief R . . ., who has on his right arm a design representing two hands crossed, and the word *union* (unity) sur-

rounded by a garland of flowers, told us that this tattooing is extensively adopted by malefactors in the South of France (Draguignan). According to the revelations made to us by emerited Camorrists, a lizard or a serpent denotes the first grade of this dangerous association.

I pass over in silence, and for good reasons, the tattooings spread over all the remaining parts of the body.

In the *Revista de Antropologia Criminal*, a new publication which has just appeared in Madrid, Mr. Sallilas has published an excellent study relative to the tattooing of Spanish criminals. According to him, this is a frequent custom among murderers. The predominance of the religious character is there noticeable, but always with the seal of lewd obscenity, universally observed. I have lately had occasion to verify up to what point the impulsion which leads criminals to inflict on themselves this strange operation, is atavistic. One of the most incorrigible thieves I have met, who has six brothers tattooed like himself, begged of me, notwithstanding he was half covered with the most obscene tattooings, to find him a professional tattooer who should complete what might well be called the carpeting of his skin. "When the tattooing is very odd and grotesque, and spreads over the whole body," he said, "it is for us thieves what the black dress coat and the decorated vest is to society. The more we are tattooed the greater is our esteem for one another; the more an individual is tattooed, the more authority has he over his companions. On the other hand, he who is not much tattooed enjoys no influence whatsoever with us; is not considered a thorough scoundrel, and has not the estimation of his fellows." "Very often," another told me, "when we visited prostitutes, and they saw us covered all over with tattooings, they overwhelmed us with presents, and gave us money instead of demanding it." If all that is not atavism, atavism does not exist in science.

Of this characteristic, of course, as of all the other characteristics of criminals, one may say that it is to be met with among normal people. But the chief thing here is its proportion, its commonness, and the exaggerated extent to which it is practised. Among honest, respectable people its peculiar complexion, its local

and obscene coloring, and the useless, vain, and imprudent display of crime are wanting.

Again, it will probably be objected that this is not psychology, and that only through the latter science can we trace out the picture of the criminal. I could well answer here, that these tattooings are really psychological phenomena. And I may add that Mr. Ferri, in the introductory part of his work on Homicides, has given us in addition to a real statistical psychology, an analysis of all criminal propensities and of their extent before and after the crime.

Among born criminals, for example, 42 in 100 always deny the crime with which they are charged, while among occasional criminals, and in particular among maimers, only 21 in 100 deny all; of the first 1 in 100, and of the second 2 in 100 confess their crime with tears; etc.*

CESARE LOMBROSO.

[Prof. Lombroso has in preparation for this series of criminological studies, an essay on the physiognomy of the Anarchists.—ED.]

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* *L'Omicidio*, Turin, 1890.

THE SQUARING OF THE CIRCLE.

AN HISTORICAL SKETCH OF THE PROBLEM FROM THE EARLIEST TIMES TO THE PRESENT DAY.*

I.

FOR two and a half thousand years, both trained and untrained minds have striven in vain to solve the problem known as the squaring of the circle. Now that geometers have at last succeeded in giving a rigid demonstration of the impossibility of solving the problem with ruler and compasses, it seems fitting and opportune to cast a glance into the nature and history of this very ancient problem. And this will be found all the more justifiable in view of the fact that the squaring of the circle, at least in name, is very widely known outside of the narrow limits of professional mathematicians.

Universal interest in the problem.

The Proceedings of the French Academy for the year 1775 contain at page 61 the resolution of the Academy not to examine from that time on, any so-called solutions of the quadrature of the circle that might be handed in. The Academy was driven to this determination by the overwhelming multitude of professed solutions of the famous problem, which were sent to it every month in the year,—solutions which of course were an invariable attestation of the ignorance and self-consciousness of their authors, but which suffered collectively from a very important error in mathematics: they were *wrong*. Since that time all professed solutions of the problem received by the Academy find a sure

The resolution of the French Academy.

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* From Holtzendorff and Virchow's *Sammlung gemeinverständlicher wissenschaftlicher Vorträge*, Heft 67. Hamburg: Verlagsanstalt, etc.

haven in the waste-basket, and remain unanswered for all time. The circle-squarer, however, sees in this high-handed manner of rejection only the envy of the great towards his grand intellectual discovery. He is determined to meet with recognition, and appeals therefore to the public. The newspapers must obtain for him the appreciation that scientific societies have denied. And every year the old mathematical sea-serpent more than once disports itself in the columns of our papers, that a Mr. N. N., of P. P., has at last solved the problem of the quadrature of the circle.

General ignorance of quadrators.

But what kind of people are these circle-squarers, when examined by the light? Almost always they will be found to be imperfectly educated persons, whose mathematical knowledge does not exceed that of a modern college freshman. It is seldom that they know accurately what the requirements of the problem are and what its nature; they never know the two and a half thousand years' history of the problem; and they have no idea whatever of the important investigations and results which have been made with reference to the problem by great and real mathematicians in every century down to our time.

A cyclometric type.

Yet great as is the quantum of ignorance that circle-squarers intermix with their intellectual products, the lavish supply of conceit and self-consciousness with which they season their performances is still greater. I have not far to go to furnish a verification of this. A book printed in Hamburg in the year 1840 lies before me, in which the author thanks Almighty God at every second page that He has selected him and no one else to solve the 'problem phenomenal' of mathematics, "so long sought for, so fervently desired, and attempted by millions." After the modest author has proclaimed himself the unmasker of Archimedes's deceit, he says: "It thus has pleased our mother nature to withhold this mathematical jewel from the eye of human investigation, until she thought it fitting to reveal truth to simplicity."

This will suffice to show the great self-consciousness of the author. But it does not suffice to prove his ignorance. He has no conception of mathematical demonstration; he takes it for granted that things are so because they seem so to him. Errors of logic,

also, are abundantly found in his book. But apart from this general incorrectness let us see wherein the real gist of his fallacy consists. It requires considerable labor to find out what this is from the turgid language and bombastic style in which the author has buried his conclusions. But it is this. The author inscribes a square in a circle, circumscribes another about it, then points out that the inside square is made up of four congruent triangles, whereas the circumscribed square is made up of eight such triangles; from which fact, seeing that the circle is larger than the one square and smaller than the other, he draws the bold conclusion that the circle is equal in area to six such triangles. It is hardly conceivable that a rational being could infer that something which is greater than 4 and less than 8 must necessarily be 6. But with a man that attempts the squaring of the circle this kind of ratiocination *is* possible.

Similarly in the case of all other attempted solutions of the problem, either logical fallacies or violations of elementary arithmetical or geometrical truths may be pointed out. Only they are not always of such a trivial nature as in the book just mentioned.

Let us now inquire whence the inclination arises which leads people to take up the quadrature of the circle and to attempt to solve it.

Attention must first be called to the antiquity of the problem. A quadrature was attempted in Egypt 500 years before the exodus of the Israelites. Among the Greeks the problem never ceased to play a part that greatly influenced the progress of mathematics. And in the middle ages also the squaring of the circle sporadically appears as the philosopher's stone of mathematics. The problem has thus never ceased to be dealt with and considered. But it is not by the antiquity of the problem that circle-squarers are enticed, but by the allurement which everything exerts that is calculated to raise the individual out of the mass of ordinary humanity, and to bind about his temples the laurel crown of celebrity. It is ambition that spurred men on in ancient Greece and still spurs them on in modern times to crack this primeval mathematical nut. Whether they are competent thereto is a secon-

The allurements of the problem.

dary consideration. They look upon the squaring of the circle as the grand prize of a lottery that can just as well fall to their lot as to that of any other. They do not remember that—

"Toil before honor is placed by sagacious decrees of Immortals,"

and that it requires years of continued studies to gain possession of the mathematical weapons that are indispensably necessary to attack the problem, but which even in the hands of the most distinguished mathematical strategists have not sufficed to take the stronghold.

About the only problem known to the lay world.

But how is it, we must further ask, that it happens to be the squaring of the circle and not some other unsolved mathematical problem upon which the efforts of people are bestowed who have no knowledge of mathematics yet busy themselves with mathematical questions? The question is answered by the fact that the squaring of the circle is about the only mathematical problem that is known to the unprofessional world,—at least by name. Even among the Greeks the problem was very widely known outside of mathematical circles. In the eyes of the Grecian layman, as at present among many of his modern brethren, occupation with this problem was regarded as the most important and essential business of mathematicians. In fact they had a special word to designate this species of activity; namely, τετραγωνίζειν, which means to busy one's self with the quadrature. In modern times, also, every educated person, though he be not a mathematician, knows the problem by name, and knows that it is insolvable, or at least, that despite the efforts of the most famous mathematicians it has not yet been solved. For this reason the phrase "to square the circle," is now used in the sense of attempting the impossible.

Belief that rewards have been offered.

But in addition to the antiquity of the problem, and the fact also that it is known to the lay world, we have yet a third factor to point out that induces people to take up with it. This is the report that has been spread abroad for a hundred years now, that the Academies, the Queen of England, or some other influential person, has offered a great prize to be given

to the one that first solves the problem. As a matter of fact we find the hope of obtaining this large prize of money the principal incitement to action with many circle-squarers. And the author of the book above referred to begs his readers to lend him their assistance in obtaining the prizes offered.

The problem among mathematicians.

Although the opinion is widely current in the unprofessional world, that professional mathematicians are still busied with the solution of the problem, this is by no means the case. On the contrary, for some two hundred years, the endeavors of many considerable mathematicians have been solely directed towards demonstrating with exactness that the problem is insolvable. It is, as a rule,—and naturally,—more difficult to prove that something is impossible than to prove that it is possible. And thus it has happened, that up to within a few years ago, despite the employment of the most varied and the most comprehensive methods of modern mathematics, no one succeeded in supplying the wished-for demonstration of the problem's impossibility. At last, Professor Lindemann, of Königsberg, in June, 1882, succeeded in furnishing a demonstration,—and the first demonstration,—that it is impossible by the exclusive employment of ruler and compasses to construct a square that is mathematically exactly equal in area to a given circle. The demonstration, naturally, was not effected with the help of the old elementary methods; for if it were, it would surely have been accomplished centuries ago; but methods were requisite that were first furnished by the theory of definite integrals and departments of higher algebra developed in the last decades; in other words it required the direct and indirect preparatory labor of many centuries to make finally possible a demonstration of the insolvability of this historic problem.

Of course, this demonstration will have no more effect than the resolution of the Paris Academy of 1775, in causing the fecund race of circle-squarers to vanish from the face of the earth. In the future as in the past, there will be people who know nothing, and will not want to know anything of this demonstration, and who believe that they cannot help but succeed in a matter in which others have failed, and that just they have been appointed by Providence to

solve the famous puzzle. But unfortunately the ineradicable passion of wanting to solve the quadrature of the circle has also its serious side. Circle-squarers are not always so self-contented as the author of the book we have mentioned. They often see or at least divine the insuperable difficulties that tower up before them, and the conflict between their aspirations and their performances, the consciousness that they want to solve the problem but are unable to solve it, darkens their soul and, lost to the world, they become interesting subjects for the science of psychiatry.

II.

Nature of the problem. Numerical rectification.

If we have a circle before us, it is easy for us to determine the length of its radius or of its diameter, which must be double that of the radius; and the question next arises to find the number that represents how many times larger its circumference, that is the length of the circular line, is than its radius or its diameter. From the fact that all circles have the same shape it follows that this proportion will always be the same for both large and small circles. Now, since the time of Archimedes, all civilised nations that have cultivated mathematics, have called the number that denotes how many times larger than the diameter the circumference of a circle is, π,—the Greek initial letter of the word periphery. To compute π, therefore, means to calculate how many times larger the circumference of a circle is than its diameter. This calculation is called "the numerical rectification of the circle."

The numerical quadrature.

Next to the calculation of the circumference, the calculation of the superficial contents of a circle by means of its radius or diameter is perhaps most important; that is, the computation of how much area that part of a plane which lies within a circle measures. This calculation is called the "numerical quadrature." It depends, however, upon the problem of numerical rectification; that is, upon the calculation of the magnitude of π. For it is demonstrated in elementary geometry, that the area of a circle is equal to the area of a triangle produced by drawing in the circle a radius, erecting at the extremity of the same a

tangent,—that is, in this case, a perpendicular,—cutting off upon the latter the length of the circumference, measuring from the extremity, and joining the point thus obtained with the centre of the circle. But it follows from this that the area of a circle is as many times larger than the square upon its radius as the number π amounts to.

Constructive rectification and quadrature.

The numerical rectification and numerical quadrature of the circle based upon the computation of the number π, are to be clearly distinguished from problems that require a straight line equal in length to the circumference of a circle, or a square equal in area to a circle, to be *constructively* produced out of its radius or its diameter; problems which might properly be called "constructive rectification" or "constructive quadrature." Approximately, of course, by employing an approximate value for π these problems are easily solvable. But to solve a problem of construction, in geometry, means to solve it with mathematical exactitude. If the value π were exactly equal to the ratio of two whole numbers to one another, the constructive rectification would present no difficulties. For example, suppose the circumference of a circle were exactly $3\frac{1}{7}$ times greater than its diameter; then the diameter could be divided into seven equal parts, which could be easily done by the principles of planimetry with ruler and compasses; then we would produce to the amount of such a part a straight line exactly three times larger than the diameter, and should thus obtain a straight line exactly equal to the circumference of the circle. But as a matter of fact, and as has actually been demonstrated, there do not exist two whole numbers, be they ever so great, that exactly represent by their proportion to one another the number π. Consequently, a rectification of the kind just described does not attain the object desired.

It might be asked here, whether from the demonstrated fact that the number π is not equal to the ratio of two whole numbers however great, it does not immediately follow that it is impossible to construct a straight line exactly equal in length to the circumference of a circle; thus demonstrating at once the impossibility of solving the problem. This question is to be answered in the nega-

tive. For there are in geometry many sets of two lines of which the one can be easily constructed from the other, notwithstanding the fact that no two whole numbers can be found to represent the ratio of the two lines. The side and the diagonal of a square, for instance, are so constituted. It is true the ratio of the latter two magnitudes is nearly that of 5 to 7. But this proportion is not exact, and there are in fact no two numbers that represent the ratio exactly. Nevertheless, either of these two lines can be easily constructed from the other by the sole employment of ruler and compasses. This might be the case, too, with the rectification of the circle; and consequently from the impossibility of representing π by the ratio between two whole numbers the impossibility of the problem of rectification is not inferable.

The quadrature of the circle stands and falls with the problem of rectification. This is based upon the truth above mentioned, that a circle is equal in area to a right-angled triangle, in which one side is equal to the radius of the circle and the other to the circumference. Supposing, accordingly, that the circumference of the circle were rectified, then we could construct this triangle. But every triangle, as is taught in the elements of planimetry, can, with the help of ruler and compasses be converted into a square exactly equal to it in area. So that, therefore, supposing the rectification of the circumference of a circle were successfully performed, a square could be constructed that would be exactly equal in area to the circle.

The dependence upon one another of the three problems of the computation of the number π, of the quadrature of the circle, and its rectification, thus obliges us, in dealing with the history of the quadrature, to regard investigations with respect to the value of π and attempts to rectify the circle as of equal importance, and to consider them accordingly.

Conditions of the geometrical solution.

We have used repeatedly in the course of this discussion the expression "to construct with ruler and compasses." It will be necessary to explain what is meant by the specification of these two instruments. When such a number of conditions is annexed to a requirement in geometry to construct a

certain figure that the construction only of *one* figure or a limited number of figures is possible in accordance with the conditions given; such a complete requirement is called a problem of construction, or briefly a problem. When a problem of this kind is presented for solution it is necessary to reduce it to simpler problems, already recognised as solvable; and since these latter depend in their turn upon other, still simpler problems, we are finally brought back to certain fundamental problems upon which the rest are based but which are not themselves reducible to problems less simple. These fundamental problems are, so to speak, the undermost stones of the edifice of geometrical construction. The question next arises as to what problems may be properly regarded as fundamental; and it has been found, that the solution of a great part of the problems that arise in elementary planimetry rests upon the solution of only five original problems. They are:

1. The construction of a straight line which shall pass through two given points.

2. The construction of a circle the centre of which is a given point and the radius of which has a given length.

3. The determination of the point that lies coincidently on two given straight lines extended as far as is necessary,—in case such a point (point of intersection) exists.

4. The determination of the two points that lie coincidently on a given straight line and a given circle,—in case such common points (points of intersection) exist.

5. The determination of the two points that lie coincidently on two given circles,—in case such common points (points of intersection) exist.

For the solution of the three last of these five problems the eye alone is needed, while for the solution of the two first problems, besides pencil, ink, chalk, and the like, additional special instruments are required: for the solution of the first problem a ruler is most generally used, and for the solution of the second a pair of compasses. But it must be remembered that it is no concern of geometry what mechanical instruments are employed in the solution of the five problems mentioned. Geometry simply limits itself to

the presupposition that these problems are solvable, and regards a complicated problem as solved if, upon a specification of the constructions of which the solution consists, no other requirements are demanded than the five above mentioned. Since, accordingly, geometry does not itself furnish the solution of these five problems, but rather exacts them, they are termed *postulates.** All problems of planimetry are not reducible to these five problems alone. There are problems that can be solved only by assuming other problems as solvable which are not included in the five given; for example, the construction of an ellipse, having given its centre and its major and minor axes. Many problems, however, possess the property of being solvable with the assistance solely of the five postulates above formulated, and where this is the case they are said to be "constructible with ruler and compasses," or "elementarily" constructible.

After these general remarks upon the solvability of problems of geometrical construction, which an understanding of the history of the squaring of the circle makes indispensably necessary, the significance of the question whether the quadrature of the circle is or is not solvable, that is elementarily solvable, will become intelligible. But the conception just discussed of elementary solvability only gradually took clear form, and we therefore find among the Greeks as well as among the Arabs, endeavors, successful in some respects, that aimed at solving the quadrature of the circle with other expedients than the five postulates. We have also to take these endeavors into consideration, and especially so as they, no less than the unsuccessful efforts at elementary solution, have upon the whole advanced the science of geometry, and contributed much to the clarification of geometrical ideas.

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* Usually geometers mention only two postulates (Nos. 1 and 2). But since to geometry proper it is indifferent whether only the eye, or additional special mechanical instruments are necessary, the author has regarded it more correct in point of method to assume five postulates.

III.

In the oldest mathematical work that we possess we find a rule that tells us how to make a square which is equal in area to a given circle. This celebrated book, the Papyrus Rhind of the British Museum, translated and explained by Eisenlohr (Leipsic, 1887), was written, as it is stated in the work, in the thirty-third year of the reign of King Ra-a-us, by a scribe of that monarch, named Ahmes. The composition of the work falls accordingly into the period of the two Hiksos dynasties, that is, in the period between 2000 and 1700 B.C. But there is another important circumstance attached to this. Ahmes mentions in his introduction that he composed his work after the model of old treatises, written in the time of King Raenmat; whence it appears that the originals of the mathematical expositions of Ahmes, are half a thousand years older yet than the Papyrus Rhind. The Egyptian quadrature.

The rule given in this papyrus for obtaining a square equal to a circle, specifies that the diameter of the circle shall be shortened one ninth of its length and upon the shortened line thus obtained a square erected. Of course, the area of a square of this construction is only approximately equal to the area of the circle. An idea may be obtained of the degree of exactness of this original, primitive quadrature by our remarking, that if the diameter of the circle in question is one metre in length, the square that is supposed to be equal to the circle is a little less than half a square decimetre larger; an approximation not so accurate as that computed by Archimedes, yet much more correct than many a one later employed. It is not known how Ahmes or his predecessors arrived at this approximate quadrature; but it is certain that it was handed down in Egypt from century to century, and in late Egyptian times it repeatedly appears.

Besides among the Egyptians, we also find in pre-Grecian antiquity an attempt at circle-computation among the Babylonians. This is not a quadrature; but aims at the rectification of the circumference. The Babylonian mathematicians had discovered, that if the radius of a circle be successively The Biblical and Babylonian quadratures.

inscribed as chord within its circumference, after the sixth inscription we arrive at the point of departure, and they concluded from this that the circumference of a circle must be a little larger than a line which is six times as long as the radius, that is three times as long as the diameter. A trace of this Babylonian method of computation may even be found in the bible; for in 1 Kings vii. 23, and 2 Chron. iv. 2, the great laver is described, which under the name of the "molten sea" constituted an ornament of the temple of Solomon; and it is said of this vessel that it measured ten cubits from brim to brim, and thirty cubits round about. The number 3 as the ratio between the circumference and the diameter is still more plainly given in the Talmud, where we read that "that which measures three lengths in circumference is one length across."

Among the Greeks.

With regard to the earlier Greek mathematicians,—as Thales and Pythagoras,—we know that they acquired the foundations of their mathematical knowledge in Egypt. But nothing has been handed down to us which shows that they knew of the old Egyptian quadrature, or that they dealt with the problem at all. But tradition says, that, subsequently, the teacher of Euripides and Pericles, the great philosopher and mathematician Anaxagoras, whom Plato so highly praised, "drew the quadrature of the circle" in prison, in the year 434. This is the account of Plutarch in the seventeeth chapter of his work "De Exilio." The method is not told us in which Anaxagoras had supposably solved the problem, and it is not said whether knowingly or unknowingly he accomplished an approximate solution after the manner of Ahmes. But at any rate, to Anaxagoras belongs the merit of having called attention to a problem that bore great fruit, in having incited Grecian scholars to busy themselves with geometry, and thus more and more to advance that science.

Anaxagoras.

The quadratrix of Hippias of Elis.

Again, it is reported that the mathematician Hippias of Elis invented a curved line that could be made to serve a double purpose: first, to trisect an angle, and second, to square the circle. This curved line is the τετραγωνίζουσα

so often mentioned by the later Greek mathematicians, and by the Romans called "quadratrix." Regarding the nature of this curve we have exact knowledge from Pappus. But it will be sufficient, here, to state that the quadratrix is not a circle nor a portion of a circle, so that its construction is not possible by means of the postulates enumerated in the preceding section. And therefore the solution of the quadrature of the circle founded on the construction of the quadratrix is not an elementary solution in the sense discussed in the last section. We can, it is true, conceive a mechanism that will draw this curve as well as compasses draw a circle; and with the assistance of a mechanism of this description the squaring of the circle is solvable with exactitude. But if it be allowed to employ in a solution an apparatus especially adapted thereto, every problem may be said to be solvable. Strictly taken, the invention of the curve of Hippias substitutes for one insuperable difficulty another equally insuperable. Some time afterwards, about the year 350, the mathematician Dinostratus showed that the quadratrix could also be used to solve the problem of rectification, and from that time on this problem plays almost the same rôle in Grecian mathematics as the related problem of quadrature.

The Sophists' solution.

As these problems gradually became known to the non-mathematicians of Greece, attempts at solution at once sprang up that are worthy of a place by the side of the solutions of modern amateur circle-squarers. The Sophists, especially, believed themselves competent by seductive dialectic to take a stronghold that had defied the intellectual onslaughts of the greatest mathematicians. With verbal nicety, amounting to puerility, it was said that the squaring of the circle depended upon the finding of a number which represented in itself both a square and a circle; a square by being a square number, a circle in that it ended with the same number as the root number from which, by multiplication with itself, it was produced. The number 36, accordingly, was, as they thought, the one that embodied the solution of the famous problem.

Contrasted with this twisting of words the speculations of Bryson and Antiphon, both contemporaries of Socrates, though inexact,

appear in high degree intelligent. Antiphon divided the circle into four equal arcs, and by joining the points of division obtained a square; he then divided each arc again into two equal parts and thus obtained an inscribed octagon; thence he constructed an inscribed dodecagon, and perceived that the figure so inscribed more and more approached the shape of a circle. In this way, he said, one should proceed, until there was inscribed in the circle a polygon whose sides by reason of their smallness should coincide with the circle. Now this polygon could, by methods already taught by the Pythagoreans, be converted into a square of equal area; and upon the basis of this fact Antiphon regarded the squaring of the circle as solved.

Antiphon's attempt

Nothing can be said against this method except that, however far the bisection of the arcs is carried, the result must still remain an approximate one.

The attempt of Bryson of Heraclea was better still; for this scholar did not rest content with finding a square that was very little smaller than the circle, but obtained by means of circumscribed polygons another square that was very little larger than the circle. Only Bryson committed the error of believing that the area of the circle was the arithmetical mean between an inscribed and a circumscribed polygon of an equal number of sides. Notwithstanding this error, however, to Bryson belongs the merit, first, of having introduced into mathematics by his emphasis of the necessity of a square which was too large and one which was too small, the conception of maximum and minimum "limits" in approximations; and secondly, by his comparison with a circle of the inscribed and circumscribed regular polygons, the merit of having indicated to Archimedes the way by which an approximate value for π was to be reached.

Bryson of Heraklea

Not long after Antiphon and Bryson, Hippocrates of Chios treated the problem, which had now become more and more famous, from a new point of view. Hippocrates was not satisfied with approximate equalities, and searched for curvilinearly bounded plane figures which should be mathematically equal to a rectilinearly bounded figure, and therefore

Hippocrates of Chios.

could be converted by ruler and compasses into a square equal in area. First, Hippocrates found that the crescent-shaped plane figure produced by drawing two perpendicular radii in a circle and describing upon the line joining their extremities a semicircle, is exactly equal in area to the triangle that is formed by this line of junction and the two radii; and upon the basis of this fact the endeavors of the untiring scholar were directed towards converting a circle into a crescent. Naturally he was unable to attain this object, but by his efforts to this end he discovered many a new geometrical truth; among others the generalised form of the theorem mentioned, which bears to the present day the name of "Lunulæ Hippocratis," the lunes of Hippocrates. Thus it appears, in the case of Hippocrates, in the plainest light, how the very insolvable problems of science are qualified to advance science; in that they incite investigators to devote themselves with persistence to its study and thus to fathom its depths.

Euclid's avoidance of the problem.

Following Hippocrates in the historical line of the great Grecian geometricians comes the systematist Euclid, whose rigid formulation of geometrical principles has remained the standard presentation down to the present century. The Elements of Euclid, however, contain nothing relating to the quadrature of the circle or to circle-computation. Comparisons of surfaces which relate to the circle are indeed found in the book, but nowhere a computation of the circumference of a circle or of the area of a circle. This palpable gap in Euclid's system was filled by Archimedes, the greatest mathematician of antiquity.

Archimedes's calculations.

Archimedes was born in Syracuse in the year 287 B. C., and devoted his life, there spent, to the mathematical and the physical sciences, which he enriched with invaluable contributions. He lived in Syracuse till the taking of the town by Marcellus, in the year 212 B. C., when he fell by the hand of a Roman soldier whom he had forbidden to destroy the figures he had drawn in the sand. To the greatest performances of Archimedes the successful computation of the number π unquestionably belongs. Like Bryson he started with regular inscribed and circumscribed polygons. He showed how it was possible, beginning with

the perimeter of an inscribed hexagon, which is equal to six radii, to obtain by way of calculation the perimeter of a regular dodecagon, and then the perimeter of a figure having double the number of sides of the preceding one. Treating, then, the circumscribed polygons in a similar manner, and proceeding with both series of polygons up to a regular 96-sided polygon, he perceived on the one hand that the ratio of the perimeter of the inscribed 96-sided polygon to the diameter was greater than $6336 : 2017\frac{1}{4}$, and on the other hand, that the corresponding ratio with respect to the circumscribed 96-sided polygon was smaller than $14688 : 4673\frac{1}{2}$. He inferred from this, that the number π, the ratio of the circumference to the diameter, was greater than the fraction $\frac{6336}{2017\frac{1}{4}}$ and smaller than $\frac{14688}{4673\frac{1}{2}}$. Reducing the two limits thus found for the value of π, Archimedes then showed that the first fraction was greater than $3\frac{10}{71}$, and that the second fraction was smaller than $3\frac{1}{7}$, whence it followed with certainty that the value sought for π lay between $3\frac{1}{7}$ and $3\frac{10}{71}$. The larger of these two approximate values is the only one usually learned and employed. That which fills us most with astonishment in the Archimedean computation of π, is, first, the great acumen and accuracy displayed in all the details of the computation, and then the unwearied perseverance that he must have exercised in calculating the limits of π without the advantages of the Arabian system of numerals and of the decimal notation. For it must be considered that at many stages of the computation what we call the extraction of roots was necessary, and that Archimedes could only by extremely tedious calculations obtain ratios that expressed approximately the roots of given numbers and fractions.

The later mathematicians of Greece.

With regard to the mathematicians of Greece that follow Archimedes, all refer to and employ the approximate value of $3\frac{1}{7}$ for π, without however, contributing anything essentially new or additional to the problems of quadrature and of cyclometry. Thus Heron of Alexandria, the father of surveying, who flourished about the year 100 B. C., employs for purposes of practical measurement sometimes the value $3\frac{1}{7}$ for π and sometimes even the rougher approximation $\pi = 3$. The astronomer

Ptolèmy, who lived in Alexandria about the year 150 A. D., and who was famous as being the author of the planetary system universally recognised as correct down to the time of Copernicus, was the only one who furnished a more exact value; this he designated, in the sexigesimal system of fractional notation which he employed, by 3, 8, 30,—that is 3 and $\frac{8}{60}$ and $\frac{30}{3600}$, or as we now say 3 degrees, 8 minutes (partes minutae primae), and 30 seconds (partes minutae secundae). As a matter of fact, the expression $3+\frac{8}{60}+\frac{30}{3600}=3\frac{17}{120}$ represents the number π more exactly than $3\frac{1}{7}$; but on the other hand, is, by reason of the magnitude of the numbers 17 and 120 as compared with the numbers 1 and 7, more cumbersome.

IV.

In the mathematical sciences, more than in any other, the Romans stood upon the shoulders of the Greeks. Indeed, with respect to cyclometry, they not only did not add anything to the Grecian discoveries, but often evinced even that they either did not know of the beautiful result obtained by Archimedes, or at least did not know how to appreciate it. For instance, Vitruvius, who lived during the time of Augustus, computed that a wheel 4 feet in diameter must measure $12\frac{1}{2}$ feet in circumference; in other words, he made π equal to $3\frac{1}{8}$. And, similarly, a treatise on surveying, preserved to us in the Gudian manuscript of the library at Wolfenbüttel, contains the following instructions to square the circle: Divide the circumference of a circle into four parts and make one part the side of a square; this square will be equal in area to the circle. Aside from the fact that the rectification of the arc of a circle is requisite to the construction of a square of this kind, the Roman quadrature, viewed as a calculation, is more inexact even than any other computation; for its result is that $\pi = 4$.

Among the Romans

The mathematical performances of the Hindus were not only greater than those of the Romans, but in certain directions even surpassed those of the Greeks. In the most ancient source for the mathematics of India that we know of, the Culvasûtras, which date back to a little before our chronological era, we do not find, it is true, the squaring of the

Among the Hindus.

circle treated of, but the opposite problem is dealt with, which might fittingly be termed the circling of the square. The half of the side of a given square is prolonged one third of the excess in length of half the diagonal over half the side, and the line thus obtained is taken as the radius of the circle equal in area to the square. The simplest way to obtain an idea of the exactness of this construction is to compute how great π would have to be if the construction were exactly correct. We find out in this way that the value of π upon which the Indian circling of the square is based, is about from five to six hundredths smaller than the true value, whereas the approximate π of Archimedes, $3\frac{1}{7}$, is only from one to two thousandths too large, and the old Egyptian value exceeds the true value by from one to two hundredths. Cyclometry very probably made great advances among the Hindus in the first four or five centuries of our era; for Aryabhatta, who lived about the year 500 after Christ, states, that the ratio of the circumference to the diameter is 62832 : 20000, an approximation that in exactness surpasses even that of Ptolemy. The Hindu result gives 3·1416 for π, while π really lies between 3·141592 and 3·141593. How the Hindus obtained this excellent approximate value is told by Ganeça, the commentator of Bhâskara, an author of the twelfth century. Ganeça says that the method of Archimedes was carried still farther by the Hindu mathematicians; that by continually doubling the number of sides they proceeded from the hexagon to a polygon of 384 sides, and that by the comparison of the circumferences of the inscribed and circumscribed 384-sided polygons they found that π was equal to 3927 : 1250. It will be seen that the value given by Bhâskara is identical with the value of Aryabhatta. It is further worthy of remark that the earlier of these two Hindu mathematicians does not mention either the value $3\frac{1}{7}$ of Archimedes or the value $3\frac{17}{120}$ of Ptolemy, but that the later knows of both values and especially recommends that of Archimedes as the most useful one for practical application. Strange to say, the good approximate value of Aryabhatta does not occur in Bramagupta, the great Hindu mathematician who flourished in the beginning of the seventh century; but we find the curious information in this author that the area of a circle is exactly equal to the

square root of 10 when the radius is unity. The value of π as derivable from this formula,—a value from two to three hundredths too large,—has unquestionably arisen upon Hindu soil. For it occurs in no Grecian mathematician; and Arabian authors, who were in a better position than we to know Greek and Hindu mathematical literature, declare that the approximation which makes π equal to the square root of 10, is of Hindu origin. It is possible that the Hindu people, who were addicted more than any other to numeral mysticism, sought to find in this approximation some connection with the fact that man has ten fingers; and ten accordingly is the basis of their numeral system.

Reviewing the achievements of the Hindus generally with respect to the problem of the quadrature, we are brought to recognise that this people, whose talents lay more in the line of arithmetical computation than in the perception of spatial relations, accomplished as good as nothing on the pure geometrical side of the problem, but that the merit belongs to them of having carried the Archimedean method of computing π several stages farther, and of having obtained in this way a much more exact value for it—a circumstance that is explainable when we consider that the Hindus are the inventors of our present system of numeral notation, possessing which they easily outdid Archimedes, who employed the awkward Greek system.

With regard to the Chinese, this people operated in ancient times with the Babylonian value for π, or 3; but possessed knowledge of the approximate value of Archimedes at least since the end of the sixth century. Besides this, there appears in a number of Chinese mathematical treatises an approximate value peculiarly their own, in which $\pi = 3\frac{7}{50}$; a value, however, which notwithstanding it is written in larger figures, is no better than that of Archimedes. Attempts at the *constructive* quadrature of the circle are not found among the Chinese.

Among the Chinese

Greater were the merits of the Arabians in the advancement and development of mathematics; and especially in virtue of the fact that they preserved from oblivion both Greek and Hindu mathematics, and handed them down to the

Among the Arabs.

Christian countries of the West. The Arabians expressly distinguished between the Archimedean approximate value and the two Hindu values the square root of 10 and the ratio 62832 : 20000. This distinction occurs also in Muhammed Ibn Musa Alchwarizmî, the same scholar who in the beginning of the ninth century brought the principles of our present system of numerical notation from India and introduced the same into the Mohammedan world. The Arabians, however, did not study the numerical quadrature of the circle only, but also the constructive; as, for instance, Ibn Alhaitam, who lived in Egypt about the year 1000 and whose treatise upon the squaring of the circle is preserved in a Vatican codex, which has unfortunately not yet been edited.

In Christian times.

Christian civilisation, to which we are now about to pass, produced up to the second half of the fifteenth century extremely insignificant results in mathematics. Even with regard to our present problem we have but a single important work to mention; the work, namely, of Frankos Von Lüttich, upon the squaring of the circle, published in six books, but only preserved in fragments. The author, who lived in the first half of the eleventh century, was probably a pupil of Pope Sylvester II, himself a not inconsiderable mathematician for his time, and who also wrote the most celebrated book on geometry of the period.

Cardinal Nicolaus De Cusa.

Greater interest came to be bestowed upon mathematics in general, but especially on the problem of the quadrature of the circle, in the second half of the fifteenth century, when the sciences again began to revive. This interest was especially aroused by Cardinal Nicolaus De Cusa, a man highly esteemed on account of his astronomical and calendarial studies. He claimed to have discovered the quadrature of the circle by the employment solely of compasses and ruler, and thus attracted the attention of scholars to the now historic problem. People believed the famous Cardinal, and marvelled at his wisdom, until Regiomontanus, in letters which he wrote in 1464 and 1465 and which were published in 1533, rigidly demonstrated that the Cardinal's quadrature was incorrect. The construction of Cusa was as follows. The radius of a circle is prolonged a distance equal to the

side of the inscribed square; the line thus obtained is taken as the diameter of a second circle and in the latter an equilateral triangle is described; then the perimeter of the latter is equal to the circumference of the original circle. If this construction, which its inventor regarded as exact, be considered as a construction of approximation, it will be found to be more inexact even than the construction resulting from the value $\pi = 3\frac{1}{7}$. For by Cusa's method π would be from five to six thousandths smaller than it really is.

Bovillius and Orontius Finaeus.

In the beginning of the sixteenth century a certain Bovillius appears, who announced anew the construction of Cusa; meeting however with no notice. But about the middle of the sixteenth century a book was published which the scholars of the time at first received with interest. It bore the proud title "De Rebus Mathematicis Hactenus Desideratis." Its author, Orontius Finaeus, represented that he had overcome all the difficulties that had ever stood in the way of geometrical investigators; and incidentally he also communicated to the world the "true quadrature" of the circle. His fame was short-lived. For soon afterwards, in a book entitled "De Erratis Orontii," the Portuguese Petrus Nonius demonstrated that Orontius's quadrature, like most of his other professed discoveries, was incorrect.

Simon Van Eyck.

In the period following this the number of circle-squarers so increased that we shall have to limit ourselves to those whom mathematicians recognise. And particularly is Simon Van Eyck to be mentioned, who towards the close of the sixteenth century published a quadrature which was so approximate that the value of π derived from it was more exact than that of Archimedes; and to disprove it the mathematician Peter Metius was obliged to seek a still more accurate value than $3\frac{1}{7}$. The erroneous quadrature of Van Eyck was thus the occasion of Metius's discovery that the ratio $355 : 113$, or $3\frac{16}{113}$, varied from the true value of π by less than one one-millionth, eclipsing accordingly all values hitherto obtained. Moreover, it is demonstrable by the theory of continued fractions, that, admitting figures to four places only, no two numbers more exactly represent the value of π than 355 and 113.

Joseph Scaliger.

In the same way the quadrature of the great philologist Joseph Scaliger led to refutations. Like most circle-squarers who believe in their discovery, Scaliger also was little versed in the elements of geometry. He solved, however,—at least in his own opinion he did,—the famous problem; and published in 1592 a book upon it, which bore the pretentious title "Nova Cyclometria" and in which the name of Archimedes was derided. The worthlessness of his supposed discovery was demonstrated to him by the greatest mathematicians of his time; namely, Vieta, Adrianus Romanus, and Clavius.

Longomontanus, John Porta, and Gregory St. Vincent.

Of the erring circle-squarers that flourished before the middle of the seventeenth century three others deserve particular mention—Longomontanus of Copenhagen, who rendered such great services to astronomy, the Neapolitan John Porta, and Gregory of St. Vincent. Longomontanus made $\pi = 3\frac{14185}{1000000}$, and was so convinced of the correctness of his result that he thanked God fervently, in the preface to his work "Inventio Quadraturae Circuli," that He had granted him in his high old age the strength to conquer the celebrated difficulty. John Porta followed the initiative of Hippocrates, and believed he had solved the problem by the comparison of lunes. Gregory of St. Vincent published a quadrature, the error of which was very hard to detect but was finally discovered by Descartes.

Peter Metius and Vieta.

Of the famous mathematicians who dealt with our problem in the period between the close of the fifteenth century and the time of Newton, we first meet with Peter Metius, before mentioned, who succeeded in finding in the fraction $355 : 113$ the best approximate value for π involving only small numbers. The problem received a different advancement at the hands of the famous mathematician Vieta. Vieta was the first to whom the idea occurred of representing π with mathematical exactness by an infinite series of continuable operations. By comparison of inscribed and circumscribed polygons, Vieta found that we approach nearer and nearer to π if we allow the operations of the extraction of the square root of $\frac{1}{2}$, and of addition and of multiplication to succeed each other in a certain manner, and that π must come out exactly,

if this series of operations could be indefinitely continued. Vieta thus found that to a diameter of 10000 million units a circumference belongs of 31415 million and from 926535 to 926536 units of the same length.

But Vieta was outdone by the Netherlander Adrianus Romanus, who added five additional decimal places to the ten of Vieta. To accomplish this he computed with unspeakable labor the circumference of a regular circumscribed polygon of 1073741824 sides. This number is the thirtieth power of 2. Yet great as the labor of Adrianus Romanus was, that of Ludolf Van Ceulen was still greater; for the latter calculator succeeded in carrying the Archimedean process of approximation for the value of π to 35 decimal places, that is, the deviation from the true value was smaller than one one-thousand quintillionth, a degree of exactness that we can hardly have any conception of. Ludolf published the figures of the tremendous computation that led to this result. His calculation was carefully examined by the mathematician Griemberger and declared to be correct. Ludolf was justly proud of his work, and following the example of Archimedes, requested in his will that the result of his most important mathematical performance, the computation of π to 35 decimal places, be engraved upon his tombstone; a request which is said to have been carried out. In honor of Ludolf, π is called to-day in Germany the Ludolfian number.

Adrianus Romanus, Ludolf Van Ceulen.

Although through the labor of Ludolf a degree of exactness for cyclometrical operations was now obtained that was more than sufficient for any practical purpose that could ever arise, neither the problem of constructive rectification nor that of constructive quadrature was thereby in any respect theoretically advanced. The investigations conducted by the famous mathematicians and physicists Huygens and Snell about the middle of the seventeenth century, were more important from a mathematical point of view than the work of Ludolf. In his book "Cyclometricus" Snell took the position that the method of comparison of polygons, which originated with Archimedes and was employed by Ludolf, need by no means be the best method of at-

The new method of Snell. Huygens's verification of it.

taining the end sought; and he succeeded by the employment of propositions which state that certain arcs of a circle are greater or smaller than certain straight lines connected with the circle, in obtaining methods that make it possible to reach results like the Ludolfian with much less labor of calculation. The beautiful theorems of Snell were proved a second time, and better proved, by the celebrated Dutch promoter of the science of optics, Huygens (Opera Varia, p. 365 et seq.; "Theoremata De Circuli et Hyperbolae Quadratura," 1651), as well as perfected in many ways. Snell and Huygens were fully aware that they had advanced only the problem of numerical quadrature, and not that of the constructive quadrature. This, in Huygens's case, plainly appeared from the vehement dispute he conducted with the English mathematician James Gregory. This controversy has some significance for the history of our problem, from the fact that Gregory made the first attempt to prove that the squaring of the circle with ruler and compasses must be impossible. The result of the controversy, to which we owe many valuable treatises, was, that Huygens finally demonstrated in an incontrovertible manner the incorrectness of Gregory's proof of impossibility, adding that he also was of opinion that the solution of the problem with ruler and compasses was impossible, but nevertheless was not himself able to demonstrate this fact. And Newton, later, expressed himself to a similar effect. As a matter of fact it took till the most recent period, that is over 200 years, until higher mathematics was far enough advanced to furnish a rigid demonstration of impossibility.

The controversy between Huygens and Gregory.

V.

Before we proceed to consider the promotive influence which the invention of the differential and the integral calculus had upon our problem, we shall enumerate a few at least of that never-ending line of mistaken quadrators who delighted the world by the fruits of their ingenuity from the time of Newton to the present period; and out of a pious and sincere consideration for the contemporary world, we shall entirely omit in this to speak of the circle-squarers of our own time.

First to be mentioned is the celebrated English philosopher Hobbes. In his book "De Problematis Physicis," in which he chiefly proposes to explain the phenomena of gravity and of ocean tides, he also takes up the quadrature of the circle and gives a very trivial construction that in his opinion definitively solved the problem, making $\pi = 3\frac{1}{5}$. In view of Hobbes's importance as a philosopher, two mathematicians, Huygens and Wallis, thought it proper to refute Hobbes at length. But Hobbes defended his position in a special treatise, in which to sustain at least the appearance of being right, he disputed the fundamental principles of geometry and the theorem of Pythagoras; so that mathematicians could pass on from him to the order of the day. Hobbes's quadrature.

In the last century France especially was rich in circle-squarers. We will mention: Oliver de Serres, who by means of a pair of scales determined that a circle weighed as much as the square upon the side of the equilateral triangle inscribed in it, that therefore they must have the same area, an experiment in which $\pi = 3$; Mathulon, who offered in legal form a reward of a thousand dollars to the person who would point out an error in his solution of the problem, and who was actually compelled by the courts to pay the money; Basselin, who believed that his quadrature must be right because it agreed with the approximate value of Archimedes, and who anathematised his ungrateful contemporaries, in the confidence that he would be recognised by posterity; Liger, who proved that a part is greater than the whole and to whom therefore the quadrature of the circle was child's play; Clerget, who based his solution upon the principle that a circle is a polygon of a definite number of sides, and who calculated, also, among other things, how large the point is at which two circles touch. French quadrators of the Eighteenth Century.

Germany and Poland also furnish their contingent to the army of circle-squarers. Lieutenant-Colonel Corsonich produced a quadrature in which π equalled $3\frac{1}{8}$, and promised fifty ducats to the person who could prove that it was incorrect. Hesse of Berlin wrote an arithmetic in 1776, in which a true quadrature was also "made known," π being exactly equal to $3\frac{14}{99}$. About the same time Professor Bischoff of Stettin defended Germany and Poland.

a quadrature previously published by Captain Leistner, Preacher Merkel, and Schoolmaster Böhm, which made π *implicite* equal to the square of $\frac{6}{3}\frac{2}{5}$, not even attaining the approximation of Archimedes.

From attempts of this character are to be clearly distinguished constructions of approximation in which the inventor is aware that he has not found a mathematically exact construction, but only an approximate one. The value of such a construction will depend upon two things—first, upon the degree of exactness with which it is numerically expressed, and secondly on the fact whether the construction can be more or less easily made with ruler and compasses. Constructions of this kind, simple in form and yet sufficiently exact for practical purposes, have for centuries been furnished us in great numbers. The great mathematician Euler, who died in 1783, did not think it out of place to attempt an approximate construction of this kind. A very simple construction for the rectification of the circle and one which has passed into many geometrical text books, is that published by Kochansky in 1685 in the *Leipziger Berichte.* It is as follows: "Erect upon the diameter of a circle at its extremities perpendiculars; with the centre as vertex, mark off upon the diameter an angle of 30°; find the point of intersection with the perpendicular of the line last drawn, and join this point of intersection with that point upon the other perpendicular which is at a distance of three radii from the base of the perpendicular. The line of junction thus obtained is then very approximately equal to one-half of the circumference of the given circle." Calculation shows that the difference between the true length of the circumference and the line thus constructed is less than $\frac{3}{100000}$ of the diameter.

Constructive approximations. Euler. Kochansky.

Although such constructions of approximation are very interesting in themselves, they nevertheless play but a subordinate rôle in the history of the squaring of the circle; for on the one hand they can never furnish greater exactness for circle-computation than the thirty-five decimal places which Ludolf found, and on the other hand they are not adapted to advance in any way the question whether the exact quadrature of the circle with ruler and compasses is possible.

Inutility of constructive approximations.

The numerical side of the problem, however, was considerably advanced by the new mathematical methods perfected by Newton and Leibnitz, commonly called the differential and the integral calculus. And about the middle of the seventeenth century, some time before Newton and Leibnitz represented π by series of powers, the English mathematicians Wallis and Lord Brouncker, Newton's predecessors in a certain sense, succeeded in representing π by an infinite series of figures combined by the first four rules of arithmetic. A new method of computation was thus opened. Wallis found that the fourth part of π is represented more exactly by the regularly formed product

The researches of Newton, Leibnitz, Wallis, and Brouncker.

$$\tfrac{2}{3}\times\tfrac{4}{3}\times\tfrac{4}{5}\times\tfrac{6}{5}\times\tfrac{6}{7}\times\tfrac{8}{7}\times\tfrac{8}{9}\times \text{etc.}$$

the farther the multiplication is continued, and that the result always comes out too small if we stop at a proper fraction but too large if we stop at an improper fraction. Lord Brouncker, on the other hand, represents the value in question by a continued fraction in which all the denominators are equal to 2 and the numerators are odd square numbers. Wallis, to whom Brouncker had communicated his elegant result without proof, demonstrated the same in his "Arithmetic of Infinites."

The computation of π could hardly be farther advanced by these results than Ludolf and others had carried it, though of course in a more laborious way. However, the series of powers derived by the assistance of the differential calculus of Newton and Leibnitz furnished a means of computing π to hundreds of decimal places.

Gregory, Newton, and Leibnitz next found that the fourth part of π was equal exactly to

Other calculations.

$$1-\tfrac{1}{3}+\tfrac{1}{5}-\tfrac{1}{7}+\tfrac{1}{9}-\tfrac{1}{11}+\tfrac{1}{13}-\ldots.$$

if we conceive this series, which is called the Leibnitzian, indefinitely continued. This series is indeed wonderfully simple, but is not adapted to the computation of π, for the reason that entirely too many members have to be taken into account to obtain π accurately to a few decimal places only. The original formula, however, from which this series is derived, gives other formulas which

are excellently adapted to the actual computation. This formula is the general series:

$$\alpha = a - \tfrac{1}{3}a^3 + \tfrac{1}{5}a^5 - \tfrac{1}{7}a^7 + \ldots,$$

where α is the length of the arc that belongs to any central angle in a circle of radius 1, and where a is the tangent to this angle. From this we derive the following:

$$\frac{\pi}{4} = (a+b+c+\ldots) - \tfrac{1}{3}(a^3+b^3+c^3+\ldots) + \tfrac{1}{5}(a^5+b^5+c^5+\ldots) - \ldots,$$

where a, b, c . . . are the tangents of angles whose sum is 45°. Determining, therefore, the values of a, b, c . . ., which are equal to small and easy fractions and fulfil the condition just mentioned, we obtain series of powers which are adapted to the computation of π. The first to add by the aid of series of this description additional decimal places to the old 35 in the number π was the English arithmetician Abraham Sharp, who following Halley's instructions, in 1700, worked out π to 72 decimal places. A little later Machin, professor of astronomy in London, computed π to 100 decimal places; putting, in the series given above, $a = b = c = d = \frac{1}{5}$ and $e = -\frac{1}{239}$, that is employing the following series:

$$\frac{\pi}{4} = 4\left[\frac{1}{5} - \frac{1}{3.5^3} + \frac{1}{5.5^5} - \frac{1}{7.5^7} + \ldots\right] - \left[\frac{1}{239} - \frac{1}{3.239^3} + \frac{1}{5.239^5} - \ldots\right]$$

The computation of π to many decimal places.

In the year 1819, Lagny of Paris outdid the computation of Machin, determining in two different ways the first 127 decimal places of π. Vega then obtained as many as 140 places, and the Hamburg arithmetician Zacharias Dase went as far as 200 places. The latter did not use Machin's series in his calculation, but the series produced by putting in the general series above given $a = \frac{1}{2}$, $b = \frac{1}{5}$, $c = \frac{1}{8}$. Finally, at a recent date, π has been computed to 500 places.

The computation to so many decimal places may serve as an illustration of the excellence of the modern method as contrasted with those anciently employed, but otherwise it has neither a theoretical nor a practical value. That the computation of π to say 15

decimal places more than sufficiently satisfies the subtlest requirements of practice may be gathered from a concrete example of the degree of exactness thus obtainable. Imagine a circle to be described with Berlin as centre, and the circumference to pass through Hamburg; then let the circumference of the circle be computed by multiplying its diameter with the value of π to 15 decimal places, and then conceive it to be actually measured. The deviation from the true length in so large a circle as this even could not be as great as the 18 millionth part of a millimetre.

Idea of exactness obtainable with the approximate values of π.

An idea can hardly be obtained of the degree of exactness produced by 100 decimal places. But the following example may possibly give us some conception of it. Conceive a sphere constructed with the earth as centre, and imagine its surface to pass through Sirius, which is $134\frac{1}{2}$ million million kilometres distant from us. Then imagine this enormous sphere to be so packed with microbes that in every cubic millimetre millions of millions of these diminutive animalcula are present. Now conceive these microbes to be all unpacked and so distributed singly along a straight line, that every two microbes are as far distant from each other as Sirius from us, that is $134\frac{1}{2}$ million million kilometres. Conceive the long line thus fixed by all the microbes, as the diameter of a circle, and imagine the circumference of it to be calculated by multiplying its diameter with π to 100 decimal places. Then, in the case of a circle of this enormous magnitude even, the circumference thus calculated would not vary from the real circumference by a millionth of a millimetre.

This example will suffice to show that the calculation of π to 100 or 500 decimal places is wholly useless.

Before we close this chapter upon the evaluation of π, we must mention the method, less fruitful than curious, which Professor Wolff of Zurich employd some decades ago to compute the value of π to 3 places. The floor of a room is divided up into equal squares, so as to resemble a huge chess-board, and a needle exactly equal in length to the side of each of these squares, is cast haphazard upon the floor. If we calculate, now, the probabilities of the needle so falling as to lie wholly within

Professor Wolff's curious method.

one of the squares, that is so that it does not cross any of the parallel lines forming the squares, the result of the calculation for this probability will be found to be exactly equal to $\pi - 3$. Consequently, a sufficient number of casts of the needle according to the law of large numbers must give the value of π approximately. As a matter of fact, Professor Wolff, after 10000 trials, obtained the value of π correctly to 3 decimal places.

Mathematicians now seek to prove the insolvability of the problem.

Fruitful as the calculus of Newton and Leibnitz was for the evaluation of π, the problem of converting a circle into a square having exactly the same area was in no wise advanced thereby. Wallis, Newton, Leibnitz, and their immediate followers distinctly recognised this. The quadrature of the circle could not be solved; but it also could not be proved that the problem was insolvable with ruler and compasses, although everybody was convinced of its insolvability. In mathematics, however, a conviction is only justified when supported by incontrovertible proof; and in the place of endeavors to solve the quadrature there accordingly now come endeavors to prove the impossibility of solving the celebrated problem.

Lambert's contribution.

The first step in this direction, small as it was, was made by the French mathematician Lambert, who proved in the year 1761 that π was neither a rational number nor even the square root of a rational number; that is, that neither π nor the square of π can be exactly represented by a fraction the denominator and numerator of which are whole numbers, however great the numbers be taken. Lambert's proof showed, indeed, that the rectification and the quadrature of the circle could not be possibly accomplished in the particular way in which its impossibility was demonstrated, but it still did not exclude the possibility of the problem being solvable in some other more complicated way, and without requiring further aids than ruler and compasses.

The conditions of the demonstration.

Proceeding slowly but surely it was next sought to discover the essential distinguishing properties that separate problems solvable with ruler and compasses, from problems the construction of which is elementarily impossible, that is by solely employing the postulates. Slight reflection showed,

that a problem elementarily solvable, must always possess the property of having the unknown lines in the figure relating to it connected with the known lines of the figure by an equation for the solution of which equations of the first and second degree alone are requisite, and which may be so disposed that the common measures of the known lines will appear only as integers. The conclusion was to be drawn from this, that if the quadrature of the circle and consequently its rectification were elementarily solvable, the number π, which represents the ratio of the unknown circumference to the known diameter, must be the root of a certain equation, of a very high degree perhaps, but in which all the numbers that appear are whole numbers; that is, there would have to exist an equation, made up entirely of whole numbers, which would be correct if its unknown quantity were made equal to π.

Since the beginning of this century, consequently, the efforts of a number of mathematicians have been bent upon proving that π generally is not algebraical, that is, that it cannot be the root of any equation having whole numbers for coefficients. But mathematics had to make tremendous strides forward before the means were at hand to accomplish this demonstration. After the French Academician, Professor Hermite, had furnished important preparatory assistance in his treatise "Sur la Fonction Exponentielle," published in the seventy-seventh volume of the "Comptes Rendus," Professor Lindemann, at that time of Freiburg, now of Königsberg, finally succeeded, in June 1882, in rigorously demonstrating that the number π is not algebraical,* thus

Final success of Prof. Lindemann.

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*For the benefit of my mathematical readers I shall present here the most important steps of Lindemann's demonstration, M. Hermite in order to prove the transcendental character of

$$e = 1 + \frac{1}{1} + \frac{1}{1.2} + \frac{1}{1.2.3} + \frac{1}{1.2.3.4} + \cdots$$

developed relations between certain definite integrals (*Comptes Rendus* of the Paris Academy, Vol. 77, 1873). Proceeding from the relations thus established, Professor Lindemann first demonstrates the following proposition: If the coefficients of an equation of nth degree are all real or complex whole numbers and the n roots of this equation $z_1, z_2, \ldots, z_n$ are different from zero and from each other it is impossible for

$$e^{z_1} + e^{z_2} + e^{z_3} \ldots + e^{z_n}$$

supplying the first proof that the problems of the rectification and the squaring of the circle, with the help only of algebraical instruments like ruler and compasses are insolvable. Lindemann's proof appeared successively in the Reports of the Berlin Academy (June, 1882), in the "Comptes Rendus" of the French Academy (Vol. 115. pp. 72 to 74), and in the "Mathematischen Annalen" (Vol. 20. pp. 213 to 225).

The verdict of mathematics.

"It is impossible with ruler and compasses to construct a square equal in area to a given circle." These are the words of the final determination of a controversy which is as old as the history of the human mind. But the race of circle-squarers, unmindful of the verdict of mathematics, that most infallible of arbiters, will never die out so long as ignorance and the thirst for glory shall be united.

HERMANN SCHUBERT.

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to be equal to $\frac{a}{b}$, where a and b are real or complex whole numbers. It is then shown that also between the functions

$$e^{rz_1} + e^{rz_2} + e^{rz_3} + \ldots e^{rz_n},$$

where r denotes an integer, no linear equation can exist with rational coefficients variant from zero. Finally the beautiful theorem results: If z is the root of an irreducible algebraic equation the coefficients of which are real or complex whole numbers, then e^z cannot be equal to a rational number. Now in reality $e^{\pi\sqrt{-1}}$ is equal to a rational number, namely, -1. Consequently, $\pi\sqrt{-1}$, and therefore π itself, cannot be the root of an equation of nth degree having whole numbers for coefficients, and therefore also not of such an equation having rational coefficients. The property last mentioned, however, π would have if the squaring of the circle with ruler and compasses were possible.

THE CRITERION OF TRUTH.

A DISSERTATION ON THE METHOD OF VERIFICATION.

MODERN science rests upon the recognition of the truth that all knowledge is a statement of facts. The formulation of natural laws is nothing but a comprehensive description of certain kinds of natural processes. Natural laws are generalisations of facts. Similarly, any philosophical theory is, or from the modern standpoint ought to be, simply a systematised representation of facts. Facts are the bottom-rock to which, everywhere, we have to go down.

The recognition of this maxim is called, most appropriately, positivism; and I take it that as a matter of principle all modern thinkers can and perhaps do agree to it. A Roman Catholic philosopher may consider some things as facts which a scientist of heretic England, for instance, does not; yet it is from facts, or what is thought to be facts, that every one derives his conception of the world.

It is natural that the range of individual experience should be very limited in comparison with the knowledge indispensably needed for acquiring an adequate conception of the world in which we live. We have, to a great extent, to rely on statements of facts which we ourselves have not observed. To enrich and to enlarge our own experience we have to imbibe the experience of others. Sometimes we can, but sometimes we cannot, verify what we have been told. For instance, that stones fall through empty space with a velocity of 32·18 English feet at the end of the first second can be verified by experiment, i. e., the experiment can be repeated under the same circumstances. But historical data such as whether Buddha died under a fig-tree, or whether Christ was crucified under

Pontius Pilate, cannot be verified by experiment. Historical data are statements, not of general truths, but of single facts, which, if they are accepted at all, have to be taken on authority. The authority may be weak or strong; it may be strong enough to be equivalent practically to a certainty, which latter case occurs, for instance, when the fact in question in its direct consequences perceptibly affects our life, and its causal connection can thus be directly and indubitably traced.

It is not intended here to emphasise the difference between facts verifiable by experiment, and historical facts; yet it is desirable with reference to all kinds of facts stated on authority, to understand the importance of a criterion of truth. We do accept and we have to accept, every one of us, without any exception, the most discriminate scientist even and most of all the philosopher, innumerable statements of facts as they have been observed by others. We all have to rely on the authority of others. The time of the longest human life would be too short to repeat all the experiments made by others, with a view to verifying them in detail. On the other hand, it is obvious that no statement of facts should be accepted on pure authority. We must have a means, a sieve as it were, by which the wheat can easily be winnowed from the chaff; a sieve that will enable us to discard at once those statements that are positively erroneous. In this way our attention can be confined to statements of things that are possible, those that need not, but *may* be true. "Possible" in German is very appropriately called *möglich*, i. e. *mayable*.

The criterion of that which 'may be' true is the first step towards ascertaining truth; and although it does not exhaust the methods of arriving at truth it is of greatest consequence, for if properly understood and applied, it would save from the start many useless efforts in the investigation of truth.

* * *

The question arises then, What is the criterion of the possible? We reject statements, sometimes, as *prima facie* untrue. Have we a right to do so? And if we have, by what standard do we determine this?

Let us first take into consideration how people really behave when a statement of new facts is made. Take, for instance, the following case. Two strangers meet; A. and B. Mr. A. relates to Mr. B. some incident of his life. He is apparently a very trustworthy person and during the conversation remains perfectly serious. He tells a ghost story in detail, how a departed friend of his appeared to him in distinctly visible form; he says that the spirit spoke to him and told him many strange things, and that he pointed out to him an imminent danger.

We suppose that on the one hand A. makes his statement in good faith and that on the other hand B. is a spiritualist. Will B. consider A.'s story as possible? B., being a spiritualist, most probably will consider A.'s story as possible, and, if he is convinced of A.'s honesty, he will believe the story the same as if he had experienced it himself; no less than a scientist will rely on the statement of an experiment made by one of his colleagues whose scientific veracity he has no reason to doubt.

Suppose A. tells the same story to C. Mr. C. is an infidel and a materialist. As characteristic features of his personality we might mention that he considers religion as pure superstition originated by the fraud of cunning priests. This man will, we may fairly suppose, laugh at A.'s story, because it appears to him an out and out lie. Mr. A. as well as Mr. B., he who tells and he who believes the story, C. will declare, are either insane or they are both impostors.

The difference of opinion in B. and C. indicates that the criterion of truth is different with different persons and that it depends upon their conception of the world. Men who have the same world-conception will also have the same criterion of truth.

The problem consequently is, whether this criterion of truth (i. e. the criterion of what is possible) is necessarily wholly subjective, or whether we can arrive at an objective criterion. It is apparent that this question is intimately connected with another problem, namely, Is every world-conception necessarily subjective, or, Is it possible to arrive at an objective world-conception? It appears to me that we can; and the ideal of philosophy to-day is just such an objective representation of facts.

The difficulty that presents itself lies mainly in the confusion between facts and our interpretation of facts. If A. declares that he saw a ghost, he does not relate a fact, but his interpretation of a fact. Let us suppose that he tells his story again to a third person D., who is a psychologist. D. most likely will not think him a liar. D. will accept the statement *bona fide* as a mere interpretation of a fact and will inquire after the causes that produced the hallucination. He may be able, possibly, to lay bare the facts disfigured by the wrong interpretation of A. And having clearly stated the objective state of things he may with the assistance of his experience explain the origin of the whole process, partly from the mental condition and the physiological constitution of A., partly from individual circumstances that gave rise to the hallucination. He will not doubt that something extraordinary has happened to Mr. A. The latter's mind has been, and perhaps still is in an abnormal state. And as to B.'s believing the ghost story, Mr. D. will not think that he is insane; though we may presume that he will regard B.'s views of the world as resting upon unfirm grounds; and he will not believe him to be a man of critical ability.

The notion is very common among idealists that we can never go beyond our subjective states of consciousness. This would be tantamount to saying that there is no difference between dreams and real life, except that a dream is cut off by awaking while life lasts comparatively much longer and ceases with death, which may also be an awakening from a dream. In that case hallucinations would be of the same value as sensations. Both would be interpretations of facts for which we do not have an objective criterion of truth. Interpretations of facts would be the sole facts, and it would be quite indifferent whether they were misinterpretations or correct interpretations.

Take a simple instance. We see a tree. The perception of a tree is an interpretation of a set of facts. Interpretations of facts, whether correct or not, are of course also facts. Thus the perception of a tree is a fact which, if all matter were transparent, would, physiologically considered, appear to the eye of an observer as special vibrations in the brain. But the peculiarity of this fact is that

it represents other facts. The question is no longer whether there is a perception of a tree taking place in a brain, but whether this perception is true, i. e., whether it agrees with the facts represented. Every perception has a meaning beyond itself; every perception is a fact representing other facts, and the question of truth or untruth has reference to the agreement between representations and facts represented.

Professor Mach says in his essay "The Analysis of Sensations" (*The Monist*, Vol. I. No. 1, p. 65):

"Bodies do not produce sensations, but complexes of sensations (complexes of elements) form bodies."*

And, certainly, we do not deny that upon a closer analysis the perception of a tree appears as a bundle, or a complex of sensations; there is the green of the leaves, the color of the bark, the different shades of the color indicating its bodily form, the shape of the branches, and their slight motions in the breeze that gently shakes the tree. Yet the perception of a tree does not consist of these sensations alone. All these sensations might be so many isolated sensations; and if they remained isolated, they would not produce the percept of a tree. These sensations are interpreted; they have acquired a meaning and are combined into a unity. It is this unity which constitutes the perception of a tree. This unity has grown from sensations; and that process which develops and, as we have learned, naturally must develop sensations from sense-impressions, and from sensations perceptions that are representative of a group of facts outside of the perceptions themselves,—that process we define as mind-activity.

What does the 'perception of a tree' mean? It means that if the person perceiving it moves in a certain direction and over a certain distance, he will have certain sensations which upon the whole can be correctly anticipated. Every perception and also every sensation contains a number of anticipations. The perception

*Professor Mach in thus speaking of bodies uses the word in the sense of representations and not in the sense of objects represented. He calls them in the sentence next following "thought-symbols for complexes of sensations (complexes of elements)."

of a tree is in so far to be considered correct, as the anticipations which it contains, and of which it actually consists, can be realised. If and in so far as these anticipations when realised tally with the perception, if and in so far as they justify it, or can justify it, if and in so far as they fulfil the expectations produced by the perception, if and in so far as they make no alteration of the perception necessary, but being in agreement with it confirm the representation it conveys: the perception is said to be true. Moreover, we can predict similar results with regard to beings of a similar constitution.

* * *

Now let us suppose that an apple falls from a considerable height to the ground. Knowing, from former experiences, the hardness of the soil as well as the density of the apple, we can anticipate the effect of the fall. The soil will not show any considerable impression, yet one side of the apple will be crushed. In predicting this result we anticipate sensations that we shall have under a certain set of circumstances. In so far as we shall necessarily have these sensations we have to deal with facts. Not as if our sensations constitute the entire existence of facts; our sensations, being the effects of so-called objective processes upon our senses, are only one end of a relation, which as a matter of course never exists without the other end. Sensations are the one end; they depend upon and vary with the other end. Showing within certain limits as many varieties here as occur there, they represent the other end.

We can, and for certain purposes we must, entirely eliminate the subjective and sensory part of our sensations, in order to represent in our minds not how two objects affect our senses of sight or touch but how two or more objects affect each other. Thus we arrive at an objective statement of facts, how the falling apple affects the soil, and the soil the apple; while the relation of both to our senses is to be eliminated. This objective statement of facts is the ideal of all natural sciences. The physicist states the interaction between the falling apple and the soil. He does not care how many sentient beings witness the fall; he does not care about the psychological element in their observations. He abstracts from the subjective ele-

ments in their observations as well as in his own, and confines his attention to the objective facts represented in their minds.

The objection to this conception of things is made by a consistent idealist, that these observations must always exist in some mind, they do not exist outside of a mind, and mind can as little go beyond itself as a person can walk outside of his skin. Certainly, observations always exist in some mind; they have always a subjective element. But they have also an objective element. No sensation, no perception, no observation is without an objective feature. This objective feature in a sensation or a perception, and also in an abstract idea, is the element that if true has to agree with other facts outside of the sentient being of whose mind the perception is a part. An idealist who is pleased to deny this would either have to identify hallucinations with sensations, or he would be obliged to consider the objective elements of his mind merely and solely as subjective states, having no representative value. In that case he would necessarily be obliged to consider the facts represented, i. e. the things outside the body, as parts of his mind. This being granted, every mind would appear as congruent and coextensive with the universe. We should have as many universes as there are minds, and yet all universes would be only one and the same universe, their sole difference being that of a difference of centres. With the death of every living creature a universe would die; but notwithstanding the chain of consciousness were broken forever in death, the existence of his mind, being that which is commonly considered as the objective universe, would not cease; merely a view-centre would be lost. That which we have characterised as representations in feeling-substance (which according to our terminology constitutes mind) would be a transient and unessential feature of mind only; and if it should cease to be, mind would still exist in what we have defined as the outside facts, the facts represented in mental symbols. In short, mind would be the All, it would be a synonym of God. And not only all mental beings actually existing or having existed would each, one and all, constitute the universe, but also all potential minds, every atom and all possible combinations of atoms that possibly might

play a part in the mental activity of a sentient being, would constitute it.

The views of an idealist who accepts these consequences are undeniably correct, although we may quarrel about the propriety of his terminology. Yet an idealist of this type, we may fairly assume, will have little difficulty in adapting himself to our terminology, and in that case we might easily agree about the possibility of arriving at a criterion of truth; for his world-conception (aside from a difference in terms) might, or rather would be practically the same as ours.

If truth is the agreement of certain mental facts with other facts outside of the mind—if it is the agreement of subjective representations with objective things or states of things represented, the problem is whether we have any means of revising or examining this agreement.

* * *

If the world were a chaos, i. e. if the facts of nature were not ruled by law; if every fact were not only individually but also generically different from every other fact, so that no single fact had anything in common with other facts; if they thus had no features in common, there would exist no general properties, and we could form no concepts of *genera*; facts would vary radically and totally, without exhibiting regularities or uniformities other than such as might occasionally and without any reason incidentally originate by haphazard,—in short, if our world were a world of chance and not of law, there would be no criterion of truth. Our world, however, is a world of law and not of chance. Thus all facts, although individually different, are found generically to agree among themselves. No two atoms are, with regard to their position, the same at a given moment; all of them are different somehow in their operation and effectiveness. Nevertheless every one of them moves in strict accordance with exactly the same law of causation. There is not the least change taking place in the universe which is not the precise effect of a special cause. There is rigidity in mutability, unity in variety, determinateness in irregularity, law in freedom, order in anarchy. The unity of law, which in its oneness is comprised in the

universality of causation, is so perfect that the different facts cannot be thought of as being generically different. However much they differ specifically, they represent the action of the same law, and this same oneness of nature is the basis of all monism.

Monism of this kind, it has been remarked by a critic of ours,* is identical with philosophy. Certainly it is. Every philosophy is or at least attempts to be monism, and in so far only as a philosophy recognises monism does it possess a criterion of truth. This monism may be based upon a correct or a mistaken conception of unity. Upon the correctness of this monism will depend the correctness of the criterion of truth. But it must be understood that without a monism there can be no criterion of truth, and philosophy must become either scepticism, mysticism, or agnosticism.

What then is the criterion of truth for a single fact, be it a sensation, a perception, or an observation? It is this, that if the observation be repeated under the same circumstances it will, to the extent that the circumstances are the same, be again the same; the observer will always make the same observation.

This maxim will do for a statement of facts. If according to this maxim we are in the position to ascertain that the same observation can be made again and again under certain conditions, we gain the assurance that we have to deal with a fact of some kind. But how shall we inquire into the correctness of the interpretation of the fact?

* * *

Every living creature and furthermore among human beings every individual man has an idiosyncracy of his own. How can we

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* *The Nation* quotes the following passage from a former essay of mine: "The philosophy of the future will be a philosophy of facts, it will be *positivism;* and in so far as a unitary systematisation of facts is the aim and ideal of all science, it will be *monism.*" *The Nation* rejects this definition of monism and adds: "The search for a unitary conception of the world or for a unitary systematisation of science would be a good definition of *philosophy*; and with this good old word at hand we want no other."

Very well. Call that which we call monism or a unitary systematisation of knowledge, "philosophy"; we will not quarrel about names—*dummodo conveniamus in re.* We agree perfectly with our critic; for we also maintain that monism (at least, what we consider monism) is philosophy; it is *the* philosophy.

avoid the errors arising therefrom? We substitute other observers so that we can detect to what extent the individual way of observation influences the result of the experiment. Thus we shall find that some persons are color-blind with reference to red or to green, and we can in this way explain certain mistakes caused by such conditions.

Supposing that all human beings were color-blind we should consider this state as normal; and the discovery of science that certain colors which appear alike to us, are after all, considering their wave-lengths and other qualities, more different than certain other tints which are easily discerned by the eye, would be an unexpected surprise. It would to some extent be analogous to the well-known fact that there are rays of light which are not perceptible to the eye, namely, the so-called chemical rays; their existence has been discovered by their chemical effects.

It might be, although it is not probable, that what appears green to me and what I call green, may appear different to other people, perhaps gray, red, or brown, or some other color that I know not of: yet other people will—just as much as I do—call that peculiar sensation green which they experience under the same conditions, for instance, when seeing the fresh leaves of a tree. It is quite indifferent how variegated in single minds the feelings may be that accompany each kind of sensation. So long as they have for every special objective state a special analogue, they can map out in their minds their surroundings, they can have a correct representation of the world, and so long as they employ the same symbols (words or other signs) for indicating the same objective states, it is quite indifferent whether or not the feelings that are produced in the process of observation vary. It would make no more difference for the general purpose of mental operations, than it would if we were to employ Roman letters, or Italics, or Greek or Hebrew characters to designate the lines and points in explaining a mathematical figure. The main thing is that certain points are marked and represented by some sign which stands for this or that point and for that alone.

To cite another example in illustration of the subjective ele-

ment of feeling in cognition, we may compare our knowledge of the world to the map of a city. The map may be printed in black, green, red, blue, or any other color. The color in which the map is printed represents the subjective element of feeling, while the form of the lines, their geometrical configuration, contains the objective element of the things represented. The map is good, i. e. its representations are true, if the squares and the streets of the city stand in the same relation among each other, as the little blocks and divisions on the map do. Whether the map is printed in green or blue will make no difference so long as we find everything we want to know about the city represented in a way such that we should be able to set ourselves aright and to find our bearings if we went astray.

The subjective element in mind is not of one half the importance generally attributed to it. The objective element, being that which is represented, is paramount, and it is the aspiration of all the sciences to concentrate their entire attention upon the objective features of observation. Objective truth is what we want, and objective truth is identical with a scientific description of facts.

* * *

What then is the criterion of objective truth for the interpretation of facts? Is it not wanting? May it not be that a person, Mr. A., will under given circumstances regularly see a ghost. Indeed we do not doubt that he will, and we can even prove it by experiment. This being so, is not the interpretation of facts as to whether the phenomenon is a real ghost or a mere vision, beyond any criterion of truth?

If the methods of science are reliable, (and they have been justified by their brilliant success,) we have indeed a criterion for the interpretation of facts; and this criterion for the interpretation of facts, no less than the criterion of single observations is based upon monism. If the world is really a universe, if there is oneness in the All, if there is a unity of law throughout nature, our interpretations of the different facts must agree among themselves. They cannot and should not contradict one another; and whenever they do, it is

a certain sign that somewhere there is something wrong in our interpretation of facts.

Philosophy has ceased to be a metaphysical world-theory. The interpretation of facts no longer means a hypothetical assumption which will square all the irregularities among facts that we are unable to account for, but simply a methodical systematisation of facts, enabling us to recognise the sameness of law in the irregularities apparent in innumerable individual instances. Interpretation in this sense means harmonisation; it means an orderly arrangement; classification with due discrimination. An explanation of natural phenomena is not the carrying of an hypothesis into facts out of the realms of our imagination, out of depths unknown, by what might be styled revelation or inspiration, but it is a comparison of facts with facts. The hypothesis we apply to facts must come from facts and must cover facts. That element in an hypothesis which does not cover facts is redundant as an explanation; it is useless as such, or even dangerous; and unless it serves as an aid to thought where ignorance of facts requires some assistance, some allegorical symbol, some auxiliary construction,—unless it is to the scientist what crutches are to the lame,—it must be dropped.

Accordingly, the criterion of truth is the perfect agreement of all facts, of all interpretations and explanations of facts among themselves. If two facts (such as we conceive them) do not agree with each other, we must revise them; and it may be stated as a matter of experience, that our mind will find no peace until a monistic conception is reached. A monistic conception is the perfect agreement of all facts in a methodical system, so that the same law is recognised to prevail in all instances, and the most different events are conceived as acting under different conditions yet in accord with the same law.

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It does not lie within the scope of this essay to enter upon the practical application of the principle which we have set forth as the criterion of truth. One hint only may be supplied, to point out the most obvious maxim derivable from it—a maxim that is instinctively

obeyed by all scientists and has often been popularly expressed in the sentence: An ounce of fact is worth a hundred pounds of hypothesis, or of any interpretation of facts. All the theories in the world, scientific and economical, our dearest ideals not excepted, and all the most ingenious hypotheses have no value unless they have been derived from, and agree with, the laws that live in the facts of our experience.

The trouble of applying this rule lies mainly in the difficulty of distinguishing between facts and our interpretation of facts. Considering that mind is representativeness in feelings we have to analyse the mind in order to come down to objective facts. The percept of a tree is not the tree; it is an interpretation of a group of facts; it is a mental picture produced by a synthesis of sensations, the latter being caused by sense-impressions. Considering that all the images, ideas, abstract concepts, and theories of which our mind consists are not the facts represented by them but their several interpretations, we at once see how careful we have to be for purposes of philosophical and scientific exactness in the statement of facts.

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On this occasion, a few critical remarks concerning the leading essay of this number, "The Architecture of Theories," by Mr. Charles S. Peirce, may be added. Mr. Peirce is one of our subtlest thinkers and logicians, and it is incumbent upon one to reflect twice before criticising any sentence of a man who writes upon the most recondite topics,—upon what I should call the higher mathematics, the differential and integral calculus of logic,—with ease and masterly accuracy. Mr. Peirce's essay "The Architecture of Theories,"* presented in this number of *The Monist*, is the first publication of his in which he propounds not mere criticism or the

* The term "architecture of theories" seems inappropriate from the standpoint of a positive conception of the world. Many monisms have been constructed in the way Mr. Peirce so well describes in his comparison of these philosophical systems to the building a house of one and the same material, for instance *papier mâché*, with roof of roofing paper, foundations of paste-board, windows of paraffined paper, etc., etc. Philosophy, however, is not a construction of a theory comparable to the building of an edifice; it is rather the mapping out of the house in which we live for the purpose of orientation.

discussion of abstruse logical subjects, but his own positive opinion, presenting in great and clear outlines the foundations of his philosophy.

The world-conception of Mr. Peirce agrees in one fundamental maxim with our own, but it disagrees with the latter in the main and most important application of this maxim. Mr. Peirce says, "Law is *par excellence* the thing that wants a reason." This maxim was the guiding star of our inquiry into the fundamental problems of philosophy.* The world considered as a universe displaying in all its innumerable actions one and the same law is called a cosmos; if considered as a heap of processes with no common law pervading them it is called a chaos. We found in our inquiry into the forms of existence that the laws of form possess intrinsic necessity. The laws of the form of existence are represented in the laws of formal thought (arithmetic, mathematics, logic, mechanics, and pure natural science). So long as the formal laws hold good, (and we have found in the chapter "Form and Formal Thought" that they will hold good under all circumstances,) any kind of world, whatever materially or dynamically it be, must be a cosmos, and cannot be a chaos. We can imagine that we had a world consisting of some other substance and being different either in the amount or in the action of its energy to this world of ours, but we cannot imagine that a world should exist which does not exhibit the harmony of form, and is not regulated as it were by the formal laws of existence. One plus one would be two in any kind of a world, and obviously all the other more complex statements of formal laws would remain true with the same intrinsic necessity. The truth 'one plus one makes two' contains the universal applicability of causation and of the conservation of matter and energy. Taking this ground we arrived at the conclusion that the world is a cosmos: there is no chaos and there never has been a chaos. A chaos, in the sense of an absolute non-existence of law, is an impossibility.

Accordingly, we cannot agree with Mr. Peirce that the occurrence of chance "calls for no particular explanation." There is no

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* See the author's *Fundamental Problems*.

chance, if chance means absence of law. Chance, if the word be admissible, is a mere subjective conception produced by limited knowledge and signifying a state of things not determinable with the means of knowledge at our disposal. Law once recognised is the death of chance (in the objective sense of the word); and chance, or sport, or chaos, or indeterminacy, or whatever one may call the absence or at least the imperfect cogency of law, far from "calling for no particular explanation," must be classed *prima facie* among those theories that are *per se* impossible. These conceptions whether applied to the world at large or to special processes of nature are in contradiction to those interpretations and systematised statements of facts which are most fundamental, most reliable, most indispensable and universal. Whatever generalisation the theory of evolution may be capable of, it is certainly not capable of being applied to law. The formal order of Nature and especially the mechanical laws of physics cannot be thought of as having been developed out of a state of sportive chance; they must be considered as having always been the same as they are now: they are eternal.*

In stating this difference of opinion, I apprehend a possibility that although Mr. Peirce has stated his case with most admirable and I should say unequivocal clearness, I have misunderstood his views. In a former article of his, Mr. Peirce makes a statement concerning Nature considered as a possible chaos, which seems to concur rather with my views on the subject than with his own. Mr. Peirce says in his fourth Paper on the "Illustrations of the Logic of Science":

"If there be any way of enumerating the possibilities of Nature so as to make them equally probable, it is clearly one which should make one arrangement or combination of the elements of Nature as probable as another. . . . It would be to assume that Nature is a pure chaos, or chance combination of independent elements, in which reasoning from one fact to another would be impossible; and since, as we shall hereafter see, there is no judgment of pure observation without reasoning, it would be to suppose all human cognition illusory and no real knowledge possible.

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* Mr. Peirce seems to define Mind as sportive chance; for according to his theory, as soon as sportiveness assumes fixed habits, it settles into the mechanical motions which physical science observes in gravitating masses; and matter is thus defined as "effete mind."

It would be to suppose that if we have found the order of Nature more or less regular in the past, this has been by a pure run of luck which we may expect is now at an end. Now, it may be we have no scintilla of proof to the contrary, but reason is unnecessary in reference to that belief which is of all the most settled, which nobody doubts or can doubt, and which he who should deny would stultify himself in so doing.

"The relative probability of this or that arrangement of Nature is something which we should have a right to talk about if universes were as plenty as blackberries, if we could put a quantity of them in a bag, shake them well up, draw out a sample, and examine them to see what proportion of them had one arrangement and what proportion another. But, even in that case, a higher universe would contain us, in regard to whose arrangements the conception of probability could have no applicability.

I rest the case here in the hope that the statement of both sides of the problem will contribute to elucidate truth.

EDITOR.

FIVE SOULS WITH BUT A SINGLE THOUGHT.

THE PSYCHOLOGICAL LIFE OF THE STAR-FISH.

THE investigation of the psychical faculties of animals is comparable to a journey into fairy-land. We do not know, and according to Du Bois-Reymond, we shall never know, how our own mental activity has originated, yet in spite of this we deliberately form theories and opinions concerning the psychical powers and faculties of other beings that in point of nervous organisation are perhaps altogether different from us! The ancients wisely limited themselves to expressing the intelligence of animals in the form of instructive fables, and in the famous park of Versailles the charming idea was actually carried out of representing the fables of Æsop in a so-called labyrinth, every turn of the intricate lanes of which led to a different group of animals whose speech was symbolised by streams of water spouting from their mouths, and the purport of their imagined utterances was to be read in golden letters upon marble tablets placed at the side. How often have I wandered over the scene of those long since ruined mazes and have thought of the deep meaning that frequently lies in childish pastime of this kind.

But labyrinth aside—when we see an animal perform before our eyes purposive acts; and we recognise that our own thought operates in accordance with definite, rigorous laws; we shall still have to say to ourselves that a comparative animal psychology is after all not necessarily so hopeless a thing as one might be led to believe from the bold, and yet faint-hearted, "Ignorabimus" of the distinguished Berlin physiologist. And as a matter of fact the range of

insight obtained in very recent times into this very field is highly encouraging. On this occasion I should like to select for discussion one of the most remarkable of questions, that, namely, which concerns the psychical activity of *many-souled* animals.

Quite a stir was made some years ago in the scientific world when Haeckel began to philosophise about the souls of cells, or so-called plastidule-souls; for it was patent that the course of life in the individual single cell of an animal or vegetable body flowed on in such strict conformity with reason that it was logically necessary to posit the presence of psychical guidance in the instance in question as much as in the case of composite cellular colonies in higher organic beings,—especially since every single one of these composite organisms begins its life as a simple cell, from which the others afterward spring. The wide-spread opposition that Haeckel's view met with, must be regarded as the result of current and common ignorance of the history of philosophy; since otherwise it must have been known that the idea of a cell-soul or a germ-soul which controls the development of the young, has been propounded by innumerable philosophers, and that it was proclaimed by Daniel Sennert, of Wittenberg, who died in 1637, with perfect consistency as the foundation of all psychological knowledge. Many beings, such as Algae, Fungi, and Infusoria, never in their lives get beyond the state of a single cell, and yet under the microscope we may observe them seeking light, capturing prey, and in the majority of cases founding families. And when the Genevan Trembley discovered, in 1740, the fact of the divisibility of fresh-water Polyps and showed that after cutting them up every piece grew and developed into a new individual endowed with sensation, will, and other psychical capacities, philosophers began to debate whether there were initially present in every divisible polyp a number of souls in the germinal state, or, if such were not the case, whether the simple soul of a polyp possessed the property of divisibility. The Leipsic theologian Crusius, who died in 1775, declared in favor of the presence in every polyp of a plurality of germinal souls; the Dutch insect anatomist, Peter Lyonnet (died 1796) declared in favor of the divisibility of the single polyp soul.

Fig. 1.—STAR-FISH. (After Haeckel.)

But let us pass by these subtle speculations to turn to a class of animals in the case of which we may speak with more propriety than in the case of polyps and other zoöphytes of a plural soul, since physically and psychically they act in every respect as if they had grown together out of five or more individuals,—I mean the Echinoderms in general and the Star-fish (*Asteroidea*) in particular. In the following paragraphs, for the sake of brevity, I shall speak of only five-rayed star-fishes, because the sacred number five is the one that lies at the basis of the physical structure of the great majority of star-fishes developed from the egg, and of all other echinoderms, although there really do occur star-fishes which are supplied, some with more and some with less than five rays,—single rays often being cast off and a larger number growing out in their places,—and although many species are regularly and normally supplied with more than five rays. From visits to the sea-shore or to aquariums, at any rate from pictures, my readers all know how a star-fish in general looks. In the first cut which accompanies this article a number of echinoderms are presented. The star-fish is in the centre to the left. It resembles the decorative star of an Order, and has short or long, broad or slender rays, as the case may be, and a disc-shaped central body.

The observation which is most important for our present discussion, and which strikes us on first seeing a star-fish, or its relatives the sea-urchin and the sea-anemone, consists of the fact that these animals possess no head, which even the most insignificant worm or insect does not lack, and that consequently its organs are in want of a guiding, regulative member, possessing externally organs of sense and having within a brain with the power to communicate the requisite commands for the movement and the conduct of the same. On the contrary, each single branch or ray possesses its own individual nervous system; and in the case of the voluntary separation of the rays, which frequently occurs, is able to continue life of its own independent accord, developing itself by the growth of new rays into a new and complete star-fish. (See Fig. 2.) But these five or more nervous systems do not radiate from a common central nerve-ganglion which might be termed a central

brain, but are merely joined to a nerve-ring which lies in a common central portion, encircling the esophagus; this nerve-ring in the majority of cases forms a regular polygonic figure, and into each angle of the polygon the nerve-cord of a ray enters. It will be seen from this structural arrangement of things, that the psychical and mental guidance of these animals is entrusted to a board of five members who possess, it is true, sentient communication with each other, but act without the intermediation of a presiding officer.

Fig. 2.—COMET-FORM OF ARM OF A STAR-FISH.
A cast-off arm re-forming by the sprouting of four new rays.

We may well look forward with intense interest to the outcome of a psychical administration of this kind, and to tell the truth, until recently its importance has been greatly underestimated. Every inference made with respect to the psychical excitability of an animal must be derived from its movements and actions in various natural and artificially produced positions, by observing what its conduct under these conditions is. To start with, star-fishes, like sea-urchins (which psychically are similarly governed), admit with respect to the position of their bodies a distinction of top and bottom; that is to say, the side on which the mouth lies situated in the centre of the five rays belongs properly face downwards, while the opposite surface is to be regarded as the dorsal side. But the conceptions of a forepart and a hindpart, of a right and a left are not applicable. The rays of the star-fish, like the central disc, also plainly exhibit a distinction of lower and upper parts. Among the real star-fishes (*Asteroidea*) the inferior or ventral surface of the arms is supplied either with two or with four rows of sucker-feet or pedicels, consisting of long, extensile, hollow sacs, which when filled and extended by the water let into their widely ramified ambulacral systems, protrude into the grooves of the arm through openings in the hardened calcareous integument. To level surfaces they easily cling fast by simply drawing back the terminal

discs of their tubular feet and thus creating a rarefied atmosphere in the space between the object to which they adhere and the puffed out walls of the extremities of the pedicels. Star-fishes may be seen climbing in this way, with their hundreds and hundreds of tube-feet, up slippery cliffs and even the perpendicular glass walls of aquariums, and they are even able to hang suspended from a horizontal glass ceiling for a considerable length of time after they have been taken out of the water. When they wish to change their position they do it by alternately loosening and fastening their extensile feet in such a way that those loosened reach forward in one and

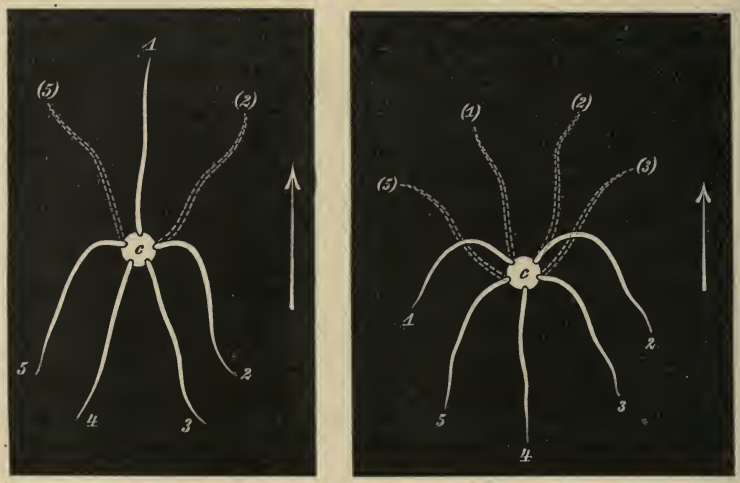

Fig. 3.—MODE OF LOCOMOTION OF SAND-STARS. (After Preyer.)

In the cut to the left *1* first advances, then (*5*) and (*2*); *3* and *4* remaining at rest. Whereupon (*5*) and (*2*) simultaneously come back to the positions *5* and *2*, *c* is lifted and pushed forwards with *1*, while the two rays *3* and *4* are pulled along behind. In the figure to the right the same animal first shoves forward the pairs (*1*)(*2*) and (*5*)(*3*), *4* remaining at rest, and then bends both pairs backwards, dragging only *4* behind; *c* is lifted and thrown forward in the direction of the arrow.

the same direction uniform in all the arms, and fasten themselves to the surface anew, whereupon the others also let loose and go through the same movement in the same direction. The sucker-feet also help to convey to the mouth the food seized at the end of the arms.

While in this instance, accordingly, the arms, although they are not immovable and bend and approach each other, officiate rather as the bearers of organs than as prehensile and locomotory apparatuses themselves,—the sucker-feet performing the principal

tasks and requiring for their work a very finely ramified nervous system; in the case of a certain other division of the star-fishes, the so-called sand-stars (*Ophiuridae*), the arms are thinner and more supple, and act as organs of prehension and locomotion, dispensing more or less entirely with their suctorial pedicels. By alternately thrusting three feet forward (Fig. 3) and then drawing back the two side feet of these three, the five-footed sea-stars move more swiftly than the others, sometimes proceeding by jumps even; but they cannot climb up smooth surfaces, or cliffs, unless irregularities are present which may be grasped by their pliant arms, whereas on the other hand the common star-fishes, which are furnished with sucker-feet, climb best of all on smooth and slippery surfaces, each one of their countless pedicels being able to suspend a considerable weight, in some species as much as twenty-five grammes. In other respects, especially with regard to the ring-shaped connection of the five nerve-cords, their organisation is essentially the same; only in the sand-stars the central portion forms a disc more distinctly separate from the arms, in which former the common organs of feeling and digestion have more fully retracted.

Recognising thus, that the star-fishes and all their relatives act physically like a federal animal-union, composed of five independent animal-states, I called attention in the first edition of my work "Werden und Vergehen" (1876) to the psychological enigma that we were here confronted with a five-fold Siamese monster, as it were, in which five separate persons were brought mentally under the same guidance, or where five minds had to pull, simultaneously, one rope. On account of the absence of a head and a brain in these animals, certain well-known modern animal psychologists have taken the position that their powers of psychical performance are very scanty, and that, in a much fuller sense than was predicated of all animals by the Cartesians, these especially were irrational automatons, or, to use a technical expression, were mere "reflex-organisms," animals in which only direct external excitations evoke with unalterable regularity responsive movements, so that, for example, if any unpleasant excitation were brought to bear on them from any direction they would move in the opposite direction, but would ap-

proach if anything became perceptible that excited their desire for food. On this ground the distinguished English animal psychologists Romanes and Ewart claim to have established that these animals actually do respond like machines to external excitations; if they were excited at any part of their body by a wound, by the application of acids, an electric current, or any other irritant, they would run without exception in a straight line in the opposite direction, but if the excitation were applied to any two parts of their body at some distance from each other they would move in the line of the diagonal of the two directions, in accordance with the principle of the parallelogram of forces. Similarly their movements after prey and food (the presence of which at a distance was made known by the emission of odors), their movements toward more brightly illuminated parts of the containing vessel, their flight from the air into the water, their recovery of their normal position when placed on their backs, and finally their so-called autotomy or self-amputation, that is the casting off of their members under the irritation of powerful stimuli—were all held to represent mere automatic responses to prearranged conditions without a trace of intelligence being exhibited.

In view of this condition of things it was a very welcome announcement, that one of the most brilliant representatives of modern experimental physiology and psychology, Professor W. Preyer, at present of Berlin, had determined to undertake a comprehensive series of experiments with these very animals, and was able to carry out his intention at the zoölogical station in Naples, so admirably adapted to the purpose. To obtain clear ideas generally with regard to animal reflex-mechanisms, fitter specimens for experiment could scarcely be presented than the star-fishes, which unite a rare degree of decentralisation, power of independent action, and absence of a cerebral centre, with a nervous system of the minutest ramifications. Here, if anywhere, were simple, clear and transparent results to be expected, and finally information relating to the co-operative activity of different nervous systems. Preyer published the results of his observations in the "Mittheilungen der Zoologischen Station in Neapel" for the years 1886 and 1887, and although he does not

regard his labors as completed, the scientific reading public may nevertheless take sufficient interest in the present state of his researches to justify a presentment of the principal and most general results obtained.

In confirmation of the view that previously obtained it was found that these animals actually did respond in a rare degree to given stimuli in a manner determined once for all; it could be foretold with a degree of sureness verging on astronomical certainty, how, for example, the sucker-feet of a star-fish would act if the animal in its normal and sound condition was irritated at this or that place, powerfully or weakly, one time or many times successively, by mechanical or chemical applications, by electric currents, or heated instruments. With all the means of irritation employed the result was always identical, and consisted in the fact that the distensible feet were drawn in at the point of application when the irritation did not extend beyond its region, no matter whether it was applied at the inferior or superior surface of the animal, but that protrusion of the feet never resulted from local irritations of this character so long as they did not exceed a certain intensity. A more powerful irritation, on the other hand, radiating over a greater portion, or over the whole animal, produces a general protrusion of the distensible pedicels, so far as the irritation extends, with the single exception of the point of application itself when the same lies on the inferior surface.

Inasmuch as this swarming protrusion of pedicels may spread over the entire inferior surface when only a single arm is irritated in the neighborhood of its extremity, it follows from this that the nervous excitation must first be conveyed to the ring at the centre in order to radiate thence to the pedicels of the other arms; and from the manner in which the irritation is propagated, the course of the radiation can be accurately followed. Thus, if the irritation of an arm proceeded from the dorsal region, the distensible pedicels of this arm were the first to protrude, then those of the two adjacent arms, and finally those of the two remaining arms, but in the latter not quite out to the extremities unless the irritation exceeded a certain intensity. That is to say, the effect of the irritation was prop-

agated through the inner nerve-ring according to the same laws by which a fluid under pressure or an electric current in a similar conductory system would proceed. But if the connection of the ring was severed at both sides of the irritated arm, the effect would remain confined to that arm. If the connection was broken only on one side the irritation advanced round the other side and reached the severed neighbor last. On the other hand, a powerful irritation of the central disc immediately provoked the extension of all the pedicels. The phenomena recorded occurred moreover in accordance with simple mechanical laws as was expected from the outset, and when the irritations were unusually powerful the effect was manifested by a continuous alternate extension and contraction of the pedicels.

Amputated arms of the common sucker-footed star-fish act like arms isolated at both sides by severance of the nerve-ring, as just explained. Upon local irritation they draw in their pedicels, and protrude them upon being powerfully irritated; they creep forward in a definite direction, and when placed upon their backs are able even to turn themselves over like the uninjured animal. The severed arms of sand-stars are less independent. They twist about aimlessly hither and thither, but if any considerable portion of the central disc and nerve-ring adheres to them they are able to perform adaptive movements. Similarly the disc, with one or two arms attached, is not helpless; and is able to get along quite alone without any arms. We could explain all these movements by so-called reflex actions and might grant also that the mechanism that effects these results operates in this case upon a greater scale and with more independence than in other classes of animals, for the reason that here a real guiding organ is not present.

But whatever might be inferred from the experiments just described in favor of a senseless and unintelligent life of star-fishes, Professor Preyer was nevertheless able by extending his experiments to win the conviction that the old conception of star-fishes being real reflex animals was wholly untenable, since a great number of capacities and capabilities could be verified and provoked, which are intelligible only on the basis of adaptive co-operation and mutual con-

certed action in the five rays. We shall not discuss here whether this is also proved by the wonderful fact that a star-fish, which fastens its arms to everything possible, never seizes its own arm and thus, like Molière's miser, in its visits to its oyster beds never catches itself for a thief. We might say, indeed, that the arm seeking a hold does not seize its companion because it feels it and has learned by experience that it takes a Münchausen to pull one's self out of a swamp by the tops of one's boots. But we find exactly the same phenomenon among creeping plants, which clasp every kind of support in their way, but never, as Darwin observed, take hold of their own stalks; whence we might assume that there probably exists in these beings some sort of power of reflex inhibition dependent upon a property of the body and developed in consequence of the fact that clasping and grasping parts of itself would involve a useless waste of energy. We shall see, however, that under certain circumstances this instinctive "dread" of contact with self is inoperative.

But to our main task. In the simplest changes of place and position, intelligent co-operation of the arms is manifest. For if in moving from one place to another, or in turning around each arm tended to perform on its own account the necessary movements of extension or rotation, without giving any heed to the others, the animal would endure the torments of Tantalus before it could reach, if ever at all, the choice bit of food that it had scented from afar, or the ray of light towards which an obscure impulsion drove it. On the contrary, when a star-fish is spying after food, we observe it lift the ends of its pedicel-covered arms so that the downward deflected eye there situated may obtain a good view of things in the neighborhood, and if in any direction an object worth going after is discovered we see the many hundreds of sucker-feet on the five arms push out in one and the same direction,—a phenomenon that requires the presence of a very widely ramified nervous system, since every tactile pedicel needs its separate telegraph wire in order to be properly moved and not always in the same direction, as for example when the animal wishes to perform a rotation about its own axis. For these comical animals sometimes do rotate about their axis, although our simple mind wonders why a Janus-head should want to turn around,

these animals being able to look simultaneously in the four directions of the compass, and having still another eye for looking downward. Similarly in the sand-stars, to which the Medusa-heads with branched arms belong, an adaptive co-operation of the arms in creeping and swimming occurs; which can be explained only as the result of a common understanding issuing from the central ring.

It would seem to follow from Preyer's extensive observations, that as a rule no one individual arm of a star-fish enjoys to the exclusion of its fellows the prerogative of universal or even general precedence; the lead of any one arm is rather solely determined by the object sought, so that the one next to the object generally starts first and assumes the lead of the little army of arms. Of course in the case of new-growing star-fishes which have sprung from a single arm by sprouting, this is different; for in this instance the old arm will undoubtedly retain control of the others for some length of time until the young ones have reached a certain size. Preyer does not seem to have instituted observations to ascertain this, but it would be interesting to determine whether an arm of this kind always takes the lead, or in the proper cases acts as driver from behind and pushes the baby-carriage with the children before it.

Examples of surprisingly dexterous co-operation and concerted adaptive action are observed in these animals in their climbing on difficult surfaces, and in their attempts, also, to regain their normal position when placed on their backs or made to swim in reversed positions by discs of cork fastened to the extremities of their arms. Scientists have observed members of the orders *Asteroidea* and *Ophiuroidea*, in difficult positions of this kind, display an astounding sense of equilibrium and a skilfulness in gaining firm holds, sug-

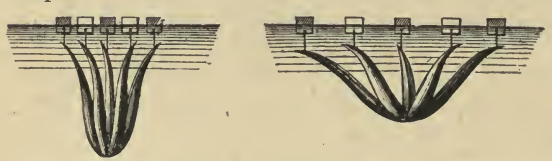

Fig. 4.—RECOVERY OF NORMAL POSITION BY ASTROPECTEN AURANTIACUS. (After Preyer.)

Through the end of each ray of the animal a thread is drawn and affixed to a cork; the animal lying back downwards. At first the creature swung the corks alternately inwards and outwards, taking the positions represented in the above figure. After the lapse of an hour the ray with the smallest cork attached, upon which thus the least upward pressure was exerted, was pulled downwards and sidewise and brought beneath an adjacent ray; the two opposite rays were retracted centrally, the disc lifted, the centre of gravity of the animal thus displaced, and the turning effected.

gestive of the athletic feats of monkeys, and that even when placed in very unusual positions such as never occur in nature. Thus many star-fishes let themselves drop from steep rocks and cliffs, if that happens to be the best way of getting down; but in such cases before they let their whole weight go hold fast to the last moment with one or two arms, as if it were previously necessary to calculate the leap into the depths below. To furnish the counter-test of this, and to prove that the central nerve-ring is, as assumed, the indispensable and necessary condition of this united co-operation, Preyer severed the ring in individual specimens of the class between every two arms, sparing the other parts as much as possible. In this way the nervous systems of the five rays were disconnected. As was expected, it was found that the more connections there were severed, the more difficult the animal found it when placed on its back to regain its normal position. For since the recovery of the normal position must be introduced by the groping about and the fastening of the pedicels of one or of several adjacent and half-turned arms, two arms or pairs of arms might for want of a mutual understanding act directly in opposition to one another and thus make the turning impossible. On the other hand, the central disc was able, though deprived of all arms, to accomplish the turning, if only the nerve-ring were preserved intact; and the more there remained of the nerve-ring on a single arm the better the single arm was able to do it.

But in circumstances which were wholly new, the adaptive co-operation of the arms demonstrated itself in so striking a manner that we may say they are not to be easily put out of countenance or confounded. When Professor Preyer, for example, slipped narrow rubber bands or cylinders over their rough spiny arms, they rid themselves as a rule of these unwonted fetters in a very short time, and in the most various but always well calculated ways. Generally the two nearest ones seized their poor imprisoned fellow "under the arms," bracing themselves with their rough spiny surface against the rubber sleeve, and thus finally stripping it off. (See Fig. 5; next page.) Sometimes, when the band was loosely adjusted, twisting movements of the arm in the water sufficed gradually to loosen it, until it could be finally cast off. Often the peeling off was effected

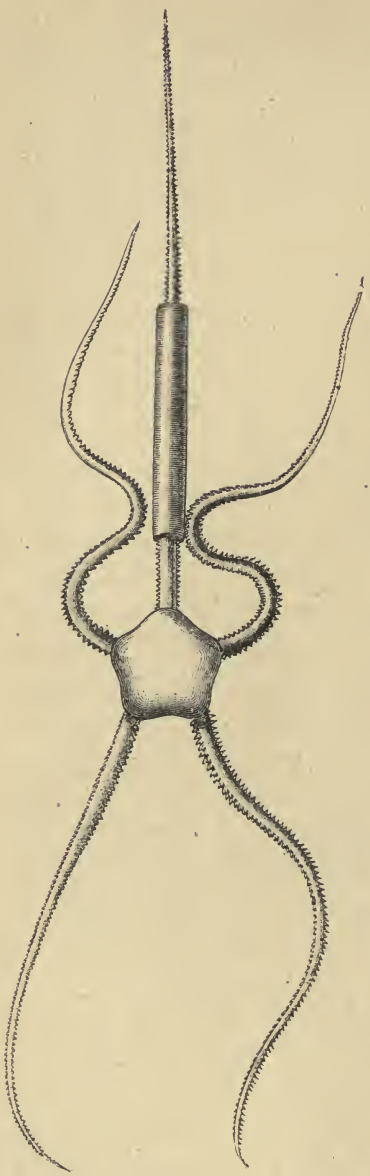

Fig. 5.—REMOVAL BY OPHIOMYXA OF A RUBBER SLEEVE. (After Preyer.)

The figure represents the moment at which the band is about to be removed. An adjacent arm is braced against the lower edge of the band, forcing it off in the direction of the extremity of the ray.

by pressing against a rough surface, whereby sometimes an adjacent arm held the sleeve fast; and when no other expedient was of avail the animal cast the arm, sleeve and all, away from itself; and the latter may possibly have not gotten rid of it at all. At times the casting off of the arm occurred subsequently, after the obstacle had been entirely removed, and often even a day later, as if the impeded arm was still sensible of some obstruction which caused it to afterwards separate from its companions.

Attempts at flight and liberation from unwonted compulsory positions or narrow confinement, also deserve special attention. Many a person who has put a star-fish into a cage and fancied that he was assured of its possession, has been disappointed on finding that the animal had effected its escape through the meshes. But star-fishes have, in consequence of their abhorrence of the air, been made to creep into the narrow necks of bottles filled with water. Professor Preyer, for example, thrust two of the arms of a common star-fish species (*Asterias glacialis*) into a tube filled with salt water leaving the three other arms exposed to the atmosphere outside; and although it would have been impossible to force the animal

into the tube without crushing it, the three arms exposed to the air were also pulled in within the space of three minutes. If the tube was placed perpendicularly in water the animal quickly crept out again. The performance seemed utterly impossible, for each single arm of the star-fish was almost as thick at its base as the greatest width of the tube, and yet three of these arms had to pass in side by side. This was made possible by the animal emptying during the passage all the numerous water-vesicles in the interior of the arms which serve to fill and to empty the distensible pedicels therein ; the star-fish, after the expulsion of the water, becomes very soft in all its parts and does not harden again until it has forced itself completely through and refilled itself with water. In order to accomplish these emptyings, bendings, turnings, and rollings, thousands of muscular fibres must work in harmony within the body of the animal. This experiment was also successfully carried out with other star-fishes, but I cannot agree with the observer when he says that in so doing he brought the animals into a completely new and hitherto unexperienced position. In their haunts on rocky coasts they must assuredly often have to force their way through narrow fissures and holes ; and they must find occasion to make use of the advantages of being able to evacuate water in the case also of single arms, as when they search with them in narrow apertures and snail-houses.

But undoubtedly new for these animals was the position in which they were fastened to a board by five long pins with broad heads, which Preyer drove in close to the central disc between the rays, so that the star-fish, as it seemed, was fastened to its resting-place in a way that admitted of no escape. Nevertheless, the star-fish found a means of freeing itself with ease and elegance from this constrained imprisonment in a great variety of ways, even when the exterior parts of their bodies were girded in by a much greater number of pins. Ordinarily they began by shoving one of their rays, accompanied by a backward bending movement of its two companions, far out between the two encompassing pins, and then drew with the greatest care first the one and then the other adjacent ray through the same narrow avenue of escape, whereupon

then the two remaining rays, the one slightly overlapping the other, were enabled to follow with perfect ease. (See Fig. 6.) A practised knot-untier who had studied the position could not have given them better advice. But if no agreement of plan and purpose existed in this case between the separate rays, if each ray sought to free itself of its own accord, a successful extrication from the difficulty could hardly have been foreseen ; and we must infer from this great unanimity of action in times of danger.

Preyer thinks that at times the concurrence of all the rays in matters of concerted action might have to be effected by first obtaining the concurrence and assent of any individual ray that might be hostilely disposed ; he holds it as not improbable that profound dissensions may arise between the united brothers, and refers to the fact that perhaps the voluntary section of a star-fish into a three-rayed and a two-rayed portion,—which frequently takes place,—may have to be regarded as the violent dissolution of a community of fellow animals formerly living in harmony, but now lapsed into a state of conflict. We shall pass this view by, however, to point out in a few words Preyer's general inferences with regard to the mutual relation of the five communal souls. Progression and flight in a direction once taken and unimpeded by obstacles,—an observation often made and easily verified,—the acrobatic performances, and lastly the intelligent behavior, so to say, of imprisoned and fettered star-fishes, prove that generally, and especially in moments of peril, strength-giving unanimity prevails.

But Preyer is nevertheless of opinion that it is not therefore necessary to assume the existence of a permanent central government, a central soul, holding simultaneous sway over the five radial souls, and in which is lodged, especially in times of battle, full executive power. He employs the simile of five hunting-dogs yoked together in the form of a ring, of like age, like power, and the same training, who hunt a hare in concert, or stand simultaneously and mechanically before a partridge ; when thrown into the water make for the shore all in the same direction, and when equally tired fall simultaneously asleep. "Like the Siamese twins," he says, "these yolked-together dogs will have upon the whole apparently but one

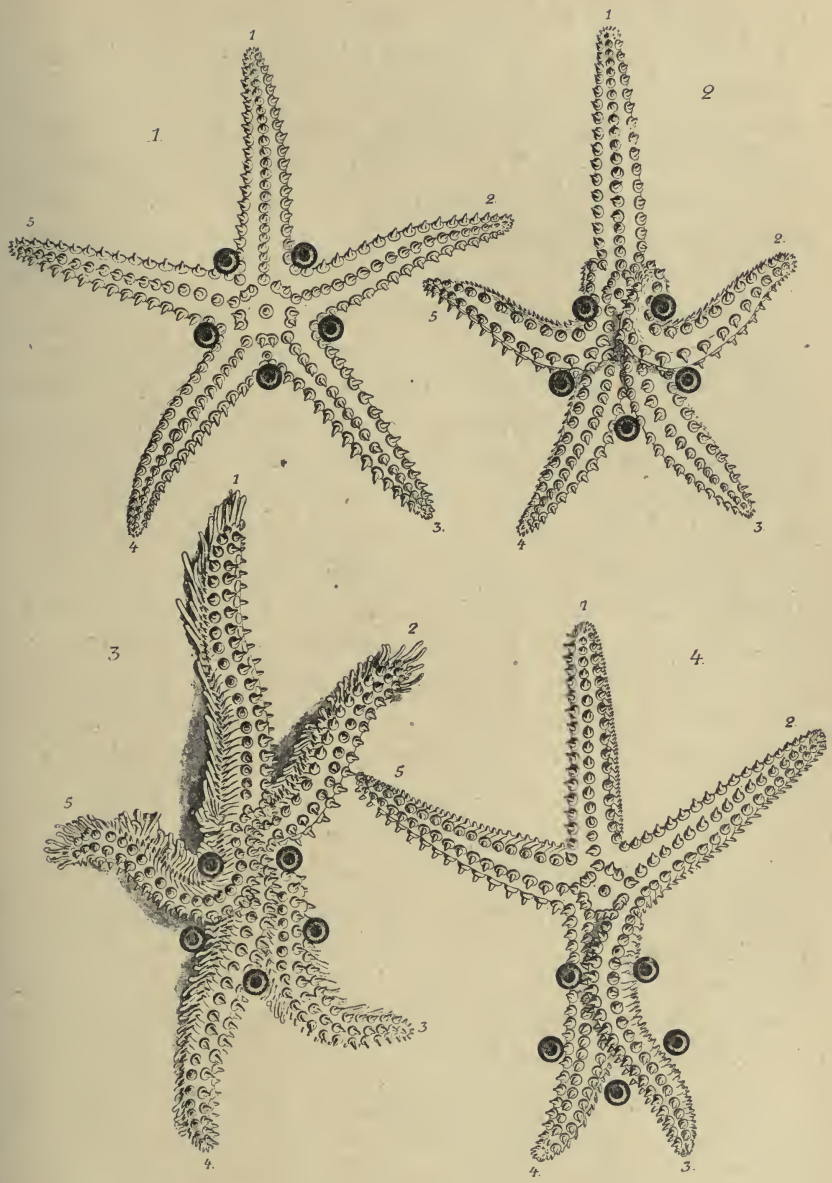

Fig. 6.—EXTRICATION OF STAR-FISH IMPRISONED INTERRADIALLY BY TACKS.
(After Preyer.)

1. Original encompassment. *2*. First stage of extrication. *3*. Second stage. *4*. Third and last stage. The smaller figures indicate the successive positions of the same rays.

will, although they often obey only necessity in this and not their own impulses." Preyer arrives in this at the same conclusion that I pronounced in 1876 in the work I have mentioned, where I compared the concerted actions and movements of star-fishes and sea-urchins to the walking and dancing of human twin-monsters, who in spite of a difference of mental individuality, often very far reaching, nevertheless bring about perfect harmony in their external movements. In this I had especially in mind the so-called "two-headed nightingale," two girls closely united in growth, who often violently quarreled but sang and danced so harmoniously with one another that for the time being the sorrowful fate of the indissoluble union of two so different natures was completely forgotten. In the majority of their relations the five or more associates united in the star-fish are much better off than unfortunate human beings like those just described, and especially in this one particular that they do not have to die with one another, but are able to break loose with impunity from a companion whom death threatens, when they observe that he has suffered a wound or loss, simply expelling him from the community.

CARUS STERNE.

LITERARY CORRESPONDENCE.

I.

GERMAN PHILOSOPHY IN THE NINETEENTH CENTURY.

YOU have requested me to write you for your new quarterly magazine a review of the philosophy of contemporary Germany as manifested in its most important tendencies and endeavors. In setting out to comply with your wish, I feel that this is no simple task. With mere titles of books neither you nor your public will be satisfied. The readers of *The Monist* will demand a deeper insight into the workshops of German philosophy; they will want to know if the old mother soil of speculative thought has retained its pristine fertility. Fertile it has remained. But in quite another sense from formerly. In a few years a century will have elapsed since Schelling published in the *Philosophische Journal* of Niethammer and Fichte, his "General Survey of Modern Philosophical Literature," and it is well to recall to mind that treatise and that period in attempting to characterise the present state of philosophy in Germany; contrasts, we all know, are quite as important for the acquisition of knowledge as resemblances. One central problem stood at that time predominantly in the foreground; the problem, namely, of the unification of knowledge. Neither the idea nor the tendency it involves, is unknown to the philosophy of to-day, but its meaning has become a different one. At that epoch it was sought to solve the problem from within, to solve it from the centre; it was sought to find a supreme species of knowledge possessing a certainty founded unconditionally in itself, and to expand this dialectically into a system of ideas.

I do not need to set forth here the great and peculiar acquisitions that this method has won for us, nor to point out what wealth of noble power was dissipated by it in the treatment of impossible problems. These things belong to history. The speculative period of German philosophy is dead. Ludwig Feuerbach in the middle of this century sung its funeral dirge. But it took some time before people accustomed themselves to regard it as really dead,—a time in which countless attempts were made to resuscitate it; it took some time before philosophers began generally to bestow upon the corpse the kicks of abuse that Schopenhauer in its own lifetime administered to it, and for which he was rebuked by a universal silence of indignation.

Earlier history, still under the influence of the speculative masters, had characterised the progress of German philosophy from Kant to Hegel as the necessary and logical evolution of the idea of philosophy in its highest sense. But the present prevailing method of presentation is accustomed to draw a sharp, deep line at the termination of Kant's activity, and to regard the entire subsequent speculative development of the Kantian philosophy as a fallacious digression and an abandonment of the fundamental critical idea. "Back to Kant" is the watchword that has resounded since the beginning of the sixties, at first in solitary utterances, and then with greater, ever-increasing emphasis—the incipient condemnation of a period in which German philosophy had celebrated its grandest and most brilliant triumphs, and at a time when German speculative thought had just begun to grow better known and more influential abroad.

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Back to Kant. Yes. But to which Kant? To the Kant of the first or the second edition of the Critique of the Pure Reason? To the Critique of the Pure or the Critique of the Practical Reason? Very perplexing questions these. The philosophy of Kant is not so easily reducible to a simple and comprehensive formula. It is a veritable Proteus, that changes at will form and appearance. Every one interprets it, in the end, as he wishes Kant should have thought. The cry "Back to Kant" has become in the ranks of

German philosophers a veritable apple of discord. An enormous Kantian literature has sprung up; critical, exegetical, constructive. No one can dispute it acumen, learning, erudition, and profundity. But the traits of Alexandrianism unmistakably cling to it. A more pernicious waste of intellectual power, perhaps, than that of the much deplored speculative period. One has the feeling often as if one would like to cast into the tumultuous, struggling crowd of combatants a different battle cry—"Back to Nature! Back to to the examination of the true contents of things!"

I shall select on this occasion from the superabundant store of Kantian literature the works of two writers only to whom the characterisation just advanced does not apply, and to whom independent and fundamental importance belongs. They are, first, Ernst Laas,* professor at the University of Strassburg, who died in 1885, and second, Alois Riehl,† formerly of Gratz, now of Freiburg. Both began with Kantian research. Neither remained identified with it. Both sought to supply a new foundation for that branch of philosophy that deals with the theory of cognition; both brought to the service of their task, in addition to eminent critical and analytical acumen, comprehensive historical knowledge. Widely different in method, both pursued the same end—the eradication of that transcendent bias which had so pernicious an influence with Kant himself and his immediate followers, and the replacing of all dualistic opposition of a higher and a lower, or a real and a phantom world, by a philosophy of reality based upon the rigid analysis of pure experience. Both, therefore, are, in this sense, indispensable preconditions of every monistic philosophy that is not founded on immediate intellectual perception, or mere postulates, but aims at a critical foundation.

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Simultaneously with this battle for the "real" Kant and the measure of that in his philosophy which could be utilised as the

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* Laas, *Idealismus und Positivismus*, 3 Vols. 1876-87.

† Riehl, *Der philosophische Kriticismus und seine Bedeutung für die positive Wissenschaft*, 3 Vols. 1876-87.

groundwork of a new structure conforming to the conditions of the times, German philosophy in the second half of this century waged another war. No fratricidal struggle this, no mere scholastic feud, but a battle for existence with a foreign foe—the physical sciences. After the speculative philosophy had retired from the throne that it had so long occupied, and the vacancy seemed yet unfilled, the attempt was made to place in the unoccupied seat another intellectual power whose credit and authority with the contemporary world had begun to keep pace with the success that attended its endeavors. We shall designate these attempts briefly as "materialism," and understand by the term any and every endeavor that aims at constructing a conception of the world with the means and methods of the mathematical and mechanical sciences alone. That which was here sought after was the exact opposite of the state of things that obtained in the speculative period; and the treatment that the speculative philosophy had to submit to at the hands of many of the spokesmen of the new movement was not entirely undeserved. The battle that German philosophy here had to fight was no easy one. Its foe occupied every position of vantage. The real or apparent exactness of its principles, the detailed character of the structure of the world that it bade fair to offer were a power. What we want is facts, not ideas; intelligibility, not profundity—these were the demands with which philosophy was confronted. It was impossible to outflank, in this direction, the representatives of a scientific discipline that admitted of skilful popularisation. There was nothing similar to oppose to it. Philosophers were accordingly compelled to confine themselves to criticism, to show forth the unmistakable defectiveness of the pure-mechanical philosophy, the weaknesses and flaws in its demonstrations and the arbitrary character of its construction; and to point out by a display of much acute reasoning what fifty years before was self-evident, that mind and mental life are not merely an accidental phase of things, not a product incidentally resulting, but an indestructible feature of the inward nature of the world itself.

Much of this extensive antimaterialistic literature, in which may also be included by far the greater part of anti-Darwinian lit-

erature, can put forth no claim to lasting worth, and is to-day wholly antiquated. For the simple reason that people no longer understand, or at least will soon no longer be able to understand, the circumstances and conditions out of which this polemical activity sprung: namely—the transcendent metaphysical philosophy; mistaken idealism which imagined that existence and reality had to be transfigured in and by cognition instead of through will and action; the secret fear of an endangerment or indeed of a dislodgment of the religio-theological world-conception, the supernatural God-idea, the pure spiritual and immortal soul, the freedom of the will, and other phantoms whatsoever the designations they may bear.

But this warfare against materialism, which was waged by minds of widely varying rank and power, resulted at least in the substantial advantage of having brought the hostile parties closer together, of having forced them to the reciprocal study of their respective means of investigation, and of having put an end to the complete estrangement that formerly existed between them. Not only did it enrich philosophy, but it also led physical science to a correction of many of its conceptions and to a re-examination of its methodological hypotheses.

This is best to be studied, perhaps, by taking to hand the writings of a man who may be characterised pre-eminently as a spokesman of the materialistic movement in Germany,—I mean Jakob Moleschott. His well known work *Der Kreislauf des Lebens* has become in its last, the eighth edition, something quite different from what it was in its first; and the rich collection of his lesser writings (*Kleinere Schriften*, 2 Vols., 1879–87) also offers the philosopher, especially from a methodological point of view, much that is worthy of especial attention. Moreover, this reciprocal influence of mind upon mind is manifested in the case of many of the most distinguished investigators of the last thirty years, in the most remarkable and gratifying manner. It is impossible to study the discourses and treatises of physiologists like Du Bois-Reymond and Wilhelm Preyer, of physicists like Helmholtz and Ernst Mach, and the discussions occasioned by their works, without being surprised at the extent to which the points of view of psychology and of the theory

of cognition have penetrated into the problems and inquiries of the physical sciences. And *vice versa* philosophical works, like Fr. A. Lange's History of Materialism (*Geschichte des Materialismus und Kritik seiner Bedeutung in der Gegenwart*), Ueberweg's Collected Essays (*Gesammelte Abhandlungen*, just recently edited in a commendable manner by Moritz Brasch), the numerous works of Ludwig Noire, and, last but not least, the entire scientific activity of Wilhelm Wundt,—all show an intimate familiarity with the methods of the physical sciences and an assimilation of materials from these branches of knowledge such as the speculative period can furnish no example of.

* * *

Nevertheless, this intellectual revolution, far-reaching as it was, has led neither to solid systematic construction nor even to the successful development of positive methods of thought. Since the decline of speculative philosophy,—in which in this connection the Herbartian may also be included,—two systems only have dominantly influenced the German mind: the system of Arthur Schopenhauer and that of Hermann Lotze. In both a resonance still lingers of the older time. In Schopenhauer we detect the spirit of Schelling's nature- and art-philosophy; in Lotze, traces of the finely studied subtlety of Herbartian metaphysics. But though both are indebted for a portion of their real intrinsic worth to this organic though involuntary connection with a great epoch, their influence upon the present time rests upon very different grounds; and primarily upon the symmetrical, finished, and compact totality of their intellectual creations. They arose at a time in which philosophers had begun to lay aside the older systems as useless, and in which that multitudinous dismemberment of knowledge already began to make itself felt which to-day seems to be still growing greater. Although it may be difficult in many phases of the development of science to satisfy the impulse latent in us to unify knowledge, and although this endeavor is characterised ever anew by the representatives of special research as a delusion, nay as a ruinous delusion,—yet this impulse is not to be eradicated from the human mind and in some way or other it will ever procure itself recognition. Works like *Die Welt*

als Wille und Vorstellung (World as Will and Idea), or *Der Mikrokosmus* (Microcosm) embrace in fact the entire sphere of knowledge, not in an extensive, but in an intensive sense: they furnish a definite view of the complete inter-relation and meaning of life.

It will perhaps appear strange to the reader that works are here mentioned in the same breath and their effects upon the present time discussed, which are separated in origin from each other by a space of about forty years. Yet this very anomaly is characteristic of the development of the German mind. When Schopenhauer published, in 1819, his principal work, the time for it had not yet come. The philosophy of Hegel, a rationalistic panlogism, was then in the very midst of its career of triumph. The irrationalistic and pessimistic elements of Schopenhauerian thought were repulsive. We now know that the two first editions of the *Welt als Wille und Vorstellung* mouldered in the shops of the booksellers. Not until shortly before Schopenhauer's death in 1860 did the literary public and the scholastic circles of Germany begin to occupy themselves more seriously with this philosopher. Not until then did he really enter as an active factor into our intellectual life.

This influence, in the case both of Schopenhauer and Lotze, rests, aside from the fact of the universal character of their thought-creations, already referred to, pre-eminently in the circumstance that both made thoroughly their own the scientific theory of things and recognised that conception as one whose justification was contained in itself, and which, regarded from the standpoint of its own hypotheses, was irrefutable; though they were nevertheless far removed from perceiving in it the final and irreversible verdict of human knowledge. In this endeavor to fix the limits of scientific cognition Schopenhauer and Lotze form important pillars of the antimaterialistic movement in Germany, and are just in this respect also intimately related with the task of the modern Critical Philosophy or Neo-Kantianism. But while the latter movements came to a stop with predominantly negative or preparatory criticism, Schopenhauer and Lotze owe a great portion of their wide-spread influence on German culture to the circumstance that they undertook, from the point of view of the critical theory of knowledge already ac-

quired, to sketch the plans of structures of the world which would furnish a general background and scheme of synthetic connection for the collective special results of the physical and mental sciences. That these sketches of world-construction have an individual coloring can only lessen their value in the eyes of those who believe they are privileged to apply to such a synthetic, constructive formulation of the highest ideas of all existence and thought, the standard of the exact determination of a single law. And so I shall only hastily point to the fact, that the contrariety and oppositeness that permeates the world and all our thought about the world also comes sharply to light in the case of these two philosophers, not to their mutual destruction, but to the heightenment of the effect by the contrast.

The fortunes of the two systems, which began about the same time to acquire influence, were dissimilar. The pessimistic element alone evinced itself fruitful, in the sense that it came immediately into contact with general culture through manifold forms of presentation and extensive discussion. The royal structure of the Schopenhauerian philosophy has given a host of dispensing draymen for thirty years an abundance to do. The leader of this army, Eduard von Hartmann, has long since taken a place by the side of the sage of Frankfort, as independent master-builder, and presented a system planned and executed with the most diffuse architectural details. The nuclear idea of the Philosophy of the Unconscious (*Die Philosophie des Unbewussten*) has been amplified by the author himself in every direction, extended, exhibited in its historical relationships, and applied to the special departments of philosophical science. The theory of cognition, ethics, æsthetics, the philosophy of religion have all been treated of by Hartmann in the last two decades in voluminous works, and often repeatedly elaborated. In addition thereto, come several volumes of essays in which the philosopher has had something to say upon every conceivable topic, political, literary, æsthetical, pedagogical, and politico-economical. Hartmann's fecundity is only surpassed by his volubility. In him appears anew that union of philosophy and journalism that had remained disunited since the close of the period

of illumination. The utility, nay the necessity, of this combination, with which, unfortunately, the academical philosophy of the passing century would have naught to do, Hartmann knew the value of, and skilfully exhibited his appreciation; though one often wishes that its popular character had, in places, been made to do service in behalf of different ideas.

The writings of no other philosopher have obtained so wide a circulation as those of Hartmann. His chief work, "The Philosophy of the Unconscious," first published in 1870, has long since been put in stereotype form, and from time to time passes through repeated new editions. Also his numerous other writings have for the greater part been repeatedly republished. We possess a collection entitled "Select Works," and have just received a "Popular Edition." And it is moreover generally known that it has only been since the appearance of the Philosophy of the Unconscious, that the sale of the writings of Schopenhauer has assumed great proportions. Through the mediation of Hartmann Schopenhauer's fundamental ideas first reached the general public.

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The philosophy of Lotze lacked an interpreter of like versatility and fecundity, although it had need of such a one in a much higher degree. Both thinkers were masters of the philosophical style. But Lotze's symmetrically rounded and intricate periods, with their inexhaustible influx of incident relations, makes very different demands upon the patient resignation of the reader than the lightly moving, epigrammatically pointed style of Schopenhauer. Lotze for this reason never really became popular. His influence has remained rather a scholastic and academic one. It has been fruitful in high degree in its effect on the special departments of philosophical science, particularly on psychology, whose present representatives in Germany almost without exception received from him incitation and a solid scientific view-point. Not unimportant, too, is his influence upon academic instruction in philosophy, through the "Dictations" to his lectures, published after his death, which are in every student's hands and serve in many ways as a substitute for the study of his principal work. Lotze's authority, finally, stands like a rock with

all whose great concern it is to find ways of reconciling the claims of theology and of religious belief with the present state of science.

And their number is by no means inconsiderable. Official Germany has become pious, or, at least, would like to appear so; and although this is not to be understood exactly in the sense of especial dogmatic zeal, yet people adhere nevertheless with a certain tenacity to the religious background of the prevailing world-conception. Abroad it is the custom to regard the Germans upon the whole as a nation of atheists, because they have produced several curious fellows like Strauss and Feuerbach, enjoy having a good time on Sunday, and drink plentifully. Nothing can be more erroneous than this opinion. The average German has long since learned to place implicit confidence in the declaration of his teachers, that the great critical liberal movement of the later Hegelian school is not to be seriously taken but to be looked upon merely as the outcome of a "pathologically over-excited" epoch. Nowhere in the great civilised countries has freethought practically found so little footing; nowhere is its dependence upon the central powers of government greater; nowhere is it more impossible to wrest even a tittle from the authority of the old system of education with its foundation laid in the theological world-theory.

This condition of things, the obstinacy, the timidity with which state and public opinion hold fast to religion,—and now in times of imminent social danger more so than ever,—must be borne in mind if we wish to understand the comparatively great success that the philosophy of Schopenhauer and Hartmann has had in Germany. In the support of these two systems the philosophical opposition of freethought has simply found expression—the opposition that has arisen against the official philosophy, of which it cannot exactly be said that it theologises, but which carefully avoids coming into conflict with theology, and does not, in its aristocratic academic exclusion, endeavor to influence more extended circles. The factor that made this philosophy of opposition accord with the spirit of the times—its proximity, namely, to the scientific world-theory—has already been emphasised; and the fact that its pessimistic coloring has not been changed by its connection therewith will be found intelligible

when we consider the turn that pessimism took in the hands of Hartmann. Only the quietistic Buddhism that Schopenhauer taught, could, in an age of the highest expansion and display of power both at home and abroad, appear as an incomprehensible riddle of the national mind. The evolutionistic pessimism of Hartmann, however, which demands of the individual complete and resigned submission to the struggle for existence, although it is able to offer him in the remotest background of time no better outlook than the ultimate annihilation of existence itself—is in its immediate practical commands too closely akin to an optimistic conception not to satisfy fully the needs of life, and is again too analogous to certain cosmological prophecies of natural science not to pass as the metaphysical expression of a truth otherwise accredited.

As opposed to this state of things Neo-Kantianism or the Critical Philosophy in its various forms has taken no firm position; no more than its master Kant himself did. To a great extent it makes use of the limitations of knowledge that have been critically determined, in order to leave open behind the same a realm of transcendent possibilities in which religion may lead a passably secured existence. Behind the greatest critical acumen theological prejudice is only too often concealed.

Few only of the intellectually eminent representatives of this movement like Alois Riehl and Ernst Laas exhibit in this respect perfect determination and the consciousness that the consequences of modern science unavoidably demand the laying aside of current religious conceptions and the substitution for them of more correct ones. Laas especially, in many passages of his principal work (Idealism and Positivism), as also in his readable little treatise *Kant's Stellung im Conflicte zwischen Glauben und Wissen*,* has emphasised strongly the view that there can be ideals only for the man who acts, and that so-called ideals where mingled with the function of pure cognition only falsify reality and lead to irresolvable conflicts. And Laas likewise belongs to the few who have laid

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* *Kant's Position in the Struggle between Faith and Knowledge.*

prominent stress upon the educational task of modern philosophy as a substitute for systems of religious ideas.

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From the point of view of different systematic hypotheses, but substantially with exactly the same tendencies, analogous ideas find representation in EUGEN DÜHRING, who in versatility of talent and literary activity is perhaps to be placed directly by the side of Lotze and Hartmann, though the favor in which his works stand and the circulation they have obtained fall far below the position of the latter. He presents a different form of positivistic philosophy in Germany, a philosophy not preponderantly critical but constructive, and begins with what Ludwig Feuerbach about the middle of this century in his Principles of a Philosophy of the Future (*Grundsätze einer Philosophie der Zukunft*) once propounded as programme. His chief work, *Cursus der Philosophie als strengwissenschaftlicher Weltanschauung und Lebensgestaltung* (Course of Philosophy as Exact-Scientific World-Conception and Conduct of Life), and the treatise against pessimism entitled *Der Werth des Lebens* (The Value of Life) sketch a world-picture that is intended theoretically to be but the simple conceptual interpretation of the present contents of experience, and therefore rejects the metaphysical constructions of Lotze, as well as the new conceptual mythology of Hartmann, and criticistic doubts concerning the objective reality of the world given in consciousness. In the practical direction, as an offset to the world-throe of humanity, the gladdening power of a life and action based on universal sympathy is emphasised. Dühring is a unique, but isolated phenomenon; standing, like Schopenhauer once did, in sullen antagonism towards the official academic philosophy, and totally ignored by it; unable by virtue of the conditions already delineated to influence wider circles, which the unanimated rigidity of his manner of presentation does not contribute to make easy. Eminent mental endowment and extensive knowledge are perhaps displayed in a higher degree in his historical works (*Kritische Geschichte der Allgemeinen Principien der Mechanik*;*

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* *Critical History of the General Principles of Mechanics.*

Kritische Geschichte der Philosophie; Kritische Geschichte der Nationalökonomie und des Socialismus*†) than in his systematic treatises.

Nevertheless, Dühring can at the farthest be regarded only as one of the forerunners of that Messiah that is destined for German philosophy and German intellectual culture perhaps in the coming century; of that man who shall be able to cast up the accounts of the work of the present period, with its infinite analyses, its historical comparative character, and its pyramidal yield of material, and to condense that which now everywhere surges about us like a spiritual ether, but nowhere palpable or tangible, into the unity of a system that shall point out the paths to be followed and shall dominate all minds.

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There are many,—and among them eminent investigators and estimable scholars,—who smile at this prophecy as an Utopian dream; nay, almost stand in dread of such hopes, as perilous to science. The day of systems, say they, is past. Philosophy, too,—perhaps it were more proper to say "mental science,"—is breaking up into a number of special sciences, over which it is sought to place a general science of knowledge or theory of science, as the last representative of that which was once called philosophy and was recognised as the queen of the sciences.

As intimated, I do not know whether the impulse toward unity that inheres in the human mind is to be so easily driven from the field; whether we shall be satisfied in the long run to behold that light that irradiates the universe, broken a hundred-fold by the prisms of the single sciences. But one thing is certain. The more irresolute they are in whom the science of the future places its confidence, the more actively will they press forward who hold that the precious treasure of truth has long since been granted unto man, and who would fain forge with this heritage of the past the fetters of the future. After the Catholic church under Pius IX. had hurled in the face of modern culture and science its frantic *Anathema sit*, it began

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* *Critical History of Philosophy.*

† *Critical History of Political Economy and Socialism.*

under his successor a much quieter, yet far more determined warfare. Like one of the famed lianas of the primeval tropical forests, it entwines the giant Science, to sap his best powers and slowly but surely to stifle his life. Whatever the modern mind with the help of freedom won by bitter struggles has gained in the knowledge of nature and of history, is twisted and turned, falsified and misinterpreted by hundreds and hundreds of busy hands until it has been fashioned to fit that ready-made scheme of things composed on the one hand of Catholic dogmatical teachings, and on the other of the Aristotelian-Thomistic philosophy. As many representatives as secular freethought can show, there will be found beside them to-day an ecclesiastical *advocatus diaboli* who will neither rest nor cease until of the hero has been made a wretch and mangy heresiarch.

Under protection of the principle of free inquiry, and with all the helps of science, a warfare of extermination is here carried on against all freedom of mind and all science, which is the more dangerous in proportion as the opponent loves to decorate himself with the borrowed plumes of science, and as he is able skilfully to mask his real designs. Catholicism is striving with untiring efforts to gain by the help of this reformed and modernised scholasticism, the mastery of the schools, of education, of the universities, and of the entire activity of science. And compared with the position of the representatives of modern thought it has decidedly the advantage. Not only is it in the possession of a unitary world-theory, but it defends that theory with most determined vigor and heedlessness against all differing views. The representatives of modern science, on the contrary, are not so fortunate as to possess inherited truth and infallible authority, and they not only have to contend with the formidable internal difficulties that stand in the way of a unitary formulation of their conception of the world, but frequently even avoid entering on this task with determination in order to make less prominent the contrast with the religio-theological system to which every exact scientific conception of the world must of necessity lead.

Against these aggressive endeavors of the theological mind, neither lofty indifference, nor calm historical contemplation, nor

mere literary warring will avail. The power of freethought must be displayed, and the positive work that it can do must be shown. Otherwise the time may come when the fame of rigid scientific thought and successful research in special fields will not exonerate German philosophy from the reproach of having left the nation in the lurch at a period of momentous spiritual crisis. To make useful the rich acquisitions of these labors toward the construction of a general theory of the world, remains, therefore, the serious task of the German philosophy of the future.

I shall be permitted, perhaps, in a future article to present an account of the literature of these special departments.

FRIEDRICH JODL.

II.

RECENT FRENCH PUBLICATIONS.

THE works that have appeared during the last three months belong to authors of different nationalities—Italian, Roumanian, Belgian, and I ought to add Russian ; but I shall not speak on this occasion of the important work of Sergneyeff, *Physiologie de la Veille et du Sommeil.*

It is, as you see, a gathering of good company, on French soil.*

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The only French work to be mentioned is that of M. Ch. Adam, *Philosophie de François Bacon*, a memoir presented in the prize competition of which M. Barthélemy Saint-Hilaire was the reporter and preferred by the Academy of Moral and Political sciences.

M. Ch. Adam is already known by several works relating to the history of philosophy. The study which he now gives to the public is conscientious ; we must commend his erudition and the moderation he has displayed both in his praise and in his criticism. I am not sure, however, if he is right in asserting that the fame of Bacon will increase and diminish alternately, according to whether patient analyses or daring hypotheses find the more favor in the scientific world. I have known many a savant, profoundly metaphysical and imaginative, who, in admiring Bacon, delusively believed himself in the possession of a solid safeguard against metaphysics. There is more chance, to my mind, of finding the admirers of the Chancellor among pure philosophers than among men of science. This is why I subscribe completely to the judgment of M. Ch. Adam, when he subordinates Bacon to Descartes and to Galileo. Especially should he be put below Galileo, who was the great initiator of modern science, at least the first to add a link to the chain of human science then being forged ; one, I might say,

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* All these works are published by Alcan.

who by his solid contributions really founded physical science, as chemistry was founded by Lavoisier and his contemporaries a century and a half later.

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The Roumanian writer is M. Basile Conta, whose unfinished work, *Les Fondements de la Métaphysique*, has been translated by M. Tescanu. M. Conta died in the heyday of his powers. Born in 1845, he was successively, from 1875 to 1881, professor of jurisprudence at the University of Jassy, deputy, and minister of public instruction. The author and his works have, therefore, serious claims to our attention. Nevertheless, I can hardly believe that M. Conta always kept in the path in which he started, for if he had, it would have led him to considerable results.

M. Conta held that every combination of ideas, that is to say every ultimate generalisation, is essentially mobile, alterable in character, and that there will never be any final, definitive philosophical system. Subject to the benefit of this wise reserve, he undertook, nevertheless, to frame a "materialist" metaphysic, founded like the positive sciences on induction, and he attempted to rise to a general system, from which it appeared to him that the ancient notions of the soul, of freedom, and of God could not be legitimately excluded.

According to my mind, the defect of his method was the allowing too much to reasoning, the too great desire to create reality by simple logic. Unfortunately, the intellectual necessity that he proclaimed, of reducing all to unity, does not carry with it the means of properly making this reduction by a subtle operation of the mind. In order to advance towards his end, M. Conta found himself led to formulate a compendious sketch of a theory of cognition, a psychology, and a logic, at the risk of sinking at times in the quicksands of a treacherous discussion. As a matter of fact, metaphysics, spiritualism, and materialism, are conceptions of great vagueness, and the problem to reconcile them by any fashion of union, is rather like inquiring how many ways there are of placing three persons at table, or even a greater number.

This is not said by way of disputing the merits of a writer

whose loss is justly regretted, or to discourage the reading of a book in which many will find much to accept.

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The Belgian author is M. Albert Bonjean, a barrister of Verviers. His book, *L'Hypnotisme, ses Rapports avec le Droit et la Thérapeutique, la Suggestion Mentale*, affects too much the style of an address before a court in which the orator wishes to exhibit wit and acumen. Nevertheless, it is written with clearness, is agreeable to read, and the verbal nicety sought does not impair its good sense.

M. Bonjean has developed the three following theses: First, that the action of magnetism is not explained by the hypothesis of a fluid, that we cannot speak with M. Ochorowicz, of "a certain tonic vibratory movement which propagates itself outward from the periphery of the body," but that it is explainable by simple suggestion; second, that the power of suggestion is almost unlimited; and third, that though verbal suggestion is incontestable, mental suggestion remains doubtful until proof to the contrary.

M. Bonjean thus sides with MM. Ochorowicz and Delbœuf, and the whole school of Nancy, against that of the Salpêtrière. He endeavors especially to show the serious consequences, in criminal and civil affairs, of immoral suggestions, the dangers of which he reproaches M. Gilles de la Tourette with having concealed far too much. His personal conviction does not rest itself solely on the expositions of others, but on experiments which seem to have been conducted with prudence.

Extraordinary as this almost passive obedience of a subject to the suggestion of an act which is repugnant to his moral tendencies appears, we come in a position, it seems to me, to comprehend it by the observation of the degenerate patients of our asylums in their various manias. The dipsomaniac resists with all his power the impulse to drink, and the kleptomaniac the impulse to steal; they fight against it even to agony, but they end always by yielding to it. "It was stronger than I"; such is the formula that we have noted most often in the answers of these unfortunates. And remark, that the dipsomaniac does not drink for pleasure, but by compulsion, be the beverage what it may, water, urine, or petroleum; just as the

kleptomaniac does not steal with a view to enjoying the product of his theft, which he ordinarily abandons or restores, but steals to deliver himself from agonising torture. In this manner also the onomatomaniac acts, who is seeking a word, and who rises at night to consult the dictionary, etc. The hypnotised subject is in the same predicament, whatever pathological difference there may be between the two; his personality has momentarily sunk in hypnosis, as does that of an insane person during the attack of insanity; his moral resistance must finally yield, and it is not at all remarkable that it does.

The volume of M. Bonjean ends with an interesting discussion of the celebrated case of Lully. The deceit that gave rise to belief in suggestion without words or gestures appears to be established; the subject reads from the lips of his magnetiser.

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Let us turn to the fine work of M. R. Garofalo, *La Criminologie, Etude sur la Nature du Crime et la Théorie de la Penalité.* M. Garofalo has himself translated his work from the Italian; this second edition is entirely recast.

The Italians have always had a taste for juridical studies. Their school of criminologists has placed itself at the head of the movement which ought to result in the reform of all criminal codes. Two principal tendencies are predominant in the works of this school: the physicians and anthropologists, for example M. Lombroso, have conformably to their mental tendencies, particularly studied the *criminal*, of whom they have endeavored to fix the type; the jurists, like M. Garofalo, vice-president of the civil tribunal of Naples, consider by preference the *crime*, which they determine by reference to our social organisation. M. Garofalo shows himself at once an innovator, in that he endeavors to give a positive definition of crime, to take the place of the vague and incomplete definition which was accepted by the old jurists, and conforming to which anthropologists have thought themselves able to mark the characteristics of the criminal man. That definition has relation to the average morality of the societies of to-day; crime or criminal offence is to be sought, according to him, only in the violation of altruistic sentiments ac-

quired and consolidated in the average social individual—compassion and probity. New categories ought then to be established ; that of "revolutionists," for example, with whom the offence does not proclaim moral monstrosity.

The violation of altruistic sentiments certainly reveals in the offender a grave anomaly ; it marks him as not adapted to the conditions of society, and even incapable of adapting himself to them, in consequence of psychical and physiological irregularities. The principle, then, is correct, although M. Garofalo has based it on an analysis of sentiments which appears to me insufficient. The sympathetic emotions which compassion embraces, are not the only source of our moral activity ; probity arises in part from intelligence, and the logical sense intervenes to give the form of justice or injustice to an act of passion. Now, feebleness of judgment becomes, incidentally, an important element of the diagnosis of the criminal. Let us agree, nevertheless, that the absence of compassion and of probity upon the whole makes up the "natural crime." This suffices surely in practice.

On the other hand, it is not convenient, and it is unquestionably not indispensable, to make a difference between an anomaly "in relation to a superior civilised type," and an anomaly "in relation to the human type itself." Here is the criterion that M. Garofalo—prepossessed as he is to take away from born criminals the benefit, too easily obtained, of disease—proposes to us, in order to distinguish from the anomaly truly morbid, an anomaly not pathological, but which depends in some way on the cerebral organisation. Subtle is this distinction which he opposes to the opinion of French alienists, according to whom the immoral are always more or less physically degenerated. I will confine myself to recalling on this point a remark of Dr. Magnan. Very often, said this eminent clinician one day to me, a father of poor moral stability but otherwise healthy of body, has a son well balanced in his moral and intellectual tendencies but already on the way to degeneracy. The anatomical anomaly invoked by M. Garofalo would be then not far from the physiological anomaly ; functional disturbance of the higher faculties is not alone concerned. Fundamentally, this

is of little moment to the practical conclusions of his system, which we must rapidly indicate. With regard to the repression of crime, and as to a large category of criminals, the social point of view necessarily dominates the medical point of view.

M. Garofalo inquires what the power of education and of the increase of well-being is in diminishing crime. He has found them extremely weak. Severity of repression alone appears of some efficacy; indulgence augments crime. For the sake of social selection, the criminal ought to be eliminated, by capital punishment, perpetual banishment, etc., according as the case demands. Temporary imprisonment has no place in this system. Finally, the only criterion of penality is lack of adaptability to social life; this criterion will replace the false principles of "moral responsibility" and "proportionment of the punishment to the crime." It is too apparent that the prevailing penal theory and the jurisprudence in agreement with it, seem to tend to protect the criminal against society, rather than society against the criminal. And what absurdities besides! The attempt is less severely treated than the consummated offence; preparatory acts are *never* punished, the attempt at a crime is *always* punished.

The criterion of penality once accepted, it is necessary to find the indices of this lack of fitness, of the impossibility of adaptation to social life, which justifies repression. M. Garofalo seeks them no longer in "premeditation," but he finds them in the motive of the crime and in the way in which it has been prepared or perpetrated. We cannot follow him into the details of this discussion, which presents the highest interest. Our exceptions would turn on the interpretation of certain features; they do not bear on the general principles of this great and solid work.

Lucien Arréat.

BOOK REVIEWS.

THE PRINCIPLES OF PSYCHOLOGY. By *William James*, Professor of Psychology in Harvard University. In two volumes. New York: Henry Holt & Co., American Science Series. Advanced Course.

In the present status of psychological science every attempt to gather the diversified facts and views and present them in a single, though extensive work, cannot but be scrutinised with great care and interest; and when this work comes from the pen of one who has gained so wide and appreciative a circle of readers, the interest becomes deeper and more personal.

It was, perhaps, the professor of mental science, struggling for years with text-books, inadequate, or antiquated, or narrow, or unscientific, or dry, or unpedagogic, who most anxiously awaited the appearance of Professor James's volumes; and his expectation was the more warranted, as the work was announced in a series of text-books deservedly successful and popular. To such a one, the work itself does not come to fill the place of a text-book; not alone the great length (1,400 pages), but the general supposition of knowledge on the part of the reader which it is the object of college courses to supply, together with the selection of topics and the peculiar division of space amongst them, limit the work to students of a much more advanced type than (unfortunately, perhaps) American education as yet supplies. But while our professor must still patiently hope for some work that will present in brief and convenient form the main facts of Psychology, he will find his task made easier and more interesting by these welcome volumes. He will find in them an original and frequently brilliant treatment of many of the deepest problems of modern Psychology: and it is as a contribution to science and as an aid to the professional student that a discussion of their contents and tenets will be pertinent in these pages.

To begin with, the attitude of the author to his subject is that of a professional scientist to his specialty. "I have kept close," he says, "to the point of view of "natural science throughout the book. Every natural science assumes certain "data uncritically, and declines to challenge the elements between which its own "'laws' obtain, and from which its own deductions are carried on. . . . This "book, assuming that thoughts and feelings exist, and are vehicles of knowledge, "thereupon contends that Psychology, when she has ascertained the empirical

"correlation of the various sorts of thought or feeling with definite conditions of "the brain, can go no farther—can go no farther that is as a natural science. If "she goes farther she becomes metaphysical."

This position does not carry with it the condemnation of all matters metaphysical, but simply excludes them from Psychology; nor does this independence place Psychology in a position unrelated to other sciences. Such relation is a cardinal fact in the mental world, and nowhere is it more necessary to bear in mind that the division of the sciences is largely an expression of the lines of men's interests and the inevitable specialisation of knowledge. Those forms of adaptations of means to ends which we study as forms of psychic action, while theoretically distinguishable from other modes of action, in fact, often resemble them; in other words, "the boundary line of the mental faculty is certainly vague. It is better not to be pedantic, but to let the science be as vague as the subject," and include all facts, whether they are usually called physiological, or biological, or not, that shed light on the main problems dealt with.

This conception accordingly views mind as distinctly related to and an essential part of its environment; it views mental phenomena as infinitely varied, as most intricately conditioned by and in turn conditioning other natural phenomena. For the complete survey of its domain, it calls upon experiment, observation, introspection, comparison, analysis, hypothesis, deduction, each properly controlled by the others, and limited by community of purpose to a firm foundation of fact.

It is true that in the more intricate problems, those with the smallest connection with sensation and the largest with inference and analysis, the author will be regarded as more metaphysical than psychological and plainly admits his fault; it is true that the personal leanings of the author lead him to lengthy discussions of these more intricate points, but none the less the positive, broad, and evolutionary spirit that dominates the general view of the subject leaves a clear impress of vitality, progress, and interest on every page.

Passing from point of view and purpose to content we do not look for and do not find any 'closed system,' but "a mass of descriptive details" in the selection of which personal interest has been the controlling factor. The articles which Professor James has written from time to time in the periodicals appear, sometimes a little remodelled, in the larger work; each chapter is thus largely an independent essay upon the topic printed at the head of it. On the physiological side we have an admirable chapter on the functions of the brain, but elsewhere the student is referred to other works for the physiological points involved.

Following this is an excellent essay on Habit and Automatism, whereupon without further ceremony the reader is invited to a somewhat speculative series of chapters upon 'Mind Stuff,' 'Knowledge and Reality,' and the like, and may resume the more concrete chapters on Attention, Conception, Discrimination and Comparison, Association, only after struggling with the complex picture of 'the

Stream of Thought,' 'the Consciousness of Self,' and 'the Snares of Psychology.' Each of these chapters presents a distinct problem, presents it well and positively, and contributes much that is original to the discussion.

In all this there is strongly emphasised the subjective contribution to Psychology,—the value of a discerning and critical introspection and the importance of the subject in all processes of sense, judgment, attention, association, and the like. The mind is not a passive receptacle of experiences, but is continually active, making and shaping, seizing and transforming, absorbing and assimilating the stimuli of its environment.

A second series of topics take up the perception of those general concepts, Time, 'Things,' Space, Reality, and Form, the largest and heaviest chapters in the work, amongst which, as if to whet the appetite, are distributed more concrete pages dealing with Memory, Sensation, and Imagination. The former devote much space to criticism, and would, perhaps, border upon the metaphysics that was to have been avoided, were it not that they spring from considerations much more concrete and provable; the latter group of chapters are amongst the most interesting of the volume, and though treating but a small and somewhat arbitrarily selected portion of each of the topics, treat them in a suggestive and inspiring way. Discerning and ingenious sketches of single mental traits and processes, happy illustrations, suggestive side issues make these pages a striking contrast to the usual text-book tone, and will attract students of all shades and grades of agreement or disagreement with the author's views.

The remaining chapters deal with Reasoning, Movement, Instinct, Emotions, Will, Hypnotism, Necessary Truths; in addition to the characteristics already indicated, we find here a wise use of the facts of Morbid Psychology, of the inferences from the abnormal to the normal. This naturally stands out prominently in the discussion of Hypnotism—so recent and yet so essential a department of mental science.

When we close the cover of the second volume we do so with the feeling that our mental horizon has been enlarged, our interests have been quickened, our attention has been held, our time agreeably spent,—and yet the result of all this reading seems intangible, diffuse, scattered, unsatisfactory. The scholar and the professor always retain the student feeling and the student habit of thought; and what is unpedagogic for the one is uneconomical for the other. A logical order of exposition, a unifying grouping of topics, a just perspective of details, a painstaking selection of facts, constitute much to convert useless knowledge into useful science; such works contain a large element of drudgery, must be impersonal in one sense of the term, and yet are not inconsistent with a high degree of originality, but it is such works that are enormously helpful, that form landmarks by which progress is measured and retained. These useful qualities we miss in Professor James's work. True, it does not pretend to possess them, but psychological text-books are not written every day, and when so influential a one appears, the wish that its

utility shall reach a maximum demands expression. Finally, it is a work destined to be much quoted, to arouse considerable discussion, to excite quite different opinions from different critics, and so, every one interested in modern Psychology will find it necessary and profitable to learn at first hand this important American contribution to the science of Psychology. J. J.

THE SCIENCE OF THOUGHT. By *Charles Carroll Everett, D. D.* Boston: De Wolfe Fiske & Co. Revised edition.

An excellent manual of that which is accepted as logic. The author is a disciple of Hegel, and throughout conforms his treatment of the topic to the lines laid down by his master, although in various connections where these lines permit, the author contributes from his own resources, and from other masters, much needed supplementary matter.

The appearance of late of so many essays, manuals, and treatises professing to deal with logic and its affiliated topics is quite noteworthy, and is the manifestation of a need that has become, not merely a crying, but an absolutely groaning one. It is scarcely a metaphor to say that to-day the intellectual world is in great travail over its need of an organon. We are crying unto our logical desire from the depths of our souls and waiting for it as they that wait for the morning. This intensity of our want makes us intolerant of the old incompetences and sets us to fault-finding in the hope of better insight when the current obscurities shall have been dissipated. We scan each effort as it appears, and as it discovers no even single clear organic general principle around which the wealth of knowledge now ascertained can set in order we lay it aside with a feeling of being merely tantalised. We cannot but assimilate our condition to that of the Haunted Man in Bret Harte's clever travesty of Dickens: "'Here again?' said the Haunted Man. "'Here again,' assented the phantom, in a low tone. 'Another novel?' 'Another "novel.' 'The old story?' 'The old story.' 'It won't do, Charles! It won't "do!' and the Haunted Man buried his head in his hands and groaned."

When the singular difficulties of the search are considered, all this is, no doubt, void of that sweet reasonableness that should obtain. Still the interests of progress are too supreme to permit any compromise with error or incompetence.

So, although the excellent manual under notice makes no pretensions that are unwarrantable, according to the customs usually observed in such cases, it yet affords salient features, apt as texts for a course of comment that applies, not merely to the doctrine and treatment adopted in it but to the doctrine and methods of the accepted logic-books in general.

The book is entitled, "The Science of Thought." This exposes an incompetent comprehension of the topic. The Science of Thought should be a mere branch of psychology. In logic, we of course, have an almost prime need of information concerning the anatomy and physiology of thought. But this is not the peculiar motive of logic. The *raison d'être* of logic is not the *general* economy of thought,

but the phenomena of *untrue*, *incompetent*, or *fallacious* thought, or, in other words, *erroneous thought*. Did but the mind of man always supply him with true and competent thoughts he would find no need of seeking logical criteria, however much he might be interested in the phenomenology of thought in general.

Man being, however, what he is, informed by a mind, prone to error, and he, in consequence, frequently subjected to evils and misses that better information would have enabled him to avoid or mitigate, he naturally seeks to solve the causes of his errors, and to discover means of testing the worth of his thoughts and of deriving thoughts that are true and competent. This search is the study of logic; the true information relevant thereto is logic, and no other device of man ought to trespass upon the name. Using for this turn the word truth in a broader sense than usual, so as to include the sense of competence, we may say that Logic is the Science of Truth and Untruth in Thought,—take notice, *in thought*—for we are supposing that there neither is, nor can be, any other or further *means* of becoming aware of aught of the nature or features, of aught that is pure alternate to mind, than thought merely, and that, therefore, truth and untruth in thought exhausts all the proper possibilities of truth and untruth.

Following Hegel, and concurring with so many others, our author starts with Being as the proper primordial universal notion. Is this not taking note merely of the comprehensive meaning of thought, in ignorance of its denominate meaning? Prior, at least logically, to Being, Form, Mode, Limit, Relation, and the like, must there not be posited or supposed somewhat to *be*, to *be formed*, to *be modulated*, to *be limited*, to *be related*, etc? Must not Quality be quality *of* somewhat, and Quantity, quantity *of* somewhat? So it seems to us and we therefore posit Ground as primordial in thought. Ground as intended here is not the same as the Absolute Being of Hegel. It is in general independent of the notions either of existence or reality, being in general that of which aught is predicative either in discourse or thought. It is pure logical denomination free of all logical comprehension. The imaginary number and the ideal number of mathematics are each just as truly grounds according to this intent as is a house or a tree.

Ground is the seat or basis of Being, Mind, Form, Mode, Limitation, Relation, etc. Behind any momented thought, say Sun shines, Mind thinks, or It is, lies, it may be latent, but all potential, the mere thought stripped of all comprehension: Sun, Mind, or It. It is wholly irrelevant that a ground is manifest only by means of its comprehension if it be true that it *must* be supposed as the seat of that comprehension. Undistributed and therefore unrelated or absolute ground from its very nature admits of no other predicate than mere being. It is in general at once the All and Existence. Its negative or Naught has no ground, being, or comprehension whatever, and no proper denomination, its name being only quasi-denominative and for convenience of notation merely. Form or Thought breaks this barren universe of mere Ground and Being by the formation of modes of Ground and by the more or less arbitrary fiats and finds of Limitation.

By the formation of Mode emerge Form, Time, and Extent, and perhaps Cause and Aim. By Limitation emerge Part and Whole, Number, and Relation in all their manifold involutions. Attribute being only *degraded* Relation, and Quantity being only one *power* of Relation.

It is a most notable peculiarity of thought that it has the ability and that it is its custom to take any form or phase of Being, and regard and deal with it as a ground.

Hence every momented thought (which in effect embraces every thought properly speaking) makes two distinct references, its ground reference and its being or predicate reference. This seems to be the bottom truth in respect to the much vexed topic of extension and comprehension. There would seem to be, therefore, in reality only two ultimate categories, Ground and Being.

As to how the categories, usually taken as such, and their complements, should be distributed between Ground and Being, would seem to be a matter requiring much pondering to arrange. Owing to the double quality of so many of the mental alternates, as in one regard Being and in another regard Ground, much difficulty might well be anticipated.

Neglecting this distribution we may say that very universal terms of thought are Ground, Being, Form, Mode, Limit, Number, Part, Relation, Epoch, Place, Alteration, Event, Cause, Effect, Aim, and the like.

The cardinal mental activities which *produce* thought seem to be, in order, Attention, Conception, Recognition, Induction, and Deduction. In all these operations there is opportunity for not only true, but erroneous thought, and logic in its office as the inspector and judge of thought in respect of its truth or error, should study all these operations and those which are subsidiary to them, and ascertain the causes of error and the means of truth, and perfect methods of deriving truth with certainty and ease.

It is very presumptuous and hazardous to essay a definition of truth, yet since such a definition is a great desideratum, and since it will not be effected except by earnest trial, and since also, in such a matter, even failures that are consequent on devoted attempts are instructive to subsequent attempts, we venture our submission :

A thought is true which while representing its applicate (that is whatever to which it is directly applied) also, in so far as its purport implies, represents in mind a thorough and respective parity and ratio, through which each thought-analyton and thought-syntheton (whether ground, mode, limit, number, part, relation, etc.) corresponds to its proper applicate-analyton or applicate-syntheton. Truth is this representative and correspondent parity and ratio in general. A thought may be true and yet incompetent, that is unfit to serve some assigned purpose or turn in view, by reason, it may be, of its irrelevancy, or it may be of its restricted application or purport. It is a question that has been much mooted whether or not our sensations are true to their mind-alternate excitants. The ar-

gument towards showing that they are would be prolix and must be passed. If however they are not true it would be interesting to hear by what quality or nature they are to be characterised in respect to their verity.

Attention is a mental activity of considerable importance in logic in connection with that very fruitful source of error, mal-observation. But by far the most important mental activity to be studied and thoroughly known for the behests of logic is Conception, with its all important adjunct of denomination. The verity or error of all other mental operations that generate thought depends largely on the truth or untruth, the competence or incompetence of Conception. On our conceptions as a basis is erected and must ever be erected every scheme of our notation, and in so far as our conceptions are untrue or incompetent, so probably is, and so will be, in perhaps a multiple measure, all our knowledge. Very much more ought to be said in this connection, but space will not permit.

The mental operation which is here called Recognition, but which has been called hypothesis and otherwise, and which the author reviewed calls Identification, has not received the attention from logicians in general which its importance requires. It is a true variety of inference, as Mr. C. S. Peirce has fully shown. Our conceptions which are the central facts of logic would be of little value to us were we not able truly to subsume our perceptions under them. A variety of facts are available to show how very often we do this wrongly, imperfectly, or not at all.

Induction, and its rationale, depends also very largely upon conception and its intimate consequences, denomination, attribution, and relationising. Deduction and the Syllogism are trite themes, although the part that attribution plays in the process has been insufficiently noticed, and although the rules of deduction from relation-terms, the most important and fruitful of all, are as yet very partially ascertained. What is needed as an indispensable prerequisite to this last, seems to be a census and classification of the manifold relations that are known, after the model of say Roget's Thesaurus, and then a determination of the consequences of such combinations and constructions as are admissible and fruitful, and a tabulation of the same as our multiplication table is a tabulation of the consequences of the multiplication of numbers. The Logic of Relatives as it is called suffers from its having been formed thus far on so very abstract and formal a plan that its formation lacks the check and correction of frequent comparison with concrete knowledge, while its results are almost if not quite useless owing to their extreme generality, which in defect of the mediate formula leaves them inapplicable to aught that can manifest their utility or power. F. C. R.

THE TIME-RELATIONS OF MENTAL PHENOMENA. By *Joseph Jastrow*. New York: N. D. C. Hodges.

The accomplished Professor of Psychology at the University of Wisconsin gives in this publication, which forms one of the series of "Facts and Theory Papers" issued by Mr. Hodges, the results of numerous observations by Cattell.

Münsterberg and other observers. His object is to present a general view of what has been done already in this department of research. The study of the time-relations of mental phenomena is of importance in various connections. As Professor Jastrow remarks:

"It serves as an index of mental complexity, giving the sanction of objective "demonstration to the results of subjective observation; it indicates a mode of "analysis of the simpler mental acts, as well as the relation of these laboratory pro-"ducts to the processes of daily life; it demonstrates the close interrelation of "psychological with physiological facts, an analysis of the former being indispens-"able to the right comprehension of the latter; it suggests means of lightening and "shortening mental operations, and thus offers a mode of improving educational "methods; and it promises in various directions to deepen and widen our knowl-"edge of those processes by the complication and elaboration of which our mental "life is so wonderfully built up."

The results of the observations referred to by Professor Jastrow are given in Tables of Simple Reaction Times and of Complex Reaction Times. One of the most important points considered is "the overlapping of mental processes," as to which Cattell made a special study. From the fact that the time needed for the performance of complete operations, as multiplying numbers and reciting a verse or two at the same time, is shorter than the sum of the times required to do each separately, it is inferred that the mind should be likened not "to a point at which but a single object can impinge at one time, but rather to a surface of variable extension." Moreover, "the performance of a complex and extended mental task is not the same thing as the separate performance of the several elements into which that task may be analysed." The addition of a classified Bibliography adds much to the value of Professor Jastrow's interesting little work. Ω.

On Sameness and Identity. By *George Stuart Fullerton*. Philadelphia: University of Pennsylvania Press.

Mr. Fullerton's psychological study is the first of a series of contributions to Philosophy to be issued by the University of Pennsylvania. It is truly entitled a "contribution to the foundations of a Theory of Knowledge," and is an attempt to arrive at an accurate conclusion as to the several senses in which the word *same* is used; with an historical and critical statement of the use of the word in a wrong sense. Mr. Fullerton finds that *same* has seven different meanings according to the mode in which it is applied. In the first case it has the sense of *identity*, and in the second that of *similarity*. Thirdly, the "external" bundle of qualities may be regarded as being the same at two different times, while in a fourth sense, two "external" things, or "external" qualities, existing at one time, may be called the same to mark similarity. Again, an "external" thing or an "external" quality may be called the *same* with its external representative, as the identification of a thing with its reflection in a mirror. This is the fifth sense; the sixth is where the

same "external" object is said to be perceived by different persons. Finally, an "external" thing may be said to be the same "with its representative in consciousness or with the substance or noumenon assumed to underlie it."

On searching for the reason why such various experiences are expressed by the use of one word, Mr. Fullerton discovers that the common notion which unites them is the idea of similarity. But how can we speak of similarity when strictly only one thing is in question? The answer given is that we have "a series of experiences, beginning with one in which two objects are recognised as similar and yet are very clearly distinguished as two objects, continued in others in which the sense of duality falls more and more into the background, and ending in one in which there is no consciousness of duality at all." The last of these experiences is not wholly different from the others. It differs from them "not in the element which has led us to declare two objects similar—the element which they have in common—but in that which has led us to declare them two and different. It is by adding to this last experience, so to speak, that we get the others. They contain it and more." The experience in which two things are not distinguished, is at the bottom of all our experiences of similarity. The use of the expression "X is X," then, emphasises the fact that one is not to pass from X to any Y or Z, and it, moreover, puts a period to one's thinking, and fixes the thought upon X alone. When the words "identity" and "sameness" are intended to be used with some degree of precision, the former word indicates "sameness in which there is no consciousness of duality, or in which the consciousness of duality has fallen into the background and may easily be overlooked."

More than half of Mr. Fullerton's work is occupied by an historical and critical consideration of the use of the word *same* in a wrong sense, beginning with Heraclitus and coming down to Prof. W. K. Clifford. The examples he has given of that confusion of thought justifies the assertion of "the need of much greater care and exactitude than one commonly finds in metaphysical reasonings," and at the same time the hair-splitting for which Mr. Fullerton needlessly considers himself called on to plead guilty. Ω

Induction and Deduction. With other Essays. By *Constance C. W. Naden*. Edited by R. Lewins, M. D. London: Bickers & Son.

The chief of the essays comprised in this volume is an "historical and critical sketch of successive philosophical conceptions respecting the relations between inductive and deductive thought." It was awarded the Heslop Gold Medal as the best dissertation by a student of Mason College, Birmingham (England), in 1887, and Miss Naden was also rewarded for it by being made an Associate of the College, an honor she well deserved. The dissertation displays a wide knowledge of scientific facts with a rare capacity for dealing with them in a philosophical spirit, and a power of acute reasoning such as few other women have ever possessed. Whether her opinions are always correct is another question. It is a profound remark that

we are obliged to regard nature as a system, "because we can consider its multiplicity only in relation to one thinking subject." But we must challenge her statement that we have no certainty for assuming that the laws of nature will always remain unchanged. A change in the laws of nature would be the replacing of it by a different nature of which man could not take cognisance, and which therefore we cannot reasonably conceive to be possible. There might be a change of conditions which would introduce other laws, but these must be in conformity with, and not in opposition to, the present laws of nature, as otherwise they could not exist for us, seeing that "experience is possible in virtue of the original constitution of the mind," and therefore, according to the views of which Miss Naden is an exponent, they could not exist at all.

The most interesting of her essays are those which explain the system to which her editor Dr. Robert Lewins gives the name of Hylo-Idealism. This is described as the "brain theory of mind and matter," and it is so described because it asserts that every man is the maker of his own cosmos, all his perceptions having merely a subjective existence and being generated by the brain, "which focuses converging rays of sense from all parts of the body, and unites them into the white light of consciousness." It would be a mistake, however, to think that, according to this theory there is nothing outside of the percipient subject, that is, beyond man himself. The real existence of matter is not denied and, indeed, "so far from being a nonentity, matter is the *fons et origo* of all entities." Hylo-Idealism deals only with the relative, "ignoring the absolute as utterly beyond human *gnosis*." While asserting that "the only cosmos known to man, or in any way concerning him, is manufactured in his own brain-cells," it affirms the existence of another cosmos, the external universe of other systems. The mind does not however passively apprehend external objects, but actively constructs them. "We make the mountains, and the sea, and the sun himself; for sunshine is nothing if not visible, and if there were no eye and no brain, there could be no sunshine." The defect of this reasoning is that it makes man the only measure of all things. Because our senses are necessary to us to distinguish certain phenomena, it does not follow that the same phenomena cannot be distinguished under other conditions. The protozoa which have no organs of special sense are affected by the vibrations of light, sound, and probably smell, which would not be possible if those phenomena are "constructed" by the human mind.

The utmost that can be said with any show of reason is that the imaging in our consciousness of external objects does not give an actual representation of them. This is required by the theory of Hylo-Idealism, which goes still further, however, and declares that the universe does not exist as we know it. It seems to us that this view is not consistent with even the principles of Hylo-Idealism. Dr. Lewins specially points out that this system "in no sense denies the objective, but only contends for *identity* of object and subject, proved as it is by natural Realism itself, from the doctrine of *molecular metamorphosis*, which shows the Ego continually

undergoing transubstantiation with the 'Non-Ego,' and *vice versâ*, so far as to form *one* indivisible organism." He compares the Ego and the Non-Ego, that is, subject and object, or our bodies and the "external universe," to a porous vessel of ice, filled with water, immersed in an infinite ocean. "What is within and without, and the septum that seems to divide the two, are all three consubstantial or identical." If they are identical, however, they must perfectly respond to each other, which would not be the case if the object in the mind did not give a true representation of the objects in external nature. Otherwise the identity of subject and object can be predicated, on the condition only of abolishing the "external universe," and affirming of it, as Dr. Lewins affirms of the stars, "What you see is a vision, or organic function, of your own *sensifacient* organism."

We have not space to critically consider Miss Naden's essay on "Evolutionary Ethics," which is a valuable study in Sociology. She gives logical form to Mr. Herbert Spencer's quasi-utilitarian system in the words, "the *inclination* is always in the direction most pleasurable or least painful; the *results* of the action, if it be a moral one, are such as in the long run and on a large scale, must increase happiness; but the *object* of the action need not be connected in the mind of the actor with any thought of happiness, personal or general." The practical objection to this view of moral conduct is the reference to *personal* happiness. This should be excluded altogether as an actual motive of such conduct where self is the chief object concerned. Here duty or virtue should be the guiding principle, as it should be ultimately in all moral conduct. This indeed is really admitted when it is said that rational utilitarianism "aims, not straight at happiness, but at the essential conditions of happiness." The weak point in Mr. Spencer's system of ethics is the origin it assigns for the altruistic sentiment. This is based in sympathy, the germ of which, says our author, is to be found in the fact that the ideal or "representative" world possesses an emotional aspect and therefore "the thought of a fellow creature carries with it the thought of his feelings." This thought is not necessarily, however, accompanied with an active feeling of sympathy. It requires some other influence to give it external expression, and this must be sought in the activity of the sexual instinct. Traced to this source we can understand how the altruistic sentiment may become instinctive, giving rise through parental and fraternal affection, to the higher love of country and of race, which in time will also become instinctive.

In taking leave of Miss Naden's work, we must say that, much as we disagree with its Hylo-Idealistic views, it deserves to be read by all who are interested in the search for the key to the great problem of nature. Its examination of the logical system of Kant is slight, and it is not surprising, therefore, that the name of the great German philosopher is omitted from among the precursors of Darwin. Miss Naden is in error, too, in describing Haeckel as a pronounced Materialist. He is no more so than was Darwin himself. Such mistakes were probably due to the bent of the mind of our authoress, whose too early death is a loss to the cause of truth and to humanity itself. Ω.

EMBLEMATIC MOUNDS AND ANIMAL EFFIGIES. By *Stephen D. Peet*. Chicago: American Antiquarian office.

The author of this work is well known, not only as the editor of the *American Antiquarian*, but as a careful explorer of aboriginal monuments in the Northwest. His attention has not been limited, however, to the results of personal observation; he has utilised the researches of other explorers, and is thus able to present to his readers an amazing amount of information, which is rendered doubly valuable by the profuse use of maps and illustrations. The points which Mr. Peet has sought to bring out in his book are, that (1) the works described as effigies were imitations of the wild animals which were once common in the region where they are found, which is chiefly in Wisconsin and Ohio, and were also totemic in their character; (2) the effigies were used for practical purposes, such as screens for hunters, guards for villages, foundations for houses, heaps on which sentinels were stationed; (3) they embodied "certain superstitions and customs which are rarely found, but which are suggestive of the religious system prevalent in prehistoric times."

The consideration of the first and second of these points does not come within our province, but it will be interesting to see what light the curious monuments described throw on the religious ideas of the aborigines. Mr. Peet states that the location of the effigies gives the idea of the prevalence among their builders of a kind of nature-worship. They are closely associated with the natural features of the earth, "the streams and lakes, hills and valleys, woods and prairies," being overshadowed by them. The animals represented were divinities to the people, and the effigies were intended to be symbols of such divinities, associated for particular reasons with special localities. In support of this view, Mr. Peet refers to the fact that the "myths which fix upon scenes in nature are those which remind one of the animal divinities which were worshipped. The figure of the moose and the turtle and other animals have been recognised in certain strange and contorted figures in the rocks and mountains, and myths have been connected with them, the myth having evidently been made to account for the resemblances." The most remarkable example of this kind is the great serpent mound of Adams County, Ohio. Serpent mounds are found in various other localities, and usually they correspond with the natural features of the ground on which they are placed.

But if the effigies are to be regarded as symbols of a totemic animal-worship, it may be thought that they cannot be taken as evidence of the existence of nature-worship. Mr. Peet remarks, however, that the symbolism of Ohio was that of sun-worship, and the existence of this phase of nature-worship among the American aborigines is an important fact. It connects their religious ideas with those which were at one time almost universally prevalent in the Old World. The Sun as the source of life and energy was from an early date the object round which centered the religious ideas of the ancient world, and the serpent occupied a chief place as symbolical of the most important of those ideas. The veneration for deceased ancestors represented similar ideas with those embodied in sun-worship, and the animal

totemism of which the effigy mounds are symbolic was connected with the latter superstition through ancestral worship, the mythical ancestor being identified with the totem. If this is so, the study of the mythology of the aboriginal inhabitants of this country may be expected to throw light on the origin of Old World superstitions, and Mr. Peet may be congratulated on having done so much to make known the symbolical and other works which will soon be the only relics of an ancient and wide-spread race. Ω.

LIFE. By *M. J. Savage.* Boston: Geo. H. Ellis.

In this volume of sermons we have a most interesting series of studies on a subject which is probably attracting at the present time more intelligent interest than at any past epoch. The views entertained by Mr. Savage are so well known that it is not necessary to give any elaborate review of the present work. Among other themes he treats of the Nature and Origin of Life, Goodness and Moral Evil, Life's Meaning, Nationalism and other social dreams, Morality and Religion. Everywhere we find much material for thought, and, although from the very nature of the case many of Mr. Savage's conclusions will not be generally accepted, his words will be read with more than a passing interest.

His statement that right and wrong "are to be understood by studying the progress, the development, of the race, just as we find out any other truth," cannot well be contested by the advocate of any ethical theory. When he affirms this life "to be only manifestations as the years go by, out-blossomings everywhere of that life which is God,—the mystery and yet the explanation of all things," he expresses an opinion that most men who have given the subject serious thought will accept—subject only to the reservation that they are allowed to understand "God" in their own way.

The answer given by Mr. Savage, in his concluding discourse, to the question "What is it all for?" will meet with less acceptance. He remarks that all the theories which can be found as to the outcome of things are only variations of three chief theories: (1) that of a future life of rewards and punishments, the theory of Milton's "Paradise Lost"; (2) that of M. Comte, which is well named the religion of humanity; (3) that which regards *spirit* as having the pre-eminence over matter. As to the first theory, Mr. Savage declares it to be condemned by the intellect, the heart, and the conscience of men. He affirms that the second theory ends in *nothing*, and he endorses the statement of Mr. John Fiske, that "considered intellectually, such a theory puts the world to permanent intellectual confusion." Mr. Savage, therefore, accepts the third theory which "makes immortality a wholly rational thought." He sees the proof of it in the existence of the brain, the conscience, the heart of man, which "are prophecies, since they are the expression of the nature of things, and since they demand the perfect thought, and love, and right." Ω.

PROTOPLASM AND LIFE. By *Charles F. Cox*, M. A. New York: N. D. C. Hodges.

The first part of Mr. Cox's contribution to the study of what may be termed the literature of the interesting subject he discusses, treats of the Cell doctrine. He traces clearly the changes that have taken place in the protoplasm theory, to which that doctrine belongs, with particular reference to Doctor Beale's *germinal matter* and Prof. Huxley's *physical basis of life*. In his summary of conclusions, Mr. Cox shows that the original idea of the cell, as propounded by Schleiden and Schwann, has gradually faded away. As he states, the attention of the defenders of the cell doctrine has been forced from one position to another until it is fixed on a germinal point. The same fate has befallen Dr. Beale's ideal living matter, which if an actually visible thing is reduced to "a mere skeleton of his original bioplasm," an attenuated reticulum; while Huxley's physical basis of life, like his *Bathybius*, is relegated to the realm of the imagination. Thus there is "no one visible and tangible substance to which the name protoplasm is rigidly and exclusively applied." Mr. Cox's conclusion as to the nature of the *basal life-stuff* is that "the only admissible alternative is matter plus vitality or matter minus vitality." This brings us to "the impassable gulf between the not-living and the living"; which we would observe, however, might cease to be impassable if we could properly define the terms "matter" and "vitality."

The second part of Mr. Cox's *brochure* is devoted to a consideration of the spontaneous generation theory, and its relation to the general theory of evolution. Mr. Cox's personal conclusion is, that, to the better part of the scientific authorities, "the spontaneous generation theory is a necessary part of the general theory of evolution, but that no experimental evidence has as yet been produced in support of the belief in the occurrence of abiogenesis, and that therefore the evolution theory hangs upon a link of pure faith." Mr. Cox finds in the gap between lifeless substances and living forms the veritable "Missing Link." Ω

NOUVEAUX APERÇUS SUR LA PHYLOGENIE DE L'HOMME. By *Madame Clémence Royer*. Extracted from the Bulletin de la Société d'Anthropologie for 1890.

Madame Royer, in this admirable memoir, taking for a text the fact that an Australian lizard was seen by M. de Vis walking on its hind feet, criticises severely Haeckel's genealogy of man, whose line of descent she declares to be distinct from that of the apes. The first terrestrial ancestors of man and of other anthropomorphous animals issued from pelagic forms of distinct origins, whose evolution had been parallel, but the human ancestors acquired the upright position in a phase of amphibious ichthyophagy, while the ape ancestors adapted themselves directly to an oblique position. This original difference of attitude adapted men from the first to an entirely pedestrian motion, and the apes to a life more or less arboreal, but neither men nor apes have had any terrestrial ancestor adapted to the horizontal position. Ω.

LE MONDE COMME VOLONTE ET COMME REPRESENTATION. Par *Arthur Schopenhauer*. Traduit en Français par *A. Burdeau*. Tome troisième. Paris: Félix Alcan.

M. Burdeau's translation of the chief work of the renowned philosopher of pessimism is the only perfect translation into the French language. It is made with a scrupulous exactness, and its style is said to be as clear as that of Schopenhauer himself, "by which he is distinguished from all other German philosophers and is recognised as a disciple of Voltaire, Rousseau, and Chamfort." The present volume contains important appendices in which Schopenhauer recapitulated and developed various points treated of in the first edition of his work. We may refer particularly to the chapters on Instinct, Genius, Insanity, the Metaphysic of Music, and the Metaphysic of Love.

DIE HYPNOSE UND DIE DAMIT VERWANDTEN NORMALEN ZUSTAENDE. Vorlesungen gehalten an der Universität Kopenhagen im Herbste 1889. By *Alfred Lehmann*, Ph. D. Leipsic: O. R. Reisland.

This little book will in one respect be of special interest to psychologists. The author confesses in the preface that when he commenced his hypnotic investigations, he attempted to explain the facts under consideration by the Cartesian theory which hitherto, he says, had proved perfectly sufficient to explain the data of normal soul-life. What the author understands by the Cartesian theory appears from the following passage:

"The popular conception of the relation between soul and body is, that the "soul is a being distinct from the body and endowed with certain faculties. This "conception is still defended by a certain, not very numerous school of philoso- "phers whom we may briefly call Cartesians from the fact that their theory can be "traced back to Descartes, although in the lapse of time it has been considerably "modified."

In a word the Cartesian theory is the theory that still accepts the existence of a mythical or metaphysical soul-unity called the ego. Dr. Lehmann says:

"It was argued since 'I' in spite of a constant change of my consciousness, "am in possession of the certainty that it is the same identical 'I' that has all these "states, sensations, feelings, this 'I' or the soul must be a unity. And this unity "must stand in a causal connection with the outside world, with the domain of na- "ture in the widest sense of the word," etc.

It is perhaps exceptional that a teacher at a University of Protestant Northern Europe has been under the influence of Cartesianism, but it is highly commendable that he openly confesses his change of opinion because the facts under observation demonstrate its erroneousness. Dr. Lehmann no doubt will find that the normal phenomena of psychic life are by no means in accord with the Cartesian doctrine. Indeed by showing how the abnormal and normal states agree, he implicitly confesses that the theory that proves untenable for the former ought to be

regarded as untenable for the latter. We have instances of men who believe in the Cartesian doctrine, or at least by a natural predisposition have a tendency to believe in it, wavering in their belief, because the data of the normal states of psychic life so little favor the dualism of the great French philosopher. Now it almost seems as if the discoveries and the strangeness of hypnotic phenomena had contributed a great deal towards turning the tendency toward a monistic solution of the psychological problems back to the almost abandoned dualistic solution. We are fully confident that this reaction will not last, because in spite of all the strange mysteries that surround modern hypnotism, it will after all only find a satisfactory interpretation in some monistic conception.

Dr. Lehmann in abandoning the Cartesian theory, says: "The bodily and "psychical states are as a matter of experience given as two series intimately con- "nected the one with the other. Their connection can be explained in two differ- "ent ways: Either the phenomena of the one are effects of the other, or both series "are effects of one and the same unknown cause."

Dr. Lehmann considers either solution as a priori equally acceptable, yet he favors the latter, which might briefly be called (although the author does not use the expression) "the agnostic solution." Dr. Lehmann characterises it as "*die Spinozistische Annahme*" and calls it Psycho-physical Materialism.

One of his colleagues, Professor Kroman has proposed in his "Logik and Psychologie" a theory that is called by the same name. Yet Kroman's psycho-physical materialism, Dr. Lehmann declares, is widely different from his own; the former being "a mutual causal relation between the Physical and Psychical within the limits of the Atom," which, says Dr. Lehmann, "would make the explanation of complex psychical phenomena impossible."

The psycho-physical materialism of Dr. Lehmann, our author maintains, agrees in all essential points with the views of Professor Münsterberg (Freiburg in Baden).*

The laboratory work done by Professor Münsterberg was published after Dr. Lehmann had finished his lectures. A certain similarity between Dr. Lehmann's views and those of the Freiburg Professor cannot be denied, yet it is more than doubtful whether Professor Münsterberg would recognise this similarity in the same measure as Dr. Lehmann does. The fact is that Dr. Lehmann has progressed in the direction which the German school of Wundt has taken; yet he has not as yet reached the same clearness; he is still entangled in Cartesian ideas, as is shown by his way of proposing problems: for instance in his treatment of the problem of will, which he justly calls "*der eigentliche Probirstein der Hypothese*," and of Attention, "the most enigmatic of all states of the soul" (*der räthselhafteste aller Seelenzustände*). In these and in other considerations Dr. Lehmann shows that he

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*The observations of Professor Münsterberg were reviewed in *The Open Court* No. 134.

is still far from the positive standpoint by which Münsterberg's investigations are distinguished. It is very strange that in speaking of Attention M. Ribot's name has not even been alluded to. If the author had shown a familiarity with some of the monographs of this great French psychologist, he might have saved himself much work. κρς.

Der Heliotropismus der Thiere und seine Uebereinstimmung mit dem Heliotropismus der Pflanzen. By *Dr. J. Loeb.* Würzburg: Verlag von George Hertz.

The object of this work is to fill a gap in the treatment of the subject of animal movement depending on light, and to explain it by a consideration of the actual facts. After stating that the effect of light upon animal movement is purely mechanical, and that it is governed partly by the action of the light as the exciting cause, and partly by the structure of the sensitive organisation, Dr. Loeb proceeds, "I will now prove that the direction of the light rays determines quite generally the movements induced in animals by the light, no less than the direction of plant movement, and that the orientation not only of plants but of animals, depends upon the bodily form of the latter, in so far as the dorsiventral animals themselves move with the median plane in the direction of the light rays," etc. The more refrangible are the rays of light the more efficacious is its mechanical action upon animal and plant movement, which is affected also by the constant intensity of the light and its temperature. Thus it appears that the moth's flight into a flame must be considered as the same mechanical process as, for instance, the motions of sunflowers, the growth of the sprouting axis in buds, etc. Dr. Loeb's conclusion that the circumstances which govern the movements of animals towards the light are conformable to those which have been already recognised in relation to plant-movement, is supported by numerous facts, which appear to fully establish the accuracy of his observations and deductions.

The diligent author who is at present engaged in scientific investigations at the *stazione zoologica* in Naples, has in the mean time published a series of further observations on the same question, all of which, as was to be expected, corroborate the propositions set forth in the above mentioned little book. We have before us two reprints, one from the *Biologische Centralblatt*, Vol. X, Nos. 5 and 6, 1890, the other the *Archiv f. d. ges. Phys.*, Vol. XLVII, with one plate and two wood-cuts, the former treating of the heliotropism of the nauplii of *Balanus perforatus*, whose periodical migrations are shown to depend upon the action of the light, the latter discussing the common features of heliotropism in animals and plants.

Untersuchungen zur physiologischen Morphologie der Thiere. 1. Ueber Heteromorphose. By *Dr. Jacques Loeb.* With 1 plate and 3 figures. Würzburg: George Hertz.

Julius von Sachs, Vöchting, Noll, and other botanists have successfully opened the way to a knowledge of the growth of plants in their causal conditions. This

method has been applied to the physiology of animals by Pflüger. The present pamphlet is a contribution to this endeavor by Dr. Loeb, whose special object has been to determine the laws of the restoration of lost organs in animal organisms. Botanists have found that if a plant that has undergone the loss of an organ has to build it up again, the new organ will be different from the original organ, and this difference can be determined by law. Dr. Loeb inquires whether the same can be said of the reconstruction of the lost organs of animals.

There are, as a rule, in animal organisms two poles, viz. the oral pole, forming the head, and the aboral forming the tail. It has been generally supposed that living animal substance possesses the tendency to develop in one special direction oral organs, and in the other aboral organs. This was called Polarity and is based upon the experiments of Allman, Trembley, Dalyell, and others. The experiments of Dr. Loeb, made with the view of testing the polarity theory, show that it is possible to develop in animals possessing physiologically distinct heads and tails, heads instead of tails in the aboral pole, and to do so without any serious interference with the vitality of the creature. The experiments have been made chiefly on *Tubularia mesembryanthemum*, *Aglaophenia pluma*, *Plumularia pinnata*, and other species.

Dr. Loeb proves by his experiments that external conditions control the reproduction of organs, so that artificially oral organs can be made to grow where aboral organs have been, and *vice versa*. It is this faculty of animal organisms which Dr, Loeb calls *heteromorphosis*. κρς.

Die ethische Bewegung in der Religion. By *Stanton Coit*, Ph. D. Uebersetzung von Georg von Gizycki. Leipsic: O. R. Reisland.

This series of Sunday lectures by Dr. Stanton Coit, the speaker of the South Place Ethical Society of London, England, has been translated into German, in the shape it is now before us, by Dr. Coit's friend and teacher Prof. George von Gizycki; they have not yet appeared in English. The South Place Ethical Society is not directly affiliated to the Ethical Societies of North America, but it stands with them in friendly relations. Dr. Coit, a native American, is strongly biased in his views by his American co-workers; he is the youngest among them, and is, I believe, to be considered as a disciple of Professor Adler. He has inherited from Professor Adler the idea that we can have ethics without a world-conception or are ligion; yet this idea has been considerably modified, and an approach to more positive and practical views is perceptible in many passages of his sermons.

In the lecture "Which Ethics?" Dr. Coit says: "We need (*bedürfen*) a theory concerning the universe and our position in it instead of the old faith." Yet in contradiction to this, he declares that theories are of little use. He adds: "If two men come down from their abstract theories into real life and to the forces which create action, it is as if they descend from two opposite mountain peaks into a warm and rich valley where rivulets run down from both sides to unite their waters inseparably into one continuous stream."

Is not this beautiful allegory, true as it certainly is in one sense, after all misleading? Is not theory and theory different? If theory means mere speculation, we heartily agree with the proposition to keep clear of and far away from theorising. It is at best a harmless play, and certainly a loss of valuable time. Yet if theory means methodical systematisation of facts, it is not mere waste of time; in that case it is the indispensable condition of all truly practical work. And it is this latter kind of theory which also in the practical work of ethical culture must be sought to be established. We must at least be clear as to basic principles so that the efforts of ethical teachers may not be at random, but directed by the progressive spirit of the age in harmony with our best scientific and philosophic thought.

Concerning religion Dr. Coit says (p. 19) in his article "Why Ethics Instead of Religion": "My own opinion is that there is one feature which distinguishes "Religion from all other doctrines, ceremonies, and rules. This feature character- "ised Matthew Arnold's view. For he insisted not only upon morals and their "importance, and thought of means for their propagation, but he proclaimed also "that there was a power above the will of man to which he must bow. In the very "moment he proposed that power which we have to obey, his ethics became "religious. . . . . But the recognition of this higher power, if I am allowed to "propose my own views, appears to me of very little importance."

If there is such a power, and we have sufficient reasons not to doubt its existence, I should say that for ethical purposes it is of paramount importance to recognise it and to obey it. In another and a more recent lecture, Dr. Coit pronounces a very different view, he says:

"Anybody who has ever reflected a moment, must have discovered how de- "pendent he is upon a power outside of his own will. He has no strength either "for good or for evil, which he has made himself. The more he thinks about it, "the deeper must become the feeling of his dependence. And being aware that God, "or whatever we call that power in all things, does not mind his whims, he will find "it easier not to mind, himself, his own whims. The constant thought that we "are not the powers of life and death, will take away conceit and vanity and "foolishness. And in this way, it brings us in times of tribulation to a quick resig- "nation. It makes us loving brothers and sons."

Dr. Coit indeed aspires to make of ethical culture a religion for the people. He speaks on this subject in his last lecture. He opposes the Churches for mixing their ethics with theology, and he speaks with great enthusiasm about the poetry of ethics, which is much more powerful than the prose of ethics. He does not seem to see that the influence of the churches is mainly due to their poetry of ethics. Would it not be advisable to point out the prosaic truth in this poetry for the purpose of freeing the human mind of the obnoxious elements of a misunderstood poetry? Would it not be advisable to investigate the poetry of the basic idea in ethics, viz., of the God-idea, so as to let the ethical movement develop itself his-

torically from the past. Dr. Coit's method of dealing with the God-idea is far from satisfactory. He is neither a theist nor an atheist. Sometimes he appears to appreciate the moral importance of the God-idea in its purified shape, and then again he seems to consider it as an ethically indifferent idea. Should not this problem be settled by every one who undertakes to preach ethics. It appears almost as if all the leaders of the ethical culture societies underrated the ethical importance and indispensableness of thought in general and of science and philosophy in particular.

The contradictions which appear in Dr. Coit's lectures show that he is still developing. The book is full of promise and we have every reason to hope that its author will overcome the unclearness that is still lurking in his mind, and that he will grow with the work he is doing. κρς.

Fremdes und Eigenes Aus dem geistigen Leben der Gegenwart. By Prof. Dr. *Ludwig Büchner*. Leipsic: Max Spohr.

Opinions admittedly are still divided with respect to the laudable efforts of a large class of scientists and writers whose main object is that of presenting the results of scientific research in an intelligible, popular form. Every department of the natural sciences, geology, astronomy, even psychology and comparative philology, each and all, are now represented by able and ardent popular interpreters, who at the same time by their aggressive style and by their polemical methods not unfrequently seem to impart a kind of militant and apostolic attitude to the cause of science. It must further be admitted, that many of these writers, by the unanimous verdict of the present age, are among the most instructive, readable, and actually the most widely read authors of contemporaneous German, French, and Anglo-American literature. At first glance, it accordingly may seem rather strange, that these same popular authors should also be subjected, not unfrequently, to their commensurate share of unfair, and even offensive, popular criticism; and yet it could hardly be otherwise.

The well-known writer of these scientific and critical essays, Prof. Ludwig Büchner, affords an exceptionally striking instance of the unenviable lot of some of our most popular writers of science. In one of these essays inscribed "Meine Philosophie," Professor Büchner has been compelled to defend the arduous work of his laborious life against a decidedly unfriendly and unappreciative criticism of his philosophy and whole scientific activity, that some time ago appeared in the American *Freidenker* of Milwaukee. Prof. Büchner, with a touch of legitimate bitterness, repudiates the imputation of having been, or still being, as he himself calls it, only the "popularisator," expounder and commentator, of the theories and systems of other thinkers; that, on the contrary, in Germany and elsewhere, among the highest representatives of science, for more than thirty years Professor Büchner himself has been recognised and honored as an original worker and thinker. His book on "Force and Matter" (*Kraft und Stoff*) was published five years before Darwin's great work on the "Origin of Species." Subsequently his well-known

popular Lectures in connection with Darwin's work claim the distinguished merit, of having more widely generalised and extended the Darwinian theory by embracing the origin and evolution of man, which had until then been overlooked by Darwin himself. By the contemporary press of Germany Professor Büchner was then charged with premature rashness, and with being only a shallow, imitative scientific dilettante; but all this vituperative criticism was for ever silenced, when in the year 1871 Darwin's own work appeared on the "Descent of Man," in which Darwin himself accepted all the consequences of the theory of evolution, as set forth in Professor Büchner's Lectures, and, somewhat later, in Professor Haeckel's "Natural History of Creation" (*Natürliche Schöpfungsgeschichte*). Professor Büchner, moreover, is the author of the widely popular work "The Future Life and Modern Science" (*Das künftige Leben und die moderne Wissenschaft*). To deny him, accordingly, the rank and merit of a solid and original scientist and thinker, as he himself says, is to do him a signal injustice, a positive injury.

Let all this be willingly granted; but this concession, at all events, does not settle his final, mediating attitude to the entire satisfaction of philosophy, regarded as an independent science. Professor Büchner openly declares himself in favor of popular science. He maintains, that "Philosophy ought to step down from her lofty state of independent science, and henceforth content herself with the humble rôle of simply mediating the results of individual scientific research; that science, in such case, would no longer run the risk of being exposed to the scorn and contempt of the masses (!) . . . In popular scientific writings, at all times, there can and must occur contradictions, superficial estimates, even trivialities, but all this is perfectly understood by any fair-minded reader." . . . These remarks might almost tempt the reader to believe, that Professor Büchner, in his eagerness to popularise science, really ignores the value of philosophy as an independent science, and of philosophical research, irrespective of all popular results, and that the Professor wishes to inculcate a narrow and purely utilitarian estimate of philosophy. But, the impulsive Professor, of course, knows better; his mental vision embraces the entire field of the sciences, and he has written admirably and entertainingly upon almost every scientific topic, and moreover he admits, that possibly he sometimes contradicts himself.

One might further be inclined to ask, whether, in view of his self-imposed, familiar contact with the popular mind, Professor Büchner upon the whole displays the expected equanimity and broad-minded consistency when resenting the harsh criticism of antagonists, which he does with a singularly thin-skinned sensitiveness scarcely worthy of a true philosopher. In all his other works and throughout these critical essays, Professor Büchner himself shows no tender regard for the feelings of his philosophical antagonists. In the critical essay "Against Materialism," (*Wider den Materialismus*), for example,—mainly directed against Prof. Harald Höffding,—he bluntly affirms that Professor Höffding's works have produced upon him the impression that the author is a man without the philosophical and scien-

tific knowledge requisite for the solution of the problems he has ventured to approach.

From what has been said, the reader may expect to find much important, instructive, and readable matter even in Professor Büchner's critical essays, bearing upon the intellectual life of the period; but he also must be prepared to find them leavened in no small degree with the characteristic mental idiosyncrasies of their ever polemical author. *γνῶν.*

Deacon Herbert's Bible Class. By *James Freeman Clarke*. Boston: Geo. H. Ellis.

This booklet is an unassuming little publication, but it is important as a symptom of the times. It was written by the late Mr. James Freeman Clarke many years ago as a series of papers for the *Christian Inquirer*. Yet it is well that they should not be forgotten and the lessons contained therein should be heeded by the clergy as well as the laity of this country. It is an attempt to make religion practical and to point out the true direction in which church-life has to develop.

There is a great truth in the general complaint made throughout the world that the religion of civilised mankind, especially Christianity in the shape it exists at present, has lost its life, its influence, and its usefulness. Our religious views must be transformed, they must be reconciled with the principles of science and must be adapted to the real needs of the people. The problem is, how to do it.

If a solution of the problem shall be found, it is certain that it will be first put into practice in the United States of America; for here the church is free. The many different churches of our country, with few exceptions (the Roman Catholic Church is perhaps the only one) are in principle churches of the people. A change of opinion, of belief, of religious conviction among the people will result in the appointment of such pastors and leaders as are in agreement with their congregations. Clergy and laity form here one organic body. The clergy are not imposed upon their congregations by the state; they are the exponents of their congregations, the representatives of the religious ideas (perhaps upon the whole of the conservative religious ideas) of their churches.

How different things are in Europe, where the state-churches of England and Germany, for instance, prevent all progress in religion, theology, and church-life.

Mr. Clarke's book, if read with these considerations in mind, shows the agencies that are at work in this country and that will (as we confidently hope) result in a new phase of religious life. Among the chapters of the book we note the following titles: "The way we helped our minister to write good sermons"; "Aim of Life"; "Temptation of Jesus"; "The Miracles"; "The Sermon on the Mount"; and others. The spirit in which the book is written is not exactly rationalistic, yet it shows in every line a strong monistic bias. For instance, the usual definition of miracles as a suspension of the laws of nature is discarded; and yet it would be erroneous to suppose that the style of the book is marked by a radical tendency. Not

at all. Every faithful Christian can read it line for line without feeling the least offence. But it is plain that herein lies the author's force. The book is popular, but behind its popularity, unusual depth of thought is noticeable. In a similar way St. Paul gave milk to his followers because they were babes in Christ, and could not bear heavier food. Mr. Clarke's book is written especially for babes in Christ, yet every one who has given any serious thought to the religious problem will appreciate at once the difficulty and the importance of such an undertaking. κρς.

PERIODICALS.

THE AMERICAN JOURNAL OF PSYCHOLOGY. September, 1890. Vol. III. No. 3.

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The full title of Dr. Donaldson's elaborate article is *Anatomical Observations on the Brain and Several Sense-Organs of the blind Deaf-Mute, Laura Dewey Bridgman.* The object had in view in the examination of the brain was "to determine, if possible, whether the peculiar mental existence of Laura Bridgman, which was the result of her defective sense-organs, has left any trace on her brain, or whether such anomalies as may be observed are sufficiently explained when considered as the direct consequences of the initial defect alone." The article is therefore "a special study in the general field of the inter-relation of brain-structure and intelligence." The final results are reserved for a second article, but it appears from the present one that the total area of Laura's brain is somewhat small for its weight, and that it is slightly inferior to two other female brains with which comparison was made, the inferiority depending mainly on the smaller average depth of the sulci, that of the left side being the most manifest. The difference can be explained in part at best, by the failure of certain portions of the brain to develop completely. Dr. Donaldson's article is illustrated by very carefully prepared plates.

In the present part of his sketch of the history of reflex action, Dr. Hodge treats of the law demonstrated by Bell, that the *posterior roots of the spinal nerves are sensory, the anterior motor,* which forms the beginning of the modern history of the nervous system, and of "the physical versus the psychic theory of reflex action." The mechanical theory of reflex action was first elaborated by Marshall Hall. It was opposed by Volkmann and others, among them Pflügel and Auerbach. On the other hand, Lotze supported the former view, but he advanced "a step beyond the comparatively crude, simple mechanism of Marshall Hall to a mechanism of the utmost delicacy, a mechanism susceptible of the nicest adjustments, capable of education, and of prolonged, independent, and complex activity." Habit is only another name for mechanism.

Under the head of Psychiatry, Dr. William Noyes gives an elaborate sketch of the life of Jean Jacques Rousseau bearing on the question of his insanity, which is exciting considerable interest at the present time. (E. C. Sanford, Clark University, Worcester, Mass.)

MIND. October, 1890. No. LX.

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The Origin of Music. This article is intended as a postscript to Mr. Spencer's essay on "The Origin and Function of Music," included in his *Essays, Scientific, Political, and Speculative*, of which he is preparing a final edition. It is a reply to Mr. Darwin, who supposes music to have originated from a particular class of vocal noises, the amatory class, instead of, as Mr. Spencer asserts, its being derived from the sounds which the voice emits under excitement, eventually gaining this or that character according to the kind of excitement. After considering various objections by Mr. Edmund Gurney and others, Mr. Spencer concludes: "The origin of music as the developed language of motion seems to be no longer an inference but simply a description of the fact."

Mr. James Sully deals with Differentiation, Assimilation, and Association as the intellectual constituents in the process of Mental Elaboration. Differentiation is considered first as a process of marking off, by means of special adjustments of attention, particular sensations; followed by Discrimination, which involves change of psychical state, the dependence of mental life on which has been formulated as the Law of Relativity. Assimilation, described as a mode of unification or integration, is treated of under the headings, *Psychological Nature of Likeness; Automatic Assimilation; Recognition;* and *Transition to Comparative Assimilation.* Association is the "process of psychical combination or integration which binds together presentative elements occurring together or in immediate succession." This supposes *Retention* or the tendency of a sensation to persist, and *Reproduction*, or the reappearance "in consciousness" of the impression under a new representative form. The three processes of Differentiation, Assimilation, and Association do not follow each other, but are closely interconnected.

Part II. of *Volkmann's Psychology* deals with the problem of Time and Space, and with the subjects of Space of Time (*Zeitraum*), Motion, Number, and Intuition. "Out of sensations intuitions are evolved in consequence of the properties immanent in the sensations." While their localisation progresses in the region of the more strongly toned sensations, projection, or the "assignment of sensations to the external world," goes on simultaneously in the region of toneless sensations. By the addition of "consciousness of dependence in having the sensation," there is the completion of the presentation of the External Thing as *thing*. Illusions are divided into two classes; namely, 'illusions of internal perception' and 'illusions of sense.' The Ego is purely a psychical result of the soul "becoming conscious of an interaction between one of its presentations and the most ramified of its presentation-masses." Self-consciousness is defined as "internal perception within the Ego."

The mind is then dealt with as thinking, feeling, desiring, and willing. Ethical feeling is a kind of æsthetic feeling, distinguished from others by the peculiarity of its objective basis, which is the actual will of the subject. Moral freedom is to have the will determined by reason. Psychological freedom permanently extended over the whole of volition is Character ; its opposite is Passion.

Mr. Orange furnishes a different explanation of Berkeley's ethical system from that given by Professor Fraser, in a note to the third dialogue of *Alciphron* (ii. 107), and points out its agreement with Berkeley's *Principles of Human Knowledge*. "Moral laws are laws of nature; but there is no value or force in them as laws, save in so far as they are the orderly expression of God's ideas." Man's ideas are true or good, when the human spirit is at one with the divine. Both in natural and moral philosophy the laws of nature are to be attained by the use of reason.

Prof. Robertson draws attention to the concessions involved in Münsterberg's idea of 'Muscular Sense.' To the term 'muscle-sensation' no exception can be taken, "provided it is meant for no more than mere external designation, as when we speak of 'eye-sensation,' 'skin-sensation,' or the like," and is not called 'sensation of movement.' Münsterberg finds that a whole class of factors have been overlooked, or hardly regarded, by previous inquirers into 'Time-Sense.' These are sensations (or representations) of muscular tension, by synthesis of which with sense-elements (sounds by preference) time-apprehension is explicable. He is struck particularly with the part played in his experiments by the breath-rhythm, and "it seems impossible to doubt that breathing has a prerogative position among the sense-factors concerned in the estimation of short time-intervals." The name 'Time-Sense' has through Münsterberg's investigations "more justification than it ever got from its inventors, for whom it has marked only the apparent immediacy of time-apprehension."

In his criticism of Mr. Spencer's theory of the derivation of space Prof. John Watson lays down as the fundamental position of Transcendentalism, or Idealism, as he prefers to call it, "that the universe is intelligible, and that man in virtue of "his intelligence is capable of grasping it in its essential nature. It therefore rejects as unmeaning the doctrine of Mr. Spencer, that we know reality to be unknowable." While recognising that Mr. Spencer and others have done good service in drawing attention to certain outward aspects of the evolution of mind, Professor Watson "concludes that no psychology can be adequate which does not recognise that perception is not the mere occurrence of transient feelings, but the first step in that recognition of the true nature of reality which culminates in the comprehension of the world as a single organic unity of which the source and explanation is intelligence."

Mr. Stout points out, in reply to Dr. Pikler (*Mind*, No. 59), that the sole aim of his article on "The Genesis of the Cognition of Physical Reality" (*Mind*, No. 57) was to trace "the genesis of the presentation of physical reality as it appears to the ordinary consciousness : not as it may be modified, and perhaps rectified, by the reflective criticism of this or that philosopher," and that what he urged against Mill was simply that "he has confounded his own philosophical view of physical reality with the view which men ordinarily take when they are not in a philosophical mood."

It is shown by Mr. Sutherland that in the utilitarian ultimate conception there is, in addition to "the greatest happiness, *plus* an arithmetical truth," the element of absolute justice, the existence of which requires that "all subsidiary rights as means to greatest general happiness should at utmost be classed under relative justice." (London : Williams & Norgate.)

INTERNATIONAL JOURNAL OF ETHICS. October, 1890. Vol. I. No. 1.

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This is the first number of the *International Journal of Ethics*, which is intended to take the place of the *Ethical Record.* In the opening article, Professor Sidgwick affirms that the idea of a universal and complete harmony of the earthly interests of all human beings is "an optimistic illusion as to human relations, which in the present age of the world has nearly faded away." Nevertheless, "a very substantial gain would result if we could remove from men's minds all errors of judgment as to right and wrong, good and evil, even if we left other causes of bad conduct unchanged." What is practically wanted is improvement in moral insight, and the aim of the paper is to aid in the solution of certain intellectual difficulties which arise when we try to get a clear idea of duty. Warfare among modern nations "is normally not a mere conflict of interests, but also a conflict of opposing views of right and justice." Disputants may therefore be brought into harmony if they can be really and completely enlightened as to their true rights, as distinguished from their interests. The international law administered by arbitrators may be most useful "in removing minor occasions of controversy and in minimising the mischief resulting from graver conflicts," but it will not provide a settlement of all occasions of strife. Where the sphere of arbitration ends that of the moral method of attaining international peace begins; "if we must be judges in our own cause, we must endeavor to be just judges." The impartiality required is difficult, but "the judicial function—which, in a modern state under popular government, has become, in some degree, the business of every man"—might be performed with success, "if national consciences could be roused to feel the nobility and grapple practically and persistently with the difficulties of the task."

Professor Adler's article is devoted to an account of the Ethical Societies, which are described as being "consecrated to the knowledge of the Good, but not to any special theory of the Good." To adopt a philosophical formula as the basis of union would be to become a philosophical sect, which he declares is "the most contemptible of all sects, because the sectarian bias is most repugnant to the spirit of genuine philosophy." The accepted norms of moral behavior form the starting points of Ethical Societies and their basis of union. They build on the common stock of moral judgment, which may be called the common conscience. Ethics is both a science and an art. As a science it has to explain the facts of the moral life, and it is necessary to begin with the facts and to test theories by their fitness to account for them. It is "the prime duty of every one in his individual capacity to rise to the ever clearer apprehension of first principles," but for this very reason Ethical Societies in their collective capacity abstain from laying down any set of first principles as binding.

It is not quite clear how Professor Adler can declare that the Ethical Societies

are consecrated to the knowledge of the good, and yet make so strong an opposition to their stating such knowledge in the exact terms of a philosophical formula. Philosophy is nothing but knowledge of the world systematised into a world-conception. It will hardly be sufficient to make the "common conscience" the corner stone of any society devoted to the elevation of morality. Not only would it be difficult to ascertain what that "common conscience" at present is, but, in addition, we can be assured that the "common conscience" is constantly changing.

Ethics as a science means philosophical ethics; and Professor Adler's ethics is, in fact, the expression of a philosophy. Yet in spite of the advanced position of the Ethical Societies, which have discarded all religious views and ceremonial practices, we find that their leader still stands upon the ground of a dualistic extra-naturalism. Professor Adler says:

"There is a reality other than that of the senses, and the ultimate reality in "things is, in a sense, transcending our comprehension, akin to the moral nature "of men. But how shall we acquaint ourselves with this Supersensible. The "ladder of science does not reach so far."

It is true that there are realities other than that of the senses; take as a most simple instance mathematical points and lines. But there is no reality which theoretically considered can not become an object of science. The statement that there are facts to which the ladder of science does not reach, is tantamount to a declaration of supernaturalism and dualism. Professor Adler has discarded the terminology of the old dogmatism, but he has not discarded its basic error. Instead of developing the old faith into a monistic religion, he throws away religion as a basis of ethics, but preserves carefully that element in it which is hostile to science and philosophy.

The *Law of Relativity* is a very important contribution by Professor Höffding to the Science of Ethics. After stating that the moral law, if it is to be truly universal, must "only judge the general direction of the *tendency* of the will," he affirms that the individual relativity of ethics, or its personal equation, is a factor which enters into the ethical question, "when different individuals with like ethical principles and in like circumstances, but with different dispositions and capacities have to be considered." The individual is always a part of society, and the life of society is no other than that contained in its members, the ideal being "reached only when the individual's efforts in the cause of society also serve the free and harmonious development of his own faculties and impulses." In an ideal State only that would be demanded of each individual which lay within his range and power. Self-control, as a negative virtue, is a psychological impossibility. It is necessary to take note whether there is room for other inclinations that could absorb the store of energy. The struggle of self-control lasts until the new application of energy gains complete ascendancy. The happiest man is where morality has become organic and "there is an agreement between the task arising from the general principles and the particular circumstances, and the capacities and desires of the individual." Professor Höffding objects to the views of the Italian *criminal-psychological* school that atavism is a sign of social imperfection, that it "does not justify placing society and the criminal over against each other as absolute right and absolute wrong." He concludes that it is at least an open question whether there are any human beings "in whom no sympathy for the moral law can be awakened, however much the law may be individualised."

The arguments of Professor Clark on *The Ethics of Land Tenure* are summed up in the following passage: "If a state originally owned its land, in the fullest

sense of the term, it had the right of voluntary alienation which is inherent in such ownership. Increments of value, present and future, are its property; in alienating them it gives away its own. If the attainment of its ends requires that they be transferred to others, the title of the grantees is valid. To deny to the state the privilege of alienation is to essentially abridge its natural rights; it is to make its ownership of the land incomplete." In relation to what is incorrectly termed "unearned increments," it is remarked, "if the essence of property is regarded, and not its form, the increments of value attaching to land are not unearned by their proprietors. In an active market land has its fair price, and this is based partly on the future increments themselves." The loss arising from a confiscation of land-value would fall "not merely on millions who have titles in fee simple, but on all who have made loans on land as security. . . . . To every one it would come in the shape of a seizure by the state of property invested in accordance with its own positive invitation."

The communication of moral ideas, and not ideas about morality, which are the abstract or scientific renderings of moral ideas, is considered by Mr. Bosanquet as the proper function of an Ethical Society. The fault of the present time is distraction, and "one great cause of this distraction is the notion of a general duty to do good, or something other than and apart from doing one's work well and intelligently." The only certain way of communicating moral ideas is contagion, and the most useful teacher of morality is "not so much a man of abstract theory as a man of reasonable experience."

Ethics may be of service to philosophy, says Mr. Salter, in opening up the realm of "what ought to be," beyond the realm of "what is and happens." Moral ideas belong to the realm of unverifiable ideas, which are believed in because of "their own intrinsic attractiveness and authority." Ethics tells us of the law according to which men should act, the law of justice and brotherhood; we may conclude "that whatever may be the actual forces in the world at any time, justice and love are rightfully supreme over them all, and that these are so interwoven with the order of things that nothing out of harmony with them can long stand." It is "the imperishable glory of transcendentalism in our country that in the decay and disintegration of the ancient creed," it sounded the high-note "that the soul can in some sense know the object of its worship; that it need not feed on hearsay, and tradition, and arguments, but can have vision." (Philadelphia: *International Journal of Ethics*, 1602 Chestnut St.)

REVUE PHILOSOPHIQUE. September, 1890. No. 177.

CONTENTS:

The principle of causality belongs only to the world of sense, that of children and of the commonality of mankind who neither reflect nor analyse their knowledge. It represents confusedly the continuity and inertia which are proper to the scientific stage, as colors represent imperfectly the undulations of the ether, and

sound the vibrations of ponderable matter. To make of causality a scientific property of things, a law of the phenomenal and mechanical world, is to affirm that bodies preserve their color in the absence of an eye to perceive it, or their sonorousness when no one hears them. Moreover, from a scientific standpoint, the words sound and color lose all proper meaning; while the principle of causality retains a sense, but then expresses a false proposition, and one which leads us incessantly into error. Several consequences flow from M. Lalande's conception of causality. The first is that this law is not a rational principle, but is an *empirical* formula, in the mathematical sense of that word. The second is that we are thereby led to see in the idea of *efficiency* an artificial concept, and, as would be said by philologists, a disease of language, instead of a mysterious "power" that emanates from one phenomenon in order to create its effect. A third consequence is the great simplification it leads to in the problem of induction, which requires us merely to believe in the stability of the laws of nature, which are only mathematical laws proved by experience. The true foundation of induction is the universal value of mathematics, which rests finally on the principle of identity. The degree of perfection of a science can be measured by the quantity of mathematics it employs; and it is this preconceived idea which has given birth to all the psycho-physical measures that have been recently introduced into psychology.

M. Guardia's paper gives a sketch of the philosophical system laid down in the work of the Spanish writer J. Huarte, *The Trial of the Spirits*, with an introductory account of the author and his book, which first appeared in 1575. Huarte is described as unique among Spanish thinkers, and as a leading figure among natural philosophers on account of the daring novelty of his original views and the excellence of his method, which is that of the inductive philosophy. His doctrine is founded on that of Galen, and he proclaims the principle that the physical determines the moral. All his metaphysics reduce themselves to the recognition of the action of exterior causes, which are of inorganic nature, and of the organism which reacts to them. He thus explains all the manifestations of life, heredity intervening as a factor in its evolution. Huarte was less concerned, however, with physiology and psychology, than with the amelioration of the social state. He worked for the future by creating of psychology an organic science of observation and experience, founded on the knowledge of human nature, and by basing on it the art of education.

In concluding his valuable study of the *Origin of Technology*, M. Espinas, after giving numerous examples drawn from ancient Greek life, says: "All the technical arts of this epoch have the same characters. They are religious, traditional, local. The myths referred to are at first the faithful as well as the symbolic expression of them." This mythological symbolism is "the product of a psychological and sociological projection, that is to say, the things of art are conceived as benevolent or angered feelings, as intelligent inventions or combinations that are attributed to fictitious idealised men, as exchanges that are made with them, as gifts or precepts that are received from them, or as orders imposed by their will. They are thus psychical operations or social products drawn from human consciousness unknown to it which, personified, find themselves invoked by it in order to explain to itself its own creations."

The unpublished matter referring to the manuscripts of Descartes is contained in a copy of the 1659 edition of the *Principes* of the French philosopher, and consists of numerous notes in the handwriting of its former owner Joseph de Beaumont. (Paris: Félix Alcan.)

REVUE PHILOSOPHIQUE. No. 178. October, 1890.

CONTENTS:

M. Tarde finds M. Lombroso too severe and at the same time too kind towards the spirit of conservatism. Too severe in terming it misoneism and too kind in regarding it as the only normal condition of societies. The hospitable reception given to novelties is an equally normal function, although intermittent. If instead of making all his sociological ideas circle round the idea of the *new*, and creating an unfruitful antithesis between the love and the hatred of novelty, he had taken as his central notion the idea of imitation, and proved the universal distinction between the imitation of the new and the imitation of the old, M. Lombroso would have escaped many errors. In all of us, caprice exists by the side of habit, due to physiological misoneism; and the conflict between them goes on in each individual throughout our life. Caprice triumphs at the commencement, but the contest is terminated in old age by the definite victory of habit. It is the same in the social life. The inclination to adopt new ideas is due to the law of imitation, which is a more important factor in great social movements than misoneism.

M. Belot remarks that he would not dare to write the title *Une théorie nouvelle de la liberté* if it referred to a theory of his own. Under it he criticises the theory advanced by M. Bergson in his *Essai sur les données immédiates de la conscience;* according to which freedom belongs, not to the empirical personality of the superficial ego, but to the deeper ego, the subjectivity itself, the alteration of which through the laws of thought and exigencies of science gives rise to the former. According to M. Belot, on the contrary, the will and freedom are shown in the forcing back of the lower ego, which comes to the surface, and its impulses by enlightened ideas. To act in harmony with these is freedom, which is not inconsistent with determinism in the proper sense. Determinism becomes freedom in becoming intelligent. Until then we obey concealed impulses, which may belong to our parents, our ancestors, or our social surroundings, and therefore we are not free.

By an excellent series of experiments, M. Féré has demonstrated that in attention all the qualities of movement are modified; its rapidity, its energy, and its precision, the physiological condition of the process being a general tension of the muscles. It is an error to suppose the intervention of arrestive action, of inhibition, in the physiology of attention. Voluntary immobility results from very intense muscular activities, and has for its physiological condition the general tension of the muscular system, which places the subject in such a condition that he can react in the quickest and most energetic manner possible to an excitation from whatever point it may come. This is the physiological condition of attention. The exercise of immobility is the most favorable to the development of intelligence, while the relaxation of the muscles which results from the removal of the tension tends to the suppression of attention, and of the psychical activity. Excitations of the skin determine exaggerated reflex activities, more rapid and more energetic

movements. As intelligence is developed, the reflex movements become less imperious, the multiplicity of motives of action gives the illusion of freedom of choice. When the excitable centres are incompletely developed, as with women and children, and especially with degenerates, the impulsions and the reflex activities generally, of which the centres are better developed, are more violent and more uncontrollable. (Paris: Félix Alcan).

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. I. Nos. 4 and 5.

CONTENTS:

Professor J. von Kries examines the hypotheses propounded of late concerning the recognition of the direction in which sound-waves reach the ear. Professor Preyer maintains that different irritations, according to the source of sound, take place in the semi-circular canals, and Münsterberg, on the basis of his own experiments, has with some essential modifications accepted Preyer's views. The author devotes his chief attention to the localisation of sounds originating either to the right or to the left of the median plane. The experiments were made with two movable whistles, the intensity of which could easily be regulated. The result was that concerning right and left direction, and also with regard to simultaneous sounds from both directions at a different pitch, each note could be correctly localised. He adds that, so far as he can judge, even he who adopts Münsterberg's view has to fall back upon a comparison of the intensity in both ears. A localisation of whistle-sounds in the median line, be it in front or at the back, was not so certain. A single tone was, upon the whole, correctly localised; yet it was difficult to discriminate two sounds in the median plane.

In another article on the same subject, entitled *On Interaureal Localisation of Diotic Sensations* Karl L. Schaefer of Jena recapitulates in brief the monotic and diotic experiments made by Silvanus B. Thompson, Purkynés, Urbantschitsch, and Preyer; completing the inquiries of Fechner on the subject he states the following result: "Let two tuning forks be placed at an equal distance from the median plane in front of the ears, so that their sound is medianly localised: 1) Synchronal vibrations of any pitch, at the same distance, and in exactly opposite directions, produce median oscillations; 2) If the forks are moved *a tempo* to the right or to the left, i. e. in the same direction, the sound rolls from ear to ear, so long as the motions are not too rapid; 3) If they are executed as quickly as possible the vibrations have their seats in both ears.

The Psychology of Causality is the subject of a longer article (47 pages) by Prof. Th. Lipps. Lipps declares that his "investigation intends to reduce causality

to association, and the law of causality to the law of association." The author does not identify his undertaking with the psychology of association, and protests against considering mind-activity as passive processes. He devotes almost too much space to stating what is, or can easily become, an anthropomorphic conception of causation. Where he propounds his positive views, we miss discriminative exactness. *Ursache* and *Grund* are not sufficiently distinguished, and the definitions of formal and material cognitions, are not lucidly stated. Dr. Lipps says: "All cognition is objectively conditioned representation; respectively associations of representations. In purely formal cognition the objective *raison d'être* (*Grund*) consists in the presence of a contents of consciousness. In material cognition, or cognition by experience in the narrower sense, it consists in the consciousness of the objective reality of a contents of consciousness."* The author's conclusion is summarised as follows:

"Hume's work and his mistake can thus plainly be recognised. That causal connection is a connection among our ideas, not a connection among the objects represented, that the necessity which distinguishes this connection consists in the psychological compulsion to combine one fact with another, that this compulsion has its reason in association, is the discovery of Hume; and this discovery of Hume is one of the most important in the history of philosophy. That the world becomes a world regulated by law, by being subjected to the law of our mind, this anthropocentric standpoint was therewith determined. Hume's mistake consisted only in this: He did not recognise the full importance of the law of association. Therefore he did not see what associative relations are directly identical with the causal relation. An attempt was made to cover the defect rising therefrom by the principle of habit. Not the principle of association, but the principle of habit depriving the principle of association of its strength, hindered Hume from proposing the correct answer to the question, 'How in experience are general and necessary judgments possible?'" Professor Lipps does not answer this question satisfactorily either; he gives no explanation of the fact that in experience general and necessary judgments are possible. He simply states the fact. Every natural scientist, he says, expects that a certain result that has been observed once, will always take place again if the experiment be repeated under exactly the same conditions.

Professor Lipps states, in concluding, that he is fully conscious of having discussed only a small part of that which might be said on this subject, and adds: "Perhaps objections or criticisms will give me an occasion for additional remarks." We here call his attention to the treatment of the subject in Dr. Paul Carus's pamphlet *Ursache, Grund und Zweck* (Dresden: Grumbkow, 1881) and also to his articles on Form and Formal Thought and on Causality in *Fundamental Problems*.

Dr. Richard Wahle, Privat-docent in Vienna, defines in a short sketch on *The Psychology of the Question* the meaning of Question in the following way: a question is "the preparation during a state of indecision for a perception of the decision." In explaining the meaning of this decision Richard Wahle makes an occasional fling at that kind of psychology which divorced from physiology confines itself to the method of introspection.

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* The passage being so difficult to translate, we quote the original in full: "Alle Erkenntniss ist objectiv begründetes Vorstellen, bezw. Verbinden von Vorstellungen. Bei der lediglich formalen Erkenntniss besteht der objective Grund im Dasein eines Bewusstseinsinhaltes, bei der materialen oder Erfahrungserkenntniss im engeren Sinne besteht er im Bewusstsein der objectiven Wirklichkeit eines Bewusstseinsinhaltes."

The last article, by Prof. H. Ebbinghaus, is the first part of a criticism of Fechner's posthumous letters on *Negative Empfindungs verthe*, published in the first numbers of this periodical. These letters, Ebbinghaus declares, afford an interesting insight into the scientific personality of Fechner; yet the doctrine contained therein, he adds, has its drawbacks. Ebbinghaus does not accept Fechner's presentation of the case, but refers us to Delbœuf from whose experiments alone, he says, the correct interpretation of negative values of sensations can be derived. Delbœuf's views are not so clearly presented in his first statement as in a later article written in answer to the objections of Tannery, published in the *Revue Philosophique* V. 1878, and republished under the title *Examen critique de la loi psychophysique* (Paris, 1883). Ebbinghaus adopts Langer's definition of negative values of sensations. They are "such as under all circumstances if additively connected with equally great positive ones produce as a result zero."

The reports of the proceedings of the International Congress of Physicians, Berlin, 1890, will be of special value to physicians. The present number contains those of the sections of oculists and aurists.

The number contains a valuable bibliographical catalogue of the chief works on physiological psychology for the year 1889. (Hamburg and Leipsic: L. Voss.)

PHILOSOPHISCHE MONATSHEFTE. Vol. XXVII. Nos. 1 and 2.

CONTENTS:

Professor Paul Natorp, the editor, discusses Quantity and Quality in Concept, Judgment, and Objective Cognition. His object is the attempt not to proceed subjectively, or psychologically, or genetically, or causally, or teleologically, but purely objectively in the same sense as mathematics proceeds objectively. The result which he reaches is summarily expressed in the statement "that there is no formal logic . . . and that it cannot exist at all—except it be based upon the logic of objective cognition (transcendental logic), or represents a part thereof, the severance of which from the whole to which it belongs can have merely technical not scientific reasons." (Heidelberg: Georg Weiss.)

RIVISTA ITALIANA DI FILOSOFIA. September and October, 1890.

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RIVISTA ITALIANA DI FILOSOFIA. November and December, 1890.

CONTENTS:

There are two problems which at present command a general and a keen interest in all countries; viz. the psychological problem and the ethical problem, the latter comprising all the questions of education and instruction, religious as well as secular. If this is true of Germany, France, England, and the United States, it is no less true of Italy. The *Rivista Italiana di Filosofia*, so ably edited by Luigi Ferri, Professor at the University of Rome, shows this tendency in its latest numbers in a marked degree. They contain among other valuable materials an article by Luigi Pietrobono on the perception of the human body, a psycho-physiological investigation of sentient substance with special reference to sensation and perception. The author arrives at a result, which, if it could be sustained, would lead to an outspoken dualism. Pietrobono believes in two principles, a psychical and an organical, forming an original synthesis and antithesis, interdependent upon and inseparable from each other. Vittorio Benini discusses in the same number the captivating subject of Attention, starting from a discussion of Ribot's monograph on the subject, and devoting his main interest to what he calls "l' attenzione perceptiva è accompagnata dall' intelligenza." The latter kind of attention is of especial importance in education, a subject which is discussed in the conclusion of the article. This leads us to another essay which treats of an exclusively educational subject, proposing the pedagogical ideas of Pietro Ceretti. This article does not contain new truths, but emphasises truths which have perhaps been too little recognised in Italy. Starting from the maxim that all education must develop the faculties of body, soul, and mind (le facoltà del corpo, dell' anima e della mente), and that all education must be conducted so as to let the social body derive the benefits therefrom, he urges besides demanding the moral and intellectual culture of man a technical instruction, and among the sciences, literature, and history, he would give mathematics a prominent place.

It may be added that the department of Bibliography contains among other reviews discussions of the following works: 1) Reich's book on Gian Vincenzo Gravina as an author of æsthetics; 2) Antonio Rosmini's Fragments of a Philosophy of Law and Politics; 3) Robert Benzoni's The Philosophy of Our Day; 4) Pietro Ellero's The Social Question; 5), in the December number, Ferdinando Puglia's Evolution in the History of Italian Philosophical Systems; 6) The national edition of Galileo Galilei's works; and 7) La Somiglianza nella Scuola Positivista e l'Identità nella Metafisica Nuova, by Donato Jaia.

VOPROSY FILOSOFI I PSICHOLOGUII.* Vol. I. No. 4.

CONTENTS:

(PART I.)

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* *Questions of Philosophy and Psychology.* In the Russian language.

The distinguished Editor, Prof. N. Grote, in his introductory remarks calls attention to the fact that the present issue of this philosophical and literary review in the Russian language, completes the series that had been promised during the first year of its existence. The review does not claim, during this brief lapse of time, to have been able to solve all the many problems incident to the task that it had assumed at the outset of its career; but it may at least modestly claim to have won the hearty sympathy of an intelligent fraction of the Russian people, expressed by the acquisition of a comparatively large number of subscribers. This material success, moreover, attests the fact that the editor did not deceive himself when at the original publication of the review he seemed to notice an awakening in his country of more serious intellectual interests, and the rise of a desire for a philosophical analysis of the principles of knowledge and of life.

On the other hand, with regard to whether the problems treated of in the pages of the review are identical with those that occupy by preference the minds of intelligent Russian readers; or whether the exposition and the methods of investigation have been properly adjusted to the degree of development and to the mental calibre of the mass of its readers, it will suffice to remark, says the editor, that the full development of all the potential forces of nature and of mind can be attained only through slow and persistent action. We have to bear in mind that the attempt is by no means easy to organise for the first time in a project of this kind the many active workers of a country in which people had never before been associated in a similar undertaking. Yet in confidently entering upon the publication of this review, the editor well knew that there existed in Russia abundant intellectual powers, perfectly adequate to the demands of a high-class philosophical magazine—scientists, learned specialists, talented thinkers, and men of letters; and the review without doubt will not fail to enlist the valuable assistance of all these men in the arduous task, which it will continue steadily to pursue. The main task above all, is to advance the development of *self-consciousness* in modern Russian society, but the success of this aspiration depends of necessity on the continued sympathy and good will of the public.

As regards the external form of the review, for the greater convenience of the public, instead of four volumes of 20 sheets, as hitherto, there will be issued during the present year five volumes in all—one volume of 15–16 sheets bimonthly, except during the midsummer months.

The editor in conclusion expresses his acknowledgment to several of his western colleagues, to the editors of *Mind*, the *Revue Philosophique*, the *Archiv für Geschichte der Philosophie*, and *The Open Court*—all of whom have promised to note with genuine interest the contents of the Russian review "Questions of Philosophy and of Psychology." (Moscow, 1890.)

VOL. I. APRIL, 1891. NO. 3.

THE MONIST.

THE FACTORS OF EVOLUTION.

THEIR GRADES AND THE ORDER OF THEIR INTRODUCTION.

THE usually recognised factors of evolution are at least five; viz.: (1) Pressure of a changing *environment* affecting function and function affecting structure, and the changed structure and function inherited and integrated through successive generations indefinitely. (2) *Use and disuse* of organs reacting on growth-force and producing change in form, structure, and relative size of parts, and such change inherited and integrated through successive generations. (3) *Natural selection* among individuals of a varying progeny, of those most in accord with an ever-changing environment—or as it has been otherwise called "*survival of the fittest*" in each successive generation. (4) *Sexual selection:* the selection by the female, among varying male individuals all competing for her possession, of the strongest or the most attractive. Among mammals the selection is mainly of the strongest as decided by *battle;* among birds, of the most attractive as determined by splendor of color or beauty of song. (5) *Physiological selection*, or selection of those varieties, the individuals of which are fertile among themselves, but sterile or less fertile with other varieties and with the parent stock. This has also been called "*segregate fecundity*" by Gulick, and homogamy by Romanes.

These five factors are all usually but not universally recognised. The first two are Lamarckian, the second two Darwinian factors. In the Lamarckian factors the changes occur *during individual life*,

and the offspring is supposed to inherit them unchanged. In the Darwinian factors on the contrary the *changes are in the offspring*, and the individuals during life are supposed to remain substantially unchanged. The fifth factor has, only very recently, been brought forward by Romanes and Gulick and is not yet universally recognised; but we believe that with perhaps some modifications it is certain to triumph. (6) To these recognised factors of organic evolution must now be added, in *human evolution*, another and far higher factor, viz. conscious, voluntary *co-operation in the work of evolution*, conscious striving for the betterment of the individual and of the race. This factor consists essentially in the *formation and pursuit of ideals*. We call this a factor, but it is also much more than a factor. It stands in place of nature herself—it is a higher-rational nature using all the factors of physical nature for its own higher purposes. To distinguish the evolution determined by this factor from organic evolution, we often call it *progress*.

Underlying all these factors as their necessary condition, and therefore themselves not called factors, are two opposite operative principles, viz. *heredity and variability*. Like the conservative and progressive elements in society, one tends to fixedness, the other to change. The one initiates change, the other accumulates its effects in successive generations. The one tries all things, the other holds fast to whatever is good. They are both equally necessary to the successful operation of any or all of the factors.

Let us now compare these six factors, as to their grade or position in the scale of energy and as to the order of their introduction.

The first two—Pressure of the environment and Use and disuse, i. e. the Lamarckian factors—are the lowest in position, most fundamental in importance, and therefore most universal in their operation. They are therefore also first in the order of time. They precede all other factors and were *for a long time the only ones in operation*. For observe: all the selective factors, viz. those of Darwin and Romanes, are wholly conditioned on Reproduction; for the changes in the case of these are not in the individual life but only in the offspring. And not only so but they are also strictly *conditioned on sexual modes of reproduction*. For all non-sexual modes of

reproduction such as fission and budding are but slight modifications of the process of growth, and the resulting multitude of organisms may be regarded as in some sense *only an extension of the first individual.* There is thus a kind of immortality in these lowest protozoa. Of course therefore the identical characters of the first individual are continued indefinitely *except in so far as they are modified* in successive generations by the effect of the environment or by use and disuse of organs—i. e. by *Lamarckian factors.* In sexual generation, on the contrary, the characters of two diverse individuals are funded in a common offspring ; and the same continuing through successive generations, it is evident that the inheritance in each individual offspring is infinitely multiple. Now the tendency to variation in offspring is in proportion to the multiplicity of the inheritance : for among the infinite number of slightly different characters, as it were offered for inheritance in every generation, some individuals will inherit more of one and some more of another character. In a word, sexual generation, by multiple inheritance, tends to variation of offspring and thus *furnishes material for natural selection.*

Thus then I repeat, all the selective factors are absolutely dependent for their operation upon sexual reproduction. *But there was a time when this mode of reproduction did not exist.* It is certain the non-sexual preceded the sexual modes of reproduction. I cannot stop now to give the reasons for believing this. I have already given them in some detail in a previous article* to which I would refer the reader. Suffice it to say now that the order of introduction of the various modes of reproduction culminating in the highest sexual modes is briefly as follows : (1) *Fission.* An organism of the lowest kind grows and divides into two. Each half grows to mature size and again divides ; and so on indefinitely. In this case there is no distinction between parents and offspring. Each seems either or neither. (2) *Budding.* Growth-force concentrating in one part produces a *bud,* which continues to grow and individuate itself

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* *Genesis of Sex*, *Pop. Sci. Monthly*, 1879, Vol. xvi. p. 167. *Revue Scientifique*, Feb. 14, 1880.

more and more until it separates as a distinct individual. This is a higher form than the last because in this case the individual is not sacrificed. Only a small part separates and the separated part is in some sense an *offspring*. We have therefore for the first time the distinction of parent and offspring. (3) By the *law of differentiation and localisation of functions*, the bud-forming function is next relegated to a special place and we now have a bud-forming organ. (4) By another general law, the law of *interior transfer*, the bud-forming organ is next transferred for greater safety to an interior surface and thus *simulates* an ovary, although not yet a true ovary or *egg-forming* organ. Examples of all these steps are found among existing animals.

Thus far reproduction is non-sexual. But now comes the great step, i. e. the introduction of sexual reproduction, in its lowest forms. (5) This simulated ovary or bud-forming organ becomes a true ovary or egg-forming organ; or rather, at first, a combination of ovary and spermary. The same organ prepares two kinds of cells, male and female, germ-cell and sperm-cell, which by their union produce an egg which develops into an offspring; and not only an offspring in the sense of a separated part of a previous individual, but in some sense a new creature, the creation of a *new individual*. There is an enormous difference and even contrast between this and all preceding modes. In non-sexual modes one individual becomes two; in this, two individual cells unite to form one. It is an expensive, even wasteful mode unless attended with some great advantage. The nature of this advantage we will presently see.

Thus far we have given only the lowest form of sexual generation. The two sexual *elements* only, germ-cell and sperm-cell are separated from each other, but not yet even the sexual organs, ovary and spermary, much less the sexual individuals, male and female. (6) The sex-element-forming function is next differentiated and localised in two different organs, ovary and spermary, but not yet in two different individuals. This is hermaphroditism so common in plants and in lower animals. (7) The already separated sexual organs are next localised in different individuals, and we now have male and female individuals. This is the case in many plants

and in all the higher animals. (8) And finally these male and female individuals become more and more diverse in character.

The object of this whole process of separation, first of the elements, then of the organs, then of the individuals, and last the increasing divergence of the individuals, is undoubtedly the funding of more and more diverse characters in a common offspring; and thus by increasing multiplicity of inheritance to insure larger variation in offspring and thereby furnish more abundant material for natural selection. This is far more than a compensation for the apparent wastefulness of this mode of reproduction.

If then the non-sexual preceded the sexual modes of reproduction, evidently, *at first, only Lamarckian factors could operate.* Evolution was then carried forward wholly by changes in the individual produced by *the environment* and by *use and disuse of organs*, continued and increased through successive generations indefinitely. It is probable therefore that for want of the selective factors, the rate of evolution was at first comparatively slow; unless indeed, as seems probable, the earliest forms were, as the lowest forms are now, more plastic under pressure of physical conditions than are the present higher forms. The great contrast between the Lamarckian and Darwinian factors in this regard, and the slowness of change *now* in higher forms under *Lamarckian factors alone*, is best shown in plants where either kind of factors may be used at pleasure. In these, if we wish to *make* varieties, we propagate by seeds—sexual reproduction—but if we wish to *preserve* varieties, we propagate by buds and cuttings—non-sexual reproduction.

We have taken the two Lamarckian factors together, in contrast with the Darwinian. But even in the two Lamarckian factors there is a great difference in grade. Undoubtedly the lowest and first introduced was pressure of the *physical environment.* For even *use and disuse* of organs implies some degree of volition and voluntary motion, and therefore already some advance in the scale of evolution.

With the introduction of sex another entirely different and higher factor was introduced, viz. *natural selection*, among a varying progeny, of the fittest individuals. We have already seen how

sexual generation produces variation of offspring and how this furnishes material for natural selection. As soon, therefore, as this form of generation was evolved, this higher factor came into operation, and immediately, as it were, *assumed control* of evolution, and the previous factors *became subordinate* though still underlying, conditioning, modifying the higher. The result was an immediate increase in the speed and in the diversity of evolution. It is very worthy of note too, that it is in the higher animals, such as birds and mammals, where we find the highest form of sexual generation, where the diversity of funded characters and therefore the variation in the offspring is the greatest, and natural selection most active: it is precisely among these that the Lamarckian factors are most feeble, because during the most plastic portion of life the offspring is removed from the influence of the physical environment and from the effects of use and disuse, by their enclosure within the womb or within a large egg well supplied with nourishment. In these, development is already far advanced before Lamarckian factors can operate at all.

Next I suppose *Physiological selection* or Romanes's factor came into operation. After the introduction of sex, it became necessary, that the individuals of some varieties should be in some way *isolated*, so as to prevent the swamping of varietal characters as fast as formed, in a common stock by cross breeding. In very low forms with slow locomotion, such isolation might easily take place accidentally. Even in higher forms, changes in physical geography or accidental dispersion by winds and currents, would often produce *geographical isolation;* and thus by preventing crossing with the parent stock, secure the formation of new species from such isolated varieties. But in order to insure in all cases the preservation of commencing species, *sexual isolation* was introduced or evolved as I suppose later, and according to Romanes somewhat as follows:

All organs are subject to variation in offspring, but none are so sensitive in this regard as the reproductive organs; and these in no respect more than in relative fertility under different conditions. Suppose then the offspring of any parent to vary in many directions. By cross-breeding among themselves and with the parent stock,

these are usually merged in a common type, their differences pooled, and the species remains fixed or else advances slowly by natural selection, along *one line*, as physical conditions change in geological time. But from time to time there arises a variation in the reproductive organs of some individuals, of such kind that these individuals are fertile among themselves, but sterile or less fertile with other varieties and with the parent stock. Such individuals are *sexually isolated* from others, or *sexually segregated* among themselves. Their varietal differences of all kinds are no longer swamped by cross-breeding, but go on to increase until they form a new species. It is evident then, as Romanes claims, that natural selection alone tends to *monotypal* evolution. Isolation of some sort seems necessary to *polytypal* evolution. The tree of evolution under the influence of natural selection alone grows palm-like from its terminal bud. Isolation was necessary to the starting of lateral buds, and thus for the *profuse ramification* which is its most conspicuous character.

Next, I suppose, was introduced, *sexual selection*, or contest among the males by battle or by display, for the possession of the female, the success of the strongest or the most attractive, and the perpetuation and increase of these superior qualities of strength or beauty in the next generation. This I suppose was later, because connected with a higher development of the psychical nature. This is especially true when beauty of color or song determines the selection. As might be supposed therefore, this factor is operative only among the highest animals, especially birds and mammals, and perhaps some insects.

Next and last, and only with the appearance of man, another entirely different and far higher factor was introduced, viz. *conscious, voluntary co-operation in the work of evolution*—a conscious voluntary *effort to attain an Ideal.* As already said, we call this a factor, but it is much more than a factor. It is another nature working in another world—the spiritual—and like physical nature using all factors, but in a new way and on a higher plane. In early stages man developed much as other animals, unconscious and careless whither he tended and therefore with little or no voluntary effort to

attain a higher stage. But this voluntary factor, this striving toward a goal or ideal, in the individual and in the race, increased more and more until in civilised communities of modern times it has become by far the dominant factor. Reason, instead of physical nature, takes control, though still using the same factors.

Now, in this whole process, we observe two striking stages. The one is the introduction of Sex, the other the introduction of Reason.* They might be compared to two equally striking stages in the evolution of the individual, viz. the moment of *fertilisation* and the moment of *birth*. As the ontogenic evolution receives fresh impulse at the two moments of fertilisation and of birth; so the evolution of the organic kingdom at the two periods mentioned. With the appearance of *sex*, three new and higher factors are introduced, and these immediately assumed control and quickened the rate of evolution. With the appearance of reason in man another and far higher factor is introduced which in its turn assumes control, and not only again quickens the rate, but elevates the whole plane of evolution. This voluntary, rational factor not only assumes control itself, but transforms all other factors and uses them in a new way and for its own higher purposes.

This last is by far the greatest change which has ever occurred in the history of evolution. In organic evolution nature operates by necessary law without the voluntary co-operation of the thing evolving. In human progress man voluntarily co-operates with nature in the work of evolution and even assumes to take the process mainly into his own hands. Organic evolution is by *necessary* law, human progress by *free*, or at least by *freer*, law. Organic evolution is by a *pushing* upward and onward from below and behind, human progress by an aspiration, an attraction toward an ideal—a *pulling* upward and onward from above and in front.

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*By Reason I mean the faculty of dealing with the phenomena of the inner world of consciousness and ideas, or *reflection* on the facts of consciousness. Animals live in *one* world, the outer *world of sense*; man in *two* worlds, in the outer world like animals, but also in the inner and higher *world of ideas*. All that is characteristic of man comes of this capacity of dealing with this inner world. In default of a better word I call it Reason. If any one can suggest a better word will gladly adopt it.

This great change may well be likened to a *birth.** Spirit or Reason or the Psyche—call it what you like—was in embryo in animals in increasing degrees of development through all geological times and came to birth and capacity of free activity, became free spirit investigating its own phenomena in man. In animals the evolution of Psyche was the unconscious result of organic evolution. In man the Psyche is *born* into a new world of freer activity and undertakes to develop itself.

It may be well to stop a moment and show briefly some of the striking differences between organic and human evolution, differences resulting wholly from the introduction of this new factor, or rather this evolution on a new and higher plane.

(1) In organic evolution the fittest are those most in *harmony with the environment* and therefore they *survive.* In human evolution the fittest are those most *in harmony with the ideal,* and often, especially in the early stages of evolution, during the dominance of natural selection, they *do not survive* because not in harmony with the social environment.

(2) In organic evolution the weak, the helpless, the unfit in any way, *perish,* and ought to perish, because this is the most efficient way of *strengthening the blood,* or *physical* nature. In human evolution the weak, the helpless, the physically unfit, are *sustained,* and ought to be sustained, because sympathy, love, pity *strengthens the spirit or moral nature.* But the spirit or moral nature is also sustained by, and conditioned on, the physical nature. In all our attempts therefore to help the weak we must be careful that we avoid poisoning the blood and weakening the physical health of the race. This we believe can and will be done by *rational education,* physical, mental, and moral. We only allude to this. It is too wide a subject to follow up here.

(3) In organic evolution the *form must* continually *change* in order to keep in harmony with the changing environment. In other words evolution is by constant *change of species,* genera, etc.; there

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*See *Evolution and its Relation to Religious Thought,* Part iii. Chap. iv, where the writer's views are more fully brought out.

must be a continual evolution of *new forms*. In human evolution, and more and more as civilisation goes on, man modifies the environment so as to bring it in harmony with himself and his wants, and therefore there is *no necessity for* change of form or *making of new species of man*. Human evolution is not by modification of *form*—new species, but by modification of spirit—new planes of activity.

(4) In organic evolution as a higher factor arises it assumes control, and previous factors sink into subordinate position. But in human evolution the rational factor not only assumes control but transforms all other factors, using them in a new way and for its own higher purposes. Thus the Lamarckian factor—*environment*—is modified and even changed so as to affect suitably the human organism. This is *Hygiene* or *Sanitation*. Again, the various organs of the body and faculties of the mind are deliberately *used* (another Lamarckian factor) in such wise as to produce their highest efficiency. This is *education*, or *training*, physical, mental, moral. So also the selective factors are similarly transformed, and natural selection becomes rational selection. This is freely applied to domestic animals and with limitations imposed by reason itself will be applied to man.

(5) The way of evolution toward the highest, i. e. from Protozoa to man and from lowest man to the ideal man, is a *very narrow way*, and few there be that find it. In the case of organic evolution it is *so* narrow, that once get off the track and it is impossible to get on again. No living form of animal is now on the way to form man, can by any possibility develop manward. They are all gone out of the way. They are all off the trunk line. The golden opportunity is past. The tree of evolution is an *excurrent* stem continuous to the terminal shoot—man. Once leave the main stem as a branch, it is easy to continue growing in the direction chosen, but impossible to get back again on the straight upward way to the highest. In human evolution whether individual or racial, the same law holds, but with a difference. If an individual or a race gets off from the straight and narrow way toward the highest, the Divine ideal, it is *hard* to get back on the track; hard but not

impossible. Man's own effort is the chief factor in his own evolution. By virtue of his self-activity, and through the use of reason, man alone is able to rectify an error of direction and return again to the deserted way.

REFLECTIONS ON THE ABOVE PRINCIPLES AND THEIR APPLICATION TO SOME QUESTIONS OF THE DAY.

I.

Just now there is much controversy in regard to the factors of evolution. Both Darwin and Spencer, the two greatest expounders of the modern theory of evolution, acknowledge and insist upon at least four factors; viz. the two Lamarckian and the two distinctively Darwinian. The only difference between them is in the relative importance of the two sets; Spencer regarding the former and Darwin the latter as the more potent. But some late Darwinians have gone far beyond Darwin himself in their estimate of the power of the most distinctive Darwinian factor, viz. natural selection. Weismann and Wallace have each written a book, and Lankester many excellent articles to show that natural selection is the one sole and sufficient cause of evolution, that changes during the individual life whether by effect of the environment or by the use and disuse of organs *are not inherited at all*, that Lamarck was wholly wrong and that Darwin (in connection with Wallace) is the sole founder of the true theory of evolution, and finally that Darwin himself was wrong only in making any terms whatever with Lamarck.

The argument for this view has, perhaps, been most strongly put by Weismann and is based partly on experiments, but mainly on his ingenious and now celebrated theory of the *immortality of germ-plasm.* The animal body consists of two kinds of cells wholly different in function, somatic cells and germ-cells, including in this last the sexual elements both male and female. Somatic cells are modified and specialised for the various functions of the body; germ-cells are wholly unmodified. The somatic cells are for the conservation of the *individual* life, germ-cells for the conservation of the *species.* Now according to Weismann, *inheritance is only through germ-cells.* Environment affects only the somatic cells and there-

fore changes produced by environment cannot be inherited. Sexual generation was introduced for the purpose of producing variability in progeny and thus furnishing material for natural selection, as this was the only means of evolutionary advance. Weismann made many experiments on animals, especially by mutilation, to show that somatic changes are not inherited.

We shall not argue this question but content ourselves with making three brief remarks.

1. If the views presented in this article be true, then the Lamarckian factors must be true factors, because *there was a time when there were no others.* They were necessary therefore to start the process of evolution, even if no longer necessary at present.

2. But if the Lamarckian factors were ever operative, *they must be so still,* though possibly in a subordinate degree. A lower factor is not abolished, but only becomes subordinate to a higher factor when the latter is introduced. Thus it may well be that Lamarckian factors are comparatively feeble at the present time and among present species, especially of the higher animals, and yet not absent altogether. In the earliest stages of evolution there was a complete *identification of germ-cells and somatic cells*—of the individual with the species. In such cases, of course, the effect of environment must be inherited and increased from generation to generation. But the differentiation of germ and somatic cells was not all at once ; it was a *gradual process,* and therefore the effect of the environment *on the germ-cells through the somatic cells* must have continued, though in decreasing degree, and still continues. The differentiation is now, in the higher animals, so complete that germ-cells are probably not at all affected by changes in somatic cells, unless these changes are *long continued in the same direction and are not antagonised by natural selection.*

3. It is a general principle of evolution that *the law of the whole is repeated with modifications, in the part.* This is a necessary consequence of the Unity of Nature. We ought to expect therefore and do find, that the order of the use of the factors of evolution is the same in the evolution of the *organic kingdom,* in the evolution of *each species,* and in the evolution of *each individual.* In all these

the physical factors are first powerfully operative, then become subordinate to organic factors, and these in their turn to psychical and rational factors. Therefore, as the individual in its early stages, i. e. in embryo and infancy, is peculiarly plastic under the influence of the physical environment and afterwards becomes more and more independent of these: so a species when first formed is more plastic under the influence of the Lamarckian factors and afterwards becomes more rigid to the same. And so also the organic kingdom was doubtless at first more plastic under Lamarckian factors, and has become less so in the present species, especially of the higher animals. The principal reason for this, as we have already seen, is the increasing differentiation of germ and somatic cells, and the removal of the former to the interior where they are more and more protected from external influence.

II.

Some evolutionists—the materialistic—insist on making human evolution identical in all respects with organic evolution. This we have shown is not strictly true. The very least that can be said is that a new and far more potent factor is introduced with man, which modifies greatly the process. But we may claim much more, viz. that evolution is here on a wholly different and higher plane. The factors of organic evolution are indeed still present and condition the whole process; but they are not left to be used by nature alone. On the contrary, they are used in a new way and for higher purposes by Reason.

But by a revulsion from the materialistic extreme, some have gone to the opposite extreme. They would place human progress and organic evolution in violent antagonism, as if subject to entirely different and even opposite laws. But we have also shown, that although the distinctive human factor is indeed dominant, yet it is underlaid and conditioned by all the lower factors—that these lower factors are still necessary as the agents used by Reason.

III.

We have already alluded to Weismann's and Wallace's views, but there is one important aspect not yet touched.

If Weismann and Wallace are right, if natural selection be indeed the only factor used by nature in organic evolution and therefore available for use by Reason in human evolution, then alas for all our hopes of race-improvement, whether physical, mental, or moral! All enlightened schemes of *physical culture* and of *hygiene*, although directed indeed primarily for the strength, health, and happiness of the *present generation*, yet are sustained and ennobled by the conviction that the physical improvement of the individual, by inheritance enters into a similar improvement of the race. All our schemes of *education*, intellectual and moral, although certainly intended mainly for the improvement of the individual, are glorified by the hope that the race is also thereby gradually elevated. It is true that these hopes are usually extravagant; it is true that the whole improvement of the individuals of one generation is not carried over by inheritance into the next; it is true therefore that we cannot by education raise a lower race up to the plane of a higher race *in a few generations;* but there must be a small residuum, be it ever so small, carried forward by inheritance and accumulated from age to age, which enters into the slow growth of the race. If it be true that reason must direct the course of human evolution, and if it be also true that selection of the fittest is the only method available for that purpose; then, if we are to have any race-improvement at all, the dreadful law of *destruction of the weak and helpless* must with Spartan firmness be carried out voluntarily and deliberately. Against such a course all that is best in us revolts. The use of the Lamarckian factors, on the contrary, is not attended with any such revolting consequences. All that we call education, culture, training, is by the use of these. Our hopes of race-improvement therefore are strictly conditioned on the fact that the Lamarckian factors are still operative, that changes in the individual, if in useful direction, are to some extent inherited and accumulated in the race.

IV.

We have said that the new factor introduced with man is a voluntary co-operation in the process of evolution, a conscious upward striving toward a higher condition, a pressing forward toward

an ideal. Man contrary to all else in nature is transformed, not in *shape* by external environment, but in *character by his own ideals*. Now this capacity of forming ideals and the voluntary pursuit of such ideals, whence comes it? When analysed and reduced to its simplest terms, it is naught else than the consciousness in man of his relation to the infinite and the attempt to realise the divine ideal in human character.

JOSEPH LE CONTE.

ILLUSTRATIVE STUDIES IN CRIMINAL ANTHROPOLOGY.

III.

THE PHYSIOGNOMY OF THE ANARCHISTS.

ONE of the most curious applications, and perhaps the most practical, of Criminal Anthropology, (of that new science which has associated itself with sociology, psychiatry, and history,) is that which flows from the study of the physiognomy of the political criminal. For not only does it appear to succeed in furnishing us with the juridical basis of political crime, which hitherto seemed to escape all our researches, so completely that until now all jurists had ended by saying that there was no political crime; but it seems also to supply us with a method for distinguishing true revolution, always fruitful and useful, from utopia, from rebellion, which is always sterile. It is for me a thoroughly established fact, and one of which I have given the proofs in my "Delitto Politico," * that true revolutionists, that is to say, the initiators of great scientific and political revolutions, who excite and bring about a true progress in humanity, are almost always geniuses or saints, and have all a marvellously harmonious physiognomy; and to verify this it is sufficient simply to look at the plates in my "Delitto Politico." What noble physiognomies have Paoli, Fabrizi, Dandolo, Moro, Mazzini, Garibaldi, Bandiera, Pisacane, la Petrowskaia, la Cidowina, la Sassulich! Generally we see in them a very large forehead, a very bushy beard, and very large and soft eyes; sometimes we

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* 1890.

meet with the jaw much developed, but never hypertrophic; sometimes, finally, with paleness of the face (Mazzini, Brutus, Cassius); but these characteristics seldom accumulate in the same individual to the extent of constituting what I call the criminal type.

In a study that I have made with three hundred and twenty-one of our Italian revolutionists, (against Austria etc.,) nearly all males, (there were twenty-seven women to one hundred men,) the proportion of the criminal type was 0·57 per cent. ; i. e. 2 per cent. less than in normal men. Out of thirty celebrated Nihilists, eighteen have a very fine physiognomy, twelve present some isolated anomalies, two only present the criminal type (Rogagiew and Oklasdky), that is to say 6·8 per cent. And if from these unfortunate men who represent to us, even psychologically, the Christian martyrs, we pass to the regicides, to the presidenticides, such as Fieschi, Guiteau, Nobiling, and to the monsters of the French Revolution of 1789, such as Carrier, Jourdan, and Marat, we there at once find in all, or in nearly all, the criminal type. And the type again frequently appears among the Communards and the Anarchists. Taking fifty photographs of Communards I have found the criminal type in 12 per cent. ; and the insane type in 10 per cent. Out of forty-one Parisian Anarchists that I have studied with Bertillon at the office of the police of Paris, the proportion of the criminal type was 31 per cent.

In the rebellion of the 1st of May last I was able to study one hundred Turin Anarchists. I found the criminal type among these in the proportion of 34 per cent., while in two hundred and eighty ordinary criminals of the prison at Turin the type was 43 per cent.

TABLE OF PERCENTAGE OF CHARACTERISTICS.

CHARACTERISTICS.	TURIN ANARCHISTS	ORDINARY CRIMINALS	CHARACTERISTICS.	TURIN ANARCHISTS	ORDINARY CRIMINALS
Exaggerated plagiocephaly.....	11	21	Dental anomalies	30	20
Facial asymmetry.....	36	60	Anomalies of the ears	64	75
Other cranial anomalies (ultra-			Anomalies of the nose.....	40	57
brachycephaly etc.)	15	44	Anomalous coloration of skin....	30	8
Very large jaw.....	19	29	Old wounds	10	26
Exaggerated zygomas	16	23	Tattooing	4	10
Enormous frontal sinus.....	17	19	Neuro-pathological anomalies ...	8	26

Among the 100 individuals arrested on the 1st of May, 30 per cent. were recidivists for common crimes; among the others, 50 per cent. Of true prison *habitués* there were 8 among the former and 20 among the latter.

Thanks to the assistance of Dr. Carus of *The Open Court Publishing Company*, who has sent me many curious data and also the work of Schaack, "Anarchy and Anarchists" (Chicago, 1889), which is very partial, although rich in facts, I have been able to study the photographs of 43 Chicago anarchists, and I have found among them almost the same proportion of the criminal type, that is 40 per cent. The ones that presented this type are the two Djeneks, Potoswki, Cloba, Seveski, Stimak, Sugar, Micolanda, Bodendick, Lieske, Lingg, Oppenheim, Engel and his wife, Fielden, G. Lehm, Thiele, and Most. Especially in Potowski, Sugar, and Micolanda I mark facial asymmetry, enormous jaws, developed frontal sinus, protruding ears; and the same (except the asymmetry) in Seveski and Novak. Fielden has a turned up nose and enormous jaws; Most has acrocephaly and facial asymmetry. On the contrary a very fine physiognomy has Marx, with his very full forehead, bushy hair and beard, and soft eyes; and likewise Lassalle, Hermann, Schwab, the two Spies, Neebe, Schnaubelt, Waller, and Seeger.

In studying the chief anarchists separately,—the martyrs of the Chicago anarchists, it might well be said,—there is found in them all an anomaly, very frequent in normal men as well; that is to say the ears are without lobes; the ears are also developed a little more than normally in all (except in Spies), they are protruding in Lingg, Fischer, and Engel; the jaw is much developed in Lingg, Spies, Fischer, and Engel; all have, however, except Spies,* the forehead fine and full, with great intelligence. In the plates of the journal *Der Vorbote* we find a Mongolic cast of feature in Engel and

* Thus according to the portrait in Schaack's book; but according to information which I later received from General Trumbull of Chicago, this portrait is not true to life. It would seem, then, that the features upon which my opinion is based do not exist.

Lingg, both of whom should have much of the degenerative characters, enormous jaw and zygoma, and Lingg oblique eyes. But these characters are much less apparent in the photographs that I received from *The Monist* and in which the jaw of Fischer even decreases. Perhaps these photographs were taken some years before the crime, when they were very young. Certainly in both instances (in the *Vorbote* and the photographs from *The Monist*) I find a very noble and truly genial physiognomy in Parsons and Neebe. The physiognomy of August Spies is morbid. He has a senile auricle, voluminous jaw bones and a strongly developed frontal sinus. And, it is necessary to remark, the physiognomy corresponds with his autobiography, written with a fierce fanaticism; whilst in the posthumous writings of Parsons and in the writings of Neebe we remark a calm and reflective enthusiasm.

Schwab has the physiognomy of a *savant*, of a student; he much resembles the nihilist Antonoff, beheaded in Russia. (See Plate IV in my "Delitto Politico.") Neebe is quite like an Italian economist well known in America, Luigi Luzzatti.

Fielden has a wild physiognomy, not without sensuality. Parsons resembles Bodio, the great Italian statistician, and in the upper part of the face, Stanley.

When I say that the anarchists of Turin and of Chicago are frequently of the criminal type, I do not mean that political criminals, even the most violent anarchists, are true criminals; but that they possess the degenerative characters common to criminals and to the insane, being anomalies and possessing these traits by heredity; as a fact, the father of Booth was called Junius Brutus, and gave to his son the name of a revolutionist, Wilkes. The fathers of Guiteau and of Nobiling, and the mother of Staps were religious lunatics; and Staps also, like Ravaillac, Clement, Brutus, had hallucinations. In the autobiographies of the *Vorbote* I find that Parsons had a very religious Methodist mother and a father who had much to do with the movement of the Temperance League. Indeed, the Parsons since 1600 had as a family taken part in all revolutionary movements. A Tompkin, a relation of his mother, had taken part in the battles of Brandywine and of Mon-

mouth; a General Parsons was an officer in the Revolution of 1776, and a captain Parsons engaged in the battle of Bunker Hill.

Spies was born in a chateau celebrated for feudal robberies—called on that account the "Raubschloss."

The father of Louis Lingg suffered through his labor as a workman a concussion of the brain—according to the *Vorbote*.

The father of Fielden, an orator of power notwithstanding his occupation as a workman, was one of the agitators of the question of agricultural lands for workingmen in England; he was one of the founders of the "Consumers' Co-operative Society" and a prime mover in the society of "Odd Fellows." For those who will object that in many of these relations they see only geniuses, I have only to cite my work "L'Homme de Génie," where I have proved how often genius is nervous epilepsy, and how almost all the sons of men of genius are lunatics, idiots, or criminals.

This hereditary influence is seen also in the great number of brothers charged together, the two Spies, the two Djeneks, the two Fieldens, and the two Lehms. According to their autobiographies also their fathers or their mothers died early; from which we may presume that they were old or diseased.

The morbid impressibility of Engel has been admitted by himself. "I cannot," he said to his wife, "hold within me what I feel. I must explode. The enthusiasm takes possession of me; it is a disease." Lingg could not remain quiet an instant; in his room he always had some dynamite in store. Bodendick was a thief and a mattoid; full of cunning, mischief and mad tricks, even according to the *Arbeiter-Zeitung*. He was always dreaming of new explosives. Though insane he was a genius as appears from his poetry, which is published by Schick and is in the style of the celebrated "Song of the Shirt." The suicide of Lingg with dynamite shows his moral insensibility, as do the words of Parsons addressed to the society of anarchists: "Strangle the spies and throw them out of the window." In Lingg we see a truly ungovernable epileptoid idea driving him to political action. "I cannot control myself;" he said, "it is stronger than I."

I repeat that among the anarchists there are no true criminals;

even Schaack, the police historian, can name but two criminals, and certainly he would not have spared them if he could have stigmatised them.

Their heroic-like deaths, with their ideal on their lips, proves that they were not common criminals. Nevertheless the psychology of the leaders of the Commune shows in them a true moral insensibility, an innate cruelty, which found a pretext and a scope in politics; and which accords too well with their criminal physiognomies. Marat demands two hundred and ten thousand heads; Vallés speaks of his family with a true hatred; Carrier wrote, "We will make a cemetery of France"; Ferré smiled while by his orders they killed Veisset; and Rigault said in slang to his pistol, "Il faut peter sur le chipau." The last words of Spies before the court express a ferocious hatred towards the rich; and the project of the anarchists of Chicago (if it is true) to blow up a part of the city with bombs attests an absence of the moral sense. We know that many anarchists regard brigands and thieves, such as Pini, Kammerer, and Gasparoni, as their brothers in arms. Booth had for accomplice Payne, a true murderer by profession. See also the journal published at Géneva *L'Explosion*, and the Como journal *Le Poignard*.

But it is necessary to note that hereditary anomaly, if it provokes an anomaly in the moral sense, also suppresses misoneism, the horror of novelty which is almost the general rule of humanity; it thus makes of them innovators, apostles of progress, though the education is too rude: and the fight with relative misery of which all the anarchists of Chicago except Neebe have been the victims, not affording material for useful novelties made of them only failures and rebels, hindering them from comprehending that humanity as a part of nature, which it is, cannot progress at a gallop, *non facit saltus*. Spies on his last day discovered that humanity is misoneic, the slave of custom, and said, quoting the lines in German, "I now understand the poet's words,

> '*Denn aus Gemeinem ist der Mensch gemacht,*
> *Und die Gewohnheit nennt er seine Amme.*'"
>
> [Man has been shaped of what is common,
> And habit is the nurse by whom he's reared.]

Evidently if he had understood it before he would not have been an anarchist. Whoever has observed in asylums the conduct of lunatics, will understand that one of their characteristics is originality, just as in men of genius; only the originality of the insane and of moral lunatics, or of born criminals, is very often absurd or unavailable.

This is why I, although I am an extremist in my partisanship for the death-penalty, cannot approve the shooting of the Communards and the hanging of the anarchist martyrs of Chicago. I deem it highly necessary to suppress born criminals, when they reach the persuasion that being born for evil they can do nothing but evil; and I believe that their death thus saves the lives of many honest men. But we have to do with a very different thing here, where the criminal type is, as shown above, less frequent than among born criminals.

It is also necessary to consider here the youthful condition of almost all these persons—Lingg 23 years, Schwab 33 years, Neebe 32 years. For at this age men are at the maximum point of their audacity and misoneism; and I remember a leading Russian Nihilist saying to me that there was not an honest man in Russia who was not a nihilist at 20 years of age and ultra-moderate at 40 years. If the inclination to evil here exists in greater proportion than in law-abiding men, it nevertheless takes an altruistic turn, which is quite the contrary to that which is observed among born criminals, and which commands our admiration and arouses our just pity. This inclination, in associating itself with the want of the new, which is also abnormal in humanity, could, if it were properly directed and were not crossed by misery, prove itself of great value to humanity; it could trace for it new routes, and in every case be practically useful to it. A born criminal imprisoned for life will kill some gaoler, in a colony will ally himself with the savages, and will never work; while political criminals in a colony will become more useful pioneers even than law-abiding men. An example is seen in Louise Michel, who in New Caledonia was the most charitable of the sick nurses.

And then there is no political crime against which the punish-

ment of death can be directed. An idea is never stifled with the death of its abettors: it gains with the death of the martyrs if it is good, as is the case in revolutions; and it falls at once into vacuity if it is sterile, as is the case, perhaps, with the anarchists. And then, as judgment cannot be formed of a great man during his life, so a generation cannot in its ephemeral life judge with certainty of the justice of an idea, and for that reason it is not proper to inflict so radical a punishment on its abettors.

CESARE LOMBROSO.

INNOVATION AND INERTIA IN THE WORLD OF PSYCHOLOGY.

I. MISONEISM.

IN the moral world the law which is seen to dominate all the others is the law of inertia. This law of inertia is so powerful that even after having been overcome by the friction of ages it always leaves, even among beings that have most progressed, traces of its original oscillation, in survivals, in rudimentary organs, when it is not renewed in all its completeness in certain atavistic forms.

Inertia in the moral world.—Granting that it were possible and desirable to contest this law in the organic world, it could certainly not be done in the moral world. In fact, although we are thought to be making great progress, yet if we form a graphic chart showing the progress made on the globe, we shall see to what miserable proportions it is reduced. It may be said that all Africa, except certain points encroached on by the Aryans, Australia, and a good half part of America, are almost in the prehistoric state, or at best in the state of the great Asiatic empires of the earliest historic epochs. Or perhaps (as in South America, Hayti, and Siberia) civilisation has only changed the appearances of primitive life, by substituting for immobility an unstable equilibrium, which is almost worse still.

The most certain proof of the extension and of the predominance in the moral world of the law of inertia, is the hatred of novelty, so little noticed, which we call Misoneism, and which arises from the effort and the repugnance we experience when we have to

substitute a new sensation for an old one. And this is so common among animals that it can be regarded as a physiological character.

Minds feeble, enfeebled, or primitive in character, show themselves the most susceptible of repugnance to what is novel; it being understood, however, that it is not a question here of small innovations, such as fashion for women, the change from the elliptic to the circular, tattooing for savages, and sports for children; for not only have the latter no dread of such changes, but on the contrary they wish heartily for them, as they excite the nervous centres, which require change, without irritating them, and without causing pain.

But when the innovation is too radical, it is not merely the savage and the child who repel it with dread; the great majority of men, for whom misoneism is a law of nature, are sensible of a feeling of repugnance, as the result of the pain produced by the necessity in which they are placed of causing their brains to be traversed by too rapid transitions, a task not within their power, inertia and the repetition of movements (individual or atavistic) before performed, being natural to ordinary men, as to all animals.

Misoneism in manners.—This may be seen, for example, in the manners and customs of the modern Greeks; notwithstanding the vicissitudes of time, we find in them the ancient Greek.

The French of the nineteenth century are still in many respects such as they are depicted by Strabo (IV, 4), and by Cæsar (De Bello Gallico, IV, 5), lovers of arms and of ostentation, incurably vain, facile of speech, easily carried away by words, and imprudent in their resolves.

Misoneism in religion—As much can be said of this in relation to religion, literature, and art, where we see misoneism triumph. With respect to religion it can even be affirmed that this is the institution most completely based on misoneism; to the extent that we see the Christian religion preserve of ancient religions, not only musical harmony (the chant), sacred vestments (the mitre and fibula of the Egyptian priests), the scapular and the sandals of the Roman plebeian, etc., but also the Mithraic legends in certain dogmas which have relation to the sun, and even to ancient fetichism.

Misoneism in morality.—The misoneistic instinct, fed by religion, may leave traces profound enough to form a morality *sui generis*, and provoke among savages remorse at having failed in a brutal custom, be it ever so repugnant, such as among us is provoked in good men by crime.

Misoneism in science.—In the domain of science the history of the various persecutions of men of genius, inventors or reformers, will suffice to prove the terrible influence of misoneism, which is the more intolerant and the more fanatical the more ignorant it is; and we need only cite the names of Columbus, of Galileo, and of Salomon de Caus, the first inventor of steam apparatus, who was sent to the Bicêtre by Richelieu.

Misoneism in literature.—Likewise to misoneism we owe, in great part, our admiration for old works and ancient ruins, however hideous they may be. Because admired by our fathers and by our forefathers they obtain, so to say, a way of entrance into us, to impose themselves on our veneration. Thus the Sanscrit language for the Hindoo, the Hebrew language for the Jews, and to some extent Latin for many Christian Europeans have become a kind of sacred tongue and linguistic fetich even outside the precincts of religious usage.

The enormous influence of grammarians in imperial Rome, and afterwards during the epoch of decadence, as well as in the middle ages, explains also the persistence of the modern fetichism for grammar, which seems absurd in an age of naturalists and mathematicians.

And from thence comes the not less absurd and yet unshakable faith in classicism, rooted deeply even in men worthy of respect, who cause us to lose the best years of life in stammering in an almost useless tongue.

Misoneism in politics.—The same may be said with much more fitness of many social and political institutions which are thought to be modern and which are only relics of other times; it is for this reason only that they attract the admiration and the respect of the majority of people, constituting true conventional lies, as Nordau calls them, but which have their *bourgeois* believers and apostles.

In fact, the past is so incorporated in our inward being that even the most refractory of us feel a powerful attraction towards it. Thus we may be as unbelieving as can be wished, and yet at every hour of the day we feel ourselves struck and attracted by the cajoleries of priests. We may be lovers of equality, but, as we have already said, we feel a secret veneration for the heirs of our barons. It is in vain that the uselessness of certain laws is accepted; he who upholds and defends them will meet with the approbation of multitudes, called forth by the sole circumstance that the laws have existed. And if civilisation progresses often, it is because it finds in the changes of climate, of race, or in the appearance of men of genius or madmen, circumstances which end in combining a great many small movements in such a manner as to make of them in time a great one. Max Nordau thinks (with some exaggeration) that progress is due more to a few enlightened despots than to all revolutionists. But this progress was very slow; he who wished to precipitate it, contravened the physiological nature of man; consequently a revolution which is not an evolution, is pathological and criminal.

Misoneism in the punishment of crimes against custom.—This is why in primitive legislation we see offences against custom constitute the *maximum* of delict, of immorality.

II. PHILONEISM.

This theory of misoneism, previously expounded in my "Delitto Politico," has aroused opposition from all sides; especially in France, on the part of Brunetière, Proal, Tarde, Joly, and Merlino. "Children," say they, "women, savages are curious, lovers of novelties, and misoneists are so far from being ignorant that you yourself refer to them as being among the academicians, (these last are still it appears in the Latin world admirers of good faith); artists have success only in attempting new paths; all peoples have the love of change; they prove it by their emigrations and by their invasions; the great invasions of the barbarians were an example of it."

"Besides, if there are *misoneists*, there are also *neophiles*, and the one makes up for the other."

"In each of us," writes Tarde, "by the side of habit, a sort of physiological misoneism, exists caprice; by the side of the inclination to repeat, the inclination to innovate. The first of these two necessities is fundamental, but the second is the essential, the *raison d'être* of the others."*

In order to reply to all these objections it is necessary above all to be well understood. As to minor innovations, and caprices that satisfy the need of movement of our organs, from the very fact that they are animate, it is certain that we are all very eager for these; in proportion of course to our sex, our age, and our degree of intellectual culture. The little child will be happy with a toy, he will experience fear or dread at the sight of a mask, of a large animal or even of a small one; I have seen children frightened by a sparrow, by a fly. Woman takes pleasure in disguising herself in a striking manner, in wearing new garments in which to attend great plays in the theatres, but she has a horror of new religious rites, and of new discoveries, to such a degree that a great number still refuse to use linen and knitted work made by machinery; sewing machines themselves find their way among them only very slowly. (Merlino.)

When it is claimed (Merlino) that savages love novelties, from the fact, related by Ellis, that some of them endeavored to procure Bibles, (taking them, perhaps, for playthings,) or arms of which they had seen the useful effects, their nature is misjudged; since even after many years passed in contact with European civilisation, after having worn its clothing and ornaments, they return naked to their forests, where a warm garment would certainly not be an object of embarrassment. To believe with Cardinal Massaia that they offer themselves voluntarily for vaccination, that they even ask it, is to ignore that even among ourselves, vaccination encounters a great number of adversaries. Does not Stanley relate that in his last journey, an epidemic of smallpox having broken out in the camp, many of the porters, although they saw that the vaccinated Zanzibaris did not die, refused to submit to vaccination?

According to Tarde, the superstitious admiration, the enthusi-

* *Revue Philosophique*, October, 1890.

astic veneration by barbarous peoples of various forms of insanity, often baptised as prophetism and saintliness, scarcely accords with the aversion for novelties, that is to say for singularities, which I attribute to them too liberally. But the cause of that admiration is nothing else than the fear, the ignorance which leads them to take a disease for the inspiration of a God. Nevertheless, I am far from denying the influence of madmen in philoneism and in revolutions (as we shall see in the sequel of this article); yet if we observe the Santons of Africa and their obscenities, we see that it is not for their useful and innovating ideas that barbarians venerate madmen.

The Academician will admire a new species of snail, he will thrill with joy at the discovery of a Phœnician inscription that will enable him to learn the name of a tribal chief, he will go into ecstasies before a greater curvity given to a screw, but he will excommunicate the telephone, the telegraph, the railway, the new laws of Darwin.

The artist, also, will love to trace a new arabesque, to change to blue the prevailing color of the rose, but he will never attempt, directly, with success, new methods. The hatred by all the elevated and academical classes which still besets Zola, Balzac, and Flaubert, the action brought against the last named, and the universal scandals raised by De Goncourt, Boito, Rossini, and Verdi, are there to prove it. The first, at least, who attempts a new method in painting, in literature, etc,, will encounter only hatred and contempt. And when we smile at models unchangeably fixed by Egyptian art, we do not think that the Madonna and the Jesus of our painters have not changed for eighteen centuries.

Horace wrote:

> "Adeo sanctum est vetus omne poema.
>
> . . . . . .
>
> Indignor quicquam reprehendi, non quia crasse
> Compositum, illepideve putetur, sed quia nuper."

It is then not true, as is objected against me in France (*Journal des Economistes*, 1890), that in extending misoneism to the academies, its greatest intensity is excluded from among the ignorant. Each class, each caste has a proportionate ignorance, and a

repugnance equally proportional for that of which it is ignorant. We have demonstrated it for genius itself, which is sublime on certain sides only to be the lowest on some others, and we could have a proof of it even in the opposition that the most ardent neophiles, the anarchists, make to this theory of misoneism, of which they are thus themselves a confirmation.

Bismarck despises parliamentarianism, peace, arbitration, and even the Latin, or rather European, alphabet. Flaubert and Rossini had a dread of railways. The statesmen who govern Europe are not all geniuses, but they are men not destitute of intellectual culture; and yet how can it be explained that they so strive with ever increasing tenacity and zeal to increase armaments and armies, to the extent of causing ruin to their peoples,—a greater and more complete ruin perhaps, than that which even a disastrous war might occasion? And this for the purpose, they declare, (and it seems to be sincere,) of more surely escaping war, when as a fact one fourth of the money spent for that end would be sufficient to assure the happiness of the peoples governed by affording the social questions which they all pretend to have at heart, a solution which, as things now are, it is ever becoming more difficult to reach. The true cause is in the repugnance they experience to the idea of starting on a fresh path, in the tendency to adhere to old habits which go back even to the epochs of the warrior castes. Indeed in the minds of a very great number, at least among the Germans, a good corporal of the guard is more worthy of consideration than a great scholar; debate in parliament on the erection of a fortress is not permitted, however costly it may be, whilst every one may speak on the establishment of a school; in France, in Italy, and in Germany, to touch the war budget, unproductive and ruinous as it may be, is to raise the hand to the ark of the covenant,—a veritable state crime. But science is a new thing, while the art of war goes back to remotest antiquity; it descends from Achilles and from Cain.

I was not guilty of a self-contradiction when I said that the modern French love novelty as much as their ancestors did. I am too much the friend and too fond of the French to flatter them, and not to tell them exactly what I think. France is undeniably at the head

of the Latin races, but to the same extent, and perhaps more than they, it prefers novelties to the new. It has always had the stormy agitations, rather than the useful results, of revolutions. The great religious reform, Protestantism, touched it without affecting it; the great constitutional reform has taken but slight root, and that two centuries and a half after it was accomplished in England.

Balzac wrote: "In France the provisional is eternal although the French are suspected of loving change."

Novelties to be accepted by the French must be such as do not interfere with their habits. And it is they who have invented the words *routine*, *blague*, and *chauvinism*. It is because they are still in the military period of Spencer. So far as that goes, they have cried out beware! to the English, then, beware to the Russians, now beware to the Germans and the Italians. They change voluntarily their dress, their ministers, their external form of government, but always there remains in them at bottom a slight attachment to the ancient druidical and Cæsarian tendencies. It is not many years since the priest still commanded in Vendée. We have seen the French, while extreme republican, make war for the Pope.

After having a Fourier and Proudhon and, what is more, universal suffrage, they have not yet a social law which gives satisfaction to the just demands of the indigent, or of workingmen, beyond that of the "probi viri."

It is true that they have had their peasant wars—their Jacquerie—and '89; but these were explosions that aroused them but for a moment only to allow them afterwards to fall much lower. Indeed, but a few centuries after the Jacquerie, they saw the same peasants who had raised the insurrection, kiss the horses of the couriers who brought good news of the health of the king. And what a king! Louis XV, who might rather be called the executioner, than the administrator of his people. And after having driven away so many Cæsars, little was wanting to make them fall again under such a trumpery Cæsar as Boulanger if the highest classes of the capital had not been opposed to it.

Moreover certain particular facts, which portray much better their physiognomy, show how fundamentally conservative they are.

Let us cite for example the veneration exhibited by the high classes for the Academies and the passion for heraldic titles and decorations. "France is academic," wrote De Goncourt in *Manette Salomon.*

Sarcey relates that during the siege of Paris, the flesh of the animals of the Jardin des Plantes, having been put up for sale, the common people preferred to suffer hunger rather than eat of it, so that the educated classes alone fed on it.

We know what resistance the French made, under a thousand pretexts, to the reform of their orthography, which is in part merely the relics of the old pronunciation.

Recently, an engineer at Bordeaux wrote to me, that, on his inventing machinery for the easy transference of merchandise from ships to the quays, sturdy opposition was met with on the part of the stevedores of the port, who would have been the first to derive great advantage from it.

The medical faculty at Paris has not only anathematised tartar emetic, vaccine, ether, and the antiseptic method, but also the physicians who substituted the use of horses for the ancient employment of mules to expedite their visits to their patients.*

Is it not in learned Germany that we find Anti-semitism in fashion? And has not Russia made it a law of the state?

In certain districts of Sicily is not the ancient method still preserved of embalming and of painting the bodies of the dead which was practised among the ancient Egyptians?

A recent law-suit tried at Turin has proved that not only the lower classes, but also numbers of persons belonging to the higher classes protect themselves by practices that distinctly recall those of the sorcerers of antiquity. All this would prove that philoneism is rather the exception than the rule.

It is objected to my position, that nations and peoples are such lovers of change that they have always emigrated. But before making this affirmation, we ought to study the causes which impel them to emigration.

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* *Revue Scientifique*, 1889.

Day by day the peasants see their wages decrease; yet even then they do not remove from the land that they love more than themselves, and to which they are more closely bound than they ever were by feudal laws. When epidemics produced by the bad quality of cereals, as pellagra and acrodynia, when mortal diseases and the most cruel famine destroy them by thousands, then only, and even then not always, do they come to a determination; while for many years they keep before them the remembrance of their native soil, of that country, which, like a true stepmother, gave them only diseases and sufferings.

I have listened to poor emigrants say to me: "We have only to die! The life that we lead is certain death; and it is for this reason alone that we have determined to emigrate."

As to the invasions of the barbarians, only ill-informed minds can believe that it was the effect of a sudden movement, of a caprice hurrying away masses almost without a reason. On the contrary, all now admit (as was really mentioned in Tacitus, Bk. II., Chap. 2, of the Annals) that it was a very slow movement, already begun three centuries before Christ, and of which that of the Cimbri, who came from Jutland, was an episode. The crossing of the Baltic was an easy enterprise. The inhabitants of the coast had a sufficient number of vessels, and from Carlsroon to the nearest ports of Russia and of Pomerania was only a distance of thirty-four leagues.

If the tribes of Germans, Suevians, and Goths were repulsed from Italian soil, they had already taken a firm position on the soil of Gaul. Cæsar (De Bello Gallico) speaks of Ariovistus and the Suevians whom he met there as his most formidable enemies. They did not appear to him as forming an isolated body, detached from Germany; on the contrary, he relates that the Germans time and again forced their way into Gaul. Movements within continued, for even after Augustus we find that the Romans did not always encounter the same peoples in the same countries. This is affirmed by Procopius, Paulus Diaconus, and many others.

Let us recall here that already after the death of Nero, Civilis, who was in the service of Rome, led eight cohorts from his country into Gaul where he was defeated, but he was able to make an ar-

rangement, thanks to which he could settle as an ally at a small distance from the borders which he had betrayed (Gibbon).

The Germans (a people composed of voluntary associations of soldiers, almost savages) being hunters rather than cultivators, were naturally obliged to change their residence ; we know indeed with what rapidity the game was exhausted, which obliged those who live by it to overrun an immense extent of territory and continually to transfer their residence to other places ; this is why emigration is in this case the result of the law of inertia, the people not knowing how to replace a precarious form of existence by one that is more stable. They had no towns, but real movable villages that could be compared to those of the Arabs of Africa. Like all nomad peoples and hunters, when the hope of a conquest shone before them, they abandoned their forests and, desiring to reach warmer regions, went from them with their wives and children to war. During long years their efforts were impotent, because until the time of Marcus Aurelius they were divided, precisely like the savages of America, into a great number (40) of small tribes, dispersed over an immense territory and enemies of one another ; it was, consequently, the more easy to subdue them, the rather that not knowing the use of the breast-plate and but little that of iron and of cavalry, they found themselves powerless against the Roman legions, of whose tactics besides they were ignorant.

But when Rome, at the decadence, commenced to recruit its army with Germans, and when less vigilant in guarding the frontiers, she allowed German families, if not even tribes, to pass the same, she found herself in great part disarmed against an enemy who had already set foot against her, bearing her own weapons, and what is worse, who knew her treasures, her tactics, and her weaknesses. Under Tiberius even, it was known that the auxiliary soldiers constituted the principal force of the Roman armies (nihil validum in exercitibus nisi quod externum); at first equal in number to the legionary soldiers, they much exceeded them afterwards, when the citizens evaded military services, and when under Gallienus the Senators were forbidden to command the army. To all these causes can still be added secondary ones.

Before the historic invasion, emigration had taken place. "When," says Gibbon, "a cruel famine befell the Germans, they had no other resource than to send a third or a fourth part of their young men to seek their fortune elsewhere."

According to the national historians, emigration was due to the disproportion between the size of the population and the means of subsistence in the region where they dwelt (Paulus Diaconus): the Germans were very prolific. As they were not agriculturists, nothing bound them to the soil; pestilence or famine, a victory or a defeat, an oracle of the Gods, or the eloquence of a chief sufficed to attract them to the warmer countries of the south. Germany was then much colder than it is at present. (Gibbon.)

The necessity of fleeing from the domination of a victorious enemy forced the Huns towards the west; religious fanaticism drove the nomad Arabs towards the great Byzantine and Persian empires; religious terror urged the Cimbri and the Teutons to throw themselves on the Gauls and on Italy.* Often also the taste for wine and liquors led them to invade rich countries for these gifts of God.

According to a legend, doubted by some historians, but accepted by others, among them Cipolla, the descent of the Lombards into Italy appears to have been caused by the fact that some of their companions, after having served Narses, conveyed into their country some Italian fruits which excited their curiosity.

All this will suffice to explain the movement we are considering, which commenced slowly among the Northern peoples and afterwards became unrestrainable, and to show how the law of inertia was counteracted among them.

And it is necessary to remark that this need of movement thus begun, did not end with the conquest; but, obeying perfectly the law of inertia, according to which a movement being started it continues indefinitely if friction does not occur to arrest it, it was continued by the crusades, by the Norman invasion of Sicily, and by the epidemics of pilgrimage that may be regarded as the contin-

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* *Revue des deux mondes.* June 11, 1889. Berthollet.

uation of the movement towards the South, begun three centuries before Christ, and become a habit when even the necessity was no longer so great as at other times, and when it was even no longer urgent.

Here is still another cause of philoneism ; the successive movements which grow out of those first started.

As the historians very well observe, Mahomet was a continuation of the Judaic Christian revolutionary initiative. "Mahomet was a Nazarene, a Judæo-Christian. Semitic monotheism regained its rights through him, and avenged itself for the mythological and polytheistic complications that Greek genius had introduced into the theology of the first disciples of Jesus." (Renan.) There is more of this in revolutions and still more in rebellions ; progress, philoneism, following the law of accelerated movement and of the same law of inertia, once begun, blindly precipitates itself to opposite excesses,—the very thing that causes its ruin. Thus Cromwell in a country almost feudal and ultra-monarchical reached, or rather was driven by his party, to regicide, and to the foundation of a democratic republic in which the peers were consigned to oblivion and his partisans (of the Barebones parliament) went so far as to wish to do away with lawyers and universities, to forbid dances, theatrical representations, and even Christmas festivities, to mutilate statues on behalf of decency, and to burn sacred pictures. (Macaulay.) This led to a reaction which under Charles II. reached absolute power by consent of parliament. In Christianity castration, and even the abolition of property was reached. We know the excesses of '89.

Passion explains many of these facts, which proceed even to insanity. St. Paul, from an enemy became an apostle of Christ. Clarendon after abandoning himself to despair at seeing his son go over from the service of James to that of William, became a rebel at the end of fifteen days. The parliament of James, ultra-monarchical as it was, rebelled. The conventional Baudot said : "There are men who have fever for twenty-four hours. I have had it for ten years." "In the days of terrible crises," wrote Valbert, "the law of cause and effect seems suspended, the work is accomplished in

an hour. To ask revolution to be wise, is to ask the tempest to break nothing."*

"In every revolution," writes Renan, "the authors of it are absorbed and suppressed by those who succeed them. The first century of the Hegira saw the extermination of the relations and friends of Mahomet by those who pretended to confiscate for their own profit the revolution he had created. In the Franciscan movement the true friends of Saint François d'Assisi, were, after a generation, regarded as heretics and as dangerous men, and were led to the stake by hundreds."

An idea in the first days of creative activity proceeds with giant steps, and we can say, the movement once begun continues by virtue of the law of inertia always to increase; its originator falls behind, and becomes an obstacle to his own idea which persists in moving forward in spite of him. The Ebionites who gave to Christianity its first start became after a century a scandal to the church; their doctrine a blasphemy.†

It is this very tendency, caused by the arousing of passion, that makes all revolutions abortive, that causes them through their own excesses to be the authors of their own destruction, and which neutralises or much decreases the progress made by revolutions.

The gravest objection against misoneism constitutes, accordingly, the strongest proof of it. Like the plant, the animal, and the stone, man remains motionless, unless a disturbance of his state occurs through other forces, and through the law of inertia itself, which after having at first rendered him immovable afterwards drives him to opposite excess, but to replunge him anew into immobility.

The most potent cause is that of physical environment, change of climate. Next comes the crossing of one race with another, and it is to this we owe in great part the marvellous productions of Greek art that arose in Magna Grecia. Then, often, the influence of climate is active, to which is owing the transformation of the

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* *Valbert. Le centennaire de 1789.* Paris, 1889.

† Renan. *L'Eglise chrétienne.*

Jew; so persecutions, and the great calamities which races experience and which determine the selection of the strongest. And to this result contribute above all the impulses impressed by geniuses and by mattoids, who, as I have already pointed out in my work on "Genius" alone possess an intense love for the new, for the very reason that their organisation is different from that of other people. The intensity of individual violence and power here unbalances the tendency to immobility; but almost always—and I show it in the work referred to—when that intensity is not favored by circumstances, when it does not arise as the final synthesis of a general desire, a latent and universal necessity, but simply as a pathological phenomenon, it becomes again valueless, for the very reason that it is individual. It is owing to this that the efforts of a madman like Cola de Rienzi, and of such geniuses as Alexander, Napoleon, Pombal, and Peter the Great, result in nothing. To beneficent geniuses, as Bolivar, the Gracchi, etc., are attributed all the merit of revolutions which triumph because they were prepared long before by history and by circumstances, and which were only precipitated by them and summed up in them. It suffices to note that the genius of Garibaldi, of Cavour, and of Mazzini, has been able to give us nothing more than Italy as it now is, in order to comprehend that in spite of geniuses and, up to a certain point, in spite of circumstances the work of revolution is durable only when the circumstances that have commenced it persist, and men are profoundly modified by it.

However, the law of inertia always prevailing, (since primitive tendencies always concern it,) these changes are but very slow and, as we have seen, give place to easy relapses; they become fixed and swell to new movements only when the causes which provoke them continue and become more intense.

In fine, philoneism, progress, also sometimes triumphs—at least with the white race and frequently with the yellow races; but it is not the result of a sudden movement or of a natural human tendency, but the effect of external physical forces, whether social, historical or the like, which have caused the law of inertia to change its direction. It is therefore the slow result, we might say, of the

small and sensible variations peculiar to men according to their condition, added to grander movements, as well as momentarily barren ones, of geniuses and forces, and to those more powerful ones of the physical and historical environment. Of the resulting product we see only the effects, because without the telescope of history and of sociology we do not perceive the slowness with which they have reached us, and the smallness of the efforts which contribute to it. It is thus that we do not imagine that the great Coral Islands can be the work of billions of small zo-ophytes accumulated the one on the other during thousands of years. The organic kingdom, like the social, is made up of the sum total of slow and small efforts.

The idea of the Christ and that of Buddha, the way for which had been prepared for several centuries by other geniuses less fortunate than they, miscarries among the people in which it was conceived, and becomes fruitful elsewhere. But dating from the epoch in which its votaries, nihilists of the reverse type, began to multiply and spread, in the lowest and least intelligent strata of society, employing as arms not violence but gentleness, more than three centuries elapsed before it was tolerated and officially recognised. For two hundred and fifty years the plebeians fought at Rome for their liberty. Yet they always heard the Senators say, "Your propositions are too novel." And liberty was granted by the one, and acquired by the others, only soon to be lost, first, in anarchy, then under the dictatorship, and then under the empire.

It is in this sense, that revolutions at the start can be the work of a small number, but they represent, they are the sign of a latent universal sentiment; this is why they grow in direct proportion to time (and time is very long) and gain partisans among their own adversaries. The apostles of Christ numbered only twelve, but a hundred and fifty years later, at Rome alone, there were in the catacombs 737 tombs of Christians; and Renan calculates that at the time of Commodus 35,000 Christians existed. We know that Saint Paul himself was one of the bitterest adversaries of the Christians.

The English revolution, up to the time Charles I. sought to cause the arrest of the four parliamentarians, was anti-republican, and strictly royalist even; but ultimately revolutionary ideas spread

throughout all England, and the zealous but not blind partisans of the king were the first to turn against him after his excesses and his treasons.

In the revolution of Flanders, the chief citizens and a great part of the nobility, held aloof from the movement for a long period; but all possessed in embryo the feeling uttered by the first apostles and pioneers of the movement. Time, in its slow development, gives rise to the complete expansion of the latent sentiments expressed by misoneism.

For example let us now transfer ourselves to another field; I wish to speak of the abolition of classical studies. There are perhaps actually five or six of us in Italy who proclaim without fear its absolute necessity; as we were only three when we proclaimed the necessity of changing the penal laws and of bringing them to examine the criminal rather than the crime.

The first statesman who should attempt to carry out our ideas would fall amid universal scandal; and yet these very ideas are entertained by all who are not blinded by archæological and academic misoneism. But they have not the courage to avow them and still less to realise them. In a few years these ideas will no longer admit even of discussion.

That is revolution. Let us look, on the other hand, at the ideas of the anarchists; they are in the heads, and unfortunately in the hands of certain diseased persons, but they are not in the thought of the majority; consequently all their agitation will be in vain, and result only in isolated commotions and frays.

That is revolt, insurrection. And let no one say that philoneism and progress are found as proportional reaction to misoneic action, an oscillation of the pendulum excluding the law of inertia. The pendulum itself does not oscillate, but remains perpetually motionless until moved; and its oscillations, even the smallest, are produced the most often by external causes entirely accidental. And the law of inertia is here also so constant, that if it did not find in the friction of the atmosphere a cause of impediment the movement once begun would continue *ad infinitum*. So a ball flies and rebounds, when a force propels it; and here also if friction did not re-

tard it, it would continue forever the motion once commenced. Inertia is the rule, and mutations are produced by special external incidents, which being usually less persistent, less tenacious, change more the appearance than the reality. And these modifications which are very slow and proceed from external causes, are produced not only among men and among animals, but are met with even in the inorganic world ; it is thus that the salts of copper and of lime, in certain conditions of a warm medium, change their color but not their nature nor their molecular arrangement, and always give the same chemical reactions.

Cesare Lombroso.

THE QUESTION OF DUALITY OF MIND.

IT is certainly conceded by all who come in general estimation within the category of thinkers, that psychology, as formerly studied, without basis in physiology, was most unfruitful, as compared with the modern study of it upon that basis. It is therefore quite remarkable to find in quarters of repute, where psychological problems are discussed, some into which enter, even inferentially, either momentary obliviousness, or temporary disregard of truths that are held indisputable by modern thinkers within the lines of the subjects indicated. Yet such contradiction and conflict are found in the constantly recurring attempted demonstration of the dual nature of the mind or the soul, call the entity what one will. That man has within his organisation tendencies which are relatively higher or lower than others within himself, is not to be disputed; but that such mixture of nature is to be regarded as constituting him of dual mental nature, is a proposition untenable coincidently with the maintenance of the proposition that he is in nature physiologically single. It has been maintained lately, that he is physiologically double, but this view has not met with any acceptance worthy of the name. In short, it would seem, from all that we know, that in every individual, psychical being must bear the same relation to physiological that the latter does to physical, and that they are all interdependent. And if this be true, the same relations must hold good when the physical and physiological nature degenerate into the pathological, and we find by observation that they do hold good. So far, therefore, as the lesson inculcated by Stevenson's Dr. Jekyll and Mr. Hyde presents to the popular mind

the idea of dual mental nature in man, it is false. Viewed from the scientific standpoint, the case exhibits nothing more or less than a phase of physical, physiological, and psychical action, terminating in pathological manifestations. Gradually, the physical, physiological, and psychical natures suffer, *pari passu*, and the whole being exhibits profound retrograde metamorphosis, through the continuous degenerations that have been so often and so ably described by Dr. Henry Maudsley, in which all will-power passes away, the whole being becomes involved, and direful death of all higher attributes finally ensues. That, during the struggle in this decadence between the will and the instincts it is natural that it should seem to the outside uninstructed view, and even to the individual sufferer himself, that the phenomenon witnessed is evidence of a dual nature of mind, is not surprising; but it is surprising to find any one of the present day who deems himself scientific, implying that the observed changing mental, moral, and bodily manifestations are not witnesses to co-ordinated change; it is surprising that any scientific inquirer should lend the slightest countenance to the belief that changed psychical phenomena are possible without changed physical and physiological conditions, and yet that is what we often see proclaimed through maintenance of the proposition of the duality of mental nature.

The point mentioned belongs to the most flagrantly unscientific view of the relations and effects of the forces in play under the conditions discussed. But there may be in the inclusive subject-matter of the question minor points as to which erroneous views are sometimes presented to the public as emanating from sources otherwise scientific. Such a one it is my intention to make the principal subject of this paper. In the October number of *The Monist*, in the article "The Magic Mirror," Max Dessoir, the author, says, pages 111 and 112:

"The theory from which I shall proceed in attempting an explanation, has already been frequently touched upon in the course of this article; for certain observations indicated it so clearly that mention of it was not to be avoided. It is the doctrine of the double consciousness of the human soul. Acts are done in the course even of our every-day life, which presuppose for their origin and execution

all the faculties of the soul, yet nevertheless occur without the knowledge of the individual; they require a sort of consciousness and a separate memory beyond the *cognisance* of the normal person. One of the most frequent cases in practical experience is where the thoughts of a person reading aloud wander and become occupied with an entirely different subject; and where despite this aberration the person in question reads correctly with the proper emphasis and expression, turns the leaves, and in short performs acts which without intelligent control are hardly conceivable. An English psychologist, Mr. Barkworth, has acquired such expertness in the practice of this, that during an animated debate he can rapidly and correctly add long columns of figures without having his attention diverted in the least. This points not only to an unconscious intelligence, but—which is of still greater consequence—to an unconscious memory. Mr. Barkworth must keep two series of figures in his mind in order to obtain from them a third; this latter sum he is again obliged to retain in order to add to it a newly acquired fourth; and so on. The latter chain of memories, let it be remarked, performs its office entirely independently of that upon which the recollection of the debate is constructed; and it may therefore be reasonably maintained that there exists beyond the cognisance of the individual, both consciousness and memory; and if the essential components of the ego are found in these two last-mentioned factors, then every person conceals within himself the germs of a second personality. I designate the two halves of consciousness that thus operate in greater or less independence of each other,—in a figurative sense of course,—as super- and sub-consciousness, and comprehend the whole as the doctrine of double consciousness or the double ego."

No one will at this late day, it is to be presumed, dispute the existence in the same individual of subconsciousness, as contradistinguished from superconsciousness; superconsciousness being that which is more familiarly known as self-consciousness, and subconsciousness as that latent consciousness of which we are not at all conscious, and which yet receives impressions which may or may not rise soon, late, or at all into the sphere of self-consciousness; an impress which cannot be summed into self-consciousness by an effort of will, for the obvious reason that the memory has yet taken no cognisance of them. That this subconscious function of the brain is simply a phenomenon dependent upon cell-storage of the brain, the product of which may or may not ever reach self-consciousness, is proved by many circumstances attested by our memory of collated facts concerned in our waking and dream life. Sir Walter Scott, in his story of the "Tapestried Chamber," gives an admirable account of its working under the lead of a sleeper's unconscious

cerebration risen to self-consciousness, for let it be here parenthetically noted that it is absurd, as is sometimes attempted, to rule dream-thoughts out of the realm of self-consciousness, the individuality of the dreamer never being lost, however modified the mental and moral ideation of that individuality may be.

But Max Dessoir evidently confounds subconsciousness with unconscious cerebration. He makes subconsciousness, in the intellection described, a primary factor in execution. Now subconsciousness is the mere tablet, as it were, upon which impressions are made, and unconscious cerebration that faculty of the brain which, without immediate, and perchance future, cognisance of self-consciousness, may evolve from all brain-impressions, whether subconsciously or self-consciously received, thought of which not even the individual himself becomes aware that he is the possessor until it is presented to him as a free gift. This proceeds during sleep as well as during waking, sometimes anticipating, coincidently with waking, the routine subject of thought for the day. It sometimes in sleep, as well as in waking moments, presents itself with the startling effect of a revelation. Subconsciousness, therefore, is a condition of passivity, and unconscious cerebration one of activity, although, of course, of even unknown existence unless a product of it reaches self-consciousness. They are not to be crudely conceived of as different manifestations of the same thing, any more than an emotion is to be thought of as another aspect of the sensation which produced it, the emotion being qualitatively an entirely new departure from the sensation. Both sensation and emotion represent conditions of activity, whereas, so far as self-consciousness is equal to differentiating them, subconsciousness and unconscious cerebration respectively represent passivity and activity.

But the admission of the coexistence in the same individual of unconscious cerebration with self-consciousness does not involve the concession of the existence of dual mentality, any more than recognised possession of striped and unstriped, voluntary and involuntary muscle, involves the concession that man is physically dual in mechanical motive power. Yet it is upon the basis of the recognised coexistence of double consciousness in man that Max

Dessoir reaches the conclusion that, figuratively speaking, as he says, there is a double ego, by means of whose duplex action different mental processes are simultaneously carried forward. Now, neither figuratively nor otherwise, as should be clearly apparent from what has been said, is there in man a double ego. For although while there is life subconsciousness must exist, and unconscious cerebration proceed, nothing is more open to observation than that subconsciousness and unconscious cerebration, although always present, do not always rise into the sphere of self-consciousness. That, during self-conscious activity of thought on a particular subject, if continued for a long time, subconsciousness may, through unconscious cerebration, in a measure yield tribute to self-conscious thought is undeniable, for we see their effect sometimes visible in the sudden inspiration of the orator and the writer, but that they are factors in ordinary thought-evolution, for immediate use, within very limited spaces of time, is impossible, for we by definition limit subconsciousness and unconscious cerebration to pure unguided automatism, while to self-consciousness we concede the direction of all automatic processes that represent conceptions of the mind. Obviously, to imagine that we direct that which may or may not appear at all in the sensorium, to be directed, and which from its nature, as known from observation, is not likely to appear within moderate time-limits of special thought-evolution, is inadmissible, involving the assertion of two contradictory propositions, for, as matter of experience, we know that the product of unconscious cerebration, even when it appears clearly recognisable as such, seldom manifests itself before the lapse of a few hours.

The simple and complete explanation of the phenomenon observed, in what are deemed simultaneous mental processes, is that they are not absolutely simultaneous. The best illustration that can be given of the manner in which they take place is afforded by the system known as synchronous multiple telegraphy, in which, by means of an admirable apparatus, points on discs, representing makes and breaks of electric current, are, at stations distant from each other, adjusted to synchronous relations with each other, by means of electro-magnetic agency, tuning-forks, and self-adjusting

varying resistances to the currents, so that receiving and transmitting proceeds with a continuousness just short of perfect continuity. I am not attempting to liken the rapidity of thought to that of electricity, even when electricity is embarrassed and slowed by mechanism of man's construction; but otherwise the analogy between so-called simultaneous mental processes and the results obtained from so-called synchronous multiple telegraphy, is as perfect as any analogy can be. Thus the make and break impulses of the will direct the self-conscious flow of nerve-force in receiving and transmitting impulses of almost synchronous time upon various subject-matter successively taken up and dropped. The thought for each is not simultaneous, nor of equal duration, but so nearly simultaneous as to appear so, and of duration sufficient for its task. The individual thought-times are not, therefore, represented, as in the telegraphic instrument described, by equal spaces of time, but bear due relations to the respective difficulties of the subject-matter almost synchronously attacked. It is self-conscious thought that is here involved, whether in sleeping or waking, that is, will-directed thought, for even in sleep we observe the will as imperfectly directing; striving, however, always to direct. As has been admitted, if the process of self-conscious cerebration last over a long space of time, it is possible that some fragment derived from unconscious cerebration may contribute to the grand total of primary flow. This, however, is not of normal occurrence, seeing that unconscious cerebration often deals with matter entirely alien to present self-conscious mental occupation. The fruits of such cerebration are therefore impossible to be counted upon, and therefore cannot be insisted upon as proving from the experience cited by Max Dessoir the existence, even figuratively speaking, of double consciousness construed as forming with self-consciousness a double self; while the well-known action of subconsciousness, unconscious cerebration, and conscious cerebration, as related to one another, amply explain all the phenomena in waking, sleep, and even in hypnotism if we include in that hysteric diathesis.

When, in abstraction, in wrapt attention to a single idea, we are carried past the door at which we had intended to stop, or

continue to read aloud, unobservantly of the sense of words, or otherwise betray that we are buried deep in one absorbing thought; it is not, in the first case, that our automaton has unwontedly borne us along, or in the second, that we are not permitting it to take a partial holiday, for it is our automaton that serves our commonest daily needs; but only that we have, in the first case, forgotten to arrest its movements in due time, and in the second, have not thought it worth while to do so; for when decrepitude overtakes us, and our automaton, sharing in the misfortune, toils wearily along, or requires intense purposiveness for special brain-accomplishment, ideation can no longer afford to give to it its former liberty, but dwells in concentration on a single action; unless, indeed, when that still lower grade is reached, when the automatic man is almost all that remains, and ideation but the fitful glow that may start to futile movement the once efficient mechanism of the human frame. By easy stages, receptivity and communicability, ever lowering in degree, in quantity, and in quality, may dwindle to a single point, and movement be but faint automatic habit; the former high being now occupying the opposite extreme from rapid thought-transmission and receipt, and bodily response to ideation, upon the basis of life's whole energised experience.

Max Dessoir remarks, in a passage shortly following the one already quoted at length:

"Closer investigation teaches further, that in dreams, states of intoxication, in somnambulistic and epileptic attacks, not only does a consciousness different from the normal consciousness rule, but that also between successive periods memory-links of greater or less stability are wont to form."

As to the greater or less closeness, as well as greater or less stability, of the memory-links to which Max Dessoir refers, there can be no dispute; but it is demonstrable that sleeping and waking consciousness of both kinds exactly correspond. The difference observable in waking and dream thought-evolution does not chiefly relate to modified consciousness, but to modified conscientiousness; the defect in both being the necessary consequence of temporary abeyance of normal co-ordination between the nerve-centres. Determinately directed thought, which is necessarily waking thought,

proceeds upon the basis of memorabilia that are the cash in hand of the kind of currency that is temporarily available for logical transactions; while in sleep, conscious cerebration only partially controls its treasures, and often regretfully sees them squandered before its face. Determinately directed thought is necessarily derived from the will, unless one believes with Lord Kames, that thought preserves unbroken heredity; in which case the ego becomes only the witness through life of pure automatism—a position which is easily refuted. The will directs the thought upon the basis of cognate memorabilia, be the channels many or few, by means of semi-synchronous, rotative attention.

The great lapse of time during which the action of subconsciousness may remain unrevealed until, through unconscious cerebration, it reaches self-consciousness, through the medium of recognition of a particular event as of actual occurrence, and how, finally, this recognition, as true, of a particular event, may be restricted for a while to the condition of sleep, and after a long period of incubation at last rise to waking knowledge, is so admirably exemplified by an experience of my own that I here put it on record.

About five years ago I had a dream of a landscape, where there were rocky escarpments partially covered with trees, with a plain as foreground, upon which a carriage drew up to take me home after a day's topographical surveying. Both in dreaming and upon awaking I was vividly impressed with the idea that the place was one in which the topography remained to be finished by me. But when awake, I fruitlessly went over in memory all parts of the coast where I had ever executed topographical surveys, and where by any chance, at any time, I could have left unfinished anything that I was in duty bound to finish. Some time elapsed, and I had the same dream again. Coming at once to the conclusion that, if I should dream it a third time, I should be told (as I should be, if I mentioned it at the second to any indifferent person) that I had dreamed that I dreamed it, I at once described in detail to a member of my family the landscape, the rocks, the trees, the plain, and the coming of the carriage, and requested that all these be memorised. Some months again passed, and the dream in all its vivid-

ness recurred, and was repeated to the same person, agreeing as to its details with those introduced in the recital of the preceding ones.

I never had from the first a doubt that the dream had a foundation in some one concrete fact, but from the lapse of time without a solution of it being afforded, I was all but hopeless that its subject-matter would ever rise into the sphere of full waking knowledge. However, at moderate intervals I dreamt it again and again, each time simply saying to my confidant, "I have had that dream again," and at length, without any special effort directed to its solution, that which had heretofore eluded all efforts to explain, was presented solved.

The uncomfortableness of the dream, it is to be borne in mind, lay in the impression, although contradicted by memory, that I had neglected to finish some piece of topography which it was my duty to finish. Hence the direction of self-conscious thought towards its solution had always been wrong. There was no piece of work of any kind that I had ever neglected to finish. There was, however, a piece of topographical work, which, when I was about to finish it, I was prevented from completing by orders taking me away from the locality to another far distant. The whole tract originally intended to be executed in topography was of about one hundred square miles, a tract of much geological as well as topographical interest, over a portion of which I had been accompanied two or three times by Prof. James D. Dana, who was deeply interested in the execution of the topography, on account of his development from it of the minute geological characteristics of the region. At one boundary of the area mentioned there was a ridge and summit of some nine hundred feet in height, densely covered with a stunted growth of trees. How to get the contours of this ridge by some original plan I had been obliged in advance to settle in my mind, for on the ridge itself nothing could, on account of the dense growth, be seen for any great distance, and over it no roads passed. I had concluded to have simultaneous horizontal and vertical angles taken to staffs, from a line of foot-hills lying parallel with the ridge, when I was ordered to Florida to make there a survey. This was succeeded by surveys in other far-distant localities

during successive years. Not, however, as it appears, until seven years after leaving the locality intimately described, did the first dream related to it take place, and not until rather more than two years thereafter did its repetitions cease with its solution. I said to my confidant when, about three years ago, that solution was reached, "I shall never have that dream again," and it has never since appeared; as why should it, the mystery with which the uncoördinated ego struggled being solved?

We can readily comprehend, from such an experience as this, how it has been possible, as we have learned from well authenticated cases, for a person to lead two somewhat independent thought-lives. What, however, is clearly shown by it is the possibility, for it has been proved, of subconscious record remaining for years dormant, proceeding at last through unconscious cerebration to reach conscious cerebration, but even then conscious cerebration only during sleep, until finally conscious cerebration of waking moments being reached, the judgment seat of co-ordinated faculties, the dream departs, no longer abusing the curtained sleeper, nor ghost-like rising to disturb his waking self-consciousness.

R. Meade Bache.

IMMORTALITY.

IF you sit down in the quiet of your own room and calmly ask yourself what it is in reference to a life after death that you really desire and what you may reasonably expect, you will probably be surprised to find what a blank your mind is upon the subject. I doubt if you will find that you inwardly desire it, in the same manner, for example, that you desire wealth, or fame, or beauty. You have grown up in the belief that it is right to desire and believe, but that, you know, is quite a different affair from actual yearning.

Nearly every one puts the thought aside as beyond solution. One says, "My thinking will not change the fact nor my longing bring it about. The duty of the passing day is all I can fulfil." Under this cover of postponed examination the world has grown as indifferent to the question as it was formerly engrossed by it. Fear of offending delicate sensibilities and established beliefs keeps the doubter and modifier silent; whilst the extreme of the omnivorous believer is set over against the out-and-out denier. But the great majority of people are neither believers nor disbelievers, but indifferentists—slowly settling toward an agnostic non-committalism that is destructive of all intellectual and moral earnestness.

It is my conviction that this abrogation of curiosity and examination is a most culpable and dangerous fact. If we live after death it is of tremendous importance; if we do not it is of no less vital import, and the belief, the disbelief, or the evasion is of the most constant influence, unconsciously, subtly, upon every thought and act of every day's living.

Suppose now we divest ourselves of the creeps and shudders usually accompanying a discussion of death and immortality, and fearlessly test the common dogma with a little analysis in the light of scientific research and reason. Let us suppose you are a believer: what is it you believe? You desire: what is it you desire, and how far is your desire feasible? You are convinced: but what is the truth? If possible, in what way and to what extent is a future life possible? If attainable, by whom and by what means? Moreover, the *kind* of belief makes all the difference in the world. I have read somewhere about an African chief who killed his wife's lover, and was defeated at last by his wife's unswerving belief in immortality, she committing suicide in order to join her lover. But the chief was equal to the emergency and he in turn killed himself in order to follow the pair and break up their tête-à-têtes in the other world! It all depends upon what you propose doing with a future life after you get it. You might just as well be digging clams on this earth as "singing Hosannas around the throne" in heaven.

Do you believe in or fervently desire what, with splendid bravery and *abandon* the old creed called "the resurrection of the body"? Terrible counter-queries arise: At what age in your life would you choose as best representing the ideal body for your resurrection? Would you prefer your body as it was when you were a child, when youthful, when mature, or when old? Moreover, it is changing every minute, this body. It is estimated that something like five million blood-corpuscles die every second of your life. Even the two or three pounds of minerals in one's bones are only a little more permanently fixed. All component parts are undergoing change every instant: they soon become grass, grain, or tree, passing again into others' bodies, and so on forever. Is it the form and feature you desire to preserve and not the constituent particles? But form and feature change every day or year, and are as impossible to fix as the atoms themselves. Indeed, is not the whole matter put beyond choice by the evident fact that unless by the fiat of an extramundane deity the only moment possible to fix the bodily form in the mould of eternity would be the death-moment? And yet this were the most undesirable of all seasons, since at that hour the body is in the

weakest, most useless, and most wretched condition of all the hours it has served us. Supposing therefore, that you are so in love with your own body that you would wish to call it into life again and for forever, we see at once that no moment or phase of development could be chosen, except perhaps the dying moment, the least desirable of all, and that the particles of one's body have served their turn in myriad other bodies each having an equally valid claim to his "property." Besides this the absurdity of the whole is emphasised by the crushing fact that all the organic matter of the world has been used over and over for bodies and the earth has not enough hydrocarbons to fit out again with bodies a small fraction of the souls that have lived upon it. Doubtless the combined weight of all the organic bodies that have lived on the earth would be many times the total weight of the globe including its minerals, elements, and gases. It may be frankly admitted that no bodily resurrection is possible.

And it is as certainly undesirable. The old dogma was the crudest materialism, wholly unworthy of the credence of those who pretended to believe that God was a spirit, and that they were his children. The belief in bodily resurrection was a natural concomitant of the age of sensualism before the mind and spirit had risen to their modern heritage. The desire for such a resurrection stamps the person with a self-confessed imperfection of mental and moral development. The impossibility of such a resurrection is one of many proofs that life is no sensualist at heart and that ideality is the final outcome, the trend of actuality. Nature compels us to take wings though the sluggish Psyche lingers lovingly in the pretty little cocoon of materiality she has built about herself.

Is it perhaps your understanding, reason, or intellect that you desire to perpetuate forever? Frankly, now, are you so in love with your mental outfit? In your more modest and sane hours are you not sadly conscious how very imperfect it is? While we are young and very conceited we may be filled with self-satisfaction and trust in our own judgment, but as the years drag by, we, looking back over the past, grow more and more conscious that our intellect is not to be trusted. Think of the interminable series of blunders of which your life is the

record! How poorly you have misjudged people and circumstances! How your reason has fooled you many times and again! How many illusions and delusions you have lived through! With what sad clearness you now see your former stupidities, and with what blindness you fail to see your present ones! Looking about you, you find others equally as gifted as yourself holding your opinions as loathsome. Looking above you, you see the most intellectual and the most educated diametrically opposed in their opinions of God, man, and nature. Two great men, two brothers learned and trained in dialectic and logic, soon grow apart. One becomes a cardinal of the Romish church, accepting papal infallibility and a thousand such absurdities, the other as firmly convinced that the fallacies of the English church are God's gospel. Looking below you, you see the great mass of men wrecking their minds and lives upon a thousand outrageous beliefs and prejudices. There is no sadder spectacle in the world than this that the people love error. But each one with imperturbable conceit is convinced that he sees better and plainer than another. Every partisan democrat or republican has no sort of doubt that he is right about every financial or governmental measure, though he has never studied finance, history, or political economy five minutes. He does not dream that he is a dupe of the lousy politicians and of his own *lack* of intellect. All history is a tangle of such poverty-stricken intellection. One can but be amazed at the proneness of everybody to see things and do things every way but the right way. And this is the kind of a mental equipment you would stamp with the seal of eternity!

Possibly you may protest that it is a more perfect and purified intellect that you wish. Ah, yes, but that would not be your intellect. You want to be made over, made into another person. That would not be your immortality but that of another. That would imply that it is pure intellect and perfect, in the abstract, that you are interested in. Have you shown much interest in that sort of intellect in the past? If you wish such an immortality of a perfected intellect you must certainly possess it before it can be made everlasting.

Perhaps, again, you will say that it is the ever-progressive ever-growing intellect you desire. This is subterfuge. That is not what

you wish but what you would take in default of your first choice. Lessing said that if God held out to him absolute truth in one hand and in the other the everlasting search for truth he would choose the latter. But the condition of everlasting search would be the condition of everlasting imperfection of intellect. Lessing's choice seems to me impious.

I therefore conclude, that at heart you do not wish to eternalise your crude imperfect intellect, and that the sole method of getting an exalted and perfected intellect is to cultivate it here and now. Have you in the past obeyed reason and not passion or self-interest? Have you studied logic, history, and science with a sincere desire to do your political and social duty, and to free yourself from prejudice, error, superstition, and conceit? If not why should God suddenly endow you with a perfect intellect ready-made? Is it God's way in this world, to give excellencies unasked and unearned? Rest assured he will not do it at your dying hour. It is no particular merit in you to die; why should you be rewarded with a new intellect then?

Or, again, you may say that it is not so much your intellect that you wish to make immortal as it is your emotional nature, affection, etc. Love and friendship, you complain, are cut off by death and the tendrils of the heart die because they find nothing to cling to or rest upon. You would like to renew beyond the grave the love and sympathy that has made the earth-life endurable, and even beautiful. Now is this, in very truth, just so? Are you really satisfied with your devotion and love? Have not your outgoings of the heart been quite fickle, illogical, selfish, and calculating? Has not your love and gratitude been often a lively sense of benefits to come? Has your love to woman not been of the "Kreutzer-Sonata" type, a little better and more subtly-concealed perhaps, but at heart the same? If you are a woman have you been seeking to get or to give love, and has your little affection been but payment for protection and a home? Have you chosen true and noble friends and been true and noble to them? Has your charity been but alms-giving without kind sympathy and helpfulness? Have you as married folk, perhaps, been, as the cant phrase has it, "devoted to each other," but oblivious of the duty of affection toward the rest of the world,—grinning

examples of *égoisme à deux?* Is your family a fetich, an enlarged sort of selfishness? Do you at heart care much for anybody except your own precious self? And a too exclusive love, even of the purest type may be sin in God's eyes. If you bind all your affection upon one weak life you risk a precious value upon too single and narrow an object, and deprive others of the sympathy that need it more. "Just wrapt up in one," as the sentimental jargon has it, is often if not always a pleasant way of great sin. Affection may become morbid—a disease, quite as well as any abuse or exaggeration of any other characteristic.

I take it that they who are the most satisfied with the strength, purity, and constancy of their love and emotional nature are precisely they that have neither actual strength, purity, and constancy of sentiment, and are thus accurately they that should not have immortality.

Lastly, if neither body, intellect, nor the affectional nature are such as you wish made eternal, are you any better contented with your moral nature? The question at once raises a smile. The feeling of our own ethical unworthiness has crystallised into the great Christian dogma of Christ's vicarious sacrifice. In the words of the old hymn, "Jesus died and paid it all, all the debt I owe." No man hoped to get to heaven on his own merits. Much of the zeal of religion has consisted in the joy of the belief that by a sleight-of-hand trick, a big sponge of forgiveness was wiped over the ethical debit and credit account by the lachrymose deity, whose occupation, as Heine said, was to forgive. History is one long monotonous list of man's sins and inhumanities. I think it probable that you will not urge the ethical aspect; I would leave that plea aside. We all know that we are very much like a lot of pigs, each after the most and best corn and the warmest bed. The amazing immorality of trying to get to heaven on another's merits was the most brazen example of how little heavenliness there was in the heaven-hunters and heaven-scalers. Of course the desire for heaven itself, the desire for one's happiness was immoral when conditioned upon the misery of others. Nature in this respect is better than man, denying him his childish materialistic desires and forcing him to

wait for immortality until he can learn to live in the spirit and seek no selfish heaven.

Just as the body is ever changing, and it is impossible to seize upon any hour when we could eternalise it, except at the undesirable death-hour, so it is the same in reference to intellect, love, and morality. There are no two days in life when we are the same. As to intellect we have little before adult life is reached, and most people have little after fifty or sixty years. It is proverbial that no one changes his opinion after that age, but lives on old prejudices and ideas. The mental powers get into ruts and habits, true reason being abrogated. As to love we laugh at our fickleness, and our habits and ideals of friendship get sordid as each year strips off the freedom and expansiveness of youth and the dear cold ghost of self is more exclusively worshipped. And our ethical standards change with each day's passing. We have at every hour to clutch ourselves by the throat and cry, "Stay! Who art thou?" And lo! while we ask our protean self the question, we have become another. We seek perpetuity of existence for something ever becoming other. We seek personal identity after death, but we have no personal identity before death: how then can we have it afterward? Do you not see that what makes you recognisable, different from other individuals, and what would make personal immortality possible depends upon the accidents of organisation,—depends firstly upon the bodily peculiarity, and secondly upon imperfections of mind that you do not wish to perpetuate? Twins sometimes wear a knot of ribbon as a signal whereby their friends may recognise them. Our faces and bodies are but such little symbols or signals that our souls have hung out for the day. Divest your best friend of his body and would you recognise him? Have you ever thought how the photograph of your friend's soul would look? If bodily form and imperfections make up the most of what we call individuality it becomes evident that in casting off imperfection we become less narrow, less individual. As you become freed from the cramping littleness of self-love and the bonds of self-gratification, as you rise into the life of the spirit, you find yourself less individual. One fitted for a true heaven would not care for the old immortality. What is good to carry over

into the future life is not so much personal identity as personal non-identity, not so much the imperfections that make us individuals as the perfections that free us from individualism. We must lose our life to find it. We have overestimated the value of individuality. Self-consciousness has become hypertrophied, and the summum bonum of life is held to be the preservation of a little puckered-up individuality. This over-development of individualism is doubtless due to the fierce struggle man has had to elevate himself out of savagery. It has been possible only through excessive carefulness and love of the ego. The struggle for existence is now taking on class and corporate characteristics so that the common weal is an ideal quite as much as individual satisfaction and safety. Hence the exaggeration of personality may now return to something like a healthy normalism. As a natural outgrowth and consequence of this over-development of the individual consciousness, there came the absurd attempt to carry over into the after-life the same sort of existence that had been developed here,—consisting in a neglect of the actual world of one's descendants, an ignoring of death that ends the body and products of organisation, and a failure to see that a future life after death must be a life of the spirit, of perfections, and of the common life, not of peculiarities and imperfections. If this seems an aery height and a too rare air it argues against your preparation for the only desirable as well as the only possible kind of immortality. It argues against you just in the same way that your horror of death does. It is only participation in the divine life of the spirit that can see death as right and good. Death comes to shatter our baseless trust in the evanescent physical and teach us dependence upon the everlasting spiritual. They dread death whose life is of the physical type. God never gave to man a greater blessing, after life itself, than death, and nothing more strikingly proves the divine government of the world than the certainty of its coming to us all. If death is your enemy, life is not your friend. The brutal attempt to ignore the fact, the belief that the body with its pack of heathenish appetites and needs could push through death and come out fresh and renewed on the other side is the very insanity of individualism and the intoxication of

materialism. The mourning, shudder, gloom, and horror of death, —God-sent if anything is—is practical pessimism and reckless atheism. Death's one lesson is that we must love and cultivate what he cannot touch. One who has lived a life of kindness and spirituality has no horror of death, and to him it has little mystery. But to him whose divinity has been self and whose religion the worship of his physiological senses, death must be the ugliest of enemies who is to rob him of his all. Did you ever notice how life is plastic and free when first fashioning for itself a body? "All heaven lies about us in our infancy." In youth we are unselfish, aspiring, and noble. As the years go by the power of the organisation, the material grows, and limits more and more the freedom of the spirit. Frankenstein turns upon its maker. With age men get narrow, cold, calculating; women snakey, scheming, cruel. The soul finds itself more and more the slave instead of the master, and by and by when the slavery becomes unendurable, it takes flight, and this you call death. It is the body's reward for insubordination. I think we deserve little sympathy for dying. Most of us have well-merited death before it comes—I speak, of course only of the death of those in life's afternoon. Few keep the young life pliant and free beyond the age of fifty. If people could see that life is the maker and moulder of organisation, and if they would seek immortality upon earth, I believe men might come to live a hundred years. Trees learn to live thousands of years, but they keep youth, and spring, and trust, and love, forever nestling with the birds among the rejuvenescent leaves of spring. We die not because the body is weak, but because it has become too strong. We die because there is no real continuance and strength in anything but the non-physical, and we have trusted in the physical. Matter without free life is inert, moved only from without: the dead body is simply matter without life. It is not the blacksmith's arm that is strong: without nerve-force it cannot raise an ounce, cannot raise itself. Whence the nerve-force? From the ganglionic gray cells of the spinal cord and brain. And whence these little gray cells? The dear stupid physiologist has now reached his limit, and you can confidently answer for him that it

was Life created these things, Life that existed before muscles, nerves, and cells, and that slowly fashioned them; Life, an order of existence in no imaginable way analogous to, or to be confounded with matter or mechanics. There is in the history of thought no more ludicrous and dismal failure than the attempt to explain life in terms of mechanics. The hope of the materialist that science would prove his prejudice is torn to tatters. The children of the spirit are amazed at the bat-blind inability to see the fact,—to see that life is more certain and enduring than matter, soul than sense. The organs of the body are changed, diseased, die; the body itself dies; generations of bodies die, but like a containing cord of silk, on which all the glittering beads of flesh are strung, there is the soul, the life, ever the same, persisting unchanged through all change, giving unity to diversity, moulding, making, discarding, choosing, healing, working to far-away ends with blind, and dead, and obstinate materials. You love the flesh over-much and jealous life says to you, "Take it then, this so loved and wondrous flesh; me you have not loved,"—and lo! the dead body, useless, decaying, lies before you. Let no materialistic misreading of science hoodwink you into any blurring of the outlines between matter and life.* The two are as far apart as heaven and earth, are as dissimilar as thought can conceive,—perhaps in a final analysis, are the only two things of the universe. There is no fact of science showing the faintest warrant for confounding the two. Even Huxley calls materialism the most baseless of all dogmas. It will probably be found that there is but one element, of which all others are duplications and combinations, atoms being but centres of force. But life is irresolvable into any form of matter or mechanical energy. It is not only unthinkable that matter could originate life, but it is demonstrably absurd. No scientist to-day believes in spontaneous generation. *Omne vivum ex vivo* is an axiom. The plant has no nervous system and yet has every physiological function possessed by the human body. It has contractility, irritability, respiration,

* Those who think this view is the voice of faith and not of true science may profitably read a little book that has come to my notice since writing these pages: *Life Theories and Religious Thought*, by Lionel S. Beale.

anabolism, catabolism, and reproductivity,—that is, it has spontaneous movement, it responds to stimulation, it breathes, it assimilates, it excretes, it begets its like,—and physiologically this is all you can do. Nay, more than this, even a drop of the jelly-like protoplasm that makes up the basis of all cell-structures, animal or vegetable, has also all of these qualities or powers.* There are bundles of wholly structureless, unorganised jelly that exhibit these capacities in a wonderful degree. There is, for instance, *Hydra viridis*, that has no eyes and yet sees, no brain or nerves and yet lies in wait for prey, pursues and fights, or flees from danger. Turned inside out it lives and digests its food as well as before. It holds live worms down with an improvised arm when they try to get out of its stomach. Any part reproduces all. Cut off the bottom of its stomach and it goes on eating, quite untroubled by the little accident,—and so on. A great, wise, blind man has defined evolution, or life, as the integration of matter and the dissipation of motion during which the matter passes from an indefinite incoherent homogeneity to a definite coherent heterogeneity, and during which the motion undergoes a parallel transformation. Some one else improved upon this by saying that it was "a change from a nohowish, untalkaboutable all-alikeness, to a some-howish and in general talkaboutable not-all-alikeness, by continuous something-elsifications and all-togetherations." Schelling said that life was the tendency to individuation. But the crystal or the planet shows that, and they are not living. As the hand cannot grasp itself, neither can life define itself. All definitions I have seen miss the essential and primal characteristics of spontaneous movement. But all definitions begin by begging the question,—assuming the thing

* According to the latest scientific researches the dependence of all organisation upon life is more clearly shown than ever. My friend Dr. Edmund Montgomery twenty-five years ago, as a result of extended experiment and research, showed that the body of animals is not an aggregation of cells, the force of the whole being derived from the enslaving and utilising these subordinate organisms, but that the whole body is a single protoplasmic living connected mass or unit with functionally specialised parts. That this view is the scientific view of to-day and that the cell-aggregate theory is dead may be seen by consulting the article "Zelle," by Prof. Frommen in *Eulenburg's Real-Encyclopädie der gesammten Heilkunde*, 1890.

explained. The truth is that there is no definition or explanation possible. The dualism of matter and life must be accepted. There is no monism can bridge the gulf between mechanics and life. Inorganic matter with its inherent forces and laws cannot be conceived as ever coming into or as passing out of existence. From all eternity it was as it is, and so it will remain. The physical universe shows no hint of design, no glimpse of freedom, no trace of intelligence, no suggestion of a maker or God. It has no power of choice, no spontaneous motion. But the merest speck of living matter is utterly and absolutely different. It may have eyes or no eyes, and yet it sees, ears or not and yet it hears, nerves or not and yet it feels and reacts, brain or not and yet it thinks and plans, and acts in accordance with intellectual resolves. The dead body of your child is most inconceivably different from the living body of an hour ago. The one fundamental mystery of the explainable world is why life seeks objectification in material forms, and why it seeks it with such vehemence and ardor. Life seems to bite at matter as if with famishing hunger. One wonders if from some other planet life is being suddenly starved out or banished by some catastrophe, and as a consequence there is thence an over-emigration of the hungry Huns upon our earth. Certain confused and confusion-breeding philosophers in the interests of a theoretical monism or pantheism pretend to find, or to believe that the organic is born out of the inorganic, that the physical world shows evidence of design, that life and mentality were implicate and latent in preexistent matter. Yet they will accept the evidence against spontaneous generation derived from the fact that if you kill all organic life by intense heat and then exclude life from without you will never find life to arise. But it is plain that in the condensation of the dust of space into suns and planets all organic life was killed in the hottest of all conceivable heat. But as the planets cool, life appears. It must have come from without, and must therefore be an universal self-existent power. Why, or how, or whence life comes to us we do not know now, but the transcendent miracle is ever before our eyes: infinitely rich and free, life is filling, thrilling, surcharging every molecule of matter to which with wondrous power

and ingenuity it can gain access. It covers every thousandth of an inch of the earth's surface, dives into the deepest ocean depths, fills the air as high as the mountain tops, ever unsatisfied, ever grasping up a million million renaissant forms, never resting, never baffled. Before this omnipresent god one stands in rapt amazement and worship. To matter, then, life first brought, and still ever brings the power of organisation, of adaptation, of spontaneous energy, and of movement. But when the death of the organisation takes place, the life that preceded and formed it is not lessened or affected. When the watch wears out does it prove that the watchmaker is dead? It is more rational to suppose that the watchmaker has kept on with his work, that he has made and will make many more watches, and I therefore judge that the life of each of us, that existed before our bodies, that formed our bodies, will still form other bodies after ours. The Oriental doctrine of the transmigration of souls is not to be accepted in its crude details, but it is doubtless a great truth. It is more rational and more consonant with what we know of life, than the theory of wasted life implicate in the barbaric notion of sending numberless millions of souls to hell to do nothing but suffer useless pain, and other millions to heaven to suffer (I use the word advisedly) useless pleasure. Any theory of immortality that rests upon the assumption of uselessness and waste may be quickly set aside. Just as matter and force are indestructible, various forms of force being interchangeable, so it must be with life. There must be a conservation of life-energy just as rigid, and this truth must remake and remould the whole conception of immortality. When a mechanical force disappears in one phase, it at once reappears in another aspect. So vegetable, animal, and mental life are but different aspects of life-force, and suffer no loss when transformed one into the other, or when the body disappears altogether. And as it is the inherent nature of force never to rest so there is no rest for life. Banishment of life to a heaven of inaction is as impossible as it is absurd.

This extension of the law of the conservation of force to things biologic and psychic is a two-edged sword: it offers conclusive evidence of the fallacy of the materialist and unbeliever. There is no

annihilation; your life at death not only may not stop but cannot stop. Life is as inextinguishable as physical force. On the other hand this sword deals the death blow to two equally shallow fallacies of believers. Just so sure as it insures the preservation of your life, of all that is worth preservation, just so sure it denies the possibility of preserving what was bound up with and produced by organisation,—that is individuality and personal identity. These things, if not entirely, are certainly largely the products of your peculiar physical and physiological organisation. Whatever is born of the flesh must perish with the flesh; what is born of the spirit shall inherit eternal life. But the profoundest and most distinguishing rebuke is given the unscientific, puerile, selfish assumption of the waste, loss, and uselessness of life involved in the old theory of heaven and hell. When from a chemical compound you take away and liberate one element or compound radicle, does it then shoot off into space, to "flock all by itself" for eternity? By no means! It at once rushes into a new combination with its nearest neighbor, quickly picking up again the round of its duty and function. The curious notion that after having done work in one body, life or souls should at once rush off to some far-away star, there to sing or howl for eternity was a childish absurdity. One wonders where even an omnipotent God could get material for such an amazing manufacture and loss of souls. The theory also forgot that logic demands that what should live forever in the future must perforce have lived forever in the past. A rope if it have one end, must have two ends. What, therefore have our souls been doing during this past eternity? The truth is that absolutely speaking there cannot be souls, but only soul. Life is a unit, and indivisible. The tiniest bit of bioplasm holds and represents all of life. Neither you nor it are separable from the whole. There may be education and progressive evolution of life as a whole but there can be no individual and selfish salvation apart from the salvation of all other souls. The idea that release from the body at once releases a soul from action, duty, and the work of life, is an illogicality that could have arisen in no mind conversant with the demonstrated law of the non-wastage of force in any work of energy elsewhere. Life is

never tired; it is the body that requires rest not the spirit. The old doctrine of heaven, an eternity of laziness, was the sigh of the sluggish flesh whipped to ceaseless work by the unresting life. The desire of heaven was the desire of eternal death.

This extension of the idea of the non-wastage, the rigid conservation and interconvertibility of force to things of life, gains a new significance and grandeur when we consider that whatever proves the immortality of man proves the immortality of every other animal or vegetable form. The tree and horse have a soul quite as well as you, and must live after death quite as surely as you will. It is the flimsiest of conceits that makes men think they are endowed with a special sort of soul or divine life, different from that of animals or plants. Don't flatter yourself. God takes quite the same loving pains and care in the elimination of a leaf that he does of a brain-cell. Man is but a small part of the animal world, and the whole animal world is but a small part of the total life of the globe. Don't despise the vegetable kingdom: it can do something you cannot do—make living matter out of mineral substances. You could not live a day without the food furnished you by "your brothers, the plants." Hence if human life or souls cannot be sent off into space to do nothing, neither can the souls of animals and plants. If we are to have our heaven they must have theirs also. Does not this tangential theory begin to be clumsy and work with huge creakings and difficulties? It looks like *reductio ad absurdum.*

Not only is the tangential theory contradictory of all physical analogies and all known laws, but it is positively immoral. It is but a refined selfishness. Worldliness is none the less sinful because it is other-worldliness. If billions of souls could thus be wasted in an eternity of useless pain or pleasure, could thus, drunken with individuation, hug their own sweet ghosts for never-ending time—then were life a farce, the universe a huge meaningless machine for grinding out waste and useless souls. But if all life, past or future, is one and indivisible, purposive, educational, then the world becomes full of meaning and the face of the Father, Life, smiles out at us from every living thing. The faith of all good men that goodness is at the heart of things is justified. The Earth becomes our

home, that we can love; our Father ever dwelleth here; we cannot be banished. When we have finished our task, when our body has worn out, tireless life, of which we are the children and heirs, gives us here and now other work to do.

To matter, this tremendous cosmical game of incarnation can mean nothing. We see the dead flesh break up into simpler chemical forms and the atoms finally spin off unaltered by their flesh-dance, again to be caught up by the mystic and unseen Master, again to be pressed into organic forms,—forms that like empty sea-shells only show where life has been. And so on forever. But to life some educative purpose must be operative through it all. Life that made eyes must see more than eyes; life that made brains must know more than brains. There is doubtless pain and strain; but is there to be no ultimate justification? We may catch glimpses of reasons. Do we not see an increase both of quantity and quality of life in geologic times? Is life trying to do away with death and heredity? Are they but makeshifts, death but a discarding of too obstinate material? Birth but a retempering and reworking of the same material? Heredity but the temporary means of passing life and its experiences onward until death and birth shall be found unnecessary in a growing command of chemical and physical forces that shall banish old age out of the world? There is no inherent reason why a body should grow decrepit. If it can be made to preserve its suppleness for fifty years why not for a thousand? It may transpire that the dream of an elixir of life may come true through scientific progress despite the savage death-blow given it by Brown-Séquard. The more sin, selfishness, and wrong there is the shorter is the average length of human lives. If you will look into the rich and awful science of statistics you will find proof of this in every class of society. When we apply ourselves to enrich and lengthen our life-time with the same zeal we now use in killing each other—when the endowments of the world's scientific schools equal the cost of the world's armies then there will be a very different life-table found in the insurance-offices.

Finally with mournful echoing recurrence comes the old question: How much of individuality persists and passes untouched

through death's fingers? How far does the graduate life carry with it the results of experience? I would answer: all that you ought to desire, all that is best, all that you will want when you fully understand how little and poor is individuality and that there is something including it and far better. I have a strange inability, personally, to understand the to me absurd hunger after personal identity. It appears to me a childish obtuseness of character. The great and glorious freeness and largeness of life, the decentralised, impersonal quality of it seems to be unappreciated. I do not see how people can fail to understand that personal identity is not only impossible, does not exist now and here, but that the desire of it is the renunciation of progress. We grow and advance only by change, only by breaking up identity and becoming other. Think also of the lack of identity or individuality in nature. There is no personality and individualism there, and yet there is something that includes personality and is much more. There is will, consciousness, intelligence, life,—but not identity or individuality. So the life that is the heart of us invites us to leave our little self and find a larger self. Religion is our *yes* to that invitation. Materialism and pessimism is the saying *no* to it. The immortality that is alone possible or desirable is the losing our life, the individual identity-loving life, again to find it as the impersonal but richer, deeper life of nature and God. God denies you an immortality of individualism and identity because he loves you so well that he refuses you your crude childish desire in order to offer you something infinitely better. People do not seem to see how narrow, small, and partial is the dissociate speck of the individual, and that as an individual progresses in all the virtues of character he evermore becomes proportionally less individual and less centralised, always more like the divine prototype of his impersonal father, Life. The love of individualism is the love of imperfection. This may to some seem a hard doctrine. It is not perhaps an easy task for the butterfly to break its way out through the million-fold bonds of its cocoon, but when risen into the large air and sunshine does it regret the birth-struggle? They who think they are being cheated of reality for a metaphysic illusion will find in breaking through the bonds of flesh that they also

have brought with them splendid wings for rising in the no less real but rarer air of spiritual trust in life. It is not that we love less the thousand ties of flesh, home and kindred, but that in recognising the paternity and fraternity of all life, we find love commensurate with that life. I do not think there was any cold stony harshness in the face of Jesus when he uttered those most profoundly significant of all words, "Who is my mother, and who are my brethren? Whosoever shall do the will of my Father, the same is my brother, and sister, and mother." What a recall to the common life of the spirit! What unity with the common life based upon loving obedience to the will of the Father. What a wonderful rebuke of the love of individualism. He did not love his mother less but humanity more. The more we rise into that impersonal atmosphere the more are we careless of the fate of personal identity. The composite photograph shows the fundamental and enduring quality, the average feature. In a certain sense life and history are taking humanity's composite photograph; but, inordinately-loving individualism, each sitter conceitedly demands that his own picture be left untouched and unblurred by that of the others, and that his poor little portrait shall stand alone and forever—precisely what the divine photographer does not wish and will not permit. Obstinacy persists and God smashes the negative to the ground with the unanswerable argument called death. Because it is more than metaphor that in many ways your body may be likened unto a photographer's negative: created, for example, by the in-flashing of a heavenly ray of light among the highly unstable chemicals of matter; useless, except as an intermediate step to a clearer showing of the character; black and invisible unless shone through by the pure light of life and love; fragile as glass,—and lastly the poor, weak, shadowy, dead counterfeit of a throbbing, marvellous, living reality. The hunger for an immortality of the body, of the senses, the lust of immortality, is, in empty fatuousness, only comparable to the mania of a crazy photographer interested only in his negatives, and who never "develops" one, or to the foolishness that values photographs more than the friends themselves. If we once get our spiritual eye fixed upon the deep reality and unity hidden by the

Maia-veilings of individuality and flesh, the cravings of our weak hearts for eternal continuance of our little bundle of littlenesses, would fall away from us as softly as the wayward longings of childhood. We could then see that it is the quality of all life, the progressive purity, power, and increase of life in the abstract, that become all-important. Religion would become the love and veneration of Life the Father of us; morality the cheerful obedience of the individual to that Father; Heaven the re-entrance of the individual life into the great unity. Much of the old religion was irreligious; its God a far-away dead abstraction, not a living, ever-present love; its immortality was at heart a desire for death, its spiritualism at heart a barbaric materialism. To this death of faith and irreligious religion, comes the sympathetic study and love of nature—that is, science—and reveals to us the opulence of life, the infinity of intellect in nature, the inexhaustibleness of her resources and of her diversity, her beauty, and her splendor. The old materialistic degradation of religion forefelt its doom would come from this spiritualistic revivification, and the devotees cried out against science as atheistic. And science found some foolish enemies in her own camp who, misreading their divine book, joined in the cry—"Nothing but mechanics." It was a dismal short-lived croak. We now see that not only are science and her workers religious, but without scientific knowledge there can be no adequate idea or practice of religion. You can't love God unless you love and know what he is doing in this universe. The man who in a walk goes neglectfully and obliviously by a million mysteries and wonders that God has been toiling to eliminate for ages,—such a man cannot lay much claim to God's friendship. If we love our friend, we have some interest in the deepest concern of his life. The foolishest of all fears is the fear that science is somehow going to destroy all good things of faith and life. In truth it reveals all good things. It demonstrates and manifests both God and immortality,—God as the Father of all life, immortality as the surety of the conservation and non-wastage of that life. Much of the fear of science, is as I have said the fear of the old materialistic religion in presence of the larger faith that burns up its beloved errors. They who had been promised and had

argued themselves into a groundless belief in the value and immortality of a bundle of sensual appetites, selfish desires, and imperfections saw far in advance that any large study of life and nature would dash their wretched faith to atoms. And science has overridden this unfaithful faith. "He that soweth to his flesh shall of the flesh reap corruption; but he that soweth to the Spirit shall of the Spirit reap life everlasting." This is as true scientifically as it is true morally and religiously.

It requires but a little study of neurology and psychology to give demonstration to this truth. The products of organisation die with disorganisation. Most, if not all, of what people mean by individuality and personal identity is a product of organisation, is an accident of incarnation. Children are similar to each other; they are lovable partly because idiosyncrasy and individualism haven't yet developed. As we grow older we cultivate individuality, until the very old are usually angular, cranky, individual with a vengeance! Death, thank heaven, is the end of that, the certainty of a non-eternalising of the imperfect. Birth is a new trial. Incarnation and reincarnation are the ever-renewed work of Life. Through the laws of heredity, through physiology, sociology, and biology, science is tirelessly illustrating to us how all life holds together, how individualism is valueless, and sacrificed to the common weal. There is no escape, sensual or supersensual from the world's great common life. The old selfish dream of a heaven apart from incarnation, from doing, and becoming was a pitiful mistake. You cannot clutch your cake of happiness and like a spoiled child run into the attic of heaven to eat it alone. Life will see to it that you do not slip off. And if you have been born again of the spirit you will have no such desire, but will beg for kindred work upon the old earth-home.

In the meantime the conclusion is clear: to love and aid the work of our master Life we need not wait for death. We may not seek our own salvation; it is no matter whether you and I are saved or not. The reincarnation of life is our work here and now. It took you twenty years to fashion out of a microscopically-small speck of unorganised protoplasm your body and brain. Within us we are to keep that organisation from cramping and binding the life,—keep

life as large and free and pliant as possible. Outside of us the incarnation goes on as well, and every person you influence either for good or for ill, thus by the fact, becomes a product of your incarnating work. Every day you have a hundred opportunities to give, without lessening your own supply, some of your own life, to increase the quantity and to elevate the quality of the general stock of the world's life. Help the young, they inherit the world and will use it well or ill according to your teaching and example. Stop cruelty to animals, they are your brothers, filled with the same life as your own; fight the political ruin we are preparing for ourselves by partisanship, bribery, and class-legislation; discourage war and intemperance and lessen the tyranny of the strong and wealthy. Wage a ceaseless war to the death against luxury, the poison that is eating and rotting the hearts of all of us; love trees, meadows, clear brooks, the mountains and silences of Nature. Love, not so much your own or another's individual life, as Life itself. There is otherwise no immortality.

The divine story tells us that after measureless suffering and self-purification, Buddha had gained the right to enter Nirvana. With compassion filling his heart he put his merited reward aside and resolved to remain without to teach and to help until every child of earth should have become his disciple, and until every disciple should have entered Nirvana before him. Such must be the resolve of every true lover of life and of every right seeker after immortality.

George M. Gould.

SOME QUESTIONS OF PSYCHO-PHYSICS.*

SENSATIONS AND THE ELEMENTS OF REALITY.

I HAVE read Dr. Carus's article "Feeling and Motion"† with care, and have also perused Clifford's essay on "The Nature of Things in Themselves." Let me attempt to present the points in which our agreements and differences consist.

To begin with, I state with pleasure that the monistic tendency of both endeavors is in the direction that appears to me to be the true one and that is most likely to afford elucidation. Consequently, agreement in matters of detail is of subordinate importance and is only a question of time.

Let me cite, first, a few passages from "Feeling and Motion" to which I give my full assent. They are the following:

"The interconvertibility of motion and feeling is an error."

"Feeling is real as much as are matter and motion."

"Its reality accordingly is most immediate and direct, so that it would be ridiculous to doubt it."

"Man's method of understanding the process of nature is that of abstraction."

"Every concept is formed for some purpose, and every concept by serving one purpose necessarily becomes one-sided. . . . We must bear in mind . . . . (1) the purpose it has to serve, and (2) that the totality of things from which abstractions can be made

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* This article is the substance of a private communication from Prof. Ernst Mach to the Editor of *The Monist*—published in the present form with Prof. Mach's consent. Translated from Professor Mach's MS. by Thomas J. McCormack.

† *The Open Court*, Nos. 153 and 154.

is one indivisible whole. . . . We must not imagine that the one side only is true reality."

Some years ago I should also have agreed *in toto* with the passages in which Dr. Carus speaks of the animation of all nature, and of the feeling that accompanies *every* motion. To-day this form of expression would not, it seems to me, correctly characterise the matter. If I were now prematurely to advance a definitive formulation, I should fear lest, so far as myself and perhaps others are concerned, important aspects might remain concealed.

I shall next cite the passages with respect to which I do not agree with Dr. Carus, and then I shall endeavor to state wherein our differences of opinion consist:

"All series *A B C* . . . are *accompanied* by $\alpha\ \beta\ \gamma$." [The *A B C* . . . series of Dr. Carus has a different meaning from mine.]

"We may represent *motion* or we may represent *mind* as the basis of the world, or we may conceive them as being on equal terms." [I cannot agree with a co-ordination of "motion" and "mind."]

"They [viz. feeling and motion] are as inseparable as are the two sides of a sheet of paper." [Fechner says, "As inseparable as the concave and convex sides of the same circle." This appears to me an inapposite simile in so far as a *duality* is predicated where in my view a *unity* alone exists.]

My view of the problem is as follows: We have colors, sounds, pressures, and so forth (*A B C* . . .), which, as simplest component parts, make up the world. In addition thereto, percepts (resolvable into $\alpha\ \beta\ \gamma$ . . .), feelings, and so forth, more or less composite. How $\alpha\ \beta\ \gamma$ . . . differ from *A B C* . . . I will not define here, for I do not know exactly. It is enough for the time being that they do differ from *A B C* . . ., as the latter do from one another. And let us now leave $\alpha\ \beta\ \gamma$ . . . entirely out of account and put ourselves in a time and state in which there are only *A B C*. Now I say, that if I see a tree with green leaves (*A*), with a hard (*B*), gray (*C*) trunk, that *A B C* are *elements* of the world. I say *elements*—and not sensations, also not motions—because it is not my purpose at this place to arrive at either a psychological or a physiological or a physical *theory*, but to proceed *descriptively*. The every-

day man, indeed, takes greenness, grayness, hardness, or complexes thereof it may be, for constituent parts of the world—for he does not trouble himself about a psychologico-physiological theory—and does not learn moreover anything more about the world; from his point of view he is right. Similarly, for the descriptive physicist the question is also one merely of the dependencies of *A B C* . . . on one another; for him too *A B C* . . ., or complexes thereof, are and remain constituent parts of the world.

If, however, I close my eye (*K*), withdraw my feeling hand (*L*), *A B C* . . . disappear. If I contemplate *A B C* . . . in *this* dependence they are my *sensations*. This is but a special point of view within the first.

According to my conception, therefore, *the same A B C* . . . is both element of the *world* (the "outer" world, namely) and element of *feeling*.

The question how feeling arises out of the physical element has for me no significance, since both are *one and the same*. The parallelism stands to reason, since each is parallel to itself. It is not *two* sides of the same paper (which latter is invested with a metaphysical rôle in the simile), but simply the *same* thing.

A perfect physics could strive to accomplish nothing more than to make us familiar beforehand with whatever it were possible for us to come across *sensorily;* that is, we should have knowledge of the interrelation of *A B C*. A perfect psychology would supply the interrelation of $\alpha\ \beta\ \gamma$. Leaving out of account the theoretical intermediaries of physics—physiology and psychology—questions like "How does feeling arise from motion" would never come up. However, the artificial inventions of a physical or psychological theory, must not be introduced into a general discussion of this character—for they are necessarily "one-sided."

I may now set forth my differing point of view with regard to the idea of "motion." A motion is either perceptible by the senses, as the displacing of a chair in a room or the vibration of a string, or it is only supplied, added (hypothetical), like the oscillation of the ether, the motion of molecules and atoms, and so forth. In the first instance the motion is *composed* of *A B C* . . ., it is itself merely

a certain relation between $A\ B\ C\ldots$, and plays therefore in the discussion now in hand no especial part. In the second instance the hypothetical motion, under especially favorable circumstances, can become perceptible by the senses. In which case the first instance recurs. As long as this is not the case, or in circumstances in which this *can never happen* (the case of the motions of atoms and molecules), we have to do with a *noumenon*, that is, a mere mental auxiliary, an artificial expedient, the purpose of which is solely to indicate, to represent, after the fashion of a model, the connection between $A\ B\ C\ldots$, to make it more familiar to us. It is a thing of thought, an entity of the mind ($\alpha\ \beta\ \gamma\ldots$). I cannot believe that this is to be co-ordinated with $A\ B\ C\ldots$ in the same way as $A\ B\ C\ldots$ among each other are. Putting together motion and feeling goes as much against me as would say the co-ordination of numbers and colors. Perhaps I stand quite alone in this, for physicists have accustomed us to regard the motions of atoms as "more real" than the green of trees. In the latter I see a (sensory) fact, in the former a *Gedankending*, a thing of thought. The billions of ether-vibrations which the physicist for his special purposes *mentally annexes* to the green, are not to be co-ordinated with the green, which is given immediately.

When a piece of zinc and a piece of copper, united by a wire, are dipped in sulphuric acid and deflect a magnetic needle in the vicinity of the wire, the unprepossessed *discoverer* of the fact discerns naught of motion beyond the deflection of the needle and the diffusion in the fluid. Everything reverts to certain combinations of $A\ B\ C$. Electricity is a thing of thought, a mental adjunct; its motion another; its magnetic field still another. All these noumena are implements of physical science, contrived for very special purposes. They are discarded, cast aside, when the interconnection of $A\ B\ C\ldots$ has become familiar; for *this last* is the very gist of the affair. The implement is not of the same *dignity*, or reality, as $A\ B\ C\ldots$, and must not be placed in the same category, must not be co-ordinated with it where general considerations are involved to which physics with its special objects does not extend.

The green (A) of the tree is not only adjoined to the presence

of the sun (B), but also to the deflection of the needle (X), by my optic nerve. Familiarising intermediary connections to-day by motions, to-morrow by some other means, is the business of the special sciences, and can only disturb and obscure a general discussion. What should we say of a cosmology from a pharmaceutical point of view? In principle, this very thing is done, it seems to me, when physical augers and saws are employed in all fields of work, as is universally the case.

So much for the juxtaposition of motion and feeling. Perhaps I alone am right, perhaps I alone am wrong.

* * *

According to my conception accordingly "material" processes are not "*accompanied*" by "feelings," but are *the same* ($A\ B\ C\ldots$); only the relation in which we consider them makes them at one time physical elements and at another time feelings.

The relation in which "percepts" and "feelings" as distinguished from "sensations" stand to sensations, is not clear to me. I am much inclined to regard these feelings as a species of sensation (co-ordinate with sensations). How the representative percepts of imagination and memory are connected with sensations, what relation they bear to them, I dare venture no opinion. The relation of $\alpha\ \beta\ \gamma\ldots$ to $A\ B\ C\ldots$ is the point regarding which I do not feel sufficiently sure. Regarding $A\ B\ C\ldots$ (world of sense in its objective and subjective significance) I believe I am clear.

Dr. Carus in a private letter to me says: "It almost seems as if you transform all $A\ B\ C\ldots$ series into the corresponding $\alpha\ \beta\ \gamma\ldots$ series."

This is not the case. I designate by $\alpha\ \beta\ \gamma\ldots$ representative percepts (not sensations), and say simply that $A\ B\ C\ldots$, *the same* $A\ B\ C\ldots$, play, according to circumstances, now the rôle of physical elements, now the rôle of sensations. I call $A\ B\ C\ldots$, therefore, *elements*, pure and simple.

Mine is not the Berkeleian point of view. The latter has been mistakenly attributed to me time and again, the separation that I make of $A\ B\ C\ldots$ from $\alpha\ \beta\ \gamma\ldots$ not having been sharply discriminated and it not having been borne in mind that I call

A B C . . . alone *sensations*, not however $\alpha\ \beta\ \gamma$. Clifford, with his "mind-stuff," approaches very near to Berkeley.

Monism, as yet, I cannot thoroughly *follow out*; because I am lacking in clearness with regard to the relation of $\alpha\ \beta\ \gamma$ . . . to *A B C* . . ., which can only be supplied by further physiologico-psychological investigations; but I believe that the first step towards a competent monism lies in the assertion that the same *A B C* . . . are both physical and psychical elements. As regards the psychical "accompanying" the physical, the question How? continually recurs. Either they are two incompatible things (Dubois) or their relation is bound up in a third thing ("thing-of-itself"). By viewing the matter as *two sides* of the same thing, not much more is gained, to my mind, than a momentary satisfaction.

All non-monistic points of view are, in my opinion, artificial constructions, which arise by investing with very far-reaching extensions of meaning psychological or physical special-conceptions, which have a limited value, applicable only within the department in question for the elucidation of the facts of that department. The overvaluing of psychological conceptions leads to spiritualistic systems, the overrating of physical conceptions to materialistic systems. Naturally in the latter systems *motion* plays a great rôle; for through a mistaken conception of the *principle of energy*, people have come to believe that everything in physics can be explained by motion. But explanations by motions have, as a matter of fact, nothing to do with the principle of energy. The majority of physicists, it is true, believe and disseminate this opinion. If, when a physicist speaks of motion and nothing but motion, the question is asked *What* moves? in ninety-nine cases out of a hundred nothing palpable or demonstrable is brought forward in answer, but hypothetical atoms or hypothetical fluids are adduced which execute motions still more hypothetical. Even in the domain of physics itself, the business of which is to proceed from the sensory and to return to the sensory, I can regard these "motions" at best only as provisorily tolerated intermediaries of *thoughts*, that have no right to be ranked on equal terms with reality, let alone placed above it.

Still less can I allow "motion" the right to create a world-

problem where none exists, and thereby to conceal the real point of attack in the investigation of reality.

I may add that some years ago I took exactly Dr. Carus's point of view, which I presented in a lecture on Psycho-physics published in 1863 in the *Oesterreichische Zeitschrift für praktische Heilkunde.*

With regard to Clifford I may make the following remarks. The notion "eject" pleases me very much. I have long had the idea in mind, but have not defined it because its limitation is not clear to me; nor has Clifford given me any light on the subject. Is the representation in us of the material nature of things we *cannot lay hold of* (the sun, the moon) to be called an eject? Are the abstract concepts of physical hypotheses, which in their very nature can never become sense-affective, ejects? Such things are abstract in widely differing degrees, and are bound up with the sensory in very unequal proportions; the impossibility of becoming sense-affective is partly absolute, partly only relative, that is, it exists for the time being.

I do not at all agree with Clifford's notion "mind-stuff"; in this I wholly concur with Dr. Carus. It is not unbiased philosophising to come down in the end to a *psychological* notion as *comprehensive of the world,*—a notion on the face of it pre-eminently one-sided.

* * *

In connection with the subject under discussion, I might incidentally make mention of Mr. Charles S. Peirce's article "The Architecture of Theories" in the last number of *The Monist.* One Mr. Peirce, a mathematician,* has made some very valuable investigations, similar to Grassmann's. This author's view of the evolution of natural laws does not strike me as so singular. If predominance be given in our conception of the world to the spiritualistic or psychical aspect, the laws of nature may be regarded as tremendous phenomena of memory; as I attempted some years ago to set forth in a lecture of mine. The idea of their evolution is then very near at hand. Of course I do not think that for the time being we can gain much light from this view. For the present the "scientific method" in

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* Mr. Benjamin Peirce, father of Mr. Charles S. Peirce.—Ed.

the grooves of which we have moved for three hundred years, continues to be the most fruitful. It is advisable to be very cautious in advancing beyond this. It is for this reason also that I do not think very much of the fruitfulness of the idea that the entire world is animated and feeling. We have as yet too little insight into the psychical, and still less into the connection between brain-organisation and brain-function and psychical process. Of what advantage to us is the assumption of feeling in cells in which every clue is missing by which to proceed from the psychical assumed to the physical connected with it. It seems to me that the physical and psychical investigation of sensations is for the time being the only thing that can be entered upon with any prospect of accomplishing anything. In this we shall first learn the proper formulation of questions that are to form the subject of further investigations.

ERNST MACH.

SOME QUESTIONS OF PSYCHO-PHYSICS.

FEELINGS AND THE ELEMENTS OF FEELINGS.

EXPOSITION.

WHEN a man who has done so much valuable work for the progress of science as Professor Ernst Mach finds it necessary to change the position he has taken,—a position which has appeared to many thinkers as a satisfactory solution of the most intricate problem in the philosophical and psycho-physical field,—there must exist in the solution some difficulty which has either been overlooked or at least too little appreciated. If there is a flaw in it, I wish it to be exposed. And convinced that its discovery must be of general interest, I take pleasure in publishing Professor Mach's criticism of the view which I have defended in a former article of mine.

The main source of most differences, it seems to me, springs from misapprehensions. I shall therefore attempt to elucidate the subject with reference to the objections presented by Professor Mach.

The main idea set forth in my article "Feeling and Motion" may be briefly recapitulated as follows. Our feelings are phenomena which to an observer who could see all the processes taking place in our brain, would appear as motions of a special kind. Motions and feelings are two aspects of one and the same reality. But feeling cannot be explained as transformed motion. Accordingly, the elements of the conscious feeling which now exists and now disappears, must have existed before. The presence of elements of feeling must be an additional feature of the processes

Recapitulation.

of nature not included in the term motion, and not observable in motions, yet inseparably bound up in motions. Or, in other words, feelings and the elements of feeling are the subjective aspect of what objectively appears as and is called motions.

The term "elements of feeling" employed in this sense has been adopted from Clifford. The idea that feelings and motions are two aspects of one and the same reality has been held by several psychologists, among whom are the founders of the science of psycho-physics, especially Fechner.

I. MOTION AND FEELING.

Professor Mach says: "Putting together motion and feeling goes as much against me as would, say, the co-ordination of numbers and colors."

Justification of juxtaposition.

The putting together of two concepts depends upon the purpose of our investigation. Motion and feeling, in spite of their disparity, have one quality in common which justifies their juxtaposition. Both in their spheres are terms of the most general circumscription.

Feeling described.

By feelings I understand those features of our experience which constitute what may be called the awareness of the present state. Feeling comprehends all the many degrees of awareness in pleasures and pains, sensations and thoughts, emotions and ideals. It constitutes the subjectivity of our existence and furnishes the basis of all psychic life. Feeling is the most general term of its kind.

Motion described.

By motion I understand all kinds of changes in the objective world that can either be directly observed or are supposed to be observable. Indeed all changes taking place must, objectively represented, be thought of as motions.

Feeling and motion being each the broadest concept of its kind, the question, In what relation do motions stand to feelings? appears to be quite legitimate.

* * *

Concerning the relation that obtains between feeling and motion, Professor Mach objects to the use of the expression "feeling accom-

panies motion." "Material processes," he says, "are not accompanied by feeling, but both are the same." And in another passage, "The parallelism stands to reason, since everything is parallel to itself."

I grant most willingly that the term "accompany" is inadequate, and I admit that a certain feeling and a certain motion form one inseparable process. There is no duality of feeling and motion, both are different abstractions made from one and the same reality. I do not say that feeling and motion are identical, not that they are one and the same; but I do say that they are one. There is no such thing as pure feeling; real feeling is at the same time motion. Feeling by itself does not exist in reality. Pure feeling is a mere abstraction. And wherever the expression parallelism between feeling and motion has been used, it can mean only a parallelism between the two spheres of abstraction.

The term "accompany" inadequate.

Professor Mach continues: "They [motion and feeling] are not two sides of the same paper (which latter is invested with a metaphysical rôle in the simile), but simply the *same* thing.

For the same reason Professor Mach objects to Fechner's comparison. Yet it seems to me that Fechner hit the mark when he compared feeling and motion to the inside and the outside curves of a circle; they are entirely different and yet the same. The inside curve is concave, the outside curve is convex. If we construct rules relating first to the concave inside and then to the convex outside, we shall notice a parallelism in the formulas; yet this parallelism will appear only in the abstractions which have been made of one and the same thing from different standpoints and serving different purposes. The abstract conceptions form two parallel systems, but the real thing can be represented as parallel only in the sense that it is parallel to itself. If we consider the real thing, it represents a parallelism of identity. There is but one line, and this one line is concave if viewed from the inside, it is convex if viewed from the outside.

Fechner's simile

The simile which I introduced of the two sides of one and the same sheet of paper was devised to convey no other meaning than this construction of Fechner's comparison. The paper is invested

with a metaphysical rôle only in the case where the simile is otherwise construed. There is no page which exists of itself as a mere mathematical plane independent of the paper of which it forms a side. Thus there can never be in reality a page without its counterpage. The paper, its size and color, belong to the page and constitute its properties.

The simile of a sheet of paper.

Thus the abstraction 'feeling' represents my looking at the one side of reality. I leave, and from the subjective standpoint I have to leave, the other side out of account. Yet the other side of the sheet is inseparable from the one at which I am now looking, just as much as feeling is inseparable from motion. And I am constrained to admit the truth of the reverse also: motion is inseparable from feeling, but with the limitation that motions need not be on their subjective side actual feelings; they may be only elements of feeling which under certain conditions become actual.

I am aware that my comparison of feeling and motion to the two sides of one sheet of paper may be easily misinterpreted. But is not that a danger to which all comparisons are subject? A comparison is always imperfect, or as the Romans used to say, it limps: "Omne simile claudicat." And is not reality liable to be misinterpreted in the same way? Have not some philosophers thus introduced the metaphysical explanation of the unknowableness of things in themselves? Such philosophers conceive the two sides of a sheet of paper (the abstract mathematical planes of the pages) as phenomenal and the paper as their metaphysical essence. The size of the sheet, the color of the paper, and all its other qualities are in a metaphysical world-conception represented as properties of which the thing is possessed—not as constituting the thing, but as essentially different from it.

The metaphysical misinterpretation.

It appears to me that Professor Mach in spite of his opposition to Fechner's simile and to the expression that feeling and motion are two aspects of one and the same reality, entertains the same view. At least his words: "Only the relation in which we consider them makes them at one time physical elements, at another time feelings," are to that effect.

II. SENSATIONS AND THOUGHTS.

Professor Mach's problem.

The difference between Professor Mach's view and mine may appear greater than it is, because the problem which Professor Mach treats in his article "The Analysis of the Sensations," lies in quite a different field from that of the problem of the relation of feeling to motion. The problem being different, the same and similar terms are not only used for different purposes, but demand also different comparisons. Professor Mach's symbols $A\ B\ C\ldots$ and $\alpha\ \beta\ \gamma\ldots$ represent a contrast different from that of feeling and motion. They represent the contrast of sensations and thoughts. Sensations, such as green and hard, are colors, pressures, tastes, etc; thoughts are memory-images, concepts, volitions, etc.

Professor Mach says: "How the representative percepts of imagination and memory are connected with sensations, what relations they bear to them, as to this I dare venture no opinion. . . . . Monism, as yet, I cannot thoroughly follow out; because I am lacking in clearness with regard to the relation of $\alpha\ \beta\ \gamma\ldots$ to $A\ B\ C\ldots$; but I believe that the first step towards a competent monism lies in the assertion that the same $A\ B\ C\ldots$ are both physical and psychical elements."

My symbols $A\ B\ C\ldots$ and $\alpha\ \beta\ \gamma\ldots$ represent the contrast of physical and psychical elements, not of sensations and thoughts. Concerning thoughts, Professor Mach says he is much inclined to co-ordinate them with sensations so that his Greek symbols might differ from his Italic symbols not otherwise than the latter, viz. $A\ B\ C\ldots$, differ among themselves. Taking this ground, I believe, it would be preferable to symbolise them accordingly among the Italic letters, perhaps as $X\ Y\ Z$. In the diagrams on page 407 they are called $M\mu$, $N\nu$, $S\sigma$.

Feeling, sense-impression and sensation defined.

According to my terminology, feeling, as explained above, is the most general term expressing any kind and degree of subjective awareness. A sense-impression is a single irritation of one of the senses, the irritation being a special kind of motion plus a special and correspondent kind of feeling. A sensation is a sense-impression that has by repetition acquired meaning. A

later sense-impression, when felt to be the same in kind as a former sense-impression, constitutes, be it ever so dimly, an awareness of having to deal with the same kind of cause of a sense-impression; thus giving meaning to it. By sensation, accordingly, I understand a sense-impression which has acquired meaning. And feelings that have acquired meaning, I should call mental states. Representative feelings (feelings that have a meaning) are the elements of mind.

Thought and thinking defined.

By thinking I understand the interaction that takes place between representative feelings. Such are the comparisons of sensations with memory-pictures, or of memory-pictures among themselves, the experimenting with memory-pictures so as to plan new combinations, etc. The products of thinking are called thoughts; and by thought in the narrower sense is commonly understood abstract thought which on earth is the exclusive privilege of man.

If I am not mistaken Professor Mach understands by sensations (represented by him as $A\ B\ C\ldots$) what I should call sense-impressions; while thoughts, memories, and volitions (represented by him as $\alpha\ \beta\ \gamma\ldots$) form what I should call mind, or all kinds of mental states, that is, the domain of representations.

The higher spheres of thought, or representative feelings, grow out of and upon the lower spheres. Sense-impressions, as I have attempted to explain in the article "The Origin of Mind" (*The Monist*, No. 1), are the data which are worked out into concepts and ideas; they are the basis upon which the whole structure of mind rests. The reflex motions of simple irritations, being modified in higher spheres by the rich material of experience consisting of memory-images, and by the possibility of forethought created through experience, become volitions.

Monism and the origin of mind.

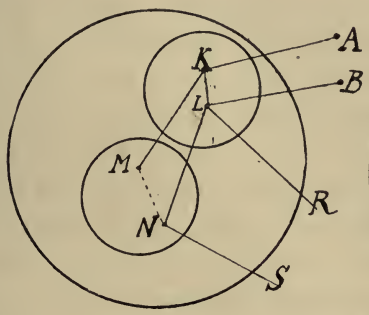
A monistic explanation of the rise of mind from elements that are not mind is possible only on the supposition that the objective processes of motion are not mere motions but that they are at the same time elements of feeling.

Is this not the same position as Professor Mach's, where he says that "the first step towards a competent monism lies in the assertion that the same $A\ B\ C\ldots$ are both physical and psychical ele-

ments"? and again: "The same *A B C*... are both elements of the *world* (the 'outer'* world namely) and elements of feeling."

Considering the two last-quoted sentences of Professor Mach, it appears to me that all differences vanish into verbal misunderstandings. Yet since I am not at all sure about it, I may be pardoned for becoming rather too explicit. The adjoined diagram may assist me in making my ideas clear.

Agreement with Professor Mach.



Fig, I.

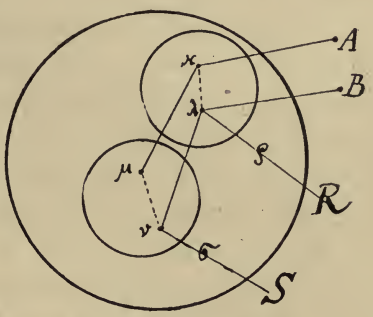


Fig. II.

Let the large circle of both figures represent a sentient being, a man. The periphery is his skin. The small circle enclosing *K* and *L* is a sensory organ; the other small circle enclosing *M* and *N* represents the hemispheres of his brain. *A* and *B* are processes taking place outside of the skin of this man. *A* produces an effect in *K*; *B* in *L*. The line *R* represents a reflex motion. *M* and *N* are concepts and abstract ideas derived from such impressions as *K* and *L*. The line *S* represents an act of volition.

Explanation of the diagrams.

All these symbols represent motions in the objective world. We know through physiological investigations that *K*, *L*, *M*, and *N* are motions; in our individual experience they appear as feelings.

The second figure represents in agreement with my system of

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* Professor Mach here says "outer world." I should prefer to replace it by the expression "objective world," because the motions of a man's brain belong to the outer world of all other men. To make sure of including the actions of my own body in this outer world, I should prefer the term "objective world," making feelings alone (to the exclusion of the subject's own motions) the constituents of the subjective world.

symbols the states of awareness, in Greek letters. Certain physiological processes ($K\,L\,R$, $M\,N\,S$ of Figure I) appear subjectively as states of awareness (i. e. $\varkappa\,\lambda\,\rho$, $\mu\,\nu\,\sigma$ of Figure II). Yet A and B remain to the thinking subject mere motions. If they possess also a subjective side, although only in the shape of potential feeling, it does not and it cannot appear.

Sensations not elementary.

Professor Mach calls green, hard, etc., which in a certain relation are our sensations, "the elements of the world." These processes characterised as "green," "hard," etc., are in my opinion too special and at the same time too complicated to be considered elementary. I grant that they are elements of mind, because if further analysed, they cease to be mental phenomena. But they are not elements *per se*, not elements of the world. It remains doubtful to me whether Professor Mach understands by his term "sensation" only $K\,\varkappa$ and $L\,\lambda$ or the whole relations $A\,K\,\varkappa$, and $B\,L\,\lambda$. Taking it that he represents $A\,B\,C\ldots$ as both elements of the world and sensations, it almost appears certain to me that his term "sensation" stands for the whole process $A\,K\,\varkappa$, and that he considers the scientific analysis of this process into A the outside thing, into K the nerve-vibration corresponding in form to the outside thing, and $\varkappa$ the feeling that takes place in experiencing the sense-impression $A\,K$, as an artificial procedure that serves no other purpose than that of familiarising us with certain groups of elements and their connections. The processes $A\,K\,\varkappa$, $B\,L\,\lambda$, in that case would be considered by Professor Mach as the actual facts, while the A and B, the K and L, the $\varkappa$ and λ represent mere abstract representations without real existence, invented by scientists in order to describe the realities $A\,K\,\varkappa$, $B\,L\,\lambda$, etc., with the greatest exactness as well as economy of thought. In their separate abstractness they are the tools of science only and we must not take them for more than they are worth.

Thoughts as mental implements.

If this be so, I understand Professor Mach very well and I agree with him when he looks upon all M and N with their respective μ and ν as being "noumena, *Gedankendinge*, things of thought." They are mental tools. Sense-impressions are realities, but mental representations are implements; they are

auxiliaries for dealing with realities; they are "the augers and saws" employed in the different fields of cognition.

Professor Mach says in his article "The Analysis of the Sensations": "When *I* (the ego) cease to perceive the sensation green, when I die, then the elements no longer occur in their customary, common way of association. That is all. Only an ideal mental economical unity, not a real unity, has ceased to exist." The term sensations, it appears to me, can in this passage be interpreted neither as $K\,\kappa$ only, nor as the whole relations $A\,K\,\kappa$, but as any $A\,B\,C\ldots$ relations; and since Professor Mach has not excluded from them the element of feeling, I should have to represent them by $A\,\alpha$, $B\,\beta$, $C\,\gamma\ldots$. Sensations as I understand the term (viz. $A\,K\,\kappa$, $B\,L\,\lambda$), are elements of mind; if they are further analysed they cease to be mental states. Says Professor Mach: "If I close my eye (K) withdraw my feeling hand (L), $A\,B\,C\ldots$ disappear. In this dependence $A\,B\,C\ldots$ are called sensations." Should we not rather say, they cease to be sensations, if this dependence ceases? Accordingly, sensations and sense-impressions are for this and for other reasons not indecomposable, not ultimate atoms. The elements of mind can be further analysed into the elements of the elements of mind. The elements of mind do not persist; but the ultimate elements of the elements of mind, whatever they are, do (or at least may) persist.

Persistence of the elements of mind.

When speaking of the elements of the elements of mind we cease to deal with objects of actual experience as much as a physicist or chemist does who speaks about atoms. Nevertheless the analysis is as legitimate in our case as it is in the chemist's. If in the above quoted passage I am allowed to replace Professor Mach's term "sensations" by elements of sense-impressions, I should not hesitate unreservedly to accept his idea. These elements of sensations would be all kinds of natural processes, all kinds of motion. They would be physical actions which are not mere motions but also and at the same time elements of feeling.

It is true that abstract concepts, and especially scientific terms and theories, are mere contrivances to understand the connections among, and the qualities of, real things. Ideas are not the real things,

but their representations, and some ideas are not even representations;

Ideas as contrivances for comprehension.

they are solely of an auxiliary nature and comparable to tools. They are used as working hypotheses wherever the real state of things is in part hidden from us, until we have found the actual connections. As soon as the actual connections are found we can and must lay down our tools.

In a certain sense all words and concepts are tools for dealing with the realities they represent. But some words are tools in a special sense. They have been invented for acquiring a proper representation.

Professor Mach says: "The implement is not of the same dig-

The dignity of mental tools.

nity or reality as *A B C . . .*" It appears to me that these implements (if they are of the right kind) have almost a higher dignity (although not reality) than the material to which they are applied. My respect for tools is very great, for tools are the most important factors, perhaps the decisive factors, in the evolution of man. The usage of tools has matured, nay created the human mind, and words,—scientific and abstract terms and theories not excluded,—are the most important and most sacred tools of all.

Some ideas, it is true, have to be laid aside like tools that are no longer wanted; but there are other ideas which we cannot lay aside, because they have more value than the ideas of a mere working hypothesis. Some ideas are indispensable and will remain indispensable; we shall always have to employ them in order to represent in our mind the connection between certain facts. If we see a train pass into a tunnel and emerge from it at the other end, we will connect in our mind these two sensations by the thought of the train's passage from one end to the other. This idea is not a sensation; it is a noumenon. Shall it therefore be called a *mere* noumenon, a tool that has to be discarded as soon as we are accustomed to expect a train to emerge from the one end of a tunnel soon after it has disappeared into it at the other end?

There are scientific concepts which, for some reason or other,

Noumena legitimate, if representing realities.

can never become objects of direct observation; they can never become sensations. Nevertheless we must think them together with certain sensations as indispensable connect-

ing events taking place behind the stage and hidden from our eyes. Our conception of a train hidden from sight in a tunnel, it is true, is a noumenon, but it is a legitimate noumenon, it represents a reality. So also many scientific ideas, although undoubtedly things of thought, are legitimate noumena. If they contain and in so far as they do contain nothing but formulated features of reality or inevitable conclusions from verified and verifiable experiences, these things of thought represent something real, which means that if we were in possession of microscopes of sufficient power, or if we could look behind the veil that hides them from our sight, we should see them, just as we should see the train if the rock through which the tunnel leads were transparent.

III. THE ORIGIN OF FEELING.

Concerning the origin of feeling Professor Mach says: "The question how feeling arises out of the physical element has for me no significance." I agree that we cannot ask how feeling arises out of the physical element. But feeling being a fleeting phenomenon, to propose the problem of the origin of feeling *has* a significance.

Physical elements with and without feeling.

Some physical elements—namely, those of our own body—are indubitably possessed of the subjective phenomena of feeling. And as to certain other physical elements, observable in our fellow creatures, that is in men and animals, no one would think of denying their presence either. But there are physical elements which we regard as bare of all feeling. The wind that blows, and the avalanche that plunges into the valley are not supposed to be feelings. Yet the energy of the wind and the energy of the avalanche may be utilised and ultimately stored up in food. The food may be changed into human energy and then the element of feeling appears as if called forth out of the void. We agree that feeling has not been changed from motion. But if feeling was not motion before, what was it? Feeling cannot be a creation from nothing. Consequently it must in its elements have existed before. Feeling, namely actual feeling, must be regarded as a special mode of action of the elements of feeling. If all that which we can observe

in motion, all that which the term motion comprises, constituting the objective changes taking place in nature, contains nothing of feeling or of the elements of feeling, we must yet attach to every motion the presence of this element of feeling.

Elements of feeling not observable.

That the potential subjectivity of the physical elements, namely the elements of feeling, cannot be seen, as motions can be seen and objectively observed, is not a reason that militates against this view; for it is the nature of all subjective states to be felt only by the feeling subject. If all feelings are objectively unobservable except by their correspondent motions, the elements of feeling can form no exception to the general rule.

* * *

The animation of all nature.

Professor Mach says: "Some years ago I should have agreed *in toto* with the passages in which Dr. Carus speaks of the animation of all nature and of the feeling that accompanies every motion."

Nature not all feeling.

Let me here emphasise that I have termed nature "alive" not in the sense that every motion is supposed to be accompanied with sensation, nor with any kind of feeling, but with an element of feeling only. I am aware that the term element of feeling may be easily misunderstood, and it seems advisable to guard against such misconceptions. Actual feeling I suppose originates from the elements of feeling similarly as an electric current originates under certain special conditions. Sulphuric acid dissolves zinc and sets energy free which appears in the copper wire as electricity. It is an instance of the transformation of potential energy into kinetic energy.

The term "elements of feeling" inappropriate.

To use the expression "elements of feeling" is no more or less allowable than to speak of the stored up energy from which electricity is produced, as elements of electricity. The latter expression is inappropriate, because we are in possession of better terms, because our range of experience in the subject is wider. But suppose that among all molar and molecular motions we were only acquainted with electricity and knew nothing of potential energy, could we not for want of a better word form the term "elements of electricity"?

The elements of feeling should not be supposed to be feelings on a very small scale. The elements of feeling may be and for aught we know are as much unlike actual feelings as mechanical motion, or chemical dissolution is unlike electricity. The essential features of feeling may be, and I believe they are, produced through the form in which their elements co-operate. Similarly the different pieces of a clock and the atoms of which it consists contain nothing of the clock ; and if we should call the heaviness of a weight, the swinging property of the pendulum, the tension of the spring, etc., etc., elements of chronometry, it might appear ridiculous, because we know so many other processes, viz. all different ways of performing work, for which these qualities can be used. The action of a spring, of a suspended weight, of a mere pendulum are not by themselves elements of chronometry; they become a chronometrical arrangement only by their proper combination with a dial and hands attached, and by being correctly regulated in adaptation to temperature and many other conditions.

What the elements of feeling are not.

* * *

It is not plausible that the earth, when in its gaseous state, was the habitation of any feeling beings, and it is actually impossible that it harbored feeling beings as they exist now. Feeling accordingly must have originated, and the question how feeling originates is a problem that suggests itself naturally to the psychologist as well as the philosopher.

The kinetic energy liberated in our actions, in brain-activity as well as muscular motions, is produced from the potential energy stored up in our tissues. This energy, *qua* energy, is the same energy which we meet everywhere in nature. All kinds of energy are interconvertible. Yet we must bear in mind that the vital energy displayed in animal organisms is a special and indeed a unique form of energy. It is as different from other forms of energy as is, for instance, electricity from molar motion.

Vital energy a unique form of energy.

In former times physics and chemistry were considered as applied mechanics, and physiology as applied chemistry. This position, however, is wrong and had to be abandoned. Mechanical, chemical, physiological, and psychical

Physiology and psychology not applied mechanics.

processes exhibit radically different conditions. The student of mechanics, the chemist, the physiologist, the psychologist, each one of them attempts to solve a different problem. They accordingly deal with different sets of abstractions. The processes which constitute the subject-matter of the physiologist's and psychologist's work are different from those of the mechanical philosopher and of the chemist. The abstraction of the so-called purely mechanical excludes such processes as chemical combinations; it is limited to molar mechanics only. The term molecular mechanics is an attempt at widening the domain of mechanics. But the terms of neither molecular nor molar mechanics contain anything of the properly physiological nature observed in vegetal and animal life. The latter is a very complicated process which may briefly be described as assimilation of living forms. The laws of molar and molecular motions are not annulled, yet they are superseded; they remain, yet some additional important traits appear. Different conditions and complications show different features and the characteristics of organised life are not the molar or molecular mechanics of their motions but their properly physiological features.

Mechanical laws accordingly cannot explain physiological action, and still less have they anything in common with ideas, or thoughts, or feelings. Accordingly, the attempt to apply mechanics to any other than mechanical considerations is *prima facie* to be rejected. We must never forget that all our scientific inquiries deal with certain sides of reality only.

The higher view of the whole.

The abstractions of the mechanical philosopher as well as those of the physiologist and psychologist are one-sided aspects only of reality. Yet it is quite legitimate to take a higher standpoint in order to classify our notions so that the general views comprise the special views and to determine the relations among the several in their kind most general views. In this way we can shape our entire knowledge into an harmonious world-conception representing the whole as a whole. This I tried to do when, following the precedent of Fechner and Clifford, I proposed the problem of the origin of actual feelings from the non-feeling elements-of-feeling, the former depending upon a special combination or form

of action of the latter, and the latter being a universal feature of reality.

When we observe some very simple process in nature, e. g. the fall of a stone, we represent it as a motion. We formulate the operation of the stone's fall into a law, describing its mode of action as it holds good in all cases of the same kind. But the motion observable and representable in our mind is not all that takes place. There must be some additional feature which in a further development will appear as man's consciousness.

The additional feature in a stone's fall.

To regard the fall of a stone as only a very simple instance of essentially the same process that takes place when a man does an act, i. e. performs a motion accompanied with consciousness, appears at first sight strange or even absurd. But we cannot escape the assumption that in a certain respect it is the same thing. We are inevitably driven to adopt this monistic conception of things by inexorable logical arguments; and we are supported in it by the observation of natural processes.

Human action develops by degrees out of other natural processes, and we have sufficient evidence to believe that humanity with its civilisation, science, art, and all its ideals—so far as the energy alone, spent in human activity, is considered—is but a differentiation of natural forces that has come to pass on the cooled off surface of the earth under the influence of solar heat. Man is transformed solar heat. All the forces animating the planetary system are differentiations from the heat of which our solar system was possessed when in a nebular state. And what is the heat of which nebular masses are possessed? It is the motion of celestial bodies, of comets, or of so called world-dust, changed by collision into molecular motion.

Human activity and energy.

But in human activity there is some additional element, that of purely subjective awareness, which is neither energy in itself nor can have been transformed from energy; it must have existed potentially. Accordingly we assume that also in the more primitive processes of nature there is some additional element which in its full development appears as feeling and reaches its highest stage known to us, in the consciousness of man.

IV. THE ORIGIN OF ORGANISED LIFE.

Organised life and feeling.

There is a very original view concerning the origin of life advocated in this number of *The Monist* by Dr. George M. Gould in his article on "Immortality."* The problem of the origin of life (namely, of organised life) is so closely connected with the problem of the origin of feeling, that the one cannot be solved without solving the other. Feeling such as we are familiar with is an exclusive property of organised life and a few incidental remarks on Dr. Gould's proposition will therefore not be out of place.

In introducing here the views of Dr. Gould in a discussion with Professor Mach, I am fully aware of the great difference that obtains between the two. While Professor Mach's thought moves in an outspoken monistic direction, Dr. Gould presents a bold dualism, attributing to all life, to the lichen on the withered rock no less than to the human soul, an extramundane origin. Why should we not then rather adopt the more consistent theological supernaturalism which attributes to inorganic nature also an extramundane origin, thus to realise by a short cut a complete unitary world-conception?

Dr. Gould's dualism.

Dr. Gould's proposition is contained in the following:

"Certain confused and confusion-breeding philosophers, in the interests of a theoretical monism or pantheism pretend to find, or to believe, that the organic is born out of the inorganic, that the physical world shows evidence of design, that life and mentality were implicate and latent in pre-existent matter. Yet they will accept the evidence against spontaneous generation derived from the fact that if you kill all organic life by intense heat and then exclude life from without you will never find life to arise. But it is plain that in the condensation of the dust of space into suns and planets, all organic life was killed in the hottest of all conceivable heat. But as the planets cool, life appears. It must have come from without, and must therefore be a universal self-existent power."

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* It cannot be denied that many ideas set forth by Dr. Gould in his presentation of the problem of immortality contain a deep truth. The brilliant and forcible language in which the author treats his subject is admirable. But the passages on the externality of life present a conception which stands in direct opposition to the views that have been editorially upheld in *The Open Court* as well as the *Monist*.

The idea that "life must have come from without" is not quite clear. Does Dr. Gould mean "from without our planetary system, out of other planetary systems"? If so, the same objection holds good: In other planetary systems also when they were in a nebular state "all organic* life was killed in the hottest of all conceivable heat." Shall we perhaps consider the cold interstellar regions as the place whence life does come? And if "from without" means "from without the whole universe," we should be driven back to the old supernaturalistic dualism which regards nature as dead and life as a foreign element that has been blown into the nostrils of material forms so as to animate them.

What can externality of life mean?

Dr. Gould proposes his theory of the external origin of life, with great confidence, in the name of modern science. Must we add that modern science is very far from sustaining his view? Professor Clifford touches the subject of spontaneous generation in his article "Virchow on the Teaching of Science." He says:

A modern thinker on the externality of life.

"Why do the experiments all 'go against' spontaneous generation? What the experiments really prove is that the coincidence which would form a *Bacterium*—already a definite structure reproducing its like—does not occur in a test-tube during the periods yet observed. . . . The experiments have nothing whatever to say to the production of enormously simpler forms, in the vast range of the ocean, during the ages of the earth's existence. . . . We know from physical reasons that the earth was once in a liquid state from excessive heat. Then there could have been no living matter upon it. Now there is. Consequently non-living matter has been turned into living matter *somehow*. We can only get out of spontaneous generation by the supposition made by Sir W. Thompson, in jest or earnest, that some piece of living matter came to the earth from outside, perhaps with a meteorite. I wish to treat all hypotheses with respect, and to have no preferences which are not entirely founded on reason; and yet whenever I contemplate this

simpler protoplasmic shape
Which came down in a fire-escape,

an internal monitor, of which I can give no rational account, invariably whispers 'Fiddlesticks!'"

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*Dr. Gould does not seem to make a distinction between "organic" and "organised." We should here prefer the expression "organised life." Carbon is an "organic substance" but not an "organised substance" A cell and its protoplasm, however, are "organised substance."

Suppose, however, Dr. Gould's assumption were accepted, suppose that life had come from without, matter were of itself lifeless, and life, the "self-existent power," had ensouled some dead organic substances so as to cause their organisation, would we be any wiser through this hypothesis? The assumption instead of diminishing the difficulties in the problem of life, would increase them. New questions arise: What must this "self-existent power" be conceived to be? Does it exist without a physical basis (to use Professor Huxley's phrase)? How does it differ from energy? Is not all power energy of some kind? And are not all kinds of energy interconvertible? Has this self-existent power the faculty of changing other energy into itself, into life, or is it only supposed to utilise it? In the latter case it would be a *Ding an sich*, not in but behind the functions of organisms; and in both cases it would form an exception to the law of the conservation of energy, for "the self-existent power of life" would be an ever-increasing power. One life-germ only may have come from spheres unknown into the universe, and by utilising the mechanical energy of the material world has animated at least our earth, and may animate in a similar way all the globes in the milky way. That life-germ, however,—if it was anything like a real life-germ, such as our naturalists know of,—must have consisted of organic substance. What a strange coincidence, that outside of the world also organic substances are found! Life-germs are not simple substance, but highly complex organisms. Accordingly, the question presents itself, How has this life-germ been formed? What conditions in another world radically different from ours have moulded it and combined its parts into this special life-germ so extraordinarily adaptable to our material universe? Or must we suppose that the first life-germ was formed out of the cosmic substance of our universe by a non-material spark of life, (whatever life may mean,) that had dropped in somehow into the material world from without?

Difficulties of Dr. Gould's position.

If life is a self-existent power, why does it always appear dependent upon and vary with the organisation, which it is supposed to have formed? Why has life never been observed in its self-existence? So far as we have ever been able to observe life, it is

matter organised and organising more matter. All the difficulties disappear if we say, Life does not produce organisation, it is organisation.

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Organisms not aggregates of cells.

Dr. Gould, in appealing to the latest scientific researches as proving "the dependence of all organisation upon life," especially mentions his friend Dr. Edmund Montgomery and also Professor Frommen's article "Zelle" (Eulenburg's "Realencyclopädie der gesammten Heilkunde," 1890). Now it is true, as Dr. Gould says, that "the body of animals is not an aggregate of cells." It is as little a mere aggregate of cells as a watch is a mere aggregate of metal, or as a hexagon a mere aggregate of lines. The body of animals is an organism; which means, it is an interacting whole of a special form built of irritable substance. A highly complex organism is not and cannot be considered as a compound of its diverse organs, but as a differentiation. Its unity is preserved in the differentiation, yet this unity does not exist outside of or apart from the differentiated parts.

Disparity of life and matter.

I fully assent to Professor Huxley's proposition, approvingly quoted by Dr. Gould, that "materialism is the most baseless of all dogmas." I also believe in the *omne vivum ex vivo;* but I do not consider it with Dr. Gould as an axiom, nor can I accept the consequence which Dr. Gould derives from it, "that life [viz. organised life] is more certain and enduring than matter, soul than sense." It is true that "matter and life" are "as far apart as heaven and earth." Farther indeed, for they are two abstractions of an entirely disparate character. No passage through spatial distance, be it ever so large, could bring both concepts together. They are and remain as different, as is for instance the idea expressed in a sentence from the ink with which it is written. Ideas contain no ink and ink contains no ideas. Yet this does not prove that ideas exist by themselves in a ghostlike abstractness apart not only from ink, but also from feeling brain-substance. Nor does the disparity of the terms life and matter prove the abstract or independent existence of life outside of matter.

If life for some such reasons as hold good only in so far as they

refute the old-style materialism, could or should be considered as being some self-existent power having come into the world "to bite" at matter, we might also consider the hexagon as a something that came into the mathematical world from without. The hexagon cannot be explained as a mere aggregate of lines, accordingly hexagoneity must be a self-existent power; it must have come from without, utilising lines for its hexagonic existence.

Organised life must have originated from non-organised elements by organisation, and thus a new sphere is created which introduces new conditions. The laws of organised life are not purely mechanical laws, nor physical laws, nor chemical laws, but they are a peculiar kind of laws; just as different as chemical laws are from purely mechanical laws (the latter not including such phenomena as are generally called chemical affinity).

Natural laws and monism.

Natural laws are formulas describing facts as they take place under certain conditions. Accordingly if special conditions arise we shall have a special set of laws. Monism assumes that all the laws of nature agree among themselves; there is no contradiction among them possible. Yet there may be an infinite variety of applications. The processes of organised life are not mere mechanical processes. The abstractions which we comprise under our mechanical terms do not cover certain features of vital activity and cannot explain them. Physiology is not merely applied physics; it is a province of natural processes that has conditions of its own and the physiological conditions are different from physical conditions. This however does not overthrow monism. We believe none the less in the unity of all natural laws and trust that if the constitution of the cosmos were transparent in its minutest details to our inquiring mind, we should see the same law operating in all the different provinces; we should see in all instances a difference of conditions and consequent thereupon a difference of results that can be formulated in different natural laws, among which there is none contradictory to any other.

EDITOR.

LITERARY CORRESPONDENCE.

I.

FRENCH PUBLICATIONS.

WHY do we sleep? Some have said, through cerebral congestion; others, through cerebral anæmia. In reality the question remains undecided. M. S. SERGUEYEFF has attempted to resolve it in his scholarly lectures published under the title of *Le Sommeil et le Système nerveux, Physiologie de la Veille et du Sommeil.** He considers it under a new and very general point of view.

According to him, wake and sleep would be the two alternating phases of one and the same function, necessarily vegetative, and absolutely indispensable to life. Sleep would respond to an assimilation ; wake to a dis-assimilation.

To this vegetative function, nevertheless, it is necessary to assign an aliment, an organ, a mechanism. Now as yet we know of only two material forms of assimilative activity, the one semi-liquid for digestion, the other gaseous for respiration. The aliment of sleep would be, as opposed to this, an ethereal matter, or, if we wish, a dynamic form, susceptible of being accumulated and of being transformed in various ways. At first sight, no doubt, it seems difficult to accept a sthenic aliment, without a ponderable substratum, and it sounds a little strange to seek in the phenomena of wake and sleep "an assimilative group the object of which belongs to the ambient dynamism," in other terms, "a functional activity," which

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* In two thick octavo volumes. Alcan, publisher.

should be influenced by the condition of the alimentary source—that which would give at the same time the explication of the fact, that, in a general way, the two phases of wake and sleep are related to the planetary periodicity of day and night, summer and winter. Let us, however, follow M. Sergueyeff in his interesting researches, where the scientific spirit does not cease, at any rate, to sustain him.

In his theory the cerebro-spinal system is no longer the organ, as it is in the theories of congestion and anæmia; but it is rather the so-called sympathetic elements, the ganglio-epidermic system, of which the imperfectly known functions rightly require to be explained. Struck with the insufficient reasons given of the phenomenon of caloricity resulting from the section of a sympathetic nerve, or from the obstruction of a ganglion, M. Sergueyeff has been led to assume an action of the great sympathetic, different from the vaso-motor action. He does not hesitate, in order to explain the caloricity, to admit into physiology the principle of the mechanical equivalence of heat. He endeavors to prove, by an ingenious argument, that the heat which is produced after the section of the sympathetic nerves, finds its immediate origin in the arrest of a nervous centripetal movement; that this arrested movement owes its existence to dynamic condensations, to which certain organs of the ganglionic system are adapted, being endowed with a condensatory capacity; and finally that in the normal state the movement represents, not an expenditure of energy, but a contribution, that is to say, it is a movement of a trophical character.

The sanguineous condition of the brain remains to be considered; but the difference in this respect between wake and sleep, would be purely distributive instead of being quantitative. Schiff has remarked that white rats deprived of their cerebral lobes and corpora striata sleep and wake; which leads us to think that the phenomena of cerebral irrigation are consequentials, and not essentials, of wake and sleep. In short, these two alternating phases serve in turns as chief moving causes for the vaso-motor excitation which differences, in one or the other period, the sanguineous condition of this or that medullar locality.

We cannot follow the author in the special study he makes, first

of the sensitive nerves and the motor nerves, then of the "cerebral activities" in the conditions of wake and sleep. It would be laborious to disengage his psychological doctrine from the long discussions which envelop it, and which, well carried out as they may be, do not always allow it to appear with as much distinctness as could be wished. We will note only the care that he takes to restore the *psychic initiative*, contrary to the theories most in favor to-day. He supposes a prefunctional movement of the sensitive nerves, in order to determine the sensorial impression; "attentive volitions" in order to explain attention, voluntary or involuntary. According to him, the physiological phenomenon which necessarily corresponds to sufficient attention, that is to say to the laying hold of an object by consciousness, can only be a volitional nervous movement. He remains convinced that "the cells of the brain must project incessantly in certain of their afferent fibres centrifugal influxes which tend to meet with perceptive images"; and feeble and involuntary as these influxes may be, he ranks them nevertheless in the somewhat mysterious category of so-called attentive volitions. These are not reflexes, but automatic movements. And definitively, every act of attention belongs to the category of volitional movement, be it involuntary or voluntary; or in short, "attentive volition exists prior to its voluntary strengthening."

As to the revival of images, it is necessary to admit the intervention of a previous tendency to association. The difficulty remains then to know how we are to be able to keep these images before the consciousness, in order to apply our attention to them, and what secret cause has power to arouse the signals, the nervous movements, which present them to it. The author resolves the difficulty by accepting, for cases of intentional reviviscence, *ideo-motor* volitions, to which he attributes a considerable rôle; their intervention distinguishes precisely, says he, the active memory from the passive memory.

In reality, for M. Sergueyeff the consciousness is not, as we have said, a simple result of the image, an epiphenomenon; it is permanent (thus he affirms that we always think, that we always dream); the *Ego*, the *We* is for him an irreducible factor. This way

of looking at things has evidently influenced the choice of his terminology, more than it has vitiated his analysis, and its conclusions, moreover, he has not put down to the credit of any system of metaphysics whatever. Far from having exhausted the matter of his book, which is replete with criticisms and facts, I have hardly sketched its outlines, and I should be his false interpreter if I did not recall, in conclusion, the hope strongly expressed by himself, that the great assimilative work of an imponderable aliment reserves for us many other solutions beyond that of the phenomena of wake and sleep. "Though it may be," says he to his hearers, "that in all the recent words I have uttered, the truth shines only by a spark, do not disdain this spark, gentlemen. May one of you receive it within him, for it can, I have the confidence, by a more powerful breath than mine suddenly increase, like a polar aurora, and illuminate unbounded horizons."

* * *

We now come to a book of less scope, rudely constructed perhaps, but very instructive. As indicated by the title chosen by him, *La Psychologie de l'Idiot et de l'Imbécile*,* Dr. Paul Sollier has attempted to draw the portrait of the idiot and the imbecile *in general;* which I sincerely approve of persuaded as I am that we shall find profit in sketching generic types and in tracing the composite photographs of social individuals grouped in various ways, in order to establish on solid basis a "natural history" of societies. The novelists have approached this difficult enterprise at random; it is for the psychologists to direct it with a method more sure and a tact not less delicate.

Idiocy is not always congenital; the lesions which produce it are extremely varied and do not consist by any means in a simple arrest of development. In short, idiots form a very diversified clinical group; and here was the first difficulty necessary to overcome in order to write their psychology. Profiting by the insufficient definitions that authors have given of idiocy, M. Sollier thinks he is able in his turn to define it as "a chronic cerebral affection with

* Alcan, publisher.

varied lesions, characterised by troubles of the intellectual, sensitive, and motory functions, going possibly as far as their almost complete abolition, and which assumes its special character, particularly in what concerns intellectual troubles, only in the youthful age of the subjects it strikes." Then, discussing the proposed classification, he stops to form three categories, which he connects with the intellectual development, for which attention serves him as the touch-stone. They are: (1) absolute idiocy—complete absence and impossibility of attention; (2) simple idiocy—feebleness and difficulty of attention; (3) imbecility—instability of attention. These differences in the state of attention (we recognise the fruit of the excellent teaching of M. Ribot) separate with sufficient clearness the imbecile from the idiot: the latter remains extra-social, the former becomes anti-social. M. Sollier, for whom the imbecile, let us say in passing, is an exceedingly disagreeable personage, follows out throughout the whole of his book this distinction, which seems to us one of the most curious and the most piquant aspects of it. How many people in the world border on imbecilty, without belonging clinically to this type, and maintain the mischievous rôle of destroyers and marplots!

Readers familiar with the study of mental maladies will not be astonished to find among idiots the following signs of degeneracy: dulled senses, obtuse perceptions, a poor condition of sensibility and consequently of mobility, and anomalies or perversions of the instincts, sentiments, etc. But that which makes of them a group apart, is the constitution of the perfect type from infancy, while among the degenerates properly so-called, the perversions, the manias, etc. present, are the episodical concurrences of a morbid evolution which unrolls itself capriciously in the course of a whole life.

M. Sollier has interesting remarks nearly everywhere in his book. We may refer, for example, to what he says concerning pity, courage; of writing; of hereditary organic memory; of ideas, etc. It is curious, certainly, to see idiots suddenly show themselves skilful in playing an instrument which was that of their father and of their grandfather. A passing observation on impressionability, greater for color in girls and for form in boys, deserves to be devel-

oped: I regret that the author should have been sparing of details on this point as on some others. M. Sollier appears, we may say, to have aimed not so much at giving new explanations in psychology, as at verifying those which have been proposed by good authors. He is precise, positive; from the medico-legal point of view, he presents practical conclusions, and does not embarrass himself in sentimentalism, from which the *Philosophie pénale** of M. Tarde, let it be said parenthetically, is not always sufficiently free.

A word more with reference to the "great suggestibility" of imbeciles, on which M. Sollier reasonably insists. Since I spoke in this place, three months ago, of the work of M. Bonjean, the awkward intervention of M. Liégeois in the Eyraud-Gabrielle Bompard case has contributed to compromise the Nancy school, much more than to serve it. M. Brouardel is able to object with ingenuity that certain persons, supposed to be victims of hypnotism, unfortunately obey suggestions "which are the most agreeable to them." It is good advice to be cautious. Still it is necessary to take into account (it is what I had omitted to say) the character of the subjects, in order to be able to judge of the possible accomplishment of acts suggested in sleep. For, it is not doubtful that among the abnormal, the imbecile, the mentally feeble, one could not count much on the revolt of a moral personality which is not constituted, on the efficiency of a power of inhibition which is almost null, and that generally criminal suggestion can become formidable when it is attended by bad instincts.

It remains to speak of a work by M. A. Ricardou, *De l'Idéal, Etude philosophique.*† I avow without any disguise that I have not taken any interest in it. M. Ricardou declares himself a deist, spiritualist; the misfortune is that he follows so much the vague and wavering manner of his school. A fine rhetoric, elevated aspirations; but few facts, not sufficient realities freely seen. What end is served by rebelling against physiological psychology, and by laying claim to the rights of the method of introspection? In truth, no one de-

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* First volume of the *Bibliothèque de Criminologie.* Masson, publisher.

† Alcan, publisher.

nies its right; it is suspected only when it affects supremacy, and rejects all control.

I simply mention, in conclusion, the interesting work, which appeared last year, of M. L. Levy-Bruhl: *L'Allemagne depuis Leibniz, Essai sur le developpement de la conscience nationale en Allemagne.** It belongs, in great part, to the history of philosophy, and furnishes to it a valuable contribution.

Paris, March, 1891. Lucien Arréat

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* Hachette, publisher.

II.

THE MODERN LITERATURE OF ITALY SINCE THE YEAR 1870

NOT being a man of letters, but an alienist, I will give you a psychological rather than a literary description of the condition of literature in Italy. My presentation will undoubtedly have many defects and deficiencies in details, but it will perhaps thereby gain in originality of treatment.

It is one of the characteristics of European writers, and especially of Italians, to isolate themselves completely from scientific research. Beauty for itself, the imitation of the ancients—this is the defect, or the strength, of our poets. ALEARDI, it is true, put some years ago a little botany and geology into his poetry, as did, nearly a century ago, Mascheroni, in his celebrated epistle *Invito a Lesbia Sidonia*. ZANELLA, a true priest, has sung in a celebrated ode the *Coquille Fossile*, which portrays in colors truly poetical the last discoveries of paleontology. But this naturalism was only a light varnish, like the golden powder that coquettes sprinkle on their hair, and which falls at the first movement. It is nevertheless true that some poets, not appreciated yet as they deserve, draw their inspiration from nature or from history.

Such is ARTUR GRAF, who in my opinion owes his genius to an intermixture of race, Italian, Greek, and German, and also to a climatic graft, as he comes from Roumania; which shows the favorable influence of the double race-infusion. (See my work on "Genius.") In his poem *Medusa*, Graf has mingled naturalism and Schopenhauerianism with a poetical spirit which is highly original. He has also written *Il Diabolo* and the *Legend of Rome among the Nations of the Middle Ages;* a work which has philological

and historical merit, especially in connection with the Folk-lore of past centuries. These books are in prose, but their form is wholly poetical.

Rapisardi is truly the Juvenal, and we may also say the Lucretius, of contemporaneous Italy. He began by giving us the best translation of the great Roman poet, and he has absorbed much of his spirit, and perhaps also of the asperity of his verses, and of his contempt for form. His great original poem is the *Giobbe* (Catania), in which he has given a bitter satire of modern society and of contemporary literary men; however, he would seem to be sometimes too personal; so much so that many persons have not forgiven him. Lately he has published a collection of *Religious Poems* (Catania, 1888), in which, despite its title, there is much less religion than naturalism. It is a hymn, worthy of its master, to the religion of nature and to the beauty of truth, without forgetting the grand social ideas of justice which our poets so often forget.

Praga may be described as the Baudelaire of Italy. He too, like the latter, lived and died an alcoholist and paralytic. He was the first to break with the Græco-Latin traditions; and has drawn his inspiration from the caprices of his disease, which has given him a powerful and original stamp. His best works are *Penombre* and *Tavolozza*. The same lot, induced by the same disease, has befallen Rovani, who in his historical novels (*Giulio Cesare* and *la Storia di centi anni*) has performed good work in history and psychology.

Among writers truly original, Mantegazza excels in prose. His is one of those many-sided, versatile minds that are met with in the Latin races; such as Cardano, Leonardo da Vinci, L. B. Alberti, Voltaire, Taine, Richet. He is by turns pathologist, physiologist, chemist, anthropologist, geographer, traveller, and novelist. His novel *Dio Ignoto* is semi-naturalistic. In his *Fisiologia del piacere* he has attempted a new kind of personal observations, although it is met with in the novels of Balzac, of Flaubert, and of Gonoret. In his *Physiology of pain* he has again become pathological, serious; this book has, accordingly, not obtained the success that it merited. In the *Feste ed Ebbrezze* he describes the pleasures of the people.

But Mantegazza, who has the originality of genius, has also its evil and treacherous volubility; and we cannot say what is his patriotic and philosophic faith. He has written pages that seem dictated by a catholic priest, by the side of others worthy of Aretino (*Amore degli uomini*), and still other pages which could be signed by Victor Hugo.

Less original perhaps, but much more consistent with himself, is M. Trezza, another versatile writer, a theologist, poet, historian, critic, philosopher, philologist, but who has not changed the facets of his genius, or the conscience of his faith. At one time a priest, he was one of the most ardent preachers; but the study of natural science and of philosophy drew him away from his faith and plunged him in naturalism. He has preserved all the apostolic warmth of the ardent and honest priest of his youth. Thus he has emerged from it a new being immovable in his faith:

> *"Come torre che non crolla*
> *Giammai la cima per soffiar dei venti."* *

His works in religious criticism *La Religione e le Religioni*, and also in history and philosophy (*Lucrezio, Epicuro e l' Epicurismo*, *La Critica Moderna*) have received from it a peculiar impress, in which the enthusiasm of the apostle is mingled with the calm observation of science, and history confounds metaphysics. He is the first and the only one perhaps, who has attempted criticism in Italy while preserving a literary brilliancy which reminds us of Carlyle.

But according to universal opinion, among all these stars, the star of first magnitude is Giosue Carducci. He is the true representative of the Italians, a graft of antiquity on the moderns, but in which antiquity predominates. His poems (*Le Nuove Poesie*, *Le Odi barbare*, *Le Nuove Odi barbare*, *Le Terze Odi barbare*, *Le Nuove Rime*) have attracted the greatest attention. He has introduced and revived a new metre, many times tried, but never with success, by Trissino, Campanella, Chiabrera, and others; a new metre which reproduces the ancient rhythm of Greek and Roman poetry, espe-

* Like a tower that shakes not
In the blasts of the storm.

cially the elegy and the Alcaic ode. His is a new pagan Renaissance with a certain gloss of modernness but with outbursts sometimes patriotic and even revolutionary which the Renaissance lacked. His prose works also consist of archaic reconstructions of Italian literary history and of vigorous polemics, sometimes too personal, but always with a refinement of critique.

By the side of these productions which are known everywhere, and which can be truly called national, there is a substratum, of considerable extent, of literary works that have a local character. Such is the poetry of dialect which has however a great weight with us; for the best satirical poems and the best comedies are almost always written in dialect (*Pascarella* in the Roman dialect, *Fucini* in the Tuscan dialect, *Di Giacomo* in Neapolitan, *Bersezio* in Piedmontese, *Rizzotto* in Sicilian). It must be remarked also that this local division is still maintained in the rolls of the great army of literature, although this does not prevent such works passing beyond the geographical limits of their territory and becoming known throughout the whole of Italy.

We have a Ligurian-Piedmontese school with De Amicis at the head,—De Amicis, who now however often attempts social studies with much intrepidity,—and Barili, Farina, Bersezio, Giacosa, and Faldella, who possess the common characteristic of a sentimentality almost feminine, altogether opposed to the rugged country of which they constitute the glory.

There is the Tuscan-Bolognese school of which Carduui is the chief pontiff and which hovers about the old school. M. Panzacchi, Ricci, Marradi, and Stecchetti belong to it; there was an epoch in the life of the last named in which he launched into a style which seemed naturalistic, but which was at bottom only pornographic; but he immediately compensated for his escapade by a great number of philological memoirs of an erudition truly oppressive, ultra-academical.

There is the Abruzzian school, of which D'Annunzio is the head. Its characteristics are variegated tropical coloring, and a certain studied ornamentation sometimes burdened with similes and metaphors, and an exaggerated objectivity; it lays hold of the out-

side of things, but does not reach to and grasp the soul of the inner life of nature.

The Neapolitan school is made up of compilers and ingenious critics, who will make you an elegant embroidery with gossamer threads on the point of a needle. The most celebrated names of this school are SETTEMBRINI, DESANCTIS, BONGHI, and VITTORIO IMBRIANI.

The Sicilian is the rudest, but it is the most powerful and most original. We could name the great historians CEMARI, LA LUMIA, LAFARINA; and PITTRE, who created Italian Folklore, and who has maintained it with a special journal. Sicily has also given us two great novelists, VERGA and CAPUANA, who are improved Zolas. The *Malavoglia* and *Don Gesualdo* of M. Verga give us the home life of the Sicilian people. In the *Giacinta* of Capuana we have the life of the citizens and of the Italian nobility photographed.

Women always preserve the local type; but with special features. Hardly any write in verse; they compose novels and light productions rather than romances, sketches rather than true portraits. They choose the young girl and the unfortunate married woman; very often they write autobiographies, or the biography of their friends or their husbands. The land-question has nevertheless been dealt with very well by the Marchioness COLOMBI, (pseudonym of Madame Torelli Viollet) and the woman's question has been treated of with great vigor and statistically by KULISCHIOFF; I have not spoken of ANNIE VIVANTI, another proof of the advantages of crossing, for she is Anglo-American and Anglo-Italian, and a Jewess to boot; she writes in verses which have nothing of the classical element in them—an extraordinary thing in Italy. Her works possess originality, which goes as far as the most extreme naturalism. (*Lirica di Annie Vivanti*, 1890.)

In fine, modern Italy has not many literary masterpieces to show. And this is due to a number of causes. In romances and comedies, dash and spirit demand a certain stock of observations that can be found only in great cities (capitals), and in Italy, Rome and Milan are only beginning to be such.

Originality, multiplicity, and energy of types are very scarce in

Italy, for everywhere the conventional lie dominates; it is much more difficult to choose models here than it is in certain other countries, for example in Russia; for genius alone can draw inspiration from inferior and ordinary material.

The classical system of education has prevented us from going to the source of social anomalies, mattoids, madmen, etc.

Besides, classicism, which has dominated us for so many centuries, and which has inspired us with its marvellous beauties, has, like the old, (and it is very old,) lost all its vital force. People have made believe to warm themselves by it; but they have not succeeded; they remain cold; and they admire its adepts only in deference to the conventional lie. Yet the entire education of our youth consists of that. It is the same as in religion. People have made Madonnas and Jesuses of it to such an extent that now there is no longer any means of contriving anything new. Naturalism without being the natural foundation of the people is nevertheless sufficiently advanced not to allow of serious inspiration in religion.

Many authors who have sought new paths have been led out of their way by journalism and politics, which always end in exhausting people, even geniuses. Scarfoglio, Bonghi, Torelli, Dezerbi, and Ferri are among the number.

The difficulty of securing a place in the literary world also very quickly exhausts many. Thus many men, especially of Southern Italy, produce a very good work; but they have become fathers too late in life, and have only a single son; such are Bersezio, with his *Travet*, Boito with his *Ballate*, Valcarenghi with his *Confessioni d'Andrea*.

Political liberty, if it has given an impulse to social and political studies, has prejudiced great literary production, perhaps because under the incitement of foreign domination and of rebellion, the heart draws from a grand source of inspiration, and the pen finds powerful excitation, more powerful perhaps, than liberty gives it.

Art finds more numerous elements of success in minds highly excited. It is the property of great revolutions to elevate the souls of all contemporaries, to impart to them a peculiar disposition unknown before, and which is not slow to disappear. The most

humble, the most obscure, those even who have not taken any part in the events and who have hardly studied them, express, a long time afterwards even, sentiments much superior to those which their ordinary condition allows. It is sufficient to have lived during some passionate epoch to issue from it better, purer, and stronger. The new ideas, the generous impulses which then carry away nations, penetrate into all classes and ennoble a whole generation. We had in our revolutionary epoch, Manzoni, Massimo d'Azeglio, Guerazzi, Giusti, Porta, Miceli, Brofferio, Berchet, Mameli, Boerio, Laquacci, Aleardi, Grassi, Prati. Who have we now to compare with them?

Turin, March, 1891. CESARE LOMBROSO.

BOOK REVIEWS.

THE ORIGIN OF THE ARYANS. An Account of the Prehistoric Ethnology and Civilisation of Europe. By *Isaac Taylor*, M. A., L. L. D. New York: Scribner & Welford.

The author of this extremely interesting work states in the preface that it does not aim at setting forth new views or speculations. His opinions on its main thesis, that is, as to the place of origin of the primitive Aryans, are those of Spiegel and Schrader, except where he prefers the conclusions of Cuno. These writers, with the majority of the latest investigators of the subject, accept the view originated* by the English philologist Dr. R. G. Latham in 1851, that the original home of the primitive Aryans was on the great plain of Central Europe. Cuno insisted also on what Dr. Taylor affirms is now an axiom in ethnology, that race is not coextensive with language. This is a most important principle, as it completely changes the aspects of the problem by making it more complex. It introduces, in fact, a fresh element; as it requires the Aryan to be identified before his primitive habitat can be sought for.

The difficulties attending this identification are clearly pointed out in the present work. During the neolithic period, Europe was inhabited by four distinct races, all of which are represented among the present Aryan-speaking peoples of the continent. If the primitive Aryans are to be identified with one of those races it must have imposed its speech on the other three. Moreover, of those four races, two are decidedly dolichocephalic, or long-headed, the other two being as decidedly brachycephalic, or broad-headed. The latter are now represented by the Slavo-Celtic, and the Ligurian, or Swiss and Savoyard, peoples; while the present representatives of one primitive long-headed race are the Swedes, the North Germans and the Friesians, and of the other, the Corsicans, the Spanish Basques, and some of the Welsh and Irish. There are grounds for believing, however, that the two dolichocephalic races were derived from a single root, and that the two brachy-

* Dr. Daniel G. Brinton in his *Races and Peoples* points out that the view referred to in the text was first stated by the Belgian naturalist M. D'Halloy; but it has always been accredited to Dr. Latham by German writers and, as mentioned by Dr. Taylor, was regarded by them as an English "fad."

cephalic races will ultimately be identified as one. There would thus be left only two primitive stocks, one long-headed and the other short-headed, and Dr. Taylor concludes, not only that the primitive Aryans belonged to the latter, but that they were racially connected with the Finno-Ugric tribes of Eastern Europe and Central Asia. He shows that the culture of the Slavo-Celtic race, as exhibited in the round barrows of Britain and the pile-dwellings of Central Europe, comes nearest to that of the primitive Aryans, as disclosed by linguistic palæontology. Further, that anthropologically this belongs to the same type as that of the tall, fair, broad-headed Finno-Ugrian tribes; agreeably to which, the grammatical resemblances between the Aryan languages and those of the Ural-Altaic stock point to a primitive unity of speech.

There would seem to be no doubt that the greater part of Europe was originally occupied by peoples of the long-headed type, and Dr. Taylor conjectures "that at the close of the reindeer age a Finnic people appeared in Western Europe, whose speech remaining stationary, is represented by the agglutinative Basque, and that much later, at the beginning of the pastoral age, when the ox had been tamed, a taller and more powerful Finno-Ugrian people developed in Central Europe the inflective Aryan speech." This theory requires that the non-Aryan long-headed race should have acquired in some way the Aryan speech, and it is not surprising that the North Germans reject the "Turanian" theory accepted by the French and espoused by our author, and maintain that the physical type of the primitive Aryans was that of their own tall, fair, dolichocephalous race. On this view, the ancestors of the brachycephalic Lithuanians, whose language best represents among those of Europe the primitive Aryan speech, must have been Aryanised by the ancestors of the Teutons, whose language approaches nearest to the Lithuanian. Dr. Taylor points out, however, that this would leave unexplained "how the speech of the brachycephalic Celts and Umbrians, to say nothing of the Greeks, the Armenians, and the Indo-Iranians, was obtained from that of the dolichocephalic Teutons; how a people which in neolithic times was few in numbers, and in a low state of culture, succeeded in Aryanising so many tribes more numerous and more civilised."

The question arises as to how far this "Aryanising" process extended. Was it limited to language or did it include certain physical characters as well? As a fact the superficial characters of the tall dolichocephalic type which, according to Nilsson and Von Düben, has prevailed in Sweden continuously from the earliest times to the present day, make an approach to the florid complexion, light eyes, and reddish hair of the tall brachycephalic race. The former have lighter hair, a whiter skin, and eyes of blue instead of gray, but these are just the differences that might be expected, as the result of the admixture of the Slavo-Celtic stock with that to which the famous Neanderthal skull belongs, and which is now known as the Canstadt type. At the same time it is possible that the difference in color a well as in stature which distinguishes the tall from the short races belonging to both the long-headed and the broad-headed stocks may be the result of external in-

fluences, such as climate, food, and clothing, and the general conditions of life in a mountainous or northern region. This would apply at all events to the Teutonic or Scandinavian type, and also to the Celto-Slavic which represents the primitive Aryan type, or rather their Ugro-Finnic predecessors, if it is true, as Dr. Schrader concludes, that the undivided Aryans had only two seasons, winter and spring, or at most three. This fact does not necessarily imply that they lived in a northern region; for the same climatic conditions could be met with in a mountainous district. Dr. Schrader thinks, however, that the precise region can be approximately indicated by reference to the beech tree. We are told that this tree does not now grow east of a line drawn from Königsberg to the Crimea, and its northern limit must formerly have been still more restricted. Hence the cradle of the Latin, Hellenic, and Teutonic races, which have the same name for this tree, must have been to the west of the ancient beech-line. But since the Slavo-Lithuanian name is a Teutonic loan-word, we must place the cradle of the Lithuanians and the Slaves to the east of this line. But since there are philological reasons for believing in the unbroken geographical continuity of the European Aryans previous to the linguistic separation, they must be placed in northern Europe astride of the beech line; the Slavo-Lithuanian in European Russia; and the Celts, Latins, Hellenes, and Teutons farther to the West. It may be doubted, however, whether this necessarily indicates northern Europe as the primitive Aryan home. Dr. Latham in his "Native Races of the Russian Empire" insisted on Podolia being the region where Sanskrit and Zend developed themselves, the Slavo-Lithuanic region lying to the north and west of it. Curiously enough the beech-line passes directly through Podolia, which might therefore claim to be the classic Aryan abode. Too much stress should not be laid, however, on such an incident as the occurrence of a particular name for a tree. It is quite possible that the beech may not have been known to the brachycephalic Aryans until after they came in contact with the dolichocephalic Teutons. This would seem, indeed, to be required if the Ugro-Finnic origin of the Aryans is well founded. At the same time it should be pointed out that while, according to Keith Johnston's "Physical Atlas," the region of deciduous trees extends as far east as the Aral Sea, Latham refers the beech to the Caucasus as its special habitat; and the mountain slopes of the Caucasus are shown by Peschel to be the best fitted geographically for the original home of the Indo-European race.

After all the question of the *place* of origin of the primitive Aryans is not so important as that of their race affinities, on which, indeed, the former question ultimately depends, and Dr. Taylor has done well to follow up what he terms the "pregnant suggestion" of Dr. Thurnam, the joint author with Dr. J. Barnard Davis of their great work "Crania Britannica," as to the identification of the primitive Aryans with the "Turanian" race of the British round barrows. That he has conclusively established this point it would be rash to affirm, but he has presented a very strong argument in its favor, which is not weakened by Prof. Huxley's at-

tempt to locate the fair dolichocephali in Latham's Sarmatia, as the primitive Aryan race. It should not be lost sight of, however, that the Ugro-Finnic relationship of the Aryans would restore to them the Asiatic origin of which recent discussion has tended to deprive them, for the Ugrians undoubtedly belong to the Asiatic area. On the other hand, if Dr. Topinard, the distinguished French anthropologist, is correct in his assertion that the Aryan blood has disappeared, the question resolves itself into "a discussion of the ethnical affinities of those numerous races which have acquired Aryan speech." This is not our author's own opinion, although it is perhaps countenanced by Cuno's maxim. We must leave here Dr. Taylor's work which will be universally recognised as one of great merit, whatever view may be taken as to the Aryans and their origin. Ω.

Introduction to the Study of Philosophy. By *William T. Harris*. New York: D. Appleton & Co., 1890.

The merits of Dr. William T. Harris in the awakening and the fostering of philosophical interests in this country are extraordinary. As the editor of the *Journal of Speculative Philosophy* he has published translations of the most effective and important chapters of the European, mainly German, philosophers, and also original articles by American thinkers. Among the latter we find contributions from names of highest rank, as well as essays by the editor himself. Dr. Harris was also one of the most brilliant lights of the Concord School of Philosophy; indeed, he may be considered as its centre and representative, for whatever divergence of thought may have appeared in the Concord lectures, the general character of what goes by the name of Concord Philosophy was determined by him. The present work accordingly will command no common attention among those interested in the historical growth of American thought and especially American philosophy, it being a systematic arrangement of extracts made by Marietta Kies from Professor Harris's essays, compiled for the purpose of serving as a class-book at Mt. Holyoke Seminary and College.

However great may be the historical importance of Dr. Harris as the Nestor of American philosophy, we cannot suppress our doubt as to whether his philosophy can be recommended as a study for beginners. Dr. Harris is too original a thinker, and his originality is not in accord with the present time. His cast of mind may be characterised as Hegelian; not that he should be called a follower of Hegel, but his way of thinking follows in many respects the method of abstract ratiocination pursued by that great German philosopher. Still, the results of Dr. Harris are even in closer contact with the religious ideas of Christianity than those of Hegel. We shall delineate here a few characteristic traits of Dr. Harris's speculative thought: "Philosophy attempts to find the necessary *a priori* elements or factors in expe-"rience, and arrange them into a system by deducing them from a first principle." We should prefer according to the method of positivism to derive the so-called *a priori* or the "formal", and with it the conditions of cognition, not from a first

principle but from the facts of experience. Dr. Harris calls Space, Time, Causality "presuppositions of experience": they make experience possible. We consider them as parts of experience as characteristic properties, and our concepts of time, space, and causality have been abstracted from experience. Dr. Harris says: "Space in limiting itself is infinite . . . . time is infinite, and yet it is the condition "necessary to the existence of events and changes. . . . . The principle of causality "implies both time and space. . . . . If we examine it, we shall see that it again pre- "supposes a ground deeper than itself. In order that a cause shall send a stream of "influence over to an effect, it must first separate that portion of influence from itself. "Self-separation is, then, the fundamental presupposition of the action of causal- "ity. . . . . Causa sui, spontaneous origination of activity, is the ultimate presuppo- "sition underlying all objects and each object of experience. . . . . Causa sui, or self- "cause, is properly the principle *par excellence* of philosophy. . . . . Here is the neces- "sary ground of the idea of God." In the last chapter Dr. Harris discusses "the immortality of man," denoting thereby the immortality of the individual and the continuance of consciousness after death. He expresses his argument in admirable terseness in the following sentence: "How is it possible that in this world of perish- "able beings there can exist an immortal and ever progressive being? Without the "personality of God it would be impossible, because an unconscious first principle "would be incapable of producing conscious being, or if they were produced, it would "overcome them as incongruous and inharmonious elements in the world. It would "finally draw all back into its image and reduce conscious individuality to uncon- "sciousness." This is a different solution of the problem from that presented in the article "The Origin of Mind" in the first number of this magazine. K.

THE EVOLUTION OF SEX. By Prof. *Patrick Geddes* and *J. Arthur Thomson*. New York: Scribner & Welford.

The present work is in some sense a reproduction of the articles "Reproduction," "Sex," and "Variation and Selection," contributed by Professor Geddes to the most recent edition of the "Encyclopædia Britannica." It goes further, however, and not only contains much additional information, but the views of the authors on the factors of organic evolution and on biology in general are more precisely formulated and developed. The central thesis of the work, as stated in the preface, is "in the first place, to present an outline of the main processes for the continuance of organic life with such unity as our present knowledge renders possible; and in the second, to point the way toward the interpretation of these processes in those ultimate biological terms which physiologists are already reaching as regards the functions of individual life,—those of the constructive and destructive changes (anabolism and katabolism) of living matter or protoplasm." The authors seek to prepare the way for the restatement of the theory of organic evolution, that of "definite variation, with progress and survival essentially through the subordination of individual struggle and development of species-maintaining ends."

Among the subjects treated of are Sexual characters and the determination of Sex, the analysis of Sex-organs, tissues, and cells—the nature and origin of Sex, and the processes and theory of reproduction. This is a sufficiently broad field, and it embraces various biological questions recently discussed, especially that of sexual selection and the theories of Professor Weismann. The authors claim that their view of the processes concerned with the maintenance of the species leads necessarily to a profound alteration of the conclusions usually held as to its origin. What is meant by this statement appears from the last chapter, in which the reproductive function as a factor in evolution is considered. Here it is stated that the usual perspective which places the theory of natural selection in the foreground, sexual selection being a mere harmonious corollary, has to be reversed. Recent investigations on heredity "forbid that attention should any longer be concentrated on the individual type, or reproduction regarded as a mere repetition process; the living continuity of the species is seen to be of more importance than the individualities of the separate links. . . . . The species is a continuous undying chain of unicellular reproductive units, which indeed build out of and around themselves transient multicellular bodies, but the processes of nutritive differentiation and other individual developments are secondary, not primary" (p. 308).

The study of the reproductive process is thus of supreme importance for the understanding of organic evolution. What then is the authors' theory of reproduction? It may be stated in the terms of their own summary. The essential fact in reproduction is the separation of part of the parent organism to start a fresh life. Hence, it begins with rupture, a katabolic crisis, at which occurs cell-division, this being always associated with the act of reproduction. This is favored by katabolic conditions of the environment. The opposition between nutrition and reproduction is the most obvious antithesis in nature after that of life and death—with the latter of which, indeed, as has been shown by Goette, reproduction is intimately associated—and it may be stated in the terms that "as a continued surplus of anabolism involves growth, so a relative preponderance of katabolism necessitates reproduction" (p. 237).

The organic relation between nutrition and reproduction is thus shown to be one of great importance, but its significance becomes more apparent when it is seen, as pointed out by the authors, that "throughout organic life there is a contrast or rhythm between growth and multiplication, between nutrition and reproduction, corresponding to the fundamental organic seesaw between anabolism and katabolism. This contrast may be read in the distribution of organs, in the periods of life, and in the different grades of reproduction; and the contrasts between continuous growth and discontinuous multiplication, between asexual and sexual reproduction, between parthenogenesis and sexuality, between alternating generations, are all different expressions of the fundamental antithesis" (p. 231). Elsewhere, the essential importance is referred to of "the continual correlation, yet antithesis—the action and reaction—of vegetative and reproductive processes in al-

ternate preponderance," to which the general rhythm of individual and social life runs parallel. And yet this life is essentially a unity, of which the specific characters are but the symptoms, whatever may be "their subsequent measure of importance and utility in adaptation, their modification by environment, their enhancement or diminution by natural selection" (p. 314).

This conclusion as to the unity of the life of the individual and that of the species, is based on the fact that nutrition and reproduction are nearly akin. Hatschek goes so far, indeed, as to affirm that nutrition is reproduction, an apparent paradox which is justified by the statement that "not only do hunger and love become indistinguishable in that equal-sided conjugation which has been curiously called 'isophagy,' but nutrition in turn is nothing more than continual reproduction of the protoplasm." The real unity is found in the fact that anabolism and katabolism, which are the determining factors of growth and reproduction, are the two sides of protoplasmic life. This conclusion has an important bearing on the question of the origin of sex. In his theory of *genoblasts*, or sexual elements, Minot treats male and female as derivatives of primitive hermaphroditism in two opposite directions, the differentiation taking place "by the extrusion or separation of the contradictory elements, the ovum getting rid of male polar globules, the sperm leaving behind a female mother-cell remnant." The authors of the present work accept this view, which however has become extremely improbable since Weismann has called attention to the fact that the same process takes place in the parthenogenetic summer-eggs of Daphnidae—a fact which has been overlooked by our authors. They also adopt Rolph's view that the less nutritive, and therefore smaller, hungrier, and more mobile cells are what we call male; the more nutritive and usually more quiescent cell being the female, as consistent with the conclusion already inferred from other facts that "the female is the outcome and expression of preponderant anabolism, and in contrast the male of predominant katabolism" (p. 132). This conclusion is elsewhere stated as that "the males live at a loss, are more *katabolic*,—disruptive changes tending to preponderate in the sum of changes in their living matter or protoplasm. The females, on the other hand, live at a profit, are more *anabolic*,—constructive processes predominating in their life, whence indeed the capacity of bearing offspring" (p. 26). Here is the same contrast as that seen in the alternating phases of cell-life, of activity and repose, and in the great antithesis between growth and reproduction. The argument is put into diagrammatic form, where the sum-total of the functions are divided into nutritive and reproductive, the former into anabolic and katabolic processes, and the latter into male and female activities. This theory of Rolph, if it contains a grain of truth, needs a thorough revision; and the same may be said about the authors' special theory, which is, that there is a parallelism in the two sets of processes, "the male reproduction is associated with preponderating katabolism, and the female with relative anabolism, according to which view both primary and secondary sexual characters express the fundamental physiological bias characteristic of either sex"

(p. 27). This has a special bearing on the question of sexual selection, the true relation of which to natural selection, according to the authors of the present work, must be expressed in their own words. It is embodied in the conclusion that sexual selection is a minor accelerant, natural selection a retarding 'brake,' "on the differentiation of sexual characters, which essentially find a constitutional or organismal origin in the katabolic or anabolic diathesis which preponderates in males and females respectively" (p. 31).

Before concluding this notice, it may be pointed out what are the particular conditions on which the determination of sex depends, in regard to any given organism. The various suggestions proposed as to the influence of parents, according to age or otherwise, the time of fertilisation, Starkweather's law that sex is determined by the superior parent, and that the superior parent produces the opposite sex, and Düsing's theory as to the regulation of the proportions of the sexes, are referred to by the authors and either rejected or considered as insufficient. The conclusion they arrive at after considering the influence of nutrition, temperature, and other conditions, is, that adverse circumstances affecting the parents, especially of nutrition, but also age and the like, tend to the production of males, the reverse conditions favoring females; a highly nourished ovum and fertilisation when the ovum is fresh and vigorous, tend to the development of a female rather than of a male. Further, the longer the period of sexual indifference continues, the more important become the outside factors, and here again "favorable conditions of nutrition, temperature, and the like, tend toward the production of females; the reverse increase the probability of male preponderance." This agrees with the conclusion independently arrived at that the male germs are "of smaller size, more active habit, higher temperature, shorter life, and the females the larger, more passive, vegetative, and conservative forms" (pp. 50, 51). Thus the authors' proposition that the male is the outcome of predominant katabolism, and the female of equally emphatic anabolism, might seem to be justified, and it is confirmed by the curious phenomenon of alternation of generations, and by various facts connected with growth and reproduction. However, it does not definitively exclude the theory (see Dr. Heinrich Janke's work. Stuttgart, 1889) that the male is the outcome of katabolism of the male element coincident with *anabolism* of the female element, and the female of the opposite state.

In considering the psychological and ethical aspects of sex from the physiological standpoint the authors remark truly that in order to obliterate the distinctions between male and female, it would be necessary to have evolution over again on a new basis. Although so different, however, the two sexes are complementary and mutually dependent, "not merely because they are males and females, but also in functions not directly associated with those of sex." Males, as the more katabolic organisms, are more active and variable than the anabolic females, who are more passive and stable. The former have larger brains and more intelligence, but the latter have more of the altruistic sentiment and greater constancy in affection and sym-

pathy. "Man thinks more, woman feels more. He discovers more, but remembers less; she is more receptive, and less forgetful." All this is true within certain limits, but whether or not it may be explained by other theories remains an open question. Ω.

Animal Life and Intelligence. By *C. Lloyd Morgan*, F. G. S. London: Edward Arnold.

The chief aim which the author of this important work had originally in view was the consideration of Animal Intelligence. But the subject of Intelligence being so closely associated with that of Life, and the questions of Heredity and Natural Selection with those of Habit and Instinct, he has devoted the first part of the work to Organic Evolution, as introductory to Mental Evolution. This was rendered necessary, however, by the direct bearing of Professor Weismann's recent contributions to biological science on questions of Instinct. It would be impossible to treat of the mental constitution of the lower animals without reference to that of man, and in his preface Professor Morgan forestals certain results arrived at by a comparison of them. He states that in man alone, and in no dumb animal, is the rational faculty, as defined by him, developed; and he adds, "it is contended that among human folk that process of natural selection, which is so potent in the lower reaches of organic life, sinks into comparative insignificance. Man is a creature of ideas and ideals. For him the moral factor becomes one of the very highest importance. He conceives an ideal self which he strives to realise; he conceives an ideal humanity towards which he would raise his fellow-man. He becomes a conscious participator in the evolution of man, in the progress of humanity."

So great a variety of topics are dealt with by the present work that we shall be able to do little more than refer critically to the author's special views, particularly those which concern the mental characters of the lower animals. There are, however, various points in the earlier part of the work well deserving of consideration. Such is the suggestion that, instead of likening an organism as a whole to a steam-engine, it would be better to liken each cell, with its fluid explosive material, to a gas-engine, and the mixed air and gas to whose explosion its motion is due. The importance of *segregation* as a factor in the formation of improved varieties is insisted on, but Professor Morgan doubts whether differential fertility, on which Mr. Romanes lays great stress*, would, without the co-operation of other segregation-factors, give rise to separate varieties capable of maintaining themselves as distinct species (p. 105).

Dealing with the knotty question whether, if the egg produces the hen, the hen produces the egg, the author criticises Professor Weismann's idea of the continuity of germ-plasm, which he regards as "an unknowable, invisible, hypothetical entity," that may be made to account for anything and everything, and prefers

* *The Monist*, No. 1. p. 5.

the hypothesis of cellular continuity (138 et seq.). The cells which become ova or sperms never become differentiated into anything else, and "hereditary similarity is due to the fact that parents and offspring are derived eventually from the same germinal cells" (p. 175). Finally, Professor Morgan criticises Mr. Wallace's views on the subject of sexual selection, which he is inclined to think is a factor with natural selection in the guidance of evolution (p. 200 et seq.).

More than half of the book, which contains more than 500 pages, is taken up with these preliminary disquisitions, the remainder being concerned with the nature and development of the mental activities. The first branch of this inquiry is that of the senses of animals. We cannot follow the author in his very interesting remarks on this subject, beyond referring to his suggestion that the lower animals may have senses not known to man. After mentioning the muciparous canals met with in fishes, he says, "apart from the possibility of unknown receptive organs as completely hidden from anatomical and microscopic scrutiny as the end-organs of our temperature-sense, there are in the lower animals organs which may be fitted to receive modes of influence to which we human folk are not attuned" (p. 298). For example, insects may be sensitive to tones of heat; while on the other hand, their color phenomena may vary greatly from ours consequent on structural differences in the sense-organs. In dealing with mental processes in man the author states as a well-known fact that "a person whose leg has been amputated experiences at times tickling and uneasiness in the absent member" (p. 307). This is not, however, an accurate description of the phenomenon. There can be no feeling in a lost limb. The idea that the sensations are "referred outward to the normal source of origin of impressions," has arisen from the remark sometimes made by persons thus affected that they feel as though they still had toes. This is true to some extent, but as a fact the sensation is as though the toes were bent and tightly bound at the end of the *stump*, and not at the end of the missing limb.

It is advisable before proceeding further to see what view Professor Morgan entertains as to the mental process in animals. This is apparent from the statement that, although there is no difference in kind between the mind of man and the mind of a dog, yet that "we have, in the introduction of the analytic faculty, so definite and marked a new departure, that we should emphasise it by saying that the faculty of perception, in its various specific grades, differs generically from the faculty of conception." The author adds, "believing, as I do, that conception is beyond the power of my favorite and clever dog, I am forced to believe that his mind differs generically from my own" (p. 350). Elsewhere he says, "if I deny them self-consciousness and reason, I grant to the higher animals perceptions of marvellous acuteness and intelligent inferences of wonderful accuracy and precision—intelligent inferences in some cases, no doubt, more perfect even than those of man, who is often distracted by many thoughts" (p. 377). If we would understand these conclusions aright we must know the sense in which Professor Morgan uses the terms employed, and to do this we must refer to the explanation he gives

of mental processes in man. He tells us that in the first place we obtain knowledge of the existence of the objects around us through perception, which is attended with a process of construction. An object is in fact a *construct*, at the bidding of certain sensations, which suggest to the mind the associated qualities. In what sense such an object is regarded as real we shall see later on. As to the constructs, their formation is followed by examination, "by which they are rendered more definite, particular and special, and supplemented by intelligent inferences." Out of this intelligent examination arises a new mental process, the *analysis of constructs*. Attention is paid to certain qualities of objects to the exclusion of others, a process termed by the author *isolation*, the products being *isolates*. This process is constantly going on, and all the qualities, relationships, and feelings thus isolated have applied to them arbitrary symbols. They are in fact *named*, and "hence arises all our science, all our higher thought." At this stage we enter the field of conception, as the isolates are *concepts*, whereas throughout the process of the formation of constructs and their definition we have to do with perception and percepts. Here Professor Morgan agrees with Noiré in holding that "the image, in so far as it is an image, whether simple or composite, is a percept," while so far as there enter into the idea of objects elements which have been isolated by analysis, the words for those objects stand for concepts. There is another important feature of the mental processes in man. The primary aim of the reception of the influences of the external world, or environment, is "to enable the organism to answer to them in activity." Moreover, out of perceptions through association there arise certain expectations, and "the activities of organisms are moulded in accordance with these expectations." Phenomena are perceived as linked or woven, and expectations are the outcome of that perception, the mental process by which we pass from one link to another being called *inference*. Again, we have perceptual inference, or inference from direct experience, and conceptual inference, or "inference based on experience, but reached through the exercise of the reasoning faculties" (p. 328 et seq.).

Applying these principles to the mental processes in animals, the author affirms that, granting the theory of evolution, "the early stages of the process of construction—discrimination, localisation, and outward projection—are the same in kind throughout the whole range of animal life, wherever we are justified in surmising that psychical processes occur, and the power of registration and revival in memory has been established" (p. 338). But, though the higher mammalia form *constructs* analogous to, if not closely resembling ours, the resemblance cannot be in any sense close, "seeing to how large an extent our constructs are literally our *handiwork*." To the question whether the higher animals have "the power of analysing their constructs and forming isolates, or abstract ideas of qualities apart from the constructs of which these qualities are elements," Professor Morgan answers negatively. He supposes, for example, that a dog may have a vague representation in memory of things good to eat, "in which the element of eatability is predominant and comparatively distinct, while the rest is vague and indistinct"; and to mark the differ-

ence he calls the prominent quality a *predominant*, "as opposed to the isolate when the quality is floated off from the object." Hence he agrees with Locke that abstraction, in the sense of isolation, is not possessed by the lower animals, and he thinks that the line should be drawn there between brute intelligence and human intelligence and reason (p. 349). As soon as predominant qualities are named they become isolates, and thus "body and mind became separable in thought; the self was differentiated from the not-self; the mind was turned inwards upon itself through the isolation of its varying phases; and the consciousness of the brute became the self-consciousness of man." The agent in this upward progress is language, and hence, granting the possibility of a transitional stage where word-signs stood for predominants, and not yet for isolates, the author accepts Prof. Max Müller's view that language and thought are practically inseparable (p. 371). If any serious objection can be made to this reasoning, it must be we think to the opinion that language made, not merely conceptual thought, but analysis and isolation possible. This is preceded, as we have seen by "intelligent examination," and we are expressly told that out of this arises the mental process of *analysis of constructs* which animals do not possess. To this faculty then must be traced the ultimate distinction between them and man. It may be doubted, moreover, whether animals have any idea of even a predominant quality apart from some object. The formation of "constructs," that is the recognition of objects, as the result of external stimuli, is instinctive, except so far as it depends upon association through experience in past generations. If animals can even vaguely represent a single quality apart from an object, it is the first step in analysis, and there is no reason why they should not go on to abstraction or isolation, and thence to reason. That animals do not possess reason, in the sense of conceptual inference, is we think unquestionable, and Professor Morgan does well in restricting them to intelligence, by which he intends the process by which perceptual inferences are reached (p. 330).

We have not space to refer to the views expressed in the chapter on "Appetence and Emotion," beyond stating that the author, while admitting that in animals are to be found the perceptual germs of even the higher emotional states, concludes that "ethics, like conceptual thought and æsthetics, are beyond the reach of the brute. Morality is essentially a matter of ideals, and these belong to the conceptual sphere" (p. 414). In the chapter on "Habit and Interest," after speaking of Mr. Romanes's treatment of instinct as most admirable and masterly, he compares Mr. Romanes's views as to the origin of secondary instincts with those of Professor Weismann as to the non-inheritance of acquired characters, coming to the conclusion that lapsed intelligence is not a necessary factor in the formation of instincts, and that there is a probability of some inheritance of experience (p. 436 et seq.). We must refer our readers to the work itself for the author's explanation of the "monistic" theory, according to which the two sets of phenomena, the physical and the mental, are identical, differing only in being viewed from without or felt from within (p. 417). This view is developed in the chapter on Mental Evolution, where we read,

"according to the monistic hypothesis, kinesis and metakinesis are co-ordinate. The physiologist may explain all the activities of men and animals in terms of kinesis. The psychologist may explain all the thoughts and emotions of man in thoughts of metakinesis. They are studying the different phenomenal aspects of the same noumenal sequences" (p. 472). For Professor Morgan the idea of the object is the object, but he is not a pure idealist. Phenomena are something more than states of consciousness. There is a noumenal reality which underlies the reality of the phenomena, and the enduring ego, of which certain states of consciousness are occasional manifestations, is the metakinetic equivalent of the organic kinesis. Here he sees the solution of the problem which baffles alike materialists and idealists (p. 475).

We must now take leave of this work which, notwithstanding its occasional abstruse and technical character, is not "beyond the ready comprehension of the general reader of average intelligence." It deserves to be widely read, not only for its subject-matter, but for its clearness of explanation and wide grasp of thought. The value of the book is much added to by its diagrams and illustrations, and by an excellent index and table of contents. Ω.

PHYSIOGNOMY AND EXPRESSION. By *Paolo Mantegazza*. New York: Scribner & Welford, 1890.

This work of the versatile Italian Anthropologist is probably one of those which best represent his many-sided mind, and which will be the most extensively read. Although strictly scientific, both in its end and method, it is popular in style and contains matter which must recommend it to the ordinary as well as the scientific reader. As the author informs us, he has taken up the study of expression at the point where Darwin left it. But he has made a further step. He has set himself the task "of separating, once for all, positive observations from the number of bad guesses, ingenious conjectures," which have hitherto encumbered the path of the study of the human countenance and human expression. His book is a "page of psychology," and he has endeavored to supply the psychologist, and also the artist, with new facts, as well as old facts interpreted by new theories, and to bring into view "some of the laws to which human expression is subject."

A glance at the table of contents shows that the author has fully carried out the promise thus made. The first chapter of the work after giving an historical sketch of the science of Physiognomy and of Human Expression—which in its infancy was "seasoned with the magic which is one of the original sins of the human family"—and tracing it from Dalla Porta to Darwin, through Niquetius, Ghiradelli, and Lavater, proceeds to treat of the human countenance in general, and of each of its features in particular. The possible judgments on the human face are reduced in number to five: the physiological, the ethnological, the æsthetic, the moral, and the intellectual. Of these verdicts, the ethnological and æsthetic are based almost exclusively on anatomical characters, while the physiological, moral, and intellectual verdicts depend chiefly on expression. The coloration of the human skin is an im-

portant ethnological feature, and M. Mantegazza thinks that it may be reduced to three tints, white, black, and "dried bean" (*fave seche*), which last he explains by saying that it results from the superposition of two colors, "most frequently from a sort of black or very dark brown dust deposited on a ground of dried bean" (p. 31). Among other interesting ethnological generalisations, is the remark that the Aryans, Semites, and many negroes have large eyes, while Mongols and many Malays have small eyes. In determining the color of the eyes, hair, and skin, the author found the table of tints prepared by M. Broca for the Anthropological Society of Paris insufficient, as the colors there used are opaque, while transmitted as well as reflected rays are combined to give the natural coloration. In the iris of the Lapps fourteen different and graduated shades are distinguishable, from dark chestnut brown to green. M. Mantegazza confirms the observation that a certain hue of the eyes is nearly always associated with a particular hair-color, and he states that this union is one of the most unvarying ethnical characters by which to judge of the purity of race. The nose is nearly as important as the eye as an ethnical and æsthetic feature. The author reproduces M. Topinard's curious table of its morphological characteristics observing that it omits only one, which nevertheless is somewhat important, that is, the angle made by the root of the nose with the forehead. In relation to the mouth we have the suggestive remark, "the eye is the centre of the expression of thought; the mouth is the expressive centre of feeling and of sensuality." As to the color of the hair, M. Mantegazza has brought together many important facts. Among the higher races, the hair may be of almost any of the ordinary tints. The Jews do not differ from the Europeans in this respect, as they exhibit fair hair as well as dark hair, and light and dark eyes. Although in Germany the Jewish population generally is much darker than the rest of the people, many of them have blonde hair, blue eyes, and fair complexion. For some reason not yet ascertained, there is a tendency in Europe and especially in England for the blonde type to disappear. We would suggest that it is a case of reversion to the type of the primitive inhabitants. M. Mantegazza remarks that the beard does not correspond to any intellectual type, as it is strongly developed as well among the Australian aborigines as among the Aryans and Semites. Nevertheless, the beard is worthy of further study as an ethnological feature. It may be noted that the Australian aborigines have been connected with the primitive inhabitants of Western Europe by other characters.

In treating of the expression of the emotions, we are told that physical expression has two different functions—to replace a complete language, and "to defend the nerve-centres and other parts of the body against dangers of different kinds." Much more might have been said on the first subject, as gesture language has within the last few years become an important ethnological study, and, indeed, a supplementary chapter has been written for the English edition of this work on the physiognomy of gesture. There is great truth in the remarks, that "every religion and many philosophical schools have been founded by word and by expression more

than by books"; and that "the more feeling a nation has, the more rich and eloquent are its methods of physical expression." M. Mantegazza does full justice to the great wealth of details and the discoveries on which the Darwinian laws of expression are based, while supplementing them with original observations and results. It is in the classification of expressions we have probably the most important feature of the present work. Full synoptical tables are given of the expressions of Sense, Passion, and Intellect, and of the various expressions of Pleasure and Pain, Love and Hatred. These are illustrated by ingenious remarks, as an example of which we may quote the somewhat cynical statement that "many ladies laugh little lest they should have precocious wrinkles, while others laugh too much and on every pretext that they may show their beautiful teeth." The author well says that in love and pleasure, hatred and pain, "we have two binary compounds, two such energetic psycho-expressive combinations that the formidable and the destructive voltaic pile of our analytic methods is needed to separate the elements." He has some curious remarks on the fact that laughter and smiling are very frequent phenomena in the expression of hatred, for which we refer our readers to the work itself.

To pleasure and pain, love and hatred, M. Mantegazza adds pride and humiliation, as "the fundamental psychical movements of human nature, as ancient as man, and common to all the inhabitants of the globe." Thus, he is of opinion that aristocracy is one of the most natural features of humanity, and that democrats "make history recede instead of advancing when they deny the most elementary laws of heredity and of human nature." We must pass over the expressions of personal feelings, and those of thought, to reach the chapter on racial and professional expression. Here races are classified, according to their expression, into ferocious, gentle, apathetic, grotesque or simian, stupid, and intelligent, but the classification, like all others from single characters, is imperfect. Probably as good a classification could be made on the basis of modes of salutation, beginning with nose-kissing, or the still more primitive smelling. Raden-Saleh, an artist of Java preferred nose-*breathing*, as by it we put our soul into contact with that of the beloved one! It is undoubtedly true, as M. Mantegazza remarks, that the expression of different peoples is replete with their most prominent psychical characters. The beautiful impassioned expression of the Italians is yet defiant and not always frank, owing to their having been so long subjected to tyrants. Speaking generally, the European peoples have an expansive or a concentric expression, of which "the first is found in the Italians, the French, the Slaves, the Russian: the second in the Germans, the Scandinavians, the Spanish." The author adds that there is also "a beautiful expression full of grace, that of the people of Græco-Latin origin; and another hard, quite angular, without roundness, that of the Germans, the English, and the Scandinavians."

M. Mantegazza gives a very skilful analysis of the "moderators and disturbers of expression," referring to his earlier work the "Physiology of Pain" for further de-

tails. In the next chapter he treats of the criteria for the determination of the strength of an emotion with reference to the accompanying expression. In addition to the *force* and the *persistency* of the contraction of the expressing muscles, there is a diffusion of expression in gradually increasing circles from the face downwards to the legs, and lastly, alternate contractions and relaxations of the muscles according to the intensity of the central movement which accompanies the emotion. The expression of pleasure is always centrifugal, that of pain being centripetal, tending to bring the arms and lower limbs towards the median line of the body. In dealing with the criteria for judging the moral work of a physiognomy, we are told that the two most certain signs of a good face, are the permanent expression of benevolence, and the absolute absence of all hypocrisy. Let us add the remark, accredited to Charles Dickens, that it is advisable to see how a person looks when silent and apparently unobserved. There are two sources of error in forming that judgment, one arising from the fact that beautiful things give pleasure, the chances of error increasing when a man has to judge a woman, or *vice versa;* the other is due to a false induction, from the observed association in one individual of a particular physical feature with a special moral character. The anatomical characters of the intelligent face and of the stupid face are given in a tabulated form, but M. Mantegazza states that the most important characters are those drawn from the expression, the two great centres of which are the eye and the mouth. Probably the non-observation of the expression accounts for the mistake made by Goethe, who, when dining at the house of an Englishman, was struck with the intellectual appearance of one of the guests and thought he must be a man of genius. Goethe anticipated pleasure in hearing him speak, but great was his horror, when apple dumplings were placed on the table, to hear the guest shout out "them's the jockies for me"!

In an appendix the author treats of the eyes, hair, and beard among the Italian races, which gives numerous statistics collected by the Italian Anthropological Society. It appears that the men of Tuscany as well as of Piedmont are noted for scantiness of beard. Probably this fact is due to the existence of a special race element, rather than a difference of climate as would seem to be suggested. The presence of red hair in all parts of Italy, although only in small quantities, is also difficult of explanation. Strange to say it is the most common in regions which are poorest in fair hair. From this we must suppose it to have some relation to dark hair, an opinion which agrees with the observation that in England dark hair in young children is sometimes interspersed with red hairs, which either change or disappear with age. The hair is known to darken considerably after puberty is reached, and possibly red hair may be due to the persistence, through special conditions of which we are not aware, of an infantile character.

We must not leave M. Mantegazza's excellent and entertaining work without referring to the plates given in the Appendix, among which are morphological, æsthetic, and intellectual trees of the human race, and figures of ethnic types illustrative of remarks made in the text. It also has a good index. Ω.

In Darkest England and the Way Out. By *Gen. Booth*, of the Salvation Army. New York: Funk & Wagnalls.

In this book,—which is considered by many to be the most profound, serious, and comprehensive study of the social problem that has yet appeared, as much so because it seems to strike at the root of the grievance as because it offers a practical remedy,—the author proposes to so ameliorate the conditions of the abandoned classes in England as not only to make the members of them self-supporting and respectable, but after a twenty years' trial of his scheme to so change the industrial condition of the kingdom that there will not be found an able-bodied man or woman in all England unable to find work or food. What politico-economical reformers have had most to contend with is the poverty or lack of opportunity for labor which seems to be inherent in the present social structure,—a condition where, to express it clearly, there seems to be not enough work for all the people. Hence the standing army of tramps to the number of 30,000 in America and more than 20,000 in the city of London alone. The submerged class that the author of this book seeks to elevate or save from sin and utter uselessness has been variously estimated. Mr. Chamberlain says that there is in England a population equal to that of the metropolis—between four and five millions—who are in a state of abject destitution and misery. Mr. Griffin estimates the number to be 1,800,000, while the author of "In Darkest England" thinks 3,000,000 to be a moderate statement. Many causes may be ascribed to this deplorable state of humanity, such as natural incapacity for work, predisposition to idleness, enforced beggary, crime, misfortune, poverty, drunkenness, and waste,—all of which operate to drag these unfortunate ones to the lowest level of life. He thinks that the inability of a large proportion of the people to obtain work drives them either into despair, sin, crime, and suicide, or to merely exist, carrying with them, year by year, the bitter ashes of a life from which the furnace of misfortune has burned away all joy and hope and strength. They are a helpless and pathetic class,—men and women who "are being sucked down into the quicksands of modern life." And when it is known that England is rich enough to drink rum in quantities which appal the chancellor of the exchequer and yet not rich enough to provide any other shelter for her homeless ones and outcasts than the midnight sky, modern civilisation with all its boasted Christianity and humanitarianism presents indeed a deplorable aspect, appearing to be but a mockery and a farce.

The method which this book seeks to popularise and use as the means of elevating to usefulness the outcasts, the indigent, and unemployed classes of England and of the civilised world, is none other than the scheme originally applied in Bavaria by Count Rumford—an American better known as Benjamin Thompson, a graduate of Harvard, who, having entered the Bavarian service at the close of the war for independence, became the governor of Munich. The scheme is threefold. It is proposed to organise the submerged classes, with their consent of course, into a gigantic co-operative society, subdivided into (1) The City Colony, (2) The Farm

Colony, (3) The Over-Sea Colony. "The scheme in its entirety," we are informed, "may aptly be compared to a great machine foundationed in the lowest slums and purlieus of our great towns and cities, drawing up into its embrace the depraved and destitute of all classes; receiving thieves, harlots, paupers, drunkards, prodigals, all alike, on the simple conditions of their being willing to work and conform to discipline. Drawing up these poor outcasts, reforming them, and creating in them habits of industry, honesty, and truth; teaching them methods by which alike the bread that perishes and that which endures to everlasting life can be won; forwarding them from the city to the country and there continuing the process of regeneration and then pouring them forth on the virgin soils that await their coming in other lands." The scheme is so comprehensive that it includes slum crusades, wagon hospitals, a brigade of Christian apostles near prison-gates to meet and help discharged prisoners, rescue homes for unfallen girls when on the danger line between sin and starvation, bureaus of intelligence, refuges for street children, industrial schools, asylums for moral lunatics, a matrimonial bureau, and banks for the poor. The project is not to be summarily rejected as utopian. It is a gigantic effort to utilise the human refuse that sieves itself through all the means available for enlightenment to the very bottom of the social structure. Into this vast machine the whole mass of soiled humanity would be taken and by the refining process which is clearly elaborated in the book we could touch this material with a new spirit and thus reclaim the men, women, and children to self-support, honor, honesty, and usefulness. For the success of the project "General" Booth has asked for one million pounds.

Three serious objections may be made to the scheme. The first is the placing into the hands of one man or one organisation the power of disposing, and the custody, of five millions of dollars—an objection which Professor Huxley makes with good reason. The second is, the theological environment which is a seeming part and parcel of the whole machine. And the third is, the superficial and unradical character of the remedy. Concerning the first objection it may be simply said, that history proves that the experiment which the "General" is about to make is a dangerous one. Professor Huxley maintains with more than usual gravity, that the unquestionable obedience which every soldier in the Salvation Army is expected, and by verbal contract is duly bound, to maintain for all orders from headquarters, gives the most suspicious aspect to the probable tyrannical development of his army in the future, as was illustrated for example in the Franciscan order founded in the thirteenth century by St. Francis. After his death, although the order was pledged by him to mendicancy and absolute separation from all worldly entanglements, it became "one of the most powerful, wealthy, and worldly corporations in all Christendom, with their fingers in every sink of political and social corruption." What guarantee is there that the Salvation Army may not become likewise involved and exercise an imperialism and fanaticism not to be exceeded even by the Jesuits or Mormons? "It is" writes Professor Huxley in the *London*

Times, "a greater evil to have the intellect of a nation put down by organised fanaticism, to see its political and industrial affairs at the mercy of a despot whose chief thought is to make that fanaticism prevail, to watch the degradation of men who should feel themselves individually responsible for their own and their country's fate, to mere brute instruments ready to the hand of a master for any use to which he may put them."

Another objection and one equally as fatal is the religious aspect which is given to the movement. As such it bears a relation to the problem of civilisation which is all important. To insist that every wicked man or woman in order to be righteous and happy must, ought, or will, believe in historical Christianity, is absurd enough, and to project or infuse into the whole character of a social reform movement a theological idea as a necessary element in its efficacy is certainly ridiculous, but to make the work of the elevation of the degenerate masses of mankind a mere accessory to a belief in an irrational and already obsolete religious doctrine or contingent upon it,—at least to emphasize it as a means to the adoption of the unfortunates into one organisation where all believe alike, or where by virtue of the gratitude they bear to those who have materially helped them, they conform or try to conform to their mode of thinking,—is indeed one of the sad mistakes upon which the "General's" social project is built. For in the submerged class, there are doubtless many who are not Christians in belief, who indeed, however fortunate they may become, yet could not subscribe to the creed of the Evangelical Church or honestly engage in a work organised in the interest of so-called historical Christianity. It is not necessary in order to make man good to make him a Christian, or a Jew, or a Buddhist, in belief. The point to emphasise is goodness of character and not merely an intellectual profession of faith. Once get a man to be good, or to hate sin and love righteousness, and he will, if he never makes a Christian profession, be as useful a man as society might wish. Righteousness will take any man or woman safely and happily through the world. The truth is just as the poet stated it:

> "A man may cry 'Church! Church!' at every word,
> And have no more grace than other people;
> The daw 's not reckoned a religious bird
> Because he keeps a-cawing in the steeple."

It is not, therefore, necessary, to the success of "General" Booth's scheme that it should be hitched to some popular, although unscientific and unreasonable religious conception of life; or that he should consider a reform in the life of any man a miracle, and therefore attribute all such to the direct interposition of God. The scheme, if a success at all, will depend, as the organisation of the Salvation Army has depended, upon the enthusiasm and enterprise of the "General" and his constituency. And all reliance upon God without any intelligent human effort in behalf of the outcasts of society would only gorge a greater multitude of humanity into the bogs and sinks of iniquity. As well might we expect a locomotive to move by tacking scripture all over it, as to expect any great social reform movement to be a suc-

cess by associating it or making it depend upon some sort of religious creed. Still whatever may be said against religious interference with social problems, the work of "General" Booth puts to shame the church whose trifling doctrinal and polemical controversies have so blinded its judgment as to neglect its duties toward the submerged classes and leave them to so enormously increase that in order to save the world from almost hopeless ruin a new organisation such as the Salvation Army had to come forth. The church has a far more important duty to perform than that of merely existing, and it will never emblason the record which its founder gave it by his self-sacrificing life and his noble death upon the cross until it takes its wealth of brain, heart, and money, and becomes indeed the modern Saviour of the world.

The third objection and doubtless the most important one of all is the superficial and unradical character of the remedy. It is not here implied that the project is useless although inclusive. The point made is this, that whatever the "General" may do to dredge the bogs of sin and clean the streets of beggars, the idlers, the unemployed, the waifs, the prostitutes, the drunkards, and the criminal class, and put all such in the way of usefulness, manliness, and respectability, what does he do or what is to be done to keep the new or fresh material from sinking into mire? While the "General" is working among the lowest, thousands are being prepared among the highest for the inevitable fate from which he is plucking the helpless ones as brands from the burning. While he is gathering up the submerged and placing them in his machine, the mill without still grinds on and on, crushing as large a number year by year as he may help and save. His method might consistently be compared to one where a man would transform rotten apples into good ones without affecting the tree that produces them. Although the criminal and sinful classes influence the innocent and unsophisticated, yet it cannot be proven that the bulk of the people will remain pure, true, honest, upright, if there were no sinful or criminal class! And hence even if all such who are avowedly sinful were made better and their pernicious influence removed from the world by the method here proposed, sin itself would still inhere in the nature of man's life and would drag thousands down to ruin and misery. Like the mosaic paintings which can only be destroyed by destroying the stones upon which they are impressed, so sin seems to be bound up in human nature. To get at it and destroy it utterly by one *coup* one must annihilate the constitution of the universe. The problem of civilisation is such that it cannot be solved by one specific reform. For to develop man it seems to be necessary that he should pass through the treatment which the long and inevitable process of experience and education can give. Although sin like poverty is but relative, yet it is the name for the conduct into which man is led either by a neglect or abuse of opportunity, or by some inevitable fatality. It is not here contended that man cannot rid himself or society of any disposition to sin. What is maintained is that it cannot be abolished from the world by any spasmodic effort such as that which characterises the present project, but that it will pass away only where and when humanity becomes perfectly educated. And this state of civilisation, by the way, does not

seem to be so surprisingly near at hand. Nor can material help, such as food, shelter, clothing, and what not, altogether effect or even change the moral status of a man's life. Thousands whose material wants are amply provided for revel in sin and corruption, and the dreadful orgy where vice holds carnival reels and swaggers in the palaces where amid gilded refinements and dazzling splendor the so-called better classes disport themselves. It is true that when a man is starving or naked, bread and clothing are the things which will satisfy his most immediate wants, and not prayers or sermons. To supply such wants is easy enough, but to so arouse or kindle into a flame of fortitude and manliness, the diseased conscience and the perverted judgment, to so operate upon the will as to make the man able to not only choose but do the right, is the great and radical difficulty which is not so easily overcome. Psychology and medicine seem to have no remedy to offer, while religion for these many years has simply touched the hem of the garment—while the abandoned classes have seemingly multiplied on our hands.

In concluding these remarks we cannot forbear to express our regret that the real author of the book has given it over to "General" Booth and allowed him not only the credit of authorship, but most likely also the privilege of mixing up a scheme of social reform with the politics of the Salvation Army. The book was "boomed" in this way, but we fear that it will at the same time be doomed in this way. The Salvation Army and its founder have reaped much undeserved praise. "General" Booth has received incredible sums from enthusiasts to support the scheme, and these sums have to a great extent been used to advertise it. It appears to us that "General" Booth has contracted a debt which he will be unable to pay. The better situated classes of society do not lack in sympathy for their wretched fellowmen, and it sets us thinking, how strong human sentimentality must be that the propagation of the mere idea of curing the evils of mankind proposed in this book as feasible with the aid of one million pounds furnishes ample means to a religious enthusiast whose method of salvation is rather noisy than thorough, representing a kind of barbarous relapse and only adapted to the lowest and most uneducated classes. We should know that sentimentality cannot save. Sentiment and sympathy are good things, but unless they are backed by a cold consideration of fact and rational foresight, they are worse than useless.

It will be wise to consider the propositions made in "In Darkest England" without taking into consideration the rôle to be played in the scheme by the Salvation Army. But while the reader may be just enough to consider the plan of social reform on its own merits, "General" Booth is in possession of the funds and will be the general manager of the experiment. Γκ.

Plankton-Studien. Vergleichende Untersuchungen ueber die Bedeutung und Zusammensetzung der pelagischen Fauna und Flora. By *Ernst Haeckel*. Jena: Gustav Fischer.

The first systematic studies of the innumerable organisms which almost everywhere drift about in the ocean, were made by Professor Johannes Müller who

some forty years ago made excursions in the North Sea. Haeckel, then a student twenty years old, accompanied him on one of these excursions to Heligoland. Since then these investigations have been conducted on a larger scale The English vessel "Challenger" cruised in different oceans for no less than forty months, and the results of this great undertaking were published by John Murray in the "Voyage of H. M. S. Challenger"—a voluminous work consisting of eighty-two zo-ological reports, to which Professor Haeckel also has contributed his "Report on the Deep-Sea Keratosa." The German government sent out the German cruiser "National" on the same errand. The scientists of the expedition were Hensen, Brandt, Dahl, Schütt, Fischer, Krümmel. They were at sea altogether ninety-three days making a circuitous trip on the Atlantic ocean, touching at the Bermudas, Brazil, and the Azores. The results of the expedition, published in reports by Hensen, Brandt, Du Bois-Reymond, and Krümmel, were considered as very satisfactory and received the unreserved applause of the German press. Professor Haeckel is of a different opinion. He considers the reports as standing in flat contradiction to former valuable observations, especially to those of the English "Challenger" and the Italian "Vettor Pisani" expeditions. Hensen's results rest upon a weak supposition and contain wrong generalisations; even his method is, according to Haeckel, entirely useless, giving a wrong presentation of the problems of pelagic biology.

The word "plancton" was introduced by Hensen. Haeckel adopts it because he considers the Greek term preferable to Johannes Müller's *Auftrieb* or pelagic *Mulder* (the latter has been adopted also by English, French, and Italian planctologists). By plancton (*πλαγκτόν*), derived from *πλάζω*, to roam about, is understood the drifting micro-organisms of the sea.

Professor Haeckel in the present volume not only corrects Professor Hensen's errors, but also gives a report of his own observations. Not the least valuable part of the brochure is the exact terminology which Professor Haeckel proposes in order to escape the confusion necessarily resulting from a looseness of terms. K.

Die allgemeine Weltanschauung in ihrer historischen Entwickelung. Charakterbilder aus der Geschichte der Naturwissenschaften. By *Carus Sterne*. Mit zahlreichen Porträts und Textabbildungen. Stuttgart: Otto Weisert.

Dr. Ernst Krause, better known by the *nom de plume* of "Carus Sterne," has here undertaken to present the modern world-conception as contrasted with the olden one. We have scarcely ever met with a book that contains in so popular a form all the noteworthy facts of the great progress that has been achieved in science since the time of Copernicus. The results of the evolution-theory are generally known, but the road and the stations of the road on which science has reached its present position, now almost universally recognised among men, are almost forgotten. No one perhaps is better able to tell us of this great struggle for truth than the enthusiastic disciple of Darwin, Carus Sterne. Carus Sterne and his friend

Prof. Ernst Haeckel, have done no small work in obtaining recognition for the theory of evolution in Germany. While Haeckel's work has been confined to the field of exact science, Carus Sterne has complemented the labors of his co-worker by pointing out the moral truths contained in Darwinism. We are aware of the fact that Carus Sterne has also written purely scientific works, "Werden und Vergehen," for instance; but what we wish to emphasise as his especial merit is that he was, so far as we know, the first to call attention to the moral workings of nature in her great cosmic empire. As an article characteristic of this trait in Carus Sterne's writings we refer the reader not familiar with German literature to his article "The Education of Parents by their Children," a translation of which appeared in Nos. 22 and 23 of *The Open Court*.

The present book (over 400 pages) discusses the following subjects: Pagan and Christian Cosmology; Copernicus, Tycho Brahe, and Kepler; The Controversy Concerning the Geo-centric View; The Infinitude of Habitable Worlds; From Bacon to Newton; The Beginnings of an Animal- and Plant-Geography; The Doctrine of Spontaneous Generation; The Discussion Concerning the Origin of Birds; The Terrestrial Globe and Its Fossils; Diluvianism; The Mongrel Theory; The Doctrines of Preformation and Metamorphosis; The Doctrine of Catastrophes; Persistence or Mutability; The Controversy on the Anthropocentric View; The Origin of Language; On the History of Evolution. K.

Ueber die Aufgaben einer allgemeinen Rechtswissenschaft. By Dr. *Alb. Herm. Post*. Oldenburg and Leipsic: A. Schwartz.

The author of this little book, Dr. Albert Hermann Post, a Judge of the courts of the free city of Bremen, Germany, has made the study of ethnological jurisprudence the scientific work of his life. His idea and purpose are to establish a positive science of jurisprudence in the widest and most comprehensive sense of the word, on the basis of an investigation of all the forms of law, available to research, that have ever appeared. A universal science of jurisprudence, according to this conception, would have for its subject-matter the contents of the jural sense or consciousness of the entire human race,—the jural facts of the totality of human society. In other words, this science must be, not only historical, but *ethnological*. It must include the jural life not only of the civilised, but also of the uncivilised races of mankind: it must comprehend *all*. It thus constitutes a step beyond that great movement of the beginning of this century which gave us the science of the history of law. It extends the latter, supplements it, and aims to find in the juro-social existence of undeveloped and uncivilised races the germs of legal practices and institutions that the literary history and traditions of civilised peoples would never supply.

The matter of the present work of Dr. Post takes up some 215 pages. It treats of the available sources of such a universal science of law, of the elaboration of these sources; it gives a concise and illustrative epitome of the most important

parallel phenomena met with in the jural life of the human race,—e. g. in the departments of the Law of Inheritance, of Property, of Marriage, etc., etc.,—and a survey of the separate ethnic divisions of law over the whole earth.

It is a grand task—the realisation of this conception. And its execution in its enormous magnitude is only possible through the speedy and intelligent co-operation of scientists and travellers as well as jurists. It will make of jurisprudence a *natural science*, as distinguished from the *a priori* character this study has up till now assumed; and its prosecution will impart into the science a light and freshness which it sadly needs. Next to theology, the science of law is least pervaded with the spirit of modern research. And this is eminently so in our country, where hardly the history, let alone the ethnology of law, is studied.

We are tempted to give a much more thorough and detailed exposition of Dr. Post's ideas. But an original article will appear from his pen in a future number of *The Monist*, and therefore we are brief. μκρκ.

PERIODICALS.

MIND. January, 1891. No. LXI.

CONTENTS:

On Physiological Expression in Psychology. In opposition to the "subjective purism" in psychology advocated by Mr. Stout and Mr. Bradley. The mixture of the psychical with the physical is such as to prove that mental processes, however distinct from bodily processes, have never owned even a vocabulary of their own. Pleasure and pain are psychical states, but we cannot theorise fully upon them without adverting to their physical causes or conditions. The action of drugs proves that the physical constitution of the nerve-substance is a paramount condition of our sensibility, pleasurable or painful. By taking the organs of special sense in separation we can exhaust the modes of sensibility under each, and when we look minutely into the anatomy of the several organs, we obtain further helps to the subdivision and distinction of the individual sensations. Connected with the physics of the brain, apart from the nervous substance and its conditions, is the important state known as excitement, with its opposites quiescence, languor, repose, drowsiness, sleep, and insensibility. The theory of the Will must rely, in the first instance, upon subjective sequences, but the physical consequences of pleasure and pain are a two-fold activity—Expression and Volition, and for verification of any hypothesis as to priority between these two forms of the physical outcome of feeling, the sequence must be taken on the physical side alone. As regards the emotions, taken in themselves, the tracing of physical concomitance is unavoidable. In Psychophysics the experiments are made upon the physical side, though not to the exclusion of subjective reference. A law relating to the seat of ideas obtained in the first instance through the senses, declares the nervous tracts to be the same in both, thus

connecting Sense with Intellect. It has always been impossible to avoid describing ideas as modified repetitions of sensation, and employing for that purpose the materialism of the sense-organs. While eminently applicable to all the phenomena of mind at their elementary stage—Sensation, Intellect, Emotion, Will—physiological conditions cease to have the like bearing in the higher complications. In all that part of Association that states the order of recurrence of our ideas in Memory, subjective investigation is paramount and exclusive. But the state described as conscious intensity, excitement, mental concentration, attention, interest, is expressible both subjectively and physiologically. The constant application of spiritual remedies to bodily ailments is an important aspect of the union of mind and body, and their interaction in those instances is of great significance.

Apperception and the Movement of Attention. Thinking is action directed towards intellectual ends. Intellectual ends are attained by an appropriate combination of movements of attention. Attention and apperception, as this word is applied by Steinthal, reciprocally determine each other. The nature of attention is explained in accordance with the monoideism of M. Ribot, but contrary to his view it is declared to be a constant character of our mental life, although the monoideism is not always complete. Apperception is the process by which a mental system incorporates or tends to incorporate a new element. The effect of attention is largely dependent on the apperception which accompanies it, and of which it is an auxiliary process. The movement of attention fastening upon the presentation to be apperceived, fixes it in the focus of consciousness, until the appercipient system has finally succeeded or failed in assimilating it. The reason why one ideal group becomes appercipient in preference to the others lies mainly in its greater affinity with the presentation to be apperceived. The conditions determining the strength of apperceptive systems may be either extrinsic or intrinsic. The extrinsic consist in passing circumstances which from time to time favor its activity. The intrinsic conditions are inherent in the constitution of the system itself. Among the former are the co-operation of another system; the recovery or the intensity of its own previous action; the influence of organic sensation; its own freshness arising from previous repose. Of these the organic sensation is of fundamental importance. The influence of the cœnæsthesis pervades the whole mental life. Every specific kind of emotion is accompanied by a characteristic mode of organic reaction. The intrinsic conditions are the comprehensiveness of the system; its internal organisation, of which the philosophy of Hegel is cited as an example; the strength of the cohesion between its parts; the nature of the sensory material which enters predominantly into its composition, that is, the comparative excitability of ideas derived from different senses. The normal working of competition, co-operation, and conflict, may be illustrated by contrasting it with the pathological state called *suggestibility*, in which those processes are more or less completely in abeyance. The conditions which determine the train of ideas arise from the fact that attention, being a motor process, depends on feeling, which dependence cannot be separated from that on apperception. Feeling gives unity to mental process, and is a simple mode of consciousness resulting from the excitement of a multiplicity of elements, and it causes attention to be concentrated on the central presentation from which the wave of excitement is radiated. The essential characteristic of a train of *thought*, as distinguished from a mere train of ideas, is that the relation linking each idea to its predecessor forms also a source of the interest through which it attracts attention. The ground of the distinction is that thinking involves the activity of a proportional system as such, that is "a system adapted to apper-

ceive objects in other respects most diverse from each other, merely because they agree in being capable of entering into certain relations." The modified working of the principle of association through the apperceptive activity of a proportional system, is *proportional* or *analogical production*, which may possibly operate in every instance of the suggestion of one idea by another. A reversion of attention to a previous link in a chain of ideas, giving rise to a modified repetition of it, is a distinctive feature of *thinking*. In a separate article will be dealt with the special part played by language, which from a psychological point of view is "a peculiar movement of attention having a peculiar influence on apperceptive process."

Helmholtz's Theory of Space-Perception. The doctrine of "unconscious inference" is explicitly founded upon the general theory of knowledge formed by Helmholtz, which is identical with that of Kant, and Helmholtz's investigation into the genesis of space-perception applied to the problem which Kant did not consider, namely, the perception of particular or concrete spaces. The distinction made by the former between the inference from the data of sense and that in which the data are consciously known to be signs, by calling the inductive inferences of the sciences *conscious*, and those involved in external perception of world *unconscious*, is open to the charge of involving a contradiction. On the one hand, the theory of "unconscious inference" supports the empirical doctrine of perception only in consequence of calling the process an inference. On the other hand, to call the process "unconscious" is to restore the conception of immediacy which the idea of inference is supposed to exclude. This contradiction may not be insisted on, but, as the phenomena of binocular adjustment discussed in a previous article showed in the visual consciousness a *quale* which, with or without its relation to tactual and muscular extension, was other than plane dimension, Helmholtz must, unless this *quale* can be proved to be result of inference, limit the application of his theory to the synthetic connection between touch and sight. *Parallax of motion*, which consists of the different afferent movements or velocities of bodies in horizontal meridians, and situated at different distances from the observer, seems to do the same for monocular vision that adjustment and fusion do for binocular vision. The phenomena attending certain experiments in which the parallax of motion was observed "correspond exactly to the conception of those who hold that the representative of plane dimension in the retinal image decides the nature of all perceptions whose character is not presented in the image except as a visual sign, and hence that aught beyond magnitude must be the result of influence." An examination of Helmholtz's fundamental principle, "the denial of all pre-established harmony between the nature of impressions and the nature of the external world," confirms the view that the conception of space may be properly a visual one, requiring the superior constancy of touch to correct illusions growing out of the complexities of vision. If we limit visual phenomena as data to mere variations of kind and distinctness in color, we cannot account for such cases as the appearance and inversion of mathematical perspective, binocular localisation and translocation, and the distinct effect of the monocular parallax of motion, qualities which are dimensional in their nature. "While the complexities of space-perception make the co-operation of inferential agencies very probable, yet the spacial quality must be originally given somewhere in consciousness either as an object of perception or as a mental construction, in order to furnish a basis for inferences to its existence or its relations where they are not immediately cognised. This makes the developed conceptions of abstract and synthetic space a complex of inferences and intuitions."

The Principle of Induction. The ultimate major premiss of Induction accord-

ing to Mill is the Law of Causation which, as he treats it, is a wide generalisation true of sequences just as other generalisations are true of the facts of space. Hence it is itself an induction like other inductions. What is wanted is "an axiom expressing in general terms what we do when we make a particular statement universal, which makes explicit the truth implied by the making of any generalisation whatever." The Law of Causation will be found to be a particular application of this wider axiom, and the axiom itself must be sought from the analysis of ordinary simple generalisations. When we connect truths together, or reason, we *support* an inferred judgment by some other assertion. That we should be able to reason at all involves that any fact, as *B*, should have some other fact, as *C*, to which it is always related; that is, "any fact precisely resembling this *B*, whatever its other attributes and concomitants may be, will be found in a precisely similar relation to a precisely similar *C*." A relation exists between two facts whenever the mind can at once distinguish the facts as two, and at the same time attend to them together and assert something of them considered together. We may speak of a relation between different aspects of the same existing thing. The three alternatives afforded by the axiom as ultimately stated correspond to the three cases in which *A* is the "sum of the conditions of *B*," or in any way a universal correlate of *B*; in which it is the cause of *B* in the popular sense of the term; and in which its connection with *B* is merely 'causal,' that is, "the Law of Causation is the Axiom of Reasoning as applied to the sequences of phenomena." Every fact observed stands in universal relation to some other fact. The judgment of that relation "is implied in the rudimentary inference which states only the particular fact observed and the particular fact now expected. It is explicit in the reason that is conscious of its own grounds and methods, and takes there the form of the universal judgment, or major premiss."

The Undying Germ-Plasm and the Immortal Soul. All unicellular beings such as the Protozoa and the simpler Algæ, Fungi, etc., reproduce themselves by means of simple fission, and consequently they are immortal. All the single individuals of a family of unicellular beings belong to each other, although they be isolated. Amongst certain infusoria they do, in fact, remain together and build up branching colonies. Later on, division of labor made its appearance and increased the dependence of the individuals upon one another, so that their individuality was to a great extent lost. By the development of this process, multicellular Metazoa arose from colonies of similar Protozoa, and at length culminated in the higher animals and man. All the cell-series are immortal, but they all must die because the structure which is built up by them collectively is mortal. The reproductive cells are the only kind adapted for existence outside the body, and from time to time some of the human reproductive cells succeed in conjugating, and from them a new individual arises. The whole structure of man is acquired with the one object in view of maintaining the series of reproductive cells, of which he is, so to speak, the slave. They are the most important and essential and also the undying parts of the organism. The series of reproductive cells thus possess the essential attributes of the human soul. If we compare the conception of the soul as held by various related religions, and take the characteristics invariably ascribed to the soul, we find that they hold also for the series of reproductive cells continually developing within the body. The ordinary conception of the fate of the soul after death agrees fundamentally with the result of observation on the prosperity of the series of germ-cells. That fate depends on conduct in the body, and the only possible definition of a good deed, that is approved by conscience, is one which will benefit the series of germ-cells

arising from one individual, that is ourselves and our family, and further which will be of use to others with their own series of germ-cells, and that in proportion to the degree of connection or relationship. Thus, "the apparently enigmatical conception of the eternal soul is founded on the actual immortality and continuity of the germ-plasma." (London: Williams & Norgate.)

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A New Study of Psychology. There are three fairly distinct types of treatment in text-books of psychology. The first type, is the science of the "mind" considered as an entity, of whose nature we might otherwise know much or little, but of which we at all events knew that it had a certain substantial unity. This was supplemented, or succeeded, by the theory of the 'ideas,' and their 'associations.' A third method confines its investigations to the facts and laws of the nervous system, with only such use of introspection as was found absolutely indispensable. Professor James, in his "Principles of Psychology," does not accept primarily any one of these views. The unit he adopts in mental analysis might be defined as "so much of the mental process as may be supposed to run parallel to a relatively simple nervous function in the cortex of the living brain, in so far as this cortex functions with a certain unity." Professor James rejects the unconscious in every form, and above all the unconscious mind-atom. He says, "the special natural science of psychology must stop with the mere functional formula. If the passing be the directly verifiable existent, which no school has hitherto doubted it to be, then that thought is itself the thinker, and psychology need not look beyond." This life of passing thoughts needs only the fundamental hypothesis that the moments as they pass really know one another, that the present is actually acquainted with the past, in order to give as a resultant of the whole life such unity as we need for purposes of psychological science. In relation to volition and freedom, Professor James holds that the idea of the end tends more and more to make itself all-sufficient, and that "motives," so-called, are "ideas of ends" which owing to their conflict, are unable to pass over into acts so long as they remain mere motives. The experience of deciding a conflict of motives is "the experience of the triumph of one idea of the end over other ideas." The act of voluntary decision is experienced as an act of "conscious attention to an idea," and nothing else. Volition is primarily a relation, "not between ourself and extra-mental matter, but between ourself and our own states of mind." Professor James's own belief is that the question of freewill is insolvable on strictly psychological grounds, although on ethical grounds he ascribes to the alternative of freedom. In relation to the question of pleasure and pain as

motives, he points out that the 'idea-motor' acts, even on a very high plane, express the presence of the 'idea of an end,' and this end may itself be very painful, yet it tends to carry itself out. It wins because we attend to it, and whether or no attention is free, certain it is that attention often rather determines pleasure and pain themselves, than is determined by them. In conclusion Professor Royce says in relation to Professor James's book: "His 'passing moments,' which can 'know' and which can freely 'attend,' which are 'self-related,' and which have 'unity,' and which are still so intimately bound to the 'neural process,' have just the paradoxical and hypothetical character which requires one, in one's philosophy, to go beyond them, and to declare them but illusory expressions in phenomenal form of an infinitely deeper truth."

The Inner Life in Relation to Morality. The emotions that are called up by the thought of the world as an organic whole constitute the inner life, that which Clifford calls 'cosmic emotion.' These emotions, although they do not end in the human soul, impart a spirit and diffuse an air over the rest of life: they have no separate external expression of their own. The pivot of man's inner life is the thought of himself as a part or member of a universal order. The object of the paper is to answer the questions: what this thought is, or ought to be; what are some of the forms which the feeling it rouses takes; what are some of its special relations to social morality; and what practical means may be suggested under modern conditions for the cultivation of it. The view of the world most characteristic of the time in which we live, has laid the foundation for an entirely new attitude of mind towards the cosmos at large. The world is now known to be an organic whole. This organism is the invisible background which is presupposed in the partial glimpses of it which we call common perception and the special sciences. If we look *inwards* we have the *human conscience* as the symbol of a microcosm of moral relations between the different parts of our nature on the one hand and the different members of human society on the other. The cosmic principle clothing itself in the twofold garb of which we know it, is the ultimate object of the emotion described as the inner life. This brings with it that which lies at the root of all religion—the sense of dependence, by which is meant, the feeling that we are born into and supported by a world which our individual wills did not make. This at first produces a vague sense of fear in the presence of forces other and mightier than ourselves. But generally it has passed in us into a higher form, a sense of fearless faith in truth and right, which are the laws of nature. The faculty of relating ourselves to the world in its widest, which is also its deepest, aspects, with its appropriate feeling invests our everyday duties with a new meaning, and gives them a wider range by connecting them with the general life of the world. Morality is thus raised to a higher power; it passes from "mere morality" into "morality touched with emotion," and thus becomes a species of religion. Among other means of cultivating the inner life are the attending the *services* of the churches, although faith has been lost in their dogmas; the reading of the books, whether belonging to Christian literature or not, which are in the best sense religious; the study of philosophy. We are on the right lines if we cling to the great watchwords of our own time,—Evolution, Progress, Organic Order.

Moral Theory and Practice. Moral theory is the analytic perception of the conditions and relations in hand in a given act,—it is the action in idea. It is the construction of the act in thought against its outward construction. It is, therefore, the doing,—the act itself, in its emerging. So far are we from any divorce of moral theory and practice, that theory is the ideal act, and conduct is the executed in-

sight. Moral conduct is absolutely individualised, and it is precisely that which realises an idea, a conception. The breadth of action is measured by the insight of the agent. Just so far as the question, What are the conditions which require action and what the action they demand, is raised and answered, is action moral and not merely instinctive or sentimental. This is a work of analysis, which requires the possession of certain working tools. What we call moral rules are precisely such tools of analysis. The Golden Rule is a marvellous tool of analysis but it gives no knowledge, of itself, of what we should do. As a tool of analysis the moral rule is an idea. A philosophic theory of ethics is a similar idea to the Golden Rule, but one of deeper grasp, and therefore wider hold. It bears much the same relation to the particular rule as this to the special case. It is a tool for the analysis of its meaning, and thereby a tool for giving it greater effect. At the back of the Golden Rule are other larger ideas which have realised themselves, and been so buried in the common consciousness of men, that they have become integrated with the content of the Golden Rule which itself has become a vast idea, or working tool, of practice. Every philosophic theory of ethics performs in its degree this same service. A man's duty is, not to obey rules, but to respond to the nature of the actual demands which he finds made upon him. The rule is merely an aid toward discriminating what the nature of these relations and demands is. A man has not to do Justice, and Love, and Truth ; he has to do justly and truly and lovingly. The relative distinction between the "is" and the "ought," is that the "ought" is the "is" of *action*. The difference between a practical and a theoretical consciousness is that the former is consciousness of *something to be done*. And this consciousness of something to be done is the consciousness of duty. Theory is the cross-section made by intelligence of the given state of action in order to know the conduct that should be ; practice is the realisation of the idea thus gained : it is theory in action.

Morals in History. A glance at the history of morals reveals independence and changeableness always and everywhere side by side. So far as we are acquainted with man in social community, the will of the community speaks to the individual concerning his practical conduct with authority ; and as an inner appropriation of that will, "the authority of conscience, of practical reason, which naturally exists only in the individual, but through friction with the community becomes filled with a universally valid content." The origin of the common will is lost in the mysterious darkness of primitive times, or of divine revelation. It is science which first extends the individual's circle of experience. Morality is a product of evolution, and is in a state of continual transformation. The sum of the ethical principles or ideals which at any time are current in any nation, presents nothing else than the conception of all that is reciprocally required in a practical direction of its members, for the advantage and profit of the community and the individual persons in it. The requirements of social adaptation are raised into the consciousness of the community. Thus full harmony between the practical needs of a time and its ethics can only be a transitory one. The conditions which evoke the individual will to carry out its own ideals over against the current ones, are none other than those upon which the formation of new organs in general is dependent. The new principles must be of assistance to felt needs ; they must be founded in the vital relations of the social body. In answer to the question whether there is progress in morality, it must be said that the circle is becoming continually greater of those over whom the strict import of the conception of humanity is extended. And this is accompanied by an increasing tenderness towards individuals within the limits unchangeably set by the needs of the community. The means by which we strive

to actualise our ideals are becoming more rational, and "the consciousness is continually becoming clearer, with which all moral principles and judgments are referred to what they signify for the welfare of the race and for its capacity to develop." But do men become better? Probably, on the whole, the inner relations of morality remain unchanged, although quite important shifting may take place at special times and in special stages. It may be that "considered from the highest historical point of view, subjective morality—that is, the conformity of individuals to the standard—relatively declines as the higher elaboration of the moral ideals advances." But this need by no means be the last word of historical development. Intelligence carries illumination into unknown paths which no one as yet has traversed, making the surrounding darkness blacker. But the will finds the means of achieving what is clearly conceived. We have no occasion to be distrustful of the energies of our race. We must not overlook the increasing influence which our scientific knowledge must exercise, not only upon the industrial but also upon the social instinct. The conviction is making rapid strides that even the widest lordship of man over nature must ultimately be a curse to the ruler himself, unless he succeeds in establishing the more beautiful and important supremacy over man; that is, over the natural forces in his own breast—the brutality of passion, the hardness of egoism, and the crudity of moral ignorance. But this can be the work only of scientific knowledge and of its increasing application to social ethical problems.

The Ethics of Doubt—Cardinal Newman. There was an ethical trend in the character and spirit of Cardinal Newman, which lifted him above any one sect or creed and made him a power to all classes of serious minds. The especial influence now excited upon us by his thought, comes from his very antagonism to what is the conspicuous feature in the intellectual life of our century,—the prevalence of doubt, and the growth of rationalism. Goethe sounded the note of warning as to the chief menace that would come to our age through rationalism; that there are few who have a great mind and at the same time are disposed to action; intellect broadens the thought, but tends to weaken the will. Newman has brought it home to us that there is a certain kind of rationalism which is dangerous to character, and we may be forced to consider whether we shall not soon be required in the sphere of ethics to discourage somewhat the universal tendency of doubt and distrust with reference to elemental convictions. There is no question that for many minds the first doubt as to whether a certain class of acts is wrong was the first step in moral decline. A principle of external authority in ethics is required, although not such an authority as that of the state or an absolute church. What we are in need of is that strength of conviction which would make us willing to die for a belief with reference to the *human* world. If we were more and more given to recognising the value of this other external authority,—that is, the consensus of all the past voices of history when they speak to us on the moral life,—we might find, more and more, that enthusiasm coming back and firing once more the hearts of the great men of the age, just as the other kind of authority gave hope, fire, and enthusiasm to the purpose of Newman. Notwithstanding the contrast between Newman, the apostle of faith, and Emerson who has been called the apostle of scepticism or of individualism, they had the same intensity of feeling and appalling sincerity, and both had a like expression of spiritual repose. A mediocre follower of either of them can never be a satisfactory character. An ultra-individualism in everything enfeebles the will, just as the complete abnegation of the free-

dom of thought dwarfs the intellect. In order to have a perfect solution of the difficulty, we need to draw both from Emerson and Newman.

The Ethics of Socialism. The question may be raised whether the philosophical ground of ethical truth does not afford philosophical standing to some sort of socialism. This view of the problem has evidently pervaded the thinking of Professor Paulsen in his "System der Ethik mit einem Umriss der Staats- und Gesellschaftslehre," and it is prominent in the "Allgemeine Ethik" of D. H. Steinthal. The first question that ought to be raised in regard to socialism is the sociological question, whether society is a product of that universal evolution which brought man himself into existence and conditions all his thought and doings. If so, we may be sure that there are certain general principles, or laws, to which social evolution has conformed in the past, and to which it will go on conforming in the future. The ethical problems involved in the socialistic propositions now before the public may be reduced to two. *First*, if not all men are converted in thought and feeling to socialism, can a majority have any ethical right to compel a minority to surrender individual initiative and submit to dictation of occupation? *Secondly* what is an ethical distribution of product among the workers that create it? Plato and Aristotle alone laid the foundation for a rationalistic argument from purely ethical premises, showing that majorities may rightfully do more than enforce contracts and keep the peace, but the modern restatement and completion of that argument remains to be made. As to the second problem, a strong argument could be made in support of the proposition that an ethical distribution of wealth would be one that should afford equality of satisfaction throughout society, of the desires that are ethically commendable. When the clever literary people hypnotised by Mr. Bellamy's dazzling vision begin to resume their intellectual self-direction, they will discover that equality of income and equality of satisfaction, of legitimate desires, are two different things.

Ethical and Kindred Societies in Great Britain. Speaking broadly the attitude of the societies towards theology and its exponents may be described as one of non-interference or neutrality. They desire to be rather constructive than destructive in their action, for they believe that desirable changes can only be effected by the slow processes of organic growth. With one exception they have none of the characteristics of a church, and they may be described as lecturing and debating societies with or without the addition of what is commonly known as "practical work." They do not retain the services of a single lecturer, but prefer to have speakers who are independent of each other. (Philadelphia: *International Journal of Ethics*, 1602 Chestnut St.)

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M. Janet remarks, in his article on *Realism and Idealism*, that since Kant philosophy has concentrated all its efforts on the problem of the objectivity of knowl-

edge. The agreement of reality and thought is a truth of which no one doubts, although many centuries were necessary for its observation. Not only is there agreement between nature and mind, but there is analogy, resemblance, affinity, between these two terms. Not only does nature obey the laws of our mind, implying that there is in it a logical and rational element, but it seems to act with the art which intelligence would employ, if it wished to create the products of nature. How is this union of nature and the mind to be explained? Two solutions present themselves: in which thought can be explained by nature, or nature by thought. The first of these solutions is that called *realism;* the second is *idealism*. Each of these systems has strong reasons in its favor. As to the first, thought and nature are not commensurate and opposed. Thought makes itself part of nature, and the only thought we know directly is our own. For human intelligence is bound to the organisation, and appears to follow all its vicissitudes. The basis of idealism is not less firm. External things exist for us only on the condition of passing through our consciousness. Further, the psychological and physiological analysis of sensations reclaims them all as being only states of the ego. But there are serious objections to both hypotheses. Realism is susceptible of two forms. If thought, considered in relation to the origin of ideas, is explained by sensation, it becomes empiricism; if considered in relation to the substratum of thought, this is explained by organisation, it becomes materialism. As against empiricism, may be objected with Kant that sensation does not explain the necessity and universality of scientific judgments. Against materialism, Fichte showed that a thing which is only a thing could never attain to thought. Thus empiricism is overthrown by the impossibility of explaining science; materialism by the impossibility of explaining thought. In order to meet the objection of Kant, and to explain the appearance of *a priori*, the new empiricists have invoked: (1) the principle of inseparable associations; (2) the principle of hereditary associations. On the other side, the new defenders of materialism in order to explain the transformation of motion into thought, have invoked the great principle of the correlation and transformation of forces in nature. But as to inseparable associations, it may be said, that they give us rather a necessity of fact, than a necessity of law. What science requires is absolute and not relative necessity. The same may be said of the principle of hereditary associations, which merely prolong the chain of experiences. But, further, association itself requires explanation, which shows that it cannot account for the principle of causality. As to the use of the principle of transformation of forces to explain the passage of motion into thought, if the objective and physical cause of our sensations is meant, there is merely transformation of motion into motion. If it is said that sensations are only transformed motions, this affirms what is in question, how motion can transform itself into thought. There are no less serious objections against idealism. The principal one is: all our reasonings about nature are established only on condition that we take nature as our basis. We thus reach the double conclusion: neither nature has produced thought, nor thought has produced nature. The ego is, however, in nature, and nature is a representation of the ego, but, while admitting the reciprocal penetration of the two principles, we are obliged to recognise their mutual independence. There is harmony, not identity. But is there not some being in which the real of nature and the real of thought coexist, and who, according to the formula of Schelling, is the absolute subject-object? Idealism, to be consequent, ought to go as far as the absolute consciousness, to the union of the subjective and objective thought. If the two inferior terms are identified in the absolute mind, this will find in nature and in the mind a double expres-

sion of itself. Nothing prevents us then, says our author, from understanding nature, with Schelling, as the drowsy mind seeking to arouse itself, and the ego on the contrary as a nature which awakens itself.

M. Tarde in *Art and Logic* remarks that the word art has two senses. In its wide conception, it includes all the exercises of the imagination and of human ingenuity, invention in a thousand forms. But in another sense of the word, it answers to the æsthetic needs of society. If we had regard only to the art of the most advanced epochs, we should perhaps say that it serves to satisfy the need of inventive expression or of expressive invention. It seems then, in effect, to be before all expressive or inventive, and the second of these traits appears the most essential. The property of art and also of morality is to seek and to believe to find a divine end in life, a great end worthy of individual sacrifice. When art presents itself separated from morality, when it is an agent not of harmony but of social dissolution, it is a sign that it is imported from abroad. Art is then immoral and dissolvent. In all ages truly logical art has been only the translator and the illuminator of morality. . . . . The work of art is not like a product of industry, an artificial organ added to the individual, it is an artificial, imaginary mistress. The privilege of art is to arouse in us sentiments which play in the social life and logic, precisely the rôle of love in the individual life and logic. The sentiment of art is a *collective love* and rejoices to be such. Art is social joy, as love is individual joy.

Morality and Metaphysics. Between practical philosophy and theoretical philosophy there is a real difference of nature. The former concerns the action and the latter the perception, and as we cannot do what yet is not, nor see what is already done, the one has relation to the future, the other to the present or the past. With this difference, they resemble each other, in that both consist in a putting in order, a co-ordination of their objects. Experience is sufficient to furnish all that is necessary for the explanation of practical co-ordination. This requires a fundamental notion of practical order, which metaphysicians see in the notion of the good, but, as the reality of the good cannot be established, it is a chimerical and arbitrary conception. We must seek in the co-ordinated objects themselves the fundamental element around which they will be disposed according to their proper nature. This cannot be the good, since this is the result of practical co-ordination. It is pleasure, not a particular kind of pleasure, but that which is possessed in common by all that pleases, all that satisfies. Volition can never go beyond pleasure. If we desire before having really been sensible of pleasure, it is because we have been ideally sensible of it. Pleasure is inherent in every practical function, it is practically constant, it is practically categorical. We cannot go beyond pleasure of some kind. It cannot be said that pleasure is preceded by function, life. These are only results, groups which have components, and therefore they cannot be the last principle of action. Thus one problem is resolved without recourse to metaphysics.—After the principle of simple co-ordination, must be sought that of the co-ordination which subordinates, which marks a sort of hierarchy. For this the idea of pleasure is not sufficient. It is necessary to limit the point of view, and in the difference of quantity of pleasure will be found the rule of co-ordination. The distinction of more or less offers itself at once, and gives place naturally to degrees, then to a subordination. The rule of the good is: the amplitude of the co-ordination, the degree of intelligibility, the number of facts which compose the object of volition. It is necessary to distinguish between urgency and superiority in proper value. Things which are the most urgent have not necessarily the most value in themselves. Thus the practical subordination ought to dispose its objects inversely, according to

whether it is occupied with their urgency or their proper value. Here also practical philosophy is not obliged to have recourse to metaphysics. Practical philosophy not only ought to regulate its objects on the basis that it has previously fixed, but still ought to assure this regulation for the future. This requires that its coördinations should be made objects of commandment, obligation. The conception of the future pleasure enters into the present; and to each volition is bound by anticipation, ideally, but positively, the future benefit of the practical co-ordination. Thus obligation has its source in a volition imposing practical co-ordination on future volitions. Obligation is in reality causal determination, and as there is a volition more or less marked in each act, and the causal chain is never interrupted, we can be said to be always under the influence of obligation, the power of which increases with life. Determination is uniformisation; and nothing else is asked for the moral imperative. Causal determination is opposed directly to the unconditionment of liberty; but obligation, as well ascausal determination in general, remains, moreover, in every partial state, limited by its opposite, liberty, which ever recoils before the continual encroachments of obligation, but without ceasing to be. There is no difficulty in admitting a sanction for the good, although it does not constitute a distinct and new element. The sanction is the consequences of actions from the point of view of pleasures. By the side of moral happiness or unhappiness, should be reserved a place for a happiness or unhappiness in some sort "amoral." The moral good does not exhaust all the good. It is necessary to distinguish between the moral good and the unrestrained good (bien libre). There is an immoralisable element which represents the veritable autonomy of the will. As in all coördinations, by reason of all bending under the rule, the moral hierarchy will sometimes injure the reality. Here the notion of the unrestrained good happily intervenes. The reality always reserves its rights in the face of co-ordinations, whatever be their nature. When it asserts itself it is sublime, it is, so to say, raised above every rule, majestic in its sovereign liberty. (Paris: Félix Alcan.)

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. II. Nos. 1 and 2.

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Professor E. Hering introduced the method of defining colors by data of measurement derived from sensations. He thus became the founder of a new conception in Optics which in many respects promises to give more correct and better explanations not only of the physiology of sight but also of the theory of colors;

his views collide however in some important points with the views of the old school, the leader of which is Professor Helmholtz of Berlin. The first article of the present number of this magazine treats of one of these problems, and the author, Professor Helmholtz, believes that the results of his experiments do not show a gradation of the perceptibility of differences which would justify Professor Hering's theory of colors. Professor Helmholtz applies Fechner's law concerning the measurement of perceptible differences to color-sensations. For the experiments he has made, a wheel was employed (after the method of Maxwell) into which slips of colored paper of various breadth could be inserted. He found by this "photometrical" method that "the effect of an additional color upon the luminosity is effectually weakened by the amount of the same color present in the whole mixture. . . . Equal small amounts of the quantity of light produce the smaller effects the larger the quantities of the same light are in the whole field." We pass by other results of Professor Helmholtz's experiments, for it takes a specialist to go over his calculations and tables; and the investigation has by no means been brought to a final conclusion. "If the strong deviation is not based upon an error," Professor Helmholtz says, "quite another and a different hypothesis would come into question, viz. whether it may not always be the clearest sensation which has effect and that which remains below the threshold does not come into consideration." The revision of his "Handbuch der physiologischen Optik" has been the occasion for these experiments of Professor Helmholtz.

Professor Gaule of Zurich propounds a most interesting theory about the development of the trophic functions and the chemical actions of the nervous system. He starts with the idea that the processes of the nervous system are in accord with the law of the conservation of energy. Du Bois Reymond's remark that love and hatred, pleasure and pain would remain unexplained even if all the changes that take place in the arrangement of atoms in our nerves were known and mathematically computable, has made a deep impression because it expresses the disparity of our definitions of atoms on the one side and feelings on the other. Yet our atomistic theory is not final; it is only an auxiliary conception which will simplify thought so long as the present method of considering phenomena from a chemical or physical and geometrical standpoint is retained. As soon as we create a common auxiliary conception to comprise all these sciences, we shall have to broaden our definitions. Taking this position as his philosophical basis, Professor Gaule attempts to consider nervous processes as reflex actions, the latter being clearly conceivable as subject to the law of the conservation of energy. Living beings appear as complexes of forces developed from the chemical actions taking place in their organisms. Through a saturation of the affinities of their carbon and hydrogen atoms with oxygen their potential energy is changed into kinetic energy. The latter is used in many various ways, partly for building up more complex molecules, partly for again storing potential energy, and partly,—and this is a predominant process in animal organisms,—for setting forces free which will serve as a source of their activity. It is such a source of activity which the impressions of the outside world affect. The impression is called *Reiz* or irritation, and the irritation has often been compared to the fuse or the spark igniting a powder-mine. We must however bear in mind that the organism is unlike the powder-mine, not at rest but in constant action and the irritation does not properly speaking evoke a reflex but it only modifies the action taking place. All this is generally conceded by the physiologist. Professor Gaule then proceeds to explain his idea of the nervous development. The cells of the epithelium in the skin perform a peculiar process, called

in German *Verhornung;* they turn into horn (keratine) by the protoplasm's losing its albuminoids. The process does not take place in one cell but in several layers of cells and represents like all actions a play of forces, raising the more keratinised strata from the basal membrane to the surface. The keratinising however is, according to Gaule, only the less important surface-phenomenon of another peculiar process which is directed toward the interior of the organism. An excretion takes place forming extremely fine threads around the cells which pass through the pores of the basal membrane (a fact proved by Caninis and Fraenkel) where they form a plexus. Out of the net-like meshes of these plexuses grow increasingly strong filaments which form the trunks of the nerves. These views agree very well with the observations of Professor His on the fœtal development of the nerves. Professor His has indubitably proved that the olfactory nerve for instance does not grow out of but into the hemispheres. The direction of the nervous growth is the same as the direction of their function. Many of the sensory nerves have been proven to, and it is probable that all of them do grow from the periphery into the central organ. Hensen in opposition to this has proposed the theory of an original connection between the peripheral root of the nerve and the central organ; yet whatever side of the controversy may be found in the end to be correct, the result does not much affect Professor Gaule's theory, that the ends of the nerves represent the roots from which they grow and every special irritation must specially affect the secretion which forms the nerve. Having been rather explicit in the basal ideas of Professor Gaule's proposition we can now be brief. The axis-cylinder of the nervous fibre corresponds to the secretion of the nervous root; around it is found the marrow-sheath, a tube of absorbing cells containing, also as proved by Ruehne, a net of neuro-keratine; this neuro-keratine again absorbs the axis-cylinder. To the question Why does not the axis-cylinder disappear? Professor Gaule answers, Because it is constantly renewed. Thus we have a constant flow in the nervous substance, an exchange of materials, an absorption, a secretion, and re-absorption; and in this way it can be, a progress of chemical action conditioning the vertical direction of the nerves upon their plexuses and also the form of the marrow-sheath which appears like craters, one inserted within the other and filed upon the axis-cylinder. Professor Gaule proposes no definite opinion as to the development of the motor nerves; he makes some suggestions which need however further explanation and demonstration. He has apparently not yet finished his investigations and we may expect to hear again from him.

E. Raehlmann, Professor of Ophthalmology at Dorpat, presents a résumé of his experiences as to the visual development of persons blind from birth to whom by a successful operation sight had been restored. We confine ourselves to a few quotations. "Four weeks after the operation of the right eye and a fortnight after that of the left, on April 28th, the first experiments were made on Johann Rubens. April 30th, patient moved his head more than his eyes. He declared he saw perfectly; yet he was unable to recognise any object except his drinking mug, which on the previous day he had felt with his fingers. Also his shoe was not recognised until he had touched it. May 4th, patient could see that a wooden ball differed from a wooden cube, both being of the same color, but was unable to tell that one was round, the other square. Nor could he distinguish the ball from a disc. After much handling the objects he learned to recognise by sight the roundness of the ball and the squareness of the cube, but he remained unable to distinguish the ball from the disc. He learned quickly to grasp objects in the median line of his eyes

but had great difficulty in finding them with his hand when placed at an angle before him.

"May 23d, a glass is again presented to the patient; he sees his picture; noticing the frame, he declares the glass to be a picture. (A picture had been presented to him repeatedly.) Now a second face is shown to him in the glass by the side of his own. Patient becomes greatly bewildered, declaring the picture to be familiar to him. Being asked whether it is that of the Professor, he denies the fact, because the Professor stood beside him. Looking over his shoulder he notices the Professor, and seeing him twice he is confounded. . . . Patient is left alone and remains almost half an hour before the glass. He moves his arm constantly up and down, observing with a smile how the picture in the glass makes the same movements. Requested to touch his nose, he first grasps into the glass, then behind the glass, repeating this several times. His hand then is put on his nose. Now he laughs and touches the several parts of his face, constantly observing the motions of his hand in the glass."

Most instructive cases of diseases of mind are those in which patients cannot help having and obeying certain ideas which are not, however, hallucinations. Dr. Hack Tuke in the fourth article of this number says: "I was consulted once in the case of a lady, the most important symptom of whose disease was that she had to count up to a certain number before doing the most trivial thing; when she turned at night in bed from one side to the other, or when she took out her watch, or in the morning before she rose; when she went downstairs to breakfast, she would suddenly stop on one of the steps and count; at the breakfast table when about to take the tea-pot before touching its handle"; etc. (Arithmomania). Another case. "A young law-student who had distinguished himself at school, one day read the English sentence 'it was not compatible' and shortly after that he found the sentence, 'I like it not' in German. It struck him that the negative in the one case was placed before and in the other after the word negatived, and he commenced to ponder on negations in general. It became an all-important and all-absorbing problem to him. It kept him from work. For some time he proposed questions to himself like: Why do we not have cold blood like some other animals? etc. He is at present in great danger of becoming undecisive and wavering in his actions, for his passion of ruminating on his problem of negatives weakens his will and threatens to destroy his energy." (Folie du doute.) Esquirol calls cases of *Zwangsvorstellungen*, in which a patient otherwise healthy is forced to pursue a certain trivial thought, "monomanie raisonnante"; Professor Ball, "intellectual impulses." Although hereditary influences most likely play an important part in this disease they seem to originate in emotions, and Régis for this reason calls them "délire émotif," stating that their ultimate cause must be sought in a diseased state of the ganglionic system of the intestines. Dr. Tuke favors Charcot's term "onomatomanie." The disease is a *Wortbesessenheit*, a word-mania. Certain expressions or phrases are pressing heavily upon the patient's consciousness so as to force him irresistibly to think them or to pronounce them again and again. Not all cases can be classified under word-mania, but such cases as doubt-mania (*Zweifelsucht*) or arithmomania are akin to it. Dr. Tuke's advice is not to fight the disease but to teach the patient to ignore it, to treat it as trivial, for the diseased ideas derive new strength from the opposition made to them.

Professor E. Mach explains Weber's discovery that "if a tuning fork is placed upon the head of a person, one ear being shut, the sound is heard and located in the shut ear," in the following way: The sound passes through the bones of the

cranium to the labyrinth of the ear and thence out of the ear into the air, thus taking the inverse direction of other sounds we hear. If the flow in one ear be stopped, the sound-waves are reflected and the drum vibrates stronger. Hence the tone will be heard more plainly in the shut ear and will be located there. Professor Schaefer in the last article of this number describes an experiment in the same line, which in another way—the transmission of sound through air waves being excluded—proves the intercranial conductibility of very weak sounds from ear to ear. (Hamburg and Leipsic: L. Voss.)

SCHRIFTEN DER GESELLSCHAFT FUER PSYCHOLOGISCHE FORSCHUNG. No. 1.

CONTENTS:

The psychological societies of Munich and Berlin have started under the above title a periodical the first number of which is very promising. Dr. von Schrenck-Notzing makes some critical remarks on Prof. Bernheim's view to consider hypnosis as an increase of suggestibility produced by suggestion. There are observations which do not justify this definition. He then investigates the substitution of narcotics as a means for producing hypnosis and their "suggestive" effects. In the second part of his essay Dr. Schrenck-Notzing speaks about the "suggestive" effects of Indian hemp which in a special preparation under the name of hashish is used in the Orient as a means of intoxication. Reference is made to the Ismaelite secret society "Megalis et Hiemit" (the house of wisdom) consisting of missionaries (*Daïs*), adepts (*Fedaïs*) and laymen (*Refiks*), all of which are bound blindly to obey their grand master (*Dai-al-Doal*). Hassan, an adept of this society, was obliged to flee, 1090, on account of some quarrels. He founded a similar sect at the head of which stood the old man of the mountains (*Shaik-al-Djabal*). Their members, especially the lower classes, the *hashishin*, made themselves formidable in the times of the crusades by their reckless obedience in executing murder and other crimes. The order consisted of 60,000 members and their blind obedience was effected through suggestibility in the state of hashish intoxication. The word assassin is derived from their name. In the year 1255 a Mongolian governor ordered 12,000 hashishin to be executed on account of the dangerous character of their sect. The secret of their formidable obedience appears to have been the method of intoxicating the neophyte before his admission to the order with hashish in some grand mountain scenery and suggesting to him all the pleasures of paradise which he would find in blind faith and unreserved obedience to the old man of the mountain. Contempt of death, insensibility under the severest tortures, and an unspeakable joy in the fulfilment of their leader's command were the result. It can readily be perceived what a dangerous drug hashish is; nevertheless it is said that the cultivation of Indian hemp, especially among some negro tribes of Africa according to the reports of Wissmann, exercises in several respects a good influence. Some of the barbarians of darkest Africa have given up cannibalism and accustom themselves to more civilised habits. The psychical effects of hashish are described as: (1) a feeling of comfort; (2) dissociation of ideas and a lack of their control; (3) illusion concerning

space and time; (4) an increased sense of hearing; (5) fixed ideas and delirium; (6) a disturbance of affective states, e. g. suspicion; (7) irresistible impulses; (8) illusions and hallucinations. Dr. v. Schrenck-Notzing freely quotes from Moreau, *Du Hashish et de l'aliénation mentale, Etude psychologique* (Paris: Masson, 1845), and adds several experiments of his own.

Mrs. Fay, a somnambule accused of imposition and fraud, was delivered by the County Court of Zurich to Professor Forel for observation who kept her for several days in his institute. The professor's report to the County Court is very interesting in so far as Mrs. Fay, a woman without education, must be considered as a genuine somnambule exhibiting all the symptoms observed in other cases. She had been a servant girl in Basel and since her fifteenth year fell twice a day in an hypnotic sleep. She married and had several children, her youngest child was born while she was in her hypnotic sleep. She made a living by curing patients who consulted her when asleep, and was punished before on that account for imposition. During one of her hypnotic states patients were introduced to her in the presence of Professor Forel and she made her statements in vague terms as almost all somnambules do. The experiment showed that her diagnosis consisted of random guesses which in exceptional cases happened to be correct; sometimes they were not wholly incorrect, but mostly erroneous. She believes herself to be possessed by a spirit whom she calls "Ernst." Professor Forel without considering the woman as a model of truthfulness, believes in her sincerity. He cured her of her hypnotic sleep on her own request. She stated that the money she earned by curing patients did not make up for the loss she endured by not being able to earn a living by work. Professor Forel succeeded with his cure, but he states in a postscript that the woman having returned to her former surroundings, has since suffered from relapses. (Leipsic: Ambr. Abel.)

PHILOSOPHISCHE MONATSHEFTE. Vol. XXVII. Nos. 3 and 4.

CONTENTS:

The conclusion of Prof. P. Natorp's article on *Quantity and Quality in Concept, Judgment, and Objective Cognition* appears to be the most important part of the essay. Professor Natorp is a transcendentalist. He understands Kant in a dualistic sense where the latter says that "the unity of apperception (Einheit der Apperception) is the radical faculty of all our cognition" (Radical-Vermögen aller unserer Erkentniss). Cognition is defined as "limitation of that which is *per se* infinite. It is natural that for a transcendentalist the greatest difficulty arises when he attempts to let his *a priori* face the facts of reality. Professor Natorp shows great skill and ingenuity in this respect. It is but consistent with his premisses to arrive at an "invincible dualism," yet he adapts his transcendentalism sufficiently to fulfil the demands of experience. Thus he does not come to a real solution but to a *modus vivendi*, which is after all the purpose of philosophy.

Professor Natorp considers the synthetic unity not as given, but as to be realised; a concept is created through definition. The data of experience on the other hand are not the defined, but the definable. They are to be defined by the forms of the concepts, and their fundamental forms are quantity and quality. He says: "The "definition as this and as that (as something identical) is a function of the concept, "but the concept presupposes sensation as the material to be defined. To consider "sensation as given in this its absolute identity which is demanded by the concept, "is after all an illusion. Therefore positivism and not idealism confounds the de- "mands of cognition with the given reality, thus adjusting facts to our wants of "knowledge. Sensation conceived as a datum and not as a postulate is and remains "the infinitely definable and never absolutely defined. . . . It appears easy thus "to reduce the dualism of form and matter, concept and sensation, the defined "and the definable to one ultimate unity. In one respect positivism succeeds, "attributing full definedness, and not mere definableness, to the data; and then, "it finds no difficulty in letting the defining function of the concept in its pecu- "liarity disappear by reducing it to a quality of the data."

We do not know to what kind of positivism Professor Natorp refers; yet it seems that it cannot be applied either to Comte's or to Littré's views. Nor does it dispose of the positivism editorially set forth in *The Monist*. Positivism, according to Professor Natorp, is at fault in dropping the definite function of the concept. But he endeavors to avoid the opposite mistake also, viz. "to entirely drop the definable, "which might be supposed to be a mere *X*, scarcely representable in clear concepts, "or to deduce it from the defining function. This other exaggeration is that of ideal- "ism which has found its purest expression in Fichte's philosophy." Professor Natorp by keeping aloof from both errors declares dualism to be insuperable; "dualism," he says, 'is a hard fact'—*eine starre Thatsache*."

The trouble with transcendentalists, it seems to us, originates in their method of starting with cognition, with the synthetic unity of apperception, with the forms of concepts. Experience means to them the sense-element of sensation, the contents of concepts without their form. They start with a dualism. When they have completed their system of transcendental forms, they find it hard to explain how to change their rigid laws into the constant flux of reality as presented to us by experience. Should the philosopher not rather start from the function of cognising, which in itself is a unity? He will find that cognition, concept, the synthetic unity of apperception, and all the complex laws of transcendental thought are products of the cognising function. If these laws are rigid, we have made them so. We have made them stable, we have fixed them for a certain purpose. Their rigidity is a legitimate fiction for that purpose, but beyond it it finds no application. Pure logic draws distinctions which do not exist in reality; pure mathematics operates with lines which considered as real things are mere nonentities. The dualism between concept and sensation, between the *a priori* and the *a posteriori*, between thought and thing, between form and matter, is not given in experience, for in experience the formal and the material are one inseparable whole; it is the product of cognition. The cognising function differentiates the data of experience into formal and material aspects; the formal being always of a general character serves as a help for systematising and classifying the material. This appears to us the only way of realising a monistic positivism, and no philosophy can be considered as satisfactory until it represents the data of experience or positive facts in a unitary view, i. e. a harmonious conception free of contradictions.

Professor Natorp has still to battle with the Eleatic question. He begins the

conclusion of his article with the following words: "Let us consider only the most "important results of our deduction. An explanation of 'becoming,' of 'change' has in "this way become possible; the solution of the Eleatic problem how 'change' can *be* "at all, since *being* means unchangeable definedness; or, how becoming can be, since "it includes not-being, for being means the transition from not-being into being, or "from being into not-being. How can we think this combination of position and "negation without contradiction, a combination of position and negation being a con-"tradiction"? This is rather a late flower of Hegelian thought: but, being presented so vigorously and unequivocally, it illustrates clearly the mistake of transcendentalism in starting from abstract concepts or pure thought, thence coming down to the facts of reality. There trenscendentalists have to fit their ideas about being and not-being to experience, and finding insuperable difficulties must consistently become dualists. Professor Natorp's solution of the Eleatic question is "to find a method of thought which overcomes the absolute contradiction of position and negation. . . . This is done by the comprehensive unity, which means identity and at the same time difference, viz. that one is the same as the other and yet not the same."

We should say that the Eleatic question will best be understood by a clear comprehension of the function, the purpose, and the products of cognition.

Says Professor Natorp: "Since Kant has restored in its purity the distinction "made by the ancients between *αἰσθητά* and *νοητά*, *φαινόμενον* and *νοούμενον*, the authors "of this distinction, the philosophers of Elea are almost nearer to us than Aristotle." The distinction between thought and sensation is indeed of extraordinary importance. Ideas (thoughts) and sensations are different, but the recognition of this difference is no reason to declare dualism as permanently established. Is not the reason of their difference the difference of abstraction made in each case.

By noumena, i. e. thoughts or ideas, we understand all mental symbols representing things. The ideas "man," "manhood," "virtue," etc., are not sensations, but symbols representing some qualities abstracted from sensations. In making the abstraction "idea" we confine the term, i. e. the symbol "idea," to its representative element alone. We leave out of sight that real ideas vibrating through our brain are at the same time nervous structures in actions; we leave also out of sight that they possess the state of awareness in common with sensations. We do it because their representative nature is of paramount importance. However, in making the abstraction "sensation" we do not exclude the state of awareness, we think first of all of the feeling of a sensation and then also of its form, viz. the special sense-impression. "I have a sensation" is almost equivalent to the phrase "I have a feeling"; a sensation of light means a feeling of the effect of ether-waves upon the retina; a sensation of sound is a feeling of the effect of air-waves upon the drum of the ear; etc. Just as much as ether-waves are not light, and air-waves not sound, (the latter being the effect of the former upon specially adapted feeling substance), so also the sensations light and sound are not the ideas we have of light and sound. The ideas of light and sound are symbols representing in feeling substance the sensations light and sound. These symbols, we suppose, have developed from the memory-images of sensations. They must in their turn also be considered as effects. They are the effects of sense-impressions upon specially adapted feeling substance, viz. upon a higher system of nervous structures, not in direct contact with the periphery, but growing upon and from the peripheral sensory reflex centres. The physiological activity of thoughts is accompanied also with the feeling element; or in other words, thoughts are, as much as sensations, states of awareness. Yet they differ from sensations in that they do not

contain anything of sense-impressions; the latter being an exclusive characteristic of the action of sensory organs. The memory-picture of blackness is not a sensation and the idea of blackness still less.

The distinction between noumena or things of thought and æstheta or sensations is by no means so distinct as is often assumed; for, as we have seen, the most prominent feature of the noumenon is its representative character. Isolated sense-impressions possess no representative character, but sensations do possess it. Sensations are the connecting link between sense-impressions and thoughts, between meaningless feeling and mental states or mind, i. e. representative states of awareness. Ideas are, as it were, an extract of the representative value contained in sensations. This is my conception of the distinction to be made between *αἰσθητά* and *νοητά*, between sense-activity and thought-activity, between the phenomenon and noumenon. It is set forth at length in the discussion with Professor E. Mach in this number. It has been here again set forth at such length, because I am convinced that a final solution of the problem is of great importance. (Heidelberg: George Weiss.) K.

MINERVA. Rassegna Internazionale. January, 1891.

Minerva will represent the first Italian venture in the direction of a comprehensive magazine of international reference and literary record. The editors, in stating the aims of their new publication, acknowledge that Italy keenly feels the lack of an international intellectual magazine. In Italy the reading public, and persons of an average culture, still seem to be cut off from all stimulating intellectual contact with the outside civilised world; while beyond the Alps, on the contrary, and across the seas, any book, or a simple magazine-article even, be it written in German, English, or French, and legitimately claim from any point of view a certain importance, is at once read by innumerable persons from San Francisco all the way to St. Petersburg. Through the intellectual medium of their international reviews, these nations seem actually to have realised one of Goethe's most ardent aspirations,—the dream of a noble and humanising "world-literature." Nearly all of the articles contained in the present issue of *Minerva* are ably condensed translations and epitomes of articles that have recently appeared in leading English, American, and German reviews and magazines. *La Minerva* is under the direction of Prof. Federico Garlanda of the University of Rome. (Rome: La Società Laziale. Tip Editrice.)

VOPROSY FILOSOFII I PSICHOLOGII.*

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* *Questions of Philosophy and Psychology.* In the Russian language.

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POLEMICAL.
APPENDIX: 1) Materials for the History of Philosophy in Russia; 2) Transactions of the Moscow Psychological Society.

Russia is perhaps that country of all civilised nations of which we know least, and even such authors as Tolstoï who are read all over the world, are perhaps, severed from their surroundings, not correctly understood by us as the Russian understands them. The present magazine, *Problems of Philosophy and Psychology*, being a strictly scientific periodical, is less peculiarly Russian without entirely losing the national characteristics of its home. The intention of the editor has been to develop and to give a chance for a further development of an independent Russian philosophy. The philosophy of the West, we are informed, does not satisfy the Russian mind; the English philosophy is one-sided empirical, the French mathematical, the German too abstract and logical. The Russian philosophy aspires to bring about a well-balanced and harmonious method of thinking in which reason, sentiment, and action—science, art and religion—are reconciled. Professor Grote, the editor of *Problems of Philosophy and Psychology*, by placing the ethical interest in the foreground, hopes that Russian philosophy will become "the salvation of the world from evil."

Among the book reviews we find six pages devoted to *The Ethical Problem*, by Dr. Paul Carus, a translation of which was made for us by Prof. A. Gunlogsen of Chicago. We find however that the reviewer, Mr. P. Astafiew, mixes the position of the author up with that of the societies for ethical culture. If he represents the Magazine's view of reconciling Science, Art, and Religion, it is sure that Religion in the shape of his peculiar creed would get the lion's share. The interest of the little book consists to him in the fact that it clearly characterises a singular anarchical condition; by having lost the old faith, it is utterly unable to replace it. It is an assumption to base ethics and religion on positive and scientific foundations; yet the attempt is curious as a symptom of the times and especially of "enlightened" America.

In answer to one of the most important errors in Mr. Astafiew's review, we have to state that basing ethics upon the facts of life, verified and verifiable by science, does not mean that we have to study psychology in order to be moral. A man can lead a moral life without understanding anything of ethics, the science of morality. Ethics is not an indispensable condition of morality. But it is of paramount importance that ethics—as a science—is not an impossibility. The data of moral life, the impulses of duty, of conscience, of the ought, are not mystical or supernatural, i. e. extra-natural, standing in contradiction to other natural facts; they are not, as the intuitionists maintain, "unanalysable," they are not, as Professor Adler, the founder of the Ethical Societies declares, beyond the pale of science; "the ladder of science," he says, "does not reach so far." The data of moral life are facts of the natural development of man and of human society; they can be investigated by science, they can be compared with other natural facts, they can be classified and understood.

A man can throw a stone without understanding anything of Newton's laws, he can build a hut without understanding architecture. Yet for that reason the study

of ballistics and of architecture are not useless. The man who has studied architecture may bridge the Niagara, which the mound-builders were unable to do. And if a bridge breaks down while the mounds of the mound-builders are still standing, it proves nothing against architecture. An ethical student may have proposed untenable theories in ethics, he may have preached a wrong morality, and may have gone astray himself: all that would prove nothing against the science of ethics. It is to be expected that ethical knowledge, if it leaveneth the whole lump of human society, will raise man's moral life higher, as surely as our knowledge of architecture made it possible that we now build palaces upon the places where in former times stood the wigwams of the Indians. (Moscow, 1891.) K.

VOL. I. JULY, 1891. NO. 4.

THE MONIST.

PSYCHOLOGY OF CONCEPTION.

GENERAL *Nature of Thought.* — The processes marked off by the psychologist as thinking or thought constitute the highest stage of intellectual elaboration (intellection). By taking our concrete percepts and resolving them into so many abstractions, (qualities or attributes of things, relations between things,) we are enabled to carry out the process of cognition to the furthest point of unification. As long as we view a particular object, or an event, alone apart from other things, we merely *apprehend* it. But when we bring it into relation to kindred things we *comprehend* it. Thus, we comprehend the tiger by classing it with other members of the feline group. So we comprehend or understand the movement of the steam-engine by assimilating it to the more familiar action of the steam in the kettle in forcing up the lid.

Like imaginative production thinking is nothing but the sum of processes of separation and combination, carried out on sense-material. But in this case the elaborative processes assume a new and peculiar form. It is one thing to build up a pictorial image as the poet does, another thing to elaborate an abstract idea, such as the scientific notion of force, fulcrum, and so forth. We must now try to investigate more thoroughly the nature of this thought-elaboration.

Thought as Activity.—It is evident that the processes here roughly described are active processes, that is to say they involve a special exertion of the forces of attention. In perception, repro

duction, and constructive imagination, this active factor is at work. But it is only in thought proper that this activity becomes fully developed. To think of a particular attribute in an object, say the color of a rose, is as we all know a conscious effort or strain. A child first called upon to think about abstract qualities, and the general relations of objects finds the operation difficult and fatiguing. All thinking is in truth an exercise of the higher form of attention, viz. volitional concentration of consciousness. We only think when we have some purpose as the discovery of the likeness or difference among objects, and such a purpose only develops itself as the individual and the race attain a certain measure of development or culture. The child and the savage, like the animal, get on very well without thinking. And even a large proportion of civilised adults think only in an occasional and rudimentary way. Thought is thus in all cases a kind of artificial activity sustained only for short periods and under the stress of impulses or motives which belong to a high stage of intellectual and moral development.

The high degree of activity in thought presumably involves a special amount of that muscular strain which forms the sensuous base of the attitude of attention. To think is thus to concentrate consciousness by aid of energetic motor adjustments. These include the innervation of certain muscles, more particularly those by which movements of the eyes and head are carried out. To think is to keep certain ideational elements in persistent consciousness, and this is probably effected in part at least by an energetic and sustained innervation of particular groups of muscles. To this it may be added that since as we shall see presently all thinking is bringing together in their relations a number of ideational elements, the muscular activity in the case is of a specially difficult kind. Such special muscular efforts would probably effect a cutting off of other elements and so subserve that severe narrowing of consciousness which is so marked a feature in thought.

Directions of Thought-Activity.—This thought-activity may be viewed as having two aspects or as following two directions, which it may be well to view apart, even though, as we shall presently see, they are inseparable aspects of one process. Just as all intellectual elaboration is at once differentiation or separation and integration

or combination of what is differentiated, so thought itself is but a higher development of each phase.

a) *Analysis, Abstraction.*—First of all, then, thought may be viewed as a carrying further and into higher forms the process of differentiation or separation of presentative elements by means of isolating acts of attention. Thus on selectively considering the color of a rose, or the form of a crystal, we are it is evident differentiating what is given in perception as a complex into a number of parts, and rendering one of these specially prominent and distinct. Such thought-separation is commonly spoken of as Analysis, i. e. the taking apart of what is conjoined in a whole, and also as Abstraction or the withdrawal of attention from what is for the moment irrelevant and confining it to one particular point, feature, or quality (Latin ab or abs, and traho).

Here it is evident a special attitude and effort of attention is required. It is one thing to note carefully a presentative complex just as it is, another thing to single out some element of this and fix the attention on it. The peculiar difficulty of this analytic attention is due to the firm coherence of the complex. The child cannot see the color of the orange just because the orange as a whole stands in the way. Hence this analytic attention is abstraction in the fullest sense, that is a deliberate turning aside from what stimulates or attracts this attention at the moment.

Such abstract singling out of an element may be supposed to involve a special modification of the muscular adjustment in attention. Hence perhaps the comparative ease with which we can single out for observation locally distinct features of an object, to which correspond different movements of the sense-organ. On the other hand the great difficulty of mentally separating the color from the form of an object may arise from the common element in the muscular adjustments concerned.

The nature of this process of analysis or abstract attention is best seen in those comparatively simple operations in which an actual presentation-complex as a group of tones or colors is being analysed. The carrying out of such a process of analysis is aided by certain conditions objective or external, and subjective or in-

ternal. Thus it is found that the closer the degree of the complication the more difficult the isolating fixation. Thus while it is comparatively easy to attend to one detail of color in an object locally separated from other color-details it is exceedingly difficult to attend to the brightness or the degree of saturation of a color apart from the quality of the tone itself. In the case of tone-masses, again, it is found that certain combinations, more especially that of the octave, are difficult to distinguish because of the tendency in this case to fusion.*

Coming now to subjective conditions we find that the detection of an element in a complex is aided by a previous familiarity with this apart from its present concomitants. Thus the singling out of the partial tones of a clang is greatly aided by the circumstance that these occur and so are known apart from the ground-tone and thus are more readily picked out and recognised.† Again, the separate detection of a presentative element is aided by special interest in the particular material. A fine ear for clang-effect or timbre can more readily fix its attention on this.

Such special interest works mainly through what is known as practice. What we are accustomed to note, and exercised in picking out from its surroundings, we are able to detect readily. This effect of practice in facilitating analysis or abstract attention to this and that constituent of a presentation-complex is abundantly shown throughout the whole domain of recent experimental inquiry into the nature and relations of sensation.

Of course all such analytical separation of presentative constituents is limited by certain conditions in our sensibility. Thus the limits of local discrimination obviously confine the range of isolating attention to local detail in our tactual and visual presentations. Since too such isolation is differentiation, i. e. the singling out of some trait or feature different in quality or intensity from sur-

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*This is Stumpf's explanation. See his account of the different degrees of fusion. *Tonpsychologie* ii. p. 65, and p. 127 et seqq.

† According to Helmholtz this previous familiarity with the elements of a composite whole when it gives rise to a vivid expectation may produce an illusory analysis, as when certain opticians affirmed that they could detect the supposed constituents of green, blue, and yellow, in that color. See *Physiol. Optik*, p. 273.

rounding features, it follows that our abstraction is in all cases limited by our discrimination. We cannot separately fixate a local detail of color if this is not qualitatively distinguishable from its surroundings, nor a local detail of form if this is not distinguishable in luminous intensity from its entourage. Similarly with respect to the difficult analysis of complex tone-presentations or clangs and taste-presentations, as the mixed flavors of a dish.

b) *Synthesis: Conscious Relating.*—In the second place all thought is integrating or combining, or, as it is commonly expressed, a process of Synthesis. In thinking we never merely isolate or abstract. We analytically resolve the presentative complexes of our concrete experience only in order to establish certain relations among them. The most appropriate term for all such conscious relating or discernment of relation is Comparison.

All our sensational or presentative material is given in certain relations or connections, including the relation of coexistence, or coinherence in a substance, of the several qualities of a thing. Thus the several parts of an extended body stand in certain spatial relations one to another, one part being situated to the right of the other, and the object as a whole being above and behind another object, and so forth. To these space-relations must be added the time-relations of all events, such as the movements of objects, their changes of form, and so forth. Lastly with these 'external' relations are given the so-called 'internal' relations of difference and likeness. The colors, forms, and so forth that present themselves from time to time exhibit a large variety of such relations.

As long as we perceive or imagine the concrete object as such we have only a vague 'implicit' knowledge of these relations. Thus a child in looking at a house sees *implicitly* the chimney in a definite spatial relation to the mass of the building, but the clear explicit grasp of the relation is a subsequent process going beyond perception and involving a rudiment of what we mark off as thought. In like manner when in recollection we recall a sequence of experiences, we may implicitly recognise one as following another; yet it is only by a process of thought that we explicitly single out this relation for special consideration.

The same holds good with regard to the all-comprehensive re-

lations of dissimilarity and similarity. A child in perceiving a particular object, say a tree, differentiates it from surrounding objects, other trees, the background of the sky, etc., and in recognising a familiar object as his toy, or as an orange, he assimilates it to previous like presentations. But in these cases the consciousness of difference and likeness is implicit only. It is some way from this implicit or unconscious discrimination and assimilation to comparison proper, issuing in a clear or explicit consciousness of a relation of likeness or of unlikeness.

It follows from this that thought grows by insensible gradations out of the lower intellective operations. The perception of objects in space, and still more, the recollection of events in time, is itself an incipient subconscious stage of the thought process, i. e. grasp of relations. Hence our demarcations of the spheres of sense and thought, of concrete or pictorial and abstract representations, are not to be taken absolutely. The germ of thought is present throughout, yet as we shall see presently it is a considerable step from the implicit to the explicit seizing of these relations.*

All such explicit grasp of relation involves a new direction of adjustive effort, or of (volitional) attention. Just as the analytic resolution of a complex demands a special effort in the way of limited concentration and resistance to irrelevant concomitants, so the comparison of two presentations in order to discern their relation imposes a further special task in the shape of a comprehensive grasp. The special difficulties of the process are manifest. Comparative attention to two presentations, say two colors in local, or two tones in temporal juxtaposition is not merely the carrying out of a simple adjustive process in one direction only, but the carrying out of a double and yet co-ordinated adjustive process.

The fact that there is a general tendency to simple modes of adjustment subserving a comparatively simple structure or pattern of consciousness, and the fact that complex simultaneous adjustments, as in the case of doing different things at the same time, and in that of the synthetic relating process of thought, are rare and acquired with difficulty, suggest that a special nervous process is involved,

*Cf. Lotze, *Mikrokosmus*, English translation, i. p. 655; Ward, article "Psychology," *Encycl. Britannica*, p. 75.

consisting of a double and divergent stream of innervation, each branch of which has to be kept going in certain relations of time, as also of proportionate strength, with the other branch.

The process of synthetic or relating activity just described may take the direction of consciously grasping the relations immediately presented along with presentation, and more particularly the co-existence of attributes in the same object, and the space and time relations of presentations. To note the juxtaposition of yellow and white in a daisy or the co-existence of its form and color, or the spatial inclusion of its yellow centre in an extended whole, is evidently to discern relations and so to carry out a process of conscious synthesis.

It is however in discerning the most comprehensive relations of likeness and unlikeness that thought shows itself most clearly to be a synthetic process. Thinking has in a special manner to do with the detection of similarity and dissimilarity or difference. Such relating by way of difference or agreement is what we ordinarily understand by comparison.

The relations of similarity and dissimilarity as comprehensive relations connecting presentations remote as well as proximate in time are spoken of as internal and thus marked off from the external relations of time and place. It is true as we have just seen that they are involved along with the latter. Thus in discerning the relations of the parts of an object, we must differentiate them. Yet the two modes of relating are distinct. I discriminate two colors in local juxtaposition not *quâ* juxtaposed but *quâ* different in their quality. The juxtaposition may greatly assist the discriminative process, but this circumstance does not make the juxtaposition and the qualitative difference one whit less distinct as relations.

It may be added that the greater comprehensiveness of the so-called internal relations is seen in the circumstance that the relations of time and place, just like the separate qualities or attributes of objects, are themselves modes of similarity and dissimilarity. Thus the relation of local contiguity between two elements is something *common* to these and other contiguous pairs. Moreover, it is evident that in such a case each element is recognised as having a different position from the other. Similarity with the temporal relations of events.

Comparison.—We may now glance at the operations here brought

under the head of comparison, the bringing of different presentative or representative materials before the mind simultaneously and keeping them in consciousness in order to note their relations of similarity or dissimilarity. Here as in the case of Analysis or Abstraction we shall illustrate the process by selecting relatively simple modes of the operation carried out on immediately presented sense-material.

Likeness and Difference.—We may here assume that likeness and unlikeness are two perfectly distinct relations. To apprehend a similarity between two sensations, say tones, is an intellectual process which we all recognise as radically unlike that of apprehending a difference.

Yet while the consciousness of likeness and that of difference are thus radically distinct, as psychical processes, it is evident that the relations of likeness and difference are presented together in close connection. As we all know similarity discloses itself in the midst of difference. This is obvious in the case of all complex presentations, as when we assimilate two objects on the ground of a color resemblance. Not only so, since even in the case of sensation-elements (e. g. color-sensations) likeness is a thing of degree shading off from perfect likeness or indistinguishableness to just recognisable affinity, it follows that here, too, likeness and difference are given together in mutual implication.

Since resemblance and difference are thus uniformly presented together, it is to be expected that comparison will commonly include the two processes, assimilation and discrimination. And this is so. We see likeness amid difference, e. g. a common trait in two faces along with striking dissimilarities. On the other hand we contrast two objects in respect of some *common* quality as color, form, beauty and so forth, which common element constitutes the ground or *fundamentum* of the comparison.

At the same time it is evident that the one process usually, if not in all cases, preponderates over the other. We are now specially interested in the likeness of two objects, say two faces, or two literary styles, the moment after, perhaps, in their differences. Accordingly we may say that comparison is the noting of likeness

against a dimly apprehended background of difference, or a difference against a dimly apprehended background of similarity.

Conditions of Comparison.—Comparison whether specially directed to likeness or unlikeness has certain common conditions. As in the case of Abstraction these conditions may be divided into objective, or those involved in the nature or concomitants of the presentations considered as external objects, or objects of common perception; and subjective or those connected with the nature of the individual mind. As I have given a full account* of these elsewhere, I must content myself here with a general remark or two on the subject.

Of the objective conditions the most important are the following: (*a*) There must be a moderate and favorable degree of strength or intensity in the presentations to be compared. We compare fairly bright colors better than very dull ones. (*b*) The common factor or *ground* of comparison must be sufficiently distinct. We cannot compare two tones in respect of pitch if this is unsteady. (*c*) Comparison is greatly aided by juxtaposition in space or time. Thus local proximity is a condition of a nice comparison of colors. With respect to temporal conditions it was found by Fechner and has been confirmed by others that immediate succession is more helpful to comparison than simultaneity. We compare sensations of weight, tone, etc., best of all when they are made to succeed one another.

With respect to subjective conditions, comparison will, it is obvious, be assisted by a good power of concentration. It will also be aided by a special sensibility for, and interest in, the particular sensuous material: witness the musician's comparison of tones as to pitch, purity, etc. Lastly reference may be made to special preparation or mental preadjustment. It is manifest that if we are expecting to see two things like one another we shall in general be more disposed to do so; similarly if we are on the lookout for difference.

It may be added that there is a special interest in likeness *as such*, and also in difference. Such interest predisposes a person to

* In *Mind*, x. p. 489 et seqq.

detect the one relation rather than the other. Hence the familiar observation that some people are particularly acute in seeing likenesses, e. g. in faces, whereas others are habitually more observant of differences.

Connection between Analysis and Comparison.—There is a close connection between the two directions of thought-activity just dealt with. To begin with, it has become evident that in the processes of comparison, analysis is always involved. Sometimes the analysis seems to precede the comparison, as when we are asked to compare two flowers in respect of their color. In other cases it appears rather as the result of comparison. Thus it is by successive comparisons of different members of a class of things, as flowers, that we gradually come to analyse out the common features of the group.

While comparison thus involves abstraction, abstraction even in the case of a single object may be said to involve the rudiments of comparison. Thus in analytically singling out for consideration the spherical form of a rain drop, we implicitly and subconsciously assimilate it to other previously known spherical objects. But for this vague imperfect accompaniment of assimilation, the analytic separation of the constituent would be difficult if not impossible. Such a subconscious reference to one or more similar things helps to direct the operation of analysis by intensifying and rendering prominent for the moment the particular constituent assimilated through the addition of an ideational element to the sensation.*

It follows that the thought-process is one process having two aspects or distinguishable factors. Either of these may become predominant according to special circumstances. In this way we obtain two varieties of operation, viz. Analysis or Abstraction, in which the recognition of likeness is subconscious, and Assimilative Comparison where the process of analysis is preliminary and subordinate to a conscious apprehension of likeness.

A somewhat like relation holds between analysis as a subconscious process of differentiation and a conscious act of discrimination. Thus in analysing a clang we must, agreeably to what was

* This is well brought out by W. James, *Principles of Psychology*, i. p. 434 et seqq.

said above, have a vague impression of the difference between one tone and another. And such subconscious differentiation readily becomes the starting-point in a full conscious apprehension by an act of comparing attention of the differences between the several ingredients.*

Thus far we have been occupied with the two fundamental processes in thought and we have illustrated these in their simplest form as employed about presentations or their equivalents, concrete representations. But as already pointed out what we mean by thought is the representation of things as classes or generalities. All the more interesting and momentous problems relating to thought, such as the question whether the lower animals think or reason as we do, have reference to such *general* thinking. We have now to examine the processes involved in this thinking.

These fully developed thought-processes are marked off by the use of what is known as the general idea or notion such as *man* or *virtue*. Such general ideas when reduced to a precise form as by the logician are spoken of as concepts. And since the science of logic assumes thinking to take place by help of such conceptual products we may also speak of these full or explicit thought-processes as Conceptual Thought.†

General Ideas and their Formation.—In seeking to trace the development of this general thinking we have first of all to consider the nature and origin of general ideas. It is evident that we only think about things generally in a distinct manner when we are able to form such ideas. Thus I cannot think out the proposition 'The mushroom is a fungus' until I am able to form the general ideas mushroom and fungus. The difficult problems respecting the nature of thought, its relation to language, and its extension beyond man

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* Stumpf uses the term Analysis for the mere vague detection of plurality of elements in a sensation-complex which he considers to be distinct from, and preliminary to a discrimination of them as different one from the other. *Tonpsychologie* ii. p. 104 et seqq.

† The use of such expressions must not, however, blind us to the fact that a concept strictly speaking is something logical, an *ideal* form of the general idea rarely if ever realised in our actual thinking processes. Of this more presently.

to the lower animals, have been discussed in close connection with the nature and origin of general ideas.

A general idea may for our present purpose be defined as an idea having a general import or reference. Thus a child's idea of dog, home, or father, becomes general when he consciously employs the term as the sign of this, that, and any other particular object which may answer to a certain description or be found to present certain characteristic attributes or traits; or, as the logicians express it, a general idea is a representation of a general class of things.*

Now it is evident that general ideas as thus defined are reached slowly and by degrees. It is exceedingly doubtful whether any of the lower animals possess them. The baby does not possess them and even after attaining to speech remains for a long time with only the rudiments of them. In their perfected articulate form as required for exact scientific thought they are confined to a few highly trained minds.

Generic Images.—The first stage in the formation of such general ideas is the welding together of a number of concrete images into what has been called a generic image. The idea tree or house may be taken as an example. Such generic images appear to be formed by a process of assimilative cumulation. Let us suppose that a child after observing one dog, sees a second. In this case the strong resemblance in the second to the first effects a process of assimilation analogous to automatic or "unconscious" assimilation. That is to say, the percept corresponding to the second animal is instantly fused with the surviving image of the first by reason of easily apprehended points of likeness. By such successive assimilations a cumulative effect is produced which has been likened to that

* The reader must be careful to distinguish the meaning of the term class as here used from its meaning when applied to a definite number of objects viewed as a collection, as a class of children in a school. In thinking of man as a (logical) class I do not represent a definite number at all; nor do I represent men as a collection. It would be more correct to say that I am representing in a more or less distinct way the fact that this, that, and an indefinite list of other things are related as like or answering to one description. How this mode of representation is effected will appear presently.

of the superposition of a number of photographic impressions received from different members of a class, (e. g. criminal,) whereby common features get accentuated and so a typical form is produced.*

Such a process of deepening and accentuating common traits and effacing individual or variable ones can only be looked on as a tendency never perfectly fulfilled. Interesting differences would in all cases tend to reinstate themselves. Thus my own generic image of a church happens to be a building with a tall spire, because the finest church in my native town was of this form. Recent examples would also tend to contribute variable peculiarities. Thus the baby's generic image of a dog might have the distinguishing characters of the dog last seen.

This process of cumulative assimilation would be largely passive and independent of those active processes of comparison, just described. It would further be capable of being carried forward (to some extent at least) independently of language. Hence we may, with some degree of confidence, attribute generic images to the child before he comes to the use of words and to many of the lower animals. Thus it is highly probable that a baby of six months forms a generic image of the human face out of the percepts answering to its mother's face, nurse's face, etc., and that when suffering from loneliness it has this image in its mind. Similarly a predatory animal may be supposed to compound a generic image out of the percepts gained from this, that, and the other specimen of his prey, so that when seized with hunger, this typical image is recalled.

In order to illustrate what is meant by a generic image, it is important to take the case of a pure representation detached from a presentation. Thus we cannot say that because a diving bird recognises a new sheet of water, it must have at the moment, a generic image answering to water. The recognition of a thing does not imply a distinct representation of the thing as previously seen. The presentative and representative ingredients are fused in this

* For an account of such composite photographic pictures, and their analogy to generic (mental) images, see Mr. F. Galton's *Inquiries into Human Faculty*. Appendix, "Generic Images."

case, or to express it otherwise, the image is latent and undeveloped. Similarly with respect to such rudimentary processes of conception or general ideation as those here considered. We can only attribute a developed and detached generic image to baby or animal when we have reason to think that these occur in the absence of percepts, e. g. in states of desire, in dreams, and so forth.*

Relation of Generic Image to General Idea.—The question still remains how far such generic images are, properly speaking, *general* ideas in the sense defined above. Is, for example, the typical face that is pictured by the lonely infant thought of as something common to this, that, and the other concrete object? Does it carry with it any clear consciousness of a general class of things? There is no certain proof that this is so. It must be remembered here that the mental image corresponding to one and the same individual object, as the infant's mother, is composite also and in the same way as the generic image. Thus the baby forms the image of its mother out of a number of practically unlike percepts, corresponding to varying appearances of the object in different positions, different light, different dress, and so forth.† Generic images accordingly differ not in kind, but only in degree (viz. proportion of common to variable feature taken up and accentuated) from particular or concrete images. And so long as they remain merely pictorial *images*, there seems no reason to attribute to them any general function or import.

The true process of conception, as generalisation or general ideation, that is a conscious representation of something as common to many as distinguished from one, involves the active processes of thought, analysis and synthesis, abstraction and comparison. It is only when the child begins consciously to break up its images to mark off this element or feature from that, and by help of such analysis discerns and demarcates common features that general thought properly so called, appears. In this way it reaches a dis-

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* The argument in support of the proposition that generic images, or (as the writer calls them) "recepts" are actually reached by the lower animals is ably set forth by Dr. Romanes, *Mental Evolution in Man*, p. 51 et seqq.

† Cf. Taine, *On Intelligence*, Part i, Book ii, Ch. 2.

tinct idea at once of an individual thing and of general or common aspects among individuals. We have now to examine into this true thought-process.

Transition to Conception Proper.—The transition from merely imagining to thinking proper is effected by processes of reflective attention in which abstraction and comparison play a chief part. In order to understand how this occurs we may suppose the process of automatic assimilation checked by the introduction of some impressive difference. Thus a child proceeds to play with a visitor's dog and finds it wanting in the friendly sentiments of his own pet. Here difference which, in the earlier stage of automatic assimilation, remained indistinct in the background of consciousness, is brought forward. The unlikeness of *morale* in spite of the likeness of *physique* is forced on his attention, the present percept is separated from and opposed to the image, and a step is taken in marking off likeness from surrounding difference.

As differences thus come into distinct view and impress themselves on the mind as the constant accompaniment of likenesses, a new and explicit grasp of likeness-in-difference ensues. This starts from a mental separation of the several perceptual constituents of the generic image, and a reflective comparison of these one with another, so as to demarcate common features or likenesses from peculiar features or unlikeness. Such comparison, or series of comparisons, begins with incomplete analysis and vague apprehension of likeness and ends in a more complete analysis and more definite apprehension of likeness. In this way, for example, the child waking up to differences among apples, goes back on his various experiences, and by noticing and setting aside variability of taste, size, etc., gets a clear grasp of the common essential features. Such a conscious active separation of definite points of resemblance from among a confusing mass of difference is what psychologists and logicians more especially mean by Abstraction.

Differentiation of Notions of Individual and Class.—As was pointed out just now the coexistence of likeness with unlikeness in the child's experience, may mean one of two things, viz. persistence or identity of one individual object, in spite of certain changes, or a

general similarity among a number of different individuals. The process of conception is sometimes described as if the child started with a definite knowledge of individuals and then proceeded to generalise or form a class-idea. There is, however, every reason for saying that the two modes of interpreting likeness-in-difference are reached concurrently and by processes largely similar. Thus it seems most reasonable to suppose that the baby which 'da-das' every bearded person it sees is as yet clearly conscious neither of individuality nor of generality. In other words we must not assume that it is stupidly confounding its sire with a stranger, or, on the other hand, forming an idea of a general class. At this stage the child merely recognises certain interesting similarities and proceeds to express the fact. We have to suppose that the clear apprehension of individual sameness is reached but slowly and in close connection with the first clear consciousness of different things attached by a bond of likeness.

To say that the child's knowledge begins with the concrete individual is not to say that it attains a clear consciousness of what we mean by an individual thing persisting and the same (in spite of change) before it begins to generalise. We must remember that the cognition of a thing as persistent and continuous is the result of lengthy and complex processes of comparative reflection. To individualise is thus to think just as to generalise is to think.* In truth, the psychological development of the idea of individuality proceeds along with that of generality, each being grasped as a different way of interpreting partial similarity among our percepts.†

The Process of Generalisation.—When once this differentiation of the individual idea from the class idea has advanced far enough the process of generalisation proper, or the grasp of common or general qualities, is able to be carried out in the way usually described by psychologists. That is to say, a number of individual things, rep-

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* Hence the logician can speak of the idea answering to a proper name as a singular *concept*. See Lotze, *Logic*, p. 34.

† The question of the priority in the individual of the knowledge of the individual or of the general class, the question known as the *primum cognitum* has been much discussed in connection with the linguistic problem whether names are first used as proper names or as general names.

resented as such, are now compared, the attention withdrawn by a volitional effort, from points of difference and concentrated on points of likeness (abstraction) and so a true process of generalisation carried out.

The common account of the process of conception here followed, as a sequence of three stages, Comparison, Abstraction, and Generalisation, rather describes the ideal form of the process as required by logic than the mental process actually carried out. As we saw above a vague analysis or abstraction precedes that methodical comparison of things by which the abstraction becomes precise and perfect, that is to say, definite points of likeness (or unlikeness) are detected. With regard to generalisation it has been pointed out that a rudimentary form of this process is involved in abstraction. To see the roundness of the ball is vaguely and implicitly to assimilate the ball to other round objects. It is to be added that an imperfect grasp of general features as such (commonly) precedes the methodical process here described. The child realises in a measure, the general function of the name 'horse' before he carries out a careful comparative analysis of the horse-characters. At the same time the use of the word generalisation is important, as marking off the clear mental grasp of the class-idea as such, that is the idea of an indeterminate number, of objects, known and unknown, answering to a certain description.*

Conception and Naming.—We have so far supposed that the processes of conception are carried out without any help from language. But it is exceedingly doubtful whether any such orderly process as that just described, the comparison of a number of percepts and the marking off of common attributes could be carried out without the aid of words or some equivalent. It is probable that even the clear grasp of individual things as unities and as permanent identical things, depends on the use of a name (proper name) which as one and the same sound seems to mark in an emphatic way the continued oneness of the object.† And the same applies still more manifestly to the apprehension of a general class of things. It is

*On the relation of Abstraction to Generalisation see Hamilton's *Lectures*. Vol. ii, Lec. xxxv.

†It seems to follow that animals cannot attain the clear consciousness of individual things as permanent unities, as we attain it.

certain that in later life at least all clear general thinking takes place by help of language. The general idea is held together, and retained by means of a name; and, as already pointed out, it is very uncertain whether in the absence of such general signs, the infant or the lower animal ever attains to a clear consciousness of the 'one in the many,' the common aspect of a number of different objects.

Is Generalisation Possible Without Language?—The question how far we can generalise or form a general idea apart from the use of names or other signs is one of the standing *cruces* in psychology. If we judge by introspective examination of our own minds we do no doubt now and again carry on processes of thought of a quasi-general character with little if any help from words. Yet it is doubtful whether we attain a clear consciousness of the *generality* of our thinking in this case. It must be remembered too that even if we can, as is alleged, employ a particular image or succession of images as representative of generalities without any aid from language (as when we intuitively follow the proof of a particular case in geometry and at the same time recognise its general validity) we are employing powers of thought that have been developed by help of language.*

If now we turn from the developed to the undeveloped mind, and ask whether children think apart from the use of language, we find the question exceedingly difficult. It has been alleged that a born mute reached prior to his mastery of a deaf-mute language the highly abstract idea of maker or creator and applied this to the world or sum of objects about him.† It must be borne in mind however, that born mutes make a certain spontaneous use of articulate sounds or signs, and such articulations, though unintelligible to others, and not even heard by themselves, may be of great assistance in carrying out the process of Abstraction. It must be further remembered that a child understands others' words and may probably make some internal use of them as signs before he proceeds to imitatively articulate them.

Lastly with respect to the lower animals, while it must be admitted that they display something closely resembling the germ of general thinking, it is manifest that we cannot in their case, be cer-

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* On the nature of such speechless thought see Venn, *Empirical Logic*, p. 147.

† See a very interesting account of the experience of a born mute by Prof. S. Porter, in an article "Is Thought Possible without Language?" in the *Princeton Review*, January, 1881.

tain of the degree of clear consciousness of generality attained. The actions of a fox caught in a difficulty and inventing a way of escape seem indistinguishable from those of a man thinking by help of general ideas and general rules: yet the mental process may after all be non-ceptual, and pictorial. It seems safe therefore to conclude that apart from verbal or other general signs the full consciousness of generality does not arise.*

Psychological Function of General Names.—A name is commonly defined as a mark or sign by the help of which the idea of a thing may be called up in our own mind or in the mind of another. Signs are either self-explaining, as in the case of a drawing, or an imitative gesture, or conventionally attached to objects as the larger number of linguistic signs or names, the symbols used in music, etc.† Language signs consist either of articulated sounds or other percept-producing movements, as the finger movements ‡ used by the deaf and dumb.

A name may be given to one thing (proper name) or to a general class (common or general name). In either case, as explained above, the name psychologically considered is the expression or indication of a similarity among our percepts. To name a thing is thus the outward manifestation of a process of assimilation.

The name (articulation-sound complex) becomes attached to the idea it stands for by a process of contiguous integration. Looking at it as accompanying and perfecting the process of assimilation, we may say that a name, whether as employed by ourselves or as heard used by others, becomes specially associated with, and so expressive of, some similar feature or features of our perceptual experience. Thus the name 'home' specially emphasises the recurring or constant features of the child's surroundings, the name

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*It must be remembered that some of the most intelligent of the lower animals, e. g. ants, have a system of tactual signs analogous to our language. On the whole subject of the germ of linguistic and conceptional power in animals, see Romanes, *Mental Evolution in Man*, Chap. v and following.

† Articulate sounds so far as imitative (onomatopoetic) words, are of course to be classed with self-explaining signs.

‡ On the general function and the possible varieties of language-signs, tone-language, gesture-language, etc., see Romanes, *Mental Evolution in Man*, Chap. v and following. Cf. Venn, *Empirical Logic*, Chap. vi.

'horse' the common features of structure in the objects so named. The name thus becomes specially attached to, and so a mark of the effects of superposition of common presentative elements in our experience.

This is well brought out in Herbart's view that the general idea is the result of "apperception," or the coalescence of a new presentation with previous like representations (apperceptive masses). Such apperceptive fusion or assimilation would according to Herbart help to explain the prominence or distinct emergence of the common element in a new presentation, and the falling back of the particular or variable features into indistinct consciousness.*

Use of Names in Early Life.—In the beginning of life linguistic signs are used in close connection with the process of automatic assimilation. Thus the recurrence of the presentative complex answering to a particular animal as the dog, calls forth, by a process analogous to a reflex movement, the articulation, let us say, of the sound 'bow-wow.' This use of words by the child to mark likeness is partly spontaneous, partly imitative. As is well known, children often invent names of their own, as their pet names for nurse, doll, and so forth, and their names for classes of objects, as when one child used the sound 'mum' as a name of eatables, generally, and another, the sound 'appa' as a name for this, that, and the other animal (kitten, chick, etc.). They also spontaneously extend the use of names supplied by others as when the sound "ba" (ball) was extended to a bubble and other round objects. This spontaneous use of names gives place in time to an imitative use of names as heard by others.†

From what we said above we have to suppose that names are used at the beginning neither as proper or Singular, nor as General names. They merely serve to mark off and register common features of the child's experience. As the processes of comparison gain in strength and the difference between the individual and the gen-

* See Mr. Stout's account of Herbart's view. *Mind*, Vol. xiv. p. 15.

† For interesting illustrations of children's spontaneous invention, as also of their extension of names, see Preyer, *Die Seele des Kindes*, 3er Theil; Pérez, *The First Three Years of Childhood*, Chap. xii; Taine, *On Intelligence*, Book iv, Chap. i, § 1; and Darwin's *Notes* on his child, *Mind*, Vol. ii. p. 285, et seqq.

eral class becomes distinct, the two uses of names as singular and general grow clearly differentiated. Thus the names Charles, Papa, Rose, and so forth, come to be marks of particular things, those organised experience-unities which are thought of as having continued existence independently of our intermittent percepts. Similarly, the general name, dog, man, and so forth, come to be consciously applied to a number of such object-unities on the ground of common attributes.

How Names Further Conception.—At first we find this use of general names confined to classes of objects having numerous points of similarity and so easily representable in the pictorial form of Generic Image, as "dog," "house," etc. Here, as pointed out above, the name is not used with a clear consciousness of its general character or function. Yet the very application of one and the same name to a number of percepts is an important aid to those processes of reflective comparison and selection of common features by which the apprehension of generality arises. To begin with, any use of a name to mark the result of an assimilative process, serves to call attention to and to emphasise the existence of like features. Not only so, the name being applied to each of a number of percepts is a valuable means of recalling these together, and so furthering that extended process of comparing a number of things which underlies generalisation. More than this, since the name from the beginning serves to emphasise and register the fact of likeness, it greatly facilitates the subsequent careful analysis and definition of the points of likeness. Of special service here is the hearing of names applied by others to a variety of things, as when a multitude of unlike things are called 'plants' and so on. Such announcement of likeness as yet undiscovered by the child serves as we know as a powerful stimulus to a comparative examination of the things and this urges the child on along the conceptual path.

The greatest use of general names, however, in connection with general ideation or conception is in definitely marking off and rendering permanent each new result of analysis and comparison. Thus on reflecting upon dogs with a view to see in what exactly they do agree in spite of their differences, and on gradually gaining clear

consciousness of this, that, and the other characteristic features of form, action, etc., a child demarcates and definitely registers these results of abstraction by help of the name. That is to say, the name is used as a defining mark as one might mark off an ill-defined local feature in a piece of board by drawing a chalk circle about the spot. When the name is thus definitely and exclusively applied to such products of comparison and abstraction it henceforth serves as a means of recalling these and keeping them distinctly before the mind.

When thus definitely attached by association to the points of similarity singled out by abstraction from a number of particular objects, the name is used as a true general sign. The image now takes on a much more definite function as a typical or representative image, through the circumstance that by help of the demarcating sign certain of its features stand out distinctly, and are at the same time realised as belonging not merely to one particular thing, but to what we call a general class. Thus the name dog, though probably still calling up an image of a more or less concrete character, that is, including traits of some individual dog or variety of dogs, becomes a general sign inasmuch as it throws prominently forward, and so secures special attention to certain definitely apprehended common class-features (the common canine form, action of barking, etc.).*

Used now in this way as a general sign of certain definitely apprehended points of likeness or common qualities, the name acquires the double function attributed to it by logicians. That is to say, it *denotes* any one of a certain order or class of things: the class or group being determined in respect not of the number of things included, but only of the common qualification or description of its number, that is to say of the qualities which the name is said to *connote*.†

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* Since the result of abstraction though representing concrete things does not represent them fully and explicitly we may, with Mr. Spencer, call the general or abstract idea a re-representation. See his *Principles of Psychology*, ii, p. 513.

† According to logicians a general name denotes certain things (members of a class) and connotes certain qualities in these things. For the terms denotation and

Formation of more Abstract Notions.—A similar process of comparison and abstraction clinched by a linguistic sign takes place in the formation of those general ideas which answer to few common qualities, and are altogether removed from the plane of the generic image, as for example 'animal.' It is obvious that we cannot compound a quasi-concrete image of animal as we can, roughly at least, compound an image of dog. There is no common form running through the vast variety of animals that renders this possible.* There is indeed an image-element here, for in thinking of animals most people probably image imperfectly one of the more familiar quadrupeds. Here the *general* representative function of the image is still more evident. A child cannot form the idea animal till he has attained a considerable skill in the use of verbal signs as general. For to represent animal (in general) is to repress the tendency to image particular concrete examples, and to give peculiar and exclusive prominence to a few properties, such as spontaneous movement, sensation, which can only be grasped by a special effort of abstraction; and can only be brought before the mind by the medium of a verbal sign.

These higher steps in the thought-process become possible by means of the verbally embodied results of the lower steps. It is after the child has formed the general ideas, dog, horse, and so forth, that he climbs to the more difficult, more comprehensive, and more abstract idea, animal. In this way, we may say with Hamilton, that language is to the mind what the arch is to the tunnel, the necessary precondition of all advanced thought-work.

It is not meant by this that the child progresses regularly from notions of a comparatively small range to more comprehensive ones. It must be remembered that it is often easier for a child to form an idea of a larger class or genus than of one of its constituent sub-classes or species, viz. when the form presents prominent easily discernible points of likeness, and when the distinctive features of the latter are obscure. Thus the child uses the name tree before

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connotation those of extension and intension are often substituted. See Jevons, *Elementary Lessons on Logic*, Lesson v.

* Cf. Lotze, *Logic*, p. 38.

he uses the name oak-tree, and so forth. This is what is meant by saying that the child sees likenesses before he sees differences.

In this brief account of the name-embodied concept reference has been made only to those names which grammarians call nouns, and of these only to such as are names of things. By the same mental process by which the child reaches the idea orange, it reaches the idea yellow, round, and so forth. The clear use of adjectives as qualifying epithets marks a higher stage of analysis than the first use of names, viz. the separating out for special consideration of *single* qualities in things. Hence in the imitative speech of the child, the first use of adjectives follows by an appreciable interval that of names.* This separate apprehension of single qualities becomes still more distinct when abstract nouns such as whiteness, height, come to be used. As the etymology of such names shows they come after concrete names in the development of the thought of the race and community, and are invented by help of such concrete names. The individual only acquires the use of these abstract names when intelligence has developed under the stimulating and controlling influence of education.

It is only when analysis is thus carried up to the point of a separate consideration of single qualities that the class-notion, the representative of a *group* of qualities, becomes definite and concise. A perfectly clear general idea of a class means one of the constituent elements of which we can separately attend to and name.

Conception as Dependent on Social Environment.—It is evident from this brief sketch of the development of the general idea that it is a process that is largely dependent on the action of the social environment. Language is pre-eminently the invention and instrument of social life. It is the medium by which we communicate one to another our ideas, wishes, and so forth. In the early years of life the undeveloped intelligence of the child is continually roused to activity through his desire to enter into the system of language

* One or two adjectives as ni-ni (nice) are used along with nouns from the first, but these probably so far as names are on the level of nouns, i. e. names of things as concrete wholes. It must not be supposed however, that the child or the race begins with a clear apprehension of any one class of words. The several classes of words distinguished by the grammarian are confused at first and are only differentiated as intelligence advances. All that is meant here is, that the child knows and names things as concrete wholes before it begins to qualify them, or discern particular qualities in them. On the differentiation of nouns etc., in the early use of language, see Romanes, *Mental Evolution in Man*, p. 219 et seqq. and p. 295 et seqq.

which he finds others using. In this way the results of ages of thought-processes embodied in the language of educated men and women are brought to bear on the growing mind, and these constitute a main ingredient in the educational influence of the community upon the individual. The profound and far-reaching influence of this medium of common word-embodied ideas is clearly seen in the arrest of intellectual development when contact with the general mind through language is excluded, as in the case of neglected deaf-mutes. As Professor Huxley says, "A race of dumb men deprived of all communication with those who could speak would be little indeed removed from the brutes."*

J. Sully.

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* Quoted by Professor Horatio Hale, in *The Origin of Language*, p. 42.

THE RIGHT OF EVOLUTION.

IN the Royal Academy's Exhibition which opened May 2, 1890, I remarked a fine picture of the Lord Mayor's Show. That Show is the monument of a mercantile evolution by which poor men,—one, 'tis said, with only a cat for capital,—clubbed together in guilds, largely socialistic, and, so increasing means, accumulated the wealth which controlled kings, and inaugurated the epoch of peace, so necessary for commerce.

But the Academy picture was not so striking as one I had seen the day before (May-day) in Hyde Park. There, amid a motley crowd with red and black flags inscribed 'Anarchy,' stood William Morris,—artist, scholar, and poet,—announcing to the workmen that they are slaves, rich men their owners, their natural enemies, and existing society a war.

The Guild-Socialism of London is past. Its gorgeous ghost may presently masquerade for the last time through November fog and London squalor. But the Hyde Park scene has its career yet to run. What its orators demanded was a new privilege. It was not the equal rights of labor, but privilege. This new lordship is to dictate my limits of education, my mode of production, my hours of work, my wages. The poet leader told the toilers that they alone did what was useful, all others were doing what was useless; the man who wrote "The Earthly Paradise" declared himself one of the mere "parasitic class," climbing and flourishing on the manual laborers. I did not see how his remorseless logic could have spared Shakespeare himself, and it appears certain that under this levelling scheme no dreamer, no poet, could ever have the culture,

or the leisure, necessary to bear his literary fruit. When the distribution of work and wages is left to a majority of the millions, will they agree that writing "The Earthly Paradise" is as productive as the mining of coal? Among these millions, how many fools, how many sots! Shakespeare drew, in Christopher Sly, a character familiar to us as to him. Christopher is taken, while in a drunken sleep, into a nobleman's mansion, and, on waking, is treated as a lord who has been wandering in his mind, fancying himself a boor. He is surrounded by liveried servants; his lady comes to welcome his recovery; he is feasted; a beautiful drama is performed before him. In the height of his glory Christopher calls for a tankard of beer; he drinks deep; and just as his players are entering on the poetic drama, Christopher rolls from his cushioned throne and lies snoring on the floor. Had it been left to Christopher Sly's vote to determine whether higher wages should be paid Shakespeare or the brewer, the bard might have come off badly. And were the wages of actors and actresses dependent on a government chosen by the masses, not only the Slys throughout England, but the millions remote from theatres, and the Methodists, Salvationists, Presbyterians, would certainly unite to close all theatres. Even Edward Bellamy "looking backward" finds no provision for a theatre. Little by little we should find ourselves in a prosaic world. Men and women would be born; they might eat, and sleep; they would die. But our little life might bid farewell to the beautiful dreams that clothe its dry bones with beauty.

Such is my impression of every constructive scheme of Socialism. I recognise the evils that give rise to such schemes; I feel their urgency. Their strong appeal to our humanity might silence criticism of their crudity, were their method evolutionary. We could then feel certain that every practical step would be traceable if not confirmed by experience. But when a theory adopts the revolutionary method, when it proposes a complete, irreversible overthrow of existing institutions; it is necessary to ask whether its own system would be any improvement on the old.

It may be said that English Socialism does not advocate violence. But violence is only an incident of revolution. There never

was a revolution in which the fighting did not come as a surprise. Those who inflame the masses with aims that cannot be gained but by bloodshed, are really advocating violence. Reforms of a political or a social system are secured peacefully, but a revolutionary subversion of the foundations in a whole nation can only come by war. It is a declaration of war to deal with the whole existing order with hostility, with acrimony and hatred, as wholly bad. Such order is thereby sentenced to death; its execution is merely a question of power.

Even supposing a revolution not attended by bloodshed, assuming it extorted from authority by fear of violence, what can be gained? What new materials, with which to make the earthly paradise? None. We see what men are, what motives now rule; such and such parties, politicians, official people, "400" people; a vast population of working people who have no definite principle of social equality, much less of fraternity. The mass, in the distance, may appear in solidarity, like the distant ocean; but, seen closely, it is made up of distinct waves. The bootblack looks down on the sweep, as the millionaire looks down on the tradesman. There is as much social inequality in Washington as in London. Revolutions pass and leave you the same old human nature. Whence is socialism to get a cabinet of angels who will administer the new order,—run the farms, public works, railways, and so on,—without selfishness, jobbery, personal ends, or corruption? And shall our schools train intelligence downward, so that it shall not rise above mediocrity? "The snow may fall level one day, the next it is piled into drifts." Property might be equally distributed this year; the next it would be in the hands of the cleverest. You seize a man by the throat and say "You've got to be fraternal." He may gasp out "I will"; but when his throat is free he will love you no better.

But we are told that the selfish forces of human nature, its tendency to social inequality, can themselves be revolutionised. It was so with the early Christians. Jesus was not a socialist, he advised tribute to Cæsar, and respect for those who sat in Moses's seat; but, some two centuries after his death, the Christians did give up their private possessions, and had all things in common.

The avowed cause of this, however, was that the world was just coming to an end. Why labor and accumulate in a world about to be consumed? No sooner did that superstitious expectation fade away than socialism ceased. The forces of human nature resumed their sway. Those forces,—the love of property, of luxury, competition, enterprise,—have since been dissolved, here and there, but only by similar superstitions. A hundred communities were formed for secular interests, about Robert Owen's time. They all failed. The only ones existing are those founded in the belief that this world is a wilderness of woe, destined to destruction, and heaven the only true investment. Such are the Oneida, Shaker, and Mormon communities. The modern socialists can appeal to no such superstition. And yet, though many of them believe themselves "infidels," their movement is the afterglow of Christianity. Their method is millennial. They look for the destruction of the old political world in much the same way as the early Christians looked for the destruction of the physical world. There is to be a grand transformation scene. Some Bellamy is to sound a trumpet, a lucifer match is to be scratched, and, puff! away go the pomp and glories of this world. The high are to be laid low, the low raised high, and a new social kingdom to be established.

All this, though uttered by some atheists, is supernaturalism. It is a survival from the millennial superstition. It is secular second-adventism. It will pass away like its forerunners, though it may like them cause revolutions. The socialistic fathers and their children will fall asleep, and the old world roll on much the same as before, diurnally, but on its moral orbit somewhat slower. For revolutionary changes invariably retard human progress. Because, while they cannot alter the inherited habitudes of a people,—their motives, prejudices, superstitions,—they give these unreformed feelings a new habitation, swept and garnished, so that the last state of that nation is worse than the first. So long as outgrown notions remain only in antiquated institutions, their error is demonstrated by their folly; their tumbling walls instruct them in new needs; and when at last the old institution falls, as it must, the experience induces adaptation of the new one to the forces that laid low the

old. When the outer embodies an inner reform, there is no reaction. The progress is permanent. Such is not the case when decrepit sentiments are suddenly given the sinews of youth.

This view is not speculative. It is derived from the study of revolutions. Near 250 years ago the English people began a revolution which presently beheaded the king, and disestablished the church. But monarchal superstition was not beheaded; religious superstition was not disestablished. In place of Charles I. was set up a monarch of unlimited power, whose little finger was heavier than Charles's whole body,—that same Cromwell whose massacres of people in Ireland is represented to-day in the one-sided feud that makes the curse of England. The disestablishment of a church, at least scholarly and picturesque, was followed by the inauguration of a primitive God of wrath, whose prophet was Calvin, and Cromwell his destroying angel. Bonfires were made of the most beautiful works of art in England. The finest statues and monuments were destroyed because a barbarian said, "Thou shalt not make a graven image." The revolution provided a fresh stronghold for the grossest prejudices and superstitions; and, despite the weakness of Charles I. and the faults of the clergy, the last state of England was so much worse than the first, that the revolution was reversed, the old monarchy restored, the church re-established, and the future of that country given to the forces of evolution.

The French revolution beheaded a weak king, and raised a monster in his place. Robespierre concentrated in his year or two all crimes spread through the history of tyranny. The masses threw down the Virgin Mary, and raised on her chief altar a goddess of Reason. Much pious horror has been expressed about that worship of a beautiful Woman instead of an image; but the real evil was the superstition, which, as it had beheaded a helpless king now shattered a helpless image, but without beheading itself—that is, superstition itself. The worship of the goddess Reason was entirely too reasonable; so she was set aside, and the revolution established a ceremonial worship of Nature, which consecrated all that was natural,—the passions, the revolutionary wrath, the natural desire to guillotine a Count, take possession of his house, drink his wine, and

imitate his revelries. Robespierre presently turned to butchering revolutionists too, if not submissive to him, so he was put out of the way. But the whole revolution naturally led to the destructive imperialism of the first Napoleon,—the enemy of mankind. He so paralysed the forces of progress that, even in 1848, the French had not learned the lesson of their first revolution. They tried another, and history repeated itself. They formed a revolutionary democracy,—that is, a disguised imperialism,—as they were soon shown. Their president proved to be an emperor, who destroyed liberty in France and Italy for twenty years, and nearly destroyed his country.

But what of America? It was from the romantic success of the American revolution,—a handful of colonists throwing off the yoke of England,—that France caught fire; and the revolutionary spirit in Europe has been kept alive by the magnificent material development of America. All these fruits of the century of independence are ascribed to our revolution; although the more astonishing growth of Australia, which had no white settler fifty years ago, might as justly be ascribed to the English throne. It is due to a false patriotism that Americans competent to do so have not exposed the superstitions about their country. To love one's native land more than humanity, is no better than to love a king more than our country. There appears to me nothing more important than that the world should be undeceived about America, whose political history is, really, the great warning against revolution,—a handwriting on the walls of the world, the misunderstanding of which is a peril to mankind.

The independence of America was a necessary thing, but it came in the worst way possible. The colonies resisted taxation, imposed by a parliament 3000 miles away,—in those days fifteen times that distance in time,—in which parliament they had no voice. The quarrel came to blows; but the colonists had no idea of separation from England, until Thomas Paine persuaded them that independence alone could end such quarrels. That was true, but it was a heavy misfortune, from which we still suffer, that independence was secured by war. The colonies had exhausted their resources in their success; but they had not exhausted England. The British govern-

ment, sore and humiliated, still held the north and northwest of America, commanded the force of the great aboriginal tribes, controlled the whole American coast with its ships. The Colonies, still confronted by the powerful enemy they had made, were compelled to unite for common defence. These colonies had radical differences, political, religious, commercial; some were free, some held slaves. But in presence of the common foe they had to unite at once, and sink their differences. When they met to frame a constitution for their union the majority had no notion of any constitution save that of England, and little accurate knowledge of that. What they framed was a crude imitation of the undeveloped English constitution of a hundred years ago. They made two legislatures because England seemed to have two; but made them equal, not knowing that in England the two were not equal. They supposed England was really governed by the king; so, having knocked down George III. they set up a monarch much more powerful, who to-day under the name of president possesses more power than any throne on earth. They formed a Senate, able to defeat the popular House.

The Senate is a peerage of states, in which New York has no more power than states hardly larger than some of its counties. This anomaly was advocated on the ground that in England boroughs of a few hundred voters had equal representation with others of many thousands. The old monstrosity, now the extinct "rotten borough" system, was here actually raised into a constitutional principle. Command of the Army and Navy, there nominally lodged in the crown, was really lodged with the American monarch, so that he may slip from his civil to his military throne, and rule by martial law. This powerful monarch is not elected by the people of the United States, but of the states separately, through electors proportioned to their members of Congress. Consequently, as New York has the greatest number of electors, the monarch in nine cases out of ten, is chosen by one state. The present President got a trifling majority in New York, and was elected. Mr. Cleveland received some 100,000 majority of votes in the nation, and was defeated. A popular superstition calls that the Great Republic. Since the electors ceased to be real electors, as the constitution intended,

and became mere messenger-boys carrying votes they never cast, this government is not so republican as is now that its revolution overthrew a hundred years ago. Even at its best our hasty constitution gave new lease to an England discredited at home, and a new lease to slavery, which had been decaying. Slavery entered its new stronghold, and ruled America for generations; had it not lost its head and assailed its own stronghold, it might be ruling still. Our much eulogised constitution, by its compromise with slavery, cost America a million lives, and a billion of money. And all of those evils, involving a steady degradation of our politics, are due to the fact that America got its independence not by evolution,—which would have surely secured it, leaving England its friend,—but by revolution, which made England its enemy; necessitating a premature, crude, military union; preventing the mature discussion and development which could have made the constitution an advance in political civilisation instead of a retrogression. When our fathers had swept English authority out of the country, they had not swept political superstitions, monarchal notions, out of it; so they re-enthroned in their garnished habitation the defects of the system they had fought. When Washington was presently both reigning and governing in America, when he was the idol of monarchs, with a petted courtier representing him in every European Court, poor Thomas Paine, who made the revolution, was a prisoner in Paris for trying to moderate the gory giant he had evoked; and pleading for something like the ministerial government of England, which was steadily adopting his principles of toleration, and the rights of man, by sure forces of evolution. By such forces,—by argument, petition, parliamentary influence,—England has secured something like republican government under its mask of monarchy.

When people are suffering, it is natural for them to attribute their sufferings to this or that institution which has an appearance of anachronism and injustice. But it is precisely when institutions are thus antiquated and anomalous that evolution is able to utilise them for an advance. The United States monarch is able to transfer office from his opponents to his supporters. He is powerful because he is removed every four years. He can claim that the

nation has freshly given him all that power. The English sovereign has no political power at all. The nation is governed by responsible ministers. The president may snap his fingers at a parliamentary majority; the English executive may be dismissed in a night. Why has the English monarch been thus deprived of power? The cause is traceable to its hereditary character,—that same hereditary character which seems so anomalous. It was found of old that the throne, because it was hereditary, sometimes fell to a baby, who could not rule. Grown up people had to act for the child. To escape interruptions of government, when the monarch might be incapable, ministers became essential; and thus ministerial government and responsibility were developed out of the antiquated hereditary anomaly. Popular government, in its development, was able to act through this elected ministry, and the monarch, though an adult, could not claim that he had the national authority behind him, except by accordance with an elected ministry. Moreover in a monarchy all classes are interested to reduce a power which only one family can enjoy; but under a presidency all are anxious to enhance the power of an office to which all may aspire,—especially where it is renewed every four years by an electoral revolution.

In England other antiquated things have subserved progress. For the very reason that hereditary legislation is anomalous, antiquated, the peers became weak; the "upper" house became "under," by an evolution that had been impossible had it been elective. But in this very irresponsibility to the popular vote lay that independence of popularity which gives their House weight as a debating and revising body. A further step in evolution, which should determine the exact number of times that the Lords might reject a measure, after which its passage through the Commons would make it law, might make the peers a useful body in checking popular passion and haste. Their independence causes the Lords to pass bills for opening Museums and Art Galleries on Sunday, which are killed by the Commoners for fear of the Sabbatarians among their constituents. This independence of the popular breath makes the House of Lords the source of a Supreme Court whose justice was lately shown by the redress it gave Bradlaugh at the very moment when

the Commons were inflicting wrongs on him, in fear of their sectarian constituents. The like may be said of another antiquated institution in England—the Church. By reason of its anomalous establishment in a nation of various creeds and a hundred and fifty sects, that Church is theologically disestablished. Subjected to the forces of political and ethical evolution, it is now preserving the vast property bequeathed by England's superstitious Past to its free-thinking Future, keeping it from being divided up among the sects, before the religious thought of the country has come of age to claim its endowment. The Church cannot spend this wealth for sectarian ends, precisely because that Church is antiquated, and without authority to represent spiritually the nation of to-day.

We might thus go through one after another anachronistic institution and show each subservient to agencies of evolution, whereas, if destroyed by revolution, they could only be succeeded by new institutions embodying, in stronger forms, the snobbery, the superstition, the sectarianism, still remaining in the country. It being certain, at the same time, that no revolution can possibly reach the troubles which alone could cause one. In England the troubles of labor are due to the fact that the birth rate is double the death rate. So long as paupers are multiplied twice as fast as they are removed, pauperism must increase. The more charity and medical care lower the death rate, the more they intensify the struggle for existence. In other swarming countries of Europe overpopulation once led to brigandage, but they are now largely relieved by emigration. This involves a steady flood of paupers to America, in addition to those spawned by native animalism. That evil may be checked when in welcoming the sound world, we shall quarantine the unsound world, —the diseased, the criminal, the ignorant. An immigrant without a dollar may be more safely admitted than one who cannot write his name.

We have a right to evolutionary legislation. We should prevent the congestion of our cities with paupers while millions of our fields are waiting to be tilled. New York will not be comforted, weeping for her children because they are not counted in the census. Rather should she weep for a multitude of those that are counted,—immi-

grants from its own slums as well as from the slums of Europe. Evolutionary legislation would prevent early marriage, and forbid marriage where there is no means of supporting offspring. Such unions are just as illicit as if there were no ceremony at all, and the children more cruelly illegitimate.

Until there is a high moral standard which shall restrain such cruelty to the unborn, Pauperism, prolific parent of both vices and crimes, can only be mitigated by a development of communal life. A hundred people, dining at a common table, can get the same dinner for ten cents each, that, separately would cost each twenty-five cents. That is, so far as food is concerned, communal life more than doubles every man's wages. There is no more reason why a poor family should support a kitchen of its own than that it should support a carriage of its own, instead of going in the omnibus. Gentlemen in their clubs get the advantage of wholesale prices, while the poor do not. The principle of combination is more largely applicable to lodgings also than is now the case. It costs far less to procure and keep clean one large tenement than a number of separate houses, to say nothing of the humanising influence, on manners and morals, of communal interests, and the social spirit so engendered. The home brute would be checked, the drunkard sobered, by amenability to the larger social censorship, and to a standard of communal conduct. When the working people have learned to utilise in normal life such combination as they occasionally use for strikes, they will find their means increasing enough even to strike, when necessary, with less recoil on themselves. They will also find that where institutions of that kind once take root, endowments and bequests seek them out, and make them centres of happiness and culture.

Political and social evolution must not be confused with natural selection: it is human selection. Some years ago a cotton-planter in Georgia observed that the leaves on one of his plants was unlike the usual leaf; it was divided as if into fingers. So far nature had gone. The planter added his intelligence. He concluded that such a divided leaf would let in more sunshine on the cotton. Also such a leaf would not be comfortable for caterpillars. So he searched

out one or two of these peculiar plants, transplanted them to a field by themselves; as they propagated, he plucked up those with the old leaf, cultivated those with the new,—and now these new cotton plants, finer than the old, free from caterpillars, are spread through many regions. That is human selection, based on natural selection, securing the fruits of evolution. It is just as applicable to man as to vegetation. A better man may be bred as well as a better kind of cotton. Already many old forms of crime have been largely bred out of society, by the substitution of imprisonment for thefts instead of the capital punishments which juries refused to inflict. Crime being largely hereditary, the offenders used to get free, and multiplied their bad species. But when punishments were assigned which juries were ready to inflict, the criminals were isolated for years, or transported, and their race diminished. The crime that now flourishes most is murder; because its death penalty survives. It was recently shown in Parliament that about three fourths of English murderers escape, mainly through aversion of juries, and merciful people, to inflict a savage and irrevocable penalty. Were capital punishment abolished the three fourths would be isolated for life. They would be kindly treated, but must have no offspring. No such survival of autocracy as a pardoning power could exist; no individual would be able to alter decrees of courts and juries. Instead of aiming at the murderer evolution aims at the murder. It will secure a survival of the peaceful, and breed ferocity out of man as it has bred the wolf out of dogs.

But that implies breeding the wolf out of our law. The eye for eye, blood for blood, spirit is wolfish. So is the whole revolutionary spirit, whether shown in armed violence, or in arbitrary laws. It can be acted upon, controlled, shamed out of society, only by pure moral and intellectual forces. There is no greater power than instructed thought, animated by love to man, enforced by honor and character.

There is as yet no civilised nation; civilisation exists in oases, which gradually encroach on the deserts. They have largely encroached on some of these already, but civilisation can only extend as it is real. The European nations are slicing up Africa among

them. This we are told is Christian civilisation : they are taking their neighbor's property only because they love him like themselves. What is the civilisation going out there? You can see it in the dens of European cities. The Africans have got to be dragged through all that. What kind of religion will go there? A Bible recording divinely ordered massacres will be put in every savage hand. Stanley says that when in sore trouble, in the African forest, he made a vow that if God would only help him, he would acknowledge his aid among men. His troubles began to clear next day. God was indifferent, it seems, so long as man and beast were suffering, but when this great temptation was held out to Jehovah—this promise of distinguished patronage—he at once interfered. There is nothing new about that God. In the Bible, his providence is always purchasable by glory. There are thousands of such gods in Africa. But Europeans are going there as representatives of civilisation, and will say to them in the name of German and English Science, in the name of Berlin, Oxford, and Cambridge,—"These be thy gods, O Africa ! Only agree to call their name Jehovah, who helped Jephtha, when he vowed a sacrifice which proved to be his daughter, and who helped Stanley on condition that the service would be reported in the press."

The intellect of Europe knows better than that; but it has very few organs of its protest against surviving barbarisms that devour the world under pretence of civilising it. And it forms few such organs because itself needs humanising. Just there America may lend a hand. Our science, our literature, and art, still lack moral earnestness, and human sympathy. The value of our every liberal moral movement and organ is therefore incalculable. It was a hopeful sign to see lately on the platform of the Ethical Congress in New York leaders in various denominations,—Heber Newton, President Andrews, Lyman Abbott, Rabbi Isaacs, Felix Adler,—uniting to establish a College for Moral Culture ; all admitting that the theological seminaries, public schools, and universities, had left them uninstructed in the great social, economic, ethical, and political problems which have now come urgently to the front. The prophets of Jehovah once said of Baal, "Peradventure he sleepeth."

The prophets of Jehovah now admit the same concerning their ancient Syrian deity. But the divine humanity is awaking. It will rise above prejudice and party. It will inspire no man to lay an axe at the root of his neighbor's holy tree because it is not his own, but to plant beside it one which they both agree is good, and agree to nourish, and which shall prove so fruitful, so sweet, that strength shall be drawn away from the roots of evil institutions, and they shall wither away. That which, assailed by revolution, is sure to be defended, and, if felled, to be reared again, evolution may gently wither by production of the more fit. The sacred groves of the Past may still cherish their traditional names, but, if not shattered by revolutionary lightnings, they will turn themselves to fences around the garden where fruits of knowledge and the happier life are growing.

MONCURE D. CONWAY.

A CONVICTED ANARCHIST'S REPLY TO PROFESSOR LOMBROSO.

I have read with much interest Professor Lombroso's article about the anarchists, and I found many things in it that are true, but also many errors. Even should we admit Professor Lombroso's theory to be correct, it would in the present case avail but little, because the portraits from which he made his deductions are not sufficiently truthful for his purpose. 'Schaak's' book is said to be a fictitious 'robber story,' and I am informed that it contains many untruths absolutely invented for ornament and decoration. It is in the highest degree improbable that such a book should not have caricatured the portraits of the anarchists. In books designed for sale to the masses, the illustrations are not, as a rule, of any value as works of art, even if the persons pictured in them enjoy the author's favor. The only true to life pictures are the photographs which Dr. Carus sent to Professor Lombroso, and these were taken in the county jail; but it appears that the Professor thought little of them, for he says, 'Perhaps these photographs were taken some years before the crime, when they were very young,' and the pictures in the *Vorbote* were drawn after the photographs, and are therefore of no account so long as the photographs themselves are accessible.

Certain as it is that vice, crime, and brutality very often find a characteristic expression of face, so equally certain is it also that prominent physiognomists very often judge inaccurately and falsely. There are many instances of this. In Mantegazza's work are found examples. Now, if it is difficult to arrive at a correct opinion under favorable circumstances, it is almost impossible to do so if

such pictures as those of Schaak's, with Schaak's explanations, form the basis and starting point of the inquiry.

Johann Most has an unsymmetric face; this however, is not the fault of nature, but of an unskilful surgeon. Of Engel I know nothing, except that he joined the socialists at an advanced age. In his earlier years he advocated anti-Socialistic ideas. After his first arrest he was set free upon the good word of Coroner Herz, who declared that he knew Engel for years as a quiet and well-behaved citizen.

With Lingg I was not on friendly terms, and therefore propriety demands that I keep silent about him.

Spies was born in the house of a forester, which had formerly been a *Raubschloss*. The connection between this fact and the other one that Spies twenty years later was converted to socialism by an American, is not very clear to me. He was undoubtedly the most gifted of all the indicted anarchists, and he had a most intelligent appearance; his forehead was well developed. Temperance in eating and drinking was one of his qualities, but as regards his intellectual activity, I regret to say that this was not the case. Many of his articles betrayed nervous over-excitement. In the beginning of the year 1886, all intellectual work was forbidden him by his physician, and for a few weeks he followed his advice. He was full of compassion for the poor and wretched, and he helped them wherever he could. Concerning his charities he observed strict silence. Any reference to them was disagreeable to him, and made him angry. A man who had once rudely offended him without cause, being in distress Spies obtained work for him. I came to the knowledge of this by accident. One of the employees of the *Arbeiter-Zeitung* who received but a small salary told me that Spies out of his own pocket gave him for some months $2.00 a week to pay a doctor and procure medicine. The salary of Spies was only $19.00 a week, and from this he supported his mother. Spies was of a very tender nature, and what his comrades thought of his blood-thirstiness may be gathered from the following anecdote. A certain man by the name of Matzinger had translated an article from the French, "The Day After the Revolution," and Spies asked an

acquaintance of mine, "What would you do the day after the revolution?" The answer was, "I should imprison you till all was over, for your sentimentality would prevent us from any energetic methods." The bystanders laughed ; Spies flushed and said nothing.

Fielden has been treated worst by Professor Lombroso. His father has been characterised as a sort of genius, and in closest connection with it, the Professor says, "Almost all the sons of men of genius are lunatics, idiots, or criminals." I hope the Professor, mindful of this, is not married.

If the term genius has so wide a meaning, the above statement is certainly incorrect. Goethe on his mother's side had very talented ancestors, and his father was extremely well gifted. The son of Goethe was a drunkard, but we know that this unfortunate inheritance came from his mother's side. The Darwin family was famous for two hundred years. The sons of Hegel and Schelling were also able men. Many more instances of that kind could be adduced ; and whenever a genius or his posterity goes to the wall, there are often external circumstances that cause it. The Fielden who became famous as a Member of Parliament at the time of the Chartist movement in England, was a relative, but not the father of Sam Fielden. Sam Fielden's father was a very intelligent laborer, who also took part in the Chartist movement, without, however, becoming very prominent in it. By the bye, the descendants of the first named Fielden are neither "lunatics, idiots, nor criminals," but wealthy manufacturers. And now to Sam Fielden ; no lunatic, idiot, or criminal could make the speech which he made when asked why sentence of death should not be pronounced against him, a speech concerning which Mr. Grinnell, the prosecutor, said that "had it been made to the jury, they would have acquitted him." Mr. Luther Laflin Mills, formerly States Attorney, declared in my presence that it was a masterpiece. That there was any criminal disposition in Sam nobody ever had any idea. He was nearly forty years old when arrested, and his wealthy employers considered him an honest man, and a harmless enthusiast of an amiable nature. He had become entangled in the Anarchist prosecution by a strange concatenation of circumstances.

Professor Lombroso's opinion concerning Fielden, formed by the study of portraits, stands in a strange contrast to the estimate of character made by the judge who tried and sentenced the anarchists. Three days before the execution Judge Gary wrote the following letter to Governor Oglesby:

Chicago, Ill., November 8, 1887.

To the Hon. Richard J. Oglesby, Governor of Illinois.

Sir: In the application of Samuel Fielden for a commutation of his sentence, it is not necessary as to the case itself that I should do more than refer to the decision of the Supreme Court for a history of his crime.

Outside of what is there shown, there is in the nature and private character of the man, a natural love of justice, an impatience at all undeserved suffering, an impulsive temper; and an intense love of and thirst for the applause of his hearers made him an advocate of force as a heroic remedy for the hardships that the poor endure. In his own private life he was the honest, industrious, and peaceable laboring man.

In what he said in court before sentence he was respectful and decorous. His language and conduct since have been irreproachable. As there is no evidence that he knew of any preparation to do the specific act of throwing the bomb that killed Degan he does not understand even now that general advice to large masses to do violence makes him responsible for the violence done by reason of that advice, nor that being joined by others in an effort to subvert law and order by force makes him responsible for the acts of those others tending to make that effort effectual.

In short, he was more a misguided enthusiast than a criminal conscious of the horrible nature and effect of his teachings and of his responsibility therefor. What shall be done in his case is partly a question of humanity, and partly a question of state policy, upon which it seems to me action on the part of your excellency favorable to him is justifiable.

I attach this to a copy of his petition to your excellency and refer to that for what he says of the change that has come upon himself.

Respectfully Yours,

Joseph E. Gary.

Professor Lombroso wrote his article with the best intentions, I fully recognise the fact; and certainly he was governed by the most humane motives. But even conceding the correctness of his theory he necessarily failed from the insufficiency of his materials.

One thing more, Anarchism is a collective term like Liberalism. People understand by it many different and sometimes contradictory

theories. That part of it which is not in harmony with human progress will fail, shall fail, and must fail, but that part of it which is good will live in spite of all. The mistake, however, which has been made in our special case will not again be made in America; and that also will be for the general good.

Joliet Penitentiary. M. SCHWAB.

THE PRINCIPLE OF WELFARE.

I.

IF we wish to discuss ethical problems in a fruitful manner and form just judgments of ethical theories, we must always bear in mind the fact that there is not merely one single ethical problem, but many. With the solution of one of these problems the solution of the others is not necessarily given, and thinkers who have treated a single problem have not, in dealing with that problem, always determined their position with reference to the others. At all events, it will be an especial and separate task to investigate the relation to each other, the reciprocal dependence or independence, of the different ethical problems. When we speak of *the* ethical problem as an especial philosophical problem, we must not forget that upon closer examination it resolves itself into a number of different problems.

The reason of this tendency to regard the ethical problem as simple and indivisible throughout, may be partly sought in the fact that philosophical ethics did not develop until the positive religions had lost their undisputed control over the minds of men. Religious ethics is simple and indivisible by virtue of its principle. It is founded on authority. Its *contents* are the revealed commands of authority; the *feeling* which impels us *to pass ethical judgments* is the fear or reverence or love with which men are filled in the presence of divine authority; the same motives impel man to follow in his conduct the commands of the authority; and the principles of the education of individuals and of the order of society are just as immediately given by definite relation to this authority. It is upon

the whole the peculiarity of positive religions and the cause of their great importance in the history of mankind that they grant man satisfaction in a lump for *all* his intellectual wants. The true believer has concentrated in his belief his whole mental life; his belief is at once the highest science, the highest virtue, the highest good, and the highest æsthetics. Philosophical ethics has sought too long to retain the simple unity which is peculiar to religious ethics. The mistakes of the greatest philosophical ethicists may be in part traced to this source. A criticism of Kant and Bentham would more fully illustrate this. The fundamental error—one so often found in the science of the past—is too great a love of simplicity.

I shall try, in the briefest possible manner, to give an outline of the most important ethical problems.

Ethical judgments, judgments concerning good and bad, in their simplest form are expressions of feeling, and never lose that character however much influence clear and reasoned knowledge may acquire with respect to them. An act or an institution that could awaken no feeling whatsoever would never become the object of an ethical judgment, could never be designated as good or bad. And the character of the judgment will be dependent upon the character of the feeling that dictates the judgment. From the point of view of pure egoism the judgment of the same act will be wholly different from what it is when regarded, say, from a point of view that is determined by motives of sympathy embracing a larger or smaller circle of living beings. An ethical system, accordingly, will acquire its character from the *motive principle of judgment* upon which it builds. This motive principle is the power that originally and constantly again gives rise to ethical judgments.

If our motive principle is to operate with clearness and logical consequence it must set up a definite standard. A *test-principle of judgment* must be established that will furnish guidance in individual cases by enabling us to infer consequences from it in instances where simple, instinctive feeling fails. The natural course will be that the test-principles will correspond directly with the motive principles at their base. The relation between the two may, how-

ever, be more or less simple. If we fix upon the feeling of sympathy as our basis, regarding it as the main element of ethical feelings, it follows of itself that the criterion we adopt must be the principle of general welfare, that is the principle that all acts and institutions shall lead to the greatest possible feeling of pleasure among living beings. This principle merely defines with greater precision what is unconsciously contained in the feeling of sympathy and in the instinct that springs from this feeling. The same test-principle (as Bentham's "Deontology," for example, shows) may also be accepted as valid from the point of view of pure egoism, only in this case the relation between the motive principle and the test-principle is more indirect. We must in this case endeavor to prove that the happiness of others is a necessary *means* to our own happiness. Our own happiness is then the real end, but in order to reach this end we must take a roundabout course, and ethics is the presentation of the system of the courses thus taken. Kant arrives in a different way again at establishing the happiness of others as an end of ethics. It would be the business of a special investigation to determine the extent to which this varying motivation of the principle of test must influence the consequences derivable from it.

A third question is, By what motive shall an individual act be determined? The *motive to action* is not necessarily the same as the motive that dictates judgment. The man who is animated with love for his fellow-creatures has reason to rejoice that ambition and the instinct of acquisition constitute grounds of action of so very general a character; in that results become thereby possible which,—for such is the unalterable character of human nature,—would otherwise remain unaccomplished. A special investigation would have to point out whether cases occur in which motive of action and motive of judgment must coincide if the act is to be approved of, and whether there are not motives to action which would rob the act of all ethical character.

Different from the problems already mentioned is the pedagogic problem: How can the proper and necessary motives be developed in man? This problem arises as well with respect to the motive

principle of judgment as with respect to the motive principle of action. It is clear that between points of view that rest upon entirely different psychological foundations, (the one, for example, starting from egoism, the other from sympathy, and the third from pure reason,) the discussion can be carried only to a certain point. The person who with conscious logic makes himself the highest and only aim can never be refuted from a point of view which regards every individual as a member of society and of the race, and therefore not only as an end but also as a means. If an understanding is to become possible, the emotional foundation adopted (the motive spring of judgment) must be changed; but the change is not effected by mere theoretical discussion: a practical education is demanded in addition thereto which life does not afford all individuals, although our inclination to make ourselves an absolute centre is always obstructed by the tendency of society to subject us all to a general order of things. There is an education of humanity by history the same as there is an education of single individuals in more limited spheres. This education demands its special points of view, which are not always directly furnished by general ethical principles. The same is true of the motive to action. For pedagogical reasons it may be necessary to produce or to preserve motives that do not satisfy the highest demand, because such motives are necessary transitional stages to the highest motives. Thus, ambition and the instinct of acquisition may be the means of attaining to true ethical self-assertion. Reverence for authorities historically given can be of extraordinary effectiveness in the development of character, since only thereby are concentration or fixity of endeavor as well as the power of joyful resignation acquired,—without our being able to see in such reverence the highest ethical qualities. A ground-color in fact must often be laid on before the final, required tint can be applied. The law of the displacement of motives operates here which in ethical estimation generally is of the utmost importance.

There must still be mentioned here finally the socio-political problem. This problem has reference to that particular ordered arrangement of society which is best adapted to a development in the direction of ethical ideals. As the former problem leads inquiry out

of the domain of ethics into that of pedagogics, so this one leads us from ethics into political economy and political science.

Although in the present discussion I intend to occupy myself only with a single one of these problems, I have nevertheless mentioned them all in order that the light that I shall attempt to throw upon the problem I deal with may be seen in its proper setting. As will be observed from what follows, the principle of welfare will be misunderstood if the problem to whose solution it is adapted is confounded with any one of the other ethical problems. The systematism of ethical science is still so little advanced that it is necessary to draw out a general outline before we pass on to any single feature. The value of systematism is namely this, that we are immediately enabled to see the connection of the single questions with one another as well as their distinctive peculiarity. In ethics we are not yet so far advanced.

II.

1) If we accept the principle of welfare as our test or criterion in judging of the value of actions and of institutions, these are then good or bad according as in their effects (so far as we can trace them) they produce a predominance of pleasurable feeling or a predominance of painful feeling in a larger or smaller circle of sentient beings. Every action may be compared to a stone thrown into the water. The motion produced is propagated in large or in small circles; and the estimation of its value depends upon whether it produces in the places it strikes predominant pleasure or pain. Just as theoretical science explains the single natural phenomenon by its connection with other natural phenomena, so ethics tests the single feeling by its relation to other feelings: the satisfaction of a person acting over the accomplishment of the act is only then to be called justifiable or good when it does not create a disturbance in the pleasurable feeling of other beings, or when such a disturbance can be proved to be a necessary means of a greater or more extended pleasurable feeling. This principle, as a principle of test or valuation, corresponds directly with sympathy as motive of judgment. The extent to which it is possible to accept this from other points of view I cannot here investigate in detail.

The act of estimation, the testing, does not stop at the outer action but goes down to the motives of the person acting, to the qualities of his character, to the whole inner life from which the act has sprung. This has its ground in the nature and significance of the estimating judgment. Ethical judgments, in fact, are in their original and simplest form spontaneous expressions of feeling. But the great practical significance of such expressions of feeling lies in the fact that they operate decisively upon the will (upon the individual will and that of others) and produce motives of future action. Logically, accordingly, they must be directed towards the point at which an altering effect on the power that produces the act is possible, and this point lies precisely in the inner life, in the character of mind of the person acting. For this reason feelings and impulses, disturbances and desires, are also judged of according to the tendency which they have of producing acts and effects that will increase pleasurable feeling or avoid unpleasurable feeling in more extended or more limited circles.

Only by its effects do we know the power. We form by inferences our conclusions as to what takes place in the mind of a man, his motives and his capacity. Goodness or greatness that never expressed itself in action could never become the object of ethical approbation; it would not even exist in fact, but would rest upon a self-deception, upon an illusion. At least some inner activity, a longing and endeavor in the direction demanded by the ethical principle must manifest itself. The individual in self-judgment must often take refuge in this inner activity, and any deep-going, unpharisaical ethical estimation will have to follow him there;* but just here do we have a beginning of that which is demanded by the principle of welfare, except that in consequence of individual circumstances its prosecution is impossible.

Equally important as the principle that we can know the power only from the effects is the other principle that the effect need not appear at once. When good and great men are so often mistaken by

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*Compare my article "The Law of Relativity in Ethics" in the *International Journal of Ethics*, Vol. I. p. 37, et seqq.

their contemporaries the fact is explained by the circumstance that only a very wide-embracing glance can measure the significance of their efforts and activity. Their goodness and greatness is founded in the fact that their thought, their feeling, their will, comprehend far more than their short-sighted and narrow-minded contemporaries see. A long time may elapse before it is possible for them to be generally understood, and for what they have done to be assimilated. It is therefore by no means implied in the principle of welfare that people are to direct their conduct so as to be in accord with impulses and wants which men have at the moment. The principle of welfare demands in very fact that we should not shrink from the battle with prejudice and with inertia. The best thing, often, that we can do for others is to make them feel that they stand on entirely too low a level in their wishes and wants and do not make adequate demands generally. Thus, to take a single instance, the great artist often treads a solitary path ununderstood or even mistaken by the great mass. Yet in so doing he follows, perhaps without being aware of it, the principle of welfare,—if he rigorously observes the demands of art. He increases the mental capital of the species, and gives it a power which later on can operate in broad spheres. Only a short-sighted conception and application of the principle of welfare stops with the need of the moment and dismisses the consideration of the permanent conditions of life and the permanent sources of new life and new activity.*

2) The principle of welfare simply furnishes a norm which may be laid at the foundation of the testing of all classes of actions. But it by no means demands, as has at times been supposed, that consideration for welfare should also be the ground and motive for every act. We have recourse to general principles only in order to be able to set ourselves aright in cases in which direct judgment, instinctive feeling cannot determine the question presented, that is in cases of doubt, or when we have in view a systematic treatment of ethical questions. The ethical feeling may operate quite involun-

* This last argument is taken from my *Ethics* (Danish edition, p. 94, German edition, p. 116).

tarily and without real ratiocination, in that we can be moved directly by the act (whether possible or real) as it appears to us, just as in our æsthetical feeling we may without æsthetical reasoning be struck by the beauty of a work of art or of a landscape. Or, we follow with confidence the "unwritten laws" that are contained in custom, in tradition, and generally in so-called "positive morality." And in agreement precisely with the principle of welfare, is immediacy of this kind to be recommended and maintained, so long as it does not lead to the neglect of real problems and questions. It is the state of innocence out of which no one dare be wrested unnecessarily. Abstract principles become necessary aids when direct reliance fails; but frequently they can only be applied to individual concrete cases by the employment of a great number of complicated intermediary steps, and do not easily acquire a practical influence upon the will. Indeed, the principle of welfare may even demand quite different motives from ethical feeling or devotion to the requirements of positive morality. It is in fact most beautiful and best that a man should care for his wife and children because he loves them and not because his ethical instinct requires it. Where conscious duty has to be invoked in the innermost relations between man and man, it is as a rule a sign of an unfortunate state of affairs. Perfect love dispels not only fear but also duty.

In his "Ethics," at page 339, Wundt advances the following objection to the principle of welfare: "It is conceivable that a person should sacrifice himself for another; it is conceivable that a person should yield up life and possessions for definite ideal ends, for his country, for freedom, for religion, for science. But it has never come to pass, and never will, that people shall renounce a thing solely to increase the sum of happiness of the world." This objection overlooks the fact that the principle of the valuation of an act that is regarded as good need not be the motive to this act. The thought and feeling of the person acting may stop very properly at country, freedom, or any other ideal object, without the person's instituting any formal reflections whatsoever with regard to the reasons of the value of the ideal ends for which he sacrifices himself. But in systematic ethics or in practical cases of doubt we inquire

what value and importance love of country, freedom, poetry, and science possess for human life. If, for example, freedom were not a good for a people, the individual would do wrong to sacrifice his life for it. It is never of course a question of the abstract notion of welfare of and in itself, just as in a single theoretical problem it is never a question of the abstract idea of cause. But in ethics we lay down the principle of welfare and in the theory of knowledge the principle of causality; endeavoring, thus, to go back through analysis to the final assumptions of our practical and theoretical intellectual activity.

3) It is no argument against the principle of welfare that pleasure must be so often bought with pain. Pain is in that case only the necessary transitional step, and the significance of the principle of welfare is precisely the requirement it makes that the duty of demonstration shall rest on those who maintain the necessity of such an intermediary step. Any infliction of pain must be supplied with a motive, whereas the feeling of pleasure in and of itself (that is if its causes do not at the same time produce additional painful effects) is justified. The principle of welfare simply says: Produce by thy conduct as much pleasure and as little pain as is possible! The degree to which it is possible to realise this demand, of this the principle in and of itself says nothing. A principle is not subverted by the difficulties of its application.

As experience teaches, there is a happiness that is not bought too dearly with pain. Clara's song in Goethe's "Egmont":

"Himmelhoch jauchzend, *zum Tode betrübt!*"

has been cited in disproof of the principle of welfare. But let us hear Clara to the end and note the last line of the song, in which she gives the result of the entire train of her emotion. She says:

"*Glücklich* allein ist die Seele die liebt!"

The phenomenon is this. There is a movement of the heart and mind, a life of feeling, which are joined with a satisfaction so deep and great that the powerful oscillation between pleasure and pain does not destroy the total feeling of happiness, but strengthens it. Two psychological factors co-operate here. The one is, that the

pain (the dis-pleasure or grief), unless it transcends a certain degree, forms the background of the pleasurable feeling and is thereby able to intensify the latter. In this very fact a sufficient motive lies to choose conditions of this sort in preference to such as do not stand so high in intensity but are nevertheless conditions of more unmixed pleasure. The other factor is, that there can be an element of attraction even in grief, simply because intense life, powerful movement, and the straining of faculties that come with it, produce of themselves satisfaction. All exertion of power which is not out of proportion is connected with a feeling of pleasure. The feeling of pleasure that accompanies grief and anxiety asserts itself in the fact that we do not *wish* to be transported out of it. An important element here is also the organic process connected with every powerful state of mind (the effect of the condition of the brain on the circulation of the blood, on breathing, and on the organs of digestion), granting that it is not the whole cause.

When Auguste Comte lost the woman who exerted so decisive an influence on the direction of his mind in the last period of his life, he said once in an outburst of sorrow evoked by her memory: "I owe it to thee alone that I shall not leave this life without having known in a worthy manner the best emotion of human nature. . . . . Amid the severest pains that this emotion can bring with it I have never ceased to feel that the *true condition of happiness* is, to have filled the heart—though it be with pain, aye with bitterest pain."

Auguste Comte and Clara are accordingly quite in agreement, and the ethics of welfare is in agreement with them both. If we desire to be wholly secure against pain and anxiety, then we dare not love anything. But what if love were the greatest happiness, even though it brought as much sorrow again with it! With powerful action and great fulness of life come also great costs, great contrasts, and great vibrations. Yet who has said that the highest was to be had for little expenditure?

The feeling of pleasure is the only psychological criterion of health and power of life. That which in all its immediate or remote effects in all the creatures that it touches produces only pleasurable

feeling, cannot possibly be condemned. Welfare, therefore, in the sense of permanent pleasurable feeling, is the final test-principle of action. Pain is everywhere the sign of an incipient dissolution of life.* This is exhibited in the simplest manner in the "physical" pain that arises through the tearing of organic tissue. But it also holds true of the "mental" pain that arises from anxiety, doubt, or repentance. It points to a disharmony between the different forces and impulses of the mind, a disharmony that can lead to the dissolution of consciousness. If pain is a necessary intermediary step, the fact is partly founded in the two psychological laws above mentioned, partly also in the circumstance that it means the dissolution of something in us that impedes a more free and more varied development of life. Childbirth is accompanied with pain because the new life can only come into the world at the cost of the old. Analogously the knowledge of truth is often gained with pain because prejudices and illusions must first be shattered. In the pain of repentance a lower self is dissolved in order that a new and higher self may develop.

4) A circumstance that has especially fostered the opposition to the principle of welfare is undoubtedly the tendency to think exclusively, in connection with the expression 'pleasurable feeling,' of the most elementary sensual forms of pleasure. The latter are not excluded by the principle of welfare; the principle, however, takes all the aspects of human character into consideration, maintaining that permanent pleasurable feeling is not to be established with certainty if an essential aspect of this character is neglected. The defect of elementary feelings of pleasure is that for the great part they correspond to only momentary and limited relations.

A being whose feeling is of a purely elementary kind can maintain itself as long as the simple conditions of life to which it is adapted do not change. Thus some of the lowest animal forms like the infusoria and rhizopods appear to have existed throughout infinitely long periods of time in exactly their present condition. Here

*Compare my *Psychology* (Danish edition, pp. 315–318; German edition, pp. 343–347).

the adaptation to the given conditions is as good as perfect. The same may be the case with beings that at an earlier stage of their development have possessed more developed organs and forms. Animals that live free in their youth, afterwards however as parasites, lead a purely elementary life and lose all the nerves and muscles that do not directly subserve this form of existence. This is also true of man. Of the Fuegians, whose wretched existence (wretched in our eyes) he portrays in vivid colors in his "Journey Around the World," Darwin says: "There is no reason for believing that the Fuegians are diminishing in number; we must therefore assume that they enjoy a sufficient measure of happiness (of whatever character this may be) to give life value in their eyes. Nature, which makes habit an irresistible power and its effects hereditary, has fitted the Fuegian to the climate and the products of his wretched country." Primitive peoples of a higher type even (and not only primitive peoples) afford examples of an adaptation to conditions which excludes all motives to change and progress. It is dire necessity that has brought man into the path of progress. Where such a compulsion does not operate human emotional life is conditioned by a narrow sphere of relations only and is therefore itself narrow and restricted. Perhaps more complete, more unmixed satisfaction can be obtained here than would be possible under more manifold and more complicated circumstances. A small vessel may be fuller than a large one although it holds less.*

It might perhaps be objected to the principle of welfare, that we should really be obliged, in consistency with it, to make ourselves all little vessels, and that agreeably to the principle an existence limited to the primitive necessities of life and to purely elementary feelings, would stand just as high as a life taken up with intellectual labor and the activity of culture, or even higher, since an existence of the latter kind could scarcely be accompanied with so unmixed and secure a well-being, but would be united with trials and efforts constantly renewed and with unrest ever recurring. If—

*Fieri potest, ut vas aliquod minus majore plenius sit, quamvis liquoris minus contineat. Cartesius, Epistola iv, Ad principem Palatinam de sita beata.

as it might be suggested—an existence like that of the Fuegians appears poor and wretched to us, since they often suffer from scarcity and want, let us take another example. Alexander von Humboldt came across a tribe in South America that lived from banana trees,—trees so fruitful that an acre of land planted with them would supply food for fifty human beings. The trees require no real expenditure of labor; only the earth about their roots must be broken with implements once or twice a year. The consequence is that the tribe is stupid and uncivilised. But the wants that it has are satisfied.

That which would make such a life unendurable for us, *the strong desire for activity, development, and progress*, this desire does not exist at such stages. It is,—a fact that must be remarked,—*itself a consequence of development and progress.*

Whereas Lamarck assumed an inner, innate impulse to development in all living creatures,* Darwin maintains, on the ground of experience, that development is invariably introduced by the influence of external causes. It was a difficulty to Lamarck how the very lowest forms of life could continue their existence, why they had not long since developed to higher stages. In Darwin's theory, which takes into consideration the external conditions of development, there is no difficulty on this point. A development that is favored *in no way* by external circumstances is simply impossible As regards human beings, the anthropologist Th. Waitz has clearly proved, that the impulse and desire of development is itself a product of development. To this effect he speaks in his treatise "The Indians of North America," page 69: "A people without intercourse and not in competition with other peoples, a people which supplies its natural wants with relative ease or only by overcoming long accustomed difficulties regarded as inevitable, directly from its natural environment, and that feels satisfied therewith and lives a happy life: from such a people it is not to be expected that it will make any endeavors to civilise itself. He that has what he needs and

* The theory of Lamarck is made the subject of an interesting criticism by Herbert Spencer in his *Principles of Biology*, Part iii, Chap. 3.

therefore feels satisfied in all respects, will not work; people do not civilise themselves voluntarily in following some noble instinct of the heart. Is it different in fact in our modern society? Is not a long period of schooling and culture previously necessary to instil in man an interest for work as work? How many are there among the so-called learned and cultured that make endeavors in behalf of the education of themselves and others without they are required!"

It is peculiar to the state of nature in contrast to the state of civilisation, (in so far as a distinct contrast may be asserted,) that in the former the impulse to change of manner of life and thought must come from without, whereas in the latter an impulse to progress operates which be it now powerful be it now feeble never ceases entirely to operate. This difference is analogous to that that prevails between inorganic and organic existence. It is the peculiar character of an organism that the play of forces is preserved in it with a certain independence of the effects of the moment and of its immediate environment. So in civilised peoples an impulse is aroused to change life in all directions, to differentiate, to shape it, and to bring it to a point in every single direction. Spiritual antennæ are grown which are in never ceasing movement. Through this a new species of feeling also is possible, *a feeling that is determined not only by the definite ends that are attained but which links itself with the work, with the activity itself which is requisite to the acquisition of these ends.* Man is thereby become more independent and more free, and his mental life, especially his emotional life, has gained in depth and intensity, it now being no longer determined merely by the external world, but essentially by the forces that are awakened in the inner world. Now ideal, and not merely elementary feelings act, and higher demands are made in life.

What I wish to maintain here is that *the rise of the impulse to development is in perfect accord with the principle of welfare.* That stability of the "state of nature" which now appears to us wretched now paradisian, is itself dependent on the stability of external conditions. Absolute stability, however, is not found in nature. If the immediate surroundings do not change, changes yet occur in other localities of nature and among other creatures, and the struggle

for existence then either causes them to perish or to change in a corresponding manner. The beings that have changed by adaptation will obtain a decided advantage in the struggle for life over those that have remained stationary. This is the fate of many primitive peoples, or indeed civilised peoples, that have remained stationary or in a low state of culture. Extinction awaits them when a higher civilisation approaches.

What is true of peoples and races also holds good for individuals. A perfect adaptation to limited circumstances always involves a danger,—the danger that the individual when its conditions of life are changed and its horizon is enlarged will lack the inner conditions necessary to self-assertion. Childish *naïveté*, dreaming phantasy, sensual enjoyment, have each their rights, but they easily lead to a condition of somnambulism ; security and happiness are always precarious here, and on awakening the greatest helplessness may take their place. Here, let us add, we leave entirely out of consideration the fact that such a condition often exists only at the cost of other individuals.

Welfare, accordingly, cannot be conceived as a passive state of things produced once for all and that is not itself in turn the point of departure of new and progressive development. Welfare, in the highest conception of it, must consist of a condition in which power is gathered and rich possibilities gained for the future, and which generates an impulse to frame new ends and to begin new endeavors. It is a condition that is desirable in and of itself as well as one that contains the germ of new desirable conditions,—a condition therefore that is not only an end but also a means, that has value not only as effect but also as cause. The feeling of pleasure is here directly bound up with activity, work, development, the unfolding of forces themselves, and not merely with the result that is obtained by the employment of the forces. Where such feeling of pleasure is possible there much suffering is endurable that at a lower stage would be the sign of the dissolution of all life. Expectation and longing, privation and disappointment will not be lacking ; they will accompany with definite rhythmical alternation the joyful advancement toward the aim that man has set himself ; but amid all

oscillations the fundamental direction and the fundamental activity will be asserted. We will not work to live, we will not live to work; but *in* work will we find life.

This is the ideal that the principle of welfare holds up to us when thoroughly reasoned out. In how far it can be realised is a question that can only be answered experimentally for the time and the individual in question. It demands not only a change of the nature of individuals but also of the relations of society. The essential thing however is, that we here have a criterion by which we are able to test actions and institutions. This criterion corresponds to a tendency that leads throughout all organic nature, in that pleasure as a rule means life and progress, pain, retrogression and death. The principle of welfare asserts the right of life: every creature has the right to exist, to develop, and to obtain its full satisfaction, unless greater pain is thereby produced to itself or to others. The ethics that builds upon the principle of welfare seeks accordingly to continue the evolution of nature in a conscious and harmonious manner. It demands that means be found which the unconscious development of nature have not supplied, and it strives to mitigate or to exclude the unnecessary pain which the struggle for existence brings with it. It embraces a series of problems from compassionate alleviation and assistance up to the highest social, intellectual, and æsthetical endeavors. It is the business of special ethics to treat these questions in detail.

5) From the fact, however, that welfare, properly understood, consists in activity and development, it does not follow that *vice versa* activity and development are always joined with welfare or lead to welfare. Because limitation of wants does not always lead to the aim set, unlimited variety of wants is not necessarily the proper state. Civilisation can assume forms and enter on paths that do not harmonise with the principle of welfare. We find in history accordingly, at times, distinct and decisive warnings against existing civilisations. Thus it was in Greece on the part of Socrates, the Cynics, and the Stoics, in the eighteenth century on the part of Rousseau, and in our day on the part of Leo Tolstoï. The opposition of such great minds should surely make us watchful.

I leave out of consideration here the question in how far that which we call civilisation can be imparted to a people forthwith. The capacity for civilisation has, it is true, been prematurely and overhastily denied many primitive peoples.* But it is not therefore necessarily a good thing for a people to give up the forms of life that it has developed by its own fortunes and endeavors to allow itself to be regulated in accordance with forms and ideals that have been developed under entirely different circumstances. Thus directly, even the best-founded and most perfect civilisation cannot be communicated. Waitz who expressly maintains that no proof has been brought forward of the Indian's incapacity for civilisation, praises nevertheless the Indian chieftains who oppose the obtrusion of civilisation on their people, for their love to their people and their just comprehension of its true well-being.

The reason why conflict can arise between civilisation and welfare lies in the restiveness and restlessness of the aspirations of civilisation. It is the same with it as with that spontaneous, involuntary impulse to movement that leads to the use of forces and of the members merely because sufficient energy is present, without their use being guided by the consideration of a more valuable end, so that the results are accidental. The effort that goes with civilisation may lead in part to over-exertion, to an overstraining of forces ; in part (in the case of extreme differentiation) to a one-sided direction of effort ; and partly to isolation, to the fragmentary elimination of individual activities. In the single individual certain faculties are fostered (in the one intelligence, in the other physical power for work) at the cost of other faculties ; the harmony, the capacity of feeling oneself as totality and unity is lacking. By such one-sidedness the individual becomes of value only as a wheel in a great machine : he serves merely as a means, not as an end. And such a one-sided individual development is connected with a one-sided social development. The suppression of certain features of the nature of the individual goes hand in hand with the suppression of single estates and classes of society. If we identify civilisation and ethics, without qualification,

* Compare my article in the *International Journal of Ethics*, No. I. p. 60.

and regard progress as a safer criterion than welfare, we should overlook the fact that there exists also a *social question*. The social question is an ethical question and at the same time a question of the correction of civilisation,—both by means of the principle of welfare. Would it be right that the products of material and ideal civilisation should only fall to the share of a small minority, while all the rest should not be able to participate therein? This would clash completely with the ideal of society that flows from the principle of welfare. For the greatest welfare is present when every single individual so develops himself in an independent manner that just by this independent development of his own he assists others to a similar development from their point of view. Then does there exist *a harmonious society of independent personalities*. The idea of such a society is the highest ethical idea that flows from the principle of welfare. Every individual is then a little world for himself and yet stands in the most intimate reciprocal connection with the great world of which he is a part. The individual serves the race and the race serves the individual. Every position of isolation, every inequality in the distribution of possessions and of employments must be founded in the demands of the various circumstances and problems of life, and the faculties and impulses of each individual shall be developed as fully and richly as is compatible with the conditions of life of the whole race.

6) It follows from the considerations presented, that it is by no means always easy to apply the principle of welfare in individual cases. The particular relations of the affairs in question can be so complicated that we are not able to take a broad survey of them and foresee the results of our interference. We cannot deduce *a priori* from the principle of welfare any system of particular acts, any determinate order of society, any civilisation. Its value (like that of the principle of causality in the theoretical field) is to present and to formulate problems, and to serve as a guide to their treatment. It is regulative, not constructive. It presumes the immediate involuntary life of the individual and of society, and its function does not begin until the conscious discussion and treatment occurs of the value on the one hand of that which has thus been developed, and

on the other of the manner in which the development shall be conducted in the future. All ethics thus acquires an *historical* character. We never—either in our own individuality or in society—commence from the very beginning, but are always obliged to start with a definite foundation and to work our way further under the guidance of the principles and ideals that spring from our nature.

III.

1) In the previous remarks I have essayed a discussion of the principle of welfare which may perhaps make clearer what was not so distinct in my former expositions ("Ethik," Chapters III and VII). The difficulty always occurs in the enunciation of a principle, that a direct demonstration of its validity cannot be given. Of so much greater significance is it then if an indirect proof can be adduced by showing that the very ones who contest it are themselves forced to employ it and actually to employ it without being aware of it.

I maintain now that Dr. Paul Carus in his book "The Ethical Problem," in which he combats the principle of welfare, has not been able to avoid giving such an indirect confirmation of the validity of this principle. Before attempting to show this in detail I shall make a few remarks concerning the criticism of my "Ethics" which Dr. Carus wrote in the first number of *The Monist*, and which in an abbreviated form is also embodied in the treatise above mentioned.

Dr. Carus thinks that I have practically surrendered the principle of welfare when I define welfare to consist in activity. His words are:

> "If welfare is to be interpreted as activity, work, development; if this kind of active welfare is the greatest good, whatever admixture of pain and whatever absence of pleasurable feeling it may have; if the greatest amount of a state of continuous pleasurable feeling is not welfare in an ethical sense, what becomes of the utilitarian definition of welfare as pleasurable feeling? If, however, welfare is 'the state of a continuous pleasurable feeling,' how can we declare that the life of a pessimistic philosopher is preferable to that of a joyful fool?"

To this I answer, that *if* it could be proved that increasing pain followed necessarily on *all* advancement of civilisation (without this pain being compensated for, as Clara's philosophy demanded, by new and proportionately greater feelings of pleasure), in that case it

would be impossible to combine civilisation and welfare. But only a pessimistic dogmatism—which is just as current in the atmosphere of to-day as optimistic dogmatism—could assert this. What experience teaches us is this, that we find ourselves amid a development, in a line of tendencies the final results of which we cannot foresee but which hitherto have evoked at many points new forces and have thereby opened new sources of satisfaction. Everything that arouses our greatest and most permanent pleasurable feeling has arisen within this development. This justifies our courage and our hope in behalf of further progress, although conflict and pain will as we may foresee not be wanting, and although the way leads through many deserts. Experience alone can show how far we shall be able to get. I agree with Dr. Carus that "this world of ours is not a world suited to the taste of a pleasure-seeker," if we understand by pleasure passive sensual enjoyment, an enjoyment which is not united with the rest and nourishment with which not only an immediate pleasurable feeling is connected but whereby power is also gathered for continued endeavor. If so many pleasure-seekers go through life without having their eyes opened to its true significance and purpose, this fact is precisely one of the things that clash with the principle of welfare, for the latter claims all faculties and powers, and demands that they that sleep be awakened,—that is if they really possess useful faculties. For perhaps the "joyful fool" cannot accomplish more than he does. Wherefore then disturb him, if his pleasure harms neither himself nor others and if his awakening will only lead to unrest and pain for himself and perhaps also for others? I pointed out the fact in my "Ethics,"* that we can determine by the principle of welfare alone in what cases we are to destroy a state of equilibrium or shatter an illusion.

I have admitted the *possibility* of a conflict between civilisation and welfare. Wherever such a conflict arises, there, according to my conception, appears an ethical problem, which must be determined by the principle of welfare, since any order of things or any development that brought with it permanent and everlasting pain

* Danish edition, p. 94. German edition, p. 109.

would be in effect a dissolution of life itself. Such pain, however, (as even pessimistic philosophers are optimistic enough to hope,) would destroy the will to live. If we live in spite of pain it is because there is always a surplus of satisfaction.

I give the idea of welfare no arbitrary extension when I deny that it should be limited to denote a passive condition produced once for all time. For our nature is at no stage wholly complete; no one condition can stand therefore as definitive. The future, and the new horizons opened, will make new demands on our capacities and our will, and in the testing of any state of things it must accordingly be a necessary point of view to establish whether in addition to the direct satisfaction which it probably affords it at the same time prepares the capacities and the possibilities of a continued development answering to the new relations. It may be necessary to choose some arduous employment which later necessarily brings with it long continued rest and inactivity. Darwin's struggle with his feeble health is a good example. The man who from love of country or to save a fellow-being risks his life, prefers the active satisfaction of a single moment (the satisfaction, namely, which he feels beforehand at the thought of saving his country or a human life) to the passive joys of years and years. It was such a moment in which Faust saw himself living in mind

"Auf freiem Grund mit freiem Volk"

and which thereby made life of value to him, which all the earthly gratifications that the demon was able to obtain for him could not accomplish. In the face of the pleasure that such a moment can produce the thought of pain and death vanishes. Thus alone is self-sacrifice psychologically intelligible.

2) While I cannot see that Dr. Carus has pointed out a contradiction in my theory of welfare, I may further assert that he himself cannot without a self-contradiction escape recognising the principle of welfare. Dr. Carus indeed, in a certain sense, himself enunciates this very principle. He says, in the preface to "The Ethical Problem," page iii, "The aim of ethics is neither the welfare of self nor that of other individuals, but of those interests that are superindividual." The aim therefore is to be welfare, not however

the welfare of individuals but of "superindividual interests." This strange expression is defined in certain subsequent passages of the book. Dr. Carus speaks, namely, later on, of "that superindividual soul-life which we call society."* It is admitted in this, that when we speak of welfare we speak impliedly of soul-life. But how can we give to society as such a soul-life that is different from the soul-life of the single individuals that have their existence simultaneously and successively in that society? This is merely a mythical and mystical personification of society, which may have arisen in the comparison, in many respects instructive, between society and an organism, which however can possess at best a poetical, but no scientific, value. The idea of society, if it is to be scientifically employed, must always be so applied that at every point the definite group of individuals which it represents may be established. The great importance of this idea consists in the fact that it expresses the common and permanent interests of individuals simultaneously and successively existing, in opposition to the interests of single individuals, or of a smaller group, or of a limited period of time. Ethical perception, (unless it starts from the point of view of egoistical individualism,) must apply its test from the point of view of society. It leads in this case to the consideration of our own and others' actions not only with respect to our own individual circumstances but *sub specie æterni* so to speak, that is with respect to their relation to the great whole of which not only we, but also other human beings are parts. Along with the educative power of authorities, it is due to the sympathy in virtue of which the individual causes to re-echo in his own bosom the feelings of others, that ethical ideals have been formed in the human mind. But as soon as it is made impossible to transpose the idea of society into the idea of individuals that live under certain definite conditions, this idea contains no instruction for us in ethical respects. No ethical norms can in this case be deduced from it. Emotional mysticism takes the place of ethical thought and volition.

Such a mysticism has of course its value. Powerful emotion

* Pages 33, 38, and 40.

leads naturally to a state in which all definite ideas recede, the mind becoming entirely occupied by emotional feeling. It will furthermore be difficult to represent by any adequate conception the great multitude of human characters on which our conduct in given circumstances can acquire decisive influence. The expression 'society,' or 'race,' characterises very well the unconcluded and the unsurveyable in so many of the consequences of human methods of action and order of life, and it will therefore not be possible to dispense with it. But transposition into concrete conceptions must always be possible. A welfare that at one or another stage is not the welfare of definite individuals is a self-contradiction, and any act that at one period or another does not lead to the welfare of definite individuals has no value.

In Wundt's "Ethics," pages 429 to 431, the same line of thought is found as this of Dr. Carus. Public well-being and progress, according to Wundt, do not consist in the well-being of the greatest possible number of individuals : for the individual is ephemeral! "However richly blest and however perfect the individual existence may be, it is but a drop in the ocean of life. What can individual happiness and individual pain mean to the world?" I should say to this : Yes, it is true, the ocean does not exist for the sake of the individual drops ; but what is an ocean that does not consist of drops? And is not the whole ocean clear if every single drop is clear? And only then is it *wholly* clear.

Just as there are people who cannot see the woods for the trees, so there are also people who cannot see the trees for the woods. In ethics this method of conception leads to the consideration of human aspiration as the means of superhuman ends. Every ethics that seeks to stand on a basis of experience and remain within the possibility of progressive verification, must cling to the standpoint of "man with men." It need not for this reason overlook the fact, that ethical conduct, like all unfolding of power, is connected with the universal world-process.

3) Dr. Carus also approaches the principle of welfare upon another, less mystical path. He maintains, with great emphasis, that ethics must be based on facts, on insight into the real, the actual,

order of nature. Our ideals—this is the opinion of Dr. Carus—arise through the wants which the relations of reality awaken in us, and must be realised by the means which the relations of reality supply.

"The new ethics is based upon facts and is applied to facts" (p. 18).

"Man wants something, so he conceives the idea how good it would be if he had it. . . . Only by studying facts will he be enabled to realise his ideals" (pp. 19 and 20).

"If you wish to exist, obey reason. Reason teaches us how to regulate our actions in conformity with the order of natural laws. If we do regulate them in conformity with the order of natural laws, they will stand; otherwise not. In the former case they will be good, they will agree with the cosmical conditions of existence; in the latter case they are bad, they will not agree with the cosmical conditions of existence; therefore they will necessarily produce disorder and evil" (pp. 31, 32).

It appears to me clear from this, that the reason why we must regulate our actions to conform with natural laws, must be the fact that otherwise they cannot "stand," which is explained more in detail in what follows, to mean that they are constituted to produce "disorder and evil,"—which in its turn must be surely understood as meaning that disorder is itself an evil. If disorder were no evil, and if no further evils resulted from actions which are not "in conformity with the order of natural laws," what foundation would Dr. Carus in that case be able to give his ethics? I wholly agree with Dr. Carus that our conduct if it is to be ethical must support itself upon as profound a comprehension of the relations of reality as physical science, psychology, and social science alone can furnish. But *this requirement can only be made good through and by the principle of welfare.* It has validity only for the person who wills that his conduct shall "stand" and produce no evil, either in extended or in limited circles. If pain and death were not evils, this requirement would have no validity.

To judge from his somewhat indefinite expressions one might suspect in Dr. Carus here a votary of egoistic hedonism, were it not that a number of other passages in his book exclude this suspicion.

However, it seems quite clear to me that his final criterion must coincide with the principle of welfare. His ethics is an ethics

of expediency, in that his ultimate criterion is the influence of actions on the life of mankind.

4) Dr. Carus justly emphasises the relation of ethics to our world-conception at large. But this connection does not mean that ethics can be derived by deduction from a philosophical system previously given. Ethics is an independent discipline which starts from its own peculiar assumptions (which cannot of course stand in contradiction to other established assumptions), although it is obliged to make much use of the results furnished by other sciences. Ethics has an independent foundation in the laws of feeling and volitional life, just as the theory of knowledge has its foundation in the laws of sensations and perceptions. In conformity with the law of economy, (which must prevail in science even though it should not prevail in nature,) we must restrict the established postulates of the single sciences to the least possible limit. If after doing this agreement between the single sciences finally occurs, this result will be all the more valuable.

According to Dr. Carus ethics is to be derived now from a philosophical total world-conception, as according to his view ("The Ethical Problem," p. 71) it originally arose through the influence of the positive religions.* Very weighty objections can be made in my opinion against this latter assumption. It is a fact that the lower a religion stands the less ethical character it possesses, and the very lowest religions it is probable possess no ethical value whatever. The question then arises how religion gradually acquired its ethical character. The ethical ideas which were perceived in the nature of the deity must have had a natural origin, and this origin can be sought only in the life of man with men. The ethical norms and ideas developed themselves here spontaneously and have been just as spontaneously projected or hypostatised as the attributes of divinity. In the history of the religion of Greece we can see clearly exhibited the development of gods as powers of nature to gods as the expression of an ethical order of nature. Compare for instance,

*Dr. Carus expresses himself differently in *The Open Court* (1890, p. 2549), where religion and ethics are called twins; whereas in *The Ethical Problem* the latter is the daughter of the former.

the Dodonæan and the Homeric Zeus with the Zeus that appears in the ideal belief of Æschylus. The experiences are made in human life that lead to the formation of divine ideals. Gods grow better and more gentle according as men themselves grow better and gentler. Religious conceptions are idealised experiences. If religion is a factor in the development of ethics it is because man conceives and represents his essential ideals in a religious form. The movement proceeds therefore from experience to experience; that which acts on nature is, as Shakespeare says, always an art that has been produced by nature itself. How could man understand the meaning of the ethical qualities attributed to his deities if he were not acquainted to some extent with these qualities through experience?

That which distinguishes philosophical from theological ethics is not the fact that the former is constructed on the basis of some philosophical system and the latter upon ecclesiastical dogmatism, but the fact that philosophical ethics brings out into full consciousness the psychological basis upon which ethical life has actually always more or less indirectly builded, and draws all the consequences implied in this. In this it furnishes an independent contribution to a philosophical system.

5) It seems to me to be perfectly justified, that the distinguished men who lead the Ethical Societies keep these institutions as independent as possible not only of all definite dogmatic tendency of thought but also of all unnecessary philosophical hypotheses and speculations. With respect to what concerns the first principles of ethics itself, it is not necessary for the practical ethicist to occupy any definite point of view, although it would be very fortunate if he were acquainted with the discussion of these principles and could take part in an independent manner in the same. He who proposes to teach applied mathematics or employ it in practice need not begin with a definite position with respect to the nature and origin of mathematical principles. So also in ethics there is a complete group of ideas and endeavors which are independent of the manner in which the first principles are conceived. The essential thing for the Ethical Societies is, (as Dr. Stanton Coit has said in his beautiful book "Die Ethische Bewegung in der Religion,") agreement as to

the methods of development of character and as to the type of character to be developed.

Dr. Carus can have really nothing to object to in this method of conception, inasmuch as it is his conviction that in the passage from the supernatural to the natural establishment of ethics the "substance of our morality" will not be changed. In an article in *The Open Court*, at page 2575, he says: "The most important moral rules are not to be altered. . . . . Some of them will be altered as little as our arithmetical table can be changed." In this passage less importance for the *contents* of ethics is attributed to the various points of view than I should be obliged to assign. Yet all the sooner should Dr. Carus really admit that the Ethical Societies have added to their other services that of holding a proper course between the different dogmatic and philosophical systems.

6) This last dispute it appears to me also testifies to the expediency of distinguishing between the different ethical problems. By so doing Dr. Carus would also have been more just in his position with regard to utilitarianism. The latter has not arisen so much from the impulse to supply a *motive* for ethical conduct as from the impulse to acquire an absolute criterion. It is true the powerful influence of Hobbes and Locke brought it about that many of the later utilitarians embraced the egoistic theory; but by their side marched another group of utilitarian ethicists (among the earlier, Bacon, Cumberland, Shaftesbury, and Hutcheson) who did not subscribe to this theory. So far as I know, Hutcheson was the first with whom the formula occurs: "The greatest happiness of the greatest number." These very historical facts show how important it is in the treatment of ethical problems to apply the maxim "Divide et impera!" I have therefore prefaced this my apology for the principle of welfare by calling attention to the relative and mutual independence of ethical problems.

HARALD HÖFFDING.

THE CRITERION OF ETHICS AN OBJECTIVE REALITY.

I. TWO DEFINITIONS OF GOOD.

WHILE Mr. Herbert Spencer in his "Data of Ethics" may be considered as the most persuasive and popular, Prof. Harald Höffding, it appears to me, is the most scholarly and learned expounder of that ethical theory which bases morality upon the principle of the greatest happiness for the greatest number. *The Monist* No. I contained (pp. 139–141) a criticism of Professor Höffding's work on Ethics, and Professor Höffding's article in this number is in part a further exposition of his views, and in part an answer to the criticism of *The Monist*.

Professor Höffding proposes, as pointed out in the criticism of *The Monist*, two criteria of ethics, (1) that which promotes the life-totality, and (2) that which produces a continuous and permanent state of pleasurable feelings. These two criteria happen to come in conflict. John Stuart Mill calls attention to the fact that a well fed pig is more satisfied than man and a jolly fool is happier than Socrates. When Professor Höffding considers the state of man preferable to that of a pig, while granting that the latter, and not the former, enjoys a continuous state of pleasurable feelings, when he similarly prefers the doleful disposition of a sombre philosopher to the empty merriness of a happy fool, he does in my opinion unquestionably surrender the second criterion in favor of the first.

Professor Höffding's present explanation of the subject does not satisfy me. The main point of my criticism, it seems to me, has not been answered, and the difficulty is not overcome. Professor

Höffding declares that the strong desire for activity, development, and progress does not exist at all stages. It is itself a consequence of development and progress (p. 537). This, it may be granted, explains why a civilised society cannot help developing workers that plod and toil, finding no satisfaction unless they plod and toil; but it does not explain why (if after all the criterion of our ethical judgment remains happiness or the continuous state of pleasurable feelings) their state is preferable to that of indolent and happy savages.

Professor Höffding says:

"*If* it could be proved that increasing pain followed necessarily on all advancement of civilisation . . . . in that case it would be impossible to combine civilisation and welfare" (i. e. a continuous state of pleasurable feelings).

Well, *if* that be so,—as Professor Höffding himself in the comparison of man to a pig and of Socrates to a fool has actually conceded to be true,—if we stand between the dilemma of civilisation and welfare, or in other words if we have the choice only between a higher stage of life and a happier state of existence, which is preferable? That which Professor Höffding considers as preferable is his true criterion of what he calls good. The other one holds only so long as it agrees with his true and final criterion, so long as it does not come in conflict with it.

Suppose we select as the final criterion of ethics not the growth and development of the life-totality, but that of procuring to the greatest number of men, as much as possible, a continuous state of pleasurable feelings,—what will be the outcome of it? Can we suppose that, if these two principles collide, we shall be able to stop growth? Can we expect to overcome nature and to curtail natural evolution so as to bring about a more favorable balance between our pleasures and pains? If we do, we shall soon find out that we have reckoned without our host.

A conflict between civilisation and welfare, (i. e. between natural evolution and our pleasurable feelings,) would not discontinue civilisation as Professor Höffding supposes, it would rather produce a change in what we have to consider as welfare. We *have to* be pleased with the development of our race according to the laws of nature, and those who are displeased might just as well commit

suicide at once, for they will go to the wall, they will disappear from the stage of life. Those alone will survive who are pleased with that which the laws of nature demand.

Our pleasurable feelings are subjective, nature and the laws of evolution are objective. The criterion of ethics is not subjective but objective. The question is not what produces pleasurable feelings, but what is the unalterable order of the world with which we have to be pleased.

The question of ethics, in my mind, is not what we wish to do or what we think we ought to do, but *what we must do.* Nature prescribes a definite course. If we choose another one, we shall not reach our aim, and if we reach it, it will be for a short time only.

The aim of nature is not the happiness of living beings, the aim of nature, in the realm of organised life, is growth, development, evolution. Pleasures and pains are phases in the household of life, they are not life's aim. Experience shows that in reaching a higher stage we acquire an additional sensibility for both, for new pleasures and new pains. The pleasures of human existence in comparison with those of animals have been as much intensified and increased as the pains. The ratio has on the average remained about the same and it has rarely risen in favor of pleasures. Rather the reverse takes place: the higher man loses the taste of enjoying himself without losing the sensitiveness of pain.

Ethics, as a science and from the standpoint of positivism, has to inquire what according to the nature of things we must do. It has to study facts and from facts it has to derive rules (the moral prescripts) which will assist us in doing at once what we shall after all *have to* do. The criterion of ethics is not some standard which we put up ourselves, the criterion of ethics is agreement with facts.

II. THE AUTHORITY OF MORAL COMMANDS.

Professor Höffding emphasises "the fact that there is not merely one single ethical problem but many"—a fact which cannot be denied, for there are, indeed, innumerable problems of an ethical nature. However, we must bear in mind that all the ethical problems are closely interconnected. The better we understand them, the

more shall we recognise that all together form one great system of problems, and that one problem lies at the bottom of all. This one basic problem I have called *the* ethical problem.

The solution of the basic problem of ethics will not involve the ready solution of all the rest, but we can be sure that it will throw light upon any question that is of an ethical nature.

Professor Höffding recognises the importance of system in ethics. He says:

"The systematism of ethical science is still so little advanced that it is necessary to draw out a general outline before we pass on to any single feature. The value of systematism is namely this, that we are immediately enabled to see the connection of the single questions with one another as well as their distinctive peculiarity."

It appears almost unfair toward the present state of ethical science when Professor Höffding adds:

"In ethics we are not yet so far advanced."

If we were not, we should do our best to advance so as to recognise the unity of all ethical problems. We must first recognise *the* ethical problem, before we can with any hope of success approach the many, which are dependent upon the one.

Which is the one basic problem of ethics?

We read in Matthew, xxi. 23:

"And when Jesus was come into the temple, the chief priests and the elders of the people came unto him as he was teaching and said, By what authority doest thou these things? and who gave thee this authority?"

This question is legitimate and all our ethical conceptions must necessarily depend upon the answer which we accept as satisfactory. The basic problem of ethics is the foundation of ethics, it is the justification of the ethical prescripts, it is the discovery of the authority upon which ethical rules are based. If there were no power that enforces a certain line of conduct, ethics in my opinion would have no right of existence; and if any one preaches certain commands, he is bound to give satisfactory reasons why we must obey his commands.

Professor Höffding says that ethics "starts from its own assumptions" (p. 111). Ethics should not start from any assumptions.

If we are to come to a mutual understanding we must drop all subjectivism, we must not study ethics from special points of view, from the principles or standards of any individual or group of individuals. There is not the slightest use of a person making himself any "highest and only aim" which, it may be true, "from his point of view can never be refuted." So long as ethics starts from assumptions or principles, it will be no science; for truly, as Professor Höffding says in excuse of the inability to prove principles, "The difficulty always occurs in the enunciation of a principle that a direct demonstration of its validity cannot be given."

The requirement of ethics is to arrive at statements of fact. Let us build upon facts and we shall stand upon solid ground.

Ethics in order to be scientific must be based upon the objective and unalterable order of things, upon the ascertainable data of experience, upon the laws of nature.

Professor Höffding says:

"Religious ethics is founded on authority. Its *contents* are the revealed commands of authority; the *feeling* which impels us *to pass ethical judgments* is the fear or reverence or love with which men are filled in the presence of divine authority."

Scientific ethics can in this respect not be different from religious ethics, for it is also based upon authority. A scientific ethicist has to proceed like any other naturalist; he must observe the course of events and attempt to discover the laws in accordance with which the events take place. These laws are no less unalterable than any other natural laws, and we may appropriately call them the natural laws of ethics. The moral commands of ethical teachers have been derived, either instinctively or with a clear scientific insight, from the natural laws of ethics. The authority of the natural laws of ethics has been decked out by different religious teachers with more or less mythological tinsel or wrapped in mystic darkness; for practical purposes it remained to some limited extent the same and will to some extent always remain the same, for we shall have to obey the moral law, be it from fear, or reverence, or love.

The unity of all the ethical problems will be preserved, however much they may be differentiated. Indeed Professor Höffding in his

enumeration sufficiently indicates their interconnection. He speaks of (1) the motive principle of judgment, (2) the test-principle of judgment, and (3) of the motive to action. Whatever difference he makes between these three terms, it is obvious that whether and how far judgments, tests, or motives are sound will depend upon their agreement with the authority of the natural law of ethics. The pedagogic problem is also connected with the ethical problem because upon our solution of the latter will directly depend the aim and indirectly also the method of education. Such complex motives as "ambition or the instinct of acquisition" will become "the means of attaining to true ethical self-assertion" in the degree proportional to the elements they contain which will strengthen our efforts of setting us at one with the natural law of ethics.

To sum up: The natural law of ethics has to be derived from facts like all other natural laws. The natural law of ethics is the authority upon which all moral commands are based, and agreement with the natural law of ethics is the final criterion of ethics.

III. ETHICS AND WELFARE.

I have no objection to an ethics of welfare; on the contrary, I consider every ethics as an ethics of welfare. My objection to Professor Höffding's ethics is solely directed against his definition of welfare as "a continuous state of pleasurable feelings." Welfare is according to my terminology that state of things which is in accord with the natural law of ethics, and it so happens that welfare must as a rule not only be bought, but also constantly maintained with many pains, troubles, anxieties, and sacrifices. It is true that upon the whole there may be a surplus of happiness and of satisfaction, if not of pleasures; but the surplus of happiness (important though it is) does not constitute that which is morally good in welfare. Morally good (the characteristic feature of the ethical idea of welfare) is that which is in accord with the natural law of ethics.

If the term "utility" were defined by Utilitarians in the sense in which I define welfare, I should also have no objection to utilitarianism. The Utilitarians, however, define their theory as "the

Greatest Happiness Principle," and if "useful" is taken in its ordinary sense as that which is profitable or advantageous, it makes of utilitarianism an ethics of expediency.

IV. FEELINGS AND JUDGMENTS.

The fundamental difference between Professor Höffding and myself, and as it seems to me his *πρῶτον ψεῦδος*, lies in his definition of ethical judgments. He says:

> "Ethical judgments, judgments concerning good and bad, in their simplest form are expressions of feeling, and never lose that character however much influence clear and reasoned knowledge may acquire with respect to them.

I am very well aware of the fact that all thinking beings are first feeling beings. Thought cannot develop in the absence of feeling. Without feeling there is no thought; but thought is not feeling, and feeling is not thought.* By thought I understand the operations that take place among representative feelings, and the essential feature of these feelings is not whether they are pleasurable or painful, but that they are correct representations. Judgments are perhaps the most important mental operations. There are logical judgments, legal judgments, ethical judgments, etc. In none of them is the feeling element of mental activity of any account. That which makes of them judgments is the reasoning or the thought-activity. Whether a judgment is correct or not does not depend upon the feeling that may be associated with it, but it depends upon the truth of its several ideas and the propriety of their connection.

A judgment, be it logical, juridical, ethical, or any other, is the more liable to be wrong, the more we allow the feeling element to play a part in it. Judgments swayed by strong feelings become biassed; they can attain to the ideal of truth only by an entire elimination of feeling.†

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* See the chapter "The Nature of Thought" in *The Soul of Man*, p. 354.

† Professor Höffding says: "The feeling of pleasure is the only psychological criterion of health and power of life." Every physician knows the insufficiency of this criterion. Many consumptives declare that they feel perfectly well even a few hours before their death.

Ethics in which the feeling element is the main spring of action, is called sentimentalism. Sentimental ethics have no more right to exist than a sentimental logic or a sentimental jurisprudence.

The philosophy of Clärchen in "Egmont" appears to be very strong sentimentalism, and I do not believe that her demeanor can be set up as an example for imitation. Her love happiness is an intoxication. She vacillates between two extremes, now *himmelhoch jauchzend* and now *zum Tode betrübt*, and her life ends in insaniyt.

To consider ethical or any other judgments as feelings, and to explain their nature accordingly, seems to me no better than to speak of concepts as consisting of vowels and consonants, and to explain the nature of conceptual thought from the sounds of the letters. We cannot speak without uttering sounds, but the laws of speech or of grammar have nothing to do with sound and cannot be explained in terms of sound. When we think and judge, we are most assuredly feeling, but the feeling is of no account, and whether the feeling is pleasurable, or painful, or indifferent, has nothing to do whatever with the correctness or the ethical value of judgments.

V. PLEASURE AND PAIN.

It is very strange that, so far as I am aware, no ethicist who bases ethics upon the Happiness Principle has ever investigated the nature of pleasure and pain. It is generally assumed that pleasure is an indication of growth and pain of decay, but it has never been proved, and after a careful consideration of this theory I have come to the conclusion that it is based upon an error. Growth is rarely accompanied with pleasure and decay is mostly painless.

Optimistic philosophers look upon pleasure as positive and pain as negative, while the great pessimist Schopenhauer turns the tables and says pleasure is negative and pain positive.

An impartial consideration of the subject will show that both pleasure and pain are positive. Pain is felt whenever disturbances take place, pleasure is felt whenever wants are satisfied, and unsatisfied wants are perhaps the most prominent among the disturbances that produce pain.*

* See the chapter "Pleasure and Pain" in *The Soul of Man*, p. 338.

Professor Höffding says:

"I agree with Dr. Carus that "this world of ours is not a world suited to the taste of a pleasure-seeker," if we understand by pleasure passive sensual enjoyment, an enjoyment which is not united with the rest and nourishment with which not only an immediate pleasurable feeling is connected, but whereby power is also gathered for continued endeavor."

When I say that this world of ours is not a world suited to the taste of the pleasure-seeker, I do not restrict the meaning of pleasure to "passive sensual enjoyment," but to all kinds of pleasure. There are also intellectual and artistic voluptuaries who sacrifice anything, even the performance of duty, to their pleasure, which I grant is far superior to any kind of passive sensual enjoyment. The pursuit of pleasure is not wrong in itself; but it is not ethical either. Ethics in my opinion has nothing to do either with my own pleasures or with the pleasures of anybody else. The object of ethics is the performance of duty; and the main duty of man is the performance of that which he needs must do according to the laws of nature, to let his soul grow and expand, and to develop to ever higher and nobler aims.

VI. PLEASURABLE FEELINGS AS AN ETHICAL CRITERION.

I know of a French teacher who has an excellent French pronunciation and speaks with perfect accuracy, but whenever he is asked to give a rule which may serve as a guide and a help to correct grammer and elocution, he says: "The chief rule in French is euphony."—"Exactly! But the same rule holds good in a certain sense for all languages."—"O no," he says, "the German is harsh and the English is tongue-breaking; only in French is the supreme law euphony."—"Now for instance," we venture to object, "you say *la harpe* and not *l'arpe;* you pronounce the *ai* different in different words you say *j'ai,* but you say *il fait* and you have again a different pronunciation of the *ai* in *nous faisons.*" He replies, "To pronounce *j'ai,* or as the Germans say *chai* would be barbarous. To say *l'arpe,* instead of *la harpe* is simply ridiculous."—"The question is," we continued in our attempts to understand him, "what is euphonious to the ear of an educated Frenchman?"—"Well," he says, "the ear will tell you. That which jars on the ear is wrong.

To say *quat'* instead of *quatre*, or *vot'* instead of *votre*, is wrong, it is vulgar. Why? it jars on the ear."

This method of teaching French appears to me a good illustration of our objection to the happiness principle of ethics. It is perfectly true that instances of immorality jar on the feelings of ethically trained minds. Why? They have become accustomed to them and look upon them as barbarous. Ungrammatical expressions and such pronunciations as do not agree with the spirit of a language are suppressed by those who recognise them as incongruous elements. Mistakes jar on their ears because they are incorrect, but they are not incorrect because they jar.

Oatmeal is a favorite dish among the Scotch. If you ask them why they eat it, they will most likely tell you, because it has an agreeable taste. But why do they like it? Because they have through generations grown accustomed to a dish which is conducive to health. Most of the dishes that are wholesome have an agreeable taste to a non-corrupted tongue. But agreeable taste for that reason cannot be considered as the supreme rule in selecting our menu. Agreeable taste is in cases of sickness a very unreliable guide and it is no criterion for a wholesome dinner. Surely the ethics of eating could not be based on agreeable taste.

The pleasurable feeling that is perceived in the satisfaction of hunger through appropriate food or in the satisfaction of any want, is not the bedrock of fact to which we can dig down; it is in itself a product of custom, of inherited habits, and other circumstances; and it can the less be used as a criterion because it varies greatly with the slightest change of its conditions.

Liberty is generally and rightly considered as a good, even though the slave may have and very often actually has enjoyed more happiness than the freed man. Stupidity is considered as an evil, although it inflicts no direct pains and may be the source of innumerable pleasures insipid in the view of others, but delightful to the jolly fool. Professor Höffding quotes from Waitz that the Indian does not progress because he "lives a happy life." Unhappiness is the cause of progress. We look down upon the Fuegians and upon the indolent South American tribe described by Humboldt.

But have they not reached the aim of ethics, if happiness be that aim? Professor Höffding says in explanation of their condition:

"That which would make such a life unendurable for us, *the strong desire for activity, development, and progress*, this desire does not exist at such stages."

If that is so, our strong desire for activity should be denounced as the source of evil. It would be ethical in that case, as some labor unions and trusts actually propose, to stop, or at least, to impede further progress. The attempt of the Jesuits in Paraguay, which to some extent was an unequivocal success, to rule the people through a spiritual dependence satisfying all their wants and keeping them in perfect contentment, cannot be condemned from that principle of welfare which defines welfare as a continuous state of pleasurable feelings.

I can see how a man can be induced to submit to a moment of pain in order to escape more pain in the future, but I cannot see on what ground one man can be requested to sacrifice himself to suffer pain or to forego his pleasures in order that a dozen or a hundred men may have a jolly time. It appears to me that a greater error has never been pronounced than that of making "the greatest happiness of the greatest number" the maxim of ethics.

For the same reason that prevents us from regarding the principle of happiness as the aim of ethics or as its test and criterion, we cannot consider self-humiliation, contrition, misery, and the abandonment of gayety and merriness as moral or meritorious. Joy and grief are in themselves as little wrong as they are virtuous. Any ethics the end of which is a morose austerity, simply because it makes life dreary, is at least as much mistaken as a philosophy which finds the purpose of life in mere pleasure, be it ever so vain, simply because it is pleasure. To pursue happiness or renounce it, either may sometimes be moral and sometimes immoral. Again, to undergo pain and to inflict pain on others, or to avoid pain, either may also be moral or immoral. The criterion of ethics will not be found in the sphere of feelings. Morality cannot be measured by and it cannot be expressed in pleasures and pains.

VII. THE SUPERINDIVIDUAL AND SOCIETY.

Professor Höffding criticises my view of "that superindividual soul-life which we call society," as based upon a mystical personification of society.

The superindividual motives of the human soul as I use the term, are actual realities, they are no less actual and concrete than are the image and the concept of a tree in my brain. I have sufficiently explained their origin and natural growth ("Ethical Problem," pp. 34–44), and feel that Professor Höffding's charge rests upon a misunderstanding. It appears to me that his term "sympathy," which he regards as the main element of ethical feelings leading to the adoption of the principle of general welfare, is much more liable to be interpreted in a mystical way. At least Schopenhauer's idea of sympathy (which he calls *Mitleid*) is undoubtedly a very mysterious thing, and its existence is supposed to be a direct manifestation of the metaphysical. I do not say that Professor Höffding uses the word sympathy in the sense of Schopenhauer's idea of *Mitleid*, but I am sure that if he attempts to explain its natural origin, he will (in order to remain positive and scientific) have to go over the same ground and arrive at the same conclusion as I did, although he may express himself in different words.

The truth is that man's ideas consist in representations of things and of relations without him, and these ideas are not the product of his individual exertions alone, they are the product of social work and of the common activity and intercourse of human society. This is true of language as a whole and of every single word which we use. This is true of all conceptual thought and most so of all ethical impulses. In spite of all individualism and in spite of the truth that lies in certain claims of individualism as to personal liberty and freedom of self-determination, I maintain that there is no individual in the sense of a separate ego-existence. That which makes of us human beings is the product of social life. I call the ideas and the impulses naturally developing in this way, superindividual, and if we could take them out of the soul of a man, he would cease to be a man. What is man but an incarnation of mankind! Social intercourse

and common work produce the superindividual ideas and impulses in man, and these superindividual ideas and impulses in their action constitute the life of society.

This view is not "a mystical personification of society" under the simile of an organism, but it is a description of certain facts in the development of the human soul.

Society is not an aggregation of individuals, it is constituted by the superindividual element in the souls of individual men. The number of people in a society is for ethical purposes unessential. Professor Höffding accordingly makes an unimportant feature prominent, when he says:

"The idea of society, if it is to be scientifically employed, must always be so applied that at every point the definite group of individuals which it represents may be established."

If the greatest happiness of the greatest number among a definite group of individuals constitutes the morality of an act, would not the man who falls among thieves be under the moral obligation to renounce his property because the robbers constitute the majority?

If we leave the superindividual element out of sight, we shall naturally fall into the error of counting the individuals and deciding right and wrong by majority votes. The pleasure of a majority however does not constitute justice, and the greatest happiness of the greatest number is no criterion of that which is to be considered as morally good.

Society in the sense of a mere number of individuals will by and by create but does not constitute morality; nor can the majority of a society propose a criterion. The nature of moral goodness is not a matter of number nor of size nor of quantity. It must be sought in the quality of our ideas and motives. Moral are those ideas which tend to build up the life-totality of our souls so as to engender more and more of mankind in man, or still broader expressed, so as to keep man in harmony with the whole cosmos—with God.

VIII. THE POLICY OF THE ETHICAL SOCIETIES.

Professor Höffding considers it perfectly justified that the leaders of the ethical societies "keep these institutions as independent as possible not only of all dogmatic tendency of thought but also of

all unnecessary philosophical hypotheses and speculations." So do we, for we object to dogmas, to hypotheses, and mere speculations. We consider the era of dogmatic religion as past, and trust in the rise of a religion based on truth, i. e. a natural and cosmical religion which stands on facts verifiable by science. Every religion, be it ever so adulterated by superstitions which as a rule, the less tenable they appear, are the more tenaciously defended as infallible dogmas—contains in its world-conception at least the germ of becoming a cosmical religion. The development of all religions aims at one and the same goal, namely the recognition of the truth and the aspiration to live accordingly. Those religions which remain faithful to this spirit of the religious sentiment will survive; they will drop the errors of dogmatic belief, they will free themselves of the narrowness of sectarianism and develop the cosmic religion of truth—of that one and sole truth which need not shun the light of criticism and which is at one with science.

We do not object to the ethical societies that they have no dogmas and that they do not identify themselves with a special philosophy; we object solely to their proposition to preach ethics without having a religion, or without basing ethics upon a conception of the world. And why do we object? Simply because it is impossible to preach ethics without basing it upon a definite view of the world, for ethics is nothing more or less than the endeavor to act according to a certain conception, to realise it in deeds. Can you realise in deeds a conception without having any? Can you live the truth without knowing the truth? You must at least have an instinctive inkling of what the truth is.

Mr. Salter separates the domains of ethics and science. He does not believe that ethics can be established on science, for he declares that science deals with facts, i. e. that which is, while ethics deals with ideals, i. e. that which ought to be. "We have to believe in ethics if we believe in them at all," Mr. Salter says, "not because they have the fact on their side but because of their own intrinsic attractiveness and authority."* This reminds me of one

*_What Can Ethics Do For Us_, p. 5. By W. M. Salter. C. H. Kerr, Chicago, 1891.

of Goethe and Schiller's Xenions in which the German poets criticise the one-sided positions of enthusiasts (*Schwärmer*) and philistines:

> Had you the power, enthusiasts, to grasp your ideals completely,
> Certainly you would revere Nature. For that is her due.
> Had you the power philistines, to grasp the total of Nature,
> Surely your path would lead up to th' idea's domain.

Ideals have no value unless they agree with the objective world-order which is ascertained through inquiry into the facts of nature. Ideals whose ultimate justification is intrinsic attractiveness and whose authority is professedly not founded on reality but on rapt visions of transcendental beauty, must be characterised as pure subjectivism. They are not ideals but dreams.

The ethical societies have as yet—so far as I am aware of—not given a clear and definite definition of good. Professor Adler treats this question with a certain slight. Concerning the facts of moral obligation he believes in "a general agreement *among good men and women* everywhere." (The italics are ours.) *The Open Court* (in No. 140) has challenged *the Ethical Societies*, saying that "we should be very much obliged to the *Ethical Record*, if it would give us a simple, plain, and unmistakable definition of what the leaders of the ethical movement understand by good, i. e. morally good." But this challenge remained unanswered.

It will appear that as soon as good is defined not in tautologies,* but in definite and unmistakable terms, the conception of good will be the expression of a world-conception. Is it possible to do an act which is not expressive of an opinion? And if an act is not expressive of a clear opinion, it is based upon an instinctive, an unclear, and undefined opinion. When the ethical societies declare that they do not intend to commit themselves to religious or philosophical views, they establish an anarchy of ethical conviction. Religion, as we have defined it, is man's inmost and holiest conviction, in accord with which he regulates his conduct. The ethical societies im-

*It is obvious that such definitions as "good is that which produces welfare" are meaningless, so long as we are not told what it is that makes a certain state *well* faring or *well* being.

plicitly declare that we can regulate our conduct without having any conviction.

Is not an ethical society without any definite convictions upon which to base its ethics like a ship without a compass in foggy weather?

The attitude of the ethical societies in not committing themselves to any religious or philosophical view is after all—and how can it be otherwise?—a palpable self-delusion, for their whole policy bears unmistakably a definite and characteristic stamp. The leaders of the ethical societies will most likely repudiate my interpretation of their position, because it appears to me that they are not clear themselves concerning the philosophical basis upon which they stand and thus (as I am fully aware) many contradictory features appear by the side of those which I should consider as most significant.

IX. PROFESSOR ADLER'S POSITION.

Professor Adler is the founder of the Ethical Societies, he is their leader, and however much Mr. Salter, Dr. Coit, Mr. Sheldon, and Mr. Weston may disagree from him in minor matters, his views are decisive in the management, and the policy of the whole movement depends on him. Through his indefatigable zeal in the holy cause of ethics, his unflinching courage in the defense of what he regards as right, his energetic devotion to his ideals, and through the influence of his powerful oratory he has made the ethical societies what they now are. He determines their character and he is the soul of the whole movement. Now it is true that Professor Adler has never presented us with a systematic philosophy, but all his activity, his speeches, his poems, and the plans of his enterprises represent a very definite philosophical conception, which, to give it a name, may briefly be called Kantian Agnosticism.

Professor Adler is an agnostic, although not after the pattern of Spencer or Huxley. His agnosticism has been impressed upon his mind by Kant.

I expect that Mr. Adler will repudiate the name of agnostic, and it is quite indifferent with what name he may characterise his views. His position remains the same, whatever name he may choose

to call it, if he chooses any; and he will choose none for he is too consistent an agnostic to define his position by a name.

It devolves upon me to prove my assertion and I hope to be able to do so.

Professor Adler looks upon ethics as something which lies outside the pale of human knowledge. He says in one of his lectures:

"And now one point more of utmost importance. If there be an existence corresponding to our highest idea, as we have said there is, yet we know not what kind of existence that may be. . . . . why then should we speak of it at all, why should we try to mention in words an existence which we cannot know? I will answer why. Because it is necessary to remind mankind constantly that *there is an existence which they do not know*. . . . . Because otherwise the sense of mystery will fade out of human lives. . . . ."

Is "the sense of mystery" really a necessary element in human lives to make men aware of the grandeur of the universe. Is there no holiness in clearness of thought, and is ethics only sacred if it is surrounded with the hazy halo of an unknowable transcendentalism?

If our moral ideal does not come by the special revelation of God, as the dogmatic religions maintain, and if we cannot find it in nature, if it is beyond the ken of human cognition, if it is unascertainable by science, whence does it come? Professor Adler says:

"We must, indeed, be always on our guard, lest we confuse the idea of the Perfect with notions of the good derived from human experience. This has been the mistake of theology in the past, the point wherein every theodicy has invariably broken down. When we think of the Perfect we think of a transcendental state of existence, when we think of the moral law in its completeness we think of a transcendental law, a law which can only be wholly fulfilled in the regions of the Infinite, but which can never be fully realised within the conditions of space and time. The formula of that law when applied to human relations, yields the specific moral commandments, but these commandments can never express the full content, can never convey the far off spiritual meanings of the supreme law itself. The specific commandments do, indeed, partake of the nature of the transcendental law, they are its effects. The light that shines through them comes from beyond, but its beams are broken as they pass our terrestrial medium, and the full light in all its glory we can never see."

In this passage I believe to recognise the influence of Kant's transcendentalism. I differ from Professor Adler's conception of Kantian transcendentalism, but that is of no account here. One

point only is of consequence. Professor Adler uses the word transcendental in the sense of transcendent and thus he changes the ethics of pure reason into mysticism. Professor Adler says:

"Though I can never be scientifically certain, I can be *morally* sure that the mystery of the universe is to be read in terms of moral perfection."

I do not deny that moral instinct ripens quicker than scientific comprehension. Why? Because in a time when science is not as yet so far advanced as to understand the operations of the moral law, those people who instinctively obey the rules that can be derived from the moral law, will survive and all the rest will go to the wall. But the fact that we can have a reliable moral guide in an instinctive certainty which is generally called conscience, even before we attain to scientific clearness, does not prove that science will be forever excluded from the world of moral ideals.

Professor Adler's agnosticism found a very strong expression in a poem which resembles in its tone and ideas the church hymns of the New Jerusalem. The poem is very unequivocal on the point that moral action is comparable to building an ideal city, the plan of which is unknown to the builders. Professor Adler says:

"Have you heard the Golden City
Mentioned in the legends old?
Everlasting light shines o'er it,
Wondrous tales of it are told.

Only righteous men and women
Dwell within its gleaming wall;
Wrong is banished from its borders,
Justice reigns supreme o'er all.

Do you ask, Where is that City,
Where the perfect Right doth reign?
I must answer, I must tell you,
That you seek its site in vain.

You may roam o'er hill and valley,
You may pass o'er land and sea,
You may search the wide earth over,—
'T is a City yet to be!

We are builders of that City,—
All our joys and all our groans
Help to rear its shining ramparts;
All our lives are building-stones.

. . . . . .

*What that plan may be we know not.**
How the seat of Justice high,
How the City of our vision
Will appear to mortal eye,—

That no mortal eye can picture,
That no mortal tongue can tell.
We can barely dream the glories
Of the Future's citadel."

How great an importance is attributed to this song by the leaders of the ethical movement may be learned from Mr. Salter's opinion of it. Mr. Salter says in criticising Unitarianism:

"Not from Unitarianism, not from Christianity, has come the song that best utters and almost chants this thought [of an ideal fellowship]. It is from Felix Adler, upon whom, I sometimes think, more than upon any other man of our day, the mantle and prophetic spirit of Channing have fallen, and whose words, I almost believe, are those which Jesus himself would utter, should he come and put his solemn thought and passion into the language of to-day."

Agnosticism is in our opinion no sound basis upon which to erect ethics. The unknowable is like quicksand, it gives way under our feet. The ethics of agnosticism must necessarily become mysticism. The ethereal dreams of mysticists need no solid basis, they hover in the air. Mr. Spencer who for some reason or other tried to escape the consequences of his agnosticism in the ethical field, adopted Utilitarianism, basing his moral maxims not upon the unknowable, as consistency would require, but upon the principle of the greatest happiness for the greatest number.

Professor Adler is not a Spencerian agnostic and here lies the strength of his ethics. Although he does not attain to a clear and scientific conception of the origin and natural growth of morality, he sounds no uncertain voice with regard to the Happiness Principle.

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* The italics are ours.

He has on several occasions, like his great master Kant, uncompromisingly rejected any Hedonism or Eudæmonism. Among all societies aspiring to foster moral ideals, the societies for ethical culture are distinguished for their seriousness and ardor; and there can be no doubt about the cause: it is the spirit of Professor Adler's zeal not to give way to a hedonistic conception of ethics.

X. THE UNITY OF THE ETHICAL PROBLEM.

We conclude. Although the ethical problem can and must be split up in innumerable different problems, we should never lose sight of its unity.

Our age is a period of specialisation, of a division of labor and of detail work. This is true. But the more will it be necessary to survey the whole field and keep in mind the unity of which all piecemeal efforts are but parts. As soon as we lose sight of the unity in a certain system of problems, we are most liable to drop into inconsistencies. This is true of all things, of every science in particular, and of philosophy, the science of the sciences, also. It is no less true of ethics. We cannot engage, with any hope of success, in any of the diverse ethical questions unless we have first solved *the* ethical problem.

EDITOR.

ON THOUGHT AND LANGUAGE.

A LECTURE DELIVERED BEFORE THE PHILOSOPHICAL SOCIETY OF GLASGOW, ON JAN. 21, 1891.

IT seems impossible to many people to look upon language as anything but an instrument of thought. In one sense this is perfectly true. We think by means of words, just as we see by means of eyes, and hear by means of ears, and walk by means of legs. But could we walk without our legs, or see without our eyes? We can walk with artificial legs, no doubt, and so we can think and speak in foreign languages, and in every kind of artificial sign-language. But as artificial legs presuppose natural legs, foreign and artificial languages presuppose our own natural language.

When we speak of instruments we mean generally such things as knives with which we cut, or pens with which we write. They are instruments which are useful, but they are not indispensable, and can be replaced by other instruments. This does not, however, apply to eyes, ears, or language, and in order to mark that distinction the former are generally called instruments, the latter organs.

Now, if we call language the organ of thought, we, no doubt, admit that we can distinguish between the *organon*, that which works, and the *ergon*, i. e. the work which it performs. But it does by no means follow that therefore the *ergon* could ever exist without the *organon*. We can easily distinguish between the act of spoken thought and the organ of spoken thought, but it does by no means follow that therefore the act of spoken thought could ever exist without the organ of spoken thought.

It may seem unfair in this argument to call thought "spoken thought." It looks like begging the whole question. But it really is not so. By calling thought "spoken thought," we only supply a deficiency of our modern languages. If we were Greeks, we should use the simple word *Logos*, and instead of begging the question, we should show that our proposition is, really self-evident, or, it may be, even tautological, namely that *logos* is impossible without *logos*.

Here we can see at once how intimately thought is connected with language, how it is dependent on it, or, more correctly, how inseparable the two really are. If, like the Greeks, we had a word such as logos, we should probably never have doubted that what we call speech and thought are but two sides of the same thing. And the same lesson is taught us again and again, if only we are inclined to listen to it.

Suppose we had no such word as *matter*, would not our whole system of thought be different? Matter is not an object, perceived by our senses. We may even go further and say that matter by itself never exists. This or that matter exists, chemical substances, say, gold or silver, oxygen or hydrogen, exist; but matter, which some philosophers look upon as the most certain and concrete of all things, is simply an abstraction, something that may be predicated of many things, but that is never found by itself *in rerum naturâ*.

Some people define matter as what is ponderable and impenetrable, but here again, nothing exists that is simply ponderable, or impenetrable. It is always something else; it is iron, wood, stone, vapor, gas, but never matter, *pur et simple*.

It is clear, therefore, that matter is made by us, and that without some such word as matter, we could never have the faintest idea or concept of matter. For how should we call it? On the other hand, it is equally clear that we could not have the word matter, without the concept of matter. For what would be the use of it? Now, what follows from this apparent dilemma? If the concept cannot be prior to the name and the name cannot be prior to the concept, they must needs be simultaneous, or, more correctly, they must be the same thing under two aspects.

From an historial point of view, that is, if we consider the genesis of words and concepts, not in modern times, but during that period when words and concepts were framed for the first time, we are bound to admit that the word is really the *prius*. That period may be ever so far distant, but it was nevertheless a very real and truly historical period.

. How did man arrive at such a word as matter? The word itself tells its own story. It came to us from French, it came into French from Latin. In Latin *materies* or *materia* still means wood and timber, though it has also assumed the meaning of matter, like the Greek ὕλη, which means both wood and matter. The process by which *materies* came to mean matter is clear. If *materies* meant originally the wood out of which a hut, a table, a chair, or a stick was made, it was naturally applied to other substances also, such as stone, bricks, or metal when used in the making of huts, tables, chairs, or sticks. In the same way we speak of a pen, i. e. a quill, though we mean a steel pen.

When the original special meaning of wood thus disappeared, there remained only the meaning of building material, material, and, at last, of matter and substance. We say now, What is the matter? What does it matter? but we little think of the solid beams out of which such expressions were hewn and fashioned. In this sense, therefore, we may say that historically the word *materies* came first, meaning a beam, and that gradually it shed its various attributes, one after the other, till there remained nothing but its trunk, and that is what we now mean by matter.

Here, therefore, we see the process of generalisation which is very important, particularly in the later periods of language and thought.

But it is the greatest mistake to suppose that language, such as we know it, what we might call historical language, always begins with the particular and then proceeds to the general. Adam Smith was one of the ablest defenders of the theory that the *Primum Cognitum* and the *Primum Appellatum* must have been the particular. But all the facts of language are dead against this theory. And yet, that theory has once more been put forward by a philoso-

pher who prides himself on nothing so much as that his philosophy rests throughout on positive facts. I do not blame a philosopher who is ignorant of the results obtained by the Science of Language, so long as he abstains from touching on the subject. But constantly to appeal to language, and yet to ignore what has been achieved by comparative philologists, is unpardonable. No one is a greater sinner in that respect than Mr. Herbert Spencer.

When speaking of the process by which the abstract idea of color was formed he says :* 'The idea of each color had originally entire concreteness given to it by an object possessing the color; as some of the unmodified names, such as orange and violet, show us. The dissociation of each color from the object specially associated with it in thought at the outset, went on as fast as the color came to be associated in thought with objects unlike the first, and unlike one another. The idea of orange was conceived in the abstract more fully in proportion as the various orange-colored objects remembered, cancelled one another's diverse attributes, and left outstanding their common attribute. So it is if we ascend a stage, and note how there arises the abstract idea of color, apart from particular colors.'

Now this is all untrue. Such names as orange and violet are some of the latest names of color. They presuppose such late, nay exotic, concepts, as *orange* and *violet*. The question why an orange was called an orange, and a violet a violet remains unasked and unanswered. In the old names for *black*, *white*, *red*, *green*, and *blue*, there is not a trace of ink, or snow, or blood, or sea, or sky. They are all derived, so far as we can analyse them at all, from roots meaning to shine, to grow, to beat black and blue, and not from oranges, roses, or violets.

Again, what can be the meaning of such a sentence as :† 'Words referring to quantity furnish cases of more marked dissociation of abstract from concrete. Grouping various things as small in comparison either with those of their kind or with those of other kinds ;

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* *Data of Ethics*, p. 124.

† L. c., p. 125.

and similarly grouping some objects as comparatively great, we get the opposite abstract notions of smallness and greatness.' Does Mr. Spencer really believe that we can call things small and great, that our language can possess two adjectives expressive of these qualities, and that yet at the same time we are without an abstract notion of smallness and greatness? Mr. H. Spencer constantly calls on the facts of language, to confirm his views, but his facts are hardly ever correct. For instance: after having explained that, according to his ideas, greater coherence among its component motions broadly distinguishes the conduct we call moral from the conduct we call immoral, he appeals to the word *dissolute*, when meaning immoral, as proving this theory. But *dissolutus* in Latin meant originally no more than negligent, remiss. *Dissolutio* meant languor, weakness, effeminacy, and then only licentiousness and immorality. Language, therefore, in no way confirms Mr. H. Spencer's speculations, still less does experience, for no man is so coherent in his acts, so calculating, so self-restrained, as the confirmed criminal; no one is often so careless, so little shrewd, so easily duped as the thoroughly moral and therefore trustful and confiding man.

But to return to the history of the word for matter. The process by which *materies*, wood, came to mean matter, is intelligible enough, whether we call it generalisation, or abstraction. But how came *materies* to mean wood? That is the question which has to be solved, and in solving it, we shall find that while in the second period of thought-language the progress is from the particular to the general, the progress in the first period is the reverse, namely from the general to the particular. In the case of *materes* this is very clear. No one can doubt that in *materies* the radical element is *mâ*, the derivatives *ter* and *ies*. The radical element *mâ* is found in Sanskrit *mâ-tram*, measure, *mâ-nam*, measuring, *mâ-na-s*, a building; in Greek *μέ-τρον*, measure; in Latin *me-tare*, to measure. We can hardly doubt that the oldest Aryan name for mother also, namely *mâtar*, Greek *μήτηρ*, Latin *mater*, English *mother*, is derived from that root, though it is doubtful in what sense. It may have meant originally no more than maker or fashioner, and it is impor-

tant to observe that in the Veda the same word *mâtar*, occurs as a masculine and means maker, and actually governs an accusative. But it may also have meant arranger, controller, and mistress of all household affairs. Whatever its original intension was, *mâtar* soon became a mere name. Its etymological keynote was no longer audible, and *mâtar* meant mother and all that was implied in that name when used by children and others.

If we compare all the words which contain this *mâ* as their common element, we can see that it meant originally to put two or more things together. This led to two applications. What we call measuring is really putting two things together, one by the side of another, to see how far they agree and how far they differ. Thus *mâ* took the special meaning of measuring, in such words as Greek *μέτρον* and Sanskrit *mâtram*. But to put together could also be used in the sense of joining, carpentering, building, and making, and this meaning we find in such words as (Sankrit) *mânas*, a building, *mâti*, he measures, he makes, and likewise *materies*, what has been fashioned, what can be used for building a hut, timber, wood, building material, then any kind of material, and at last matter, substance in its most general acceptation.

You can see here very clearly the twofold process in the formation of words, first, from the general to the particular,—from measuring to wood, and then from the particular to the general, from timber to matter.

If you ask, what is this syllable *mâ* which has the general meaning of measuring and making, I can only answer, We know, and we do not know. We know as a fact that it is the common element in a number of words, which are differentiated by a number of derivative elements, called suffixes, prefixes, and infixes, but which can all be shown to share in common the general meaning of making and measuring. These common elements have been called roots. The question whether these roots ever existed by themselves, and whether any language could ever have consisted of these roots, is a foolish question. For as soon as a root occurs in a sentence, it is either a subject or a predicate, a noun or a verb, and it has ceased to be a mere root. But on the other hand, it is quite true that in

certain languages, as, for instance, in Chinese there is no formal difference between a root and a word—there are no suffixes or prefixes. But the strict rules of the collocation of words in every sentence make it quite clear whether a word is to be taken as a substantive, a verb, an adjective, an adverb, and all the rest.

By the same process by which we have reduced a number of words to the root *mâ*, the whole dictionary of Sanskrit, and of English also, in fact of all the Aryan and likewise of the Semitic languages, has been reduced to a small number of roots. Given that small number of roots, we undertake to account for the whole wealth of words in any language, simply by means of derivation with suffixes and prefixes, and by means of composition.

In all this we are dealing with fact, facts which are as well ascertained as any facts in physical science.

Making allowance for a small margin of words which have as yet resisted all attempts at etymological analysis, we can state that the vast majority of words in Sanskrit has been reduced to about 800 roots. In the progress of language whole families of words derived from some of these roots become extinct while others continue prolific and take their place. The consequence is that the number of roots in English has dwindled down to 461, while the sum total of words has risen to about 250,000.

Every one of these roots has a general or conceptual meaning, such as striking, pushing, rubbing, cutting, bearing, binding, measuring, building, moving, going, falling, and all the rest.

It often happens, however, that two or more roots have the same or nearly the same meaning, and this explains why, when we count the fundamental concepts expressed by our 800 roots in Sanskrit, we find that they amount to no more than 121.

I say again that in all this we are dealing with well ascertained facts.

The next step, however, leads us into the domain of theory. If we are asked, how these roots came into existence, we may decline to answer the question as outside the limits of science. A chemist would probably do the same, if he were asked how the chemical elements came into existence. In fact, the students of the

Science of Language have always taken their stand here and have treated roots as ultimate facts.

I ought to mention, however, two theories which, though they have long been surrendered by students of the Science of Language still enjoy a certain popularity, and commend themselves to many people by their extreme simplicity and plausibility.

The first consists in ascribing the roots of all languages to a direct communication from God. It is impossible to refute such an opinion; all we can say is that such a communication, if we try to realise it in imagination, would imply such a crude anthropomorphism that one naturally shrinks from entering into details.

The second consists in looking upon roots as imitations of the sounds of nature or as interjections. Here all we can say is that the experiment has been tried again and again, and has failed. Every language contains a number of such words which are imitations of the sounds of nature or interjections. No one can doubt of the origin of *bow wow*, a dog, or of *pooh-poohing*, in the sense of rejecting. But the great stock of words, however, cannot be accounted for by this easy process, and no serious scholar would think of resuscitating what many years ago I described as the Bow-wow and Pooh-pooh theories.

But while the student of language seems to me to have a perfect right to treat the roots of language as ultimate facts, it is difficult for the philosopher not to look beyond. He cannot hope to do more than to suggest an hypothesis, but if his hypothesis accounts for the few facts he has to deal with, such an hypothesis is legitimate, though, no doubt, it is very far from being an established truth.

The hypothesis which I suggested on the origin of roots, was suggested to me by Professor Noiré's hypothesis as to the origin of concepts. My late friend, Professor Noiré, was one of those who discovered difficulties where no one else saw them. While most philosophers were satisfied with the fact that man possessed the power of forming, not only percepts, but concepts also, while no trace of conceptual thought was found in animals, Noiré subjected this power of forming concepts to a most minute psychological

analysis, and thus was brought face to face with the question, what was, from a psychogenetic point of view, the real impulse to the formation of conceptual thought. Questions like this, which to most people, seem perfectly superfluous, often mark the real progress in the history of philosophy. Logicians see no difficulty in explaining how, either by addition or subtraction, positively or negatively, concepts are formed out of percepts. White, they say, is either what snow, milk, and marble share in common, or what remains if we drop from snow, milk, and marble all but their color. The psychologist who looks upon the human mind as the result of an evolution, whether in the individual or in the race, asks, not *how*, but *why* such concepts should have been formed. Now Professor Noiré showed, as I thought, with great sagacity, that the first inevitable concepts arose from man's consciousness of his own repeated acts; that nowhere in nature could we find a similar primitive and irresistible impulse to conceptual thought, but that if the beginning had once been made, there was no longer any difficulty in accounting for the further development of conceptual thought in all directions.

I call this no more than an hypothesis, or, if you like, a guess, and I do not see how in the regions in which we find ourselves, we can expect anything more than an hypothesis. But when one hypothesis, like that of Noiré's, harmonises with another hypothesis, that was formed quite independently, we cannot help seeing that the two lend each other powerful mutual support.

Let us remember then that a most careful psychological analysis had led Noiré to the conclusion that the germs of all conceptual thought were to be found in the consciousness of our own repeated acts. And let us place by the side of this, the well-ascertained fact that the germs of all conceptual language, what we call the roots, express with few exceptions the repeated acts of men. Is not the conclusion almost inevitable that these two processes were in reality but two sides of one and the same process in the evolution of human thought and human language? Professor Noiré did not know of the linguistic fact, when he arrived at his psychological conclusions. I did not know of his psychological conclusions, when I arrived at

my linguistic facts. But when I saw that by different roads we had both arrived at exactly the same point, I thought that this could not be by an accident.

There remained, however, one more question to be answered, and that question again could be answered hypothetically only. How can we account for the sounds of the roots, which we have recognised as the germs of conceptual thought and conceptual language? Why should, for instance, the concept of rubbing be expressed by MAR, and that of tearing by DAR? Here again Noiré and others before him have pointed to the well-known fact that men, when engaged in common acts, find a relief in emitting their breath in more or less musical modulation. It has therefore been supposed that our roots are the remnants of sounds which accompanied these acts, and which, being used, not by one man only, but by men acting in common, were therefore intelligible to the whole community.

No one would dream of representing this theory of the origin of our conceptual roots as a well-ascertained historical fact. It is and can only be an hypothesis. But, as such, it fulfils all the requirements of a working hypothesis. It explains all that has to be explained, and it does not run counter to any facts, or any well established theories. It explains the sounds of our roots, not as mere interjections, which would be the signs of momentary feelings, and not, what we want, the signs of our consciousness of a number of repeated acts as one action. Our roots are, if we may venture to say so, conceptual, not interjectional sounds. They are, in fact, exactly what, according to Noiré's philosophical system, the primary elements of language ought to be.

I do not say that this theory is the only possible theory of the origin of roots, and therefore of language. Let a better theory be started, and I shall be delighted to accept it. But don't let us try to revive exploded theories, unless there are new facts to support them. I can only give you my own experience. For many years I was satisfied to look upon roots as ultimate facts. But when Professor Noiré showed that the fundamental concepts of our thought must be concepts expressive of our own acts, and

when thereupon I went carefully through the list of our Aryan roots and found that with few exceptions, every one of them, as a matter of fact, expressed the ordinary acts of men in a simple state of civilisation, I was driven to the conclusion that the primitive roots of Aryan speech may owe their origin to the sounds which naturally accompany many acts performed in common by members of a family, a clan, or a village. This would vindicate once more the conviction which I have always held that language was from the beginning conceptual, and confirm the well-known statement of Locke, that 'the having of general ideas is that which puts a perfect distinction between man and brutes, and is an excellency which the faculties of brutes do by no means attain to.'

Allow me in conclusion to say a few words on what I can hardly call a criticism, but rather a misrepresentation, or, I ought perhaps to say, a complete misapprehension of this theory of the origin of roots which appeared in a book lately published by Professor Romanes, "Mental Evolution in Man," as a continuation of an earlier work of his, called "Mental Evolution in Animals." My learned friend, Professor Romanes, labors to show that there is an unbroken mental evolution from the lowest animal to the highest man. But he sees very clearly and confesses very honestly that the chief difficulty in this evolution is language and all that language implies. He tries very hard to remove that barrier between beast and man. For that purpose he devotes a whole chapter, the thirteenth, to a consideration of the roots of language, and yet he says at the end of the chapter, "I wish in conclusion to make it clear that the matter—that is the question whether roots are imitations of sound or interjections—is not one which seriously affects the theory of evolution."

If it were so, why should Professor Romanes have devoted a whole chapter to it? But it is not my intention to argue this question with Professor Romanes, but rather to show how difficult it is for any one, not acquainted with the Science of Language, even to apprehend the problems that have to be solved. Professor Romanes is, I believe, a most eminent biologist, and the mantle of Darwin is said to have fallen on his shoulders. Far be it from me to venture to criticise his biological facts. But we see in his

case how dangerous it is for a man who can claim to speak with authority on his own special subject, to venture to speak authoritatively on subjects not his own. Professor Romanes has, no doubt, read several books on philology and philosophy, but he is not sufficiently master of his subject to have the slightest right to speak of men like Noiré, Huxley, Herbert Spencer, to say nothing of Hobbes, with an air of superiority. That is entirely out of place. When he points out differences of opinion between philologists, he does not even understand how they have arisen, and he ought to know better than anybody else that mere difference of opinion between two competent scholars does not prove that both are wrong and can never be used to throw discredit on the whole science.

But as I said just now, I am not going to argue with Professor Romanes because, as he says himself (p. 276), if I were right, his whole theory would collapse. I hope this is not the case, but I feel sure that, if it were, Professor Romanes would only rejoice at it. Anyhow why introduce so much of the *meum* and *tuum* into these discussions? If it could be proved that the Aryas came from Europe, then, no doubt, the other theory that they came from Asia, would collapse. But among serious students every such collapse would be greeted with gratitude, and would be looked upon simply as a step in advance. We are all fellow workers, we all care for one thing only, the discovery of truth. It is in this spirit, and without a thought of any collapse, that I venture to point out a number of clear mistakes which occur on almost every page when Mr. Romanes touches linguistic questions, and which fully account for his not perceiving the true character of the evidence placed before us by the Science of Language.

On page 267 he says that I profess, as a result of more recent researches, to have reduced the number of Sanskrit roots to 121.

I wish I had. But the number of roots in Sanskrit stands as yet at about 800; the number 121, of which he speaks, is the number of concepts expressed by these roots, many of them conveying the same, or nearly the same idea. A root is one thing, a concept quite another. To confuse the two is like confusing thought and expression.

I thought I had made it quite clear, that these 121 concepts, conveyed by about 800 roots, are simply and solely the residue of a careful analysis of Sanskrit, and of Sanskrit only. I took particular care to make this clear. 'They constitute the stock in trade,' I said, 'with which every thought that has ever passed through the mind of India, so far as it is known to us in its literature, has been expressed.' What can be clearer? Still Professor Romanes thinks it necessary to remark that 'these concepts do not represent the ideation of primitive man!' I never said they did. I never pretended to be acquainted with the ideation of primitive man. All I maintained was that, making allowance for obscure words, every thought, that of the lowest savage as well as that of the most minute philosopher, can be expressed with these 800 roots, and traced back to these 121 concepts. I even hinted that the number of these concepts might be considerably reduced. The question is not whether forms of activity, such as *to yawn*, *to spew*, *to vomit*, *to sweat*, were of vital importance to the needs of a primitive community, but whether they were known and therefore named, in the early vocabulary of India. If on the other hand some of these concepts, such as *to cook*, *to roast*, *to measure*, *to dig*, *to plat*, *to milk*, betoken an advanced condition of life, all we can say is that they would probably not occur in the dictionary of primeval savages, wherever such a being can be found, and that they do not profess to be the first utterances of the *Homo alalus*, whoever that may be.

Immediately after this, Professor Romanes dwells on what he calls the interesting feature of all roots being verbs. This is simply a contradiction in terms. In giving the meaning of roots scholars generally employ the infinitive or the participle, to go, or going, but they have stated again and again that a root ceases to be a root as soon as it is used in a sentence, either as a subject or as a predicate, either as a noun or a verb. All his arguments therefore that archaic words, expressive of actions, would have stood a better chance of surviving as roots than those which may have been expressive of objects, are simply out of place. The question whether verbs came first or nouns, may be argued *ad infinitum*, quite as much as the question whether the egg came first or the chicken. Every sen-

tence requires a subject as well as a predicate. If Professor Romanes approves of my saying that roots stood for any part of speech, just as the monosyllabic expressions of children do, I can only say that if I ever said so, I expressed myself incorrectly. A root never stands for any part of speech, because as soon as it is a part of speech, it is no longer a root.

After that, Professor Romanes returns once more to his statement that the roots of Aryan speech are not the aboriginal elements of language, as first spoken by man. Why deny what has never been asserted? I know nothing of the language as first spoken by man. I say with Steinthal, 'Who was present when the first sound of language burst forth from the breast of the first man, as yet dumb?' All that we, the students of language, undertake to do is to take language as we find it, to analyse it, and to reduce it to its simplest component elements. What we cannot analyse, we leave alone. The utmost we venture to do is to suggest an hypothesis as to the possible origin of these elements. Of the *Homo alalus*, the speechless progenitor of *Homo sapiens*, with whom Professor Romanes seems so intimately acquainted, students of human speech naturally know nothing. Professor Romanes assures us (p. 211) that the reducing of language to a certain small number of roots, and the fact that all the roots of language are expressive of general and generic ideas, yield no support whatever to the doctrine either, that these roots were themselves the aboriginal elements of language, or, *a fortiori*, that the aboriginal elements of language were expressive of general ideas. He evidently does not see that we are speaking of two quite different things. I am speaking of the facts of language, he is speaking of the postulates of a biological theory which may be right or wrong, but which certainly derives no support whatever from the Science of Language. If, like Professor Romanes, we begin with the 'immense presumption that there has been no interruption in the developmental process in the course of psychological history,' the protest of language counts for nothing; the very fact that no animal has ever formed a language, is put aside simply as an unfortunate accident. But to students to whom facts are facts, immense presumptions count for nothing: on the

contrary they are looked upon as the most dangerous merchandise and most likely to lead to shipwreck and ruin.

Instead of closing with these facts, Professor Romanes tries to show that those who try to explain them are not always consistent. That may be so, and I should be sorry indeed if my latest views were not more advanced and more correct than those which I expressed forty years ago. But very often where Professor Romanes sees inconsistency, there is none at all.

Speaking of roots in my "Science of Thought," I said: 'Although during the time when the growth of language becomes historical and most accessible, therefore, to our observation, the tendency certainly is from the general to the special, I cannot resist the conviction that before that time there was a pre-historic period during which language followed an opposite direction. During that period, roots beginning with special meanings, (though, of course, always general in character) became more and more generalised, and it was only after reaching that stage, that they branched off again into special channels.'

The observation which I recorded in these words, was simply this, that a root meaning originally to yawn, may in time assume the meaning of opening, while during a latter period, a root meaning to open, may come to be used in the more special sense of yawning. Facts are there to prove this. But whether a root expresses the act of yawning or opening, it remains general and conceptual in either case, though the intension of the concept may be smaller or larger. Where Professor Romanes sees inconsistency, he only shows that he has not apprehended the drift of my remarks.

When all the facts of real language are against him, Professor Romanes betakes himself to baby-language. Here he is safe, and he knows quite well, why I refuse to argue with him or any other philosopher either in the nursery, or in the menagerie, either about Mamma and Papa, or about 'Poor Polly.' But if all he wants is to prove the possibility of onomatopœia, he could have found much ampler evidence in my own laboratory, only with this restriction that, after we have analysed these onomatopœic words which in

some languages are far more numerous than even Professor Romanes seems to be aware of, we are only on the threshold of the real problem, namely how to deal with real language, that is, with those conceptual words which *cannot* be traced back to natural sounds or interjections.

Professor Romanes appeals to philology in support of his theory, and, to use a favorite phrase of his own, to philology let him go! It was long considered an irrefragable proof in support of the onomatopœic theory that *thunder* was called *thunder*. People imagined they heard the rumbling noise of the clouds echoed in the sound of thunder. However, the word was taken to pieces by comparative philologists, *thunder* was found out to be closely connected with the Latin *tonitru* and the Sanskrit *tanyatu*, and there could be no doubt that these words were all derived from the root TAN, to stretch, from which the Greek τόνος, stretching, tension, and tone. Thunder, therefore, was clearly shown to owe its origin to this root TAN, in which there is very little trace of distant rumble. But what does Professor Romanes do? He appeals in his distress to Archdeacon Farrar, who is reported to have said that the word *thunder*, even if not originally onomatopœic, became so from a feeling of the need that it should be! Now, this fairly takes away one's breath, and I cannot believe that Professor Romanes could have used this argument seriously. He begins by maintaining that words are formed by imitation of natural sounds. He quotes *thunder* as a case in point. He is told by comparative philologists that thunder is derived from a root TAN, to stretch. He does not attempt to deny this, but he appeals to Archdeacon Farrar, who says that the word became afterwards onomatopœic, from a feeling of the need that it should be so. If that is not shirking the question, I do not know what is. Suppose it were true that thunder had been supposed to be an imitation of a rumbling noise by those who, like Professor Romanes, are convinced that all words must be more or less onomatopœic. What in all the world has that to do with the real origin of the word? We want to know how the word thunder came to be, and we are told, if it was not onomatopœic, it ought to have been so, nay that by certain ignorant people it was supposed

to be so. This goes beyond the limits of what is allowed in any serious discussion.

But Professor Romanes attempts a still greater triumph in forensic adroitness, when he suddenly turns round and declares himself altogether convinced by the theory proposed by Noiré and myself, though at the same time placing it on a level with the Bow-wow and Pooh-pooh theories. Now the fact is, that both Noiré and myself have been most anxious to show the fundamental difference between these two exploded theories and our own. The theory which I, for clearness' sake, was quite willing to call the *Yo-he-ho* theory, is the very opposite of what Noiré called the *Synergastic* theory. Those who appeal to words like *thunder* as derived from the rumbling sound in the clouds, without any conceptual root standing between our conceptual word *thunder* and these unconceptual noises, hold the Bow-wow theory. Those who hold that *fiend* is derived direct from the interjection *fie*, without any conceptual root standing between the unconceptual *fie* and the conceptual word *fiend*, hold the Pooh-pooh theory. Those who would derive *to heave* and *to hoist* from sounds like *Yo-he-ho* would hold what may be called the *Yo-he-ho* theory. I have never denied that there are some words in every language which may be so explained.

But what similarity is there between these theories and our own? We begin with the fact that the great bulk of a language consists of words, derived, according to the strictest rules, not from cries, but from articulate roots. No one denies this. We follow this up with a second fact, that nearly all these roots express acts of men. No one denies that. We then propound an hypothesis that possibly the phonetic elements of these roots may be the remnants of utterances such as even now sailors make when rowing, soldiers when marching, builders in pulling and lifting, and that as expressing originally the consciousness of such repeated acts, performed in common, these roots would fulfil what is wanted, they would express conceptual thought, such as beating, cutting, rubbing, binding, and all the other 121 concepts from which, as a matter of fact, all the words that fill our dictionaries have been derived. Those who cannot see the difference between a man, or, for all that,

between a mocking bird, saying *Cuckoo*, and a whole community fixing on the sound of TAN, as differentiated by various suffixes and prefixes, and expressing the concept of stretching in such words as *tonos*, *tone*, *tonitru*, *thunder*, *tanu*, *tenuis*, *thin*, should not meddle with the Science of Language.

Observations, for instance, on the language of children, or on what I call Nursery psychology, are very interesting and may be useful for other purposes. But what have they to do with the problem of the origin of language? The two problems, how a child learns to speak English, and how language was elaborated for the first time, are as remote from each other as the two poles. The one is perfectly clear, though it may vary in different children. No child makes its language, it simply accepts what has been made. What *we* are concerned with is, how each word was originally made, how the first impulse to speech was given, what were the rough materials out of which words were shaped, how words assumed different meanings by becoming specialised or generalised, or by being used metaphorically—how, in the end, some words became purely formal, and served as the grammatical articulations of human speech. What has that to do with a child learning to say *Bread* or *Milk*, or with a parrot learning to say *Poor Polly?* We might as well try to study the geological stratification of the earth from watching the layers of a wedding-cake. I know quite well that every philosopher, when he becomes a father thinks that he may discover the origin of language in his nursery. The books which owe their origin to these paternal experiments are endless. But they have thrown hardly one ray of pure light on the dark problem of the origin and evolution of human speech. That problem, if it can be solved at all, can only be solved by a careful analysis of language, such as it exists in the immense varieties of spoken languages all over the globe. This is the work which the Science of Language has carried out for nearly a century, and which will occupy the minds of many students and philosophers for centuries to come.

F. Max Mueller.

LITERARY CORRESPONDENCE.

I.

SOME distinguished foreigners have called my attention to the *Manuals of Moral and Civic Instruction* which circulate in our schools, thinking with reason that they mark perhaps the most important reform in public teaching. There have been published in France a dozen or more during the last ten years or so. The clerical party has thundered against these little books: it had good reason for alarm, for they aim at nothing less than to take the place of the catechism.

How do they replace it? What is their inferiority, or, what their advantages? What is their principle, their disposition? This can be sufficiently judged of by the five we have before us, signed by names more or less known, those of PAUL BERT, PIERRE LALOI, CHARLES BIGOT, MME. HENRY GREVILLE, and GABRIEL COMPAYRE.*

The manuals of MM. Paul Bert and Laloi, are models of style: the one in familiar, easy dialogues; the other in simple and clear precepts, set off and illustrated by pleasant stories. Lists of questions facilitate the use of the book by the master. The divisions or chapters relate to special subjects,—the military service, taxes, the fatherland, the parliament, the law, the government, etc. So much as to the form; let us look at the groundwork.

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* Paul Bert, *L'Instruction civique à l'école*, Picard-Bernheim, Pub.; Pierre Laloi, *La première année d'instruction morale et civique*, Armand Colin, Pub.; Charles Bigot, *Le petit Français*, Weill et Maurice, Pub.; Mme. Henry Gréville, *Instruction morale et civique des jeunes filles*, Weil et Maurice, Pub.; Gabriel Compayré, *Eléments d'instruction morale et civique*, Paul Delaplane, Pub.

The catechism imparted general moral precepts which concerned the man, and particular commands which concerned the Christian. Our manuals also tend to form the man; but in the man, above all, the good Frenchman. We find there glowing pages on the love of one's native land, and on the beauty of one's country, which we must love. Far be it from me to cast censure on this noble sentiment. Nevertheless, I do not think exaggeration on that point is desirable, lest we should seek a cause of patriotism even in the acknowledged superiority, from a gastronomic point of view, of the hare of France over the hare of Germany! Our writers, undoubtedly, have too much tact to lay themselves open to this ridicule. It is very striking, though, that the notion of the moral man considered as a Frenchman, German, Englishman, or Italian, is narrower than that of the Christian man: this reversion into the folds of nationality is a characteristic phenomenon of our old world in this latter end of the century. If our encyclopædists had hit on the idea of writing a laic catechism, the tone of it would have been different. Our authors of to-day alas! have only too much excuse to wish to form at first the *little Frenchman*, and to promote the reaction against a cosmopolitanism which had become dangerous to our national existence. They have done it, however, with sufficient caution, and without detriment to justice.

I shall not say as much for M. Paul Bert, in relation to his manual dedicated to the Revolution. Still here, undoubtedly, it is necessary to make allowance for the political necessities of the present time. But what a danger to sanctify at any cost the sanguinary epoch of our democracy; what an error to date the French era from 1789, and to make our children believe that our fathers should have had hardly the sentiment of public virtue! The worst is not that their young souls are thus embittered, but that their judgment on the facts of history is falsified. We are here only too much inclined to disregard the necessity of human evolution, and to imagine that it suffices to change the label of the sack to improve the merchandise. M. Bigot and M. Laloi, at least, have more wisdom, more prudence in this respect.

The ambition of the catechism, on another point, seems to go

beyond that of our manuals. It offered an explanation of the world, a complete conception of human destiny, in a word, a doctrine which *returns into itself.* This doctrine holds no longer, it is known nevertheless, and it is necessary now to replace it. Unfortunately scientific morality has not yet found its formula in a practical book, and the divergences of views are confessed in our manuals, where the conception of a fundamental ensemble almost entirely fails. It is sufficient to read the tables of contents to convince oneself of this. The work of M. Compayré, who addresses himself especially to the "middle and higher grades," changes suddenly in Book III. entitled *La Nature humaine et la morale.* What signifies the definition, that "morality is nothing more than the ensemble of the laws that nature has engraved in your soul before human legislators inscribed them in their codes"? What is doing here the vain affirmation of the existence of God and of the immortality of the soul, and this "let us contemplate and adore" which sums it up? In the mouth of M. Compayré it is only a concession and an avowal of infirmity. A frank spiritualist will resolutely establish his moral conception on his belief; but nominal deism causes God to play the rôle of an ignominious personage who has no longer a suitable occupation on the scene.

After all is said, however, our manuals have the advantage over the catechism in the clearness of their definitions (not all correct, it is true) and in the immediate value of the instruction. For example, M. Laloi gives information as to the placing out of money, reproduces the formulas in use in the ordinary acts of life, etc. I should take care not to blame, either this good practical sense, or this manner of instructing the child according to his capacity to understand himself and understand the world which surrounds him. In the modest articles of our little class-books, is found summed up, definitively, the secular experience of human societies, and this also has an aggregative value.

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Numerous are the works written among us by distinguished authors to introduce youthful minds into the various sciences. The *Bibliothèque utile* already includes several, and among them one of

the best will always be the book of ADOLPHE COSTE, *La Richesse et le Bonheur*,* with which that library is about to enrich itself. M. Coste has reproduced here, in order to express them in a simple form, the doctrines expounded in his large works. But there is also contributed something new, as to what he calls property, for example. The *Manuals* of which I just spoke base all property on labor alone. Mme. Henry Gréville defines it "a right, based on the difficulty that any one has had in acquiring a thing." It would be proper to add—"and to save a thing," in taking account of the more exact analysis made by M. Coste. For if it is true that "consumable goods" are always due to labor in some manner, it is no less true that "productive capital," can only be acquired by putting a part of these goods outside of the current consumption, that is to say by saving something of that which one possesses. Saving is to-day the only regular source of accumulation of wealth; it is one of the indispensable factors of property. The usual definition sees only the other factor of wealth, labor, and opens thus the road to the dangerous sophism of which the workmen make a weapon, when they claim that they alone ought to possess, as they produce.

Let us quote the passage. It is exact. "By his labor man takes possession of the fruits, he enters into the enjoyment of his part of the product: this is in some sort only a personal right which disappears at once with consumption. But from the time that this man saves something from consumption and establishes capital, he becomes a proprietor, he acquires a social right. Fundamentally, property is the public acknowledgment of the service rendered to the community by the increase of the productive capital" (p. 25).

I will notice further, in the work of M. Coste, the difficulty that it describes, and that greatly embarrasses economists, of reconciling the value of labor, due to individual effort, with the value of exchange, imposed by the general needs. As to the relations between Wealth and Happiness, he judges them intimate enough: happiness resides chiefly, according to him, in activity, which has for its

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*Publisher of the *Bibliothèque utile*, F. Alcan.

principal forms the acquisition of wealth and the productive employment of wealth. The question would appear undoubtedly more complex, from the psychological point of view. But we could very well content ourselves with this notion, clear and sound, of an economical happiness.

One has always pleasure in reading M. Coste, because he has just ideas, because he approaches questions of political economy as a naturalist and studies the facts in their evolution. It is the best method for understanding the subject. The deductive economists have never failed to deceive us. I would wish in the public interest for numerous readers of treatises of this kind.

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Some day or other, the occasion will present itself for us to speak somewhat fully of pedagogy. Certainly, if the passion of *magister* was ever exaggerated, it is in our day, and, through logic and principles, it will become in time more difficult to make a little boy eat his porridge than to govern an empire. In all that has been done, I see some good, but much evil ; I am afraid that little artificial prodigies will in time be produced, and that we shall be given hot-house oranges instead of fine fruit ripened in full sunshine. Books follow books, and mistakes succeed mistakes. There is everywhere an embarrassment of *talents*, scarcity of *characters*. Have the causes of it been unravelled and the remedy discovered? In order to judge the results, let us wait half a century !

M. Eugene Maillet, whose work—*L'Education, Elements de psychologie de l'homme et de l'enfant appliquée à la pédagogie*—I have formally to announce,* will readily excuse, I hope, this quarter of an hour's bad humor. It is not from him that I take it, and his work gives evidence of too much experience, too much study, that a high value should not be placed on it. The present volume is only the first part of it ; "the second part will have for its object education itself, considered at first in its idea, then in its various forms,—physical education, education of the heart, education of the mind, education of the will and of the character, finally in the general principles of

* Belin frères, Publishers.

logic and morality which ought to dominate it and without which the rules of a wisely graduated methodology or of a rational discipline cannot be established."

In these *Elements of Psychology*, M. Maillet shows himself acquainted with new studies and methods. It is regrettable only that he does not enter into them with sufficient freedom. He has not consented to rid himself of the old terminology, he preserves the outlines almost of spiritual psychology, and appears even to seek in the affirmation of spiritualism the indispensable completion of a science of education. His work will perhaps be better welcomed for it by the university public; but we should have preferred, for our part, that he had remained less "classic," while retaining his entire freedom of criticism.

With this limitation we can recommend his work without mental reservation; some portions of it are excellent, and many readers will profit by consulting it. It is written with order, clearness, and good sense.

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Here now is a curiosity, the first number of the *Annales des sciences psychiques, recueil d'observations et d'expériences*, appearing every two months, founded under the patronage of M. Charles Richet, with M. Dr. Dariex as editor.* This magazine will publish "Observations relative to so-called occult facts, *telepathy*, *lucidity*, *presentiment*, *objective apparitions*, etc." *Experiences*,—there can hardly yet be any question of them except in appearance; M. Richet so avows with good grace in a letter forming an introduction,—a very curious letter, rich in excellent advice which will perhaps not be sufficiently listened to, and with a declaration of principle which has a chance of being far too much so.

"We have the firm conviction," writes M. Richet, in effect, "that there is, mixed up with the known and described forces, forces that we do not know; that the simple, vulgar mechanical explanation will not suffice to explain all that passes around us; in a word,

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* Felix Alcan, Publisher.

that there are occult psychic phenomena, and, if we say 'occult,' it is a word intended to express simply what is unknown."

What is meant here by the word forces? We are told "for three hundred years electricity was an unknown force." But it is always *occult*, as *force;* and if science is become positive, it is because it has neglected the vain entity, in order to see only a new group of empirical data, a new series of facts, that it is more or less easy to translate into unities of heat and of work. What then would forces be subtracted from mechanics, if not occult forces, with "chimerical functions"? The expression *vulgar mechanics*, does not suffice to correct the sense of the phrase and rather aggravates it, in allowing to be supposed that there exist two kinds of forces, one of which has no *measure*. But the comparison, then, is not worth anything, and it is not necessary to speak of electricity or chemical affinity in this matter.

As to the "observations," of what value are such as are presented to us? But little, after all, and many other facts will be necessary to lead us to accept the non-fortuitous relation of certain hallucinations with an objective event. Notwithstanding the wise reservations of the editor, it is to be regretted that we find already in this first number, under the title of *Une chambre hantée*, a real ghost story. Story for story, I would prefer much to read the *Chambre bleu* of Mérimée; so also, I doubt not, would M. Richet.

This little censure is not meant in jest, which would be out of place. There is always advantage in collecting *facts*, on condition that they are chosen with care, and that haste is not made to interpret them. MM. Richet and Dariex insist on this point with the greatest force. Curious readers will not be wanting for these Annals, even among sceptics. It has always been necessary to carry the lamp to cause the phantoms to vanish.*

LUCIEN ARRÉAT.

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* Reference may be made to the first number of the *Revue mensuelle de l'Ecole d'Anthropologie de Paris*, published by the Professors at the *Librairie Alcan*. In this number will be found a lecture by M. André Lefèvre, under this interesting title: *Du Cri à la Parole.*

II.

THE SCIENCE OF PEDAGOGICS IN GERMANY.

In view of the great care with which *The Monist* cultivates psychology, I may be permitted in my first letter, consistently I judge, to speak of the most important application of this science—its application namely to pedagogics.

Psychological pedagogics, in the true sense of the word, exists with us in Germany only since the days of J. F. Herbart who abandoned the ancient psychological theory of the faculties and discovered in ideas the sole component elements of all psychical activity, derived feelings and volitions from the interrelation and interoperation of ideas, thus denied the absolute freedom which the possibility of formation of will, or education, excludes, and upheld the determinability of the will by the ideas.

Although Herbart himself applied his system of psychology pedagogically, yet it bore in the life-time of its author only scanty fruit in this direction. Psychological pedagogics was not developed beyond its original generality and unprofitableness of character until Professor Stoy of Jena and especially Professor Ziller of Leipsic took up, with an energy that equalled their tact, the practical construction of psychological pedagogics.

Pedagogics now exerted a reactive promotive influence, if not on the further development of psychology, yet on its study. After the psychological writings of Herbart, it was eminently the *Empirical Psychology** of M. W. Drobisch, sustained in the Herbartian spirit but written more in agreement with "scientific" (i. e. inductive) methods, that supplied psychological pedagogists with nourishment. The last-named work, which in many respects possesses value even to-day, was received with especial favor, since it avoided happily the metaphysical tendencies which Herbart rather assiduously employed. A like excellence and a like favorable reception were the merit and reward of the large work, later appearing, of

* Leipsic, 1842.

LAZARUS: *Das Leben der Seele in Monographien.* Subsequently, were effective two little books by I. DREAL and by LINDNER: *Lehrbuch der empirischen Psychologie* and *Handbuch der empirischen Psychologie.* Lindner's treatise has recently appeared in an English translation, published by Heath of Boston, under the title of "A Manual of Empirical Psychology as an Inductive Science. A Text-book for High Schools and Colleges. By Dr. G. A. Lindner, of Prague. Translated by Chas. de Garmo." The English edition of this book received an unfavorable review in the London *Academy* (Nov. 1, 1891); yet in one respect the criticism was in our opinion justified. Too little use, namely, has been made of the results of experimental psychology.

This is, moreover, not only true of Lindner's book but holds for all the psychological books that have exerted any considerable influence in pedagogical circles, is true in fact of the great *Lehrbuch der Psychologie* by VOLKMANN, the latest edition of which, prepared by Cornelius, is not in this respect abreast of the position of the times.

Neglect in such a matter in the country of a Wundt appears striking at first glance; yet it has its good reasons. The labors of the school of Wundt were antagonistic to the Herbartian psychology and the pedagogics founded thereon, to the extent that a goodly portion of the old theory of the faculties has been re-introduced into those labors. The English association-psychology could have counted on a much more welcome reception. Happily, there has appeared within the last few months a remarkably clear, and withal handy, volume which will succeed in introducing into the pedagogical circles of Germany this association-psychology. It bears the modest title of *Leitfaden der physiologischen Psychologie* (The Elements of Physiological Psychology, Jena, Fischer, 1891), and consists of lectures delivered by PROF. DR. ZIEHEN at the University of Jena. In many respects the book of Ziehen is like the recent work of Dr. Paul Carus*: except that everything of a speculative character is lacking in the former, of which from our point of view we cannot approve.

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* *The Soul of Man*, Chicago, 1891.

Now that I am speaking of pedagogics particularly, I will mention still another work of Lindner, to whom I referred above, which is the first of its kind in Germany. Its peculiarity appears from its title: *Grundriss der Pädagogik als Wissenschaft, auf Grund der Entwickelungslehre und der Sociologie neu aufgebaut* (Outlines of Pedagogics as a Science, Newly Constructed on the Basis of the Doctrine of Evolution and of Sociology, Vienna, 1890). The endeavor of the author of this work has been, to make fruitful within the domain of the Herbartian system the principles of evolution and of the science of sociology; and though he has not been successful in this respect as regards all the details of educational methods, the book nevertheless represents a good beginning.

CHRISTIAN UFER.

BOOK REVIEWS.

OUTLINES OF A CRITICAL THEORY OF ETHICS. By *John Dewey*. Ann Arbor: Register Publishing Company. 1891.

The title of this very thoughtful book expresses well the author's method of comparing opposite one-sided views with the aim of discovering a more adequate theory. In carrying out this aim not only is an analysis given of the main elements of the theory of ethics, but the main methods and problems of contemporary ethics are considered also. Professor Dewey rejects both Hedonism and Kantism. He rejects Hedonism because pleasure fails as a standard of ethics, and he rejects Kantism because it is a barren abstraction. Kant's "ought" does not root in and does not flower from the "is." Professor Dewey says:

"Hedonism finds the end of conduct, or the desirable, wholly determined by "the various particular desires which a man happens to have; Kantianism holds "that to discover the end of conduct, we must wholly exclude the desires. Hedonism "holds that the rightness of conduct is determined wholly by its consequences; "Kantianism holds that the consequences have nothing to do with the rightness of "an act, but that it is decided wholly by the motive of the act. From this contrast "we may anticipate both our criticism of the Kantian theory and our conception of "the true end of action. The fundamental error of Hedonism and Kantianism is "the same—the supposition that desires are for pleasure only. Let it be recognised "that desires are for objects conceived as satisfying or developing the self, and that "pleasure is incidental to this fulfilment of capacities of self, and we have the "means of escaping the one-sidedness of Kantianism as well as of Hedonism. We "can see that the end is neither the procuring of particular pleasures through the "various desires, nor action from the mere idea of abstract law in general, but that "it is the satisfaction of desires according to law" (pp. 82–83)

The author acknowledges his indebtedness to the writings of the late Professor Green and others for the "backbone" of his theory, which he states to be "the conception of the will as the expression of ideas, and of social ideas; the notion of an objective ethical world realised in institutions which afford moral ideals, theatre and impetus to the individual; the notion of the moral life as growth in freedom, as the individual finds and conforms to the law of his social placing." Among the

specific forms which the author calls particular attention to, as giving "a flesh and blood of its own" to that backbone, are the idea of desire as the ideal activity in contrast with actual possession; the analysis of individuality into function including capacity and environment, and the statement of an ethical postulate.

This postulate may be regarded as summing up the ethical theory as presented by Professor Dewey. It is thus expressed: In the realisation of individuality there is found also the needed realization of some community of persons of which the individual is a member; and, conversely, the agent who duly satisfies the community in which he shares, by that same conduct satisfies himself. We have here postulated a community of persons, and a good which realised by the will of one is made public. In "this unity of individuals as respects the end of action, this existence of a practical common good," we have what is called "the moral order of the world." This view would seem to satisfy the requirements of both Individualism and Socialism, but is it consistent with the law of progress elsewhere insisted on by the author? He affirms, as against the Hedonism of Spencer, that moral ideals are always developing. Progress is itself the ideal, since "permanence of *specific* ideals means moral death." But this progress must originate with the individual, who by the formation of the new ideal ceases to be in perfect accord with the community, and will continue to be in disaccord with it until the community has accepted his ideal. A perfect realisation of individuality in the community would be the "fixed millennium" which the author properly objects to, and to escape which it is necessary, that the equilibration towards which the individual, as well as the social, organism is ever tending shall never be actually attained. Its attainment would mean stagnation and death.

We have not space to say more of Professor Dewey's book than that it is a very thoughtful work, most so in its critical parts, and will form an excellent help for the student of ethics Ω.

An Introduction to Social Philosophy. By *John S. Mackenzie.* New York: Macmillan & Co. Chicago: A. C. McClurg & Co. 1890.

We have here, in an enlarged form, the substance of the Shaw Lectures delivered by the author, at the University of Edinburg, in January, 1889. The work is professedly, not a systematic treatise on the subject dealt with, but only a slight contribution to the discussion of it; and it is said to be "not so much a book as an indication of the lines on which a book might be written." The force of these apparently deprecatory remarks depends entirely on the result attained. If an introductory study is based on true principles it may be of more general value than an elaborate work, because it will probably present the conclusions of the latter in a simpler and less technical form. This presupposes, however, a knowledge of previous inquiry, and, therefore, the use of the term "Introduction" is somewhat of a misnomer. Mr. Mackenzie remarks, indeed, that his inquiry may be thought to belong to the end rather than to the beginning of philosophic study.

The leading idea of Mr. Mackenzie's work is embodied in the sentence just quoted. The value of social life depends on the ultimate end to be attained, and the author sets himself to discover what is the true aim of society. The existence of a society of human beings cannot be accounted for without the conception of purpose, for to whatever element of accident may be due the bringing of those human beings into relation to each other, "the particular direction in which their relations become developed is obviously due to certain aims by which they are guided." The inquiry into the principles which determine the nature of those aims, and as to the ideal to which such principles lead, is what constitutes Social Philosophy. This falls within the third of Hegel's chief divisions of philosophic study, the *Philosophy of Spirit*, which is concerned with objects in so far as they are themselves creations of thought; and the objects of Social Philosophy may be described as the relations of men to each other, their relations to the material world, and the development of individual character in so far as that is affected by these relations. Before treating of the aim which constitutes the social ideal, our author states the conditions of the social problem, those of *difficulty* on the one hand, and of *hope* on the other, and he finds that the general state of society for a number of generations back has been one of "tumultuous progress." There is a great improvement in the condition of nearly all classes of people and "a very great brightening of our general outlook." But life has become in many directions more chaotic and uncertain. What is now wanted is "some principle which will enable us to bring about a more perfect connection between the parts of our society, to form new links and ties, so that men may no longer be subject to the directions of iron laws over which they have no control. We have to overcome individualism, on the one hand, and the power of material conditions, on the other." To do this will be the chief step towards the realisation of the social ideal, which is dependent on the nature of society and on the nature of men.

The recognition of the fact that everything deepest in nature, and especially in human nature is a product of growth has, says Mr. Mackenzie, "passed over into popular thought, and become a part of our intellectual atmosphere." Nature is thus regarded as *organic*, by which our author means "a systematic unity, in which neither the parts exist independently of the whole nor the whole independently of its parts." This view is distinguished from that of Monadism, which regards the world as a collection of mutually independent parts, and of Monism, according to which Mr. Mackenzie declares the world is a single system, in which the nature of every part is predetermined by the whole. According to the organic view the world is a real unity, though it is a unity which expresses itself through difference. It goes without saying that there is no Monism of Mr. Mackenzie's description. No Monist would ever deny that the unity of the world expresses itself through difference.

Whether or not our author is right in rejecting what he describes as the monistic view of nature, does not really affect the conclusion as to the nature of Society. This he declares to be organic, and it is shown that society possesses the three con-

ditions which belong essentially to the nature of an organic system ; that is, the relations of the parts which form the whole are *intrinsic*, changes in it take place by an internal adaptation or growth, and its end forms an element in its own nature. This conclusion would, indeed, seem to be required by the fact that society consists of a number of individuals who are themselves organic units. At the same time it might be objected that, although many of the lower animals dwell together in societies, these can hardly be regarded as organic. This consideration gives rise to the thought that the organic nature of human society depends on the conditions by which man is differentiated from other animals. In treating of this point, Mr. Mackenzie shows that there are several stages in the development of the "self," and he concludes that although an animal is conscious of a self, yet that it is not conscious of "the unity of its individual life, the connected system of its experiences as a whole, in which each single experience has a definite place," being that which constitutes the highest development of self, and which is the distinguishing self-consciousness of humanity.

This faculty of self-consciousness might be reduced to simpler elements, but it is that by which, as Mr. Mackenzie shows, we are enabled to understand the organic nature of human society. The recognition of the fact that the universe is a systematic whole constitutes an ideal, which, although consciously aimed at by few, gives a progressive character to the general mind. Man is the only creature that has an ideal, because he has been able to catch a glimpse of a kind of consciousness of that which he has not attained, but which he is bound to strive to attain. He begins with vague impressions and animal impulses, "and his whole life is a struggle towards clearness—clearness in the conceptions which he applies to things in knowledge, clearness in the conception of ends of which he makes use in conduct." The struggle between the immediate experience of what is present in sense and "the 'still small voice' of the ideal, which bids us have regard for the Universal," would be fruitless, however, if the individual were alone. Society is necessary for the proper development of the more ideal elements in human nature, as it provides the rational environment required for a rational being. This leads to a consideration of the ultimate end of society. In the course of the discussion of this question the author deals with the different views entertained as to the principles by which we are guided in conduct and by which human progress is determined. He points out that what we seek is some definitely ascertainable end, which we recognise as good, and which is the happiness or well-being of persons. He rejects, however, the Utilitarian theory, showing that pleasure cannot be the end of conduct, and concludes that, if "we have any rational end at all, it must consist in some kind of realisation of our nature as a whole"; of knowledge, and will, and feeling, taken together. The true end is in fact self-realisation, and this includes society, for we cannot suppose that the ideal should be realised within our lives. It is conceivable only "by our being able to see the world as a system of intelligent beings who are mutually worlds for each other." The true nature of man's end is thus necessarily a social

one, and it includes everything that belongs to the highest good. It embraces the realisation of Reason, Order, and Beauty in the world; the realisation of Life; the perfection of Knowledge and Wisdom, of Will and of Feeling.

We have given so full a summary of Mr. Mackenzie's argument that we can add only a mere outline of what he considers "the form of social union in which, under given conditions, the progress will be most rapid and most secure towards that good which we must regard as the ultimate end." The social ideal is said to depend on three chief elements of well-being, Individual Culture, Subjugation of Nature, and Social Organisation; which give rise to the one-sided ideals of Liberty, Equality, and Aristocracy, not of birth but of talent. The Organic ideal, which is that of Fraternity, is the true one, and it consists in constant progress. This progress includes the three elements of human well-being, personal development being the most important, as education reacts on social life generally, by bringing new ideals of life as well as a new sense of duty. In leaving Mr. Mackenzie's excellent work, we may say that it deals in a clear and logical manner with the important questions considered, and that it fully justifies the author's remark that "Social Philosophy is a subject which at present will repay a careful study." Ω.

Twelve Lectures on the Structure of the Central Nervous System. By *Ludwig Edinger*. Philadelphia and London: F. A. Davis, Publisher, 1890.

Dr. Edinger, of Frankfort-on-the-Main, Germany, is one of the very best authorities on the anatomy of the nervous system and the brain. His twelve lectures contain a statement of our present knowledge of the subject, to which the author has added considerably in several not unimportant details. No one who is a student of the human brain can do without Edinger's book, and we are glad that so soon after its appearance in German it has been translated by competent men into English. κρς.

Hypnotism. By *Albert Moll*. New York: Scribner & Welford. 1890. Chicago: A. C. McClurg & Company.

The present book is a translation from the second edition of the German original. It reviews in 410 pages the main facts of Hypnotism. The author begins with the history of Hypnotism (Chap. i); he then explains the different hypnotic methods and stages of hypnotism (Chap. ii). The symptoms of hypnotism (Chap. iii) are contrasted and compared with cognate states (Chap. iv). Information is given concerning several theories of hypnotism (Chap. v); all of them, however, are meagrely sketched and the author does not arrive at a conclusion himself. Simulation and its influences are briefly treated (Chap. vi). The medical and legal aspects of hypnotism (Chap. vii and viii) are good expositions of the matter, presented in lucid terms and impartially. The last chapter, on Animal Magnetism, treats of a series of questions which, as the author rightly remarks, refer to "phenomena which are often mentioned in connection with hypnotism, although the connection is rather

historical than essential." In Mr. Moll's view they "are the consequences of erroneously interpreted observations." The topics here discussed are (1) animal magnetism, (2) telepathy, (3) supernormal acts of somnambulism, (4) the experiments with the magnet, and (5) the effects of the mere approach of drugs.

The author does not present new views of his subject, but he is considerate in his statements, as well as scientific and clear. He is not blind to the dangers of hypnotism, yet upon the whole he looks upon it favorably, saying that "hypnotism and suggestion will outlive many remedies whose praises fill the columns of medical journals at present." κρς.

DER HYPNOTISMUS: SEINE PSYCHO-PHYSIOLOGISCHE, MEDICINISCHE, STRAFRECHTLICHE BEDEUTUNG UND SEINE HANDHABUNG. By Dr. *August Forel*. Zweite umgearbeitete und vermehrte Auflage. Stuttgart: Verlag von Ferdinand Enke. 1891.

Prof. August Forel's pamphlet on hypnotism was, even in its first edition, one of the best publications of its kind. The second edition which now lies before us is enlarged and improved. The author has not changed his views; he retains his old definitions, explaining hypnosis as a state of abnormally increased suggestibility; but at the same time he has added some chapters which present his position much more accurately than he has ever done before. He rejects most positively the fluidum theories; he opposes the views of Dr. Luys whose experiments Dr. Forel repeated with his most sensitive somnambulists and obtained negative results.

The position which Professor Forel takes is unequivocal Monism. He says in his preface:

"A psychological introduction seemed to me indispensable, for it is a daily dis-"covery with me, how much the monistic foundation of the doctrine of suggestion "is misunderstood. Normal dream-life, the theory of suggestion, and the relation "of the latter to medicine and to mental disorders generally, demanded substantial "complements, and the addition of a few new instances of therapeutic suggestion "seemed to me advantageous."

In agreement with this proposition he says in the first chapter of his pamphlet:

"Hypnotism throws much light on the phenomenon we call consciousness, and "in a manner that substantially agrees with the monistic world-conception. To "understand hypnotism in other relations, we must know what we have to under-"stand by consciousness and its relation to nervous activity. . . .

"With dualists, who regard the soul as one thing and the body together with "all matter and all the forces of nature thereto appurtenant as a totally different "thing, the doctrine of the psychical faculties follows of itself: herein the con-"sciousness, the will, the mind, and the rest must be regarded as separate depart-"ments of the soul. . . .

"The monistic conception of the world aims to reduce all cosmic phenomena "to a single unity, and regards matter, force, and consciousness ultimately as only

"forms of appearance of a same primitive potency. Especially, however, it de-
"nies, that the soul is anything else than forces of nature. . . .

"Considered from the monistic point of view, consciousness by itself is noth-
"ing; as Ribot ('The Diseases of Memory') correctly remarks with Huxley and
"others, 'Consciousness is merely the accompaniment of certain nervous pro-
"cesses; it is as incompetent to influence the latter as the shadow is the steps of
"the wayfarer it follows.' It follows, however, immediately from this, that the
"notions of consciousness and subject, or subjectivism, are identical and undefin-
"able. Consciousness is merely the subjective form of appearance of nervous
"activity. . . .

"Consequently, our human consciousness denotes only a summarised, synthet-
"ical, subjective illumination of the more powerful portion of our cerebral activ-
"ity. . . .

"A very important phenomenon of consciousness takes place, further, in the re-
"viviscence of previous combinations of cerebral activity, that is in the play of mem-
"ory-images. We have here to deal with the connection in time of the activity of the
"brain, that is with the relative illumination of this activity by consciousness. Espe-
"cially on this field does hypnotism throw valuable light. The whole process of mem-
"ory is in itself completely independent of consciousness and exhibits very interesting
'laws, for which, I refer the reader to Ribot (l. c.). We discover the laws of the
"memory in ourselves for the greater part through the illumination by conscious-
"ness of the activity of the brain. But it is not proper to oppose a conscious
"memory to the organic or unconscious memory. There is but one memory,
"which consists *a*) in the weakened preservation of the vibrations of every cerebral
"action (nervous activity in general), *b*) in the powers of reviviscence, or, better,
"power of re-invigoration of these actions, and often, *c*) in the re-cognition, that is
"in the identification, of the re-invigorated activity with the original one (localisa-
"tion in time). . . .

"We all possess a second consciousness, the consciousness of dreams or sleep,
"which, qualitatively, does not differ in essential respects from the consciousness
"of the waking state. . . .

"We may not, accordingly, place conscious and unconscious activity in oppo-
"sition to each other."

Dr. Forel discusses in other chapters of his pamphlet the relation of nervous activity and nervous substance to the states of consciousness (Chap. ii). He explains suggestion, compares sleep with hypnosis, treats the symptoms of hypnosis, resistance of hypnotised persons, auto-suggestions, the "suggestion à échéance," retroactive hallucinations or suggested memory falsifications, the import and nature of suggestions (Chap. iv). He then proceeds to investigate diseased states of mind with reference to hypnotism, and maintains that insane people are least suggestible (Chap. v). He gives some valuable hints for suggestive or psycho-therapeutic treatment to hypnotisers (Chap. vii), and presents cases of successful cures (Chap.

viii). The legal aspect is treated in Chap. x, the hypnotisation of animals in Chap. xi. An interesting and indeed candid chapter is Forel's views on quackery (Chap. ix); acknowledging the fact that at best one sixth only of patients are cured by physicians, our author hopes that the full recognition of the suggestion theory in therapeutics will contribute not a little to the advancement of medical science and also to the moral attitude of the profession. κρς.

DER MODERNE MENSCH. Versuche uber Lebensführung. By *B. Carneri*. Bonn: Emil Strauss. 1891.

During a long and laborious life Mr. Carneri has been an indefatigable champion of the monistic world-conception. With a keen eye he recognised years ago the importance of physiological investigations for psychology, and he saw at once the moral import of the evolution theory even at a time when most of its defenders denounced it as the immoral law of nature. Carneri thus became the preacher of a new ethics; he taught the morality of science and helped us out of the pessimism that naturally followed a time when the old foundations had been overthrown and the new ones had not as yet been built. The author is now at a very advanced age and the present book contains his maturest and dearest ideas. He is a man whose burden of life has been heavier than that the average man has to bear. Physical weakness, since birth, long periods of illness accompanied with almost incessant pain later on periods of recovery and transient happiness followed. He married and had children. But new visitations came. He buried his wife, and also a little son at the premature age of ten years.

These are some facts of the author's life not mentioned in any one of his books; they are only hinted at in a line of the preface of the present book, quoted below. But his readers should know these facts, because they bring the author so much nearer to us. We learn to understand him better and shall the more appreciate his genuine courage in working out a noble conception of life and sound rules of moral conduct.

The present book contains a number of articles on various subjects, and the author has as he says in the preface "put into them his whole heart." It differs from former publications of his. The latter are as a rule scientific and objective, they are investigations into the laws of life and of ethics. The present book is subjective; it shows the aim and the path of the author's conduct of life. Carneri adds: "And that I, visited with ills above the average measure, have found life beautiful, and being in my seventieth year now, find it beautiful still, speaks in favor of this path. It speaks also for a happy individuality, but I hope that this will not detract from the truth that the present book is not mere imagination but is taken from the thrilling pulse of life."

Carneri is fully convinced that morality will find a better foundation in the unitary nature of man than in the old conception of his double nature and in this sense he discusses the following topics, Gratitude, Labor, Egotism, Justice, Versatility, Passion, the Ideal, the Inevitable, the God-idea, Truthfulness, Morality,

Love, Family, Imagination, Continence, Honor, God-everywhere, Death, Tolerance, Character, Art, and Humor. The whole tenor of the book is very sympathetic and we might describe the author as one of the high priests of the coming Religion of Science. κρς.

Ueber die Grundlagen der Erkenntnis in den exacten Wissenschaften. By *Paul du Bois-Reymond.* Nach einer hinterlassenen Handschrift. Mit einem Bildnis des Verfassers. Tübingen: H. Laupp'sche Buchhandlung. 1890.

This little book of the late Prof. Paul du Bois-Reymond has been prepared for print by Dr. Guido Hauck with the assistance of the author's brother from a posthumous manuscript. The pamphlet contains in popular form the final résumé of a thinker's life-work; complementing and completing his investigations, and maturing mainly his favorite ideas which he had presented to his students in a course of lectures on gravitation during the winter '87–88 at the Technical High School of Berlin, where he was Professor of Mathematics.

Prof. Paul du Bois-Reymond is not only as powerful and at the same time as subtle a thinker as his more famous brother Emil du Bois-Reymond, but he also agrees with the latter's philosophical attitude. Both are agnostics and both represent an unusually profound and scientifically elaborate agnosticism. They have become agnostics because they have arrived at results which, to their mind, present an insolvable problem. Prof. Paul du Bois-Reymond does not despair of a final solution of the problem of life, which according to Emil du Bois-Reymond decidedly belongs to "the seven world-riddles," but he considers gravitation as incomprehensible. The purpose of all our attempts to explain phenomena is to limit the incomprehensible to the smallest space possible and to reduce it to the simplest expression (p. 13). Comprehension, according to Paul du Bois-Reymond, can be attained by three methods, (1) the empirical, (2) the mechanical, and (3) the meta-mechanical. The empirical is inductive, the mechanical is deductive, and the meta-mechanical attacks those problems which are at the bottom of all our fundamental conceptions. The meta-mechanical tendency of science is not satisfied with the results of the empirical and mechanical investigations; it attempts to conquer all the difficulties or at least to arrive at the limits of human comprehension. "Its province is to comprehend matter, how matter can have effect on other matter, how actio in distans can produce pressure or motion; it tries to understand the great concepts of time and space and whatever profound problems may now or during the further progress of science be proposed."

Having explained these preliminary views concerning the methods of comprehension, the author discusses the following topics: Is the Space-filling Substance Continuous or Atomistic? (Chap. iii.)—Actio in Distans (*Fernkraft*) (Chap. iv).—Several Syntheses (Chap. v).—The Idealistic and the Empiristic World Conception (Chap. vi).—Atomism and Actio in Distans with Reference to the Absolute (Chap. vii).—Concerning World-Conceptions (Chap. viii). In the first of these

chapters (viz. in Chap. iii. of the book) the author presents the difficulties which beset the theory of a continuous substance. At first sight it appears most plausible to conceive of that which fills space as something constant and uninterrupted, but continuity of substance, our author declares, excludes a possible change of volume; compressibility and expansibility, properties which we predicate of any kind of substance, stand in a patent contradiction to a continuous filling of space. Substance therefore cannot be continuous, it must consist of a material which can be shifted, which is compressible, can be mixed, is liable to chemical changes, and allows imponderabilia to pass freely through; it is porous, or in other words it is permeated by space free from substance. Prof. Paul du Bois-Reymond conceives of substance as dust-like, viz. it consists of spatially distinct corpuscles, and he thinks that there must be supposed to be different kinds of dust. These dust-particles are in his synthesis the vehicles of any actio in distans, their properties are energy and inertia. Actio in distans, we are informed in the next chapter, cannot be explained by constructing a world-synthesis either out of absolutely rigid elements or out of absolutely elastic elements. Since we cannot derive a construction of actio in distans from mechanical concepts, we are led to the conclusion that we have reached here the limit of cognition. Indeed, the incomprehensible in all forces is and remains the actio in distans. All the hypotheses which try to explain the problem, will only defer it by introducing some medium which is to be the vehicle of the actio in distans, and the simplest method is after all to consider the atom as this vehicle. "The far-effective atom, conceived as a centre of activity, endowed with inertia, freely movable, is the simplest mechanism that can be used as the basis of our synthesis, and we call it briefly the far-effective (fernwirkende) atom" (p. 52).

It seems to us that Professor du Bois-Reymond has disposed of the idea of a continuous substance too easily, and that he is at the same time too easily satisfied with the shortcomings of his atomistic theory of a dust-like substance. We grant most willingly that the idea of an actio in distans is inconceivable, for an action can be effective only where it takes place, it can have no effect in other and more distant places. But action is never confined to a limited point: it always stretches over a field of some size. Suppose an action *a* takes place along the line *b c*, can we speak of *b* as being effective in *c*; or is it not rather *a*, i. e. the whole process, which takes place in *b* and in *c*. The sun's mass exercises an effect upon the earth; and yet they are about 80,000,000 miles distant. But let us use an instance which can become a more direct object of our observation. We have a pair of scales and put a weight on one of them. At once, simultaneously with the sinking of the weighted scale, the other scale rises. Is this not just as much an actio in distans as any other instance of gravity? In fact our astronomers compare the gravitating celestial bodies quite frequently to the action of a balance. It may be objected to this comparison that we see the beam of the scales, while there is no beam between the sun and the earth. If there is no beam, there must be a connection of some kind. If the earth and the sun are two disconnected bodies, we see no possibility for an

explanation that the effects of the sun's mass are felt upon the earth. Is not after all the hypothesis of a continuous world-substance the easiest explanation of gravity? It seems to me that it is the only possible way of explaining what is commonly and perhaps awkwardly called actio in distans. The atomistic philosophers are bound to have the world a composition of innumerable particles of dust; they wish to construct the universe mechanically and this view of things appears for certain purposes very well adapted. Yet they cannot construct the world of isolated world-dust particles, they must have some glue or cement to fasten their atoms into a single whole that sticks together. Professor Du Bois-Reymond is consistent enough to see the impossibility of this construction. The cement of which the mortar of atomism consists is the inconceivable, unthinkable idea of an actio in distans.

Let us try to look at things from the other side. Our world-conception consists of the sum of all the divers things we are acquainted with; but daily experience teaches, that the world is not a composition of things or of atoms, the world is one inseparable whole, and the least change in one part affects the whole universe. Some one said, if I raise my finger the entire cosmos is shaken; and this we know is true, although the vibrations are too insignificant to be noticed by our dull senses. We speak of the earth and we speak of the sun, but in reality there is neither an isolated sun on the one side nor an isolated earth on the other, there is a whole and continuous world, one part of it is called sun and another part is called earth. Every action of every part of the world has its effects on all the other parts, and there is no action taking place in the world which in this sense is not an actio in distans. If we call the part played by the sun alone his action, then there is certainly actio in distans, and actio in distans would be the basis of the existence of the world as a cosmic whole. Yet we should remember that the sun does not perform any action alone for itself. The actions that take place in reality are relations among the inseparable parts of the universe. The sphere of every action extends, closely considered, over the whole world.

This view of things is not a construction of the world, it has not been invented for making a philosophical synthesis, it is a description of the world as we know it by experience. The description is imperfect and it presents many difficulties which will have to be formulated in problems. But we are confident that this descriptive method is the only procedure that promises success and will produce results in the future.

Attempts to reconstruct a world-system from its analysed elements have been made and, although we have not as yet reached a general consensus, we must consider these attempts as being at least in part successful. Suppose we call the simplest and most original state of substance ether and consider matter as ether-whirls of a certain kind. The ether must have a peculiar aggregate state of its own which in some respect is like a fluid, for its parts are continuous as well as interchangeable. An ether whirl, or an atom, being a condensation of ether, would naturally produce a tension which stands in some proportion to the condensed mass.

Let an india-rubber plate in a frame such as the designers use for altering the size of a picture represent the normal relation among the different parts of pure ether. Now put the finger-tips of both hands upon the india-rubber and contract them so as to condense in both places the india-rubber inside your finger-tips. Would not the tension between both condensations be increased? and suppose the two condensed spots were swimming freely in the india-rubber, they would in that case attract each other in a similar way as masses of matter gravitate toward each other.

This comparison is of course rude, but it may serve here as an illustration of how we can conceive of actio in distans without committing ourselves to the assumption that an action has its effects in a place where it does not operate. We should not venture to speak of the absolute rigidity or absolute elasticity of the world-substance until the phenomena which urge us to form our views about ether have been better classified and understood.

In the chapter on "Several Syntheses" the author discusses problems without coming to any conclusion. The synthesis of organised life may lead us to something which is quite as incomprehensible as actio in distans and cannot be reduced to it (p. 70). The riddles grow before our eyes, "above the fog of that which lies near us rises the imposing problem of the soul and towering above all other things appears the awful question of the consciousness of the ego." Prof. Du Bois-Reymond does not attempt any solution and proposes no reconciliation between the empirical and idealistic world-conceptions (which are contrasted in Chapter vi). This lack of arriving at a definite solution leads our author into mysticism, in which he indulges in the last chapters to a greater extent than we are inclined to allow a man of science. He speaks of a treble world in which we are shut up as if in a treble cage, (1) the world of immediate apprehensions, (2) the world of conceptions, and (3) the world of reality. The third world is "extra-phenomenal," it is the physical beyond our ego included. But "we are lacking the organ of reality" (p. 120) and "in the physical beyond nothing is impossible" (p. 122). It is strange that Prof. Du Bois-Reymond mentions Professor Kirchhoff's famous preface to his mechanics, in which he replaces the word "explain" by "describe" (p. 13). He also mentions Professor Helmholtz's term that phenomena (i. e. sensations) are symbols or signs of reality, *Zeichen der Wirklichkeit* (p. 121). But he overlooks entirely that the world-conception derived from these ideas can be developed in a positive world-conception that can satisfactorily reconcile idealism with empiricism. As soon as we know that cognition means description, we can dispense with meta-mechanics and need not join in the disheartening cry of the agnostic *ignorabimus*. The inscrutableness of reality, says our author, is almost a matter of course. Happily we forget it constantly, for the idea is one of the dreariest and the most weird (trostlosest und unheimlichst).

The whole result is negative, for we can predicate of reality nothing save that it is contained in a space and that there is motion taking place in it. But of what

kind this space and the time depending on the motion are, and in what relation they stand to our conceptions of time and space we can say nothing.

This is sad, but, adds Prof. Du Bois-Reymond, "world-pain is of no avail and yet, the world is not so bad after all" (p. 124). *κρς.*

TUISKO-LAND DER ARISCHEN STAEMME UND GOETTER-URHEIMAT. Erläuterungen zum Sagenschatze der Veden, Edda, Ilias, nnd Odyssee. By Dr. *Ernst Krause.* Mit 76 Abbildungen im Text und einer Karte. Glogau: Carl Flemming. 1891.

Dr. Ernst Krause, better known by the nom de plume of "Carus Sterne," has of late made a special study of comparative mythology, and many interesting articles of his have appeared in different German periodicals, analysing and collating the myths of the Aryan nations and investigating their material as to their probable origin. Dr. Krause distinguishes between two kinds of myths, (1) those which might and actually do originate in any place, and (2) those which could originate only in a certain and limited locality. The former are most interesting to the psychologist. We can expect that they will afford us an important clue to the development of the human soul. The latter, however, are valuable material to the historian and ethnologist, and from their rich mines Dr. Krause quarries his main arguments to prove the European origin of the Aryas. The course and the effects of the sun vary so greatly in the south and in the north that it would have been strange if the solar myths also did not vary. Now it is natural that such a myth as that of Baldur's death, for instance, could only originate in a northern climate, and if we find the same legend told with slight modifications in the south, we must assume that it has been transplanted there. The attempt has often been made to explain the similarities between the Edda on the one hand and the Greek or Hindoo legends on the other by the influence of the latter on the former; yet we find that this theory is no longer tenable and we must grant, if not to the Edda itself, certainly to the substance of the Edda traditions a far greater antiquity than we ever could have anticipated. Let us compare, for instance, the Baldur myth with the account of Herodotus in "Klio" (Chaps. 34–45), and let us bear in mind that here we have not to deal with history, but with legends, for Plutarch already observes, the ancient historians had noticed that Solon died soon after Kroesos's accession to the throne (563 B. C.); accordingly it was little probable that he saw the Lydian King while at the height of his power. The striking similarity of the two versions can be seen in eight points:

1. King Odin has two sons, of whom the one is a model of perfection, beloved by God and men, while the other appears to be excluded from the succession by the fact of his being blind.	1. King Kroesos has two sons of whom the one excels by his virtues all his companions, while the other appears to be unable to succeed his father on the throne. He is deaf.
2. The Ases have evil dreams, indicating that some danger is threatening to Baldur.	2. Kroesos dreams that a pointed iron wi l kill his favorite son Atys.
3. Frigga takes an oath from all created things not to injure her son.	3. Kroesos removes all iron arms within reach of his son.

4. Baldur is married young, the name of his wife being Nanna.	4. Atys is married young, his mother's name is Nana.
5. The Ases make a sport of shooting at Baldur because no missile can hurt him.	5. Atys goes a hunting, because in this sport he need not fear the tooth of the boar.
6. Baldur's own brother kills him without intention.	6. A friend (who was a fratricide by accident) kills Atys unintentionally.
7. Loki is accused of being guilty of the murder.	7. Not he who threw the fatal missile is accused, but the God who predicted Atys's fate in the dream.
8. The innocent murderer is slain.	8. The innocent murderer commits suicide.

We must consider it as an additional proof of the theory that the southern version has been taken from northern sources when we find incidental features which have sense only so long as they appear connected with their original surroundings. The Ilias also contains a modified version of the Baldur myth in the account of Patroclus's death. Patroclus is the kind hero, obliging and friendly to all who knew him, the brightest and purest figure of the whole poem. He falls by the intrigues of a God. When Patroclus's body is burned the same thing happens as with Baldur. Achilles lights the funeral pyre but it will not burn, and as in the Edda a giant-woman is called in, so in the Iliad, Iris is sent for in order to call Boreas and Zephyr who by the promise of considerable sacrifices are induced to make the fire burn. There is no reason here why the fire should not burn, but in the Edda there is a very obvious reason, for all the elements had promised by oath not to harm Baldur's body. The flames were not allowed to burn him, the logs on which the funeral ship should roll into the waves were not allowed to carry him down, and the waves were not allowed to receive him.

Great interest attaches also to the similarities between the Baldur myth and Christianity, and not long ago a Danish theologian has attempted to show that the sagas of the Edda were imported into the North by Christian monks, the world-tree Yggdrasil was said to be the biblical tree of life, the same from which the wood of Christ's cross had been taken, Loki was identified with Lucifer, the blind Höder with Longinus, the Roman captain who thrust the lance into the side of Christ, etc. It is a strange coincidence that Longinus was blind, according to the Gospel of Nicodemus, which may have been written in the eighth century. Longinus, it is told, acquired sight through the blood of Jesus, thus interpreting the passage "they shall look at him whom they pierced" in the sense as if Longinus had not been able to look at Jesus before.

A Jewish libel against Christianity, *Toledoth Jeshu*, (reprinted in Eisenmenger's "Entdecktes Judenthum") contains a very striking similarity with the Baldur myth. It is told:

"When the wise had ordered Jesus, after he had been stoned, to be hanged to "the wood and the wood would not bear him but broke, his disciples saw it and "they wept and said: 'Lo the justice of our Lord Jesus; no wood will bear him.' The disciples did not know that he had extorted an oath from all the wood while

"he had still the name (viz., the mystical and miracle-working name of God) in his "power, for he knew his fate that he would be condemned to be hanged. . . . But "when Judas saw that no wood would bear him, he said to the wise: Consider "the shrewdness of his mind. He has taken oaths from all wood that it should not "bear him, but in my garden grows an enormous cabbage-stock. I shall go and "bring it; perhaps it will bear him. The wise said: Do as you say. Then Judas "went and brought the cabbage-stock, and they hanged Jesus on it."

This account being older than 1278, it was supposed to have contributed to form the Baldur myth of the Edda, but Müllenhoff refuted all the attempts to attribute a recent origin to the Edda. The mistle does not grow in Iceland, accordingly the main parts of the Baldur myth in which the mistle plays so prominent a part must have existed before the Icelanders left their Scandinavian homes.

Dr. Krause's investigations strongly tend to corroborate the new view of placing the home of the Aryas in Europe.

By Aryas in the old sense of the name were understood those families of nations which spoke the Aryan languages, viz., the Hindoo, the Persians, the Greeks, the Romans, the Slaves, the Germans, and the Celts, and some few smaller ones. These Aryas were formerly considered as kin in blood and their home was sought somewhere in Asia. Of late, however, many considerations tend to prove that these Aryan nations were by no means one family; they are the product of a mixture of several races among which one has forced its language upon the others. If we call this race the Aryans proper we find that they are represented most purely in the Teutonic nations, the Saxons, Low Germans, and Scandinavians. These Aryans are a tall, blond, and dolichocephalic race. They appear as the conquerors of India, the masters of Persia, the Dorian immigrators of Greece, showing everywhere the same attributes. It is natural that they were swallowed up again by the dark brachycephalic races whom they had conquered, because the latter were better adapted to the southern climate than their masters.

There are three long-headed races: (1) the blond long-heads or Aryas, (2) the dark South European long-heads, and (3) the dark and woolly-haired long-heads of Africa or the Negroes. There are also several broad-headed races, among them the Ugro-Finnians, Turanians, South European broad-heads are represented as the Savoyards. The original Aryans (by A. de Quatrefages called the Cannstadt race) were extremely long-headed, the proportion sinking below 75 : 100. This race, so called after the discovery of graves in Cannstadt, shows a strong similarity with, and must be considered as, an evolution from the Neanderthal type. The eyebrows of the male Neanderthal type skulls protrude (slightly reminding us of the Gorilla) making the smallness of the forehead still more noticeable. The hind part of the head is well developed. The bones are extremely strong, the skull is thick, and the proportion of length to breadth averages in both, the Neanderthal and Cannstadt types, 71·3. This race inhabited the banks of the Rhine and Seine and has been called the Germanic type by Hölder, the Saxon type by Englishmen, Cymrians by Broca,

while Dr. Krause calls them Aryans. The South European long-heads with dark hair are called by A. de Quatrefages the Cro-Magnon type, named after a place in the Vésère valley where as its first specimen a tall old man had been discovered. The Cro-Magnon type varies greatly from the Cannstadt type; the forehead is broad and high, and the cranium is also well formed. The proportion of breadth to length is also dolichocephalic, it averages 73·76. The orbits are broad but closely set, and the size of the lower parts of the face from the middle downward is strongly lessened in proportion to the higher parts, ending in a pointed and protruding chin. This race lived in Greece, Southern Italy, France, and Spain, and is found also in England, where its descendants even to-day can be traced in some of the Silurian inhabitants of South Wales and Ireland. Tacitus says that the Silurians have come from Spain, and even to-day the people of Berkshire resemble greatly, as Boyd-Dawkins says, the Basques of the Western Pyrenees, near Bagnères de Bogorre. Their stature is sometimes small but not always, they are sometimes tall, their gait is light, their nose narrow and long, sometimes approaching Jewish features, their skin dark, their hair coarse, black, and usually curled.

Long after the appearance of these long-heads arrived several varieties of broad-heads, among them Mongoloid, Ugro-Finnish, and Turanian types. Dr. Krause arrives at the following résumé, that the Cannstadt skull represents the Germanic or better the Aryan type. "This race lived in Middle Europe in the oldest times to which prehistoric investigation descends and has not immigrated from Asia since the great ice-era. This conclusion has been adopted by the most prominent anthropologists, in France by Hamy, Topinard, Quatrefages, in England by Beddoe, Flower, Thurnam, in Germany by Ecker, Lindenschmit, Hölder, Virchow, and others."

Dr. Krause adds: "Virchow however takes in this question of the characteristic features of the Aryan race a strange and isolated position, in so far as he believes that from the beginning there had been and are still broad-heads as well as long-heads among the Germanic races." With respect to the conflict between Virchow and Dr. Krause, we should prefer to call the old and original races by new names, as Quatrefages did; we should speak of them as the Cannstadt type, the Cro-Magnon type, etc. When we speak of Aryans, or Saxons, or Germanic nations, we should know that they are no longer the pure Cannstadt type, but a mixture, and this mixture has not even to-day become sufficiently fixed to produce one uniform race. There are certain features predominant in certain nations, and certainly the blond long-heads are purest in the Teutonic nations; nevertheless, it is not an uncommon occurrence that in one and the same family both types are distinctly represented. Johannes Ranke on the strength of this fact has no faith in the constancy of the skull and does not regard it as a fit method of settling any race problem.

The Aryans, i. e. the tall, blond broad-heads of the Cannstadt type are distinguished by strength and by power of will. They were hunters, fishermen, sea-faring people, and warriors. They loved the sea, they loved rivers and lakes.

They appear repeatedly in history as conquerors. The arts and industries, however, the use of metals, the invention of pottery, do not seem to have originated among them.

It seems to us that Dr. Krause exhibits an excusable partiality for the blond tall Aryas in comparison with the dark South-European long-heads as well as the broad-heads. The Aryans were chiefly the rulers, except in Palestine, where the tall blond Amorites had been conquered by Semites. It appears that the conquest of a country by the Aryas for instance in India, in Persia, in Greece, gave a start to civilisation, as the Ostro-Goths restored peace and reawakened the arts in Italy. But at the same time we notice that the Aryas were most likely more savage than their broad-headed fellowmen. The present Teutonic population represents so little the pure type of the old tall long-heads that Professor Virchow refuses to recognise long-headedness as a race symptom at all. We find long-heads and broad-heads in the same family. Both long-headed parents may have broad-headed children and *vice versa*. This need not prove the correctness of Professor Virchow's position, but it may very well prove that the present nations, the Teutonic race not excluded, are the product of a mixture. As the most important feature of Aryan character Dr. Krause considers their religion, and we are inclined to accept Dr. Krause's opinion as thoroughly sound. The Aryan religion, he says, is the cult of light in opposition to the southern cult of darkness. The original Semites worshipped the earth, the moon, the night; the Aryan, worshipped the sun, the sky, the day, the former bowed before womanhood and sentimentality; the latter represented manhood and will-power. (The Jews are not pure Semites, they show a constant proportion in the north of a little over $\frac{14}{100}$ and in the south of a little over $\frac{13}{100}$ of tall, blond long-heads. These blond Jews, are according to Virchow, the Amorites with which the Israelites mixed after the conquest of Palestine. The religion of the Jews also shows very strong Aryan influences especially since their contact with the Persians.)

The Aryan religions as a rule begin the world with male motherless Gods; while the Semitic religions begin with female mother-gods without fathers. There is the giant Ymir or in Alfadur, here the goddess Kybele, Isis, Rhea, or Demeter. This difference is founded on a social difference which again depends upon climatic conditions. In the south we find in the beginning a state of matriarchy. There was no great difficulty in bringing up large families and the assistance of the father was not needed. In consequence thereof the father was and remained a stranger, an occasional visitor. There were no lasting family ties between himself and the mother of his children, the sexual relations remained free, and the right of heredity recognised the mother only. How different was it in the north! Without their father a family had to perish. The severe struggle for life created the family and eventually the monogamic family, it made the men strong, active, liberty-loving. There was undoubtedly much rudeness among the northern nations; they were savages in many respects, but wherever they appeared as conquerors they introduced their re-

ligion of light, activity, and submission to moral laws. The conquered tribes contributed undoubtedly many most valuable qualities to the mixture from which the future races arose, qualities which the Aryans would perhaps never have been able to evolve out of themselves alone. Nevertheless the Aryans gave character to the nations, impressed upon them their speech, their thought, their world-conception and their morality.

Dr. Krause's treatment of comparative mythology with reference to the physical and geographical conditions under which myths originate, is very suggestive, and we wish he had also taken into consideration the parallelism of the northern Sun-myths with Christianity. Dr. Krause mentions that the idea of immortality is an Aryan thought, he might have added that the idea of a dying God who will again rise from the dead can only have originated in the home of the Baldur myth.

Dr. Krause's work contains in 624 pages an almost inexhaustible store of investigations. It is one of the most interesting books we have ever seen. We mention here only the chapters on the Megalithian Monuments, on Orion, on the northern animals of Apollo, on little Red Ridinghood, on the Wagon in the Skies and Tom Thumb, on Helen and her northern representatives, and on the history of the Odyssee. The book would be more valuable to the reader if it possessed an index. κρς.

Die Mathematik die Fackeltraegerin einer neuen Zeit. By *C. Dillmann*. Stuttgart: W. Kohlhammer, 1889.

The importance of this little book does not lie so much in the theories as in the practical aims of the author. Oberstudienrath Dillmann is a reformer in the system of higher education; he is not a mere theorist, but a man of experience who has now been for years the principal of a school like that which he advocates. Mr. Dillmann's idea is very simple and obviously correct. He claims that the old so-called classical method, where the teaching of dead languages is made the basis of education, no longer meets the needs of our time; that there is however another discipline, which for its universality and its fundamental importance in every branch of knowledge should be made the corner-stone of education, and that is mathematics. So he proposes to have our boys educated in mathematical high schools.

We may insert here some information concerning Mr. Dillmann, which is not found in his book but will throw light upon his plans and theories. Mr. Dillmann is the son of a schoolmaster. He inherited from his father the aspiration of acquiring a higher education and having passed through the gymnasium he went to the university to study theology. The study of theology is the only one in which a poor youth finds support and material help from his fellowmen. Having passed his examinations he was engaged for about seven years as a vicar in the service of the church. He felt however the need of completing his education in mathematics and the natural sciences. He went again to the university (this time to the polytechnic school at Stuttgart) and devoted himself with great zeal to his favorite

studies. Having passed his examinations in these branches he was appointed professor of mathematics at the Stuttgart gymnasium. While here engaged in preparing his pupils for the university, he became more and more convinced that the whole plan of teaching then followed was inadequate. Our youth receive much information about trifles which are useless to them in after life, while the main things are treated with indifference. He wrote a book "The demands of the Realistic Sciences on Education," which excited general interest and called the attention of Kultus-minister von Golther to his ideas. Herr von Golther founded a new kind of a high school which besides giving good philological instruction, Latin included, was to be devoted mainly to a thorough mathematical education; and Professor Dillmann was appointed president of the school, which first bore the name of "mathematical gymnasium." The authorities soon considered it best to change the name into Real-gymnasium. The school was started in 1867 as a mere trial and in 1871, when its success appeared to be assured, it became a permanent institution. For 15 years it counts an average of from 800 to 900 pupils.

In spite of the confidence of the public, the new school had and has still its hard times. The views now prevalent among the German authorities are less favorable to great reformatory ideas than ever. The restrictions put upon the Real-gymnasia have also hit Mr. Dillmann's school, although his institution is different in plan from the other Real-gymnasia, the latter being, as a rule, schools in which the scholastic severity of the gymnasia is neglected without replacing it by other systematic studies.

The present book has been written to explain and justify Mr. Dillmann's methods, and we cannot but say that we heartily sympathise with his aspirations. At the same time we express here the sincere hope that another Dillmann might rise on American soil and institute a real mathematical high school which will give a more solid foundation for the education of scientists than our present educational systems can give. We do not mean that the philological and historical studies should be neglected in such a mathematical school. We trust that they can be taught with less waste of energy than has been done in the past. There is perhaps no need of preaching against Greek and Latin in our American schools, because philology, it appears, is the most neglected study on this side of the Atlantic and the ignorance in classics often of highly educated scholars is sometimes astounding and would be shocking to pedants of European philology. But I have not as yet been able to discover that this ignorance concerning a few grammatical rules of two dead languages has wrought great harm. At the same time I have noticed that European savants in spite of their enormous philological scholarship are sometimes grossly ignorant of the spirit that lived in the so-called classic nations. They have translated Homer, have analysed the Ionic and Aeolian and Dorian forms of Homeric speech, but they have rarely read Homer and imbibed the beauties of Greek poetry. Philological scholarship is dry and hard work, but the study of historical evolution, to be nourished with the spirit of the past and to see it develop into

the spirit of modern times is rather recreation than drudgery. We can keep the latter without plaguing our boys so much as before with the former.

The present book contains as introduction an "open word" by the author to his Excellency the Prussian Secretary of Education, Dr. von Gossler, pointing out the error of his policy not to admit the pupils of Real-gymnasia to the universities. The bulk of the book is devoted to an explanation of the importance of mathematics in all the sciences. Mr. Dillmann declares it is a mistake to believe that the objective world is unknowable. Kant has torn the world in two halves and by making space and time purely subjective, he created a gap between the subject and the object, between mind and nature, a gap which, if Kant's assumption be true, cannot be bridged. Kant's division of the world however is wrong. Does not every thinking subject with his feelings and concepts lie in the sphere of objectivity of other subjects? Time and space are not purely subjective and the science of time and space is destined to reconcile the conflicting parties, it will restore peace and harmony again between mind and nature. Our world of conception is in immediate contact and interconnection with the world of reality. All intellectual activity is motion of our organ of thought. Sensations are produced by motions of the objective world and these sensations are gradually transformed into concepts. Words are the embodiment of concepts. The phenomena of the outer world reappear in the symbolism of language, and thus our intellectual activity can lead to a faithful representation of nature. The world is cognisable, truth can be born in us and we need not lose the self-confidence in our own abilities.

These theoretical explanations are of great interest, and we need scarcely add that Mr. Dillmann's plan would still retain its value, if they were proved to contain inaccuracies or errors. We look upon it as the author's philosophical confession of faith, the main idea of which is indubitably correct while many of its details are without great consequence. We would express the main idea of Mr. Dillmann's book in the following way: Formal thought is the basis of all knowledge and a correct comprehension of the main formal sciences especially of mathematics is the primary condition of a scientific education. *κρς.*

GEISTESSTOERUNGEN IN DER SCHULE. Ein Vortrag nebst 13 Krankenbildern. By *Christian Ufer*. Wiesbaden: J. F. Bergmann. 1891.

The subject-matter of this pamphlet was read as a lecture on November 9th, 1890, before the *Verein für wissenschaftliche Pädagogik* at Weissenfels. The author's aim is, to bring home to parents and teachers the important idea, that the treatment of psychical disturbances must be based on our best knowledge of psychology, and especially of physiological psychology. A deeper insight into pathological conditions, says Krafft-Ebing, will remove many mistakes and tyrannies in our education. Teachers as a rule have to deal with healthy children, but diseased conditions are sufficiently frequent to demand of our teachers that they should learn how to treat them. The cases with which the author illustrates his doctrines show

that one of the most common causes of psychic diseases in children must be sought in the nervous disposition of their parents, their unequal treatment and also their over-anxious ambition which produces excitement in the child's mind without helping him to overcome the rather heavy demands of German school-life. *κρς.*

THE SOUL OF MAN. An Investigation of the Facts of Physiological and Experimental Psychology. By Dr. *Paul Carus*. Chicago: The Open Court Publishing Co. 1891.

The Editor of *The Monist* has collected and collated in this book the results of the work done in the field of psychology and its auxiliary sciences. The author's philosophical standpoint is characterised in the first chapter where he contrasts feeling and motion. Feeling is defined as the subjective aspect of certain processes which, viewed objectively, appear as motions, and it is described as a state of awareness. Feeling originates from the simpler elements of subjectivity and becomes naturally representative, i. e. it acquires meaning. Mind is an organised totality of meaning-endowed feelings. The author reconciles from his standpoint idealism with realism. He shows that "the fulfilment of mind is truth. . . . Mind expands in the measure that it contains and reflects truth" (p. 46). The question of telepathy is touched, yet telepathy has here a different meaning from mystic thought-transference without any means of communication. Every sensation is a "far feeling" in the literal sense of the word, for "we do not feel our sense-organs but in and through our sense organs objects outside of us are felt. In and through our eyes most distant stars are seen. . . . What is the soul but a telepathic machine?" (p. 44) In the chapters following are described the characteristic features of organised life and its rise from non-organised life. The physiological part of the book treats of the soul-life of plants, then of animals, and gives by the aid of profuse illustrations an account of the evolution of nervous systems up to man. The chapter on the seat of consciousness proposes a new theory which will be of interest to physiologists as well as psychologists.

The recapitulation of the present state of experimental psychology presents the most telling facts of hypnotism, compares them with their correspondent normal states of soul-life, and explains them from the standpoint of the author. The conclusion of the book is devoted to the ethical and religious application of this conception of psychology. The practical importance of the new truths in the psychological field is vigorously maintained, but at the same time it is shown that the old conceptions psychological as well as religious are by no means worthless. They contain great truths and cannot be discarded offhand. In this sense are discussed among others the problems of Freewill and Responsibility, of Immortality and of the God-idea.

PERIODICALS.

MIND. April, 1891. No. LXII.

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Mr. Hodgson states that the kernel of the problem of Free-Will lies in the question whether, as imagined by Compulsory Determinists, the strongest motive has from the first governed the deliberation or process of choosing, as it subsequently governs the action chosen, or whether the victorious motive owes its superior strength to the act or process of deliberation, which terminates in choice, as much as to its own initial degree of strength. In favor of the latter view, he states that choice involves deliberation, and such deliberation involves a consciousness of incompatible or alternative desires, and a comparison of their relative degrees of desirability. The act of choice is the same in nature as the act of selective attention in perception and thought, and is known by the sense of effort or tension which gives it the character of an *act*, and the consciousness of a decisive change in the relative desirabilities of the alternative desires represented in the deliberation, which gives it the character of an act of *choice*. All true volition is choice, whether the desire, almost instantaneously adopted, is adopted because the will is weak, or because it is strong. In the former case, the will is mastered by a powerful motive; in the latter case, the motive which it follows receives its strength from the will itself, in the character of a deliberating agency. To the extent of the deliberation there is freedom. Freedom in willing is merely the power to will. Volition is the name for the whole action of which Freedom is the potential state, and Choice or Resolve the completing act.

Mr. Stout's article is in continuation of that on "Apperception and the Movement of Attention" in the last number of *Mind*. Intuitional thinking is independent of language and other expressive signs. Language is a way of attending indirectly to that which cannot be attended to directly, and signs which fulfil such a

function are *expressive* signs. An expressive sign must be carefully distinguished from a *suggestive* sign, which merely calls up a certain idea which may then be attended to independently of it, and a *substitute* sign, which is a means of *not* thinking about the meaning which it symbolises. The development of language is a development of self-consciousness. A concept is an apperceptive system objectified by means of an expressive sign. Expressive signs are the form, as distinguished from the matter, of conceptual thought. The distinction between formal and formless languages acts as a line of demarcation between the language of natural signs and that of conventional signs. Gesture-language may be described as formless. It is an instrument of conceptual thinking, in which the natural signs are either demonstrative or imitative. Onomatopœia is a phonetic gesture. Conventional signs, being free from the necessary limitations of natural signs, are capable of expressing adequately and accurately the most specific and the most abstract concepts.

In his article on the "Nature of Consciousness," Mr. Shand seeks to show that consciousness, when abstracted from the other acts combined with it, is a unique judgment, and as an act of judging it is simple and unanalysable. As a union of act and object, however, consciousness is complex. The whole is a judgment which, besides its object, contains also the difference between its act and its object. Here is shown its contrast with the Transcendent Judgment, which merely judges its object. But there is a fundamental unity between them. Each is a judgment—an act concerned about an object different from its act, and, as an act, each is a simple reality. Judgment, universally as an act, is such a simple reality. Reality in consciousness means no more than presentation, and the act of being conscious is the subject exercising one of its functions. This mysterious something, the subject, cannot be resolved into any association of presentations, nor into any one of them, nor be derived by abstraction from them, so far at least as the act of being conscious is concerned, which is a genuine function of the subject.

Professor Land gives a sketch of the life and work of Arnold Geulincx, the Flemish thinker of the seventeenth century known to students of philosophy in connection with the doctrine of Occasionalism. The key to Geulincx's view of philosophy is to be found in his statement that the utterances of our own reason are far less regarded than the shows of senses and fantasy; although they have their source in the bodily life, which is radically foreign to the soul, and can only darken the knowledge of our self and of its true interests. The dualism of mind and body is for Geulincx a determined fact. Professor Land has undertaken to prepare a complete edition of Geulincx's works, the expenses of the publication of which will be defrayed from the balance remaining over from the Spinoza Memorial fund.

In his discussion on "thought-relations," Mr. Eastwood states that this puzzling expression is interwoven with the whole of Green's writings, and requires to be thoroughly explained. The proof that the Real is identical with the Thinkable was Green's great problem, and to Hegel's inquiry what are the essential features of thought? he replied: the constitution of relations. Green found, however, that they are not fully adequate in themselves and he called to their aid a spiritual principle or eternal subject. But the reference of relations to the Eternal Mind as their subject is a reference to the unknown, and therefore is, on grounds of strict reason, illegitimate. Thought-relations are essentially finite, and are the connecting links of the phenomenal world. In the evolution of thought the absolute is nothing short of the whole, and especially, it is the whole *process of transition* from Being to the Idea. The more we try to externalise it or to arrest its movement, by im-

pressing it with the immutability of thought-relations, the more it recedes from our grasp.

In his Notes on Volition, Professor Bain considers whether pain is to be regarded as the sole motive in voluntary action, or whether the motive is a growing pleasure or a diminishing pleasure, in concurrence with some form of active exertion. Considerations arising from the great differences among pleasures themselves leads him to reject the view that the stimulus of the will is uneasiness pure and simple, and that pleasure, as such, leads to quiescence and contentment. A taste of pleasure constitutes an impetus to seek for more and may be accepted as the normal situation of the human will. The graded scale of voluntary action ranges from the lowest depths of pain, at which the motive power is at its maximum, to the highest assignable or attainable modes of pleasure, approaching which the motive power gradually dies away.

Mr. Mackenzie points out, in considering Mr. Alexander's criticisms of his *Introduction to Social Philosophy*, the importance of distinguishing, when dealing with the subject of organic development, between the psychological and the metaphysical points of view, and that he wrote entirely from the metaphysical point of view. (London: Williams & Norgate.) Ω.

THE AMERICAN JOURNAL OF PSYCHOLOGY.

CONTENTS: February, 1891. Vol. III No. 4.

CONTENTS: April, 1891. Vol, IV. No. 1.

It is pointed out by Dr. Bancroft that the close relationship between automatic muscular movement and the inhibitory power renders a study of the latter essential to a complete understanding of the subject of automaticity in health and disease. The inhibitory power is intimately associated with all the higher faculties, and as it must, in common with them, seek expression through functional activity of the cerebral cortex, functional or organic disturbance of this region should be attended by disordered inhibition. In many cases of insanity that portion of the brain that "originates the will impulse" is cut off by reason of organic or functional disturbance, and consequently the areas that lie nearer the centrifugal nerves are left to act independently of will and inhibition. The development of mechanical attitudes among the chronic insane is illustrated by a plate exhibiting two cases of melancholia with stupor and two cases of chronic dementia.

The literature of the Psychology of Time is dealt with by Mr. Nichols from the historical and the experimental standpoints. The most striking feature of the

whole time investigation is, that of all the philosophers and psychologists who have touched upon the problem, only two of the whole number, Condillac obscurely, and James Mill definitely, have solved the mystery by *letting the sequences themselves be the ultimite mystery*—by letting their process, as process and of itself, show forth its own explanation. The results of experimental investigations in time psychology are scarcely more satisfactory. Most experimenters have confined themselves to the determination of the Constant Error, Sensibility, and Weber's Law, yet with difficulty, if at all, can the results of any two of such determinations be harmonised. The majority of evidence is strongly against the validity of Weber's Law; also against any fixed or constant Periodicity. Later investigators look to physiological processes for explanation of time-judgments, and particularly to rhythmic habits of nerve centres.

Dr. Hodge's paper is a continuation of chapters which appeared in the *American Journal of Psychology* in May 1888 and May 1889. His experiments on cats show that spinal ganglion cells do recover from the effects of injuries by electrically stimulating the nerve going to them, but that the recovery is a slow process.

An account is given by Dr. Scripture of the known Arithmetical Prodigies. The opinion of Bidder was that "mental calculation depends on two faculties of the mind in simultaneous operation—computing and registering the result"! The power to do long calculations in the mind without making a mistake is the most remarkable fact in regard to ready reckoners; next the wonderful rapidity which some of them have shown. All of them possessed a remarkable impressibility, and practised modes by which arithmetical associations may be enormously shortened. Dr. Scripture offers for consideration the points that the power of mental calculation could be greatly developed under cultivation; that numbers and their values may be learned before figures, just as a child learns words and their meanings long before he can read; that it is best to teach "calculation" by the *abacus* before "ciphering."

Mr Nichols records in his second article the result of a series of experiments made by him at Clark University to investigate the apparently contradictory results obtained by various experimenters regarding the Constant Error of Time-judgments. The experiments teach nothing of the cause of the Constant Error, but it is shown that those individuals who make the largest constant error, make the error most constantly in one direction, and are apt to make a constantly increasing error throughout the series of experiments. Mr. Nichols's final conclusion is that "the processes of the environment, of our bodily organism, and of the sensations and images which correspond thereto, are, in themselves a sufficient explanation of time-psychology, and that time perception cannot be explained by any single state or disparate sense, but must be accounted for as a *process*." (E. C. Sanford, Clark University, Worcester, Mass.)

INTERNATIONAL JOURNAL OF ETHICS. April, 1891.

Vol. I. No. 2.

CONTENTS:

ANOTHER VIEW OF THE ETHICS OF LAND-TENURE. By *Prof. Simon N. Patten.*
MORAL TALES. By *Clara E. Collet.*

Mr. Leslie Stephen affirms that it is our duty to try to make men equal by raising the grade of culture in all classes. The distribution of classes would continue, but it would correspond purely to the telling off of each man to the duties which he is best fitted to discharge. The essential condition of all social improvement is that the individual should be manly, self-respecting, doing his duty as well as getting his pay. Nothing will do any permanent good which does not imply the elevation of the individual in his standard of honesty, independence, and good conduct.

One of the earliest studies of life, says Professor Toy, is that which is known as the clan-constitution of society, during which two important facts are exhibited, (1) ethical ideas are determined by those of the community, and (2) the deity of the community is regarded as a member of the clan. Both these characteristics have become modified in the progress of civilisation. Moral rules and principles have become clearer, broader, and higher, and society has come to be an efficient moral guide and support. Religion has moved away from the conception of the tribal god, and the conception has been formed of the absolute dominion of natural law in the moral world. The end to which human moral history points is a conscience absolutely independent and yet absolutely dependent,—independent in that it refuses to recognise any other authority than its own ideals, dependent in that it receives its ideals from the life of man, which is the highest revelation of God.

According to Professor von Gizycki, the ultimate basis of all ethical demonstration is the supreme standard of good and evil, the greatest possible happiness of all mankind. Various objections urged against this, as the final aim of life, are examined by Professor von Gizycki and declared not to constitute a decisive case against it. As to the desire to obtain peace of conscience he affirms that this can only follow upon such action as is in conformity with the greatest possible happiness of mankind. The Professor has modified his former position. The injunction, "Seek peace of conscience in devoting thyself to the welfare of mankind," which he had proposed in his "Moral Philosophy," implies an impracticable combination of two distinct final aims. Either the one or the other must abdicate the supremacy to its rival. We must invoke the aid of *ethical* self-love in order to insure the victory to the forces which make for good. But our ruling aim ought to be the advancement of the universal happiness of mankind.

The main purpose of Professor James's paper is to show that there is no such thing possible as an ethical philosophy dogmatically made up in advance. Three questions in ethics must be kept apart—the *psychological*, the *metaphysical*, and the *casuistic*. The psychological question asks after the historical *origin* of our moral ideas and judgments; the metaphysical question asks the very *meaning* of the words good, ill, and obligation; the casuistic question asks what is the *measure* of the various goods and ills which men recognise, so that the philosopher may settle the true order of human obligation. As to the *psychological* question,—relations exist in our thought which do not merely repeat the couplings of experience. Our ideals have certainly many sources. They are not all explicable as signifying corporeal pleasures to be gained, and pains to be escaped. As to the *metaphysical* question,—goodness, badness, and obligation must be *realised* somewhere in order really to exist. Without a claim actually made by some concrete person there can be no obligation, but there is some obligation wherever there is a claim. Claim and obligation are co-extensive terms. The words good, bad, obligation, are objects of

feeling and desire, which have no foothold or anchorage in Being apart from the existence of actually living minds. "The religion of humanity" affords a basis for ethics as well as theism does. As to the *casuistic* question—The best of the marks and measures of goodness is the capacity to bring happiness, but in seeking for an universal principle we find that the essence of good is simply to *satisfy demand.* But the actual possible in this world is vastly narrower than all that is demanded, and the guiding principle for ethical philosophy must be simply to satisfy at all times *as many demands as we can.* So far as the casuistic question goes, ethical science is just like physical science, and must be ready to revise its conclusions from day to day. Concrete ethics cannot be final because they have to wait on metaphysics. The final conclusion is that the stable and systematic moral universe for which the ethical philosopher asks is fully possible only in a world where there is a divine thinker with all-enveloping demands. If he now exist, then actualised in his thought already must be that ethical philosophy which we seek after as the pattern which our own must ever more approach.

Professor Patten treats of the economical data bearing on the facts of land-tenure, and concludes that if no surplus land value goes to the monopolies or to privileged classes, there is no ethical problem involved. If some of the surplus goes in this way, then the ethical problem is the same as if all of the produce of industry above a minimum of wages went to increase the surplus. The growth of society in wealth and numbers often makes the man without wealth and land less productive, because he must use poorer land or less productive instruments. The loss being due to social changes the workman is entitled to compensation for which he should look to society, which may choose the concrete form in which it shall be made. The expense of doing this should be borne by those who have profited from the prosperity of society.

In her interesting paper on Moral Tales, Mrs. Collet passes in review certain books which, read in childhood, have left an indelible impression on her mind. Chief among them are the "Sandford and Merton" of Thomas Day, who was deeply impressed by the writings of Rousseau; the stories of Maria Edgeworth, the most truly democratic of our moral writers; and those of Dr. Aiken and his sister, Mrs. Barbauld, whose writings although pervaded by a strong religious spirit, are very striking for their unaggressive and yet open declaration of the right to think independently in religion. Mrs. Collet gives her verdict, with regard to the moral education of children, in favor of the voluntary "consumption of moral tales." (Philadelphia: *International Journal of Ethics*, 1602 Chestnut St.)

REVUE PHILOSOPHIQUE.

CONTENTS: March, 1891. No. 183.

CONTENTS: April, 1891. No. 184.

M. Delbœuf's article is the complement to his studies on the origin of death, and was inspired by the work of M. Maupas, *Recherches expérimentales sur la multiplication des infusoires ciliés*, some of the conclusions of which he thinks are not supported by observation and emanate from the sophism, "that which has not been seen does not exist." Nevertheless he accepts the opinion of M. Maupas, as against M. Weismann, that the protozoa as well as the metazoa, are mortal as individuals, although immortal in and by the species. M. Delbœuf accounts for the change from fissiparity to sexuality by reference to mathematical law applicable to the transformation of species, according to which from the moment that a *constant* cause begins to make a type vary, in however small a degree, the variations will end by victoriously disputing the position with it. The death of the ciliated infusoria is then not due, as supposed by M. Maupas, to the effect of a *senile* alteration of their elements proceeding from an internal cause,—which would render inexplicable the unaltered maintenance of the species,—but the effect of a *disequilibration* of their organism due to a sort of mathematically fatal external physical constraint. The two corpuscles in the union of which the conjugation of those infusoria consists are regarded by M. Delbœuf as truly male and female, and he affirms that before uniting they make a *choice* of individuals apt to rejuvenate. Intelligence is thus the indispensable factor of the perpetuity of races. The answer to the double question, Why is individual matter mortal and specific matter immortal, is reserved for another number.

M. Janet's interesting study is of a subject, a young girl of 22, who, as the title denotes, exhibits an almost total loss of the faculty of will, partly through hereditary causes and partly consequent on a serious attack of typhoid fever. Marcelle has a singular difficulty of movement, which extends to all the voluntary movements of the arms, the legs, and even the tongue and the lips, and is due to a kind of paralysis. She is, however, extremely suggestible, and very easily hypnotised. By experiment M. Janet found that the difficulty of a movement is in proportion to its novelty. The difficulty consisted in forming the synthesis of ideas and images which constitutes the commencement of the act, but its repetition is easy when the act has been once done. Marcelle sometimes went into a demi-cataleptic state during which she had a crisis of ideas, which she described as a cloud passing. She complained that during the cloud her head spoke constantly. This M. Janet explains by reference to the theory of M. Séglas that there are several kinds of verbal hallucinations as of language, that is hallucinations of hearing, of visual images, and of tactile and muscular sensations attendant on speaking or writing, the last named being the psychic hallucinations or the epigastric voices of the insane. During the lucid intervals Marcelle performed the commands given to her by her hallucinations while under the cloud, like a person who while in a state of somnambulism receives a posthypnotic suggestion.

In this concluding article on "Art and Logic," M. Tarde, after considering the characteristic differences between industry and art, from the point of view of the desires of consumption and production proper to them, deals with the distinctive characters of the work of art considered in itself and the reason of its being. The attribute of the work of art is to be interesting. Art is a game, but a serious and profound game, like love, and it is born of leisure and pleasure. The unity of the

work of art consists simply in the coupling of a question and an answer, a problem and a solution, a combat and a victory. Every phrase, musical or spoken, is a wave which rises and descends, and in every art whatever all is phrases and waves, and their combination is itself a complex wave, a period. In the undulating mirror of art we see again social life in action; since esthetics reflect the dynamic, and not the static, social logic. M. Tarde criticises the theory of Spencer that all the arts are derived from architecture, and shows that the first art was speech and that from speech, spoken or written, all art is derived. Narrative poetry, the epic poem, is the complex germ of all artistic development; and as art began in narration, it ends in the drama, because man is above all social. Art, or reflection of man, borrows by turns its dominant inspiration from the passions of life or the inspirations of society.

M. Richet sums up his description of General Physiology in the formula: Life is a chemical function. His most important conclusions are that the general laws of life are chemical laws, and respond to the chemical conditions of hydratation, temperature, electricity and pressure; force is condensed in living beings under the form of chemical energy, and manifests itself outwardly, by movement, by electricity, by light, by heat, or by thought. (We consider this juxtaposition of "electricity, light, heat and thought" as extremely misleading, and so is the definition of life as "a chemical function." It appears, then, that M. Richet considers thought also a chemical process. That physiological actions are processes which have their own conditions and are different from chemical and physical processes, has been explained in *The Monist*, No. 3. p. 413–414.) M. Richet continues: Living beings are cellular aggregates, but in animals the nervous system forms a centre of unity, from whence proceed motor excitations and where sensible excitations terminate; cellules and beings are organised to live: they are adapted to the ambient medium, and to all the causes of destruction which can reach them. Thus their acts, although often automatic and deprived of all intelligence, appear to us admirably intelligent; the sensations and consciousness of intelligent beings are in agreement with the needs of the organism, and tend to strengthen the automatic mechanisms by means of which beings resist death, whether it be the death of the individual or that of the species.

M. Brochard takes exception to M. Barthélemy Saint-Hilaire's opinion of Bacon as a philosopher, and endorses the views expressed by M. Charles Adam in his Memoir crowned by the Academy. Bacon not only saw what scientific induction should be, but indicated with perfect precision the conditions that it ought to fulfil. Added to the theory of method is the theory of forms, which is the culminating point of Bacon's philosophy. M. Adam shows that the word *form* is used by Bacon to express the true difference, or that by which a thing is defined; the essence or the thing in its intimate constitution; and a law of pure act, (*lex actus puri*). M. Brochard adopts M. Adam's explanation, that by this law is to be understood a disposition in space, an arrangement of material parts, in other terms, a mechanical or mathematical relation—and he justifies M. Adam's assertion, and shows that Bacon resembled Galileo and Descartes in divining that physics rested on mathematics, and that the pure act was produced whenever certain arrangements of material molecules are formed according to mechanical conditions. Bacon superposes, in some sort, a philosophy of quality on a philosophy of quantity, and achieves the passage from movement to quality so embarrassing for every doctrine which gives a place to mechanism.

M. Janet concludes his study of the curious case of aboulism presented by Marcelle, giving details of her experiences under the influence of hypnotism and

suggestion, which greatly ameliorated her condition, temporarily at least. The nature of her disease approaches much the mental feebleness described elsewhere by M. Janet under the name of "psychological disaggregation with contracting of the field of consciousness," but differs from it in several particulars. It consists essentially in a weakening of the faculty of synthesis which ought, at every moment of life, to co-ordinate afresh our sensations and our images. The study of this enfeeblement shows the importance of the novelty of acts in connection with the will, the rôle of the will in apparently the most simple perceptions, the necessity of voluntary synthesis for originating habits and recollections, the connection between doubt and defective perception, and the development of various hallucinations.

Before answering the question why we die, M. Delbœuf considers the origin of life. He makes a distinction between dead matter and living matter. On this subject he has published a book entitled "*La matiere brute et la matière vivante.*" He affirms that life in the universe began with living, sensible atoms, endowed with will and liberty, and having a knowledge of their own movement. This life gradually concentrated itself in germs having the faculty of perpetuating themselves. They remained naked and some of those germs still continue composed almost entirely of reproductive, that is essentially living, substance. The others have gradually become clothed with a body, a kind of protective envelope. The life of this envelope is not inherent; it has been communicated by the germs that it protects, and at the end of a period of a greater or less duration it becomes useless, fades and dies. Life is sustained by nutrition but the assimilating faculty diminishes by degrees, until it ceases, and at last, the reparation of our organs not being equal to their wear, they are not able to fulfil their mission. The decay of living matter is due to the operation of physical and chemical laws. Assimilation is at the base of life, and it is exhibited in inorganic nature as well as in living beings. Living bodies must have some permanent centres of assimilation around which the nutritive elements group. The earliest of these centres was the germ, in which is the supreme or immortal life, and which immortalises that part of the nutriment which becomes incorporated with it. Although the organs of nutrition deteriorate and die, the reproductive organs remain eternally young, in power at least. Nutrition itself is manifested either as alimentation, or as conjugation or fecundation, and is a phenomenon analogous to copulation. M. Delbœuf then proceeds to show the uniformity in the modes of propagation, and gives reasons for believing, contrary to the views of Van Beneden, that the cellule-egg, and not the spermatozoid, is hermaphrodite. The ovary is the true depository of the immortal propagative substance. Woman is the inexhaustible source of life. (Paris: Felix Alcan.)

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE. Vol. II. No. 3.

CONTENTS:

Professor Grashey, now of Munich, formerly of Würzburg, has published in the *Archiv für Psychiatrie* (Vol. XVI, p. 654 ff.) an interesting case of a peculiar

kind of aphasia. A man whose name is Voit, 32 years old, engaged for menial service in the brewing business, received an injury on the head. He was treated at the psychiatric clinic of Würzburg by Professor Grashey and dismissed as cured, yet five years after the accident he was again submitted to the professor's investigations and it was found that he was suffering from "amnestic aphasia." He could not remember the name of anything for a few seconds. Professor Grashey drew the following conclusion from Voit's case: "There is an aphasia which is based neither upon the functionary inability of certain centres nor upon the interruption of commissural connections, but exclusively upon a diminution of the sense-impressions, which causes a disturbance of apprehension and association." Voit was unable to name any object shown him unless he could spell it with the assistance of his hands, legs, or even his tongue. By writing only could he find the names of objects. Dr. Sommer objects to Professor Grashey's interpretation of the case and shows convincingly from the symptoms, as represented in the *Archiv für Psychiatrie* by Grashey himself, that whenever Voit was prevented from making writing gestures (which was done by holding his hands and legs immovable and by ordering him to show his tongue so that he could not employ it for writing on the roof of his mouth) he could never find the name of any object. Accordingly it is no case of amnesia; Voit actually has only one way left for finding words, that is by spelling them. Now it is generally supposed, that we first see an object, and recognise it at the centre of vision. The nervous irritation is thence transmitted to the centre of language; the sight of a knife evokes in the centre of speech the word knife and we suppose that the spoken or heard word will in the centre of writing awaken the motor stimuli of spelling the word. The present case proves that if this be the rule there are exceptions to it and Dr. Sommer proposes the question How can we explain the case? It is strange that the man is not deprived of concepts; so long as he is prevented from writing he is only deprived of naming things or concepts. He never failed to recognise similar things as belonging to the same class, but so long as he was tied at tongue and limb, he could never find their common name. For instance a guitar and a trumpet were shown him while he was bound, as it was called. When asked, Do they belong together? he nodded emphatically. (He had to answer by nods because he had to show his tongue.) When asked, Do you know their names? he shook his head and could never find their names until he was allowed to make writing gestures with either one of his limbs or his tongue. In this way he recognised and classified things correctly, but he never named them except by spelling the names. Such things or pictures of things shown him were the following:

Guitar—trumpet—: musical instruments.
Gun—canon—: arms.
Sickle—watering-pot—: utensils.
Lantern—lamp—: lights.
Palace—barn—: buildings, etc.

Dr. Sommer says: "Suppose that those parts of the brain the loss of which according to modern experiments and pathological observations cause a loss of memory-pictures, are thought of as motor apparatuses, the destruction of which has a similar effect as in the present case, the binding which prevented Voit from spelling: in this case amnesia might find an explanation without the crude materialistic assumption that they are localised in the injured cells." Dr. Sommer only throws out the hint without finding space to explain himself. Yet it appears to us that whether amnesia is produced by the destruction of the centres or of their supposed

motor apparatuses that the one is not less and not more crude materialism than the other. The problem it appears has nothing to do with materialism, but with the mechanism of the brain. The fibres of association seem to work in Voit's brain in the opposite direction to what we should expect. The normal path is apparently interrupted. The sight of an object does not evoke its name. Yet are there not innumerable fibres of association which may reach the desired end—in this case the pronunciation of the name—in a roundabout way? There must be, for the facts prove it. One thing in the case of Voit is patent. When Voit finds the names by writing them, he apparently knows the written word, he cannot pronounce it, because he does not know the spoken word, the centre of spoken words being the seat of the injury. He has a concept of the thing, he could write it, but he cannot pronounce it. The roundabout way leads through a province not directly accessible to consciousness. The written word is not in the same immediate contact with consciousness as the spoken word. That this is so we know from actual and daily experience. Who has not tried to assure himself of the correct spelling of a word by writing it down and thus leaving the test to the unconscious memory of the motions of our hand?

C. S. Cornelius discusses the theory of spatial conception with special reference to a localisation of after-images. He takes the position that we are in relation to the outer world through sensation only, rejecting all assumptions of innate ideas, of a special space sense, etc. "Sensation," he says, "is an intensive state. The conception of space-relations can originate only by a multiplicity of sensations which through the qualitative contrasts affect each other and arrange themselves in a certain order beside each other. The vertical and horizontal conception height and breadth, are easily explained, but depth, the third dimension of space affords some difficulty. Th. Lipps denies the existence of an apprehension of depth, yet Cornelius maintains that it actually exists. He explains it in the same way as the vertical and horizontal space-conceptions as originating from muscle sensation.

It cannot be denied that upon the whole space-sense is the product and the interpretation of motion experiences mainly due to the activity of the muscles of the eye. But it appears that the conception of the third dimension of sight is not due alone, as says Cornelius, to muscle activity. The investigations of Wundt and of Mach, which are not taken into consideration by Cornelius, prove that the perspective and the distribution of light and shade are essential elements in our perception of the third dimension in space. Our eyes have become accustomed by the information received through other channels, especially the sense of touch, to interpret perspective in combination with certain shadings as depth so that *even the one-eyed* man sees things not as two dimensional pictures but as three dimensional corporeal forms.

A subject of extraordinary interest is discussed by J. Rehmke, who criticises O. Flügel's position and contrasts it with his own. O. Flügel has published a book, entitled *Die Seelenfrage*, treating the subject from the narrow standpoint of Herbart's school. It is unnecessary to state that Herbart has great merits in the evolution of our psychological views. He attempted to introduce mathematical methods in order to define exactly the dynamics and statics of the soul. Herbart failed, although he gave new impulses to psychological investigations which have proved valuable in many ways. Many of his disciples are now busy perpetuating his mistakes Flügel is one among them. Flügel emphasises the immateriality of the soul, but being like his master an advocate of atomism he postulates soul atoms which are mathematical points. "Atomism" Flügel declares, "must reject actio

in distans" because it is (1) inconceivable, (2) nonsensical and contradictory, and (3) because force is an accidens of matter, matter being the substance. The accidens can have no effects, it cannot exist, where the substance is not. Flügel also lays much stress on the disparity of feeling and motion, and of thought and motion. Soul and body are to him two distinct things and their interaction is explained through the contact of the point-like, immaterial soul atom and the brain atoms. Rehmke points out that this view in spite of its professed hostility toward materialism is extremely materialistic, but the view which he proposes himself suffers from similar errors. Flügel has preserved the unity and the immortality of the soul which is an indestructible immaterial mathematical point, moving about in our brain. Rehmke also preserves the unity and immortality of the soul: he believes in a "subjectum," in an ego which is the essence having the states of consciousness as attributes. The soul according to Rehmke is not space-given, it is an immaterial something which has sensations. We should accordingly make a distinction between the ego as the subject and the ego as our bodily existence; moreover we should distinguish between the state of consciousness and the object of consciousness. Rehmke takes the word contents of consciousness in the sense of signifying that which the "ego" possesses. The state of consciousness is always the same, it has no evolution, no growth, no development. The object of consciousness however constantly changes. The subject of consciousness is the soul. The interconnection between soul and body is not denied, but there can be no thought of a contact between the immaterial and the material, The soul is, but it is not in space, it is nowhere, and its co-operation with the body is described as "an exemplary together"—an expression to which, we are sorry to say, we cannot attach any meaning.

J. Rehmke objects also to the theory that feeling and motion, soul and body, the spiritual and the material are two sides of one and the same thing. If this two-sides theory were correct, he says, the soul would be an abstract and so would be the body. But, he adds, all abstracts are immutable, unchangeable and the object of psychology is something that is observed to possess evolution. Now it is true that some abstracts represent immutable concepts; matter is such an abstract. Matter is that which all matters have in common and the abstract matter is everywhere the same; we cannot speak of the evolution of matter as such. But other abstracts are not so rigid. Take for instance life. Life is an abstract, but it would be a strange proposition to say that there can be no evolution of life because life is an abstract, all abstracts being unchangeable, immutable, invariable.

We cannot agree with Flügel, but J. Rehmke's psychological views are still less acceptable. (Hamburg and Leipsic: L. Voss.) κρς.

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE. Vol. XV. Nos. 1 and 2.

CONTENTS:

R. Seydel regards sight alone as space-sense and the other senses as time-senses. This, he says, is the reason why there is no "naïve realism" for any other sense but sight.

S. Hansen, taking our concepts and sensations as the data from which we have to start, discusses the problem of the reality of the outer world. He arrives at the conclusion, that "if there is a thing in itself, the phenomenon is only one side of it, viz. that side which it reveals. The thing in itself is the real world in which we live and of which we speak in daily life, although we know it only through phenomena, i. e. our concepts."

Max Dessoir presents a review of Experimental Patho-psychology as it has developed in the last decades through the extraordinary attention bestowed upon the phenomena of hypnotism and kindred subjects. He discusses experimental patho-psychology with special reference to the great problems of (1) consciousness, (2) the relation between feeling and motion, (3) memory, and (4) personality. The two former points are discussed in the first article, the two latter in the conclusion. Max Dessoir emphasises in this essay again his theory of the double ego which he proposed in his pamphlet, *Das Doppel-Ich*.

B. Kerry's article is the conclusion of a series of essays on intuition (i. e. apprehension or sensation) and its psychical transformation. The author distinguishes between subjective concepts and objective concepts. If I think for instance of all the grapes that will grow this year in Italy, I do not know in my subjective conception their definite number. It is a definite number nevertheless. This concept is the objective concept. He devotes much space to a discussion of the rigidity of Kant's aprioristic judgment $7+5=12$. The most important point is ultimately *how* this judgment possesses necessity. The author observes that the theorems of arithmetic possess necessity while we cannot attribute necessity to the results of calculation. Our faculty of calculation, B. Kerry says, should be considered as aprioristic, or more correctly, it is a complex of primitive faculties, and these are: "our faculty to apprehend in some contents of our apprehension something else which is designated afterwards as a concept derived from that contents; that is our faculty of forming abstracts. Further our faculty of comparison and at last our faculty of combining and separating. These faculties are aprioristic in the psychological sense of the word, which to-day is not recognised, in the sense of being innate." The whole article is written in a heavy style and in extra-Teutonic constructions with innumerable dashes containing parenthetical sentences and other bewildering explanations. We have after all not been able to discover how the judgment $7+5=12$ possesses necessity.

E. G. Husserl criticises the position of several modern logicians, Boole, Venn, Peirce, and especially E. Schroeder, who published in the *Göttinger Gelehrten Anzeigen* an article on the Logical Calculus. Husserl says that "the logic of the logical calculus is in a wretched condition still. Its advocates have attained to clearness neither concerning the limits of this discipline nor its relation to deductive logic and to arithmetic. The logical considerations upon which the technique is built, are as a rule of such a kind that they cannot bear the most superficial criticism. And this calculus pretends to be a thoroughly reformed and the truly exact logic. It is natural that among the logicians the more scientific upon the whole keep aloof here. However the logical foundation of arithmetic is just as weak, yet this does not suffice to discard it. I believe that logical algebra in spite of its limited practical applicability should not be underrated, and that it should be of high interest to the logician for the sake of its actual merits." In the struggle between the logic of

circumference and the logic of contents, Husserl maintains that a calculus of pure deductions can be constructed upon the basis of operations which are strictly without any contents. (Leipsic: O. R. Reisland.) K.

PHILOSOPHISCHE MONATSHEFTE. Vol. XXVII. Nos. 5 and 6.

CONTENTS:

Johannes Volkelt criticises in a long article Wundt's *System der Philosophie.* We do not have the work under discussion at hand, but judging simply from the quotations made in the present article, we can confidently say that Volkelt has misunderstood Wundt's position. We shall here confine ourselves to one point only which is of paramount importance, and Johannes Volkelt fully appreciates its importance. This point is the problem, "Can we have any objective knowledge at all?" This is the way we should formulate the question. Volkelt, however, asks whether the trans-subjective can successfully be made object of our cognition. It is maintained that there is a trace of naïve Realism left in Wundt, because his trans-subjectivism remains unproven, and subject and object are treated as inseparably connected. Wundt says: "As soon as we make the erroneous proposition that the object of our perception is only a perception, we shall in vain try to get somehow out from our subjective perception and to regain in some way the lost object." This idea is objected to. Also the following passages are quoted from Wundt: "Reality once destroyed cannot be restored merely through pure thought," and "the theory of cognition has not to create reality from elements that do not as yet contain it." We agree perfectly with Wundt and have expressed similar ideas in the article "The Origin of Mind," No. 1 of *The Monist.* Perception is a relation between object and subject. It is an error of idealism to consider the subject alone as given. The data of experience are states of subject-object-ness. The idea of mere subjectivity is as much an abstraction as the idea of things in themselves. Accordingly the term "trans-subjective" is a misnomer. All perceptions being impressions of objects and serving as symbols for their correspondent objects contain an objective element. As soon as we disregard this truth, we shut ourselves up in the hollow globe of pure ideality; objectivity becomes an unwarrantable assumption and there is no way out of our own subjectivism.

Knud Ipsen sketches the history of the Danish philosophy during the last ten years. He mentions five philosophers, Höffding, Kroman, Wilkens, Lehmann, and Starcke, among whom Höffding is by far the most prominent. All the Danish philosophers have one feature in common. Kroman made a distinction between philosophy and world-conception; philosophy should make such propositions only as can be logically proven, not otherwise than theories have to be proven in the sciences. Yet a world-conception is the work mainly of our emotion and imagination. Accordingly philosophy and world-conception are two distinct things which have nothing in common. This position seems to be generally accepted by the Danish philosophers, and as a natural consequence Ipsen says, we can speak no more of "philosophy," but only of philosophical disciplines. The unity of philosophy, its ideal of system

is lost. Metaphysics is dead in Denmark and the search for the universal laws of existence is also given up. Philosophy has ceased to be the science of the sciences and has become an aggregate of scientific disciplines. On this point there is a tacit agreement so that there is no "useless struggle about great and insolvable problems," and since Höffding wrote on the relation between faith and science, our Danish philosophers also shun all theological interference. A division of labor has taken place so that psychology has been treated by Höffding, Kroman, and Lehmann, Ethics by Höffding and Starcke, Logic by Höffding and Kroman, Sociology by Wilkens and Starcke, and Æsthetics by Wilkens.

Professor Höffding and Kroman in spite of their consensus in rejecting the unity of philosophy represent a very strong contrast, which is best characterised by their method of treating the law of causation. Kroman rejects all the former evidences employed to prove the law of cause and effect. Empiricism is wrong because it can at best show the temporal succession of two phenomena, and apriorism is wrong because *a priori* knowledge lies in the subject alone and not in the object. In causation, however, the objects play an important part, and we can never know whether the objects will always conform to the subjective and *a priori* laws. Kroman's view of the subject is that the causal law is the sole condition by which we can acquire any knowledge at all, accordingly for the sake of self-preservation we *hope* that this condition will be fulfilled. The causal law accordingly is not only the condition of all knowledge, it is also the postulate with which we have to start.

Höffding attacks the problem in a different way. He asks first: "How do we come at all to a reality supposed to be independent of the subject?" and "What is the import of this reality?" Reality according to Höffding is not yet given in sense-perception, we arrive at the idea of reality not until our sense-perceptions are arranged in a coherent system. If I see a picture at the wall, this may be an hallucination, but if my sense of touch corroborates the perception of sight, I consider it as a reality. Thus the idea of reality originates and this reality is not distinguishable from a coherent and self-consistent dream. To the dreamer his dream is reality. Now the question of causality is not legitimate, whether things conform to the law of causation, for indeed we know things only by their being causes or effects. The main function of our consciousness is to recognise similarities and dissimilarities, it searches for unity and this search is performed through the application of the causal law. Höffding accordingly considers both ideas, the causal nexus and reality, as being of the same value. His causal law is more than a postulate, it is in part a result. Our organ of cognition would die of atrophy if it were not constantly nourished, and we should share the fate of Tantalus were we condemned to investigate and always unable to discover.

Kroman looks upon the law of inertia as a special application of the causal law. To him the conservation of matter and energy is an hypothesis. Höffding looks upon the law of inertia as a material principle. Where Kroman speaks of energy, Höffding speaks of corporeal energy. (It may be that here the German translation *körperliche Kraft* is at fault.) As a material principle the law of inertia is something more than a mere corollary of the causal law, for in its present form it has made science possible. The conservation of matter and energy is conceived in an analogous manner, but considered as natural laws both propositions possess a mere hypothetical value.

It appears to us that the law of cause and effect lies deeper still, and there can be no doubt that the law of the conservation of matter and energy is the same thing only formulated for different purposes. Hume's merit was exceedingly great

when he laid his finger on the sore spot of philosophical thought, pointing out the prevailing confusion about the law of causation. But when investigating the subject, he led us on a wrong track. Cause and effect are not two objects following one another, and not even two phenomena following one another. It is not a synthesis of two events. It is on the contrary an analysis of one event. Cause and effect is a change. In this change the same amount of matter and energy is preserved, yet the form is altered. Hume broke the process of cause and energy into pieces, he lost sight of their interconnection and was astonished that one piece was not exactly the same as the other. Hence his skepticism.

The law of cause and effect can be proved, except to him who would obstinately refuse to acknowledge the law of identity that $A=A$. There may be some one who thinks that something can come out of nothing, or that something can suddenly disappear into nothing. If there is, the weight of the argument rests with him, yet we shall not listen to him until he presents an unequivocal case in which we can observe a transition from being into not-being or *vice versa*. Until then we consider the law of identity and also its practical application and corollary, the conservation of matter and energy as unrefuted.

The law of cause and effect and its corollary the conservation of matter and energy rest ultimately upon our recognition of the *Gesetzmässigkeit* of formal laws. He who acknowledges the correctness of the statement "$2\times2=4$" as universal and necessary, implicitly accepts also the law of causation and of the conservation of matter and energy. The law of the conservation of matter and energy contains no other proposition than this that 2×2 will always be 2×2 or its product, i. e. 4; it will never be less, it will never be more.

The ultimate basis of the law of causation lies in the laws of form. We may call causality and the law of inertia and the conservation of matter and energy hypotheses, but in that case the meaning of the term hypothesis would have to be changed, for if these laws are hypotheses, the statement $2\times2=4$ would be just as much an hypothesis.

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In psychology Kroman and Höffding are more antagonistic than in any other subject. Both consider the soul as an x, but Kroman attributes to this x, unity and the faculty of feeling, willing and thinking; Höffding however looks upon feeling and motion as two sides of the same unknown object. Kroman in spite of his formal opposition to metaphysicism still believes in a subject underlying the acts of consciousness. After all, the name only of metaphysicism seems to be dead in Denmark, not metaphysicism itself. Höffding has shown how Kroman's psychological theory has led him into a highly mythical conception of the activity of the soul.

We may add that the proposition of non-interference with theological views may be excellent in preserving peace, but we cannot help considering this kind of peace as a mistaken policy. If there are conflicts between theology and philosophy, they should be settled, for there cannot be two contradictory truths, and it is wrong also to leave errors alone simply for the sake of peace. Yet it is objected that religion is a matter of the heart and philosophy a matter of the brain. Certainly, but the heart should have its emotion regulated by the brain. If our world-conception is the product mainly of our emotions and of our imagination, it would be simply foolish to let the heart build its world-conception just as it pleases without consulting the head. Wherever philosophy and religion or our world-conception (the latter considered as the product of our emotion) have nothing to say to each other, wherever they are kept distinct, it will lead to confusion in all the depart-

ments of our existence, it will put our philosophy, our scientific thought, and our ethics out of joint. A rent will go through the world of our life producing disharmony in every spot and the end will be a dreary pessimism. Our emotions are not a separate chamber of our being which should be kept private and unaffected by scientific knowledge, our emotions are springs of action, and it is of paramount importance to keep them in harmony with our knowledge of facts. The policy of theological non-interference may do for some time, but certainly not long. It is a mere armistice but no peace, and honest war is better than a sham-truce which is an ill-concealed state of intolerable hostility. (Heidelberg: G. Weiss.) κρς.

VOPROSUI FILOSOFII I PSICHOLOGII. Vol. II. No. 3. March, 1891.

CONTENTS:

Schiller's Doctrine of Beauty and Æsthetical Enjoyment. The nations of western Europe have been long familiar with Schiller's doctrine of beauty and of æsthetical enjoyment; but one must agree with the writer, that it is still a subject that has not outlived, probably never will outlive, that unfading freshness and deep interest which it ever must possess to all cultured and thinking minds. The writer, moreover, calls attention to the fact, that as regards Russia, Schiller, although well-known as a poet, is too little known as a philosopher.

On the Nature of Consciousness. Concluding his series of articles on the nature of human consciousness with an internal analysis of consciousness, the writer remarks, that without having recourse to the testimony of hypnotic experiments or to the phenomenon of so-called "mental suggestion," which so conspicuously demonstrates the reciprocal compenetration of the individual sphere of consciousness, we find a constant, normal, and substantial bond between that which constitutes and

conditions the whole accord or harmony of the spiritual life of individual man; because, if from our individual consciousness this vital bond is removed which unites us to other consciousnesses, to the preceding as well as the following ones; if there is removed from our individual consciousness the connection and partnership of all succession, of all that is suggested and suggestible, it will lose both form and contents, and be turned into nothing. . . . We know that man is the heir of the work of previous races, of their organisation and feeling. All human feelings,—the results of adaptation,—all the instincts and appetites are precisely just as our organs, they are our psycho-physical organisation. Feeling is the original basis of individual consciousness; and thus, in consciousness itself, in our feeling itself, we are able to disclose several radical, universal elements. We, unaccountably, attribute every reality to particular feelings, and we cannot imagine that these peculiarities depend exclusively upon our subjective individual feeling, on our own eyes and ears. Light, warmth, hardness, sound, colors are naïvely conceived within our consciousness, irrespective of the objective properties of the things themselves. Usually we suppose that the sun shines, the sea roars, flowers are fragrant simply through our personal presumption. We do not understand that our own feelings experience certain sensations in the presence of the given phenomena. . . . If we now conceive that all sensation presupposes something that is sentient; it is clear that feeling, as conditioning the perception of the material world, cannot be merely subjective. Recognising the objective reality of the material world, we presuppose anthropomorphically a general feeling. The elements of which the external world consists correspond to the fundamental aspects of sensation and to the elements of sense. A sensual universe, in so far as we recognise its objectivity, presupposes a universal sense, with which our own individual sensation must be connected. In reference to the analysis of moral consciousness the writer refers the reader to the works of Kant. If there is a solidarity of myself with all things, then it is clear that I am bound to live up to it. As in a general way I am conscious of the existence and reality of other beings, so I likewise feel an ideal, moral necessity of a common altruism, of a common and perfect love toward all. This general love is distinguished from natural inclination, and is contrary to it; this constitutes my bounden *duty* in my relation to all, and is a general ethical law. One cannot maintain that man knew this law *a priori*, because he was moral before and he knew it not. Still, it is less possible, that man knew this general and unconditional verity *a posteriori*—that he knew good without goodness, morals without morality. But, when man attains to a certain degree of self-knowledge, when he has detached himself from the omnipotent tyranny of prejudices, and of all traditional principles of congenital morals, then he grows conscious of this law, and finds it in himself. This law is not anything external to us, but it is deposited within us. In just the same proportion as we recognise the law of causality, we shall also recognise the moral law. *Reason* itself is compelled to arouse in us conscience,—theoretical consciousness awakens ethical consciousness.

The law of causality is a formal law, that does not impart to us any real cognition; it is, precisely, the form of our knowledge. The ethical law, the law of the general solidarity of ethical aims, does not presuppose this form without contents, but presupposes an ideal content, the true essence of a common *general* consciousness, as something that unconditionally must be. Its sanction is not in the formal agreement of individual beings, but in their being in a necessary, ideal union.

Man is conscious of the fact that he cannot attain the ethical ideal through himself only. He must seek for it in perfect love. Only a perfect and all-com-

prehensive love can atone and justify man. But this love is not a natural instinct of man, but a grace, independent of man, which is acquired by faith. This faith itself is already a fact of love, and by those who believe, it is conceived as a manifestation of grace.

Letters on Tolstoï's book "Of Life." The writer of these letters on Count Tolstoï's book "Of Life" undertakes an analysis of the peculiar philosophical truths and errors which it contains. He points out the *method* employed by Tolstoï and the *causes* of his contradictions and errors. By so doing he hopes in conclusion to formulate the theory of the philosophical system to which belongs the work itself.

The writer first calls his correspondent's attention to Tolstoï's positive statement to the effect, that "the world is subordinated to the law of reason—in the heavenly bodies, in animals and plants. This law, without our own interference, prevails throughout all creation, and within ourselves we know this law, and are obliged to fulfil the same." Yet how does Count Tolstoï know that the whole world is subject to the law of reason? By virtue of the principle of cognition that was mooted in the writer's previous letter, we can know it with a degree of certitude only concerning ourselves. Tolstoï himself maintains, that "much less are we able to know anything about the external, material world which is subject to the laws of space and time." In other words, Tolstoï contradicts his own theory. As regards his other statement, his estimate of "true and false life," the two can only be reconciled by admitting certain other hypotheses that are manifestly contradictory to constant human experience, such as the gratuitous hypothesis that men who follow "the teaching of this world" and not that of wise men "do not live," they "exist" only. Tolstoï's theory, expressing a definition of life, would oblige us to turn our attention only to a few facts of immediate consciousness, but to ignore many others that are not subject to doubt. But, setting aside Tolstoï's peculiar theory of consciousness and cognition, the writer turns to the problem of the Ego, as the most important for the solution of the points involved in the present discussion.

In reply to this letter the writer regrets that he himself, having but little taste for deep philosophical discussion, finds it exceedingly difficult to defend Count Tolstoï's views against attacks such as those of Mr. Kozlov. Still, it seems to him that Mr. Kozlov in his whole analysis of Tolstoï's book seeks to evade the main question; namely, Can we call a human life a life so long as men tear each other to pieces like wild beasts?

Tolstoï's critic in conclusion asks, what, precisely, ought to be understood by life? In his reply, after investigating the nature of the Ego, Mr. Kozlov concludes: Man, according to Tolstoï, is only a collective term. It is no more than a name for groups of a few special objects, in their arbitrary relation to a totality. These collective objects are purely *entia rationis*, as the names forest, river, army, crowd, etc. This collective subject is called man. Matter, in Tolstoï's metaphysics, represents the only element, the reality and substantiality of which is not subject to the least doubt. Matter is uncreated and indestructible, it remains identical with itself, constantly through motion combining itself into different aggregates called bodies. In the formation of the living body, matter serves as the basis, on which exist other subjects, that also constitute man, by Tolstoï called "animal personalities." This subject, in its functions and manifestations answers to that which is usually called man, and with Tolstoï it has a doubtful substantiality. Thus, although man is indefinitely continued, preserved through reproduction, and constantly renewed in fresh specimens, still this subject might disappear, be destroyed, for example, by a catastrophe happening to the terrestrial globe. On the other

hand, this subject arose in time. At all events, all that is individual, existing in the separate specimens of the human race, disappears, is destroyed at the physical death of the individual, animal body. Consciousness belongs to this animal personality; it exists in time, and is subject to the laws of time. On the soil and foundation of this animal individuality there arises a third existence that enters into the composition of man, namely—reason or rational consciousness. This element displays the character of substance in a much higher degree than animal personality. Like matter it is uncreated, indestructible, and eternal. But eternity of reason is distinguished from eternity of matter in this, that reason is not subject to the laws of time and space, to which matter is subject notwithstanding its eternity. Yet here we have an unavoidable combination of two conceptions of eternity,—the one as endless time, the other as absence of time, which means that the idea of time should not be attributed to it at all. Reason, according to Tolstoï, is not particular and individual, but purely universal and common. It does not possess a detached or transcendental being. (Moscow, March, 1891.) γλν.