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ses and coatings with botryoidal surfaces which are drusy or covered with imperfectly formed crystals. Most of the forms observed indicate the formation of the masses by gradual accretion and not as the result of percolation of fused material. But some of the specimens appear to have been so far fused as to flow down through crevices in the furnaces. Some of these are hollow tubes of compact vitreous oxyd two inches in diameter, and four to eight inches in length, the inside being studded with small crystals. These masses were taken from a flue under the retort in which the mixture of ore and coal is heated; a considerable quantity of fused ore had flowed down into this flue through cracks and fissures, and the oxyd was found investing portions of the surface of this ferruginous slag, which gave it the appearance of having been fused, although it was undoubtedly formed from the zinc vapor issuing from the slag. The tubular masses of oxyd which seemed to have flowed down, may have lined cylindrical cavities in the slag, the specimens having been removed before I saw them; I am unable to affirm positively upon this point, but that such was the case is indicated by other specimens.

It will be observed that in all the cases of occurrence above cited, zinc vapor was slowly cooling under circumstances which prevented the presence of oxygen in large quantity, indicating that the crystals were formed by the slow oxydation of zinc vapor and not from dissolved or fused oxyd.

The blowpipe reactions with the the purest and cleanest crystals are all those of pure oxyd of zinc. The crystals I have under examination, and I reserve for another occasion an account of their forms and angles.

Works of New Jersey Zinc Co., Newark, March, 1852.

3. *On Carrollite, a new Cobalt Mineral;* by Wm. L. Faber, Metallurgist and Mining Engineer, (communicated for this Journal by Prof. James C. Booth.)*—Having received through Prof. Booth a cobalt ore from Finksburg, Carroll Co., Maryland, which seems to differ essentially from any known mineral, I subjected it to a careful examination, the results of which are given below. It occurs in a vein of copper pyrites, and is accompanied by erubescite, a few points of which exhibited the regular octahedron.

Although crystalline and homogeneous, no distinct crystals were observed; and the apparent rhombic cleavage was too indistinct to allow of a definite determination. The hardness is 5·5; specific gravity =4·58. Lustre metallic, tarnished in some pieces, probably from the presence of magnetic pyrites. Color tin-white, inclining to steel-gray. Streak iron-black. Fracture uneven; sub-conchoidal in small fragments. Brittle.

Before the blowpipe on charcoal it emits a strong odor of sulphurous acid (and arsenic), intumesces, and melts to a white, brittle and magnetic globule. With borax, soda and microsmic salt it shows the usual reactions of cobalt and copper.

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* This communication was received at too late an hour to be inserted as an article.

The chemical composition is as follows:

		Quantity of sulphur required for the metals.	Forming:	
Insoluble (silica),	2·145			
Sulphur,	27·039			
Cobalt,	28·502	16·001	CoS	44·503
Nickel,	1·500			
Copper,	32·988	8·328	Cu_2S	41·316
Iron,	5·311	3·035	FeS	8·346
Arsenic,	1·815			
	99·300	27·364		

Another determination of nickel and cobalt by Mr. J. Hewston, assistant in Prof. Booth's laboratory gave very nearly the same numbers.

The analysis evidently proves that, if the iron replaces cobalt, then Cu_2 is isomorphic with Co and Fe, because there are more than two equivs. of $(Co, Fe)S$ combined with Cu_2S; but that if the FeS be rejected as a mere admixture, then precisely 2 eq. of CoS are united to 1 eq. of Cu_2S, and the isomorphism of Co and Cu_2 is not proved thereby. In order to ascertain whether the FeS was chemically combined with the sulphides of cobalt and copper, a weighed quantity of the mineral, reduced to a fine powder, was subjected to the action of a magnet, by which means 8·769 pr. ct. were separated by repeating the extraction by the magnet four times. The close agreement of this number with that obtained by analysis, 8·346, as the per-centage of sulphide of iron, shows the latter to exist in the mineral only as a mechanical compound; and the substance separated by the magnet being soluble in HCl, while the remaining powder is totally insoluble, the sulphide of iron can only be magnetic pyrites.

As in all cases where arsenic replaces sulphur, such as mispickel, or cobalt glance, one eq. of arsenic ($As = 75$), seems to replace two of sulphur ($S = 16$); and as there is not a sufficient quantity of the latter to form RS_2 with any one of the metals; the arsenic must owe its presence to the foreign admixture of a mineral R_2As; and since the quantity of nickel found by analysis happens to satisfy the formula Ni_2As, and it is immaterial, from the close agreement of their equivalents, whether the arsenic be combined with nickel or cobalt, the nickel was thus disposed of in the calculation. The true formula of the compound is therefore $2CoS + Cu_2S$.

The substance subjected to analysis consists therefore of a new mineral, which I shall call *Carrollite*,* with foreign admixtures of about 8·5 pr. ct. of magnetic pyrites, and 3·3 pr. ct. of copper nickel, with 2 pr. ct. of quartzose gangue; carrollite consists of—

	By analysis.	Calculated from the formula $2CoS+Cu_2S$.
Sulphur, ...	28·355	28·077
Cobalt, ...	33·256	34·050
Copper, ...	38·389	37·873
	100·000	100·000

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* The name is given in memory of the locality whence it was obtained, as well as of a name cherished by every American.