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ANTHROPOLOGY OF THE EGYPTIAN NUBIAN MEN

ABSTRACT: In 1965 and 1967, two United Arab Republic – Czechoslovak expeditions examined 600 Egyptian Nubian men, 542 women and 1,744 children, i.e. almost 6% of inhabitants of Old Nubia who had been transferred from their native country to a former desert plain south of the South-Egyptian town of Kom Ombo. Main results were published in about 40 scientific reports, but a comprehensive monograph is still missing. The present report represents one of its basic parts, together with a report on women by F. H. Hussien, defended as a CSc. thesis in 1971. It deals with the original Lower Nubia, its geography, climate, settlement pattern, anthropological development and history of its population as well as with previous anthropological notions on living Nubians. Also the main features of the New Nubia are mentioned. The histories of negotiations with Egyptian authorities, a preparatory course at the Cairo University, both expeditions and their achievements have been outlined.

The aims, programme and methods of research and investigation introduce chapters with results. The anamnestic data acquired from the probands included personal data, family structure with data on the number of wives and children and their mortality, birthplaces of the probands, seasonal periodicity of their birth and their health condition. Methods of popular medical treatment are described and the descent group concept is introduced. Anthropometric data divided into cephalometric, somatometric, body composition and functional features are presented for the three Egyptian Nubian ethnic groups and a small sample of the Ababda, the nomads of the Eastern Desert, gradually settling down in Egyptian Nubia. The same features have been analyzed also in four Kenuz, three Arab and five Fadidja village samples. Statistical significance of mutual differences has been tested and discussed.

The ancient Arab custom of prevailing endogamous marriages caused in the Nubians an inbreeding depression, connected with delay in growth and development of young males as well as eruption of their third molars. Various dental morphological and orthodontic anomalies were found. Several changes of metric features were proved to affect the 56 to 78-year-old Nubians. Anthroposcopic parameters reflect the influence of dry and hot climate as well as the geographic position of Egyptian Nubia. Of its three ethnic groups, the Kenuz are physically more similar to the Fadidja than both these groups to Nubian Arabs, who are the later immigrants. Egyptian Nubians retained, from the Neolithic times until now, their prevailing Caucasoid character in spite of their successful adaptation to the climate and an almost permanent Black Sudanese gene inflow. The ancient descent group concept still plays a role as an important social bond but creates no physical differences except for a few remnants between members of descent groups with names of Nubian, Arab and Turkish origins. On the other hand, distinctive features of the Sudanese Black Africans immigrated into the Fadidja territory survived. Sexual differentiation of the Nubian ethnic groups and their comparison with samples of North-East Africans close the present paper. The Fadidja are akin to the North Sudanese ethnic group of the Mahasi, which was proved to be physically close to them, while the Sudanese Arab tribe of the Rubatab showed some affinity to Nubian Arabs. From three Egyptians samples the one from Qift is the closest to all Nubian ethnic groups. The Nilotes and the Ethiopian nation of the Oromos are most distant.

KEY WORDS: Egyptian Nubians – Czechoslovak–United Arab Republic expeditions – Cultural and social anthropology – Anthropometry – Heterosis – Growth and development – Senile changes – Descent groups – Sudanese immigrants – Sexual dimorphism – Comparison with N.-E. African samples

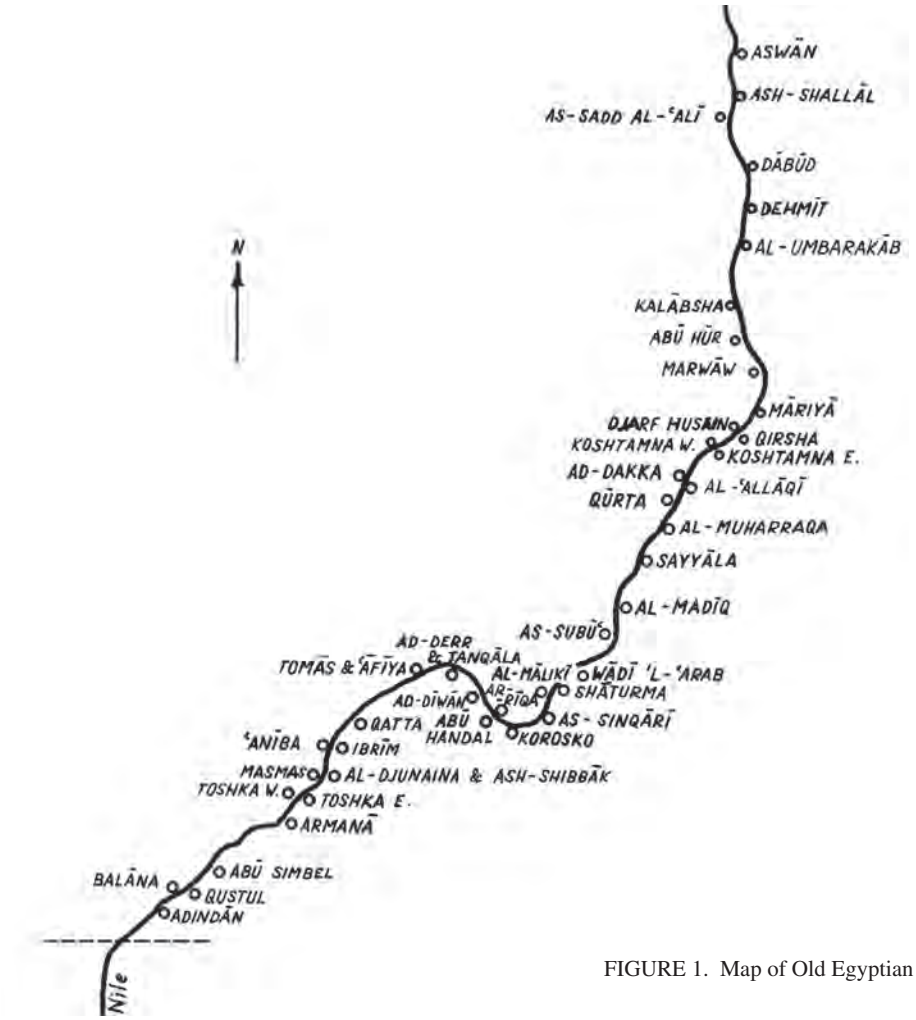

FIGURE 1. Map of Old Egyptian Nubia (Nubian names in Arab transcription).

INTRODUCTION

Egyptian Lower Nubia is the native country of the Nubians, stout and handsome people, poor but honest, happy and cheerful, proud of their original barren, but beautiful country. They did not abandon it during two risings of Nile level-by the old Aswan Dam during the first half of the 20th century. They were, however, compelled to leave it in connection with the building of the High Dam up-stream of Aswan, which flooded the rest of their country in the 1960s. At that time Nubia and the Nubians attracted worldwide attention. The country with monuments of immense cultural value became also the focus of specialists from many countries, and missions were sent to save them within the scope of a UNESCO international action. Members of the Czechoslovak (hereinafter CS) Institute of Egyptology, Charles University in Prague, were invited to take part in that endeavour, too, adding to it a bit more: an interest in the physical condition, health and socio-cultural peculiarities of the people whose ancestors had lived in Nubia for millennia and contributed by their manpower to build these monuments.

Thanks to the Director of the Moravian Museum in Brno Dr. Petr Šuleř and to the editor of Anthropologie Dr. Marta Dočkalová, Ph.D. the present report, originally intended as a chapter in a collective monograph on the Egyptian Nubians, can be presented to the interested public.

1. EGYPTIAN NUBIA AND THE NUBIANS

1.1. Geography and population

Egyptian or Lower Nubia is a 320 km long sector of the Nile Valley between Aswan and Adindan that used to connect Egypt with Sudan. It is crossed by the Tropic of Cancer 67 km south of Aswan near the village of Abu Hor. The Nubian valley is mostly very narrow, lined with mountain slopes, steep above the right bank, gentler on the left one. In places, ancient wadis, dry beds of extinct brooks or small rivers, cut through the slope. Up-stream of Korosko, 200 km south of Aswan, the valley gets larger and the hills recede, allowing some place for fields (*Figure 1*).

The Egyptian Nubian population consists of three distinct ethnic groups: The northernmost one, formerly living in the area between Aswan and As-Sebua, are the Kenuz (sg. Kenzi), descendants of the Nobadae from Graeco-Roman times. Their close relatives in the southernmost Egyptian

Nubia between Korosko and Adendan are the Fadidja, who often call themselves "Nubi", and are also descendants of the Nobadae.

Between these two groups, various Nubian Arab tribes settled down in the 14th century AD in a 30 km long stretch of the Nile Valley lined with hills on the right bank, between Wadi el-Arab and as-Sinqari, cutting the Kenuz off the Fadidja.

Another ethnic group – the Ababda, originally nomads of the Eastern Desert, have been gradually settling down, recently in some Kenuz villages (as Muharraqa, Allaqi, Qirsha, etc.) and in Arab villages. Genetically and historically they do not belong to the Nubians, but to dispersed nomadic tribes of the Bedja whose vast territory reaches along the Red Sea up to Somaliland.

The area populated by the Nubian ethnic groups continues along the Nile about 400 km further towards the south on the Sudanese territory up to the Nile Fourth Cataract. The area between the Egyptian-Sudanese border and the Nile Third Cataract is settled by the Mahasi (the Fadidja of the southern part of Lower Nubia are a part of them). Further south of the Third Cataract, in the Dongola province, the Danakla (Dongolawi) live. Because of the rise of the Nile, its level-lifted by the High Dam reached a small Dal Cataract north of the village of Abri. Therefore, also the population of the northernmost stretch of Sudanese Nubia had to be transferred to the Khashm el-Ghirba area in south-east Sudan.

1.2. Climate

Nubia, crossed by the Tropic of Cancer near Abu Hor, 8 km south of Kalabsha, lies in the zone of extremely dry desert climate, stretching across the terrible Nubian Desert. The dry hot climate is, however, ameliorated by Nile evaporation and the prevailing northern breeze. From March to June a dry hot southern wind can bring sand-storms. The hottest season with a maximum of 52.5° C in the shade lasts from May to September (Wendorf 1968: 8–9). The same temperature was recorded by the present author as highest noon temperature in the shade at the CS Nile ship "Friend of Nubia" (*Sadik an-Nuba*) with the humidity of mere 15%, while on the shore in sunshine it amounted to 70–80°C.

According to long-lasting measurements in the first half of the 20th century, the mean annual temperature at Aswan is of 25.8°C with relative humidity of 34% and annual precipitations rate of 3 mm; in Wadi Halfa 25.7°C, humidity 31% and precipitations only 0.1 mm (Ireland 1952). Only once, in May 1964, we experienced a short storm with only a few sporadic rain drops. No wonder that the skin of the Nubians became deep black after millennia as a result of perfect adaptation to such a hot and dry climate.

1.3. Settlement pattern

Egyptian Nubia is a stretch of land on both banks of the Nile in a deep valley bordered by rocky mountains, higher on the east bank than on the west one. There it gently rises, covered by accumulated sand, in places forming dunes. On the north the valley is mostly narrow. It widens south of Korosko, especially in the region of Aniba and Toshka, where a land reclamation project has recently been started.

The two-phase rising of the Old Aswan Dam resulted in the flooding of the narrow strip between the river and the mountains. This forced the Nubians to move their houses and miniature fields further up the slopes. Because of the lack of fertile soil there, the people lifted handfuls of soil before the rise of water to make small gardens. The first rising around 1910 hit the region up to As-Sebua, the second one after 1930 up to Wadi Halfa.

The character of the countryside and the rise of the Nile level-conditioned the settlement pattern of Egyptian Nubia. It consisted of typical small settlements (*nagas*) with dozens of houses dispersed through the country (*Plate I*). They were originally seats of certain descent groups, as evidenced by the names of some nagas identical with the names of descent groups (see Chapter 6). Some 10–20 nagas were grouped together into administrative units, villages (*qaryas* or *nahias*) with a hundred or more houses.

Houses, sheds and other buildings were lining a wall of farmsteads with a courtyard in the middle (*Plate II*). The wall was interrupted with an entrance porch leading into an entrance room for receiving guests. White-washed sides of houses and walls were decorated (*Plate III*), usually by girls or brides, with colourful ornaments and realistic motifs observed in the environment. This added a joyful appearance to the grey or yellow rocky countryside (*Plate IV*).

The biggest or most important local settlement (*naga*) in the village became the seat of the mayor (*omda*), school (*Plate V*), mosque and community house for meetings and gatherings of the inhabitants (*Plate VI*). The small settlements were connected by bad sand roads only in the southern part of Nubia, while in the north only by paths trod by pedestrians. Wooden sail-boats (*felukas*) were solely used for transporting people and goods (*Plate VII*). Since there were no shops in the settlements, local traders brought basic food and various goods from Aswan to be sold directly from their boats.

As there were no doctors' consulting rooms, the government sent twice a year a ship with an Egyptian physician. In the meantime sick people had to sail to a small clinic run by Dr. med. Elisabeth Herzfeld on the Island of Sehel-a couple of km south of Aswan. For more serious affections it was necessary to reach the Egyptian public hospital or the German Evangelic Mission hospital in Aswan. In the southern part of Lower Nubia there was a possibility to cross the Egyptian-Sudanese border at Adindan for a local hospital at Wadi Halfa.

The population census of 1960 confirmed 48,021 inhabitants living in Lower (Egyptian) Nubia, in order to assess how many of them should be transferred to New Nubia. There were, however, still hundreds of young and mid-aged men, working temporarily in Egypt, sometimes together with their families, so that the total number of Egyptian Nubians was in reality 2–3 times bigger.

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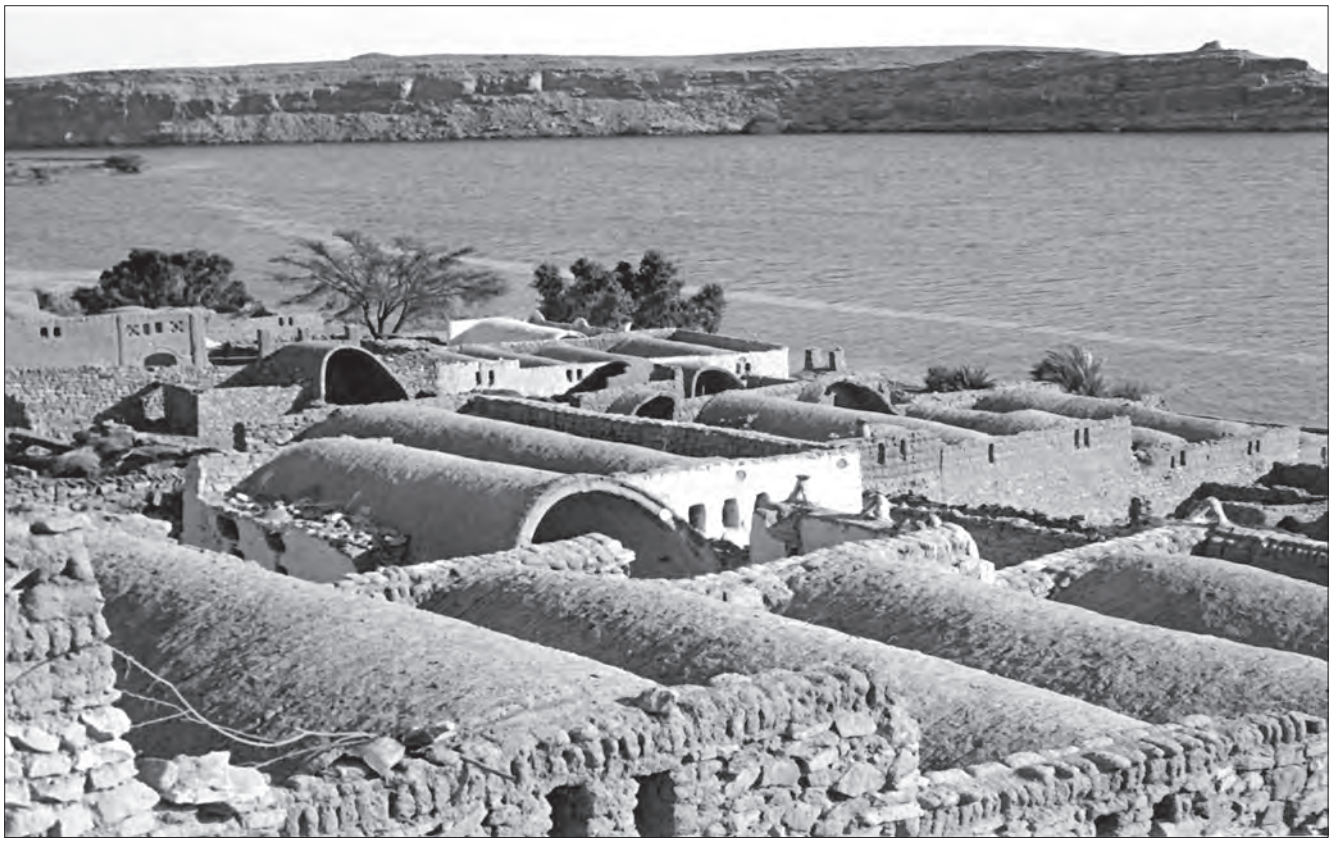

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PLATE I. 1–2) Small settlements (*nagas*) along the Nile in the Kenuz part of Old Egyptian Nubia.

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PLATE II. 1–2) Courtyards of two farmsteads in the Nubian Arab part of Old Egyptian Nubia.

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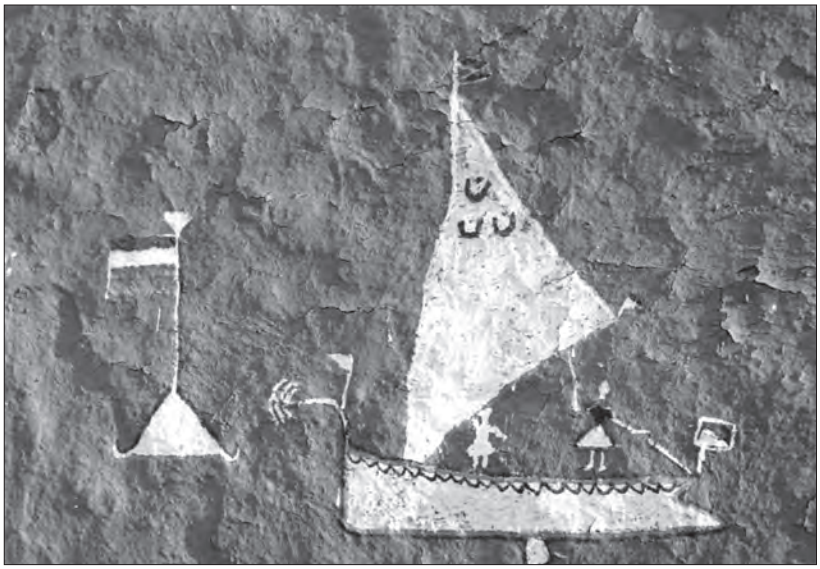
PLATE III. 1) External decoration of a Kenuz house. 2–3) External decorations of two Nubian Arab houses.



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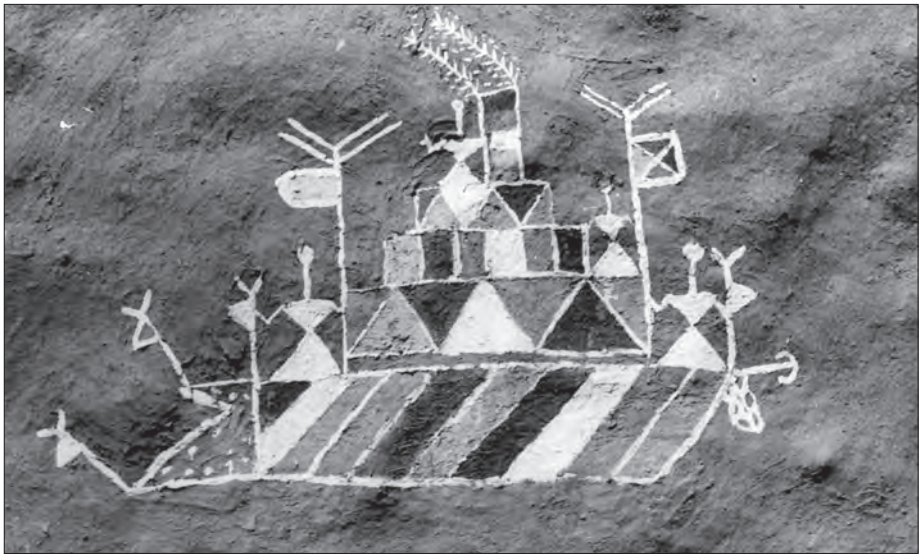

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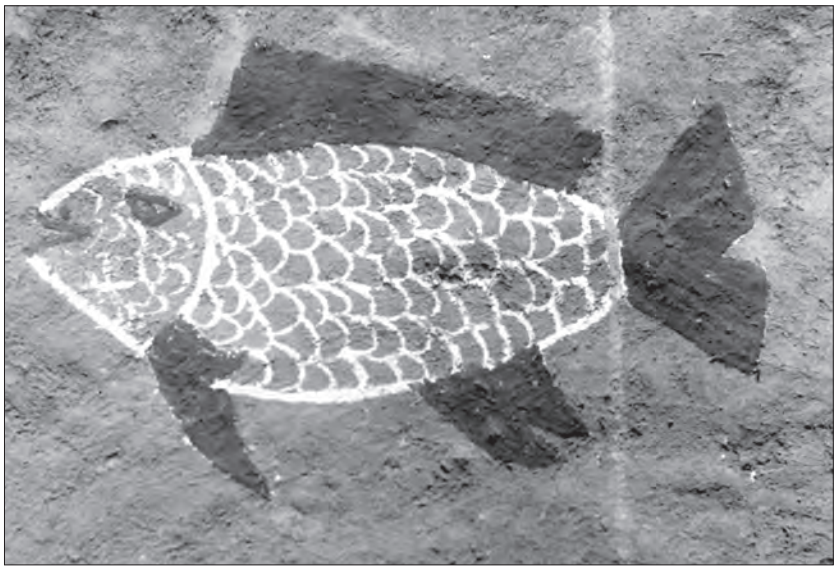

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PLATE IV. 1–6) Selection of decorative motifs from the Kenuz part of Old Nubia (nos.1 and 4 by M. Stuchlík).

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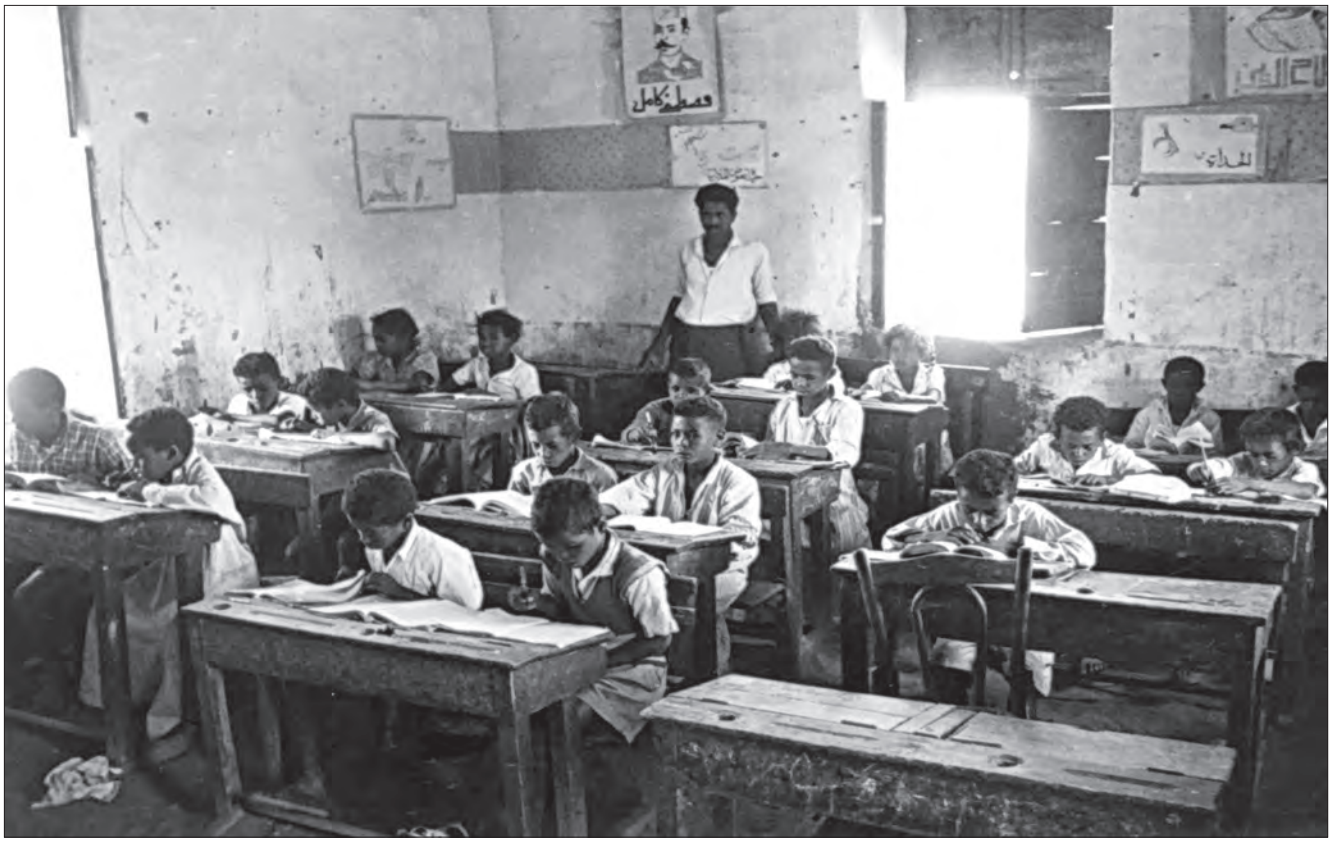

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PLATE V. 1–2) The elementary school in Korosko, the Fadidja part of Old Nubia.

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PLATE VI. 1) The mosque in a Kenuz settlement. 2) The community house in a Nubian Arab settlement.

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PLATE VII. 1–2) Sailing boats (*felukas*) on the Nile. 3) Landing in a village.

1.4. Historical development of the Nubian population

The study of ancient Nubian population has been very intensive as a consequence of the first and second elevations of the Old Aswan Dam which flooded the lower area of Egyptian Nubia up to 100 m above sea level. Anthropological material from the excavated cemeteries was studied by Grafton Elliot Smith and Franz Wood Jones (1910), later by Gruber-Menninger (1926), Collett (1933) and Batrawi (1935, 1945, 1946).

The construction of the High Dam lead to a new huge rise of the Nile level-for about 80 m and its Lake Nasser reached deep into Sudanese Nubia south of the Third Cataract. Within the scope of the International Action for Safeguarding Nubian Monuments also human remains from further cemeteries were excavated and researched (Chamla 1967, Anderson 1968, Nielsen 1970, Greene, Armelagos 1973, Van Gerven *et al*. 1973, 1977, Billy 1975, 1976, 1987, 1988, Simon, Menk 1985, Carlson 1976, Carlson, Van Gerven 1977, Calcagno 1986, Strouhal, Jungwirth 1971, 1984, Trancho Gayo 1987). Additional cemeteries outside the flooded area in Sudan were studied by Lisowski (1954), Knip (1970) and Billy (1985).

The great amount of data and information in these and several other contributions not quoted here cannot be analyzed in detail in the present publication. Instead, general trends of development of the Egyptian Nubia population during different archaeological and chronological periods will be outlined.

1.4.1. Paleolithic and Mesolithic people

Lower and Middle Paleolithic skulls and skeletons were discovered as isolated finds in Egypt (Kom Ombo, Nazlet el-Khattar), however, none yet in Nubia. They are still scarce and belong to a very robust archaetype of *Homo sapiens fossilis*.

In Epipaleolithic to Early Mesolithic times (around 10,000 years BC) a curious hunting and gathering semi-sedentary culture labelled *qadan* (Wendorf 1968) used incipient harvesting of uncultivated plant food. It yielded cemeteries with tombs of people displaying wounds from intertribal fights, most probably in competition for hunting and fishing territory. Human remains were found in the region of Wadi Halfa, both on the left (Anderson 1968) and right banks of the Nile (Greene, Armelagos 1973). Physically the people had very robust bodies and skulls with archaic features, like strongly developed supraorbital arches and heavily protruding jaws with strong masticatory muscles. They were first identified as the Mechta-el-Arbi type at Taforalt and at other sites in north-west Africa. Similar people were later discovered also in Mali by Dutour (1986, 1989). It seems likely that they inhabited large areas of Sahara as nomadic or semi-sedentary hunters and gatherers before the beginning of the Neolithic. It can be supposed that some of them migrated also to the Nile Valley.

The question of the relation between the Wadi Halfa fossil people and the first Neolithic populations of Egyptian Nubia still remains unsolved. Some authors suppose evolutionary connections (Greene *et al.* 1967, Carlson, van Gerven 1977, Calcagno 1986), many others express their doubts, as connecting links between the 9th and 6th millennia are still missing.

1.4.2. Neolithic Egyptians and their origin

In contrast to the sturdy nomadic or semi-sedentary human groups of presumed Saharan origin, the first agriculturalists and cattle-breeders, living in Nubia with a culture labelled by archaeologists as Group A in the 5th millennium BC, were slim and gracile, dolichocranic, with small faces and slightly broader noses. Their physical features were Caucasoid, not distinguishable from the contemporary Predynastic Upper Egyptians of the Badarian and Nagadian cultures (Billy 1975, Simon, Menk 1985).

The origin of the Egyptians was looked for in the course of almost two centuries in nearer or more distant regions in all possible directions. It has not been, however, established yet with certainty. Predynastic Egyptians seem to be similar to the Capsian Mesolithic people of North Africa and to the historical Berbers. Recently it has been supposed that they had entered the Nile Valley from Neolithic Sahara through the Western Oases, bringing with them the archaic way of agriculture and cattle-breeding (Strouhal 1988).

The problem of the Egyptians' origins has been intensively studied by linguists, too. Greenberg (1955) proved that Hamitic and Semitic languages are genetically bound, as both developed from a common Hamito-Semitic (recently called Afro-Asian) language. Later it was split into an Asian (Semitic) and four African branches: the Tchadian, Berberic, Egyptian and Kushitic. The Old Egyptian language, being the most archaic known one, has retained its original Hamito-Semitic character. It assumed a central geographic position, while the three other language families further polarized during migrations and evolution of their speakers.

1.4.3. Evolution of the Nubian population

The evolution course of the Nubian A-Group population has been followed using periodization by successive archaeological cultures or horizons (Adams 1967). Group A was roughly contemporary with the Egyptian Predynastic Period to the Old Kingdom (4000–2400 years BC). Group B was supposed to follow, but later has been disproved as a separate period and recognized as a poorer version or later stage of Group A. The following Group C covered the time from the Old Kingdom to the Second Intermediary Period in Egypt (2400–1550 BC). Group D ("Pharaonic") was the period of Egyptian domination over Nubia during the New Kingdom (1550–1070 BC).

This was followed by a thousand-year-long hiatus in settlement, contemporary with the Third Intermediary and Late Periods in Egypt, when Lower Nubian people probably retreated to Upper Nubia, into the realm of the Late Kerma and Early Meroitic cultures. New settlements

and cemeteries in Lower Nubia are dated to the Late Meroitic culture (from the beginning of Christian era to 300 AD), Balana culture (formerly called X-Group, 250–500 AD) and the Christian period (500–1400 AD). They are contemporary with the Ptolemaic, Roman, Byzantine and Arab periods in Egypt.

Changes observable in metric and descriptive features in population samples from the individual periods were explained from two different points of view, which do not necessarily exclude each other. The first, older concept, was based on populational typology, which was interpreted as the result of human migrations along the Nile in two opposite directions, from the North (Egypt, Caucasoids of Mediterranean phenotype) and from the South (Black Africans).

This idea was expressed already by Batrawi (1946: 154), who found an increase of variability as a result of gene flow from the A-Group to Balana culture. It was further substantiated by Billy (1975), who used the Penrose size and shape analysis based on length, breadth and height of the skull, height and breadth of the upper face and height and breadth of the piriform aperture. Altogether 39 populational samples – 4 from Lower Egypt, 19 from Upper Egypt, 10 from Lower Nubia and 6 from Upper Nubia – were analyzed.

The first presence of a Negroid element with an increase of population variability was distinguished in the C-Group. During the New Kingdom Nubia became a firm part of Egypt and was ruled by Egyptian colonial officers. Tombs of the Nubian type became progressively scarce, while tombs of the Egyptian type increased. The majority of archaeologists supposed that the Egyptian type tombs contained "Egyptianized" Nubians. Anthropologically they belong, however, to people of Upper and Lower Egyptian origin, settled at that time in the Theban area, who migrated as officers and scribes to Lower Nubia (some even to Upper Nubia). This situation can be interpreted as a gradual exodus of the Nubians and influx of the Egyptians.

After the above mentioned hiatus in settlement, caused probably by a withdrawal of the Egyptian settlers, a new population intermingled with Negroid characters immigrated from the Meroitic South into Lower Nubia, first in its southern part, during the 3rd century also to the northern part, the former Egypto-Roman area of the Dodecaschoinos (Strouhal 1984). Participation of Negroid features increased with the transition from the Meroitic to the Balana cultures. A physically almost identical population called Nobadae accepted Christianity in the 6th century; later, gradually during the 11th–14th centuries, it accepted Islam (see Section 1.4.6.).

A further work by Billy (1988) classified the populations of Egyptian Nubia basically into the realm of North-African Whites, the Mediterraneans. Their relations to Sub-Saharan Africa are secondary. There exists a convergence of forms between the Egyptian Nubians and populations on the Ethiopian coast as far as the coast of Yemen, due to similarly operating genetic mixtures.

1.4.4. Bio-cultural adaptation of the craniofacial complex

The other conception has emerged more recently, explaining the observable changes of metric features as an evolutionary process by natural selection and bio-cultural adaptation, observing ecological and economical conditions of populations. It was revealed mainly by American authors – concerning the craniofacial complex by Van Gerven *et al*. (1973, 1977), Carlson (1976) as well as Carlson and Van Gerven (1977), concerning dentition by Greene (1973), Greene, Armelagos (1973) and Calcagno (1986).

The authors used multiple discriminant analysis and the material of the Scandinavian joint expedition starting from the Egyptian–Sudanese border and progressing 60 km south on the east bank of the Nile (Nielsen 1970). It was analyzed by roentgenographic cephalograms allowing for 37 linear and angular dimensions (Carlson 1976).

According to archaeological evidence the A-Group and Early C-Group people were not fully adapted to agriculture, still using hunting and gathering as an important contribution to their economy. By discriminant functions a significant difference was assessed between them and the Late C-Group people as well as the Meroitic, Balana and Christian populations, which were fully dependent on agricultural subsistence. They showed close similarities between each other (Carlson 1976).

In a following analysis (Carlson, Van Gerven 1977) using anthropometric data and multiple discriminant analysis, the Late Paleolithic–Mesolithic population of the Wadi Halfa region supposed to be probably ancestral to later Nubian groups, was compared with human remains from the A-Group and C-Group sites and the Meroitic, Balana and Christian complex from the same Wadi Halfa area (measured by Nielsen 1970), naturally except for the Pharaonic (New Kingdom) group.

The authors proved that the masticatory-functional hypothesis, observed in other populations, is valid also for Nubia. According to it the gradual decrease of functional demand on mastication by transition from tough food provided by hunting, fishing and gathering to softer food of the agriculturalists, the masseter and temporal muscles were progressively reduced and slightly relocated. This caused a reduction of the upper and lower jaws in their antero-posterior growth together with diminution of dental size. Together with it, the cranial vault became progressively shorter and taller in relation to its length (more globular), while the face became less robust and more infero-posteriorly located in relation to the cranial vault.

These findings were supported also by dental evidence. The exceptionally large and morphologically complex dentition of the Late Paleolithic–Mesolithic population as selective adaptation to attrition by gritty diet and heavy masticatory force, to smaller and less complex teeth based on softer foodstuffs during the Nubians further development (Greene *et al*. 1967, Greene, Armelagos 1973, Carlson, Van Greven 1977).

The reduction of teeth size between ca 10,000 BC and the first millennium BC was analyzed by Calcagno (1986).

He found it to have been most intensive, and affecting the size of all teeth, between the Mesolithic people and the "Agriculturalists" (A-Group and C-group). Only one tenth of that difference occurred between the latter and the "Intensive Agriculturalists" (Meroitics to Christians), involving only posterior teeth.

On the other hand, already in 1967 when carrying out comparison of dental morphological features, Greene (1967) recognized developmental continuity between the Meroitic, Balana and Christian populations of the Wadi Halfa region.

It may be concluded that the biocultural concept of the Nubian evolution added new aspects to the older populational evolutional view. Both concepts are not contradictory. The second one has rightly omitted the period of Egyptian influx to Nubia during the New Kingdom. On the other hand, the similarity in discriminant functions expressing continuation of the bio-cultural adaptation between the C-Group and Meroitic populations can be parallelled by the influx of Southerners bringing Black African genes to Nubia.

1.4.5. Other insights into Nubian evolution

A diachronic study of the internal structure of the Nile Valley population based on multivariate analysis was performed by Simon and Menk (1985) using 32 samples –Egyptian (16), recent East African (4), and also a choice of 12 Nubian ones.

The results shown in a dendrogram consist of three distinct clusters. The first one groups together mostly Upper Egyptian samples, including also the garrison of the Egyptian fortress of Mirgissa (Billy 1975). Not far from them, the second cluster contains six samples of the northern part of Lower Nubia from the A-Group to a Roman period one, collected during the first survey by Smith and Wood Jones (1910), except for their "Group E" placed apart. Much more distant is the third cluster, including Egyptian Predynastic samples together with Upper Nubian samples, mainly from Kerma (Old and Classic being apart) and the Nubian C-Group.

A different approach to the study of diachronic trends in Egyptian Nubia in the course of more than 13 millennia up to recent times is represented by a study not dealing with *samples,* but with 10 main craniofacial *features* of 37 Nubian series by Strouhal and Soudský (1990). The data were pooled into 9 chronological horizons by calculation of weighted means and variances. The thickness of soft tissue had to be subtracted from measurements of living Nubians. Single means of the horizons were submitted to one-way analysis of variance, the differences between pairs of means of the successive and further horizons to t-tests of equality of means.

Secular trends were apparent in all measurements. All features (except for nasal height which slightly increased) showed a significant decrease between the Late Paleolithic and 3000 BC, expressing the trend of diminution and gracilization of the skull. In later periods, this trend changed into an undulating form of the curves with temporal reversions of the trend. These could neither be explained by changes of living conditions, way of life nor a return to more coarse food, but as the result of alternating infiltration either of the Egyptians or Sudanese people (less so by sporadically settling down nomads of the Eastern Desert). The first immigration was clearly palpable during the New Kingdom, the second one slightly in the C-Group, more in the Meroitic, Balana and Christian times.

1.4.6. Arab, Berber and Turkish influx to Egyptian Nubia

Human remains from Islamic cemeteries cannot be anthropologically studied. There exist, however, several historical sources mentioning political changes in Egyptian Nubia which could have affected the population structure. They were compiled by Milan Fiedler (1970) from writings of Mas'udi 935–966, Abu Salih 1200, Ibn Salim 957–966, Maqrizi 1420, Quatremere 1811 (quoting the History of Sultan Qala'un, ca 1290), Burckhardt 1819 and MacMichael-1922. Milan Fiedler also wrote this section, which was then abbreviated by the present author.

After Egypt was conquered by an Arab Muslim army (638 AD), the Arabs pushed as far as to Old Dongola where they beat the Nubian army. In a peace treaty a yearly delivery of Nubian slaves in exchange of Egyptian goods was fixed, together with a prohibition to Christian Nubians to settle in Egypt and Arab Egyptians in Nubia. This treaty was in force for about 600 years, but was not too strictly observed by both sides.

Egyptian Nubia was a part of the Christian Muqqura Kingdom with the capital in Old Dongola. Many Muslim settlers acquired land north of the Second Cataract in the time of the Umayyad dynasty (late 7th – mid-8th centuries AD).

The tribe of Rabi'a from Hidjaz settled in the northernmost part of Nubia, from Aswan to Bab el-Kalabsha, in 854 AD. They founded an Arab aristocracy who ruled over the Nubians by mutual consent. They started to intermarry with Nubian women and gradually adopted their language. Around the year 1020 their chief was invested by the Egyptian Khalifa with a hereditary title of *Kanz ad-Dawla* (Treasure of the State). By the end of the 12th century he was also awarded with the title *Amir of Aswan*. The Rabi'a and the assimilated Nubians were since called *Banu Kanz.*

Around 1275 the governor of the Upper Egyptian capital city of Qus invaded Nubia and, subsequently, "a quarter of Nubia" (approximately *Dar al-Kunuz*, the present area of the Kenuz) was ceded to the Egyptian sultan as his personal fief.

When Sultan Qala'un dispatched an expedition against Dongola in 1287, he ordered the governor of Qus to reinforce it with members of Banu Kanz, Banu Hilal and other tribes settled in northern Nubia.

During 1313–1320 the Christian kings and Banu Kanz fought for rule over Nubia. The last Christian king of Nubia was ousted about 1323. Since the early 14th century hordes

of Arabs, mainly from the Djuhaina tribe, were pouring into Sudan as far as Abyssinia and Darfur, while the present Egyptian Nubia was left to the Banu Kanz and tribes of 'Ikrima. These migrations resulted in the islamisation of Nubia.

Since 1366 the Bani Kanz ruled occasionally over Aswan, but in 1412 they were expulsed from there by the Howara Berbers. About as many as 1500 villages south of Aswan were subjected to the nomads Bedja of the Eastern Desert.

After the end of the Christian Nubia two important tribes took possession of Egyptian Nubia, the Djawabra (a branch of the Dja'aliyyin Arabs of Sudan) and the Gharbiya (a branch of the Berber tribe of Zenata). In 1520 the Gharbiya helped by Turkish troops ejected the Djawabra into the present province of Dongola, leaving some families in ed-Derr and Wadi Halfa. The Gharbiya adopted the Nubian language and have remained until now the strongest tribe among the Fadidja.

In the same year, the Ottoman Turkish Sultan Selim I extended his rule to the Third Cataract. Nubia was placed under a hereditary governor of Arab origin, *kashif*, subordinated to the governor of Egypt (Fiedler *et al*. 1971: 457). However, he ruled quite independently, seated in ed-Derr and having at his disposal a number of troops of mercenaries, mainly of Turkish and Bosnian origin (including also Kurds, Hungarians, Tatars and Azerbaijanis – Fiedler *et al*. 1971: 455). Some of them became local tax collectors.

Besides this, other Turkish and Bosnian garrisons, directly subordinated to the Sultan in Istanbul, were stationed at Aswan, Ibrim and Sai in Sudanese Nubia. These soldiers intermarried with local women and their profession passed from father to son. The kashifs had wives in nearly every village and created big families.

Around 1770, the Howwara Berbers, powerful in Upper Egypt and northern Nubia since the 15th century, became masters of the land between Asyut and Aswan, from where their supremacy expanded to Nubia including the area of the Mahasi in Sudan. Different descent groups originating from the Turks or members of subdued nations which they brought to Nubia, together with the Ad-Dababiya (Arabs from Qift), ruled the region from Ibrim to Wadi Halfa on behalf of the Howwara (Fiedler *et al*. 1971: 455–456). The power of the Howwara was broken by the Egyptians in 1813, the rule of the kashifs finished at the end of the 19th century.

When Burkhardt visited Nubia in around 1819, he met Arab bedouins at Dehmit and Umbarakab who came from the environs of Baghdad. Between the Kenuz and the Fadidja lived the Arab 'Ulaiqat, who were not mentioned by ancient Arab historians of Nubia. Therefore, they could not have arrived sooner than in the 15th century. The west bank of the Nile from ad-Dakka to Mahas was periodically raided by the Magharba, a half-Arabised Berber tribe, whose name is still borne by the settlement (*naga*) al-Magharibiya near ad-Dakka.

The population of Egyptian Nubia was also influenced by Black Sudanese slaves who operated *saqiyas* for the irrigation of fields. Many of them were owned by the kashifs. The Nubians did not intermarry with them, but their women were used as concubines.

1.5. Previous anthropological research

In line with accumulation of great knowledge on archaeological cultures of Nubia, its history and monumental temples erected there by Ancient Egyptian kings (Adams 1967) as well as on historical anthropology of its population (Section 1.4.), interest in *cultural and social anthropology* was exerted by various early travellers and scientists, firstly Arab, later also European ones. Moreover, several Egyptologists paid attention to Nubian culture and language while studying pharaonic remains.

A modern comprehensive compendium on Nubian language and ethnology concerning ethnic groups, social structure and forms, economy and changes of social structure was presented by Rolf Herzog (1957).

A new wave of interest in cultural and social anthropology of the Nubians arose at the time of planning and building the High Dam over Aswan, which brought along the need to transfer the inhabitants of Ancient Nubia to New Nubia. In 1961 the Social Anthropology Research Centre of the American University in Cairo undertook a preliminary survey of a number of Nubian villages. Later it collaborated with the Egyptian government employees responsible for the resettlement project and in the following years organized together with Egyptian colleagues a thorough ethnological survey of Nubia. Its main results were discussed in a seminar and published in two volumes of proceedings (Fernea 1966).

Unlike these observations and studies, physical anthropological research on living people of Nubia remained rather scarce for a long time. The first mentions on the Nubians can be found in accounts of ancient travellers. Thus J. Bruce (1805) noted that "the Kenuz are not black, but dark brown and their heads are not covered by crinkly hair. They are small, slim and agile, and seem to be always hungry."

J. L. Burckhardt visited Nubia thirty years later (1819), recognizing that the Nubians form an intermediary group between the Blacks and Abyssinians. According to him, their features, still preserving some of their Negro past, have certain regularity. Their nose, although smaller than in Europeans, is not flat as it is in the Negroes, their lips are less thick and their zygomatic bones do not protrude so much. Some of them have curly hair, but mostly one can find hair similar to that of the Europeans, but coarse.

The Austrian major Prokesch von Osten (1931) observed that a Nubian distinctly differs from an Arab by language, skin colour and body built. He is black, with curly hair, but does not have a flat nose or inflated lips as members of Negro tribes. His facial features are not unpleasant. He has big eyes, a sharp and vivid look, slender growth and swift motions. Prokesch von Osten did not appreciate Nubian

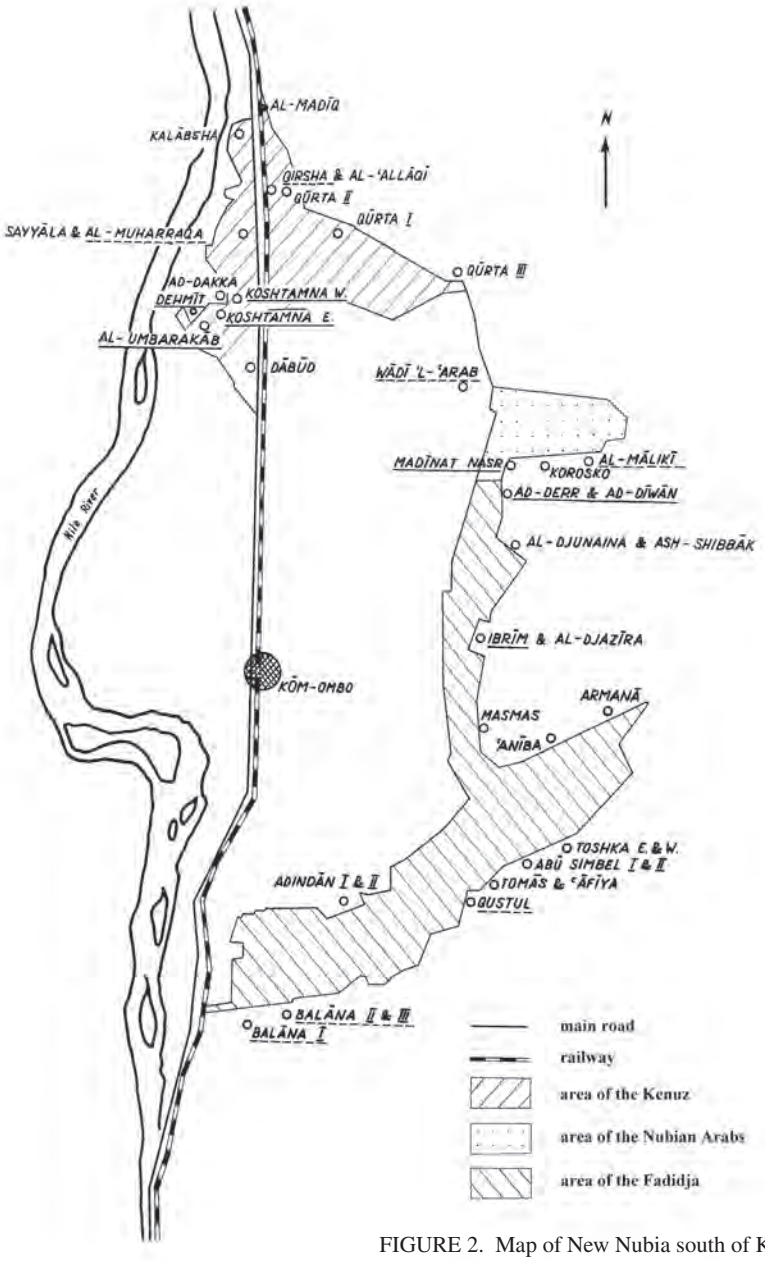

FIGURE 2. Map of New Nubia south of Kom Ombo (Nubian names in Arab transcription).

women very much: he found them uglier than the men, small and meagre, admitting that only some of them can be called pretty.

The German scholar G. Fritsch (1904) published a photographic atlas of typical folk types of the Egyptian population including several Sudanese Nubians.

The French physical anthropologist Ernst Chantre (1904), author of the first major work on the living Egyptians and some other populations of north-east Africa, used scientific methods for the determination of stature and for expressing their features by precise measurements. His work includes also a group of males from Shellal near Aswan (in average 168 cm high).

In his monograph on African anthropology the British author C. G. Seligman (1957) described also the Nubians: "Tall, and mainly long-headed ... of a slight, rather graceful build, which immediately distinguishes them from the Fellahin. They are darker-skinned and narrower-faced ... and though the hair is frequently curly, it is seldom as crisp as that of a Negro ...".

The Englishman J. Craig (1911) included the Nubians in a nationwide survey on stature and main head measurements of Egyptian recruits. Their mean stature of 165.1 cm is smaller than the one assessed by Chantre and values obtained by our expedition in the Nubians.

In the scope of his north-east African research travel-the American scientist H. Field (1952) measured a sample of the Nubian ethnic group Mahasi from Abka in northern Sudan. Their stature of 171.4 cm ascertained the trend of increasing stature up the Nile. Only a small group from

the Kenuz village Dabod was examined by the Polish anthropologist W. Szwaykowski (1960).

No Nubian woman was anthropologically examined prior to the CS – UAR expeditions.

1.6. New Nubia

The hitherto barren desert south-east of the Upper Egyptian town of Kom Ombo was selected by Egyptian authorities to become a new homeland for the Nubians, resettled from Old Nubia in 1963–1964 (*Plate VIII*).

On demand of the Nubians the living areas of the three main ethnic groups of Ancient Nubia were respected and arranged in their original direction from north to south – the Kenuz, Arabs and Fadidja (*Figure 2*). In their territories the majority of 43 former administrative units – villages (*karyas*) with traditional names – were located without a possibility to respect their original relations. Some big villages were divided into two or three administrative units, while some too small ones merged with close bigger ones.

The standardized unplastered stone houses, built there in advance for the Nubian families by the Egyptian government (*Plate IX: 1*), tried to respect by their dimensions the number of family members, but for some families they were too small or too big. In the former case the Nubians started to prolong them (*Plate IX: 2*). The traditional Nubian ornament decorating houses in Old Nubia could survive in a rather debased form only in houses which were additionally plastered by their owners (*Plate X: 1*).

Great progress was an elementary school in every village and higher schools in Nasr City, administration centre of New Nubia (*Plate XI*). Beside health units in villages, a clinic was provided also in Nasr City. Also the police got their headquarters there.

No mosques or village houses for meetings and gathering of the villagers could have been built at the beginning, so that people started to build them by themselves after settling down (*Plate X: 2*).

The intention of the government was to bring the Nubians back to agriculture. Therefore, fossil soil covered by sand in the region was exposed to be cultivated by the settlers. A system of newly dug channels bringing Nile water to the new fields was created for irrigation. However, the Nubians frequently leased their acquired fields to Egyptians from the Kom Ombo region who started their cultivation.

2. HISTORY OF THE UAR – CZECHOSLOVAK EXPEDITIONS TO NEW NUBIA

2.1. The idea and the first contacts with Egyptian scientists

In distinction to the great amount of archaeological and physical-anthropological knowledge on the history of Egyptian Nubia and its inhabitants, the physical character of their descendants, the recent living Nubians, was largely unknown, except for a few data mentioned above (see Section 1.5.). The idea of the need for its investigation arouse in the mind of the present author already before his first travel-to Old Nubia. Being aware that such an enterprise cannot be fulfilled without collaboration with Egyptian scientists, he paid consultation visits to the only living Egyptian professor of anatomy and anthropology at the Medical Faculty Kasr-el-Aini of the Cairo University in Giza, Dr. med. Ahmad Mahmud El-Batrawi on April 15 and on May 5, 1961.

Prof. Batrawi agreed with the idea, showing great interest and enthusiasm. Based on his long experience with historical development of the Nubian population (Batrawi 1935, 1945, 1946), he recommended to get in touch with the Egyptian supreme scientific institution, the National Research Centre (further NRC) at Dokki, and promised to support our initiative and even to participate in person in the mission.

Because of the necessity to prepare our Nile ship and equipment for the first expedition of the Czechoslovak Institute of Egyptology to Tafa and Qertassi in Nubia during the summer of 1961, the present author's visit to the office of the NRC Director Prof. Dr. Ahmad Riad Tourky could be realized only on October 7. He had been already informed about the CS initiative by Prof. Batrawi and gladly offered the collaboration of the NRC.

For details of the collaboration he recommended to visit Prof. Dr. Ali Hasan, an Egyptian specialist on nutrition, which we did on October 11. Prof. Hasan agreed with the idea and offered us his own collaboration in the field. Based on his experience from Polish missions to Western oases in 1958–1959, he suggested cooperation with several young medical men. According to him the joint mission could be sent to Nubia on an Egyptian and our ship as soon as in autumn 1962, prior to the exodus of its population.

The director of the Czechoslovak Institute of Egyptology, Prof. Dr. Zbyněk Žába, CSc., although upholding the idea of broad collaboration of different scientific disciplines in the programme of the Institute, first hesitated to support the idea of a joint mission, but later changed his mind under the threat that the proposition could be passed over to some other CS institution. Therefore, he took an active part in the following meeting with Prof. Tourki and Prof. Hasan in the NRC on October 25. It was agreed that the CS side would prepare a project of the joint expedition with all scientific and technical details, which would be discussed by the Egyptian side and incorporated into a preliminary agreement that had to be approved by CS and Egyptian authorities. We also informed the CS Ambassador in Cairo Mr Zachystal and the cultural counsellor Mr Korselt about our negotiations with Egyptian colleagues, and they promised to include the project of the joint mission in the programme of the CS – Egyptian Cultural Agreement.

The first version of the project of a joint UAR – Czechoslovak expedition (since at that time, Egypt was, together with Syria, a part of the United Arab Republic) was submitted to the Egyptian side represented by Professors Tourki, Hasan and Batrawi by the CS side represented by Assist. Prof. Ing. arch. Miroslav Korecký (on behalf of

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PLATE VIII. 1–2) Ships and trucks transporting movable possession of Egyptian Nubians during their resettlement.

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PLATE IX. 1) Standardized houses built for the Nubians by the Egyptian government. 2) A group of Nubians prolonging their house.

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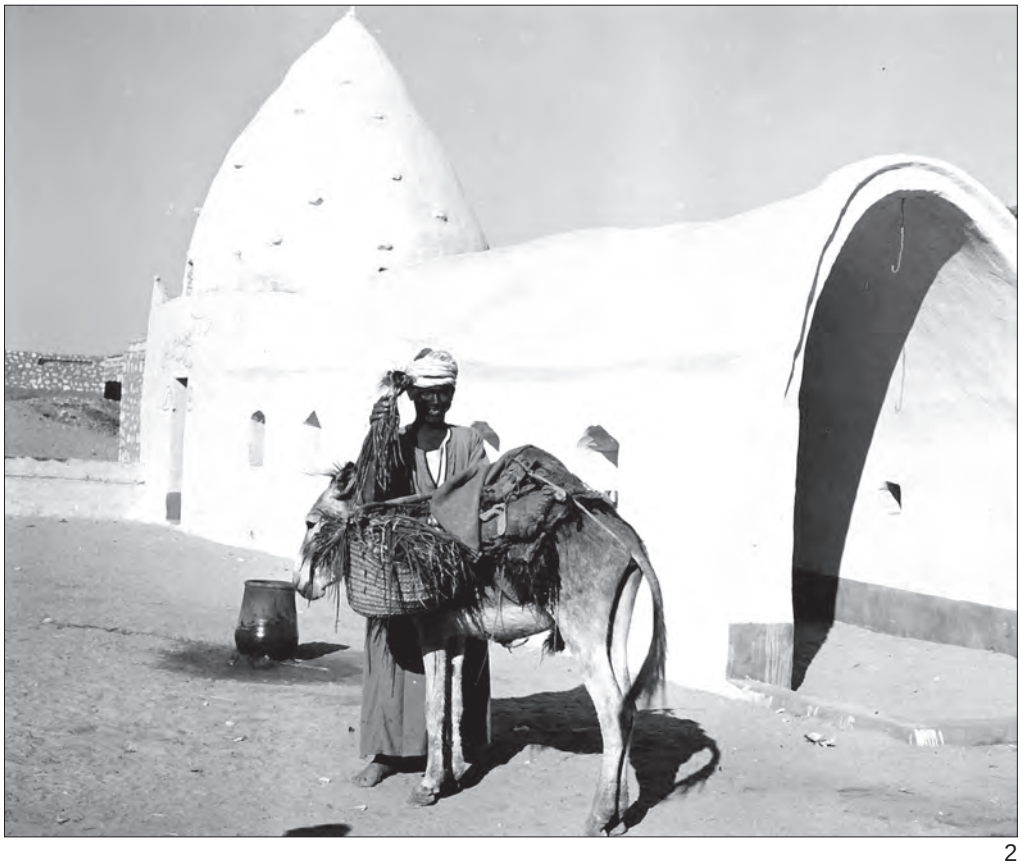

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PLATE X. 1) Two houses plastered by their owner with debased decoration. 2) A boy with his donkey besides of a mosque built by local Nubians of mud bricks.

1

2

PLATE XI. 1) Nasr City with a grammar school and modern houses. 2) Girls learn how to plait the traditional Nubian wicker–work.

Prof. Žába) and the present author. We spent two hours discussing every paragraph in detail. At the end we were assured that a written standpoint of the Egyptian side would be sent by mail at the beginning of the following year.

2.2. Postponement of the project

No message came from Egypt during the year 1962 in spite of our reminders. The present author could not resume direct negotiations with Egyptian authorities, because Prof. Žába intentionally avoided assigning him to participate in the next two Egyptological missions to Nubia. The delay on the Egyptian side could have been caused by the realization of the second joint UAR – Polish mission to Fayyum and a part of Delta and by the preparation of the population transfer out of Nubia, threatened by flooding due to the quickly progressing construction of the Aswan High Dam. This of course rendered our examination of the Nubians impossible.

In the meantime the present author could continue preparations for the joint expedition in Czechoslovakia, contacting Prof. Dr. med. et Dr. nat. sc. Jindřich A. Valšík, DrSc., head of the Chair of Anthropology at the Comenius University in Bratislava, and asking him to lead the CS part of the mission, which he gladly accepted. This decision was later approved by Prof. Žába. The present author discussed all the personal, scientific and technical aspects with Prof. Valšík at several meetings and subsequently elaborated a detailed project (Plan of the anthropological research of Nubia, unpublished manuscript, 20 pp., November 20, 1962).

Meanwhile, the transfer of more than 48,000 Nubians from Old to New Nubia had been fixed to the period between October 1963 and May 1964. Taking into account this threatening deadline, Prof. Žába, Prof. Valšík and the present author sent a slightly re-worked Project of a Joint UAR – CS Anthropological Expedition to Nubia (signed by Žába, Strouhal and Valšík) to Prof. Tourky and Prof. Hasan on December 23, 1962 – we proposed to have it realized even before the start of the Nubians transfer, in March and April 1963, using our Nile ship "Friend of Nubia" with its captain Milan Hlinomaz.

This time Professors Tourky and Batrawi promptly replied on January 8 and 9, 1963, accepting the project and its term. Closely before the pending departure of the mission members, on February 28, Prof. Žába sent to Prof. Tourky a letter asking for a written explicit confirmation that the Egyptian side of the mission "is prepared to cover all financial expenses of the CS members during their stay in the UAR" in order to have the departure of CS members approved by CS authorities. Since no reply came, the approval to leave was not granted and the last occasion to work with the Nubians in Old Nubia was thus lost. We had to wait until the resettlement was finished and the Nubians were in New Nubia.

2.3. Reaching an agreement with the Egyptians

After their return from the 4th Egyptological mission to Nubia, on June 13, 1964, Prof. Žába, Prof. Batrawi and the present author were received by Prof. Tourki, who recently became Minister for scientific research of the UAR. We took up all points of the new project which was accepted with some minor changes and the addition, then so important for CS authorities, that the Egyptian side would cover all expenses of the CS members of the mission in Egypt. Prof. Hasan, who was then a head of section at the Ministry, was appointed leader of the Egyptian part of the expedition, responsible for its scientific, logistic and technical aspects. Prof. Batrawi became an expert counsellor, responsible for teaching a group of young Egyptian medical doctors for their field work with the mission.

The expedition was neither realized in the second half of 1964, as foreseen. Instead of getting the invitation to travel-to Cairo, our CS group received a message that the health of Prof. Batrawi deteriorated and later, on November 28, that he had died.

The ultimate decision to start the mission was brought only by the present author's meeting with Minister Tourki in a CSA airplane from Athens to Cairo on March 8, 1965. During the flight we could discuss problems still pending on the planned expedition. He stressed that the main obstacle after the loss of Prof. Batrawi was the cancelling of the preparatory course for the future Egyptian collaborators. He asked whether the present author and Prof. Valšík were prepared to taking over this task, and furthermore whether two of the participants with best output during the work in Nubia and deep interest in anthropology could become postgraduates in a CS institute free of charge. Only if so, the existence this discipline, cut by the death of Prof. Batrawi, who had no successors, could be restored in Egypt.

On March 21 Prof. Tourki invited Prof. Žába, Mr Tomášek from the Czech Embassy and the present author to his office at the Ministry of Scientific Research. He agreed with our proposition to add to the name of our Joint UAR – Czechoslovak Expedition a complement "In memory of Professor Batrawi". Our side accepted gladly his request to send two specialists to teach in an intensive course of anthropological methods. The demand of two places for postgraduate students was promised to be considered by the pertinent CS authorities.

The definitive Agreement on the Expedition included collection of anthropological, medical, socio-economic and demographic data, as well as nutritional, serological, biochemical and parasitological aspects. The date of beginning of the field work was fixed for November 8, 1965.

The Czechoslovak side was to send three experts, anthropometric instruments, photographic equipment and films, dermatoglyphic devices, recording cards, petty gifts for the Nubians, etc.; it was further bound to cover future publication expenses. The two teachers for the preparatory course were to come to Cairo six weeks ahead.

The Egyptian side was committed to send experts for organization of the field work, a female doctor for the examination of women, experts for research of nutrition, equipment for blood sampling, to cover accommodation

and boarding of the CS participants, their travel-expenses and ensure their health care if necessary. The agreement was signed by Prof. Žába and Dr. Asvassan, a counsellor of the Ministry. On May 28 Prof. Valšík visited the CS Institute of Egyptology and approved the Agreement. The written request addressed by Prof. Žába to the CS Ministry of Education to provide two new postgraduate grants in anthropology besides the usual seven places guaranteed for Egyptian students by the cultural agreement, was refused. Instead, Prof. Valšík started personal negotiations with the same Ministry, and succeeded to secure them.

2.4. Preparatory course in Cairo

From October 4 to November 3, every day except for Fridays and Saturdays from 3 to 6 pm Prof. Valšík and the present author taught a group of ten young Egyptian medical doctors and technicians selected by the Egyptian side at the Department of Anatomy, Medical Faculty of the Cairo University. Prof. Valšík focused mainly on auxology (growth and development of children and adolescents) and on several basic anthropological issues (e.g. races and typology). Dr. Strouhal was entrusted to teach theoretically and practically methods of anthropometric and anthroposcopic research. His further topics were craniology and osteology as well as the hitherto anthropological research on the Egyptians and Nubians.

At the end of the course five participants were appointed members of the Egyptian team. Dr.Vlado Ferák from the Comenius University in Bratislava arrived in time to complement the CS team.

During the following days the well-packed equipment was put in big boxes and sent in two microbuses to Aswan, the future headquarters of the mission.

The original departure day was delayed by a week by the Egyptians. All participants in the expedition flew to Aswan on November 13 and were accommodated in the new Abu Simbel-Hotel, which at that time served as a Regional Planning Office.

2.5. First expedition

From November 15 till December 20 we commuted every day from Aswan by two microbuses to New Nubia, a hitherto barren desert region south-east of the town of Kom Ombo, about 40–50 km north of Aswan.

Because one of the goals of the mission was to compare physical features of the three main Nubian ethnic groups, we chose 3–6 villages for each of them as their representatives. This choice was consulted with the experts on Nubian population, Prof. Batrawi, a German ethnologist Prof. Rolf Herzog and a medical doctor of the German-Swiss evangelic mission in Aswan, Dr. Elisabeth Herzfeld in her clinic on the Island of Sehel.

In each village we visited the elected chairman (*omda*) or some members of the village council (respected *sheikhs*), the leader of the police station, the physician of the local health centre and the director of the local school (*Plate XII: 1*). Mostly our Egyptian collaborators explained them the goals and benefits of the inhabitants' examination. These local dignitaries were very important for the publicity of our mission and for persuading inhabitants to come for examination. The best situation was when some of these dignitaries came themselves to be examined (*Plate XII: 2*).

The easiest was to acquire school children, if the teachers provided whole classes (*Plate XIII: 1*). Problems arose with adults, especially men, because they lived in villages in low numbers, being either adolescents or old. Males in productive age were mostly absent, migrating for work to Egypt; if they did not have their family with them, they only came occasionally to Nubia to visit their relatives. The few who – for whatever reason – were staying in the village had to be looked for and convinced for examination.

On the other hand, women lived in villages in great numbers. Many of them came gladly for examination when they heard that they would be examined by an Egyptian female doctor (*Plate XIII: 2*). Such message had to be passed over from one person to another for lack of loudspeakers in the villages.

The research was performed by four parallelly working teams. The first one, headed by Prof. Valšík, comprised Dr. Ferák, Dr. Ali el-Nofely, CSc. and Hamdy Adly Youssouf, a technical assistant. They examined children from the 1st to 5th grades of primary schools (6 to 12-year-old) in a suitable room directly in schools.

The second team composed of Dr. Eugen Strouhal, Dr. Helmi A. Ramly F.R.C.S., a surgeon, and Abd el-Kadr, a technical assistant, examined men from 21 to 55 years in health centres or village common houses (*Plate XIV: 3*). This age span was determined after a couple of days experience, because younger ones were still slightly growing (see Chapter 15) and older ones had already senile signs (see Chapter 16).

The third team of Dr. Fawzia Helmi Hussien M.B.B.C. and technical assistant Madam Hagar examined women of the same age in separate consulting rooms of the health centres (*Plates XIV: 1–2, XV*).

The fourth, purely Egyptian team, lead by Prof. Ali Hasan, haematologist Dr. Fouad Mohammad Badr, gynaecologist Dr. Mustafa and a few technical assistants examined the nutritional state and habits as well as some human genetic features. In some probands blood was sampled for determination of blood groups and biochemical data or urine samples taken for screening of parasites (especially *Schistosoma haematobium* – see Section 4.9.). A group of researchers from the Regional Planning Centre in Aswan joined the mission for some days in order to collect data on socio-economic changes in the life of the resettled Nubians.

The first 15 days were spent by the examination of people from Kenuz villages of northern Nubia (Dehmit, Umbarakab, Koshtamna, Dakka, and single probands from others). The following 15 days we worked in Nasr City, the "capital" of New Nubia. It was possible to examine 15–20-year-old adolescents attending the local higher school – a preparatory school equal to European grammar schools, and a teachers' institute). The team of Prof. Valšík

could examine pupils of the secondary school (6th–8th grade, 12–15 years of age). During free Fridays expedition members visited ancient monuments around Kom Ombo and Aswan (*Plate XVI: 1*).

In the last week we started to work with the Fadidja from southern Nubia (adults from Ibrim and children from Divan and Derr).

Since the work of the mission was shortened by one week at its start and by another one because of the beginning of the sacred month *Ramadan*, we agreed with Prof. Hasan that the mission should continue its work in autumn 1966. This proposal was later submitted to both Egyptian and CS authorities. Minister Tourki signed an Addendum to the UAR – Czechoslovak Agreement in December 1965.

During the closing days of the expedition in Cairo from December 25, 1965 to January 6, 1966 the filled up research cards were duplicated and handed to participants in the mission for elaboration according to the division of topics. Detailed instructions were provided by Prof. Valšík and Prof. Hasan.

2.6. Second expedition

In the meantime responsibility of the CS part of the expedition was transferred from the CS Institute of Egyptology to the Faculty of Natural History of the Comenius University in Bratislava, under the condition that further collaboration of the CS Institute of Egyptology would be preserved. This helped to alleviate official, scientific and technical problems connected with preparations of a second mission to Nubia. However, on request of the Egyptian side it again had to be postponed by a quarter of a year.

The CS group arrived to Cairo on January 29, 1967, but it took another two weeks to start the work, extending from February 14 to March 12, 1967. There were three personal changes in the working teams. Dr. Mohammad Reda Khorched, physician and anatomist from the Abbassia University in Cairo, replaced Dr. Nofely, anatomist Dr. Mohammad Fawzi Gaballah replaced Dr. Ramly and the female team was complemented by anthropologist Dr. Mária Drobná from Bratislava.

During the first ten days Nubian Arabs, inserted between the Kenuz and Fadjidja (villages Wadi el-Arab, Shaturma and Maliki), were examined (*Plate XVI: 2*). Our work of the year 1965 with the Fadidja was resumed later (villages Divan, Derr, Qatta, Balana and Qustul) for two weeks. The last three days were reserved for the study of a small sample of the Ababda, living originally as nomads in the Eastern Desert, but recently settled down in some Kenuz villages (Qirsha, Dakka, Allaqi, Sayyala, Muharraqa).

Several laboratory technicians delegated by Prof. Dr. Harry Madison Smith from the American University in Beirut joined the Egyptian group of human genetics researchers so that to collaborate with them.

2.7. Further unrealized projects

After the close of each expedition Prof. Valšík and other CS members of the mission visited Khartoum to discuss with Sudanese authorities the possibility of a joint Sudanese – CS mission as a continuation of the UAR – CS expeditions. They concluded a preliminary agreement with the Director of the Sudan Research Unit, Faculty of Arts, University of Khartoum, Prof. Yousuf Hasan on March 30, 1967 for the research on the Sudanese Nubians transferred to the region of Khashm el-Ghirba in the winter season of 1967–1968. During this action serological and blood group research could have been realized by the group of Prof. Smith from the Springfield College, Massachusetts, USA. According to Smith's letter of April 28, 1967, there was a possibility for the research to be covered by a Wenner Gren Foundation for Anthropological Research grant. The grant, however, was not allocated.

Prof. Valšík also signed a new agreement with Minister Tourki on April 6, 1967 on the realization of a third UAR – CS expedition to Kom Ombo area (Valšík: Report on the Second Arab – CS Anthropological Expedition to New Nubia of May 22, 1967).

The CS Ministry of Education was, unfortunately, not ready to cover any of these projects financially. In later years the situation got even more complicated during and after the Prague Spring, so that any of these projects could not be realized.

2.8. General evaluation of the results

Both expeditions gathered data on 1,744 children, 600 males and 542 females, altogether 2,886 people. If the 35 Ababda, who are of different ethnic origin, are subtracted, then we examined 2,851 Nubians, which makes 5.9% of the number of 48,028 Nubians calculated by the census in 1960. This number is representative to yield a real picture of the physical, health and socio-cultural condition of the Nubians as the result of the traditional way of life in Old Nubia, since they were examined immediately after their resettlement. In any future research, this can serve as a basis for finding out positive or negative influences of the changes of environment, employment and way of life in New Nubia.

Various results of the expeditions were elaborated and published in the following years by members of the missions or further interested specialists, starting with preliminary reports (Valšík 1967, Valšík *et al*. 1968, 1970, Drobná 1970). Special topics of the expedition materials included e.g. the prolongation of growth in young men (Strouhal 1970) and morphological variability of adult Nubians (Strouhal 1971a), eruption of permanent teeth (Valšík, Hussien 1970), evolution of stature and weight in Nubian children (Valšík 1971a) and linguistic analysis of the names of Nubian descent groups (Fiedler *et al*. 1971).

In autumn 1970 ethnologist Dr. Milan Stuchlík in collaboration with the present author prepared an exhibition "Nubia – People and folk culture" in the Náprstek Museum, section of the National Museum in Prague. In its scope a symposium on ethnic anthropology was organized. Papers concerning Nubians were published

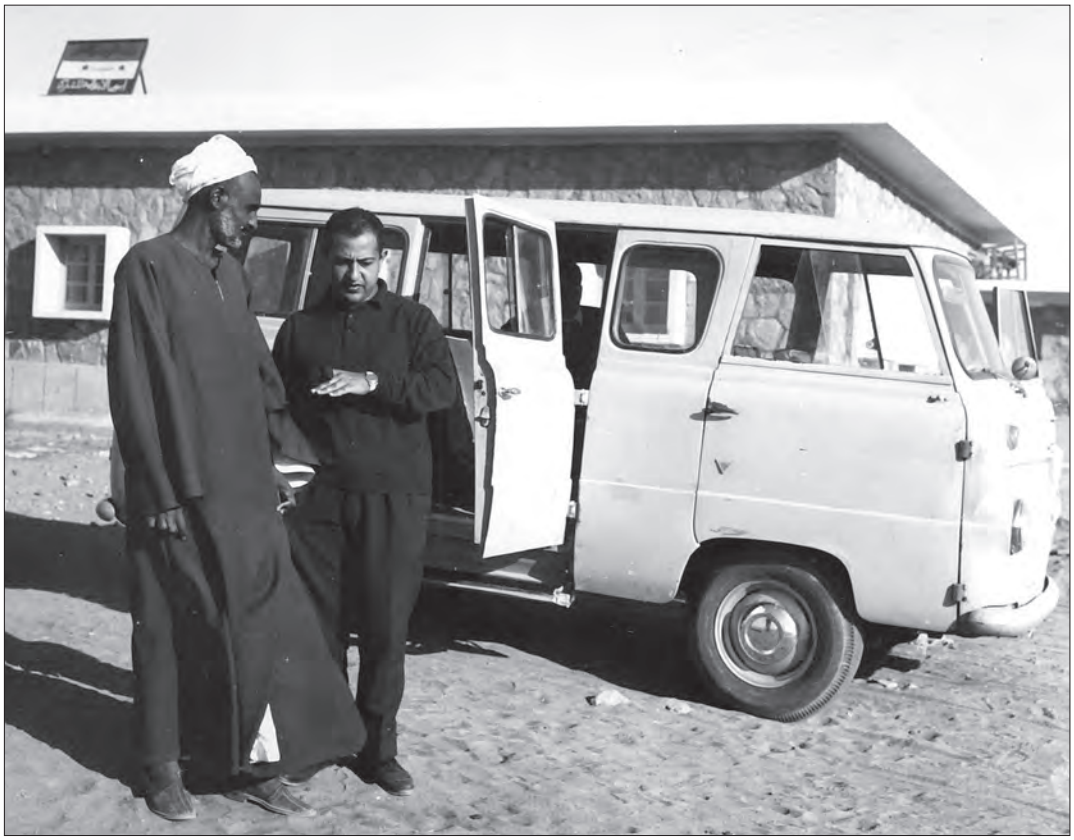

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PLATE XII. 1) Dr. H. A. Ramly with a local school–master besides one of two microbuses used by members of the Expedition. 2) Dr. E. Strouhal photographing one of the probands in front of the director and staff of a local health unit.

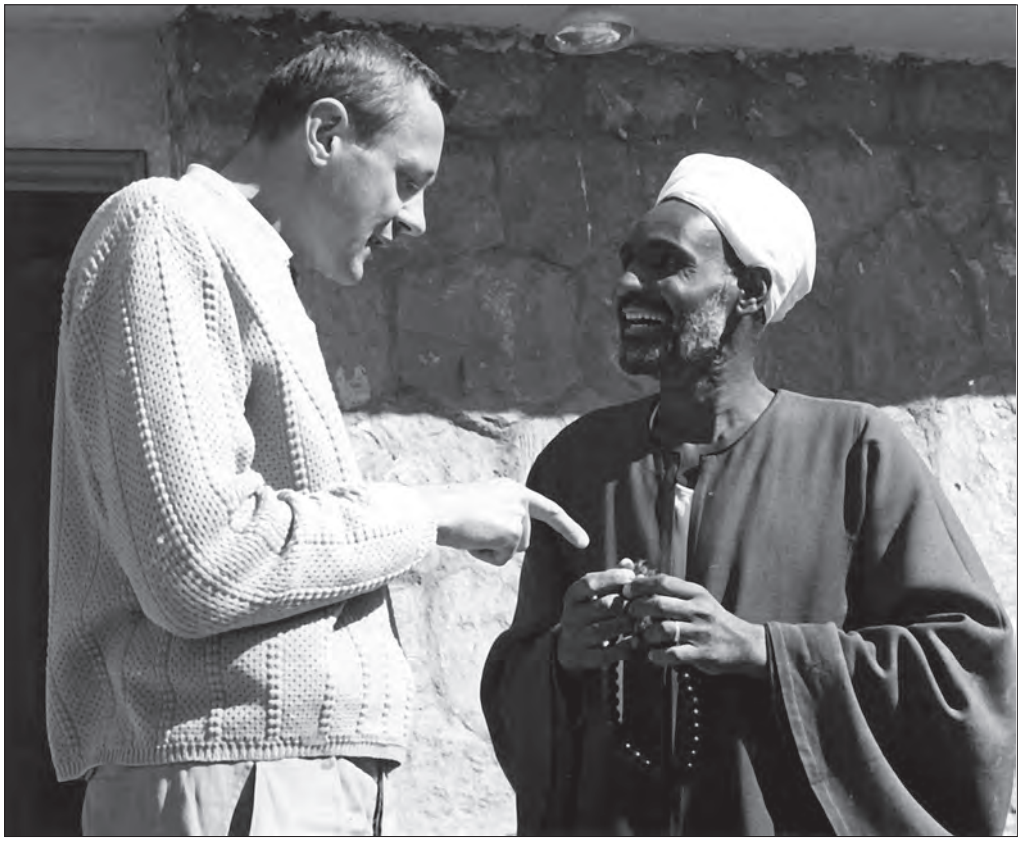

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PLATE XIII. 1) Dr. E. Strouhal presenting the school–master of the school at Ibrim with a Czechoslovak-made Muslim rosary (by V. Ferák). 2) Dr. F. H. Hussien preparing a woman for photographing.

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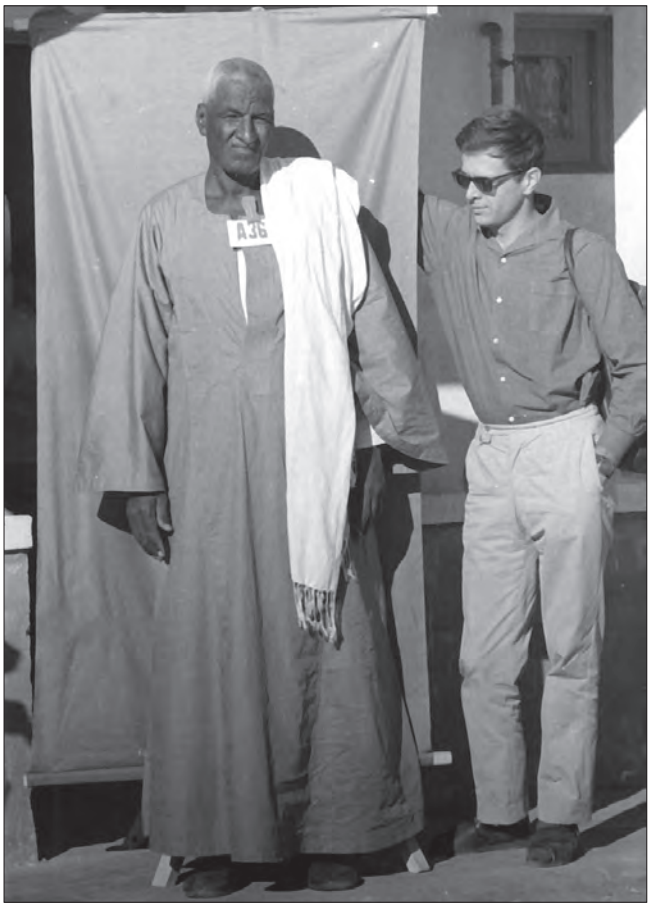

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PLATE XIV. 1) Nubian women coming for their examination to the clinic at Nasr City. 2) A young woman standing before the photographic screen. 3) Dr. V. Ferák holding the screen for photographing an adult male.

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PLATE XV. 1–3) Portraits of old, young and mid-aged Nubian women waiting for examination, sometimes with grand-children or children (nos. 1–2 Kenuz, no. 3 Fadidja).

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PLATE XVI. 1) The Czechoslovak–Egyptian team of the first Expedition visiting the Ptolemaic Temple of Kom Ombo. From left to right: Dr. E. Strouhal, Prof. J. A. Valšík, Dr. V. Ferák, Dr. F. H. Hussien, a technical assistant and Dr. H. A. Ramly. 2) Probands from the Nubian Arab village of Wadi el-Arab with Dr. M. R. Khorched (standing 3rd from left) and Prof. J. A. Valšík (standing 4th from right).

in a volume of Acta Musei Nationalis 30 B-1974. They comprised an account on the expeditions (Valšík 1974), somatic distinctions of males (Strouhal 1974) and females (Hussien 1974), dermatoglyphs (Ferák, Pospíšil l974) and hair whorls in the Nubian females (Drobná 1974).

In another symposium "On Weight" organized by the Anthropological Department of the National Museum in Prague in 1971, also Nubian children (Valšík 1971b) and males (Strouhal 1971c) were discussed. The same topic was published by Valšík and Tomanová (1971). The timing of menarche in Nubian girls and their prepubertal spurt were published in Russia (Valšík, Hussien 1971a, Hussien, Valšík 1971) and Slovakia (Hussien 1971). A high degree of endogamy in the Nubians (Strouhal 1973) enabled to prove the existence of heterotic effect (Strouhal 1971b). General data on anthropology of Nubian females were provided by F. H. Hussien in a preliminary report (1968) and in her CSc. dissertation (Hussien 1972). Somatometry, body composition and physiological features of Nubian males were published in the proceedings of the 9th Congress of Anthropological and Ethnographic Sciences in Chicago 1973 (Strouhal 1980). Also records on folk medical treatment, mutilations and tattoo in Nubian females (Valšík, Hussien 1971b, 1973) and males (Strouhal 1981a, b) were presented. The standards of growth and development of Nubian children and the thickness of their skinfolds were elaborated with respect to the use in paediatrics (El-Nofely 1971a, 1978, 1981). The same author elaborated data on eruption of their permanent dentition (El-Nofely 1971b) and skinfold thickness in relation to ethnicity, sex, age and site (El-Nofely 1983). A large work on blood groups of Nubians was published in Egypt (Azim *et al*. 1974). A special analysis of hair whorls in men with regard to the Nubians (Drobná 1976, 1978–9), elaboration of the Nubians' dermatoglyphics (Pospíšil, Ferák 1990) and a study on diachronic trends in Nubia (Strouhal, Soudský 1990) complemented the CS–Egyptian bibliography on the living Egyptian Nubians.

A large joint monograph on the Egyptian Nubians was planned, but never realized. Prof. Valšík strongly opposed publication in Prague (Academia), preferring Bratislava as the capital of Slovakia and seat of his Institute (after the federalization of Czechoslovakia). A synopsis with a list of chapters was established at meetings of some CS authors and Fawzia Helmi Hussien in 1970 and repeatedly in 1972. Neither then did Prof. Valšík succeed to get contributions from a number of potential authors. In 1974 Fawzia Helmi Hussien and the present author urged Valšík by a letter from Cairo to speed up the gathering and editing process. Unfortunately later Prof. Valšík became ill and tired, loosing his former keen interest. Ultimately he died on February 10, 1977. In 1978 another synopsis with a list of chapters was offered to several Prague publishers, but without success.

In spite of this serious deficiency, about 40 publications contributed to the fact that Egyptian Nubians ceased to be an unknown nation from the physical-anthropological standpoint. The CS initiative, project and its results were valuated positively. CS anthropology once again appeared on the scene of world science and strengthened its international position.

Moreover, realization of postgraduate studies of two young Egyptians, former members of the missions – today's Prof. Dr. Fawzia Helmi Hussien, who worked in the Genetic Department of the NRC Cairo and at Alexandria University, and Prof. Dr. Ali El-Nofely, head of the Department of Anthropology of the NRC, contributed to the restoration of physical anthropology as a special discipline in Egypt. Both trained a good number of postgraduates, of which some continue their successful work.

3. AIMS, PROGRAMME AND METHODS OF INVESTIGATION

3.1. Aims

The initiative for investigation of the Nubians arose from the fact that the UNESCO international action for safeguarding Nubian monuments focused on the Nubian past, totally neglecting the people living in the country who had created these monuments. Their physical condition, diversity, nutrition and health condition remained largely unknown. Therefore, the UAR – Czechoslovak expeditions as an original and priority project also contributed to the UNESCO action.

The physical, health and nutritional condition of the Nubian males, as outlined in this paper, are the result of the hitherto difficult and rough life conditions (climatic, geographic, economical and social) of Old Nubia. The Nubians' physical specificity as well as ethnic and geographical variability can be understood if correlated with the course of their anthropological development and past history of the country (as outlined in Section 1.4).

The recorded data can also be considered as a basis for their future examinations aimed at revealing the pros and cons of changed living conditions of New Nubia.

3.2. Programme of the examination

For distinction between the three ethnic groups of Egyptian Nubia, research was performed in 3–6 villages chosen after consultation with Prof. Batrawi, Dr. Herzfeld and the monograph by Herzog (1957). From north to south these were the Kenuz villages (*karyas*) Dehmit, Umbarakab, Koshtamna and Dakka, for Nubian Arabs Wadi el-Arab, Shaturma and Maliki, for the Fadidja Diwan joint with the close Derr, Qatta, Ibrim, Qustul and Balana. A small sample of the Ababda originating from the Eastern Desert was used for comparison.

For evaluation of age differences 15 to 20-year-old adolescents of the three Nubian ethnic groups and a group of 56 and over old Kenuz, were compared with the pertaining adult groups.

Special questions concerned possible existence of luxuriation (vigour) of hybrids compared with descendants of endogamous parents (evidence of heterosis), further

physical validity of the concept of descent groups tested in the Kenuz and Fadidja, comparison of Sudanese Negroes with the Fadidja among whom they are living, and sexual differences of Nubian males and females.

3.3. Methods

Besides anamnestic data, head and body measurements as well as body composition, physiological and functional features were recorded, complemented by a few descriptive features.

Anamnestic data: place of origin in Old Nubia, domicile in New Nubia, ethnic and descent group appurtenance, name of the proband, his/her age, birthplace, father's name and birthplace, mother's name and birthplace, born and living children, original and current profession, health anamnesis.

The latter characteristic was complemented with a check of eventual pathological changes and interventions of Arab folk medicine. No tattoo was found in men.

Cephalometric data (in brackets: numbers of measurements by the technique of Martin and Saller 1959): 1. Maximum head length (1); 2. Maximum head breadth (3); 3. Auricular head height (15); 4. Minimum frontal breadth (4); 5. Morphological height of the face (18); 6. Bizygomatic breadth (6); 7. Bigonial breadth (8); 8. Height of the nose (21); 9. Breadth of the nose (13). From these measurements, the following indices were computed: 10. Cephalic (3:1); 11. Length-height (15:1); 12. Breadth-height (3:1); 13. Transverse frontoparietal (4:3); 14. Morphological facial (18:6); 15. Jugofrontal (4:6); 16. Jugomandibular (8:6); 17. Transverse cephalofacial (6:2); 18. Nasal (13:21); 19. Jugonasal (13:6); 20. Facionasal (21:18).

Somatometric data (in brackets: numbers of measurements by the technique of Martin and Saller 1957): 1. Weight (W); 2. Stature (1); 3. Sitting height (23); 4. Total upper extremity length (45); 5. Length of the cubit (48.3); 6. Biacromial breadth (35); 7. Bicristal breadth (40); 8. Breadth of the thorax (36); 9. Depth of the thorax (37).

These measurements were computed in the following indices: 10. Rohrer's ($W:1^3$); 11. Cormic (23:1); 12. Relative total upper extremity length (45:1); 13. Relative length of the cubit (48.3:1); 14. Relative biacromial breadth (35:1); 15. Relative bicristal breadth (40:1); 16. Relative breadth of the thorax (36:1); 17. Relative depth of the thorax (37:1); 18. Length of the cubit in percents of the total upper extremity length (48.3:45); 19. Acromio-iliac (40:35); 20. Thoracic (37:36).

Body composition and functional features (in brackets: numbers of measurements by the technique of Martin and Saller 1957): 1. Lower radio-ulnar breadth (52.4); 2. Maximum circumference of the upper arm (65); 3. Maximum circumference of the calf (69); 4. Skinfold thickness in the tricipital area; 5. Skinfold thickness in the subscapular area; 6. Skinfold thickness in the cristal area; 7. Pulse rate; 8. Systolic blood pressure; 9. Diastolic blood pressure; 10. Maximum grip force of the right hand; 11. Maximum grip force of the left hand.

Three of these measurements yielded indices: 12. Relative lower radio-ulnar breadth (52.4:1); 13. Relative maximum circumference of the upper arm (65:1); and 14. Relative maximum circumference of the calf (69:1).

Descriptive features: 1. Skin colour; 2. Eye colour; 3. Hair colour; 4. Hair shape; 5. Facial hair (beard); 6. Body hair; 7. Eyelids; 8. Nasal profile; 9. Nasal base; 10. Lip form; 11. Profile of forehead; 12. Prognathism; 13. Zygomatic arches; 14. Back of the head (for scales see Chapter 14). In young men also eruption of the third molar was recorded.

The sitting height was measured on probands sitting on a seat 30–40 cm high (Olivier 1960). For skinfold thickness a caliper of Best modified by Pařízková and Lorenc (Pařízková 1962, 1977) with the surface of 28.26 mm and pressure 200 g=7g/1 mm^2 was used.

Statistical elaboration based on Student's t- and F-test was performed by Ing. Roman Reisenauer in the Institute of Endocrinology of Prague.

4. ANAMNESTIC DATA OF THE PROBANDS

4.1. Number and age of the examined males

In total 173 Kenuz, 130 Nubian Arabs, 233 Fadidja and 12 hybrids between Nubian ethnic groups, altogether 548 Nubians and 27 Ababda, i.e. 575 males, were included in the research (*Table 1*). All were either full natives (if both parents were born in the same village as the proband) or half natives (if one or both parents were born in another village of the same ethnic group as the proband). Intra-Nubian hybrids had one parent originating in another ethnic group of Egyptian Nubia.

The remaining 25 males have been excluded from the physical-anthropological analysis, but their anamnestic data have been used (Chapter 4). Seven of them were young adolescents of 15–18 years of age, 7 Egyptians, 7 hybrids between a Nubian and an Egyptian (*Plate XLVII: 2*) and 4 hybrids between a Nubian and a Sudanese (*Plate XLVIII: 1–2*). Altogether 600 males were examined.

Another 5 Nubians yielded anamnestic data which could have been used (Chapter 4), but they refused to be examined (4 adult men and an old one).

4.2. Ethnic group origin and selected villages

In the Kenuz region (sg. Kenzi, pl. Kenuz) two villages of the northern barren and poor region were chosen (Dehmit

TABLE 1. Number of examined probands according to ethnic group and age.

Ethnic group	Young	Adult	Old	Total
Kenuz	35	103	35	173
Nubian Arabs	14	115	1	130
Fadidja	54	175	4	233
Intranubian hybrids	4	8	–	12
Sum of Nubians	107	401	40	548
Ababda (Bedja)	3	24	–	27
Total of probands	110	425	40	575

and Umbarakab). It scarcely attracted immigrants, but had a high rate of emigration to either Egyptian cities or to southern Nubia. The southern Kenuz area represented by villages Koshtamna and Dakka had more opportunity for agriculture and irrigation pumps, which attracted Egyptian settlers (excluded from the research). These four villages together with some other in the same region yielded 173 males (plus 4 with anamneses only).

The territory south of the Kenuz area had been gradually settled down in the past years by the Ababda, people from the Eastern Desert, members of the Beja tribes, of which a tiny sample of 27 individuals could be examined.

In the merely 27 km long territory of Nubian Arabs there were only a few villages, of which we selected Wadi el-Arab in the north, and Shaturma and Maliki in the south. Together with some other localities they yielded 130 males.

In the long and more open valley of the Fadidja region samples were taken from villages to which many people of Balkan and Caucasian origin had been brought by the Turkish army since the 16th century. Their "capital" village Derr was selected with the nearby Diwan, Qatta and Ibrim. Another two samples came from Qustul and Balana in an area richer in agricultural production. In all villages of southern Egyptian Nubia there used to live also families of Sudanese African slaves, which can be still encountered in spite of the fact that in the past their females served as concubines to the Fadidja and Turkish men. In Qustul some individuals indicated that their grandfathers had come from the Kenuz region as they had to abandon their settlements due to the building of the first Aswan dam in 1902. The mentioned villages together with several other ones yielded altogether 233 males for examination.

There were 12 males whose parents belonged to different Nubian ethnic groups (intra-Nubian hybrids). They could be included into the sum of the three indigenous ethnic groups. This was not the case of the small sample of immigrated Ababda, members of the big tribal "nation" of the Bedja, living in the Eastern Desert of Egypt, Sudan and Somalia. In spite of the fact that the total of Nubian males was big, their number in some village samples was lesser than the statistical minimum of 30. In that situation it was not possible to take into account the small settlements (*nagas*) constituting the basis of the Nubian settlement pattern (see Section 1.3.).

4.3. Descent group origin

Each Nubian belongs to one of the three large ethnic groups, and at the same time also to a smaller group of people related by origin, called descent group. The list of gathered Egyptian Nubian descent groups was compiled on the basis of our data and data from a manuscript by Muhammad Mitwalli Badr (Fiedler *et al.* 1971). For more see Chapter 6.

4.4. Family structure

4.4.1. Matrimonial age of males

Nubian males marry late, starting in the 21–30 years age interval, while the number of married males doubles in the 31–40 years age interval, and reaches the maximum in almost 41–50 years interval; the absolute highest value occurs after 50 years of age. Living, dead and divorced wives are considered together. The Kenuz marry slowly, followed by the Fadidja and hybrids, Nubian Arabs marry quicker, and the Ababda irregularly (*Table 2*).

4.4.2. Number of wives per male

According to Islamic law, the highest number of simultaneous wives may be four. Polygyny is, however, generally on decline, mostly for economic reasons. In Nubia it is especially rare, showing an ascending sequence from the Ababda through hybrids, the Fadidja who equal Arabs, to the Kenuz (with quotients 1.06–1.10 wife per male). The old Kenuz witness that more polygynous marriages occurred in older times, but there were more divorces, and more women than men died because of older age in the adult category. The rate of divorces was extremely low except for the adult and especially the old Kenuz. The rate of dead wives was also low, naturally except for the old Kenuz and the tiny group of old Arabs combined with the Fadidja (*Table 3*).

Except for the old Kenuz, the most current condition is a one-wife marriage. In adults two wives occur more in the Ababda than in the Nubian groups. Three wives are an exception, confined only to the old Kenuz (*Table 4*).

4.4.3. Endogamy and exogamy

For the evaluation of temporal changes in the marriage pattern of the Nubians and Ababda, we divided the recorded data in two generations: of the probands themselves who

TABLE 2. Percentages of married men (including the divorced ones and widowers) in age groups. Legend: N = total of questioned males, n = number of cases, marr = number of married males (omitted in 50–87 yrs), % = percentage of married males (omitted in 15–20 yrs).

Ethnic group	15–20yrs			21–30yrs			31–40yrs			41–50yrs			50–87yrs	
	N	n	marr	n	marr	%	n	marr	%	n	marr	%	n	%
Kenuz	184	42	–	43	11	25.6	18	17	94.4	31	29	93.5	50	100
Nubian Arabs	130	14	–	35	17	48.6	39	33	84.6	31	31	100	11	100
Fadidja	233	54	–	47	16	34.0	65	61	93.8	45	45	100	22	100
Nubian hybrids	23	6	–	4	2	50.0	6	5	83.3	2	2	100	5	100
Ababda	27	3	–	8	1	12.5	6	6	100	7	6	85.7	3	100
Total of probands	597	119	–	137	47	39.5	134	122	91.0	116	113	97.4	91	100

TABLE 3. Number of present, divorced and dead wives per Nubian and Ababda men. Legend: n = number of cases, % = percentage of the total no. of wives, q = quotient of wives per male.

Ethnic group	Married	Total	Actual wives			Divorced wives			Dead wives		
	n	n	n	%	q	n	%	q	n	%	q
Kenuz adult	71	87	78	94.9	1.10	7	8.0	0.10	2	2.3	0.03
Kenuz old	36	62	48	77.4	1.33	5	8.1	0.14	9	14.5	0.25
Nubian Arabs adult	91	103	98	95.2	1.08	2	1.9	0.02	3	2.9	0.03
Fadidja adult	140	160	151	94.3	1.08	6	3.8	0.04	3	1.9	0.02
Combined Arab and Fadidja old	5	8	5	62.5	1.00	1	12.5	0.20	2	25.0	0.40
Nubian hybrids adult	14	15	15	100.0	1.07	–	–	–	–	–	–
Total of Nubians adult	316	365	342	94.6	1.08	15	4.1	0.05	8	2.2	0.03
Total of Nubians old	40	70	53	75.7	1.33	6	8.6	0.15	11	15.7	0.28
Ababda adult	16	18	17	94.4	1.06	1	5.6	0.06	–	–	–
Sum of adult	332	383	359	93.7	1.08	16	4.2	0.05	8	2.1	0.02

TABLE 4. Number of simultaneous wives living with the Nubian and Ababda men.

Ethnic group	Age group	Males	Wives	One wife		Two wives		Three wives	
		n	n	n	%	n	%	n	%
Kenuz	21–55	71	78	64	90.1	7	9.9	–	–
Kenuz	56–87	35	48	24	68.6	9	25.7	2	5.7
Nubian Arabs	21–55	91	98	84	92.3	7	7.7	–	–
Fadidja	21–55	140	151	129	92.1	11	7.9	–	–
Combined Arab and Fadidja	56–70	5	5	5	–	–	–	–	–
Nubian hybrids	21–55	14	15	13	92.9	1	7.1	–	–
Ababda	21–55	15	17	13	86.7	2	13.3	–	–
Total of probands	21–70	331	359	303	91.5	28	8.5	–	–

TABLE 5. Related and unrelated marriages in ethnic groups and two generations of the Nubian and Ababda men.

Ethnic group	Generation	Number of marriages	First cousin		Distant relation		Unrelated marriages	
		n	n	%	n	%	n	%
Kenuz	probands	83	46	55.4	20	24.1	17	20.5
	parents	122	45	36.9	35	28.7	42	34.4
Nubian Arabs	probands	101	65	64.4	30	29.7	8	5.9
	parents	123	63	51.2	29	23.6	31	25.2
Fadidja	probands	153	89	58.2	43	28.1	21	13.7
	parents	210	96	45.7	62	29.5	52	24.8
Nubian hybrids	probands	15	5	33.3	3	20.0	7	46.7
	parents	23	–	–	–	–	23	100.0
Ababda	probands	15	11	73.3	3	20.0	1	6.7
	parents	26	23	88.5	2	7.7	1	3.8
Total of probands	probands	367	216	58.8	99	27.0	52	14.2
	parents	504	227	45.0	128	25.4	149	29.6

married in the period 1931–1966, and of their parents who concluded marriages between the years 1889–1951.

By comparison of the data it appears striking that the probands of the three main Nubian groups prefer first cousin marriages more often than their parents (with the mean increase of 14.7%). This form of marriage, most frequent in the Arab societies (Cuisenier 1968), involves a half of all marriages (mean 49.3%). Most of these marriages were concluded in both generations of Nubian Arabs, followed by the Fadidja and the least in the Kenuz. The paradox may be explained by the fact that we examined mostly males who stayed in Nubia for most of their lives (or permanently), and could therefore marry their related females easily. This opportunity occurred less often for those who migrated out

of Nubia to Egyptian towns for labour. In the generation of our probands their share was estimated to be of about 85% (Scudder 1966: 105).

On the contrary, the Ababda, who had the highest rate of first cousin marriages in the parent generation (88.5%!), showed a decrease in the probands, still having a higher value (73.3%) than their share in the Nubians (*Table 5*). This has most probably been related to their transition from a nomadic way of life in small groups of related people, to a settled life in Nubian hamlets (*nagas*).

All forms of more distantly related marriages (uncle–niece, aunt–nephew, second cousins, etc.) constituted in the Nubian groups altogether slightly more than one quarter of the cases (mean 26.7% in both generations). Compared with the parents, they decreased in the adult Kenuz, slightly in the Fadidja, but increased in the Arabs. In the Ababda they played a minor role, but in the probands they increased together with the decrease of first cousin marriages. Unrelated marriages (mean 24.0%) show a general decrease in the Nubians.

Nubian hybrids have unrelated parents by definition, while the probands of the same group observe the habit with 1/3 of first cousin marriages and 1/5 of more distant relations.

The custom of endogamous marriages was in accord with the settlement pattern of Old Nubia, with small hamlets (*nagas*) allowing for relatively little contact between them (see 1.3). There were also economic reasons, led by an effort to prevent disintegration of family property. They were welcomed psychologically as well: a mother-in-law gets on better with a related daughter-in-law, mostly well-known to her. Therefore, endogamy became a constant part of the Nubian social system.

4.4.4. Laterality of first cousin marriages

Firstly it is obvious that only about a half of questioned probands were able to indicate their own and/or their parents' patri- and matrilaterality.

In the Kenuz and Arab groups patrilaterality predominates, in the former in older, in the latter in younger generations. On the other hand the Fadidja show more matrilaterality with the same intensity in the probands and their parents. In sum, the Nubians' older generation shows more patrilaterality, while in the younger one both lateralities are balanced (*Table 6*).

4.4.5. Marriage in relation to ethnic and descent group origin

Within the same ethnic group, couples of identical descent groups were the leading category in the probands (more than a half), slightly less in their parents. In the probands they were the most numerous in Nubian Arabs, followed by the Fadidja and Kenuz. In their parents they occurred slightly less commonly in the Arabs and Fadidja, but more often in the Kenuz, so that the sequence was the Arabs, the Kenuz, the Fadidja (*Table 7*).

Couples of different descent groups were less common in the probands. They occurred mostly in the Kenuz, followed by the Fadidja and the least in Nubian Arabs. They occurred slightly less in their parents in the Kenuz, but more in Nubian Arabs and the Fadidja. Their sequence was the Fadidja, the Kenuz, the Nubian Arabs, exactly reversed in comparison with the previous category.

Couples of different Nubian ethnic groups were rare except naturally for the hybrids whose parents concluded most marriages inside, less outside Nubia. In probands the picture was changing towards marriages of different or the same descent group, followed by those of inside Nubia and least of outside Nubia.

The Ababda show completely different results with an extraordinary high number of identical descent group marriages, especially in the parent generation. In the probands, their proportion slightly decreased in favour of other ethnic groups inside Nubia, connected with the process of their settling down.

This analysis showed once more the high rate of endogamy as compared to exogamy.

4.4.6. Marriages according to birth-places of married couples

In this analysis we could not get reliable information on the parents, therefore we limited it only to the probands.

The overwhelming number of examined Nubian males married in either identical hamlets (adults slightly more

TABLE 6. Patrilateral and matrilateral first cousin marriages in ethnic groups and two generations of the Nubians. Hybrids and Ababda have not been included due to small number of cases.

Ethnic group	Generation	First cousin marriages		Patrilaterality		Matrilaterality	
		Total	Reported patri- and matrilaterality	n	%	n	%
Kenuz	probands	46	41	22	53.7	19	46.3
	parents	45	32	25	78.1	7	21.9
Nubian Arabs	probands	65	8	6	75.0	2	25.0
	parents	63	14	8	57.1	6	42.9
Fadidja	probands	89	56	25	44.6	31	55.4
	parents	96	45	20	44.5	25	55.5
Total of Nubians	probands	200	105	53	50.5	52	49.5
	parents	204	91	53	58.2	38	41.8

TABLE 7. Descent and ethnic group origin of couples in two generations of the Nubians and Ababda.

Ethnic group	Generation	Number of couples	Same descent and same ethnic groups		Different descent group and same ethnic groups		Different ethnic group inside Nubian Arabs		Different ethnic group outside Nubian Arabs	
		n	n	%	n	%	n	%	n	%
Kenuz	probands	45	22	48.9	22	48.9	1	2.2	–	–
	parents	89	48	53.9	40	45.0	–	–	1	1.1
Nubian Arabs	probands	99	72	72.8	25	25.2	2	2.0	–	–
	parents	125	86	68.8	39	31.2	–	–	–	–
Fadidja	probands	157	86	54.8	68	43.3	1	0.6	2	1.3
	parents	210	109	51.9	101	48.1	–	–	–	–
Nubian hybrids	probands	14	4	28.6	5	35.7	3	21.4	2	14.3
	parents	21	–	–	–	–	12	57.1	9	42.9
Total of Nubians	probands	315	184	58.4	120	38.1	7	2.2	4	1.3
	parents	445	243	54.6	180	40.4	12	2.7	10	2.2
Ababda	probands	16	13	81.2	–	–	3	18.8	–	–
	parents	26	24	92.3	1	3.8	1	3.8	–	–

TABLE 8. Territorial origin of couples of the Nubian and Ababda men. Legend: adult (21–55 years), old (56–87 years).

Ethnic group	No. of reported marriages	Couples from identical hamlet		Couples from different hamlets of identical village		Couples from different villages of identical ethnic groups		Couples from different villages of different ethnic groups	
	n	n	%	n	%	n	%	n	%
Kenuz adult	85	52	61.1	19	22.4	8	9.4	6	7.1
Kenuz old	57	34	59.6	18	31.6	3	5.3	2	3.5
Nubian Arabs adult	101	68	67.3	26	25.7	3	3.0	4	4.0
Fadidja adult	159	87	54.7	47	29.6	20	12.6	5	3.1
Combined Arab and Fadidja old	8	3	37.5	4	50.0	1	12.5	–	–
Nubian hybrids adult	15	4	26.7	4	26.7	5	33.3	2	13.3
Total of Nubians adult	360	211	58.6	96	26.7	36	10.0	17	4.7
Total of Nubians old	65	37	56.9	22	33.8	4	6.2	2	3.1
Ababda adult	16	12	75.0	–	–	3	18.8	1	6.2

TABLE 9. Number of born and living children in the Nubians and Ababda. Legend: n = number of cases, Q = quotient child per father.

Ethnic group	No. of respondents	Born children		Living children		
		n	Q	n	Q	%
Kenuz adult	70	337	4.8	222	3.2	65.9
Kenuz old	36	195	5.4	129	3.6	66.2
Nubian Arabs adult	85	384	4.5	238	2.6	62.0
Fadidja adult	138	625	4.5	391	2.8	62.6
Combined Arab and Fadidja old	5	19	3.8	11	2.2	57.9
Nubian hybrids adult	14	54	4.2	34	2.6	63.0
Total of Nubians adult	307	1400	4.6	885	2.9	63.2
Total of Nubians old	41	214	5.2	140	3.4	65.4
Ababda adult	16	80	5.0	51	3.2	63.8

than olds) or in different hamlets of the same village (in adults less than in olds). Thus 90.8% of marriages of the old Nubians and 85.3% of the adult Nubians were concluded inside the same village. This preference concerns mostly Nubian Arabs, followed by the Kenuz, but less the Fadidja, where a small share of couples from different villages of identical ethnic group appears. A deviation is naturally shown in the hybrids with less marriages within one hamlet or one village, and more between partners from different villages, members of the same ethnic group; also a few

TABLE 10. Number of living children per family.

Ethnic group	No. of living children per family	0		1–2		3–4		5–6		7–12	
		n	%	n	%	n	%	n	%	n	%
Kenuz adult	70	13	18.6	18	25.7	15	21.4	17	24.3	7	10.0
Kenuz old	36	3	8.3	10	27.8	14	38.9	4	11.1	5	13.9
Nubian Arabs adult	85	17	20.0	33	38.8	13	15.3	14	16.5	8	9.4
Fadidja adult	138	22	15.9	48	34.8	36	26.1	21	15.1	11	8.0
Combined Arab and Fadidja old	5	1	20.0	2	40.0	1	20.0	1	20.0	–	–
Nubian hybrids adult	14	3	21.4	5	35.7	3	21.4	3	21.5	–	–
Total of Nubians adult	307	55	17.9	104	33.9	67	21.8	55	17.9	26	8.5
Total of Nubians old	41	4	9.8	12	29.3	15	36.6	5	12.2	5	12.2
Ababda adult	16	3	18.8	3	18.8	5	31.2	3	18.8	2	12.5

TABLE 11. Birthplace of respondents in relation to that of their parents.

Ethnic group	No. of respondents	Amphilocality		Patrilocality		Matrilocality		Other Nubian		Outside Nubia	
		n	%	n	%	n	%	n	%	n	%
Kenuz young	42	27	64.3	8	19.0	–	–	2	4.8	5	11.9
Kenuz adult	105	69	65.8	18	17.1	6	5.7	6	5.7	6	5.7
Kenuz old	36	30	83.3	5	13.9	1	2.8	–	–	–	–
Nubian Arabs young	14	6	42.9	4	28.6	2	14.3	1	7.1	1	7.1
Nubian Arabs adult	114	80	70.2	30	26.3	1	0.9	2	1.8	1	0.9
Nubian Arabs old	1	–	–	1	100.0	–	–	–	–	–	–
Fadidja young	54	24	44.5	8	14.8	5	9.2	8	11.1	11	20.4
Fadidja adult	175	126	72.0	32	18.3	3	1.7	4	2.3	10	5.7
Fadidja old	4	2	50.0	2	50.0	–	–	–	–	–	–
Nubian hybrids young	6	2	33.3	2	33.3	2	33.3	–	–	–	–
Nubian hybrids adult	17	4	23.5	5	29.4	3	17.7	5	20.4	–	–
Total of Nubians young	116	59	50.9	22	19.0	9	7.8	9	7.8	17	14.7
Total of Nubians adult	411	279	67.9	85	20.7	13	3.2	17	4.1	17	4.1
Total of Nubians old	41	32	78.1	8	19.5	1	2.4	–	–	–	–
Ababda young	3	1	33.3	–	–	–	–	1	33.3	1	33.3
Ababda adult	24	14	58.3	2	8.3	4	16.7	4	16.7	–	–

TABLE 12. Seasonal periodicity of birth of the Nubian men.

Month	Men			Boys			Girls		
	No. of cases	Normalized number	%	No. of cases	Normalized number	%	No. of cases	Normalized number	%
I	65	62.9	14.5	74	71.6	7.4	59	57.1	8.5
II	47	50.4	11.6	60	64.3	6.6	53	56.8	8.4
III	34	32.9	7.6	93	90.0	9.2	54	52.3	7.8
IV	44	44.0	10.2	71	71.0	7.3	64	64.0	9.5
V	28	29.6	6.6	67	64.8	6.7	47	45.5	6.8
VI	24	24.0	5.5	73	73.0	7.5	45	45.0	6.7
VII	30	29.0	6.7	99	95.8	9.8	54	52.3	7.8
VIII	34	32.9	7.6	77	74.5	7.7	62	60.0	8.9
IX	32	32.0	7.4	85	85.0	8.7	58	58.0	8.6
X	23	22.3	5.2	85	82.3	8.5	56	54.2	8.0
XI	35	35.0	8.1	89	89.0	9.1	64	64.0	9.5
XII	40	38.7	8.9	116	112.3	11.5	67	64.8	9.6
Sum	437	432.7	99.9	989	973.6	100.0	683	674.0	100.1

marriages of couples from different ethnic groups can be found. Also here, however, the same distortion as discussed in Section 4.4.3. can play a role: we investigated only the non-migrating part of the male population that had a better occasion to choose partners from the same or nearby hamlets of their native village (*Table 8*).

4.4.7. Number and survivorship of children

Our data are based on reports of married men (including a few of them which were still childless). In average, adults begot 4.2–4.8 children per male. The highest quotients were reached by the Kenuz, lower by the Nubian Arabs and the Fadidja, and the lowest by hybrids. This corresponds well to the sequence of polygynous marriages (Section 4.4.2.). The Ababda yielded a higher rate of 5.0 children per male than the adult groups of the Nubians. Nevertheless, in comparison with developing countries, namely with Egypt, the obtained data are lower. The effect of migration of male labour force to Egypt did not influence them, because among the examined males non-migrants predominated. The situation could have been caused by the women, their morbidity and premature mortality, due to scarcity of foodstuffs in Old Nubia (*Table 9*).

On the other hand the old Kenuz had more – 5.4 children per male; the only five old Arabs combined with the Fadidja giving an aberrant number. The higher rate in old Kenuz is a consequence of the fact that their number of children was final, while in the adults it could still have increased. But it could be also influenced by the higher rate of polygyny in old Kenuz (Section 4.4.2.).

The survivorship of children was generally low (under 2/3 of the born children); it was highest in the Kenuz (olds and adults), followed by the Ababda, hybrids and the Fadidja, and the lowest in Nubian Arabs. Considering the small number of living children and the constant outflow of a part of the Nubians, the population of Egyptian Nubia remained roughly stationary between 1897 (96,500 in Nubia and an unspecified number outside Nubia) and 1960 (48,028 inside and an estimate of 70,000 outside Nubia; Geiser 1966: 148). During the same time, the population of Egypt tripled.

Of the total Nubian adults, 1/3 of the fathers had 1–2 children, then followed those with 3–4 children. The number of fathers with 5–6 children was identical with the number of childless ones. Seven and more children were recorded only exceptionally (with maximim of 12). In the olds and the Ababda the two leading categories were reversed (*Table 10*).

Leaving aside the meagre combined category, no children occurred mostly in the hybrids, followed by Nubian Arabs, the Kenuz and Fadidja, and least were in the old Kenuz. Families with 1–2 children occurred mostly in Nubian Arabs, followed by the hybrids and the Fadidja, least in the adult Kenuz. Families with 3–4 children are present mostly in the Fadidja, followed by the same shares in the Kenuz and hybrids, least in Nubian Arabs. Families with 5–6 children show great differences between the maximum in the Kenuz, less in the hybrids and Nubian Arabs and least in the Fadidja. Seven and more children were encountered sporadically, in the sequence of the Kenuz, Arabs, Fadidja.

The old Kenuz differ from the adult ones in a minimum of childless families, almost twice higher numbers of families with 3–4 children, almost 2.5 times less of families with 5–6 children, and more of 7 and more children families, as the result of their longer life span and polygyny.

4.5. Birthplaces of probands in relation to the parents' ones

The original pattern in Nubia was to be born at the same place (usually hamlet – *naga*) as both the parents (*amphilocality*). This is shown in the totality of Nubians of the old generation, but obviously decreases in the adult and younger generations. *Patrilocality,* the birth at the same place as the father, remains almost the same in all three generations and occurs more often than *matrilocality,* the birth in the native hamlet of the mother. It can be supposed that this variant increases from the old to the young generations (*Table 11*).

There are, however, differences between adults of the three ethnic groups, amphilocality being more common in the Fadidja and Nubian Arabs, less in the Kenuz, while patrilocality prevails in Nubian Arabs over the two other groups. Matrilocality is rare, occurring slightly more often in the Kenuz than in the other groups. The birth of probands from parents of different Nubian villages occurs also rarely, except for the group of hybrids. Also the birth from a couple in which one partner was born outside Egyptian Nubia is rare, but there is a tendency for these cases to occur more in the young than in the adult generation.

The Ababda showed a lower rate of amphilocality and patrilocality, but a higher rate of matrilocality and births in couples from different Nubian villages than the adult Nubians.

4.6. Seasonal periodicity of birth and conception in Nubia

Birth dates of 437 adult males and 1,672 children (989 boys and 683 girls) aged 6–12 years (Valšík, pers. comm.) were tabulated (*Table 12*). Similar data could not be taken from adult women who in majority ignored their exact calendar age (Hussien 1972: 31, 60). Crude numbers for each month were, with respect to their different lengths, standardised to 30 days.

Because the tabulated data do not allow for an objective idea, they have been depicted (*Figure 3*). The normalized data based on determination of date of birth of the questioned adult men and children (boys and girls pooled together) yielded two curves which agree only roughly. The male curve shows greater deviations to maxima and minima than the children's one which shows less fluctuation.

Taking birth timing (upper scale of *Figure 3*), there is a clear depression in spring and the summer months, followed by a rise in autumn (children on higher level-than males, especially in October). A real dissolution of both curves occurs in winter (January and February).

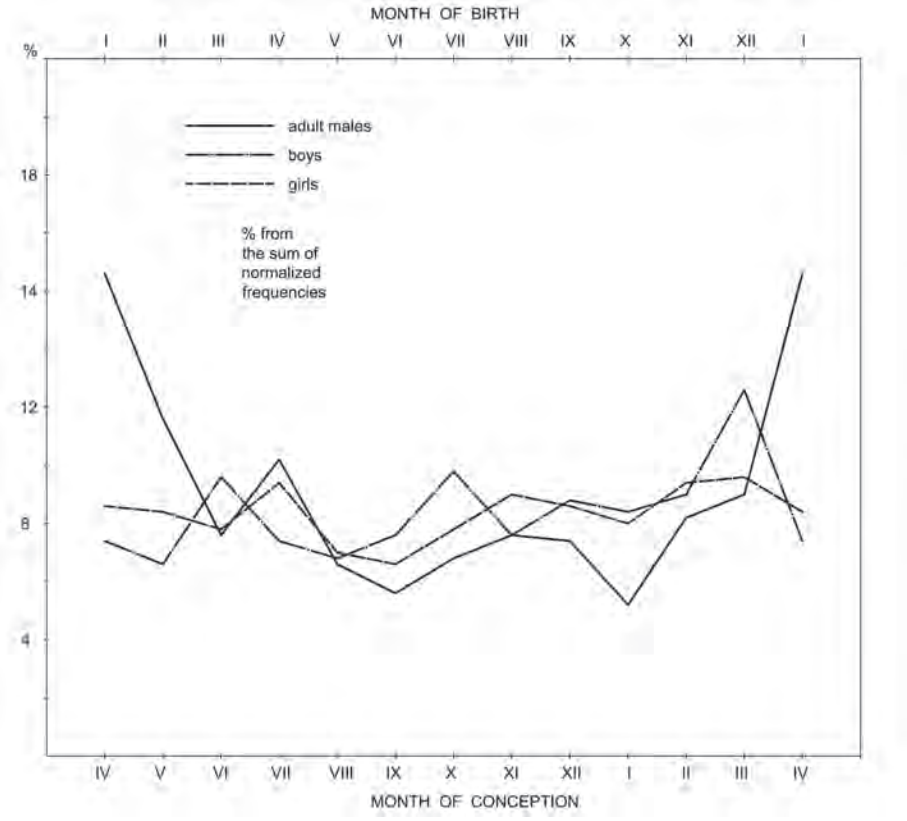


FIGURE 3. Seasonal periodicity of birth and conception in the Egyptian Nubians.

Taking conception timing (lower scale), the pleasant spring months of April and May caused the acme in males, with hot July coming strikingly as a second, lower peak, while late summer meant a decrease, followed by gentle rise in autumn months and a fall of the curve in January. A generation later data obtained from children reveal a similar tendency of a drop in late summer (August and September), but rise in winter (February and March). A change of sexual behaviour in recent times can be supposed.

4.7. Social status, profession and their changes

There were only adult probands who responded to the question about their social status. Several refused to answer. This information naturally involves subjective assessments; nevertheless, it can contribute to getting an insight into their psychology. Answers are included in *Table 13*.

Most men of all groups considered their social situation as moderate, except for the Kenuz, of which half indicated themselves as poor, while, on the other hand one third considered themselves to be rich. The Fadidja believed to be the richest group with a minimum of poor and nearly half of the rich. The Nubian Arabs stand between these two contrasting groups. The hybrids and Ababda assessed their situation in majority as moderate, the former with several rich, the latter with several poor. The Nubians as a whole lived – according to their opinion – mostly in a moderate social situation, while the rich outnumbered the poor.

The original profession in Old Nubia was recorded in almost all probands (*Table 14*).

The leading profession in Old Nubia was farming, giving employment to 48.5% of adult respondents. While in the northernmost part of Lower Nubia only tiny fields resembling more gardens than fields could be cultivated by several farmers (16.7%), in the stretch of the valley inhabited by the Nubian Arabs strikingly 67.8% of the men claimed farming. In the broader countryside of the Fadidja area bigger field plots were cultivated by 54.8% of the respondents.

Traditional Nubian professions occurred less often in Nubia, being exerted by the Nubians in big Egyptian

TABLE 13. Social status of males.

Ethnic group	No. of respondents	Poor		Moderate		Rich	
		n	%	n	%	n	%
Kenuz	111	55	49.5	22	19.8	34	30.6
Nubian Arabs	91	17	18.7	49	53.8	25	27.5
Fadidja	121	4	3.3	61	50.4	56	46.3
Nubian hybrids	14	–	–	11	78.6	3	21.4
Ababda	22	4	18.2	18	81.8	–	–
Sum of all adult Nubians and Ababda	359	80	22.3	161	44.8	118	32.9

TABLE 14. Original profession of the probands in Old Nubia. Legend: Fa = farmers, Fi = fishermen, Wo = workers, Te = technicians, Dr = divers (+ = camel drivers), Sa = sailors, Tr = traders, Wc = waiters and cooks, Cs = cleaners and servants, Vp = different village professions, Bg = doorkeepers *(bawab)* and guards *(gafir)*, WC = white collar professions, Te = teachers, St = students, Nw = not working.

Ethnic group	No. of respondents	Fa	Fi	Wo	Te	Dr	Sa	Tr	Wc	Cs	Vp	Bg	WC	Te	St	Nw
Kenuz	120	20	3	3	2	3	11	3	13	14	1	2	–	–	26	19
Nubian Arabs	115	78	–	–	1	–	–	–	–	5	3	3	6	9	9	1
Fadidja	168	92	–	7	2	4	–	1	3	6	1	5	23	3	21	–
Nubian hybrids	16	10	–	3	1	–	–	–	–	1	–	–	–	–	1	–
Ababda	24	15	–	2	–	5+	–	1	–	–	–	–	–	–	–	1
Sum of all adult Nubians and Ababda	443	215	3	15	6	12	11	5	16	26	5	10	29	12	57	21

TABLE 15. Repeatedly occurring diseases and injuries in the Nubians.

Disease / injury	Kenuz adult	Kenuz old	Nubian Arabs adult	Fadidja adult	Nubian hybrids adult	Sum of all Nubians
No. of respondents	106	36	115	175	16	448
Schistosomiasis	11	3	6	12	–	32
Gastritis/hyperacidity/dyspepsy	6	1	2	3	–	12
Tuberculosis	3	–	1	2	1	7
Diabetes mellitus	–	1	3	1	–	5
Heart arrhythmia	1	3	–	1	–	5
Hypertension	–	2	–	2	–	4
Malaria	2	–	1	–	–	3
Dysentery	2	–	–	–	–	2
Pterygium	18	1	14	30	1	64
Trachoma	6	4	10	16	–	36
Cornea opacity	4	4	–	7	–	15
Cataracta	3	3	2	2	–	10
Strabismus	–	–	2	3	–	5
Half-blindness	2	1	1	1	–	5
Glaucoma	2	1	–	1	–	4
Old scars	3	1	2	5	1	12
Skin moulds	6	–	4	1	–	11
Depigmentation spots	1	1	2	4	2	10
Benign tumours	1	2	2	3	–	8
Eczema	2	–	2	–	1	5
Acne	1	–	1	3	–	5
Nerve root pains/spondylarthritis	2	6	–	2	–	10
Healed fractures	2	1	3	2	2	10
Appendectomy	1	–	1	6	–	8
Umbilical hernia	1	1	1	4	1	8
Degenerative osteoarthritis	2	4	–	1	–	7
Varices	3	–	2	1	1	7
Haemorrhoids	–	–	2	4	–	6
Gastrectomy	1	1	–	2	–	4
Parodontosis	–	–	2	2	–	4
Deafness	–	–	2	2	–	4
Sum	87	41	70	124	10	332

cities. Thus among the respondents there were 5.9% of cleaners and servants, 3.6% of waiters and cooks and 2.3% of doorkeepers and guards. While teachers were scarce (2.7%), other white collar professions occurred more often (6.5%) and many adults claimed to be former or present students (12.9%).

In Nubia, there were workers (3.4%), drivers (2.7%, of which 1.1% were Ababda camel-drivers) and also sailors (2.5%) were acclaimed professionals, less so technicians (1.4%), traders and different local village professions (both 1.1%).

The lack of Nubian fishermen known from literature (Herzog 1957) could be attested by their minimum occurrence (0.7%), limited to the Kenuz. On the other hand, there was surprisingly low unemployment (only 4.7%, of which 4.3% were claimed by the Kenuz).

With moving to New Nubia the professions of some men changed. This could be recorded only with the Kenuz. In adults, more than half of the men in comparison to the previous inquiry reported to be farmers, traditional Nubian professions decreased by a half and sailors with fishermen disappeared completely because of a greater distance to the Nile.

Of 36 old Kenuz 25% (instead of 8.3% in Old Nubia) started farming on the reclaimed earth, only 19% instead of 55.6% exerted traditional Nubian professions, and 41.7% did not find any job because of their old age.

4.8. Health anamnesis of the probands

Every adult or old proband was asked what diseases or injuries had afflicted him in past years. Recorded information on often recurring diseases in the three Nubian ethnic groups and their hybrids was assembled in *Table 15*, divided into internal, eye, skin, surgical and other diseases. The Ababda will be discussed further apart.

Beside these recurring diseases, several others were reported anamnestically by the probands. They will be listed here according to medical specialities. If more than one case, their number will be indicated in the adult Kenuz (Ka), old Kenuz (Ko), Nubian Arabs (A), Fadidja (F) and hybrids (H).

Internal diseases: meningitis (Ka, H), pneumonia (F), chronic bronchitis (Ko, F), bronchial asthma (Ko, A), hepatitis (A, F), collitis (A), obesity (F), rachitis (A, F) and teniasis (F).

Cardiological problems: mitral stenosis (A), angina pectoris (Ko), night asthma (Ko).

Endocrinological troubles: hyperthyreosis (Ka), struma (A, 2 F) and exophtalmus (A, F).

Neurological diseases: paresis of the facial nerve (F), Bell's palsy (F), spastic paralysis of the left upper limb (Ko), epilepsy (A, F) and nervous depression (A, F).

Surgical diagnoses: hydrokele, (F), haluces valgi (K, 2 Ko), inguinal hernia (2 A, F), anal fistula (K), kidney stones (Ko), renal colics (A), prostatic hypertrophy (Ko) a shoulder problem (Ka), an unspecified hernia (F), traumatic deformation of forearm (F), anal fistula (Ka), amputation of left arm (A), amputation of finger phalanges (2 Ka, A), and amputation of left foot toes (F).

Orthopaedic defects: kyphosis (Ko, F), scoliosis (A), and flat feet (F).

Ear-nose-throat diseases: otitis media with impaired hearing (A, 2 F), frequent epistaxis (F), removal of nasal polyps (A), and tonsilectomy (F).

Ophthalmologic diseases: ptosis of eye lid (F), hypermetropy (A).

Dermatological problems: desquamous skin (A), allergic reactions on skin (F), furuncles and carbuncles (A, 2F), and sebaceous cyst (Ka).

Stomatology: extreme tooth abrasion (F), missing upper or lower dentition (2 F), missing entire dentition with atrophy of jaws (F), plaques (F) and ulcer (F) on buccal mucosa.

General weakness was claimed by three probands (Ka, Ko, F).

Totals of diseases in particular Nubian ethnic groups were divided by the numbers of respondents to get a quotient expressing the load of diseases, injuries or other health problems per person (*Table 16*).

Anamnestically recorded diseases in the Nubians constituted in sum 0.92 per person. The same quotient was found in the adult Kenuz. The old Kenuz (56–87 years) logically showed the highest quotient. The adult Fadidja had almost the same quotient as the Kenuz. The Arabs and hybrids seemed to be less afflicted by diseases than both their neighbours.

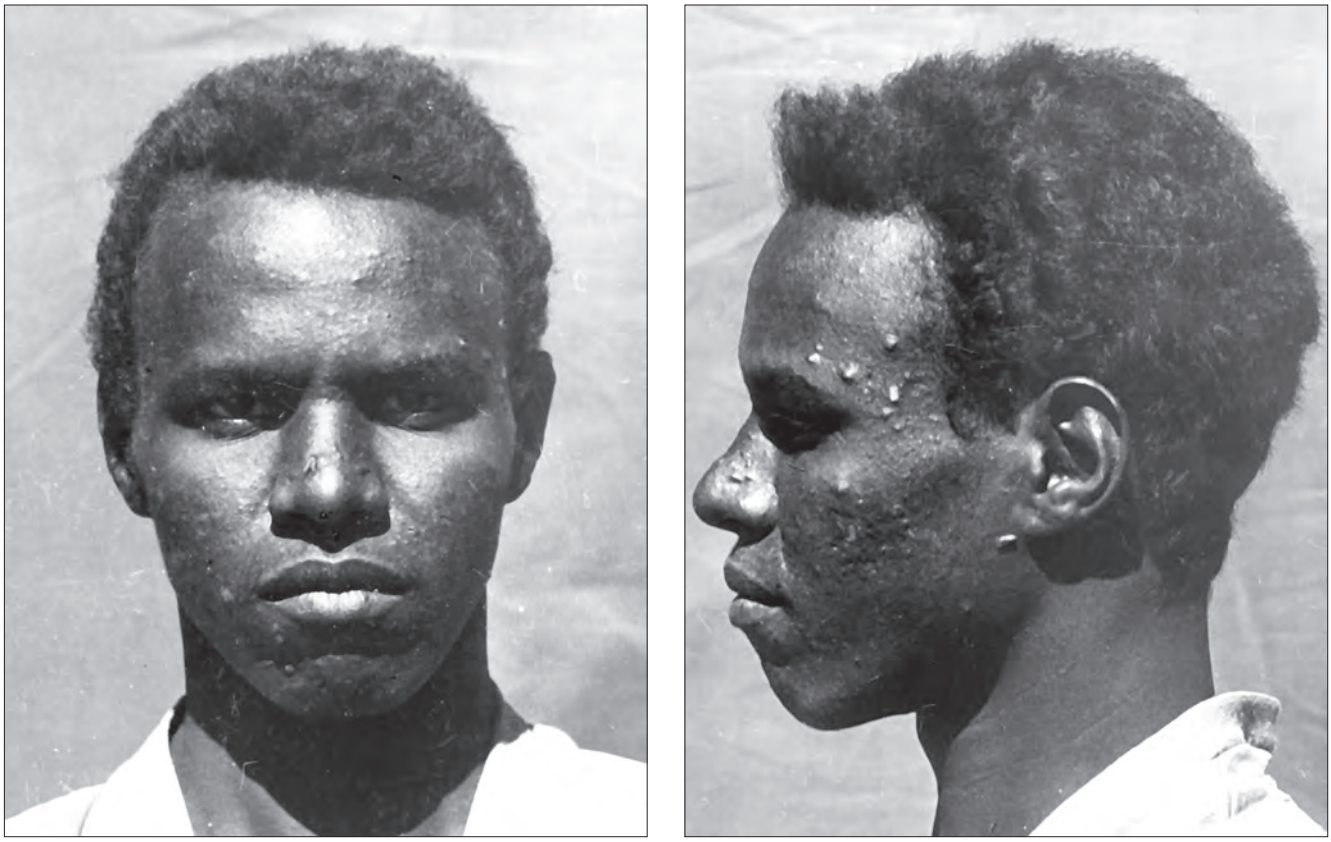
The Ababda, who originally used to live as nomads in the Eastern Desert, reported a strikingly limited number of

TABLE 16. Diseases reported in the Nubians.

Health problems	Kenuz		Nubian Arabs	Fadidja	Nubian hybrids	Sum
	Adult	Old	Adult	Adult	Adult	
Number of cases	106	36	115	175	16	448
Reported diseases	97	51	91	163	12	414
Disease per person	0.92	1.42	0.79	0.93	0.74	0.92

TABLE 17. Detection of thyreoid hypertrophy.

Group age	Kenuz		Nubian Arabs		Fadidja		Nubian hybrids		Sum		
	Adult	Old	Young	Adult	Young	Adult	Young	Adult	Young	Adult	Old
No. of examined probands	103	35	35	115	14	175	54	12	103	405	35
No hypertrophy	100	32	35	111	12	161	47	7	94	373	32
Slight enlargement	3	2	–	3	1	11	6	4	7	24	2
Struma	–	1	–	1	1	3	1	1	2	8	1



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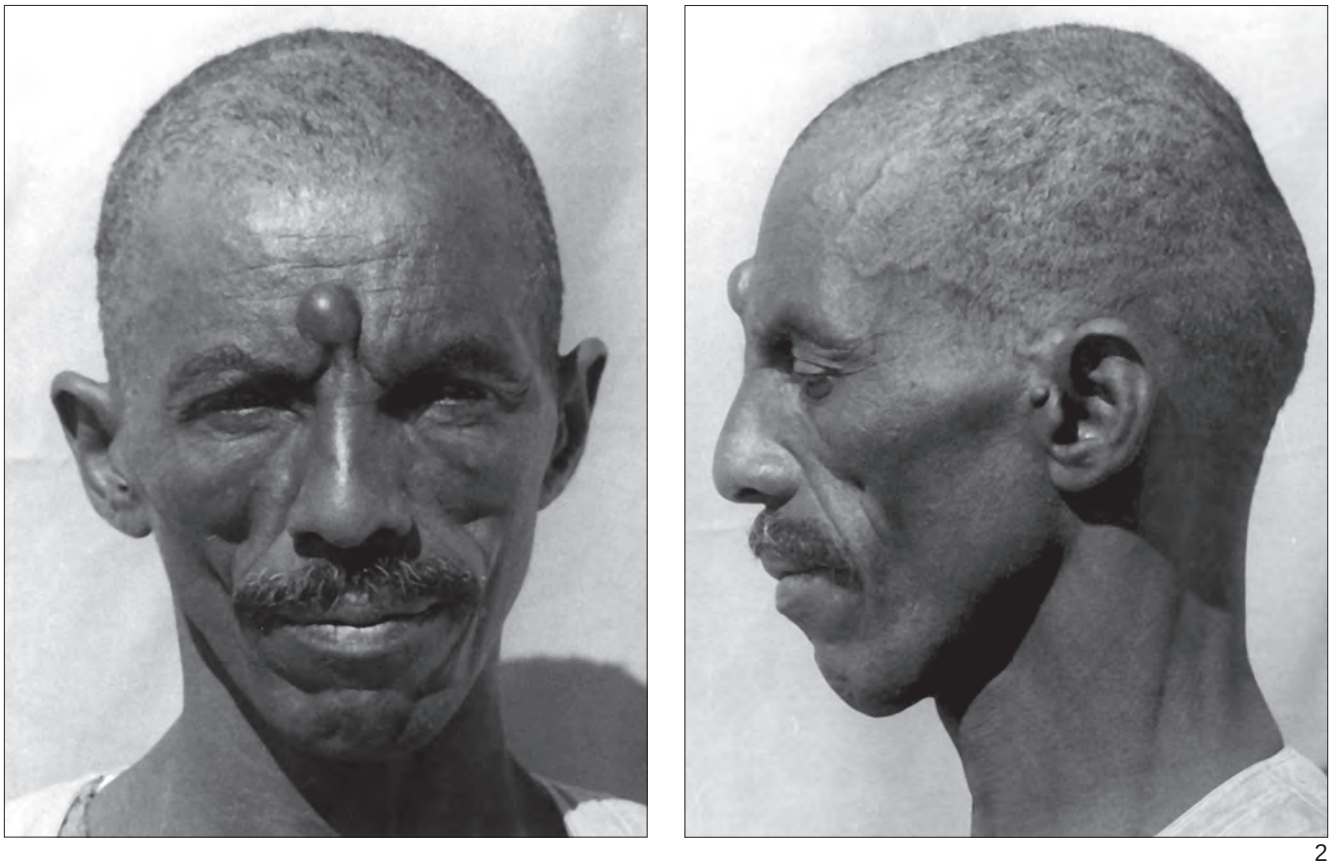

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PLATE XVII. 1) Face of 20-year-old Arab O 88 from Wadi el–Arab with acne juvenilis. 2) Sebaceous cyst or lipoma above nasal root of 34-year-old Kenzi A 11 from Dehmit.

1

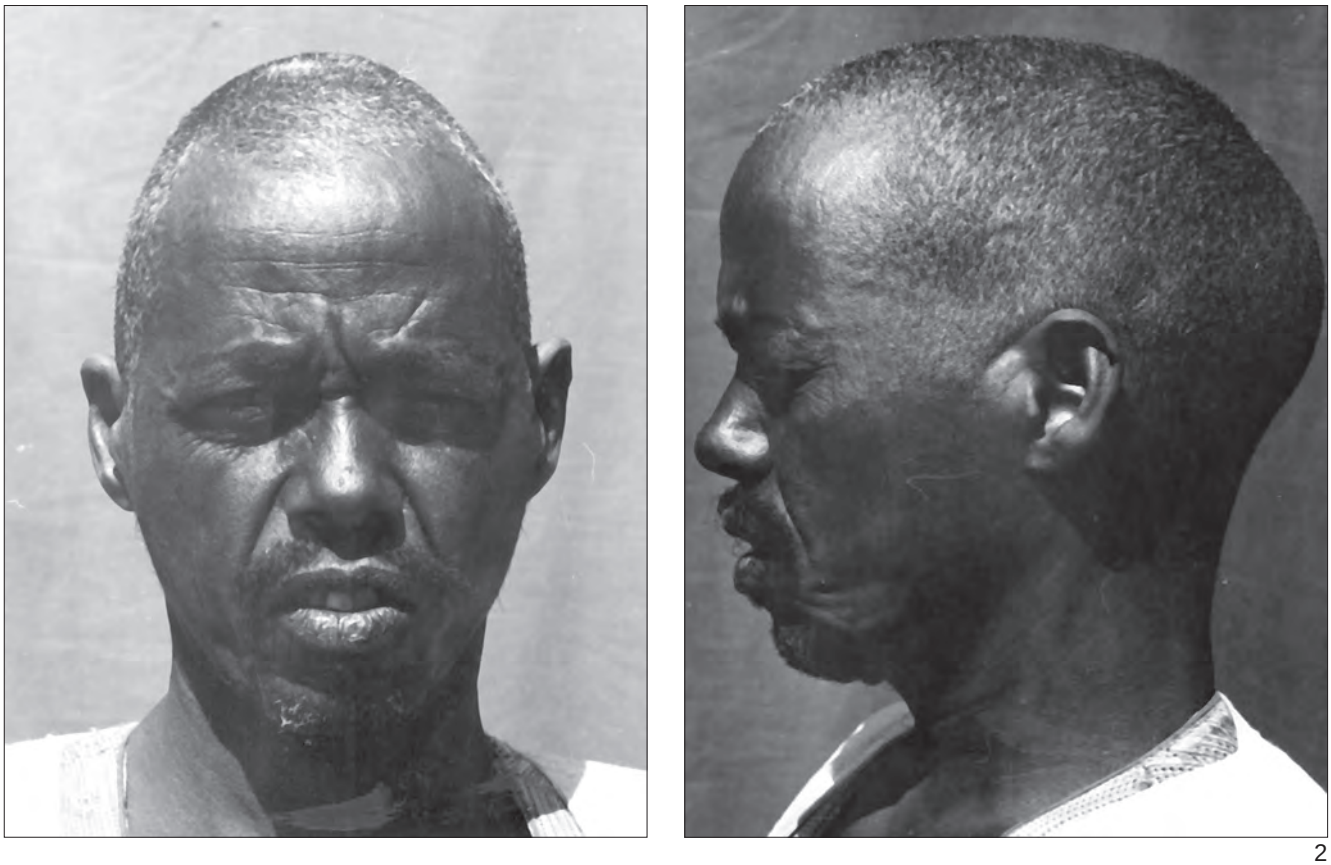

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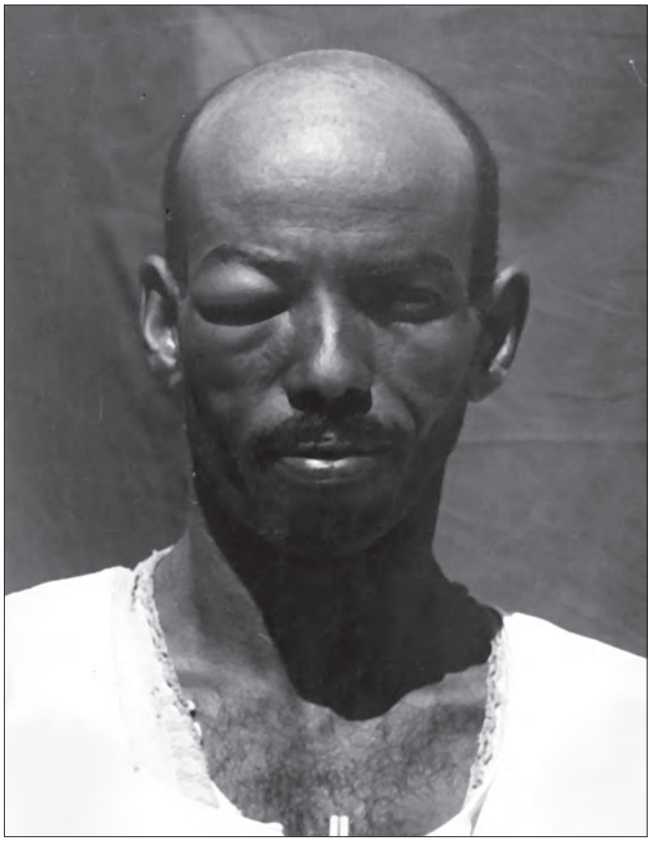
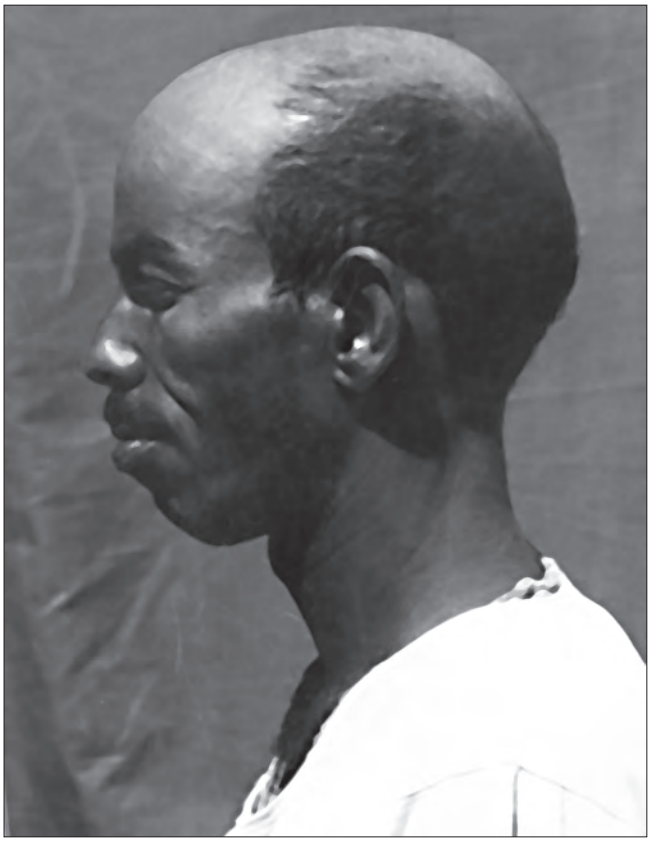
PLATE XVIII. 1) Turricephaly in 24-year-old Nubian Arab S 95 from Wadi el–Arab. 2) Scaphocephaly in 44-year-old Fadidja from Balana.





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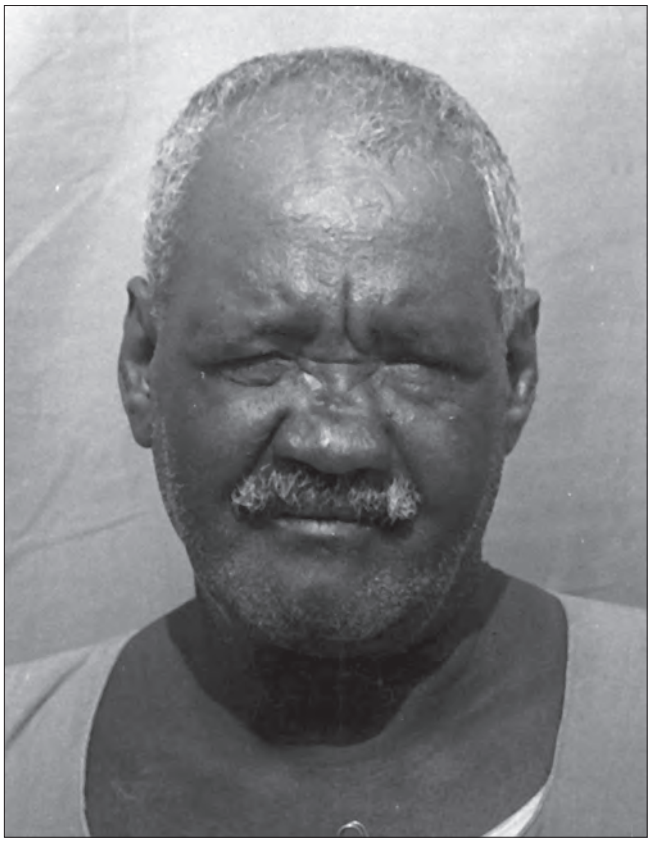

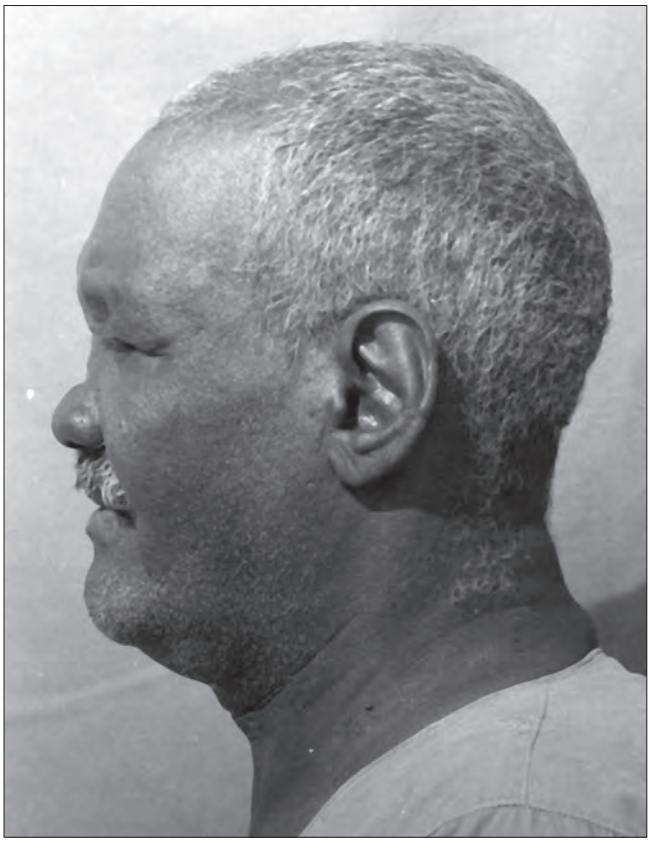

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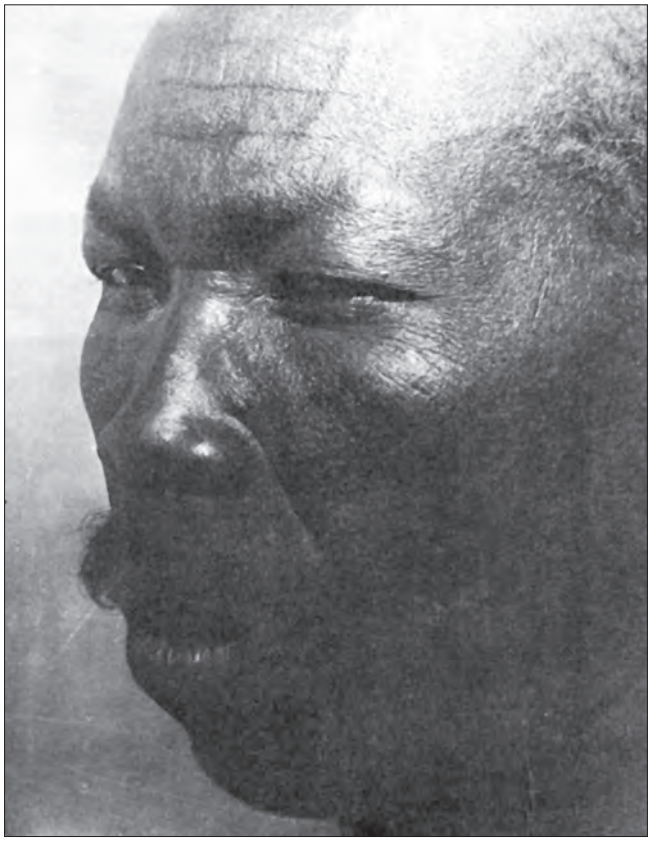
PLATE XIX. 1) Swelling of right eye of 40-year-old Fadidja from Qustul. 2) Saddle nose after luetic destruction of nasal bones in 58-year-old Kenzi from Dakka.



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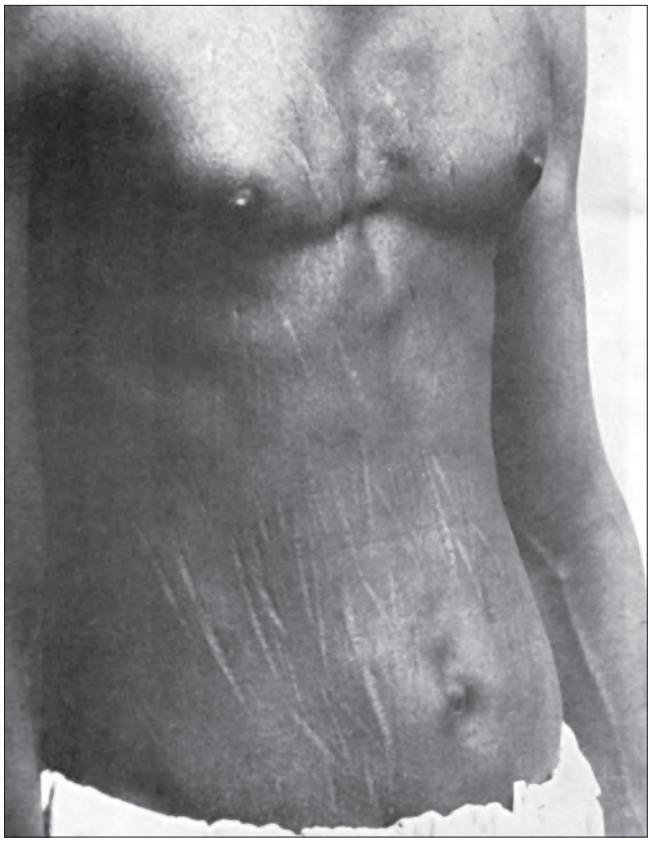

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PLATE XX. 1) Scars after incision laterally of the eyes. 2) Scars after incision on the anterior side of the trunc. 3) Scars after cauterization on the upper third of the spine and right of it. 4) Large scars after cauterization above and below the navel.

diseases in comparison with the Nubians. These were peptic ulcer, anal fistula, appendectomy, mitral stenosis, epilepsy, kidney troubles and nervous depression, altogether mere 7 cases reported by 24 interviewed persons. This gives the quotient of 0.29 only. Either their way of life in the Eastern Desert was healthier than that of the Nubians in the Nile valley, or they were less attentive to their own health problems of which they understood less than the Nubians.

4.9. Direct medical examination

Also the anamnestic record yielded by the Nubians was not complete. To check it we confronted the data on schistosomiasis in the Kenuz with the results of laboratory examination of a part of their sample. In adults, 20 of 65 urine samples (30.8%), in olds 3 of 23 (13.0%), altogether 23 of 88 urine samples (26.1%) proved to be infected by *Schistosoma hematobium*. This result reveals a frequency 2.5 times higher than the probands recorded anamnestically (10.4%; see *Table 15*).

Also hypertrophy of the thyroid gland was examined directly by palpation (*Table 17*).

In adults of all groups 5.9% of thyroids were slightly enlarged, and struma was present in 2.0%. In the old these shares were 5.7% and 2.9% respectively, very close to those of the adults. In the young the shares were 6.8% and 1.9% respectively, the former slightly higher, the latter lower. No significant difference could be proved.

Differences can be found between the ethnic groups with their age groups taken together. The Kenuz (n=173) had 2.8% of slightly hypertrophic thyroids, but only 0.6% (a single) struma. Nubian Arabs (n=129) showed 3.1% and 1.6% respectively, while the Fadidja (n=229) yielded 7.4% of enlarged thyroids and 1.7% of struma. The results in hybrids are clearly distorted by coincidence due to their small number.

A much more different situation was detected in the Ababda. In 24 adults, 9 (37.5%) had thyroid hypertrophy and 2 (8.3%) struma. Of the three young one had hypertrophy. If it was not a matter of coincidence in the small Ababda sample, one might suppose that the Nile water which the Nubians drank had enough of iodine, while this element was probably scarce in the springs of the Eastern Desert.

Another six examples of various medical findings observed during examination of men can be provided: An already 20-year-old Arab showed acne juvenilis, usually occurring sooner, in pubertal age (*Plate XVII: 1*). The globular springy formation above the nasal root of a 34-year-old Kenzi was probably a sebaceous cyst or a benign tumour lipoma (*Plate XVII: 2*). Abnormal shapes of head were observed in a 24-year-old Nubian Arab (turricephaly, *Plate XVIII: 1*) and a 44-year-old Fadidja (scaphocephaly, *Plate XVIII: 2*), both caused by premature obliteration of some cranial sutures. Several eye diseases were identified, among them an acute eye swelling in a 40-year-old Fadidja (*Plate XIX: 1*). The pressed nasal bones of a 58-year-old Kenzi (*Plate XIX: 2*) evidenced the presence of syphilis (lues) among the Nubians.

5. FOLK MEDICAL TREATMENT IN NUBIA

5.1. Two diverse interventions

Since medical care used to be inadequate in Old Nubia (see Section 1.3.), Nubians had until recently recourse to practices of the Arab folk medicine brought by Arab tribes settling in Nubia (see Section 1.4.6.). Their efficiency has been proved through past centuries. They consist of two basic methods differing by techniques of execution, morphology, purpose and operators (Strouhal 1981a, b).

Examining the probands, either linear scars after incisions (*tashrih*) or circular scars after cauterization (*kauwi*, i.e. brand-marks) were revealed by inspection; subsequently, the probands were asked about the origin of these scars. Both were considered by the questioned men to be efficient therapeutic procedures.

The former ones were incised strokes made mostly in vertical direction, of which the most apparent were two to three short ones laterally from the eyes (*Plate XX: 1*), less often horizontal incisions on the cheeks. On the trunk and arms they could be found in larger numbers as bunches of incisions running in oblique direction and up to 10 cm long (*Plate XX: 2*). They were executed with a knife or razor blade. Their effect was blood-letting similar to that practised by medieval and early modern European medicine, but less efficient. Their derivative effect in painful conditions inside the body can, however, be important.

The latter interventions were circular cicatrices which had as a rule wriggled and slightly depressed bottoms (keloids occurred rarely). Their contour ranged from regular circles located most often over spinal processes of the vertebrae (*Plate XX: 3*) or *crista sacralis mediana* to horizontally or vertically extended oval ones. The length of the latter could be up to six times larger than their width. Such long scars were found frequently on the abdomen above or below the navel-(*Plate XX: 4*). Circular scars were sequels of cauterization, i.e. burning the skin and adjoining tissue with a hot iron or wooden bar. This procedure caused pain, whose derivative effect could influence painful processes inside the body. We recorded traces of the above two operations on skin surface and studied separately their frequency in the ethnic groups and localization in different parts of the body.

5.2. Linear scars after incisions

The share of probands with scars after incisions was found to be strikingly high in the adult Fadidja, only half of this occurrence in the adult Nubian Arabs and still less in the adult Kenuz. Concerning the young Fadidja it was only slightly over a half of the share in their adults; in the young Kenuz it was identical as in their adults, while young Nubian Arabs showed more scars than their adults. The highest share in hybrids is a coincidence result. Among all the Nubians 42.8% of men were treated with linear scars, attesting thus a relatively frequent use of this technically easy healing method. Also half of the Ababda had linear scars, ranging thus between the frequencies of the adult Fadidja and Arabs.

The scars were found to be mostly manifold in a single individual, occurring in various locations, as shown by their sum of 564, more than double than the share of 235, i.e. 42.8% of probands who had them. In all Nubians the highest occurence of incisions were two to three strokes laterally from the eyes, followed by a rather large number of irregularly dispersed incisions on the belly and on the back. Smaller, identical shares were found on the forehead and chest, slightly less on cheeks. They were even less common on arms and rare on lateral sides of the trunk and in other unspecified locations.

Strikingly high numbers of abdominal and dorsal locations of scars after incisions in the adult Fadidja are consistent with their rich anamnestic disease record (see Section 4.7.).

Considering age, in the young Nubian men of the three ethnic groups 64 scars were found among the 110 examined, which gives a quotient of 0.58 scar per person. In the adult Nubians of the three ethnic groups, there were 471 scars among 393 examined men, yielding the quotient of 1.20. On the other hand, the old Kenuz had only 6 scars in 35 men, i.e. a quotient of 0.17.

The half value of the quotient in youngsters compared with the quotient in adults is more probably due to the age difference in both groups than to a possible decrease of this therapeutic method in recent times. The three times lower value of the quotient in the old Kenuz, in which one could expect on the contrary even higher values than in the adults, was due to the fact that many of these highly respected members of rural communities could not be urged to remove all clothing and did not report (for weak memory?) that some scars remained hidden under their clothing. Also the possibility that some of the scars healed perfectly and became unrecognizable cannot be excluded.

In 12 intra-Nubian hybrids (9 adults and 3 juveniles) 18 linear scars were found, yielding a quotient of 1.50, the highest if compared with all the other groups, but owing to their small number, it has been considered a coincidence result (*Table 15*).

In the total of 550 examined Nubians 559 linear scars after incisions were revealed, giving the quotient of 1.01. This contrasts with the 27 Ababda possessing only 16 scars and a quotient of only 0.60. This comparison agrees with greater morbidity in the Nile valley than in the Eastern Desert (see Section 4.7.).

The frequency of scars after incisions in adult men of the three Nubian ethnic groups can be compared with that in children (6–12-year-old) and adult women (Valšík, Hussien 1973). In children scars were found in 16.2% of Nubian Arabs, 8.7% of the Kenuz and 5.2% of the Fadidja respectively, in women in 17.1% of Nubian Arabs, 15.1% of the Fadidja and 14.5% of the Kenuz, while in men in as many as 66.9% of the Fadidja, 33.9% of Nubian Arabs and 26.2% of the Kenuz.

The low shares of scars in children are due to their low age and therefore lesser occurrence of diseases in comparison with adults, rather than to the influence of modern medicine, engaged in the fight against the use of folk healing procedures, as believed by Valšík and Hussien (1973).

The intermediary position of women between children and men can be explained by two factors: Even though the examination of women was carried out by a female physician, she was not able to inspect their completely unclothed bodies in all cases. Thus some scars which the probands did not report might have escaped notice of the investigator. Also a social factor, however, can be taken into consideration. Men representing the leading social element in Nubia probably requested the treatment more often than women.

5.3. Circular scars after cauterisation

The frequency of probands with scars after cauterization was found to be very high in the adult Nubian Arabs, while in the Fadidja and Kenuz it was about half of the frequency of the former. Concerning young males, it was only one third to one fifth of the values in pertaining adults; concerning the old Kenuz, they proved to have scars in only half of the number of their adults. The highest share in the hybrids is a coincidence result.

In Nubians as a whole circular scars occurred in 31.9%, i.e. less by one quarter than the frequency of linear scars, thus attesting that cauterization, as a more difficult treatment demanding special knowledge, was used less often than incision. The frequency of circular scars in the Ababda ranges them (as in linear scars) between the adult Fadidja and Nubian Arabs.

The sum of ascertained circular scars (287 in 31.9% of the probands with circular scars) is only about a half of the number of linear scars, revealing once again a lesser use of cauterization. In all Nubians it was applied mostly over vertebral spines of the cervical part of the vertebral column, followed by the mid-thoracic and lumbar spine, and less in the lower and especially upper thoracic spine. It agrees well with the bends of the spine, often seats of pains. The sacral region and the abdomen were less cauterized than the spine.

As far as age is concerned, in the young Nubian men of the three ethnic groups only 16 scars were found among the 110 examined, which yields a quotient of 0.15 scar per person. In the adult Nubians of the three groups there were 254 scars among 393 examined, which gives a quotient of 0.65 (*Table 19*).

On the other hand, the old Kenuz had only 9 scars in 35 individuals, i.e. a quotient of 0.26. In young men the quotient was by a quarter lesser than in adults, which is mostly due to the age difference of both groups, but may also be a sign of a recent decrease in the frequency of cauterisation. The quotient in the old Kenuz (lower by more than a half as compared with the adults), which was expected to be much higher than in the adults, was caused by the already mentioned fact that several scars remained hidden under their clothing.

In 12 intra-Nubian hybrids (9 adults and 3 juveniles) 12 circular scars were found, yielding a quotient of 0.58, which is less than in the adult Nubians.

TABLE 18. Frequency and localization of linear scars after incisions. Legend: young (19–21 yrs), adult (21–55 yrs), old (56–87 yrs), % S = percentage of scars; localization of scars: 1 = laterally from the orbits, 2 = forehead, 3 = cheeks, 4 = chest, 5 = abdomen, 6 = back, 7 = lateral sides of the trunk, 8 = arms, 9 = other and unspecified; [1] = one old more, [2] = four old more, [3] = three young more.

Ethnic group	Age group	Number of investigated men	Number of probands with scars		1	2	3	4	5	6	7	8	9
			n	%	n	n	n	n	n	n	n	n	n
Kenuz	young	42	11	26.2	9	2	3	–	–	–	–	–	1
Kenuz	adult	103	27	26.2	20	6	3	1	5	4	–	2	–
Kenuz	old	35	5	14.3	4	–	1	–	1	–	–	–	–
Kenuz	all	180	43	23.9	33	8	7	1	6	4	–	2	1
Nubian Arabs	young	14	6	42.9	8	6	3	–	–	–	–	–	–
Nubian Arabs	adult	115	39	33.9	34	13	2	1	6	5	–	1	1
Nubian Arabs	all	130[1]	45	34.8	40	16	2	1	6	5	–	1	1
Fadidja	young	54	20	37.0	17	5	5	2	6	3	–	1	1
Fadidja	adult	175	117	66.9	77	20	31	45	79	80	9	22	4
Fadidja	all	233[2]	137	59.8	95	26	37	47	86	84	10	23	4
Hybrids	all	123	9	7.3	9	1	2	2	2	2	–	–	–
Nubians	all	555	235	42.3	177	51	48	51	100	95	10	26	6
Sum of scars in all Nubians		1216	469	% S	31.4	9.0	8.5	9.0	17.7	16.8	1.8	4.6	1.1
Ababda	adult	24	12	50.0	11	1	–	1	1	1	–	–	–
Ababda	all	27[3]	13	48.2	12	1	–	1	1	1	–	–	–
Sum of scars			16	% S	76.0	6.3	–	6.2	6.3	6.2	–	–	–

TABLE 19. Frequency and localization of circular scars after cauterization. Legend: young (19–21 yrs), adult (21–55 yrs), old (56–87 yrs), % S = percentage of scars; localization of scars: 1 = cervical spine, 2 = upper thoracic spine ($T_{1–4}$), 3 = middle thoracic spine ($T_{5–8}$), 4 = lower thoracic spine ($T_{9–12}$), 5 = lumbar spine, 6 = sacral region, 7 = abdomen (area of navel), 8 = other and unspecified, [1] = one old man more, [2] = four old men more, [3] = three young men more.

Ethnic group	Age group	Number of investigated men	Number of probands with scars		1	2	3	4	5	6	7	8
		n	n	%	n	n	n	n	n	n	n	n
Kenuz	young	42	2	4.8	–	–	1	1	–	2	–	–
Kenuz	adult	103	29	28.2	10	4	12	5	5	6	7	5
Kenuz	old	35	5	14.3	1	–	4	1	–	1	1	1
Kenuz	all	180	36	20.0	11	4	17	7	5	9	8	6
Nubian Arabs	young	14	3	21.4	2	–	–	–	1	2	–	–
Nubian Arabs	adult	115	70	60	49	4	24	10	21	4	1	10
Nubian Arabs	all	130[1]	73	56.2	51	4	24	10	22	6	1	10
Fadidja	young	54	6	11	2	1	3	1	–	–	–	–
Fadidja	adult	175	53	30.3	11	7	29	13	6	7	2	2
Fadidja	all	233[2]	59	25.3	13	8	32	14	6	7	3	2
Hybrids	all	123	9	75.0	3	1	1	–	1	1	–	–
Nubians	all	555	177	31.9	78	17	74	31	34	23	12	18
Sum of scars in all Nubians		287	% S	27.2	5.9	25.8	10.8		11.8	8.0	4.2	6.3
Ababda	adult	24	10	41.7	4	–	–	–	–	–	1	8
Ababda	all	27[3]	11	40.7	5	–	1	1	–	–	1	9
Sum of scars			17	% S	29.4	–	5.9	5.9	–	–	5.9	52.9

In the total of 550 examined Nubians, 286 scars after cauterization were revealed. The resulting quotient of 0.52 is two times bigger than in the 27 Ababda with only 7 scars and a quotient of 0.26. It also reflects greater morbidity in the Nile valley than in the Eastern Desert (see Section 4.7.).

If the intensity of both folk Arab therapeutic methods is compared by means of the quotients, in Egyptian Nubians as well as the Ababda twice as many incisions were made than cauterizations. The Ababda, at the same time, showed only half of both the therapeutic interventions.

The frequency of scars after cauterization in adult men of the three Nubian ethnic groups can also be compared with the results on the same subject in children by Valšík and Hussien (1973). In children cauterization scars were present in as little as 2.9% of Nubian Arabs, 1.5% of the Fadidja and 1.4% of the Kenuz, respectively. Concerning women, they occurred in 8.1% of the Fadidja, 7.2% of the Kenuz and 5.3% of Nubian Arabs, while in men in as much as 56.2% of Nubian Arabs, 25.3% of the Fadidja and 20.0% of the Kenuz.

The very low frequency of children subjected to cauterization reflects mostly their low age and lesser occurrence of hitherto diseases as compared with the adults. The much lower shares observed in women can be explained by the examination of dressed or partly clothed probands, which could have hidden some of the scars. Also in this case, however, a social factor preferring treatment of men has to be taken into consideration.

5.4. Indications, age of the patients, operators

In a randomized sample of treated men the indications for both analyzed therapeutic procedures, the age of the treated patients and identity of the operating persons were questioned. These data revealed further distinction between the two interventions.

The majority of incisions were carried out for therapeutic reasons. Of the 60 questioned men 29 stated that the two or three vertical incisions laterally from the eyes helped to cure or to prevent eye diseases transferred by flies searching humidity on the cornea. This corresponds to the fact that the most common eye disease in Old Nubia was trachoma.

According to 9 individuals incisions at different places of the body were done for withdrawing "bad blood" or as general preventive measures. In 6 cases incisions were used to treat various other diseases, as rage (incisions laterally from the right orbit), back pain (on shoulder-blades), recurring headache (on the occiput around the lambda point), obesity (on the belly) and allegedly against hepatitis (on the arms). In 4 cases indications for abdominal incisions included diarrhoea or pain. Only 3 respondents mentioned other than therapeutic indications: for two of them they were tribal marks and for one a punishment for eaten figs.

According to 76 questioned men most incisions were performed in their childhood, viz. 9 between 0–2 years of age (11.8%), 8 between 3–6 years (10.5%) and 2 between 7–14 years (2.6%). Another 52 men indicated simply "during childhood" (68.4%). The remaining three indicated adolescence (15–20 years, 4.0%) and only two adult age (2.6%). This strongly suggests that incisions were a method for treating children and adolescents.

Of the 55 questioned men, 42 indicated their mother as "operator" (76.4%), in a single case the father (1.8%). In 7 cases the interventions were done by a kind of healers – in three cases Arab men, in one case a Fadidja man, in another one a Fadidja woman, one Sudanese male, and a man called *hala sakha* (12.7%). The remaining three cases were women from the neighbourhood (5.5%).

According to 42 respondents, the indication for cauterization above the spinal processes of the vertebrae were spinal or back pains in 10 cases (23.8%). In 7 cases the same intervention was used as supportive measure in injuries, even if the spine was not directly involved (16.7%). In 6 individuals various other problems were treated by cauterization: In two cases it was increased thoracic kyphosis, in single cases cough, wryneck, temperature above normal and pressure on the chest associated with mental disorder (14.3%). In another 4 cases this method was supposed to help in curing an undefined disease (9.5%) and in 3 cases it was applied as a preventive "fortifying" measure (7.1%).

In 10 individuals cauterization in the abdominal region (in one case also in the lower lumbar region) was applied for diarrhoea (4 cases), abdominal pain (3 cases), dyspeptic complaints, for an undefined disease and as a preventive measure (23.8%).

A rarely occurring cauterization beyond the left orbit was applied for undefined eye affection (2.4) and on the left shoulder joint for pain (2.4%).

Compared with the incisions, also cauterizations were mostly applied in childhood, but with an obvious shift towards higher age groups. Of the 41 questioned men, cauterization occurred in 2 cases already between 0–2 years of age, in 5 cases between 3–5 years, and in 8 cases between 7–14 years. Another 17 cases, identified simply as "during childhood", should be added (78.1%). The remaining men were cauterized in adolescence (6 cases, 14.6%) or as adults (3, 7.3%).

According to the respondents, cauterizations in contrast to incisions were predominantly carried out by specialists – mostly Arab men (11 cases, 39.3%) who operated upon members of the other ethnic groups as well, further by Fadidja men (6 cases, 21.4%) or Fadidja women (2 cases, 7.1%), Kenuz men (5 cases, 17.9%), rarely by an Ababda man (a single case, 3.6%). One man was cauterized during his stay in Saudi Arabia (3.6%). Only rarely this intervention was performed by the mother or uncle of the proband (7.1%).

6. DESCENT GROUPS IN EGYPTIAN NUBIA

A distinctive socio-cultural feature of the Nubians is their awareness of belonging to a kindred group of people called descent group. This is a term of wide application, denoting a smaller or larger group of people connected by a common ancestor, either real or fictitious.

The majority of descent groups registered by our expedition correspond to clans. Only a few bigger groupings can be regarded as true tribes. Among the Kenuz these were the Wanasab, Najm ad-din and Sharaf ad-din; among the Arabs they were the 'Ulaiqat, among the Fadidja – the Kashif, Magarab, Gharbiyab, Abu Rasab, Dawudab, Mandulab, Al-Dababiya, Buzurginab as well as all the descent groups of the Ababda.

In Nubia, the system of descent groups has survived until the present days, so that sometimes greater importance has been attached to a descent group origin than to the appurtenance to an ethnic group. During our examination we did not meet an adult, old or even young man who would not know to which descent group he and his parents belonged.

Records of our expedition together with the data of an unpublished manuscript by Mohammad Mitwalli Badr, who used to be a teacher in Nubia for 17 years and later became inspector of the Egyptian Arab Republic Ministry of Education, were elaborated by Fiedler *et al.* (1971), mostly from linguistic and historical standpoints. The article includes a survey of the majority of Egyptian Nubian descent groups with their localisation in villages (*qaryas*) and, where available, also in smaller settlements (*nagas*), followed by a comprehensive commentary discussing the etymology of their names and history. In this connection it is important to note that many *nagas* still bear the names of descent groups attesting that they once had been their original seats.

As generally supposed and confirmed by Ibn Khaldun as early as in the 14th century AD, this social structure had been taken over by the Nubians from the Arab tribesmen with whom they had been intermarrying since the fall of Christian Nubia in the same century AD. The original Nubian population often joined the descent groups of Arab conquerors, accepting their names and genealogies. Therefore, the majority of descent group names have stems of Arab origin. Nevertheless, names with non-Arab stems have still survived. Names of Nubian origin were found among the Kenuz in 13.4%, among the Arabs (14.3%) and among the Fadidja it was 15.9%. The similar proportion of descent group names with Nubian stems in the three ethnic groups is a remnant (residuum) of the original stratum common to the whole of Egyptian Nubia which has been preserved in spite of strong influences of Islamic and Arab cultures.

Names of Turkish nations and their subdued ones (of Circassian, Anatolian and Balkan origin) can only be found among the Fadidja (in 13.9%), in whose countryside the Turkish frontier garrisons were stationed (see Section 1.4.6.).

There is no space here to enumerate all descent groups recorded during the examination of the probands. The example will be taken of those which appeared most often. Thus, among the Kenuz, 16 inhabitants of the village (*karya*) Umbarakab (10 adults, 4 olds and 2 young) belonged to the descent group of Sallumab. According to a local boy, they were named after Sallum, an Egyptian port on the Mediterranean Sea, from where their progenitors came to Nubia. Sallum is, however, also a Bedouin personal name.

Among the Nubian Arabs, 17 adults from the villages of Wadi el-Arab, Shaturma, As-Subu' and As-Sinqari belonged to the large Arab descent group (tribe) Al-'Ulaiqat. Their origin has not yet been explained unambiguously. They claim their descendance from the Banu 'Uaba tribe from north Arabia. These came to Egypt soon after the Arab conquest of the country in the 7th century. They moved to Nubia in the 14th century with the main invasion of Arab tribes into Nubia and Sudan. Their name comes from Ibn 'Oleg.

Among the Fadidja, 12 adults from the villages of Derr, Kostol and Balana claimed their descent group to be Kashif. In Egypt this was originally the title of a chief of province. When the Ottoman Turkish Sultan Selim I extended his rule up to the Third Cataract, he placed the local population under the supremacy of the kashifs, governors and officials of Turkish or Bosnian origin. Together with their mercenaries, they gradually mixed with the Fadidja. The name Kashif was gradually extended to tribes, mostly also of Turkish origin, which bought the right to collect taxes. The rule of Kashifs lasted until the end of the 19th century.

Another common descent group among the adult Fadidja were the Abu Ras (Rasabs), mostly (12) of Ibrim, and some individuals from Balana and Aniba. Their name's interpretation is uncertain – "ab" means "father" or "owner", "ra's" means head, upper part of headland, promontory or a large group of people or army. Their provenance is unknown.

Also well represented were the Gharbiab, attested by adults from Diwan, Ibrim, Qatta (2), Balana (5). Their name means "west". They came from a branch of the Berber tribe of the Zenata from Libya. In the 13th–14th centuries they took some possessions in Lower Nubia (see Section 1.4.6.).

We also examined individual adult members of descent groups whose names recalled nations subdued by Ottoman Turks, as the Tatarab (from Derr), Magharab (2 from Qatta) or Abzerjan (born in Cairo by parents from Ermenne). These names have clearly been derived from Crimean Tatars, Hungarians and Azerbaijanis.

In this chapter only the most important issues of the study have been included. The impact of the descent group concept and of the descent group names on physical features of their namesakes will be examined in Chapter 15.

7. CEPHALOMETRIC FEATURES

7.1. Samples of Nubian ethnic groups

Measurements of the head and their indices are, in physical anthropology, the best help for distinguishing the phenotypic individuality of population groups determined by their genetical component. This can be demonstrated by a comparison between samples of the main Nubian ethnic groups – the Kenuz, Nubian Arabs and the Fadidja, and a sample of the Ababda, part of the Bedja of the Eastern Desert (*Table 20*).

The Kenuz (I) are most similar to the Fadidja (III) except for statistically significantly broader heads, higher faces and broader noses, and higher cephalic as well as lower breadth-height and cephalofacial indices, proved by t-tests. The variability assessed by F-test is similar in both ethnic groups. This agrees with the result of historical

TABLE 20. Cephalometric features of adult men in Nubian ethnic group and Ababda samples.

Measurement or index	I. Kenuz				II. Nubian Arabs				III. Fadidja				IV. Ababda				V. All Nubians				t-test values of sample differences					
	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	I:II	I:III	II:III	I:IV	II:IV	III:IV
1. Maximum head length (1)	103	190.6	0.74	7.5	115	188.9	0.57	6.1	174	190.5	0.49	6.4	24	189.7	1.61	7.7	424	190.0	0.32	6.6	1.816+	0.118	2.122	0.522	0.553	0.559
2. Maximum head breadth (3)	103	147.8	0.56	5.7	115	144.0	0.43	4.6	174	145.2	0.36	4.8	24	145.2	1.33	6.4	424	145.5	0.25	5.2	5.341+	4.062	2.118	1.949	0.859+	
3. Auricular height (15)	103	125.8	0.52	5.3	115	124.0	0.38	4.1	175	126.6	0.41	5.4	3	122.7	0.52	5.3	400	125.6	0.26	5.1	2.788+	1.193	4.633+	5.034+	2.592+	7.405+
4. Minimum frontal breadth (4)	103	105.0	0.48	4.8	115	102.7	0.45	4.8	174	103.9	0.35	4.6	24	104.8	0.92	4.8	424	103.9	0.23	4.7	3.529	1.896	2.132	0.186	1.964	0.902
5. Morphological height of the face (18)	103	122.0	0.69	7.0	114	118.3	0.66	7.0	173	119.4	0.54	7.1	24	118.0	1.38	6.6	422	119.7	0.35	7.1	3.859	2.943	1.288	2.514	0.191	0.909
6. Bizygomatic breadth (6)	103	135.1	0.57	5.8	115	133.6	0.43	4.6	175	134.1	0.42	5.5	24	132.8	1.02	4.9	425	134.2	0.26	5.3	2.088+	1.428	0.837+	1.781	0.766	1.097
7. Bigonial breadth (8)	103	102.0	0.59	6.0	115	101.2	0.51	5.4	175	101.2	0.43	5.7	24	101.6	0.92	4.4	425	101.5	0.27	5.6	1.027	1.106		0.305	0.336	0.331
8. Height of the nose (21)	103	55.2	0.45	4.5	115	53.9	0.29	3.1	175	54.7	0.31	4.1	24	52.6	0.96	4.6	425	54.5	0.19	4.0	2.430+	0.936	1.859+	2.513	1.298+	2.286
9. Breadth of the nose (13)	103	40.4	0.37	3.7	115	38.3	0.32	3.4	175	39.4	0.27	3.5	24	37.5	0.77	3.7	425	39.2	0.17	3.6	4.391	2.271	2.667	3.460	1.031	2.488
10. Cephalic index	103	77.6	0.36	3.6	115	76.3	0.28	3.0	174	76.3	0.24	3.1	24	76.7	1.04	5.0	424	76.6	0.17	3.4	2.913	3.169		0.824+	0.374+	0.377+
11. Length-height index	103	66.1	0.30	3.0	115	65.7	0.23	2.5	174	66.5	0.23	3.0	3	66.0	1.56	2.2	399	66.1	0.15	2.9	1.052+	1.071	2.465+	0.056	0.205	0.289
12. Breadth-height index	103	85.2	0.40	4.0	115	86.1	0.33	3.5	174	87.2	0.27	3.6	3	84.4	2.33	3.3	399	86.3	0.19	3.7	1.776	4.321	2.587	0.343	0.828	1.348
13. Transverse frontoparietal index	103	71.1	0.32	3.2	115	71.3	0.27	2.9	174	71.6	0.24	3.1	24	71.9	0.96	4.6	424	71.4	0.16	3.2	0.481	1.290	0.827	0.798+	0.606+	0.306+
14. Morphological facial index	103	90.3	0.56	5.7	114	88.6	0.48	5.1	173	89.2	0.43	5.6	24	89.0	1.00	4.8	422	89.3	0.27	5.5	2.299	1.551	0.913	1.019	0.350	0.165
15. Jugofrontal index	103	77.8	0.35	3.5	115	76.9	0.29	3.1	174	77.6	0.25	3.3	24	79.0	0.56	2.7	424	77.5	0.16	3.3	1.996	0.473	1.779	1.571	3.029	1.960
16. Jugomandibular index	103	75.6	0.40	4.0	115	75.8	0.34	3.6	175	75.5	0.28	3.7	24	76.7	0.81	3.9	425	75.7	0,18	3.8	0.391	0.211	0.684	1.218	1.099	1.472
17. Transverse cephalofacial index	103	91.4	0.33	3.3	115	92.8	0.27	2.9	174	92.4	0.24	3.2	24	91.5	0.83	4.0	424	92.2	0.16	3.2	3.302	2.478	1.070	0.127	1.473+	1.242
18. Nasal index	103	73.6	0.90	9.1	115	71.2	0.69	6.9	175	72.3	0.62	8.2	24	71.5	1.58	7.6	425	72.2	0.39	8.1	2.172+	1.226	1.232+	1.043	1.226	0.189
19. Jugonasal index	103	29.9	0.26	2.6	115	28.7	0.22	2.5	175	29.4	0.20	2.6	24	28.2	0.52	2.5	425	29.2	0.13	2.6	3.426	1.541	2.259	2.876	0.877	2.122
20. Facionasal index	103	45.3	0.36	3.6	114	45.7	0.30	3.2	173	45.8	0.24	3.1	24	44.6	0.60	2.9	422	45.6	0.16	3.2	0.864	1.221	0.264	0.883	1.542	1.793

anthropology that both groups had derived from the same Nobadian population (see Section 1.4.).

In distinction to it, the Nubian Arabs (II) differ considerably from both their neighbours, showing lower values of all measurements except for bigonial breadth which is identical in the Fadidja. At the same time, their difference from the Fadidja is less pronounced than from the Kenuz. Nubian Arabs differ statistically significantly from the Fadidja in all measurements except for facial and nasal heights as well as bizygomatic and bigonial breadths. Only three indices from 11 are significantly different when Arabs are compared to the Fadidja: the lower length-height and breadth-height of the head as well as the lower jugonasal index. The variability between the Fadidja and Arabs is different in three measurements (nos. 3, 6 and 8) and the nasal index (no. 18).

The same Arabs differ from the Kenuz also in all measurements except for two, head length and bigonial breadth, as well as in six indices out of 11, viz. lower cephalic, facial and jugofrontal indices, higher cephalofacial index, lower nasal and jugonasal indices. Variability between the Arabs and Kenuz, as determined by F-test, differs in five measurements (nos. 1–3, 6 and 8) and two indices (11 and 18). The morphological distinction of Nubian Arabs from the "aboriginal" Nubian groups is a reflection of their origin distant from Nubia and relatively late settling down in the Nile valley (see Section 1.4.).

The unfortunately too small group of the Ababda (IV) proved to be similar in all measurements and indices to Nubian Arabs, except for the significantly lower auricular height and the significantly higher jugofrontal index. The resemblance is perhaps due to the originally nomadic way of life of these two groups. Their variability by F-test was, however, different in measurements nos. 2, 3 and 8 and indices 10, 13 and 17.

The Ababda are more distinct of the Fadidja because of significantly very much lower head, smaller both nasal measurements and lower jugonasal index. The variability between these two groups was proved significantly different in measurements nos. 2 and 3 and indices 10 and 13.

When compared to the Kenuz, the Ababda differ even more: they have significantly lower head height, lower facial height, and also both nasal measurements are lower, as well as the jugonasal index. Both groups differ also in the variability of measurement 3 and indices 11 and 13.

These results clearly prove the different genetic origin of the Ababda which were living for millennia in wide areas of the Eastern Desert and only recently started to settle down in small groups in the Nile Valley because the desert has been drying out. The lowest mean values of almost all cephalometric measurements except for bigonial breadth are perhaps results of their adaptation to poor resources of the desert and repeated periods of famine.

7.2. Samples of Kenuz villages

Four Kenuz villages in the almost 200 km long Kenuz territory are represented only by 14–21 individuals each (*Table 21*). In spite of this, we have tried to show that their mutual differences in cephalometric features are smaller than between the ethnic groups. Also distances between the villages in Old Nubia were taken into consideration.

Between Dehmit (1) and Umbarakab (2) (distance of 12 km) two measurements – significantly broader head and broader nose in Umbarakab, and three indices – significantly higher cephalic, lower cephalofacial and higher jugonasal index in Umbarakab, are apparent. Also variability between these villages is significantly different in nasal breadth, nasal and jugonasal indices. Most of these results are connected with broader noses in Umbarakab.

Between Umbarakab (2) and Koshtamna (3) (distance 57 km) three measurements – higher and broader face as well as bigonial breadth in Koshtamna, but no significant difference in indices, were found. Variability proved to be different only in the facionasal index.

Between Umbarakab (2) and Dakka (4) (distance 66 km) no significant differences were proved and only different variability of the facionasal index appeared.

Between Koshtamna (3) and Dakka (4) (distance 9 km) only a single significant measurement, bigger bigonial breadth in Dakka, no difference in indices and different variability of the jugomandibular index were found.

7.3. Samples of Nubian Arab villages

The Arab region of Nubia is only 30 km long. The village Wadi el-Arab (5) lies 54 km to the south of the Kenuz village Dakka (4) and 63 km south of Koshtamna (3). Shaturma (6) and Maliki (7) are 12 km south of Wadi el-Arab, Shaturma on the right bank of the Nile, Maliki on the left one. The two Fadidja villages Diwan and Derr (8) are 34 km further upstream the Nile.

It can surprise that the three Nubian Arab villages, situated relatively close to each other, show more significant differences than the above mentioned Kenuz village samples (*Table 22*).

In men from Wadi el-Arab (5) and Shaturma (6), in the latter village the head was significantly longer, minimum frontal breadth was broader and the nose was broader. Also four indices (frontoparietal, jugofrontal, nasal and jugonasal) were significantly higher in Shaturma. Significantly different variability by F-test appeared only in head breadth.

Between Shaturma (6) and Maliki (7), the head height was bigger and minimum frontal breadth was broader in the former village. Also four indices (length-height, breadth-height, frontoparietal and jugofrontal) were significantly higher in Shaturma. There was no significant difference in variability. The specificity of Shaturma reflects either an origin in another Arab tribe with larger head dimensions or is a result of better living conditions than in the two other Arab villages.

If we compare pairs of villages on the ethnic border between the Arabs and the Kenuz, all measurements from Wadi el-Arab (5) are smaller. Significance was proved in all but one (auricular height) in the Kenuz village

TABLE 21. Cephalometric features of adult men in Kenuz village samples.

Measurement or index	1. Dehmit					2. Umbarakab					3. Koshtamna					4. Dakka					t-test values of sample differences			
	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	1:2	2:3	2:4	3:4
1. Maximum head length (1)	14	190.0	1.66	1.66	6.0	3.2	21	189.3	2.06	9.2	4.9	17	192.1	2.10	6.0	3.2	19	191.3	1.77	7.5	3.9	0.245	0.948	0.733	0.294
2. Maximum head breadth (3)	14	144.6	1.25	1.25	4.5	3.1	21	150.0	1.45	6.5	4.3	17	151.0	1.22	4.9	3.2	19	147.8	1.13	4.8	3.2	2.634	0.513	1.180	1.925
3. Auricular height (15)	14	124.9	1.39	1.39	5.0	4.0	21	125.2	1.45	6.5	5.2	17	126.5	1.45	5.8	4.6	19	125.5	1.27	5.4	4.3	0.142	0.625	0.154	0.520
4. Minimum frontal breadth (4)	14	103.3	0.86	0.86	3.1	3.0	21	105.7	1.05	4.7	4.4	17	106.8	1.42	5.7	5.3	19	104.0	0.97	4.1	3.9	1.652	0.637	1.189	1.653
5. Morphological height of the face (18)	14	122.6	1.53	1.53	5.5	4.5	21	119.2	1.86	8.3	7.0	17	125.1	2.00	8.0	6.4	19	122.6	1.63	6.9	5.6	1.309	2.153	1.371	0.978
6. Bizygomatic breadth (6)	14	135.0	1.41	1.41	5.1	3.8	21	135.0	1.14	5.1	3.8	17	139.1	1.58	6.3	4.5	19	135.7	1.32	5.6	4.1		2.156	0.402	1.659
7. Bigonial breadth (8)	14	98.9	1.25	1.25	4.5	4.6	21	100.4	1.25	5.6	5.6	17	106.5	1.35	5.4	5.1	19	102.3	1.30	5.5	5.4	0.812	3.292	1.050	2.224
8. Height of the nose (21)	14	54.6	1.50	1.50	5.4	9.9	21	55.3	0.92	4.1	7.4	17	56.7	1.08	4.3	7.6	19	54.6	1.08	4.6	8.4	0.420	0.999	0.493	1.371
9. Breadth of the nose (13)	14	38.3	0.53	0.53	1.9	5.0	21	41.9	1.07	4.8	11.5	17	41.1	0.75	3.0	7.3	19	41.5	0.87	3.7	8.9	3.005+	0.582	0.285	0.340
10. Cephalic index	14	76.3	0.83	0.83	3.0	3.9	21	79.4	0.89	4.0	5.0	17	78.7	0.78	3.1	3.9	19	77.3	0.71	3.0	3.9	2.396	0.573	1.803	1.335
11. Length-height index	14	65.9	0.83	0.83	3.0	4.6	21	66.2	0.60	2.7	4.1	17	65.9	0.72	2.9	4.4	19	65.7	0.82	3.5	5.3	0.297	0.315	0.493	0.179
12. Breadth-height index	14	86.4	1.08	1.08	3.9	4.5	21	83.6	1.01	4.5	5.4	17	83.8	0.98	3.9	4.7	19	84.9	0.75	3.2	3.8	1.884	0.140	1.007	0.894
13. Transverse frontoparietal index	14	71.4	0.58	0.58	2.1	2.9	21	70.5	0.72	3.2	4.5	17	70.7	0.72	2.9	4.1	19	70.4	0.71	3.0	4.3	0.888	0.192	0.099	0.296
14. Morphological facial index	14	90.9	1.36	1.36	4.9	5.4	21	87.9	1.34	6.0	6.8	17	90.1	1.68	6.7	7.4	19	90.4	1.15	4.9	5.4	1.508	1.039	1.395	0.151
15. Jugofrontal index	14	76.6	0.83	0.83	3.0	3.9	21	78.4	0.80	3.6	4.6	17	76.8	0.70	2.8	3.6	19	76.7	0.73	3.1	4.0	1.507	1.465	1.554	0.099
16. Jugomandibular index	14	73.3	0.64	0.64	2.3	3.1	21	74.5	1.03	4.6	6.2	17	76.6	0.75	3.0	3.9	19	75.9	1.25	5.3	7.0	0.992+	1.580	0.872	0.480+
17. Transverse cephalofacial index	14	93.3	0.75	0.75	2.7	2.9	21	90.9	0.58	2.6	2.9	17	91.9	0.98	3.9	4.2	19	91.8	0.78	3.3	3.6	3.533	1.754	1.879	0.081
18. Nasal index	14	70.6	1.28	1.28	4.6	6.5	21	76.1	2.53	11.3	14.8	17	72.9	1.92	7.7	10.6	19	76.4	2.00	8.5	11.1	1.937+	0.968	0.092	1.254
19. Jugonasal index	14	28.4	0.47	0.47	1.7	6.0	21	31.0	0.69	3.1	10.0	17	29.6	0.60	2.4	8.1	19	30.6	0.59	2.5	8.2	3.076+	1.493	0.438	1.202
20. Facionasal index	14	44.5	0.89	0.89	3.2	7.2	21	46.6	1.10	4.9	10.5	17	45.4	0.55	2.2	4.8	19	44.5	0.68	2.9	6.5	1.360	0.975+	1.608+	1.007

TABLE 22. Cephalometric features of adult men in Nubian Arab village samples.

Measurement or index	5. Wadi el-Arab					6. Shaturma					7. Maliki				t-test values of sample differences				
															Adjoining ethn. groups		Nubian Arab		Adjoining ethn. groups
	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	3:5	4:5	5:6	6:7	7:8
1. Maximum head length (1)	39	185.6	0.84	0.84	5.2	2.8	21	190.2	1.25	5.6	2.9	37	191.3	0.93	5.6	2.9	2.876+	3.310	3.122	0.704	1.181
2. Maximum head breadth (3)	39	143.4	0.84	0.84	5.2	3.6	21	144.8	0.74	3.3	2.3	37	144.9	0.72	4.3	3.0	5.004	3.033	1.237+	0.090	1.472
3. Auricular height (15)	39	124.5	0.65	0.65	4.0	3.2	21	126.0	0.80	3.6	2.9	37	122.9	0.68	4.1	3.3	1.251+	0.780	1.413	2.846	4.341
4. Minimum frontal breadth (4)	39	101.0	0.75	0.75	4.6	4.6	21	105.5	0.94	4.2	4.0	37	102.8	0.77	4.6	4.5	3.964	2.382	3.681	2.176	1.588
5. Morphological height of the face (18)	39	115.8	0.99	0.99	6.1	5.3	21	118.8	1.34	6.0	5.0	36	119.9	1.25	7.4	6.2	4.646	3.750	1.790	0.569	1.170
6. Bizygomatic breadth (6)	39	132.6	0.81	0.81	5.0	3.8	21	134.1	0.96	4.3	3.2	37	134.3	0.73	4.4	3.3	4.058	2.094	1.150	0.164	
7. Bigonial breadth (8)	39	99.9	0.81	0.81	5.0	5.0	21	101.6	1.19	5.3	5.2	37	102.4	1.00	6.0	5.9	4.341	1.627	1.209	0.502	0.604
8. Height of the nose (21)	39	53.2	0.47	0.47	2.9	5.5	21	53.7	0.65	2.9	5.4	37	54.2	0.53	3.2	5.9	3.486	1.173+	0.623	0.579	1.344
9. Breadth of the nose (13)	39	36.6	0.52	0.52	3.2	8.7	21	40.0	0.51	2.3	5.8	37	39.1	0.58	3.5	9.0	4.872	5.132	4.280	1.044	1.126
10. Cephalic index	39	77.3	0.60	0.60	3.7	4.8	21	76.2	0.60	2.7	3.5	37	75.8	0.37	2.2	2.9	1.340		1.181	0.595	2.489
11. Length-height index	39	67.1	0.36	0.36	2.2	3.3	21	66.3	0.58	2.6	3.9	37	64.3	0.32	1.9	3.0	1.634	1.554+	1.231	3.342	6.020
12. Breadth-height index	39	86.9	0.65	0.65	4.0	4.6	21	87.0	0.65	2.9	3.3	37	84.9	0.53	3.2	3.8	2.629	1.859	0.099	2.441	3.059
13. Transverse frontoparietal index	39	70.5	0.52	0.52	2.4	3.3	21	72.9	0.54	2.4	3.3	37	71.0	0.42	2.5	3.5	0.216	0.112	2.961	2.799	0.568
14. Morphological facial index	39	87.4	0.78	0.78	4.8	5.5	21	88.7	1.07	4.8	5.4	36	89.3	0.85	5.0	5.6	0.683	2.185	0.985	0.438	1.324
15. Jugofrontal index	39	76.2	0.50	0.50	3.1	4.1	21	78.7	0.65	2.9	3.7	37	76.5	0.43	2.6	3.4	0.676	0.568	4.986	2.871	1.776+
16. Jugomandibular index	39	75.4	0.55	0.55	3.4	4.5	21	75.7	0.76	3.4	4.5	37	76.2	0.67	4.0	5.2	1.223	0.365+	0.317	0.471	0.611
17. Transverse cephalofacial index	39	92.5	0.50	0.50	3.1	3.4	21	92.6	0.60	2.7	2.9	37	92.7	0.43	2.6	2.8	0.599	0.769	0.121	0.137	1.282
18. Nasal index	39	69.0	1.02	1.02	6.3	9.1	21	74.7	1.52	6.8	9.1	37	72.3	1.17	7.0	9.7	1.952	3.659	3.201	1.252	1.960
19. Jugonasal index	39	27.6	0.42	0.42	2.6	9.4	21	29.9	0.40	1.8	6.0	37	29.1	0.43	2.6	8.9	2.684	4.148	3.566	1.236	1.164
20. Facionasal index	39	46.0	0.54	0.54	3.3	7.2	21	45.3	0.56	2.5	5.5	36	45.3	0.51	3.0	6.6	0.675	1.650	0.835		0.269

Koshtamna (3) and in all except for auricular height and bigonial breadth in Dakka. From the Wadi el-Arab indices, the breadth-height index is significantly bigger than in Koshtamna, the facial index is smaller than in Dakka, the nasal index is smaller than in Dakka and the jugofrontal index is smaller than in both Kenuz villages. Differences in variability between Wadi el-Arab and Koshtamna concern two measurements (nos. 1 and 3), between Wadi el-Arab and Dakka one measurement (no. 8) and two indices (nos. 11 and 16). This result expresses not only the huge distance between the compared villages, but also the different origin of both ethnic groups.

On the other hand, the Arab village Maliki (7) and nearby Fadidja villages Diwan and Derr (8), lying at a distance of 25 km from Maliki, show only statistically significantly lower head and lower length-height and breadth-height indices at Maliki. Only the jugofrontal index (no. 15) reveals significantly different variability.

In line with the conclusions in Section 7.1., we could prove the existence of a sharp borderline between Nubian Arabs and the Kenuz, while the transition between the Arabs and the Fadidja appears to be less pronounced.

7.4. Samples of Fadidja villages

Six villages were chosen to represent the 120 km long territory of Fadidja people. The northernmost two villages of Diwan and Derr (8), lying on the right bank of the Nile close to each other, were joint into a common sample. Qatta (9) is situated on the same bank 16 km farther upstream the Nile. Ibrim (10), only 6 km away, lies on a Nile island and the right bank of the Nile. And finally two large villages Qustul (11) and Balana (12) were as far as 70 km upstream the Nile, on its right and left banks, respectively.

Compared with the differences between the Kenuz and Arab villages, the amount of statistically significant differences between the Fadidja villages is very low (*Table 23*).

Thus, between Diwan with Derr (8) and Qatta (9) there is none but a significantly different variability of the jugofrontal index by F-test.

Between Qatta (9) and Ibrim (10) the head is significantly higher at Qatta, reflected also in significantly higher length-height and breadth-height indices. On the opposite, face proved to be significantly higher in Ibrim.

Between Ibrim (10) and Qustul (11) the head is significantly longer and higher in Qustul (the longest of all Nubian villages), together with significantly higher values of length-height and breadth-height indices, while the nasal index is significantly lower (the lowest of all Nubian villages).

Between the two close villages of Qustul (11) and Balana (12), divided by the Nile, no significant differences in measurements, but different variabilities by F-test were revealed in minimum frontal breadth and bizygomatic breadth. Among the indices, only the nasal and jugonasal ones proved to be higher in Balana, while the cephalofacial index showed different variabilities.

7.5. Categories of indices

Expressed by the traditional categories (Martin, Saller 1957) the means of cephalic index were mesocephalic in all ethnic groups and village samples (except for Maliki and Qustul, being in the uppermost reach of dolichocephaly). The length-height index was uniformly hypsicephalic, and the breadth-height one acrocephalic (except for the Ababda and the villages of Umbarakab, Koshtamna, Dakka, Maliki and Ibrim, reaching the upper reach of metriocephaly).

The morphological facial index was leptoprosopic (except for the villages of Umbarakab, Wadi el-Arab, Diwan with Derr and Qatta, falling in the upper reach of mesoprosopy).

The nasal index was in the lower third of mesorrhiny (except for the villages of Umbarakab, Dakka, Diwan with Derr, Qatta, where it lies in the middle third of the same category, as well as Wadi el-Arab and Qustul, being in the upper reach of leptorrhiny).

8. SOMATOMETRIC FEATURES

8.1. Samples of Nubian ethnic groups

Nine body measurements and eleven derived indices complement the cephalometric features. These features are also determined genetically, but more sensible to environmental influences (*Table 24*).

The Kenuz (I) appear closer to the Fadidja (III) than to Nubian Arabs (II). Only the biacromial breadth and the indices are significantly bigger: the Rohrer's index, the relative upper extremity length and the relative cubit length, except for the significantly lower acromo-iliac index in the Fadidja. Significantly different variability was revealed only in the weight as well as in the acromo-iliac and thoracic indices.

All features in the Kenuz (I) are bigger than in Nubian Arabs (II) except for the same biacromial breadth. Significance of these differences was proved in weight, stature, sitting height, upper extremity length and thoracic breadth. Among the significantly differing indices are the Rohrer's index, lower relative upper extremity length and cubit length and well as higher acromo-iliac index. Significantly different variability was found in weight, cubit length and thoracic depth.

Also in the Fadidja (III), all somatic measurements are bigger than in Nubian Arabs (II), significantly weight, stature, sitting height, upper extremity length, cubit length and biacromial breadth. Only the acromo-iliac index is significantly higher in Nubian Arabs. Significantly different variability was found in measurements nos. 5, 7 and 9 and in indices 13, 18 and 20. Thus the Arabs significantly differ in somatic features from the other two "aboriginal" groups.

In weight, the Ababda (IV) are the lightest group of all compared, obviously adapted to shortage of resources in the desert, being but one cm higher than the smallest Nubian Arabs (II). These two groups are most similar in measurements (the absolute and relative depth of thorax

TABLE 23. Cephalometric features of adult men in Fadidja village samples.

Measurement or index	8. Diwan & Derr				9. Qatta				10. Ibrim				11. Qustul				12. Balana				t-test values of sample differences			
	n	x̄	s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	8:9	9:10	10:11	11:12
1. Maximum head length (1)	29	1.10	5.8	3.1	17	187.1	1.40	5.6	3.0	24	189.0	1.50	7.2	3.8	25	192.9	1.05	6.1	3.2	42	190.8	1.02	6.5	3.4	1.390	0.900	2.038	1.293
2. Maximum head breadth (3)	29	0.81	4.3	2.9	17	144.7	1.05	4.2	2.9	24	144.0	1.02	4.9	3.4	25	146.3	0.92	4.5	3.1	42	145.3	0.83	5.3	3.6	1.353	0.466	1.666	0.777
3. Auricular height (15)	29	1.04	5.5	4.3	17	126.8	1.35	5.4	4.3	24	122.0	1.13	5.4	4.4	25	128.0	0.82	4.0	3.1	43	128.3	0.79	5.1	4.0	0.767	2.751	4.356	0.249
4. Minimum frontal breadth (4)	29	0.83	4.4	4.2	17	103.1	0.92	3.7	3.6	24	103.4	0.79	3.8	3.7	25	104.9	0.63	3.1	3.0	42	104.0	0.75	4.8	4.6	1.163	0.247	1.504	0.917+
5. Morphological height of the face (18)	29	1.27	6.7	5.7	17	114.6	2.02	8.1	7.1	24	120.6	1.21	5.8	4.8	25	122.1	1.14	5.6	4.6	41	119.9	1.17	7.4	6.2	1.414	2.701	0.906	1.255
6. Bizygomatic breadth (6)	29	1.02	5.4	4.0	17	134.7	1.25	5.0	3.7	24	134.0	1.08	5.2	3.9	25	135.4	0.76	3.7	2.7	43	133.9	1.05	6.8	5.1	0.243	0.419	1.061	1.155+
7. Bigonial breadth (8)	29	1.11	5.9	5.8	17	100.8	1.70	5.6	5.6	24	102.1	1.25	6.0	5.9	25	102.1	1.29	6.3	6.2	43	100.4	0.77	5.0	5.0	0.388	0.682		1.208
8. Height of the nose (21)	29	0.74	3.9	7.4	17	53.0	1.02	4.1	7.7	24	54.7	0.73	3.5	6.4	25	56.5	0.92	4.5	8.0	43	55.2	0.57	3.7	6.7		1.387	1.527	1.265
9. Breadth of the nose (13)	29	0.51	2.7	6.8	17	39.5	0.78	3.1	7.8	24	39.3	0.75	3.6	9.2	25	38.0	0.57	2.8	7.4	43	39.7	0.63	4.1	10.3	0.559	0.181	1.376	1.796
10. Cephalic index	29	0.49	2.6	3.4	17	77.4	0.60	2.4	3.1	24	76.3	0.75	3.6	4.7	25	75.9	0.55	2.7	3.6	42	76.2	0.53	3.4	4.5	0.128	1.079	0.433	0.372
11. Length-height index	29	0.47	2.5	3.7	17	67.8	0.58	2.3	3.4	24	64.6	0.63	3.0	4.6	25	66.4	0.63	3.1	4.7	42	67.2	0.42	2.7	4.0	0.264	3.615	2.029	1.090
12. Breadth-height index	29	0.68	3.6	4.1	17	87.7	0.80	3.2	3.6	24	84.7	0.75	3.6	4.2	25	87.5	0.61	3.0	3.4	42	88.2	0.56	3.6	4.1	0.186	2.677	2.872	0.804
13. Transverse frontoparietal index	29	0.60	3.2	4.5	17	71.2	0.45	2.6	3.7	24	71.9	0.60	2.9	4.0	25	71.7	0.45	2.2	3.1	42	71.7	0.50	3.2	4.5	0.214	0.772	0.269	
14. Morphological facial index	29	0.85	4.5	5.1	17	85.1	1.40	5.6	6.6	24	90.1	1.00	4.8	5.3	25	90.3	1.12	5.5	6.1	41	89.9	1.00	6.3	7.0	1.680	2.970	0.132	0.257
15. Jugofrontal index	29	0.79	4.2	5.4	17	76.5	0.60	2.4	3.1	24	77.2	0.50	2.4	3.1	25	77.5	0.51	2.5	3.2	42	77.8	0.53	3.4	4.4	1.611+	0.894	0.418	0.378
16. Jugomandibular index	29	0.70	3.7	4.9	17	74.8	1.00	4.0	5.3	24	76.2	0.75	3.6	4.7	25	75.4	0.88	4.3	5.7	43	75.1	0.49	3.2	4.3	0.666	1.441	0.691	0.325
17. Transverse cephalofacial index	29	0.68	3.6	3.9	17	93.1	0.68	2.7	2.9	24	93.1	0.60	2.9	3.1	25	92.6	0.47	2.3	2.5	42	92.1	0.59	3.8	4.1	1.344	-	0.657	0.661+
18. Nasal index	29	1.46	7.7	10.1	17	75.0	2.12	8.5	11.3	24	72.1	1.54	7.4	10.3	25	67.5	1.39	6.8	10.1	43	72.2	1.34	8.7	12.0	0.361	1.138	2.220	2.290
19. Jugonasal index	29	0.40	2.1	7.0	17	29.3	0.60	2.4	8.2	24	29.4	0.56	2.7	9.2	25	28.1	0.43	2.1	7.5	43	29.7	0.46	3.0	10.1	0.714	0.120	1.853	2.308
20. Facionasal index	29	0.53	2.8	6.2	17	46.3	0.68	2.7	5.8	24	45.4	0.56	2.7	5.9	25	46.3	0.73	3.6	7.8	41	46.0	0.54	3.4	7.4	1.380	1.039	0.978	0.334

TABLE 24. Somatometric features of adult men in Nubian ethnic group and Ababda samples.

Measurement or index	I. Kenuz					II. Nubian Arabs					III. Fadidja					IV. Ababda					V. All Nubians					t-test values of sample differences					
	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	I:II	I:III	II:III	I:IV	II:IV	III:IV
1. Weight (71)	102	62.7	1.27	12.8	20.4	115	58.8	0,93	9.9	16.8	174	61.9	0.77	10.1	16.3	24	57.2	1.96	9.4	16.4	423	61.0	0.53	10.6	17.9	2.475+	0.538+	2.565	1.967	0.721	2.144
2. Stature (1)	103	169.8	0.67	6.8	4.0	115	166.2	0.59	6.3	3.8	174	168.5	0.44	5.8	3.4	24	167.2	1.54	7.4	4.4	424	168.1	0.31	6.4	3.8	4.041	1.676	3.171	1.643	0.682	0.938
3. Sitting height (23)	103	86.6	0.38	3.8	4.4	115	84.9	0.30	3.2	3.8	174	86.4	0.24	3.2	3.7	24	85.2	0.81	3.9	4.6	424	86.0	0.17	3.5	4.1	3.584	0.467	3.923	1.601	0.404	1.674
4. Total upper extremity length (45)	103	77.2	0.35	3.5	4.5	115	76.1	0.35	3.7	4.9	175	77.3	0.26	3.4	4.4	24	76.3	0.90	4.3	5.6	425	76.9	0.17	3.6	4.7	2.233	0.233	2.825	1.075	0.232	1.298
5. Length of the cubit (48, 3)	103	47.0	0.22	2.2	4.7	114	46.4	0.29	3.1	6.7	175	47.3	0.17	2.2	4.7	24	46.8	0.63	3.0	6.4	424	47.0	0.11	2.3	4.9	1.635+	1.073	2.663+	0.363	0.572	0.767+
6. Biacromial breadth (35)	103	37.7	0.20	2.0	5.3	115	37.7	0.18	1.9	5.0	175	38.5	0.14	1.9	4.9	24	37.7	0.50	2.4	6.4	425	38.0	0.14	1.9	4.9		3.340	3.577			1.902
7. Bicristal breadth (40)	103	27.2	0.20	2.0	7.4	115	26.7	0.21	2.2	8.2	175	26.8	0.13	1.7	6.3	24	26.5	0.40	1.9	7.2	425	26.9	0.09	1.9	7.1	1.745	1.762	0.414+	1.541	0.415	0.796
8. Breadth of the thorax (36)	103	26.6	0.21	2.1	7.9	115	26.0	0.17	1.8	6.9	174	26.3	0.14	1.8	6.8	24	25.3	0.40	1.9	7.5	424	26.2	0.09	1.9	7.3	2.271	1.243	1.369	2.769	1.712	2.481
9. Depth of the thorax (37)	102	19.7	0.21	2.1	10.7	115	19.4	0.15	1.6	8.2	174	19.6	0.14	1.8	9.2	24	18.7	0.29	1.4	7.5	423	19.5	0.09	1.8	9.2	1.175+	0.417	0.989+	2.785+	1.991	2.334
10. Rohrer's index	102	1.28	0.022	0.22	17.2	115	1.28	0.020	0.21	16.4	173	1.29	0.015	0.20	15.5	24	1.22	0.035	0.17	13.9	422	1.28	0.01	0.21	16.4			0.403	3.304	1.302	1.603
11. Cormic index	103	51.0	0.13	1.3	2.5	115	51.1	0.14	1.5	2.9	174	51.3	0.11	1.4	2.7	24	50.9	0.27	1.3	2.6	424	51.2	0.07	1.4	2.7	0.519	1.730	1.144	0.333	0.610	1.300
12. Relative total upper extremity length	103	45.4	0.14	1.4	3.1	115	45.8	0.11	1.2	2.6	174	45.9	0.10	1.3	2.8	24	45.6	0.25	1.2	2.6	424	45.7	0.10	1.3	2.8	2.237	2.951	0.635	0.651	0.716	1.034
13. Relative length of the cubit	103	27.7	0.09	0.9	3.2	114	28.0	0.08	0.8	2.9	174	28.1	0.07	0.9	3.2	24	28.0	0.19	0.9	3.2	423	27.9	0.04	0.9	3.2	2.669	3.533	1.008+	1.457		0.498
14. Relative biacromial breadth	103	22.6	0.25	1.2	5.3	115	22.7	0.09	1.0	4.4	174	22.8	0.08	1.1	4.8	24	22.6	0.25	1.2	5.3	424	22.6	0.05	1.1	4.9	0.716	1.511	0.812		0.432	0.851
15. Relative bicristal breadth	103	16.0	0.10	1.0	6.2	115	16.1	0.11	1.2	7.5	174	15.9	0.08	1.0	6.3	24	15.9	0.21	1.0	6.3	424	16.0	0.06	1.2	7.5	0.656	0.775	1.512	0.426	0.766	
16. Relative breadth of the thorax	102	15.6	0.12	1.2	7.7	115	15.6	0.10	1.1	7.1	174	15.6	0.08	1.1	7.1	24	15.1	0.21	1.0	6.6	424	15.6	0.05	1.0	6.4				1.865	1.968	2.078
17. Relative depth of the thorax	103	11.6	0.12	1.2	10.3	115	11.7	0.09	1.0	8.5	174	11.6	0.08	1.1	9.5	24	11.2	0.19	0.9	8.0	423	11.6	0.05	1.1	9.5	0.678		0.773	1.574	2.242	1.674
18. Length of the cubit in % of the total upper extremity length	103	60.9	0.14	1.4	2.3	114	61.1	0.11	1.2	2.0	175	61.2	0.08	1.0	1.6	24	61.5	0.25	1.2	2.0	424	61.1	0.06	1.2	2.0	1.110	1.882	0.714+	1.923	1.440	1.310
19. Acromio-iliac index	103	72.4	0.53	5.4	7.5	115	71.0	0.47	5.0	7.0	175	69.9	0.33	4.3	6.2	24	70.3	0.77	3.7	5.3	425	70.9	0.24	4.9	6.9	1.986	3.995+	1.985	2.252+	0.648	0.430
20. Thoracic index	102	74.4	0.69	6.9	9.3	115	75.2	0.59	6.3	8.4	174	74.8	0.62	8.2	11.0	24	74.8	1.83	8.8	11.8	423	74.8	0.37	18.0	0.37	0.891	0.432+	0.464+	0.241	0.207+	

TABLE 25. Somatometric features of adult men in Kenuz village samples

Measurement or index	1. Dehmit					2. Umbarakab					3. Koshtamna					4. Dakka					t-test values of sample differences			
	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	1:2	2:3	2:4	3:4
1. Weight (71)	14	56.5	2.52	9.1	16.1	21	57.7	2.57	11.5	19.9	16	75.7	3.33	12.9	17.0	19	64.8	3.11	13.2	20.4	0.319	4.351	1.772	2.386
2. Stature (1)	14	169.6	2.02	7.3	4.3	21	167.5	1.21	5.4	3.2	17	172.6	1.72	6.9	4.0	19	170.4	1.86	7.9	4.6	1.086	2.480	1.332	0.859
3. Sitting height (23)	14	85.7	1.16	4.2	4.9	21	85.3	1.16	4.2	4.9	17	88.2	0.95	3.8	4.3	19	88.1	0.87	3.7	4.2	0.313	2.501	2.542	0.078
4. Total upper extremity length (45)	14	77.0	0.94	3.4	4.4	21	75.9	0.74	3.3	4.3	17	79.3	0.55	3.8	4.8	19	78.2	0.90	3.8	4.9	0.925	2.868	2.000	0.850
5. Length of the cubit (48, 3)	14	47.2	0.58	2.1	4.4	21	46.6	0.42	1.9	4.1	17	47.8	0.62	2.5	5.2	19	47.2	0.66	2.8	5.9	0.866	1.633	0.789	0.654
6. Biacromial breadth (35)	14	36.6	0.50	1.8	4.9	21	37.3	0.51	2.3	6.2	17	38.8	0.50	2.0	5.2	19	38.4	0.38	1.6	4.2	0.935	2.047	1.687	0.632
7. Bicristal breadth (40)	14	27.1	0.36	1.3	4.8	21	26.7	0.40	1.8	6.7	17	29.2	0.52	2.1	7.2	19	27.3	0.47	2.0	7.3	0.694	3.792	0.957	2.654
8. Breadth of the thorax (36)	14	25.9	0.61	2.2	8.5	21	25.9	0.45	2.0	7.7	17	28.1	0.50	2.0	7.1	19	27.2	0.54	2.3	8.5		3.336	1.890	1.226
9. Depth of the thorax (37)	14	18.9	0.47	1.7	9.0	21	19.5	0.38	1.7	8.7	17	21.6	0.72	2.9	13.4	19	19.6	0.40	1.7	8.7	0.992	2.568±	0.177	2.409±
10. Rohrer's index	14	1.16	0.050	0.18	15.5	21	1.23	0.049	0.22	17.9	16	1.49	0.059	0.23	15.4	19	1.31	0.057	0.24	18.3	0.964	3.371	1.071	2.153
11. Cormic index	14	50.4	0.33	1.2	2.4	21	50.9	0.25	1.1	2.2	17	51.1	0.38	1.5	2.9	19	51.9	0.28	1.2	2.3	1.261	0.464	2.148	1.278
12. Relative total upper extremity length	14	45.3	0.36	1.3	2.9	21	45.2	0.27	1.2	2.7	17	46.0	0.25	1.0	2.2	19	46.0	0.35	1.5	3.3	0.222	2.084	1.764	
13. Relative length of the cubit	14	27.7	0.19	0.7	2.5	21	27.8	0.22	1.0	3.6	17	27.7	0.18	0.7	2.5	19	27.7	0.28	1.2	4.3	0.324	0.350	0.287	
14. Relative biacromial breadth	14	21.5	0.33	1.2	5.6	21	22.2	0.25	1.1	5.0	17	22.5	0.22	0.9	4.0	19	22.6	0.21	0.9	4.0	1.720	0.852	1.208	0.321
15. Relative bicristal breadth	14	16.0	0.22	0.8	5.0	21	15.9	0.22	1.0	6.3	17	16.9	0.22	0.9	5.3	19	16.0	0.26	1.1	6.9	0.298	3.041	0.294	2.587
16. Relative breadth of the thorax	14	15.3	0.44	1.6	10.5	21	15.4	0.25	1.1	7.1	17	16.3	0.25	1.0	6.1	19	16.0	0.33	1.4	8.8	0.213	2.483	1.469	0.714
17. Relative depth of the thorax	14	11.2	0.31	1.1	9.8	21	11.7	0.25	1.1	9.4	17	12.5	0.40	1.6	12.8	19	11.5	0.24	1.0	8.7	1.317	1.781	0.603	2.163±
18. Length of the cubit in % of the total upper extremity length	14	61.1	0.39	1.4	2.3	21	61.4	0.34	1.5	2.4	17	60.3	0.30	1.2	2.0	19	60.3	0.31	1.3	2.2	0.574	2.358	2.353	
19. Acromio-iliac index	14	74.6	1.22	4.4	5.9	21	71.8	1.41	6.3	8.8	17	75.4	1.22	4.4	5.9	19	71.1	1.11	4.7	6.6	1.394	1.810	0.384	2.494
20. Thoracic index	14	73.6	2.25	8.1	11.0	21	76.0	1.70	7.6	10.0	17	76.6	0.78	7.5	9.8	19	71.9	1.08	4.6	6.4	0.863	0.237	2.021+	2.228

TABLE 26. Somatometric features of adult men in Nubian Arab village samples.

Measurement or index	5. Wadi el-Arab					6. Shaturma					7. Maliki					t-test values of sample differences				
																Adjoining eth. groups		Nubian Arabs		Adjoining eth. groups
	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	3:5	4:5	5:6	6:7	7:8
1. Weight (71)	39	55.1	1.23	7.6	13.8	21	62.3	2.01	9.0	14.4	37	60.5	1.90	11.4	18.8	5.766±	2.868±	3.175	0.612	0.115
2. Stature (1)	39	166.2	1.12	6.9	4.2	21	168.0	1.21	5.4	3.2	37	165.7	1.10	6.6	4.0	3.141	2.044	1.025	1.335	0.644
3. Sitting height (23)	39	84.3	0.49	3.0	3.6	21	86.8	0.51	2.3	2.6	37	85.0	0.58	3.5	4.1	4.008	4.113	3.232	2.078	1.691
4. Total upper extremity length (45)	39	76.0	0.73	4.5	5.9	21	75.9	0.69	3.1	4.1	37	76.2	0.60	3.6	4.7	2.606	1.815	0.090	0.316	0.361
5. Length of the cubit (48, 3)	39	46.3	0.41	2.5	5.4	20	46.5	0.50	2.2	4.7	37	46.5	0.37	2.2	4.7	2.026	1.224	0.301		0.562
6. Biacromial breadth (35)	39	37.6	0.31	1.9	5.1	21	38.2	0.42	1.9	5.0	37	37.8	0.30	1.8	4.8	2.068	1.534	1.142	0.793	2.016
7. Bicristal breadth (40)	39	26.6	0.49	3.0	11.3	21	26.7	0.29	1.3	4.9	37	27.1	0.27	1.6	5.9	3.175	0.902	0.176+	0.978	0.919+
8. Breadth of the thorax (36)	39	25.3	0.31	1.9	7.5	21	26.1	0.29	1.3	5.0	37	26.6	0.27	1.6	6.0	4.976	3.317	1.712	1.211	1.058
9. Depth of the thorax (37)	39	19.0	0.28	1.7	8.9	21	19.9	0.22	1.0	5.0	37	19.6	0.30	1.8	9.2	3.380±	1.252	2.570±	0.789+	0.723
10. Rohrer's index	39	1.20	0.026	0.16	13.3	21	1.31	0.036	0.16	12.2	37	1.33	0.042	0.25	18.8	4.390±	1.758+	2.494	0.322	0.355
11. Cormic index	39	50.7	0.23	1.4	2.8	21	51.6	0.34	1.5	2.9	37	51.3	0.27	1.6	3.1	0.931	2.577	2.275	0.689	1.567
12. Relative total upper extremity length	39	45.8	0.24	1.5	3.3	21	45.1	0.25	1.1	2.4	37	46.0	0.17	1.0	2.2	0.504	0.471	1.880	3.131	1.584
13. Relative length of the cubit	39	28.0	0.13	0.8	2.9	20	27.9	0.16	0.7	2.5	37	27.7	0.12	0.7	2.5	1.371	0.991+	0.483	1.015	0.569
14. Relative biacromial breadth	39	22.6	0.15	0.9	4.0	21	22.6	0.27	1.2	5.3	37	22.8	0.15	0.9	3.9	0.378			0.694	1.929
15. Relative bicristal breadth	39	16.0	0.26	1.6	10.0	21	16.0	0.20	0.9	5.6	37	16.4	0.12	0.7	4.3	2.568±			1.854	1.264+
16. Relative breadth of the thorax	39	15.3	0.19	1.2	7.8	21	15.5	0.20	0.9	5.8	37	16.1	0.18	1.1	6.8	3.019	1.986	0.647	2.166	1.333
17. Relative depth of the thorax	39	11.4	0.16	1.0	8.8	21	11.9	0.18	0.8	6.7	37	11.9	0.18	1.1	9.2	2.534±	0.355	1.974		1.686+
18. Length of the cubit in % of the total upper extremity length	39	61.0	0.26	1.6	2.6	20	61.5	0.21	0.9	1.5	37	61.2	0.18	1.1	1.8	1.581	1.614	1.504+	1.057	1.212
19. Acromio-iliac index	39	70.7	1.04	6.4	9.1	21	70.5	0.96	4.3	6.1	37	71.8	0.57	3.4	4.7	2.608	0.239	0.127	1.250	2.298±
20. Thoracic index	39	75.2	1.04	6.4	8.5	21	76.8	1.07	4.8	6.2	37	74.3	1.07	6.4	8.6	0.699	1.963	0.985	1.457	0.051

being significantly smaller in the Ababda). No significant difference in variability was found.

The Ababda (IV) are more distant of both "aboriginal" Nubian groups. They are smaller than the Kenuz in all measurements, significantly in both thoracic ones. They have smaller Rohrer's and acromo-iliac indices. Variability of thoracic depth and acromo-iliac indices is significantly different in the compared groups.

The Ababda (IV) proved to be also smaller than the Fadidja (III) in all measurements, significantly in weight and both thoracic ones as well as in the relative thoracic breadth. Variability of cubit length is significantly different.

8.2. Samples of Kenuz villages

The two northernmost and neighbouring villages Dehmit (1) and Umbarakab (2) have similar values of somatometric features without significant differences and with similar variabilities (*Table 25*).

On the other hand, the comparison between the distant Umbarakab (2) and Koshtamna (3) shows that all measurements (except for the cubit length) are significantly bigger in Koshtamna. There is also a significantly higher Rohrer's index, relative length of the upper extremity, relative bicristal and thoracic breadths, but shorter length of the cubit in % of upper extremity length. Variability of the thoracic breadth is significantly different. This is an unexpected curious result caused by (coincidence?) accumulation of men being in average by 18 kg heavier and 5.1 cm higher in Koshtamna, one of the richest villages of Egyptian Nubia.

Comparison between the still slightly more distant Umbarakab (2) and Dakka (4) reveals also men in average by 7.1 kg heavier and 2.9 cm higher in Dakka, but only the difference in sitting height, cormic index and length of cubit as % of upper extremity length as well as variability of the thoracic index proved to be significant.

As to Koshtamna (3) and Dakka (4), located nearby each other, all measurements showed to be higher at Koshtamna, while weight, bicristal breadth and thoracic depth being significantly higher. The Rohrer's index, relative bicristal breadth, relative thoracic breadth, acromio-iliac and thoracic indices are higher in Koshtamna. Variability differs significantly in thoracic depth, Rohrer's index, relative cubit length and relative thoracic depth.

It appears obvious that in somatometric features a dichotomy of Kenuz villages was revealed – the poorer ones in the north (Dehmit and Umbarakab) differ clearly from the richer ones in the south (Koshtamna and Dakka).

8.3. Samples of Nubian Arab villages

The three Arab villages, located close to each other, were relatively similar in somatometrics (*Table 26*). All measurements (mostly weight) were bigger (except for the upper extremity length) at Shaturma (6) than at Wadi el-Arab (5), but statistically significant were only the thoracic depth and variability of the bicristal breadth, thoracic depth, relative bicristal breadth and length of cubit in % of upper extremity length.

Shaturma (6) differed from Maliki (7) by five bigger and three smaller measurements (cubit length being identical), but statistically significant were only the sitting height, relative upper extremity length and thoracic breadth, which had also significantly different variability.

Looking for differences of ethnic border between Arab and Kenuz villages, Koshtamna (3) compared with Wadi el-Arab (5) shows all measurements significantly bigger as well as Rohrer's index and relative bicristal breadth, thoracic breadth and depth, and the acromio-iliac index. There are also significantly different variabilities in weight, absolute and relative thoracic depth, Rohrer's index and relative bicristal breadth. Significantly different variability concerns features nos. 9, 15 and 17.

Similarly, all measurements were bigger at Dakka (4) as compared with Wadi el-Arab (5), significantly in weight, stature and breadth of the thorax. Indices are less different, only the cormic one differing significantly. Variability differs significantly in weight, Rohrer's index and relative cubit length.

The numerous significant somatometric differences are in line with similar ones in cephalometry, expressing not only the different genetic background of the two ethnic groups, but also adaptations to peristatic influences – the rich southern Kenuz villages versus the poor villages of the Nubian Arabs.

On the contrary, the Fadidja villages Diwan and Derr (8), as compared with the Arab village Maliki (7), show far less significant differences: only the biacromial breadth is bigger in the former, and the acromio-iliac index is higher in the latter. Variability differs significantly in features 7, 15, 17 and 19.

8.4. Samples of Fadidja villages

Similarly to cephalometry, the Fadidja villages were found mutually less different than the Kenuz and Nubian Arab ones (*Table 27*). Between the neighbouring villages Diwan and Derr (8) and the nearby Qatta (9), differences are small and only the relative biacromial breadth is significantly bigger in the former. Variability differs significantly in bicristal breadth, relative biacromial breadth and relative thoracic breadth and depth.

Between the villages of Qatta (9) and Ibrim (10), located close to each other, no significant differences at all were found.

Surprisingly, Ibrim (10) is only slightly more different when compared to the 70 km distant Qustul (11). There was only significantly bigger thoracic breadth and relative biacromial breadth at Qustul, together with a significantly different variability of the relative length of cubit.

Qustul (11), situated on the other bank of the Nile opposite to Balana (12), has all measurements slightly bigger (except for the upper extremity length). Significance was proved only in thoracic breadth together with significantly different variability. Significantly bigger

TABLE 27. Somatometric features of adult men in Fadidja village samples.

Measurement or index	8. Diwan & Derr				9. Qatta				10. Ibrim				11. Qustul				12. Balana				t-test values of sample differences			
	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	8:9	9:10	10:11	11:12
1. Weight (71)	29	60.8	1.68	8.9	14.6	17	59.9	2.30	9.2	15.4	24	62.0	2.34	11.2	18.1	25	65.4	2.33	11.4	17.4	43	61.3	1.50	9.7	15.8	0.320	0.620	1.033	1.554
2. Stature (1)	29	166.7	1.04	5.5	3.3	16	168.1	1.55	6.0	3.6	24	169.4	1.65	7.9	4.7	25	168.9	1.06	5.2	3.1	43	168.3	0.74	4.8	2.9	0.771	0.545	0.257	0.472
3. Sitting height (23)	29	86.4	0.57	3.0	3.5	16	86.4	0.98	3.8	4.4	24	87.4	0.65	3.1	3.5	25	87.0	0.61	3.0	3.4	43	85.1	0.45	2.9	3.4		0.881	0.446	2.558
4. Total upper extremity length (45)	29	75.9	0.55	2.9	3.8	17	77.1	0.85	3.4	4.4	24	76.5	0.88	4.2	5.5	25	77.6	0.61	3.0	3.9	43	78.7	0.45	2.9	4.7	1.237	0.475	1.033	1.466
5. Length of the cubit (48, 3)	29	46.2	0.38	2.0	4.3	17	46.9	0.55	2.2	4.7	24	47.0	0.56	2.7	5.7	25	47.4	0.41	2.0	4.2	43	48.3	0.29	1.9	3.9	1.087	0.122	0.580	1.828
6. Biacromial breadth (35)	29	38.7	0.34	1.8	4.7	17	37.9	0.48	1.9	5.0	24	38.1	0.33	1.6	4.2	25	39.0	0.31	1.5	3.8	43	38.7	0.29	1.9	4.9	1.410	0.352	1.969	0.667
7. Bicristal breadth (40)	29	26.6	0.47	2.5	9.4	17	27.0	0.28	1.1	4.1	24	26.9	0.21	1.1	4.1	25	26.9	0.29	1.4	5.2	43	26.6	0.28	1.8	6.8	0.727+	0.291		0.719
8. Breadth of the thorax (36)	29	26.1	0.42	2.2	8.4	17	26.8	0.34	1.3	4.9	24	26.1	0.25	1.2	4.6	25	27.0	0.29	1.4	5.2	43	25.9	0.34	2.2	8.5	1.131	1.698	2.341	2.441+
9. Depth of the thorax (37)	29	19.3	0.26	1.4	7.3	16	19.5	0.41	1.6	8.2	24	19.9	0.46	2.2	11.1	25	19.8	0.41	2.0	10.1	43	19.6	0.25	1.6	8.2	0.437	0.614	0.162	0.436
10. Rohrer's index	29	1.31	0.034	0.18	13.7	16	1.28	0.052	0.20	15.6	24	1.28	0.054	0.26	20.3	25	1.36	0.045	0.22	16.2	43	1.28	0.029	0.19	14.8	0.498		1.163	1.554
11. Cormic index	29	51.9	0.26	1.4	2.7	16	51.3	0.36	1.4	2.7	24	51.6	0.38	1.8	3.5	24	51.6	0.24	1.2	2.3	43	50.6	0.19	1.2	2.4	1.369	0.550		3.214
12. Relative total upper extremity length	29	45.6	0.19	1.0	2.2	16	45.8	0.34	1.3	2.8	24	45.2	0.31	1.5	3.3	25	45.9	0.22	1.1	2.4	43	46.8	0.15	1.0	2.1	0.557	1.262	1.829	3.352
13. Relative length of the cubit	29	27.8	0.13	0.7	2.5	16	27.8	0.23	0.9	3.2	24	27.8	0.23	1.1	4.0	25	28.1	0.14	0.7	2.5	43	28.7	0.11	0.7	2.4			1.083+	3.354
14. Relative biacromial breadth	29	23.3	0.21	1.1	4.7	16	22.6	0.26	1.0	4.4	24	22.5	0.19	0.9	4.0	25	23.1	0.16	0.8	3.5	43	23.0	0.14	0.9	3.9	2.029	0.324	2.434	0.451
15. Relative bicristal breadth	29	16.0	0.30	1.6	10.0	16	16.1	0.15	0.6	3.7	24	15.9	0.19	0.9	5.7	25	15.9	0.14	0.7	4.4	43	15.8	0.15	1.0	6.3	0.302+	0.796		0.445
16. Relative breadth of the thorax	29	15.7	0.25	1.3	8.3	16	16.0	0.15	0.6	3.8	24	15.5	0.19	0.9	5.8	25	16.0	0.16	0.8	5.0	43	15.4	0.20	1.3	8.4	0.995+	1.852	1.979	2.303±
17. Relative depth of the thorax	29	11.5	0.13	0.7	6.1	16	11.5	0.28	1.1	9.6	24	11.8	0.33	1.6	13.6	25	11.8	0.27	1.3	11.0	43	11.6	0.15	1.0	8.6		0.710		0.721
18. Length of the cubit in % of the total upper extremity length	29	60.9	0.17	0.9	1.5	17	60.9	0.28	1.1	1.8	24	61.4	0.21	1.0	1.6	25	61.2	0.20	1.0	1.6	43	61.3	0.19	1.2	2.0		1.515	0.679	0.353
19. Acromio-iliac index	29	68.9	1.13	6.0	8.7	17	71.0	0.60	2.4	3.4	24	70.8	0.75	3.6	5.1	25	69.0	0.73	3.6	5.2	43	68.9	0.59	3.8	5.5	1.643	0.196	1.719	0.104
20. Thoracic index	29	74.4	1.64	8.7	11.7	16	72.3	1.88	7.3	10.1	24	76.1	1.86	8.9	11.7	25	74.0	1.78	8.7	11.8	43	75.9	1.31	8.5	11.2	0.799	1.377	0.814	0.867

were also the cormic index and relative depth of the thorax with significantly different variability at Qustul, as well as relative upper extremity length and relative cubit length at Balana. This differentiation is curious because the river cannot be considered as an obstacle for contacts between people possessing boats (*felukas*).

From north to south, a growth gradient of the cubit and total upper extremity length were observed in the Fadidja villages (except for the latter in Qatta).

9. BODY COMPOSITION AND FUNCTIONAL FEATURES

In field conditions of the examination, body composition was assessed by an osseous component (lower radio-ulnar breadth), a muscular component (maximum circumference of the upper arm and of the calf) and a fat component (skinfold thickness in the tricipital, subscapular and cristal areas).

Physiological features included the pulse rate as well as the systolic and diastolic blood pressures.

Functional capability was tested according to the maximum grip force of the right and left hands assessed by a dynamometer. For control, the relative lower radio-ulnar breadth and the relative maximum circumferences of the upper arm and calf were expressed as a percentage of stature.

9.1. Samples of Nubian ethnic groups

9.1.1. Body composition

The lower radio-ulnar breadth was biggest in the Kenuz (I), medium in the Fadidja (III) and smallest in Nubian Arabs (II). These differences are statistically significant. The Ababda (IV) had the same medium value as the Fadidja with no significant differences as compared with the Nubians. Variability proved to be significantly different between II and III (*Table 28*).

The relative lower radio-ulnar breadth showed the same ranges as did the absolute values. There were significant differences between the Nubian Arabs (II) and both other Nubian groups (I, III), but identical values of the Kenuz (I) and Fadidja (III) with significantly different variability between I : II and I : III. Strikingly the small difference between the Arabs (II) and Ababda (IV) also proved to be significant.

Also the maximum circumference of the upper arm and calf was biggest in the Kenuz (I), medium in the Fadidja (III) and smallest in Nubian Arabs (II). The difference between I : II and variability between I : III were significant. The Ababda (IV) showed absolutely lowest values, significantly differing from I and III, and significantly different variability was proved between I : IV.

The relative maximum circumference of the upper arm brought even values of the Kenuz and Fadidja, smaller ones in Nubian Arabs, and the smallest in the Ababda. Variability proved to be significantly different between I : III. The relative maximum circumference of the calf showed the highest value in the Kenuz, an identical medium one in Nubian Arabs and the Fadidja, and the lowest in the Ababda. Differences and variabilities were, however, insignificant.

Skinfold thickness was, as usually, biggest in the subscapular area, medium in the cristal area and smallest in the tricipital area. The three skinfolds were thickest in Nubian Arabs (II), followed by the Fadidja's (III) subscapular and Ababda's (IV) tricipital and cristal ones, thinnest in the Kenuz. The subscapular skinfold was significantly bigger in Nubian Arabs (II) than in the Kenuz (I), while significantly different variability was found in subscapular skinfold between II : III and in the cristal one between III : IV.

In spite of lower values of somatometric features the nutritional state of Nubian Arabs was better than that of the other groups; the worst condition was not in the Ababda, but in the Kenuz.

9.1.2. Physiological data

The pulse rate of the Nubians, adapted to life in the hot dry Nubian climate, proved to be slightly quicker (73–76.5 beats per minute) than the European standard (72 beats/min.). It was relatively slowest in the Fadidja (III), followed by Nubian Arabs (II) and the Kenuz (I); the differences between I : II and I : III being significant (*Table 28*).

The Ababda, coming from a hot and absolutely dry desert, yielded a mean value as high as 79.8 beats/min., which was proved significantly different when compared to the Fadidja (73 beats/min.). They also showed significantly different variabilities as compared to all three Nubian ethnic groups.

The mean values of the systolic (118.2–124.6 mm Hg) and diastolic blood pressure (77.7–80.4 mm Hg) were lower than the current European standard (140–80 mm Hg). They grew from the smallest in the Fadidja (III), medium in Nubian Arabs (II) to the highest in the Kenuz (I), the systolic one being significantly different between I : II and I : III, the diastolic one between I : III. Variability was significantly different between Nubian Arabs and the two other Nubian groups.

The Ababda had a still higher blood pressure (126.5–80.9), significantly different as compared to Nubian Arabs and the Fadidja; variability was significantly different as compared to the Kenuz.

9.1.3. Dynamometric data

Grip force of the right hand measured by a dynamometer was bigger than that of the left hand, revealing the prevailing right-handedness of the Nubians (*Table 28*). The average range was 34.6–36.6 for the right and 31.2–32.3 for the left hand. Grip force of the right hand was the same in the Kenuz (I) and the Fadidja (III), bigger in the Arabs (II), the difference between II : III being statistically significant. Grip force of the left hand was the lowest in the Kenuz, medium in the Fadidja and the biggest in Nubian Arabs.

The Ababda's grip force was even lower than that of the Nubians (right 34.4, left 30.0), but insignificantly when

TABLE 28. Body composition and functional features of adult men in Nubian ethnic group and Ababda samples.

Measurement or index	I. Kenuz					II. Nubian Arabs					III. Fadidja					IV. Ababda					V. All Nubians					t-test values of sample differences					
	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	I:II	I:III	II:III	I:IV	II:IV	III:IV
1. Lower radio-ulnar breadth (52.4)	103	5.6	0.036	0.36	6.4	115	5.4	0.027	0.29	5.4	175	5.5	0.026	0.34	6.2	24	5.5	0.073	0.35	6.4	425	5.5	0.017	0.34	6.2	4.515	2.307	2.634+	1.233	1.445	
2. Maximum circumference of the upper arm (65)	103	27.1	0.36	3.6	13.3	115	26.1	0.28	3.0	11.5	175	26.7	0.22	2.9	10.9	24	25.0	0.50	2.4	9.6	425	26.5	0.15	3.1	11.7	2.235	0.967+	1.730	3.403±	1.676	2.814
3. Maximum circumference of the calf (69)	103	33.3	0.33	3.3	9.9	115	32.0	0.28	3.0	9.4	175	32.6	0.20	2.7	8.3	24	31.1	0.71	3:4	10.9	425	32.5	0.15	3.0	9.2	3.020	1.804+	1.773	2.879	1.301	2.469
4. Skinfold thickness in the tricipital area	102	0.60	0.044	0.44	73.3	115	0.69	0.043	0.46	66.7	175	0.66	0.033	0.43	65.2	24	0.77	0.104	0.50	64.9	424	0.66	0.22	0.45	68.2	1.464	1.105	0.565	1.644	0.763	1.147
5. Skinfold thickness in the subscapular area	102	0.94	0.071	0.71	75.5	115	1.12	0.057	0.61	54.5	175	1.09	0.056	0.74	67.9	24	1.01	0.142	0.68	67.3	424	1.06	0.034	0.70	66.0	2.003	1.645	0.375+	0.434	0.785	0.499
6. Skinfold thickness in the supracristal area	102	0.71	0.060	0.60	84.5	115	0.82	0.053	0.57	69.5	175	0.73	0.042	0.55	75.3	24	0.90	0.150	0.72	80.0	424	0.77	0.029	0.59	76.6	1.381	0.282	1.348	1.329	0.595	1.095+
7. Pulse rate	97	76.5	0.92	9.0	11.8	114	74.2	0.72	7.7	10.4	173	73.0	0.63	8.2	11.2	24	79.8	2.63	12.6	15.8	416	74.6	0.44	8.9	11.9	1.992	3.238	1.237	1.182+	2.048+	2.510±
8. Systolic blood pressure	98	124.6	1.60	15.8	12.7	114	118.5	1.00	10.6	8.9	174	118.2	1.07	14.1	11.9	23	126.5	2.22	10.4	8.2	417	120.4	0.68	13.9	11.5	3.224±	3.424	0.205+	0.695+	3.284	2.713
9. Diastolic blood pressure	98	80.4	1.01	9.9	12.3	114	79.0	0.83	8.8	11.1	174	77.7	0.72	9.5	12.2	23	80.9	2.22	10.4	12.9	417	78.9	0.47	9.5	12.0	1.083	2.209	1.164	0.214	0.905	1.495
10. Maximum grip force of the right hand	103	34.6	0.82	8.3	24.0	115	36.6	0.67	7.2	19.7	172	34.6	0.62	8.1	23.4	24	34.4	1.67	8.0	23.3	422	35.1	0.39	7.9	22.5	1.894		2.143	0.106	1.327	0.113
11. Maximum grip force of the left hand	103	31.2	0.71	7.2	23.1	114	32.3	0.71	7.5	23.2	173	31.6	0.61	8.0	25.3	24	30.0	1.58	7.6	25.3	422	31.6	0.38	7.7	24.4	1.091	0.415	0.739	0.720	1.347	0.918
12. Relative lower radio-ulnar breadth	103	3.3	0.022	0.22	6.7	115	3.2	0.015	0.16	5.0	174	3.3	0.014	0.18	5.5	24	3.3	0.035	0.17	5.2	424	3.3	0.009	0.19	5.8	3.711±		4.716		2.672	
13. Relative maximum circumference of the upper arm	103	15.9	0.20	2.0	12.6	115	15.7	0.17	1.8	11.5	174	15.9	0.13	1.7	10.7	24	15.0	0.31	1.5	10.0	424	15.8	0.009	1.8	11.4	0.766		0.959	2.046	1.751	2.500
14. Relative maximum circumference of the calf	103	19.6	0.18	1.8	9.2	115	19.3	0.17	1.8	9.3	174	19.3	0.12	1.6	8.3	24	18.6	0.40	1.9	10.2	424	19.3	0.08	1.7	8.8	1.244	1.447		2.450	1.731	1.960

TABLE 29. Body composition and functional features of adult males in Kenuz village samples.

Measurement or index	1. Dehmit					2. Umbarakab					3. Koshtamna					4. Dakka					t-test values of sample differences			
	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	n	x̄		s	V%	I:II	I:III	II:III	I:IV
1. Lower radio-ulnar breadth (52.4)	14	5.6	0.097	0.35	6.2	21	5.6	0.058	0.26	4.6	17	5.9	0.058	0.23	3.9	19	5.6	0.092	0.39	7.0		3.626		2.769±
2. Maximum circumference of the upper arm (65)	14	25.8	0.67	2.4	9.3	21	26.1	0.74	3.3	12.6	17	31.3	0.85	3.4	10.9	19	27.7	0.82	3.5	12.6	0.283	4.634	1.456	3.051
3. Maximum circumference of the calf (69)	14	31.8	0.75	2.7	8.5	21	31.9	0.69	3.1	9.7	17	37.1	0.82	3.3	8.9	19	33.0	0.54	2.3	7.0	0.095	4.879	1.218	4.246
4. Skinfold thickness in the tricipital area	14	0.32	0.042	0.15	46.9	21	0.47	0.078	0.35	74.5	16	0.96	0.132	0.51	53.1	19	0.61	0.123	0.52	85.2	1.694+	3.358	0.982	1.943
5. Skinfold thickness in the subscapular area	14	0.59	0.069	0.25	42.4	21	0.74	0.116	0.52	70.3	16	1.55	0.232	0.90	58.1	19	1.02	0.236	1.00	98.0	1.113+	3.112±	1.070+	1.588
6. Skinfold thickness in the supracristal area	14	0.38	0.047	0.17	44.7	21	0.58	0.105	0.47	81.0	16	1.01	0.155	0.60	59.4	19	0.96	0.207	0.88	91.7	1.732+	2.376	1.640+	0.188
7. Pulse rate	13	76.7	3.18	11.0	14.3	19	79.3	1.96	8.3	10.5	15	73.5	1.98	7.4	10.1	18	80.7	7.06	8.5	10.5	0.736	2.049	0.491	2.479
8. Systolic blood pressure	14	118.2	2.08	7.5	6.3	20	126.5	3.14	13.7	10.8	16	133.1	5.27	10.4	15.3	18	131.1	4.22	17.4	13.3	2.205±	1.125	0.887	0.300
9. Diastolic blood pressure	14	76.8	2.08	7.5	9.8	20	83.8	1.74	7.6	9.1	16	84.1	2.43	9.4	11.2	18	83.1	2.52	10.4	12.5	2.591	0.103	0.232	0.284
10. Maximum grip force of the right hand	14	32.4	1.78	6.4	19.8	21	33.1	1.74	7.8	23.6	17	38.4	1.25	9.0	23.4	19	34.3	1.60	6.8	198	0.272	1.891	0.503	1.499
11. Maximum grip force of the left hand	14	29.6	1.75	6.3	21.3	21	29.7	1.54	6.9	23.2	17	34.8	0.68	7.1	20.4	19	31.6	1.44	6.1	19.3	0.042	2.168	0.893	1.412
12. Relative lower radio-ulnar breadth	14	3.3	0.064	0.23	7.0	21	3.3	0.040	0.18	5.5	17	3.4	0.040	0.16	4.7	19	3.3	0.052	0.22	6.7		1.750		1.493
13. Relative maximum circumference of the upper arm	14	15.1	0.44	1.6	10.6	21	15.5	0.45	2.0	12.9	17	18.1	0.45	1.8	9.9	19	16.2	0.49	2.1	13.0	0.611	4.091	1.321	3.651
14. Relative maximum circumference of the calf	14	18.8	0.47	1.7	9.0	21	19.0	0.38	1.7	8.9	17	21.4	0.48	1.9	8.9	19	19.4	0.33	1.4	7.2	0.329	4.003	0.778	3.541

TABLE 30. Body composition and functional features of adult males in Nubian Arab village samples.

Measurement or index	5. Wadi el-Arab				6. Shaturma				7. Maliki				t-test values of sample differences				
													Adjoining eth. groups		Nubian Arabs		Adjoining eth. groups
	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	3:5	4:5	5:6	6:7	7:8
1. Lower radio-ulnar breadth (52.4)	39	5.3	0.050	0.31	5.8	21	5.5	0.051	0.23	4.2	37	5.4	0.055	0.33	6.1	7.083	3.134	2.566	1.220	1.113
2. Maximum circumference of the upper arm (65)	39	25.2	0.36	2.2	8.7	21	27.2	0.56	2.5	9.2	37	26.5	0.58	3.5	13.2	6.621±	2.805±	3.173	0.804	
3. Maximum circumference of the calf (69)	39	30.8	0.36	2.2	7.1	21	33.2	0.60	2.7	8.1	37	32.9	0.52	3.1	9.4	7.108±	3.462	3.661	0.361	
4. Skinfold thickness in the tricipital area	39	0.57	0.065	0.40	70.2	21	0.73	0.096	0.43	58.9	37	0.73	0.075	0.45	61.6	2.963	0.317	1.409		0.825
5. Skinfold thickness in the subscapular area	39	0.99	0.075	0.46	46.5	21	1.12	0.134	0.60	53.6	37	1.20	0.117	0.70	58.3	2.886±	0.122+	0.922	0.431	0.338
6. Skinfold thickness in the supracristal area	39	0.70	0.071	0.44	62.9	21	0.85	0.134	0.60	70.6	37	0.85	0.100	0.60	70.6	2.082	1.190+	1.080		0.621
7. Pulse rate	39	73.5	1.33	8.2	11.2	21	74.5	1.83	8.2	11.0	36	76.3	1.12	6.6	8.7		2.985	0.442	0.890	1.155
8. Systolic blood pressure	39	116.5	1.83	11.3	9.7	21	121.2	1.72	7.7	6.4	36	119.9	1.71	10.1	8.4	2.979±	3.177±	1.672	0.501	0.629
9. Diastolic blood pressure	39	80.0	1.38	8.5	10.6	21	79.8	2.17	9.7	12.2	36	77.6	1.47	8.7	11.2	1.549	1.170	0.081	0.867	1.082
10. Maximum grip force of the right hand	39	37.1	1.35	8.3	22.4	21	37.5	1.25	5.6	14.9	37	36.9	1.13	6.8	18.4	0.514	1.249	0.194	0.335	1.040
11. Maximum grip force of the left hand	39	33.7	1.23	7.6	22.6	20	31.7	1.10	4.8	15.1	37	32.4	1.35	8.1	25.0	0.498	1.031	1.203+	0.401+	0.742
12. Relative lower radio-ulnar breadth	39	3.2	0.024	0.15	4.7	21	3.3	0.040	0.18	5.5	37	3.3	0.028	0.17	5.2	4.477	1.755+	2.264		
13. Relative maximum circumference of the upper arm	39	15.2	0.23	1.4	9.2	21	16.2	0.31	1.4	8.6	37	16.2	0.35	2.1	13.0	6.445	2.619	2.566		0.623
14. Relative maximum circumference of the calf	39	18.6	0.23	1.4	7.5	21	19.8	0.31	1.4	7.1	37	19.8	0.32	1.9	9.6	6.197	2.049	3.207		0.229

TABLE 31. Body composition and functional features of adult men in Fadidja village samples.

Measurement or index	8. Diwan & Derr				9. Qatta				10. Ibrim				11. Qustul				12. Balana				t-test values of sample differences			
	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	8:9	9:10	10:11	11:12
1. Lower radio-ulnar breadth (52.4)	29	5.5	0.074	0.39	7.1	17	5.5	0.072	0.29	5.3	24	5.6	0.077	0.37	6.6	25	5.6	0.078	0.38	6.8	43	5.5	0.045	0.29	5.3		0.911		1.219
2. Maximum circumference of the upper arm (65)	29	26.5	0.49	2.6	9.8	17	26.8	0.62	2.5	9.3	24	27.7	0.63	3.0	10.8	25	28.0	0.63	3.1	11.1	43	25.8	0.39	2.5	9.7	0.378	0.998	0.341	3.179
3. Maximum circumference of the calf (69)	29	32.9	0.43	2.3	7.0	17	31.6	0.62	2.5	7.9	24	33.0	0.58	2.8	8.5	25	32.8	0.63	3.1	9.5	43	32.0	0.42	2.7	8.4	1.768	1.615	0.231	1.095
4. Skinfold thickness in the tricipital area	29	0.64	0.077	0.41	64.1	17	0.61	0.108	0.43	70.5	24	0.69	0.117	0.56	81.2	25	0.77	0.088	0.43	55.8	43	0.63	0.059	0.38	60.3	0.232	0.485	0.552	1.379
5. Skinfold thickness in the subscapular area	29	1.14	0.134	0.7	62.3	17	1.00	0.115	0.46	46.0	24	1.35	0.231	1.11	82.2	25	1.15	0.174	0.85	73.9	43	1.04	0.103	0.67	64.4	0.715	1.347+	0.691	0.581
6. Skinfold thickness in the supracristal area	29	0.76	0.104	0.55	72.4	17	0.72	0.105	0.42	58.3	24	0.73	0.129	0.62	84.9	25	0.83	0.151	0.74	89.2	43	0.76	0.082	0.53	69.7	0.254	0.057	0.503	0.446
7. Pulse rate	29	74.4	1.21	6.4	8.6	17	70.9	2.08	8.3	11.7	24	76.7	1.36	6.5	8.5	24	71.2	1.92	9.2	12.9	42	73.0	1.33	8.5	11.6	1.569	2.437	2.333	0.711
8. Systolic blood pressure	29	121.7	2.38	12.6	10.4	17	116.2	3.18	12.7	10.9	24	119.4	3.46	16.6	13.9	25	124.4	2.69	13.2	10.6	42	115.6	2.11	13.5	11.7	1.394	0.652	1.145	2.561
9. Diastolic blood pressure	29	80.0	1.66	8.8	11.0	17	75.3	1.75	7.0	9.3	24	78.3	1.98	9.5	12.1	25	83.4	1.67	8.2	9.8	42	76.0	1.50	9.6	12.6	1.841	1.078	1.967	3.171
10. Maximum grip force of the right hand	29	35.0	1.46	7.7	22.0	17	35.9	1.55	6.2	17.3	21	34.8	0.86	8.3	23.9	25	37.8	1.49	7.3	19.3	43	30.6	1.19	7.7	25.2	0.400	0.443	1.280	3.736
11. Maximum grip force of the left hand	29	30.9	1.51	8.0	25.9	17	31.8	1.20	4.8	15.1	22	33.5	2.01	9.2	27.5	25	33.4	1.67	8.2	24.6	43	27.8	1.10	7.1	25.5	0.464+	0.726	0.039	2.913
12. Relative lower radio-ulnar breadth	29	3.3	0.038	0.20	6.1	16	3.3	0.044	0.17	5.2	24	3.3	0.42	0.20	6.1	25	3.3	0.035	0.17	5.2	43	3.3	0.025	0.16	4.8				
13. Relative maximum circumference of the upper arm	29	15.9	0.30	1.6	10.1	16	16.0	0.39	1.5	9.4	24	16.3	0.40	1.9	11.7	25	16.7	0.37	1.8	10.8	43	15.4	0.22	1.4	9.1	0.198	0.526	0.750	3.234
14. Relative maximum circumference of the calf	29	19.7	0.28	1.5	7.6	16	18.8	0.41	1.6	8.5	24	19.5	0.38	1.8	9.2	25	19.4	0.35	1.7	8.8	43	19.0	0.23	1.5	7.9	1.858	1.251	0.198	0.981

compared to them. There were no significant differences in variability.

9.2. Samples of Kenuz villages

In the neighbouring villages Dehmit (1) and Umbarakab (2), body composition features and pressure force showed very similar values, while pulse rate was insignificantly higher and blood pressure significantly higher in Umbarakab. Features 4, 5, 6 and 8 (*Table 29*) had significantly different variabilities.

Comparing the distant villages Umbarakab (2) and Koshtamna (3), body composition features were significantly bigger at Koshtamna. The pulse rate was, however, significantly higher at Umbarakab, systolic blood pressure insignificantly higher at Koshtamna and the diastolic nearly the same. Grip force was also bigger at Koshtamna, nearly significantly for the right hand and significantly for the left. Only the subscapular skinfold showed significantly different variability. These points to the specific character of the Koshtamna sample, revealed already in cephalometrics (see Section 7.2.) and somatometrics (see Section 8.2.).

In distinction to it, the even more distant Dakka (4) compared with Umbarakab (2) had no significantly different features, and only subscapular and cristal skinfolds revealed significantly different variabilities.

The specific character of Koshtamna (3) can be once more proved by its comparison with the nearby Dakka (4). Of the body composition features, radio-ulnar breadth and maximum circumferences of the upper arm and calf are significantly bigger, the three skinfolds insignificantly bigger at Koshtamna. Only the pulse rate is opposite, being significantly higher at Dakka. Blood pressure and grip force of the right and left hands are insignificantly higher at Koshtamna. Only the radio-ulnar breadth shows significantly different variabilities.

9.3. Samples of Nubian Arab villages

Differences between the three Arab villages Wadi el-Arab (5) Shaturma (6) and Maliki (7) were, similarly to somatometric features, less important. Shaturma compared with Wadi el-Arab showed higher values in all features except for the diastolic blood pressure and the left grip force. The lower radio-ulnar breadth and its relative version as well as the maximum circumferences of upper arm and calf were significantly different (*Table 30*).

Only insignificant differences were found between Shaturma (bigger nos.1–3, 8–10) and Maliki (bigger nos. 5, 7, 11), features 4 and 6 showing identical mean values. In both comparisons significantly different variabilities were shown only in the grip force of left hand.

The ethnic border between the Arab and Kenuz villages can be ascertained by comparisons of Wadi el-Arab (5) with Koshtamna (3) and Dakka (4). In Koshtamna people as compared to those of Wadi el-Arab, all values of functional features were significantly higher except for the cristal skinfold, being only on the border of significance, diastolic blood pressure and grip force were insignificant, while the pulse rate was identical. Significantly different variabilities were in features nos. 2, 3, 5 and 8. In this comparison, the specific position of the Koshtamna people plays once again a major role.

Also the comparison of Wadi el-Arab (5) and Dakka (4) yielded all features bigger at Dakka, five of them (nos. 1–3, 7–8) significantly, the remaining insignificantly. Significantly different variabilities were shown by features nos. 1, 5, 6 and 8.

Also in these features Wadi el-Arab represents a sample of one of the poorest regions of Nubia.

Comparing the Arab sample from Maliki with the Fadidja sample from Diwan and Derr, no significant differences in features and variability were found. Maximum circumferences of the upper arm and calf were identical in both samples; lower radio-ulnar breadth, systolic and diastolic blood pressure were higher at Diwan and Derr, and skinfold thickness, pulse rate and pressure force were bigger at Maliki. Also in this comparison the transition between the Arab and Fadidja areas does not remind of an ethnic border.

9.4. Samples of Fadidja villages

Lack of significant differences between samples from Fadidja villages continues fluently to the south (*Table 31*). Men from Diwan and Derr (8) resemble to men from nearby Qatta (9) with the only significant difference in variability of the grip force of the left hand. Radio-ulnar breadth was identical, circumference of the calf, skinfolds, pulse rate, systolic and diastolic blood pressure were higher at Diwan and Derr, circumference of the upper arm and pressure force of both hands were bigger at Qatta.

Men from Ibrim (10) had only significantly higher pulse rate than those from Qatta (9). All their other features were insignificantly higher except for the lower grip force of the right hand than in Qatta. Subscapular skinfold showed a significant difference in variability.

In Qustul (11) the pulse rate was significantly lower than in Ibrim (10). The radio-ulnar breadth was identical, most of other features were bigger in Qustul, except for the calf circumference, subscapular skinfold and left hand grip force. No significant difference in variability was proved.

As in somatometrics, most significant differences were found between Qustul (11) and Balana (12), situated vis-à-vis across the Nile. All features were bigger at Qustul (except for the pulse rate being higher at Balana), significantly for the upper arm circumference, systolic and diastolic blood pressure and grip force of both hands. No difference in variability was present.

10. EVIDENCE OF HETEROSIS IN THE FADIDJA

Of the three ethnic groups of adult males (analyzed in Chapters 7–9), the Fadidja are represented by the greatest number of investigated individuals and villages. They were, therefore, chosen to demonstrate the existence of heterosis

(luxuriation, hybrid vigour). This phenomenon known from plant and animal realms was proved also in humankind by a number of mainly Japanese and American authors (for literature and details see Strouhal 1971b). These studies have shown an effect of inbreeding towards diminution of stature and some other anthropometric features (imbreeding depression). On the contrary by outbreeding, following previous inbreeding, body dimensions increase.

10.1. Heterosis and inbreeding depression

For examination of the consanguinity effect, the Fadidja material was divided in three fractions: 1) offsprings of parents which were closest kin (first cousins); 2) offsprings of unions between distant kin (second cousins and other kinds of relationship, e.g. uncle and niece, aunt and nephew); 3) offsprings of unrelated parents. Most instructive results were obtained by comparison of the two clear-cut groups, the closely endogamous (1) and exogamous (3) ones, leaving apart the second fraction.

The rate of endogamy and exogamy in the five examined Fadidja villages was different, from maximum endogamy (93.7%) and minimum exogamy (6.3%) in Qatta, through 76.2% : 9.5% in Balana, 43.5% : 21.7% in Diwan and Derr, 36.4% : 27.2% in Ibrim to minimum endogamy (32.0%) and maximum exogamy (32.0%) in Qustul. The remaining rates were of more distant relations (*Figure 4*). The range of the villages was found without regard to their geographical position (*Figure 5*).

Summing together the results from the five villages and dispersed individuals from other Fadidja villages and leaving apart men of Black Sudanese origin, the results presented in *Table 32* were obtained.

In all compared features, the mean values of the exogamous fraction are higher than the means of the endogamous one. In the cephalometric features the differences are small, amounting to 0.1–1.0% of the mean values of the exogamous fraction. In somatometric features they are bigger, in the range of 0.4–7.0%, still more in body composition features with 2.8–9.1%. They are most impressive in functional features, reaching 1.3–16.9%.

Assessed by t-test, differences of all nine cephalometric features are insignificant. Four of the nine somatometric features are significantly different – weight, stature, sitting height and breadth of the thorax (44.4%). Among the six body composition features, three were proved to be significantly different – the lower radio-ulnar breadth as well as the maximum circumferences of the upper arm and calf, expressing development of muscular tissue (50%). Similarly, of the five functional features the maximum grip force of both the right and left hands was significantly stronger in the exogamous Fadidja than in the endogamous (40%). All features taken together showed 9 of 29 significant differences (31%). This result suggests a real influence of exogamy, a heterotic effect.

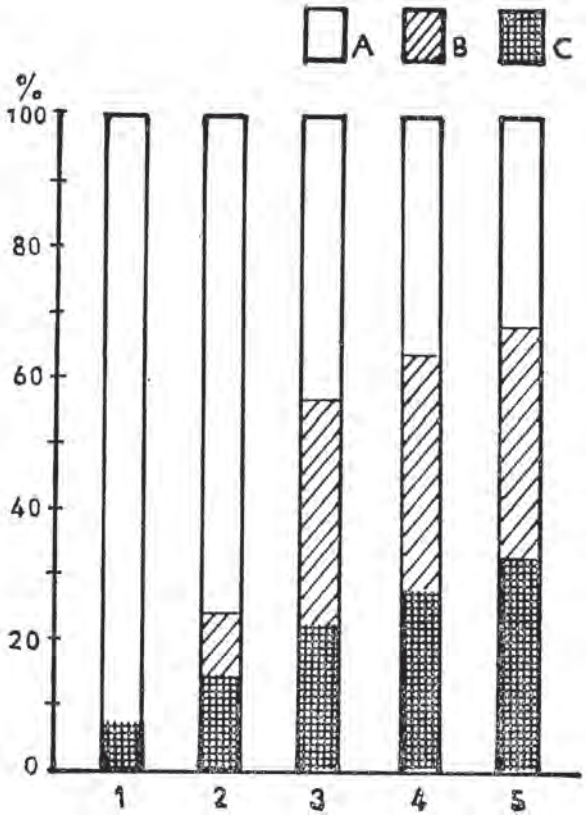


FIGURE 4. Endogamy and exogamy in five Fadidja villages, arranged from the most endogamous to the most exogamous one: A = offspring of first cousin marriages, B = offspring of other types of consanguineous marrages, C = offspring of unrelated marriages, 1 = Qatta, 2 = Balana, 3 = Diwan and Derr, 4 = Ibrim, 5 = Qustul.

FIGURE 5. Map of Old Egyptian Nubia showing the areas of the ethnic groups and the investigated Fadidja villages.

TABLE 32. Differences of endogamous and exogamous Fadidja in anthropometric features. Legend: n = number of cases, x = mean values, s = standard deviation, D = difference between means, D % of x_2 = difference in percentage of x_2, max. = maximum, min. = minimum, morph. = morphological, u. extr. = upper extremity, cf = circumference, skinf. th = skinfold thickness, systol. = systolic, diast. = diastolic, R = right, L =left, * = statistically significant difference (p = 0.05), ** = ibid. (p = 0.01), all measurements in mm except for weight (kg).

Feature	Endogamous		Exogamous		D	D % of x_2	t-value of D
	x_1	s_1	x_2	s_2			
1. Max. head length	190.3	6.4	191.6	6.5	1.3	0.7	0.961
2. Max. head breadth	45.4	4.9	146.3	3.9	0.9	0.6	0.92
3. Auricular height	127.3	5.6	127.4	3.7	0.1	0.1	0.112
4. Min. frontal breadth	103.9	4.7	104.8	4.7	0.9	0.8	1.001
5. Morph. height of face	119.2	8.2	119.4	5.3	0.2	0.2	0.131
6. Bizygomatic breadth	133.8	6.0	135.0	4.2	1.2	0.9	1.294
7. Bigonial breadth	100.7	5.8	101.7	6.0	1.0	1.0	0.871
8. Height of nose	54.8	4.4	55.2	4.2	0.4	0.7	0.524
9. Breadth of nose	39.3	3.2	39.7	3.3	0.4	1.0	0.689
10. Weight	62.0.	10.2	66.7	10.5	4.7	7.0	2.244*
11. Stature	167.5	5.2	171.0	6.8	3.5	2.0	2.498*
12. Sitting height	85.9	3.3	87.4	3.1	1.5	1.7	2.353*
13. Total up. extr. length	77.6	3.2	77.9	3.6	0.3	0.4	0.474
14. Length of cubit	47.4	2.1	47.9	2.2	0.5	1.0	1.097
15. Biacromial breadth	38.5	2.0	38.7	1.3	0.2	0.5	0.384
16. Bicristal breadth	26.9	1.8	27.4	1.3	0.5	1.8	1.601
17. Breadth of thorax	26.3	1.9	27.3	1.4	1.0	3.7	3.087**
18. Depth of thorax	19.8	1.8	20.0	1.6	0.2	1.0	0.514
19. Lower radio-ulnar breadth	5.50	0.34	5.66	0.36	0.16	2.8	2.276*
20. Max. cf. of upper arm	26.5	2.7	28.0	2.9	1.5	5.4	2.644**
21. Max. cf. of calf	32.2	2.9	33.6	2.6	1.4	4.2	2.586*
22. Skinf. th. tricipital	0.71	0.44	0.74	0.50	0.03	4.1	0.317
23. Skinf. th. subscapular	1.16	0.73	1.27	0.77	0.11	8.7	0.766
24. Skinf. th. cristal	0.80.	0.56	0.88	0.63	0.08	9.1	0.641
25. Pulse rate	73.0	8.0	73.6	8.9	0.6	8.2	0.310
26. Systol. blood press	117.3	12.8	120.3	16.6	3.0	2.5	0.974
27. Diast. blood press	77.7	8.6	78.7.	10.4	1.0	1.3	0.528
28. Max. grip force R	33.7	7.9	38.4	7.6	4.7.	12.2	3.25*
29. Max. grip force L	29.9	7.7	36.0	8.2	6.1.	16.9	3.852*

In most of the features small differences between variances occurred, not significant by F-tests. Seven features out of 29 (24.2%) showed, however, bigger differences, significant at 5% probability. Higher variances were found in the endogamous fraction for the auricular height, height and breadth of the face, bicristal breadth and breadth of the thorax, while in the exogamous fraction there were higher variances in stature and systolic blood pressure.

The means of the endogamous fraction (*Table 32*) are very close to the means of the whole Fadidja group (see *Tables 20, 24* and *28*). This suggests that offsprings of first cousin marriages (48.9%) together with offsprings of distantly related parents (26.5%) prevail over offsprings of not related parents (24.6%) and shift the means of the whole Fadidja sample towards an inbreeding depression, which seems to characterize the whole present Nubian population.

It may be expected that the transfer of Egyptian Nubians to New Nubia and break-up of the older way of life will also result in a change of traditional marriage habits. Exogamous marriages will be more frequent. This will lead in upcoming generations to an increase in weight, stature and other body dimensions as well as to a change of some functional features of the Nubians, supported by the improvement of socio-economic and health conditions. The delayed growth and development recorded by our expedition (Chapters 11 and 12) will be gradually improved, too.

10.2. Inbreeding differences versus regional differences

The intensity of inbreeding in the Fadidja can by assessed by comparing the differences between the exogamous and endogamous fractions with differences between the largest and smallest means of the five village samples mentioned

TABLE 33. Comparison of regional and breeding differences of the Fadidja. Legend: D_1 = regional differences between minimum and maximum means of the village samples, D_2 = breeding differences between means of offsprings of exogamous and endogamous parents, s = standard deviation of the whole Fadidja sample. Data in italics = greater breeding difference than the regional one.

Feature	D_1 in % of s_1	D_2 in % of s_1
1. Maximum head length	90.6	20.2
2. Maximum head breadth	52.1	18.7
3. Auricular height	116.7	1.8.
4. Minimum frontal breadth	39.1	19.6
5. Morphol. height of the face	127.1	3.4
6. Bizygomatic breadth	27.3	21.8
7. Bigonial breadth	29.8	17.5.
8. Height of the nose	85.4	9.8
9. Breadth of the nose	57.1	11.4.
10. Weight	54.5	46.5
11. Stature	46.6	*60.3*
12. Sitting height	71.9	46.9
13. Total upper extremity length	82.3	8.8
14. Length of cubit	95.5	22.7
15. Biacromial breadth	57.9	10.5
16. Bicristal breadth	23.5	*29.4*
17. Breadth of the thorax	61.1	55.6
18. Depth of the thorax	33.3	11.1.
19. Lower radio-ulnar breadth	29.4	*47.1*
20. Max. upper arm circumf.	75.8	51.7.
21. Max. calf circumf.	51.9	*51.9*
22. Skinfold thickness tricipital	37.2	7.0
23. Skinfold thickness subscapular	47.2	14.9
24. Skinfold thickness cristal	20.0	14.5
25. Pulse rate	70.7	7.3
26. Systolic blood pressure	62.4	21.3
27. Diastolic blood pressure	85.2	10.5
28. Maximum grip force right	88.9	58.0
29. Maximum grip force left	71.2	*76.2*

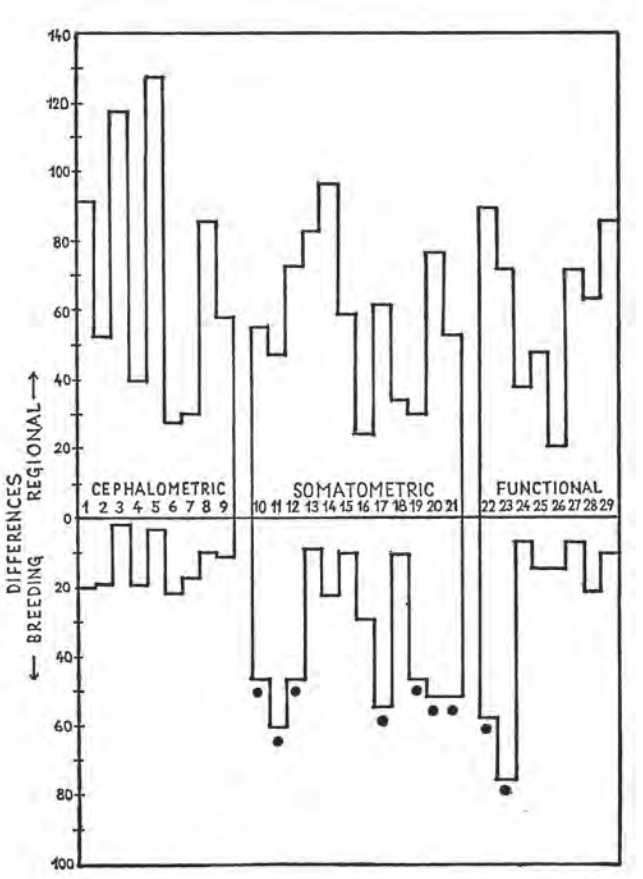


FIGURE 6. Comparison of ranges of regional (upper half) and breeding (lower half) differences, both expressed in percentage of standard deviation of the whole Fadidja sample. 1 – 29 = measurements listed in the same order as in *Tables 32* and *33*. Legend: • = significant.

above. Both differences were expressed as percentage of the standard deviations of the whole Fadidja group as common denominators (*Table 33, Figure 6*).

In all cephalometric features the regional differences are far greater than the breeding differences. Other influences, e.g. hybridization, environment, function, may be responsible for the greater part of the regional variability. In two of the nine somatometric features (stature, bicristal breadth) and two of the six body composition features (radio-ulnar breadth, calf circumference), however, the breeding differences reach or even exceed the regional ones (altogether in 26.7%). In these features their role appears to be most important.

This comparison further indicates that in the dimensions of the upper extremity girdle (arm length, cubit length, biacromial breadth) and thoracic depth other influences than breeding, as more or less strenuous function and feeble or intensive breathing, play a major role. The skinfold thickness reflects the state of nutrition, which is an environmental feature depending on food accessibility and habits.

Of the five functional features one (maximum grip force left) shows greater value of the breeding than regional difference, while the others (maximum grip force right as well as pulse, systolic and diastolic pressure) show greater regional than breeding differences, being influenced by environment and function. Disagreement of the grip force left and right can be explained by the probable right-handedness of the majority of the Fadidja, conditioning functionally influenced variability right, while the force left could be determined more genetically than functionally.

To sum up, five features out of 29 (17.2%) proved greater importance of breeding than regional differences.

11. DELAYED GROWTH OF YOUNG MEN

Adolescents aged 15–20 years were processed separately from the adults (21–55 years), divided into the three Nubian ethnic groups: 35 Kenuz (I), 14 Arabs (II) and 54 Fadidja

TABLE 34. Cephalometric features of young men of Nubian ethnic groups.

Measurement or index	I. Young Kenuz				II. Young Nubian Arabs				III. Young Fadidja				IV. All young Nubians				between young men samples			between young and adult men (a) samples			
	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	I:II	I:III	II:III	I:Ia	II:IIa	III:IIIa	IV:Va
1. Maximum head lenght (1)	35	188.1 1.01	5.9	3.1	14	188.8 1.63	6.6	3.5	54	189.5 0.96	7.0	3.7	110	189.2 0.64	6.7	3.5	0.353	0.970	0.334	1.984^{+}	0.057	0.983	1.125
2. Maximum head breadth (3)	35	145.9 0.77	4.5	3.1	14	144.8 1.64	5.9	4.1	54	144.8 0.67	4.9	3.3	110	144.9 0.47	5.0	3.4	0.690	1.059		1.985^{+}	0.588	0.535	1.103^{+}
3. Auricular height (15)	35	125.3 0.69	4.0	3.2	14	124.8 1.22	4.4	3.5	54	125.3 0.84	6.1	4.9	109	125.0 0.51	5.3	4.6	0.376		0.282	0.578^{+}	0.685	1.480	1.073
4. Minimum frontal breadth (4)	35	105.5 0.74	4.3	4.1	14	107.0 1.50	5.4	5.0	54	105.0 0.62	4.5	4.3	110	105.2 0.62	4.5	4.3	0.996	0.518	1.406	0.560^{+}	3.095	1.563^{+}	2.611$^{\pm}$
5. Morphological height of the face (18)	34	118.3 0.91	5.2	4.4	14	117.1 1.50	5.4	4.6	54	118.6 0.99	7.2	6.1	109	118.1 0.62	6.4	5.4	0.704	0.224^{+}	0.719	3.235$^{\pm}$	0.615	0.713	2.265$^{\pm}$
6. Bizygomatic breadth (6)	35	131.1 0.57	3.3	2.5	14	132.9 1.11	4.0	3.0	54	132.1 0.67	4.9	3.7	110	131.5 0.43	4.5	3.4	1.591	1.144^{+}	0.560	4.959^{+}	0.544	2.511$^{\pm}$	5.330$^{\pm}$
7. Bigonial breadth (8)	35	98.8 0.79	4.6	4.7	14	98.8 1.53	5.5	5.6	54	99.9 0.74	5.4	5.4	110	99.2 0.50	5.2	5.2		0.980	0.665	3.249$^{\pm}$	1.548	1.509^{+}	4.022$^{\pm}$
8. Height of the nose (21)	35	52.7 0.67	3.9	7.4	14	52.3 1.00	3.6	6.9	54	52.5 0.49	3.6	6.9	110	52.6 0.34	3.6	6.8	0.326	0.245	0.181	3.128$^{\pm}$	1.754	3.730$^{\pm}$	4.792$^{\pm}$
9. Breadth of th nose (13)	35	38.1 0.55	3.2	8.4	14	37.7 0.53	1.9	5.0	54	38.1 0.32	2.3	6.9	110	37.9 0.25	2.6	6.9	0.428		0.587	3.493$^{\pm}$	0.979	3.154$^{\pm}$	4.242$^{\pm}$
10. Cephalic index	35	77.7 0.60	3.5	4.5	14	78.2 1.53	5.5	7.0	54	76.5 0.38	2.8	3.7	110	76.9 0.35	3.7	4.8	0.371	1.771	1.084^{+}	0.143^{+}	1.229^{+}	0.447^{+}	0.816
11. Length-heigth index	35	66.6 0.39	2.3	3.5	14	66.2 0.64	2.3	3.5	54	66.1 0.36	2.6	3.9	109	66.1 0.25	2.6	3.9	0.549	0.912	0.128	1.021	0.711	0.935^{+}	
12. Breadth-heigth index	35	85.9 0.51	3.0	3.5	14	86.3 0.94	3.4	3.9	54	86.6 0.58	4.2	4.8	109	86.3 0.36	3.7	4.3	0.400	0.915^{+}	0.245	1.089^{+}	0.202	1.035	
13. Transverse frontoparietal index	35	72.3 0.55	3.2	4.4	14	74.0 0.89	3.2	4.3	54	72.5 0.36	2.6	3.6	110	72.6 0.28	2.9	4.0	1.647	0.323	1.821	1.911	3.195	2.139$^{\pm}$	3.798$^{\pm}$
14. Morphological facial index	34	90.3 0.68	3.9	4.3	14	88.1 0.89	3.2	3.6	54	89.8 0.74	5.4	6.0	109	89.8 0.47	4.9	5.5	1.830	0.496^{+}	1.104		0.356	0.696^{+}	0.918^{+}
15. Jugofrontal index	35	80.4 0.53	3.1	3.9	14	80.4 0.61	2.2	2.7	54	79.6 0.38	2.8	3.5	110	79.9 0.28	2.9	3.6		1.261	0.985	4.126$^{\pm}$	4.009	4.379$^{\pm}$	7.580$^{\pm}$
16. Jugomandibular index	35	75.4 0.65	3.8	5.0	14	74.4 0.80	2.9	3.9	54	75.6 0.45	3.3	4.4	110	75.4 0.33	3.4	4.5	0.873	0.259	1.207	0.265^{+}	1.405	0.186^{+}	0.800^{+}
17. Transverse cephalofacial index	35	89.9 0.53	3.1	3.4	14	91.9 0.83	3.0	3.3	54	91.2 0.41	3.0	3.3	110	90.8 0.30	3.1	3.4	2.040	1.945	0.762	2.427$^{\pm}$	1.071	2.487$^{\pm}$	4.177$^{\pm}$
18. Nasal index	35	72.5 1.20	7.0	9.7	14	72.6 2.14	7.7	10.6	54	72.9 0.80	5.8	8.0	110	72.4 0.62	6.5	9.0	0.043	0.290	0.159	0.735^{+}	0.704	0.596^{+}	0.272^{+}
19. Jugonasal index	35	29.0 0.39	2.3	7.9	14	28.4 0.42	1.5	5.3	54	28.9 0.21	1.5	5.2	110	28.2 0.17	1.8	6.2	0.886	0.225^{+}	1.078	1.913^{+}	0.431	1.738^{+}	1.855^{+}
20. Facionasal index	34	44.6 0.54	3.1	7.0	14	44.6 0.69	2.5	5.6	54	44.3 0.34	2.5	5.6	109	44.6 0.07	2.8	6.3		0.491	0.390	1.086^{+}	1.230	3.577$^{\pm}$	3.210$^{\pm}$

(III). Four Nubian hybrids and 3 young Ababda were added to them, which gave the sum of 110 youngsters of Nubia (IV).

11.1. Cephalometric features

In mutual comparison of the young males of the three ethnic groups, no significant differences were found at all. There were only significant differences in variability, mostly between the Kenuz and Nubian Arabs (nos. 3, 5, 6, 9, 12, 14 and 19) and only a single one (no. 10) between the Arabs and the Fadidja (*Table 34*). This finding reflects the greater distance of the Nubian Arabs from the Kenuz and their relative proximity to the Fadidja.

The comparison of the young males of the three Nubian ethnic groups with the adult males of the same Nubian ethnic groups showed that some of their measurements were significantly smaller. This was proved in six instances with the Kenuz, in only three instances with the Arabs (perhaps due to their small number), in seven instances with the Fadidja – altogether in ten instances with the sum of young Nubians.

At the same time, not the three head measurements, but the facial measurements showed repeatedly significantly lower values. Length and breadth of the head (nos.1–2) revealed values near to significance only in the Kenuz. Significantly different were the minimum frontal breadth, facial height, bizygomatic breadth, bigonial breadth (all in two comparisons), as well as the height and breadth of the nose (in three comparisons).

Variability between the young and adults proved to be significantly different in all measurements in the Kenuz, in none in Nubian Arabs (probably due to their low number), in the Fadidja in all measurements except for those on the head and facial height and, in the sum of young males from Nubia, in all measurements except the length and height of the head.

Concerning indices, the three cephalic ones, i.e. the facial index, jugomandibular index, nasal index (18) and jugonasal index did not change significantly. Significant differences appeared, however, in the frontoparietal index (in three comparisons), jugofrontal index (in all comparisons), cephalofacial and facionasal indices (both in three comparisons).

The variability between the young and adults proved to be significantly different in the Kenuz in all indices except for the length-height index of the head and frontoparietal index, in Nubian Arabs only in the cephalic index, in the Fadidja in all indices except for the breadth-height one and in the sum of the young from Nubia in all indices except for the cephalic one.

11.2. Somatometric features

Comparison of young males of the three Nubian ethnic groups proved their similarity in all measurements in a majority of indices, except for significantly bigger cormic index in the Kenuz as compared to the Fadidja, larger relative bicristal breadth in the Fadidja as compared to the Kenuz, larger relative thoracic breadth in the Fadidja as compared to Nubian Arabs and also to the Kenuz, as well as longer length of cubit in % of upper extremity length in the Kenuz as compared to the Arabs (*Table 35*).

Significantly different are also some variabilities – between I : II in the thoracic index, between I : III in the cormic and thoracic indices, and between II : III in the relative breadth of the thorax.

The four significant indices and four significantly different variabilities cannot, however, warrant any ethnic group influence on the growth of the Nubians.

Many more measurements and indices revealed significant differences between the young and adult males than in cephalometrics, proving the continuing growth. In the Kenuz they were proved in 5 measurements and 8 indices, in the Arabs in 2 measurements and 6 indices, in the Fadidja in 6 measurements and 7 indices and in the sum of young Nubian males in 7 measurements and 8 indices. All measurements and indices showed one to four significant results except the cormic index, which was in the sum exactly the same in young and adult Nubians.

Also significantly different variability was assessed: in the Kenuz in all except for features nos. 2, 18 and 20, in Arabs only in features nos. 5, 15 and 16, in the Fadidja in all features except for features nos. 6, 11 and 18.

11.3. Body composition and functional features

Also these features are similar in young men of the three Nubian ethnic groups, except for the radio-ulnar breadth and its relative version being significantly higher in the Fadidja as compared to Nubian Arabs and the pulse rate significantly lower in the former than the latter. The relative radio-ulnar breadth of the Fadidja was also significantly higher as compared to the Kenuz (*Table 36*).

There are also four significantly different variabilities – between I : III in cristal skinfold and between II : III in the calf circumference, tricipital skinfold and radio-ulnar breadth.

Significant differences in body composition features between the young of all groups and the adults of the same groups were attested: the still continuing growth of the radio-ulnar breadth (in all comparisons), upper arm circumference (except for the Arabs) and circumference of the calf (only in the Fadidja and in the sum from Nubia). Of the three skinfolds, significant increase was found only in the subscapular one in the Fadidja and in the sum.

The pulse rate was significantly lower than in adults (69.5–71.6) except for Nubian Arabs showing higher value in the young (76.7) than in adults (74.2), probably a coincidence result due to their small number. Both the systolic and diastolic blood pressure values were significantly lower in the young (except for the systolic one in the Arabs).

Grip force of both hands was lower in the youngsters of all groups, significance being proved, however, only in the sum. Also the three remaining relative measurements showed lower values than the ones in the adults except for insignificantly lower values of the relative arm and calf

TABLE 35. Somatometric features of young men of Nubian ethnic groups.

Measurement or index	I. Young Kenuz				II. Young Nubian Arabs				III. Young Fadidja				IV. All young Nubians				between young men samples			between young and adult men (a) samples			
	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	I:II	I:III	II:III	I:Ia	II:IIa	III:IIIa	IV:Va
1. Weight (71)	35	58.1	1.68	9.8	16.9	14	61.0	3.44	12.4	20.3	54	58.7	1.22	8.9	15.2	110	58.5	0.92	9.6	16.4	0.848	0.296	0.780	2.184±	0.756	2.224±	2.355±
2. Stature (1)	35	169.4	21.05	6.1	3.6	14	170.9	1.30	4.7	2.8	54	169.0	0.76	5.5	3.3	110	109.2	0.54	5.6	3.3	0.809	0.317	1.171	0.321	2.690	0.572+	1.773+
3. Sitting height (23)	35	86.9	0.58	3.4	33.9	14	87.7	0.89	3.2	3.6	54	86.3	0.40	2.9	3.4	110	86.6	0.30	3.1	3.6	0.744	0.881	1.547	0.434+	3.110	0.214+	1.749+
4. Total upper extremity length (45)	35	74.9	0.48	2.8	3.7	14	76.4	0.67	2.4	3.1	54	75.3	0.43	3.1	4.1	110	75.3	0.28	2.9	3.9	1.724	0.614	1.221	3.891±	0.293	4.036±	4.835±
5. Length of the cubit (48, 3)	33	46.2	0.37	2.1	4.5	14	46.4	0.42	1.5	3.2	54	46.3	0.27	2.0	4.3	108	46.3		2.0	4.3	0.313	0.218	0.721	1.835+		3.091±	3.181±
6. Biacromial breadth (35)	35	36.7	0.29	1.7	4.6	14	37.2	0.61	2.2	5.9	54	37.2	0.26	1.9	5.1	110	37.0	0.18	1.9	5.1	0.838	1.236		2.825±	0.925	4.438	4.895±
7. Bicristal breadth (40)	35	25.7	0.21	1.2	4.7	14	26.0	0.33	1.2	4.6	54	26.1	0.18	1.3	5.0	110	26.0	0.12	1.3	5.0	0.761	1.433	0.253	5.214±	1.740	3.163±	5.873±
8. Breadth of the thorax (36)	35	25.4	0.26	1.5	5.9	14	25.6	0.36	1.3	5.1	54	25.9	0.23	1.7	6.6	110	25.7	0.15	1.6	6.2	0.428	1.428	0.622	3.628±	0.804	1.502+	2.819±
9. Depth of the thorax (37)	35	19.0	0.33	1.9	10.0	14	18.8	0.36	1.3	6.9	54	18.7	0.21	1.5	8.0	110	18.8	0.16	1.7	9.0	0.354	0.807	0.218	1.817+	1.348	3.553±	3.831±
10. Rohrer's index	35	1.19	0.027	0.16	13.4	14	1.21	0.058	0.21	17.4	54	1.21	0.022	0.16	13.2	110	1.20	0.016	0.17	14.2	0.353	0.562		5.394±	1.171	2.942±	4.169±
11. Cormic index	35	51.3	0.19	1.1	2.1	14	51.4	0.28	1.0	1.9	54	51.1	0.19	1.4	2.7	110	51.2	0.12	1.3	2.5	0.290	0.743+	0.730	1.319+	0.728	0.898	
12. Relative total upper extremity length	35	44.2	0.15	0.9	2.0	14	44.7	0.22	0.8	1.8	54	44.6	0.14	1.0	2.2	110	44.5	0.10	1.0	2.2	1.706	1.889	0.343	5.702±	3.186	7.668±	10.514±
13. Relative length of the cubit	35	27.3	0.11	0.6	2.2	14	27.2	0.14	0.5	1.8	54	27.4	0.10	0.7	2.6	108	27.3	0.10	0.7	2.6	0.495	0.683	1.033	2.759±	3.826	6.138±	7.872±
14. Relative biacrominal breadth	35	21.7	0.15	0.9	4.1	14	21.8	0.28	1.0	4.6	54	22.0	0.14	1.0	4.5	110	21.9	0.10	1.0	4.6	0.329	1.402	0.654	4.720±	3.233	5.005±	6.450±
15. Relative bicristal breadth	35	15.2	0.10	0.6	3.9	14	15.2	0.19	0.7	4.6	54	15.5	0.10	0.7	4.5	110	15.4	0.07	4.5	4.5		2.072	1.484	5.282±	4.227±	3.316±	7.282±
16. Relative breadth of the thorax	35	15.0	0.14	0.8	5.3	14	15.0	0.14	0.5	3.3	54	15.4	0.12	0.9	5.8	110	15.2	0.09	0.9	5.9		2.116	2.197±	3.347±	3.526±	1.327+	4.167
17. Relative depth of the thorax	35	11.2	0.17	1.0	8.9	14	11.0	0.19	0.7	6.4	54	11.1	0.12	0.9	8.1	110	11.1	0.09	0.9	8.1	0.669	0.489	0.395	1.918+	2.523	3.403±	4.785±
18. Length of the cubit in % of the total upper extremity length	33	61.7	0.19	1.1	1.8	14	60.8	0.25	0.9	1.5	54	61.3	0.15	1.1	1.8	108	61.3	0.11	1.1	1.8	2.607	1.594	1.514	3.313	0.872	0.609	1.619+
19. Acromio-iliac index	35	70.2	0.67	3.9	5.6	14	69.6	1.00	3.6	5.2	54	70.4	0.55	4.0	5.7	110	70.4	0.37	3.9	5.5	0.485	0.229	0.667	2.563±	1.012	0.778+	1.129+
20. Thoracic index	35	74.7	I.34	7.8	10.4	14	73.5	1.03	3.7	5.0	54	72.2	0.78	5.7	7.9	110	73.2	0.63	6.6	9.0	0.710+	1.610+	0.798	0.214	0.981	2.592±	2.206±

TABLE 36. Body composition and functional features of young men of Nubian ethnic groups.

Measurement or index	I. Young Kenuz				II. Young Nubian Arabs				III. Young Fadidja				IV. All young Nubians				between young men samples			between young and adult men (a) samples			
	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	n	x̄	s	V%	I:II	I:III	II:III	I:Ia	II:IIa	III:IIIa	IV:Va
1. Lower radio-ulnar breadth (52.4)	35	5.3	0.048	0.28	5.3	14	5.2	0.050	0.18	3.5	54	5.4	0.041	0.30	5.6	110	5.3	0.028	0.29	5.5	1.232	1.569	2.350	5.101+	2.461	2.052+	6.146+
2. Maximum circumference of the upper arm (65)	35	25.1	0.39	2.3	9.2	14	25.5	1.00	3.6	14.1	54	25.1	0.36	2.6	10.4	110	25.1	0.26	2.7	10.8	0.451		0.461	3.746±	0.687	3.822+	4.691+
3. Maximum circumference of the calf (69)	35	33.8	0.50	2.9	8.6	14	33.3	0.92	3.3	9.9	54	33.9	0.26	2.7	8.0	110	38.7	0.26	2.7	8.0	0.506	0.176	0.767+	0.828	1.505	3.419±	4.077±
4. Skinfold thickness in the tricipital area	35	0.67	0.081	0.47	70.1	14	0.68	0.108	0.39	57.4	54	0.61	0.055	0.40	65.6	110	0.65	0.041	0.43	66.2	0.632	0.575	0.788	0.788	0.078	0.779+	0.215
5. Skinfold thickness in the subscapular area	35	0.79	0.067	0.39	49.4	14	0.88	0.150	0.54	61.4	54	0.82	0.050	0.37	45.1	110	0.82	0.050	0.37	45.1	0.636	0.360	0.378+	1.543+	1.402	3.547	4.543±
6. Skinfold thickness in the supracristal area	35	0.74	0.101	0.59	79.7	14	0.85	0.133	0.48	56.5	54	0.66	0.056	0.41	62.1	110	0.70	0.046	0.48	68.6	0.609	0.692+	1.475	0.255	0.189	1.004+	
7. Pulse rate	34	71.6	1.39	8.0	11.2	14	76.7	2.61	9.4	12.3	54	69.5	1.18	8.6	12.4	109	71.2	1.18	8.6	12.4	1.865	1.131	2.693	2.940±	1.106	2.692	3.579±
8. Systolic blood pressure	34	114.0	2.77	15.9	13.9	14	114.3	2.86	10.3	9.0	54	112.4	1.68	12.2	10.9	109	113.3	1.26	13.1	11.6	0.064	0.526	0.526	3.339	1.390	2.909±	4.942+
9. Diastolic blood pressure	34	70.3	1.51	8.7	12.4	14	71.4	2.00	7.2	10.1	54	70.5	1.04	7.8	11.1	109	70.6	0.79	8.2	11.6	0.408	0.110	0.384	5.538±	3.072	5.557±	9.036±
10. Maximum grip force of the right hand	35	33.5	1.10	6.4	19.1	14	34.3	1.50	5.4	15.7	52	33.1	0.95	6.9	20.8	108	33.2	0.63	6.5	19.6	0.406	0.271	0.595	0.803+	1.151	1.311+	2.565±
11. Maximum grip force of the left hand	35	30.2	0.98	5.7	18.9	14	28.9	1.25	4.5	15.6	51	29.5	0.84	6.1	20.7	107	29.5	0.55	5.7	19.3	0.744	0.529	0.337	0.824+	1.640	1.984+	3.145±
12. Relative lower radio-ulnar breadth	35	3.1	0.022	0.13	4.2	14	3.1	0.025	0.09	2.9	54	3.2	0.023	0.17	5.3	110	3.2	0.015	0.16	5.0		2.536	2.841±	5.820±	3.322±	3.619±	5.549±
13. Relative maximum circumference of the upper arm	35	14.8	0.24	1.4	9.5	14	14.9	0.55	2.0	13.4	54	14.9	0.22	1.6	10.7	110	14.8	0.15	1.6	10.8	0.193	0.297		3.536±	1.519	3.906±	5.593±
14. Relative maximum circumference of the calf	35	19.9	0.27	1.6	8.0	14	19.6	0.47	1.7	8.4	54	20.1	0.19	1.4	7.0	110	19.9	0.14	1.5	7.5	0.576	0.624	1.137	0.931	0.597	3.555±	2.838

circumferences in the Arabs, as well as of the relative calf circumference only in the Kenuz.

Significant differences of variability were proved in the following features: nos. 1, 2, 5, 7, 9 and 11 in the Kenuz, none in the Arabs, in all features except for no. 7 in the Fadidja, and in all features except for no. 4 in the sum of all Nubians.

11.4. Increase of growth and weight in 19–21-year-old men

A special study was performed (Strouhal 1968) in order to decide when the growth of the youngsters from Nubia ends, comparing young Nubians (of all three ethnic groups) year by year: 19-year-old (n=49), 20-year-old (n=49) and 21-year-olds (n=37) with 22–55-year-old adults (n=128) in 9 cephalometric measurements and 10 indices (except for the transverse cephalofacial) as well as 3 somatometric measurements (weight, stature and sitting height) and 2 indices (Rohrer's index and cormic index; *Table 37*).

Significant results of the t-test were found between the 19-year-olds and adults in 12 of 24 features (50%), namely increase of head breadth, facial height and breadth, bigonial breadth, nasal height and breadth, further decrease of the cephalic, frontoparietal and jugofrontal indices, and increase of weight and jugonasal index in adults.

Between the 20-year-olds and adults there were still 8 significantly different features (33.3%), namely increase of the facial height and breadth, bigonial breadth, nasal height and breadth as well as decrease of the frontoparietal and jugofrontal indices.

Between the 21-year-olds and adults only 5 statistically different features (20.8%) were revealed, viz. increase of the facial height, bigonial breadth and nasal breadth, as well as decrease of the frontoparietal and jugofrontal indices.

On the other hand, stature was growing significantly (2.9 cm) only between the 19- and 20-year-olds (not in *Table 37*), while weight was also growing between 19-year-old and adults.

Summing up, it may be stated that neurocranial dimensions (except for head breadth and the cephalic index) were already constant during the studied period. On the other hand, facial growth still continued. Most indices did not change, except for the frontoparietal, jugofrontal and jugonasal ones.

Taking account of these results, we decided to include in the category of adult men only individuals aged 21 years and more.

TABLE 37. Statistically significant differences between age groups. Legend: L = length, B = breadth, H = height, min. = minimum, D = difference in measurements in cm, in kg in weight and without denotation in indices.

Features	Difference between men aged 22–55 years and					
	19–year-olds		20–year-olds		21–year-olds	
	D	t	D	t	D	t
1. Head lenght	–	–	–	–	–	–
2. Head breadth	0.20	2.22	–	–	–	–
3. Head height	–	–	–	–	–	–
4. Min. frontal breadth	–	–	–	–	–	–
5. Facial height	0.35	3.00	0.28	2.31	0.27	2.04
6. Facial breadth	0.32	3.64	0.31	3.51	–	–
7. Bigonial breadth	0.32	3.34	0.23	2.40	0.22	2.00
8. Nasal height	0.23	3.33	0.23	3.33	–	–
9. Nasal breadth	0.20	4.44	0.15	2.73	0.13	2.36
10. L-B index of head	–	–	–	–	–	–
11. L-H index of head	–	–	–	–	–	–
12. B-H index of head	–1.45	2.27	–	–	–	–
13. Frontoparietal i	–1.33	2.59	–1.79	3.51	–1.75	3.14
14. Facial index	–	–	–	–	–	–
15. Jugofrontal index	–2.55	4.69	–2.54	4.87	–2.07	3.53
16. Jugogonial index	–	–	–	–	–	–
17. Nasal index	–	–	–	–	–	–
18. Jugonasal index	0.84	2.39	–	–	–	–
19. Facionasal index	–	–	–	–	–	–
20. Body weight	5.38	3.07	–	–	–	–
21. Stature	–	–	–	–	–	–
22. Sitting height	–	–	–	–	–	–
23. Rohrer's index	0.08	2.40	0.08	2.39	–	–
24. Cormic index	–	–	–	–	–	–

12. THIRD MOLAR ERUPTION, TEETH MORPHOLOGY AND ORTHODONCY

12.1. Delayed eruption of third molars

To elucidate the question of growth delay in young Nubian males (described in the previous Chapter), we examined the eruption of third molars in 172 young Nubians and 9 young intra-Nubian hybrids. Each molar was classified in one of the four eruption stages.

The eruption process was followed separately in the three Nubian ethnic groups and intra-Nubian hybrids. Because of similar results and low numbers of cases, they were pooled together to show Nubians as a whole (*Table 38*). The Ababda had to be left aside because of the insufficient number of young subjects.

Data on third molars eruption in the Nubians are presented also graphically (*Figure 7*) to show the course of the process. In all the followed years, eruption of the lower molars was ahead as compared to the eruption of the upper ones. No consistent right-left differences were observed.

Our results do not show the beginning of eruption. It was not yet observed, however, in seven examined 15–18-year-old Kenuz boys. This cannot be, however, considered as a definitive proof because of the insufficient number of cases. Only the extrapolated curve (*Figure 8*) suggests that the eruption starts around the age of 17 years.

The end of eruption cannot be determined, too, because of only 11 available men between 24 and 30 years, in which only a single case with eruption of stage 2, a much delayed one, was revealed. Another case with no eruption of any third molars and a case of not erupted upper third molars could have been, however, caused by hypodoncy, which could not be ascertained due to lack of an X-ray device in the field or local medical centre.

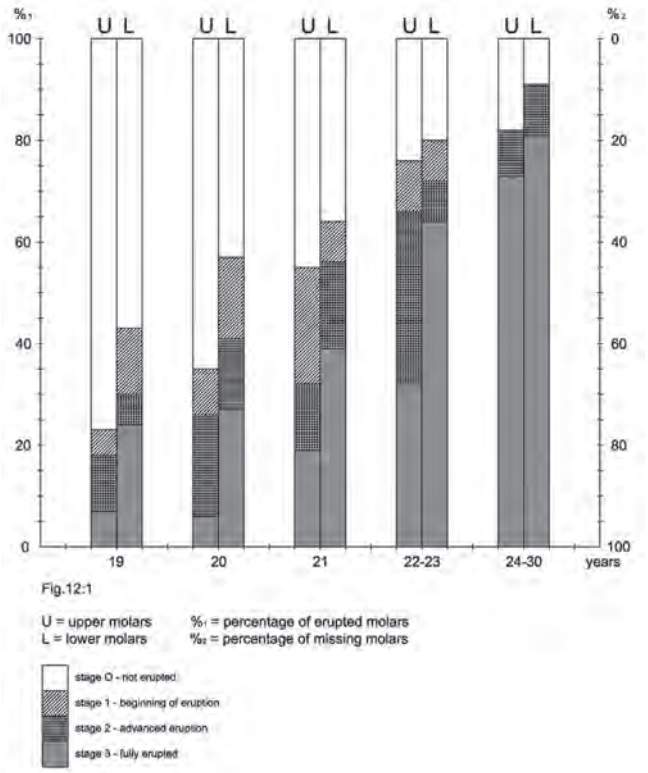


FIGURE 7. Stages of eruption of third molars in Egyptian Nubians.

TABLE 38. Eruption of third molars in young Nubian men. Legend: N = number of cases for the year; stages: 0 = no eruption, 1 = beginning of eruption, if at least one or more cusps had cut through the gum, 2 = advanced eruption, not yet reaching the occlusal level, 3 = fully erupted tooth.

Molars			Upper right		Upper left		Lower right		Lower left	
Age (years)	N	Stages	n	%	n	%	n	%	n	%
19	50	0	39	78.0	38	76.0	28	56.0	29	58.0.
		1	2	4.0	3	6.0	6	12.0	7	14.0.
		2	6	12.0	5	10.0	3	6.0	3	6.0
		3	3	6.0	4	8.0	13	26.0	11	22.0
20	55	0	36	63.6	37	67.2	24	43.6	23	41.8
		1	6	10.9	3	5.5	8	14.6	10	18.2
		2	11	20.0	11	20.0	7	12.7	8	14.6
		3	3	5.5	4	7.3	16	29.1	14	25.4
21	40	0	18	45.0	18	45.0	15	37.5	14	35.0
		1	10	25.0	8	20.0	3	7.5	3	7.5
		2	4	10.0	7	17.5	7	17.5	7	17.5
		3	8	20.0	7	17.5	15	37.5	16	40.0
22–23	25	0	6	24.0	6	24.0	5	20.0	5	20.0
		1	2	8.0	3	12.0	3	12.0	1	4.0
		2	9	36.0	8	32.0	1	4.0	3	12.0
		3	8	32.0	8	32.0	16	64.0	16	64.0
24–30	11	0	2	18.2	2	18.2	1	9.1	1	9.1
		2	1	9.1	1	9.1	1	9.1	1	9.1
		3	8	72.7	8	72.7	9	81.8	9	81.8

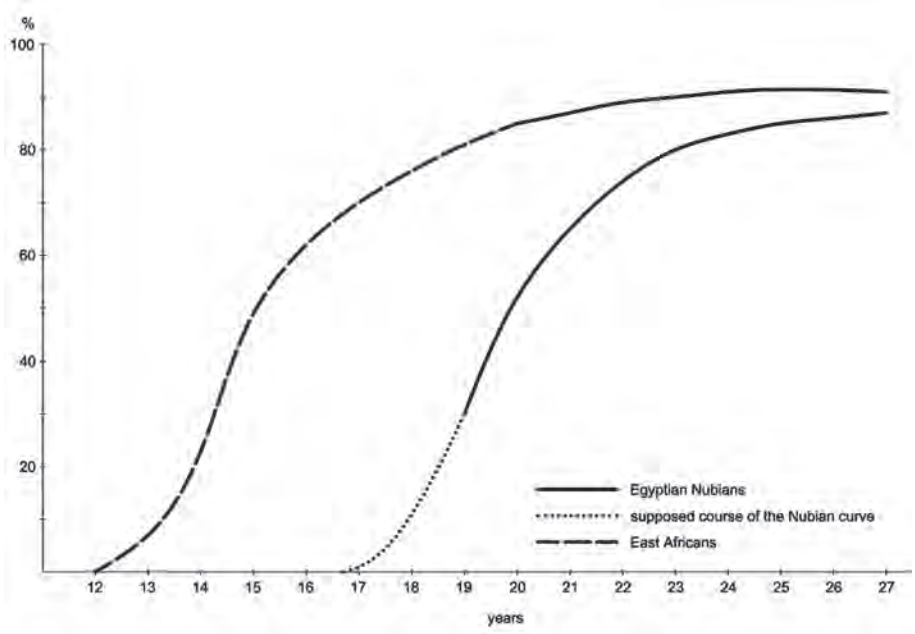


FIGURE 8. Extrapolated curves of erupted third molars in Egyptian Nubians compared with the East Africans.

From our results a delay of eruption of the third molar can be deduced as analogy to the delay of growth in young males (Chapter 11). Also Valšík and Hussien (1970), who studied eruption in 1,033 Nubian boys and 698 girls found that "the start of the first permanent molar eruption is delayed by about a year (and) the same is valid ... for all permanent teeth". Their criteria were the eruption data of Czechoslovak children. At the same time Valšík (1972) found a greater correlation between the number of erupted teeth and height than between the number of teeth and weight.

A similar study was performed in East African young males by Chagula (1960), whose results are compared with ours in *Table 39* and *Figure 8*.

Comparison of our results with those of Chagula (1960) by extrapolated curves shows the delay of eruption in the Nubians. The Nubians' third molars erupt about three to four years later than in the East Africans. According to Chagula third molars in general erupt much earlier in Africans than in the Caucasians. Besides anthropometrics, also this fact ranges the Nubians more to the Caucasian than the African side.

12.2. Accessory cusps on permanent molars

In the groups of the same young males with not yet abraded teeth also morphological anomalies were detected (*Table 40*).

From the accessory cusps, Carabelli's tubercles, considered to be an evolutionary progressive trend, were the most frequent. They were closely followed by the 5th cusp on the second lower molar, while the 6th cusp on the first lower molar was present in less than half of the frequency of the previous ones (*Plate XXI: 1*). Both these latter traits are considered to be archaic ones.

The percentage of Carabelli's tubercles in the Nubians is similar to European data. For example in 61 Czech and 79 Slovak young males they were present in 8% and 11.2% respectively (Strouhal 1959).

In the same two groups, first lower molars with the 6th cusp were found in only 1.3% and 0.0% respectively, but second lower molars with the 5th cusp in as much as 19.8% and 21.7% respectively (Strouhal 1959).

There are striking differences between ethnic groups. Carabelli's tubercles were found mostly in the hybrids, followed by Nubian Arabs, the Kenuz and Fadidja. The frequency of the 6th-cusp first lower molars was four times higher in Nubian Arabs than in the Fadidja and Kenuz. On the contrary, the share of the 5th-cusp second lower molars was about a half higher in the Kenuz than in the Fadidja and Arabs.

Some other accessory cusps were found: A Kenzi had a right upper second molar with an accessory cusp on the mesiobuccal side. An Arab had it on the same left molar, possessing its own root, on the same side. In a Fadidja, both upper first molars had, together with Carabelli's tubercles, still smaller cusps on buccal sides. Moreover, one right lower third molar had a developed paramolar on the buccal side.

Other morphological anomalies included small conical upper I2, observed in two young Kenuz (*Plate XVIII: 2–3*) (frequency 3.1%), canini-form upper I2 in another Kenzi (1.6%) and a small conical one-cusp upper M3 in still another Kenzi. Molariform lower P2 were observed in three Kenuz (4.7%) and in a Fadidja (1.2%).

12.3. Persistence of deciduous teeth and hypodoncy of permanent teeth

The rates of anomalous eruption of permanent canines (*Plate XXI: 4–5*), persistence of deciduous canines (*Plate XXI: 6*), hypodontic canines (*Plate XXII: 1–2*) and anomalous P2 are, compared with the rates in other groups, elevated in the hybrids, more probably by chance, due to their rather small number, than to mixture between ethnic groups (*Table 41*).

The anomalous eruption of permanent second premolar is higher than usual in all groups, especially in Nubian

TABLE 39. Comparison of third molar eruption in the Nubians and East Africans.

Ethnic group		Nubians					East Africans			
Age (years)	n	% of males with no erupted M3	% of males with 1–3 erupted M3	% of males with all erupted M3	% of erupted M3 of their ideal number	n	% of males with no erupted M3	% of males with 1–3 erupted M3	% of males with all erupted M3	% of erupted M3 of their ideal number
19	50	46.0	40.0	14.0	33.0	63	12.7	17.5	69.8	80.2
20	55	21.8	47.3	30.9	57.3	109	2.8	22.0	75.2	90.8
21	40	27.5	27.5	45.0	58.8	88	4.5	22.8	72.7	84.6
22–23	25	8.0	36.0	56.0	78.0	102	2.9	13.7	83.4	89.9
24–30	11	9.1	9.1	81.2	86.3	65	6.2	9.2	84.6	90.5

TABLE 40. Accessory cusps on permanent molars. Note: the number of the Kenuz was increased by including 5 boys aged 15–18 years – also in the following tables.

Tuberculum Carabelli on upper first molar	No. of men with M1	Tuberculum Carabelli present	%	No. of upper M1	Tuberculum Carabelli present	%
Kenuz	64	6	9.4	128	12	9.4
Nubian Arabs	27	5	18.5	54	9	16.7
Fadidja	86	5	5.8	171	9	5.3
Hybrids	9	2	22.2	18	4	22.2
Nubians	186	18	9.7	.371	34	9.2
Sixth cusp on lower M1	**No. of males with M1**	**6th cusp present**	**%**	**No. of lower M1**	**6th cusp present**	**%**
Kenuz	60	2	3.3	117	3	2.6
Nubian Arabs	27	3	11.1	54	6	11.1
Fadidja	83	3	3.3	164	5	3.0
Hybrids	9	–	–	18	–	–
Nubians	179	7	3.9	353	14	4.0
Fifth cusp on lower M2	**No. of males with M1**	**5th cusp present**	**%**	**No. of lower M2**	**5th cusp present**	**%**
Kenuz	63	7	11.1	126	14	11.1
Nubian Arabs	27	2	7.4	54	4	7.4
Fadidja	85	7	8.2	169	14	8.3
Hybrids	9	–	–	18	–	–
Nubians	184	16	8.7	367	32	8.7

TABLE 41. Persistence of the deciduous teeth and hypodoncy of the permanent ones in the Nubians. Legend: C = permanent canine, c = deciduous canine, P2 = permanent second premolar, m2 = deciduous second molar.

Ethnic group	No. of young	Anomalous C	%	No. of teeth	Persistence of c	%	Hypodontic C	%
Kenuz	64	3	4.7	256	2	0.8	1	0.4
Nubian Arabs	27	–	–	108	–	–	–	–
Fadidja	86	3	3.5	344	2	0.6	1	0.3
Hybrids	9	2	22.2	36	1	2.8	2	5.6
Sum of Nubians	186	8	4.3	744	5	0.7	4	0.5
	No. of young	**Anomalous eruption**	**%**	**No. of teeth**	**Persistence of m2**	**%**	**Hypodontic P2**	**%**
Kenuz	64	3	4.7	256	2	0.8	3	1.2
Nubian Arabs	27	2	7.4	108	–	–	4	3.7
Fadidja	86	3	3.5	344	3	0.9	4	1.2
Hybrids	9	1	11.1	36	–	–	1	5.6
Sum of Nubians	186	9	4.8	744	5	0.7	12	1.6

Arabs; its hypodoncy as well as anomalous eruption of permanent canines (except for Arabs) is slightly elevated too.

Several slight or expressed bodily shifts of teeth were observed e.g. in both lower I2 (*Plate XXII: 3*) and upper I2 (*Plate XXII: 4–5*). A weighty diversion of axes of lower incisors afflicted the 21-year-old Kenzi E114 from Gezira village on the Elephantine Island (Aswan) (*Plate XXII: 6*).

13. SENILE CHANGES OF METRIC FEATURES IN THE KENUZ

13.1. Cephalometric features

Only in the Kenuz area we succeeded to assemble a sufficient number of males aged 56 and more (only a single old Nubian Arab and only four old Fadidja men came to be examined). Anthropometric features of the old Kenuz can therefore be compared with the data of the adult Kenuz (*Table 42* versus *Table 20*).

While the head length remains nearly the same, head breadth of the old males becomes slightly narrower and head height drops significantly, together with narrowing of the minimum frontal breadth. Other changes proved to be insignificant: facial height decreases, while bizygomatic and bigonial breadth as well as both nasal dimensions increase (bigonial breadth nearly significantly).

Cephalic, breadth-height, frontoparietal indices drop insignificantly, but the length-height index increases significantly. The facial and jugofrontal indices are significantly smaller, while the cephalofacial and facionasal indices are significantly bigger. The remaining indices (jugomandibular and jugonasal) are insignificantly bigger and the nasal index is slightly smaller.

Significantly differing variabilities were only found in features nos. 9, 14 and 18.

13.2. Somatometric features

Also the whole body of old Kenuz shows changes connected with ageing (*Table 43* versus *Table 21*). The increase in weight and decrease in stature appear insignificant, while the decrease in sitting height is significant, caused by lowering of intervertebral discs and increased thoracic kyphosis. Slight increases in the upper extremity and cubit lengths are insignificant, the biacromial and thoracic breadths being almost the same in old and adult men. On the contrary, the bigger bicristal breadth and thoracic depth are significant.

This is well reflected in the indices. Significantly different are not: the bigger Rohrer's one, the smaller cormic one, the increased relative cubit length and its length in percents of the upper extremity length, as well as the bigger biacromial and thoracic breadths. Significantly different are: the relative upper extremity length, relative bicristal breadth and thoracic depth, as well as acromio-iliac and thoracic indices.

Significant variabilities between old and adult Kenuz concerned features nos. 3–7, 10, 11 and 17.

13. 3. Body composition and functional features

The body composition features show mostly slight, insignificant decrease, most apparent in the circumference of the calf, none in radio-ulnar breadth (*Table 44* versus *Table 28*). Also the three skinfolds become slightly thinner, which is most obvious in the tricipital one, as the result of lesser or deficient nutrition. Physiological features naturally increase with age, the systolic blood pressure significantly. However, its value 133.4±18.5 mm Hg is favourable, if compared with the industrial world, including only a few men with pressure above 150 mm Hg. On the other hand, the significant decrease of grip force is connected with easier life style of the aged Kenuz. No significantly different variability of any feature was revealed between the old and adult Kenuz in these features.

14. ANTHROPOSCOPIC FEATURES

A selection of portraits of the probands of the three ethnic groups of young, adult and old age are included to illustrate their features (*Plates XXIII–LX*).

14.1. Skin colour

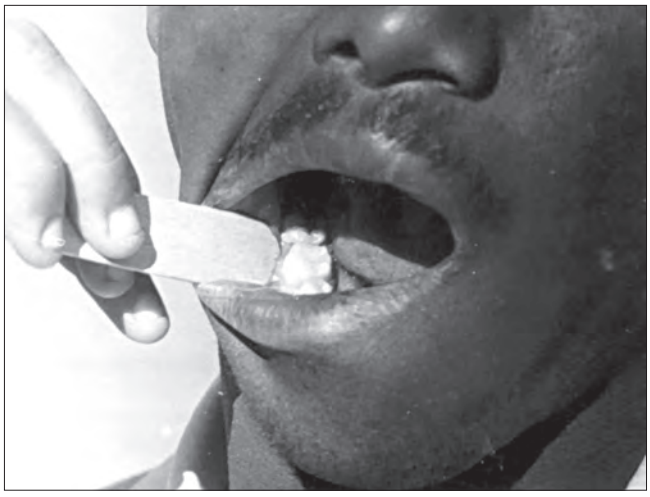
This feature was determined by means of Hautfarben-Tafel-by B. K. Schultz (J. F. Lehmanns Verlag München) below the umbilicus in order to get basal shade of untanned skin (*Table 45*). No shades 1–6 (fair skin) occurred among the Nubians and Ababda.

In the age groups of the Kenuz dark shades prevail, while the light ones are rare. In Nubian Arabs brown shades are more often present than the dark ones, light being also rare. A single old Arab (not included in *Table 45*) had dark skin. The adult Ababda showed browner than dark shades, while in the only three young the sequence was reversed. Young Fadidjas were mostly of brown skin and less of dark shades, adults had both shades in equilibrium. There were more of light shades than in the two other groups, most probably as the result of influx of people of European and Caucasian origin under the Turkish rule since the 16th century (see Section 1.4.6.). The unusual south–north increase of dark to black skin from the Fadidja and Ababda through Arabs to the Kenuz can be demonstrated (*Figure 9*).

14.2. Eye colour

Colour of the iris was assessed by Martin's Augenfarbtafel. Only shades 1–4 and exceptionally 5–6 and 7a were found (*Table 46*).

Eye colour of the overwhelming number of the Nubians and Ababda is dark. It is, however, possible to find a difference between the Kenuz showing mostly grade 2, while in the Nubian Arabs and Fadidja grade 3 dominates.



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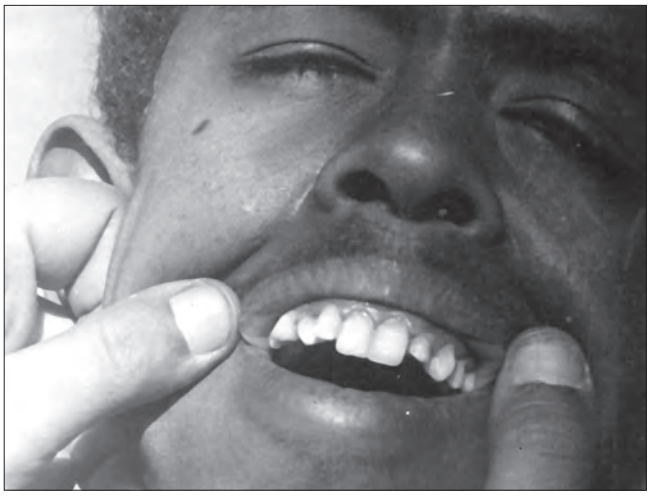

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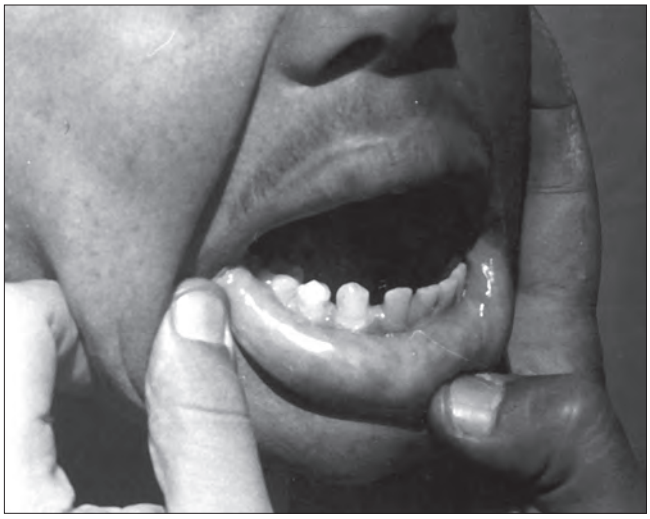
PLATE XXI. 1) Right lower first molar with 6 cusps in young Nubian Arab E 131. 2) Small conical upper second incisors in young adult Kenzi E 161. 3) Small conical upper second incisors in adult Kenzi E 25. 4) Anomalous (ectopic) eruption of right lower canine in young Fadidja E 1. 5) Anomalous (ectopic) eruption of left lower canine in adult Kenzi E 127. 6) Persistence of deciduous canine in young Fadidja E 181.



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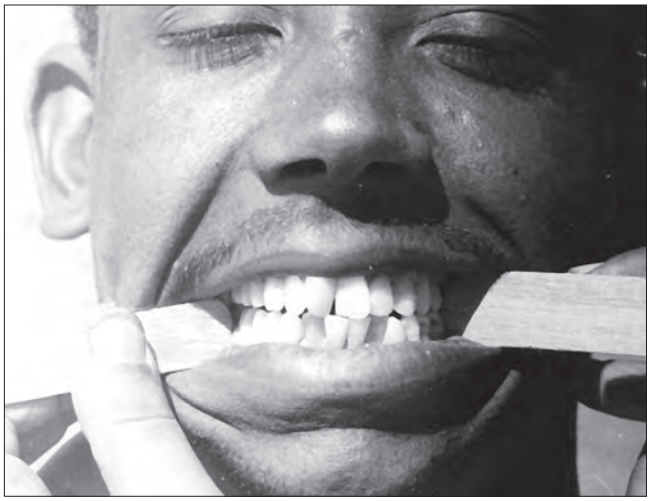

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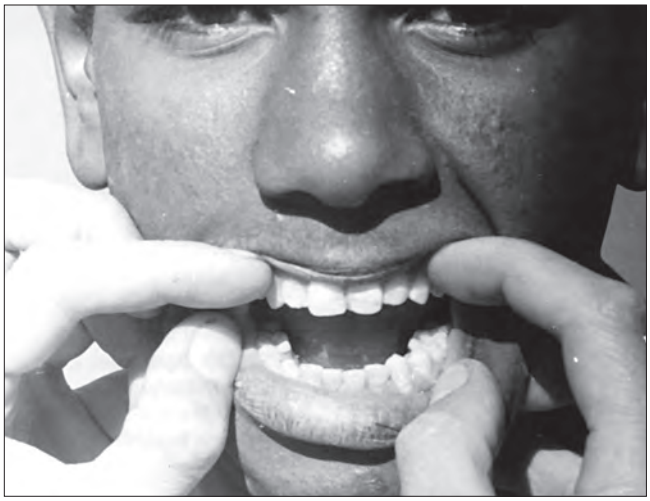

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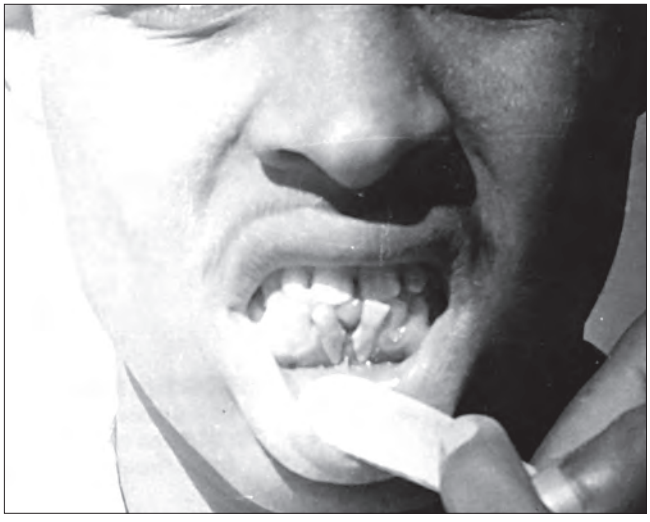

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PLATE XXII. 1–2) Both hypodontic lower canines in young Nubian Arab E 175. 3) Bodily shift of lower second incisors in adult Kenzi E 112. 4) Slight shift of upper second incisors in young Fadidja E 80. 5) Bodily shift of upper second incisors with rotation in adult Nubian Arab E 107. 6) A weighty diversion of axes of lower incisors in young Kenuzi E 114.

TABLE 42. Cephalometric features of old Kenuz.

Measurement or index	Old Kenuz					t-test between adult and old Kenuz
	n	x̄		s	V%	
1. Maximum head lenght (1)	35	190.5	1.17	6.8	3.6	0.069
2. Maximum head breadth (3)	35	146.7	0.77	4.5	3.1	1.028
3. Auricular height (15)	35	123.6	0.93	5.4	4.4	2.109
4. Minimum frontal breadth (4)	35	102.9	0.75	4.4	4.3	2.277
5. Morphological height of the face (18)	34	120.0	1.18	6.8	5.7	1.436
6. Bizygomatic breadth (6)	35	136.3	0.84	4.9	3.6	1.087
7. Bigonial breadth (8)	35	104.3	0.98	5.7	5.5	1.966
8. Height of the nose (21)	34	57.1	0.96	5.5	9.6	1.792
9. Breadth of th nose (13)	35	41.6	0.84	4.9	11.8	1.311+
10. Cephalic index	35	77.1	0.53	3.1	4.0	0.734
11. Length-height index	35	64.9	0.46	2.7	4.2	2.056
12. Breadth-height index	35	84.3	0.57	3.3	3.9	1.197
13. Transverse frontoparietal index	35	70.1	0.53	3.1	4.4	1.606
14. Morphological facial index	34	88.3	0.68	3.9	4.4	2.263±
15. Jugofrontal index	35	75.7	0.57	3.3	4.4	3.103
16. Jugomandibular index	35	76.6	0.69	4.0	5.2	1.152
17. Transverse cephalofacial index	35	93.0	0.50	2.9	3.1	2.536
18. Nasal index	34	73.2	1.85	10.6	14.5	0.194+
19. Jugonasal index	35	30.5	0.45	2.6	8.5	1.166
20. Facionasal index	34	47.6	0.59	3.4	7.1	3.269

TABLE 43. Somatometric features of old Kenuz.

Measurement or index	Old Kenuz					t-test between adult and old Kenuz
	n	x̄		s	V%	
1. Weight (71)	34	63.3	2.28	13.1	20.7	0.233
2. Stature (1)	35	167.7	1.23	7.3	4.4	1.535
3. Sitting height (23)	35	84.3	0.75	4.4	5.2	2.742±
4. Total upper extremity length (45)	35	77.7	0.70	4.1	5.3	0.638+
5. Length of the cubit (48, 3)	35	47.2	0.46	2.7	5.7	0.394+
6. Biacromial breadth (35)	35	37.5	0.39	2.3	6.1	0.446+
7. Bicristal breadth (40)	35	28.2	0.31	1.8	6.4	2.572±
8. Breadth of the thorax (36)	35	26.7	0.31	1.8	6.7	0.252
9. Depth of the thorax (37)	35	21.0	0.38	2.2	10.5	3.119
10. Rohrer's index	34	1.34	0.045	1.34	0.26	0.800+
11. Cormic index	35	50.2	0.04	1.4	2.7	2.313+
12. Relative total upper extremity length	35	46.3	0.21	1.2	2.6	3.449
13. Relative length of the cubit	35	28.2	0.14	0.8	2.8	2.945
14. Relative biacrominal breadth	35	22.4	0.21	1.2	5.4	0.917
15. Relative bicristal breadth	35	16.9	0.17	1.0	5.9	4.488
16. Relative breadth of the thorax	35	15.9	0.21	1.2	7.5	1.274
17. Relative depth of the thorax	35	12.6	0.24	1.4	11.1	3.809±
18. Length of the cubit in % of the total upper extremity length	35	61.1	0.06	1.2	2.0	
19. Acromio-iliac index	35	75.2	0.74	4.3	5.7	2.772
20. Thoracic index	35	79.3	1.25	7.3	9.2	3.565

TABLE 44. Body composition and functional features of old Kenuz.

Measurement or index	Old Kenuz					t-test between adult and old Kenuz
	n	$\bar{x}$		s	V%	
1. Lower radio-ulnar breadth (52, 4)	35	5.6	0.058	0.34	6.1	
2. Maximum circumference of the upper arm (65)	35	27.0	0.65	3.8	14.1	0.140
3. Maximum circumference of the calf (69)	35	32.2	0.55	3.2	9.9	1.687
4. Skinfold thickness in the tricipital area	34	0.54	0.063	0.36	66.7	0.711
5. Skinfold thickness in the subscapular area	34	0.92	0.111	0.64	69.6	0.145
6. Skinfold thickness in the supracristal area	34	0.68	0.110	0.63	92.6	0.247
7. Pulse rate	30	78.7	1.50	8.1	10.3	1.191
8. Systolic blood pressure	31	133.4	3.38	18.5	13.9	2.569
9. Diastolic blood pressure	31	83.9	2.03	11.1	13.2	1.651
10. Maximum grip force of the right hand	32	28.8	1.31	7.3	25.3	3.513
11. Maximum grip force of the left hand	32	25.0	1.29	7.2	28.8	4.223
12. Relative lower radio-ulnar breadth	35	3.3	0.031	0.18	5.5	
13. Relative maximum circumference of the upper arm	35	16.1	0.39	2.3	14.3	0.456+
14. Relative maximum circumference of the calf	35	19.2	0.34	2.0	10.4	1.116

TABLE 45. Skin colour of the Nubians and Ababda. Legend: Shades 7–10 (light, slightly tanned), 11–19 (brown), 20–30 (dark, brown black to black).

Shade	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
07–10	3	8.6	6	5.8	–	–	9	5.1
11–19	9	25.7	37	35.9	16	43.2	62	35.4
20–29	23	65.7	60	58.2	21	56.8	104	59.4
Sum	35		103		37		175	

Shade	Arabs					
	young		adult		all	
	n	%	n	%	n	%
07–10	–	–	6	5.2	6	4.7
11–19	8	57.1	56	48.7	64	49.6
20–30	6	42.9	53	46.1	59	45.7
Sum	14		115		129	

Shade	Ababda					
	young		adult		all	
	n	%	n	%	n	%
07–10	–	–	–	–	–	–
11–19	1	33.3.	14	58.3	15	55.6
20–30	2	66.6.	10	41.7	12	44.4
Sum	3		24		27	

Shade	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
07–10	9	16.7	27	15.6	1	25.0	37	16.0
11–19	37	68.5	73	42.2	3	75.0	113	48.9
20–29	8	14.8	73	42.2	–	–	81	35.1
Sum	54		173		4		231	

In the Arabs slightly more of light brown to brown-greenish eyes were found. A single old Arab had grade 4.

Adult Ababda displayed mostly grade 3 followed by grades 4, 2, 1 and 5 (4.2%). Two young Ababda showed grade 3 and one grade 2.

A big difference in percentage of black and dark brown eye colour is apparent between the Ababda and the Nubians in which the Kenuz possess greatest share (*Figure 10*).

14.3. Hair colour

Hair colour was determined by the Fischer-Saller's colour table for hairs. We looked for a spot with the darkest shade by pushing hair aside (*Table 47*).

In all ethnic groups black colour dominates in the young and adults. In the Kenuz with a larger share of old people there is less black colour, due to increased share of grey shades (*Figure 11*). Brown-black shade is present only rarely in the Ababda and Fadidja, while it is absent in the Kenuz and Arabs. No red-heads were encountered. A single old Arab had grey hair. Data on five Ababda and one Arab are missing; perhaps they were bald-headed.

14.4. Hair shape

Hair shape was determined by means of a scheme by R. Martin and K. Saller (1959, Fig. 196). Straight hair (a) was never found in any of the groups, slightly wavy (b) in the Fadidja. On the other hand, loose and tight woolly hair (h, i) occurred only in the Fadidja. In Arabs no data on the old were gained (*Figure 12*).

The hair form of 36 probands in the Kenuz, of 44 in Nubian Arabs, of 14 in the Ababda, and of 29 in the Fadidja could not be determined because of their hair being cut too short.

In the young and adult Kenuz the percentage increases smoothly from c/b to e (slight to narrow waves) to a peak at f (curly), followed by a decrease in g (crinkly), lower in adults than in the young. In the old Kenuz c–f categories are almost balanced.

Young Nubian Arabs as compared to adults show a smaller increase from c to e and a smaller peak at f in profit of g. Adults show an increase c–f with anomalously lower e and a decrease in g (crinkly).

There is not a sufficient number of Ababda probands, but they suggest an increase of b–d with a peak already at e (narrow waves), a decrease in f (curly) and the absence of g (crinkly).

The Fadidja start with b in adults, with c in the young, and both show the above-mentioned increase with a peak at f. Instead of well represented g (crinkly) in the young, the adults have lower shares of g with addition of h–i (loose and tight woolly hair) of 6 Black Africans living in the Fadidja area (*Table 48*).

All the three Nubian groups have hair shape varying from Caucasian wavy to African curly and crinkly. Only the Fadidja revealed the presence of Sub-Saharan Africans with crinkly to woolly hair, while the Ababda stand clearly apart (*Figure 13*).

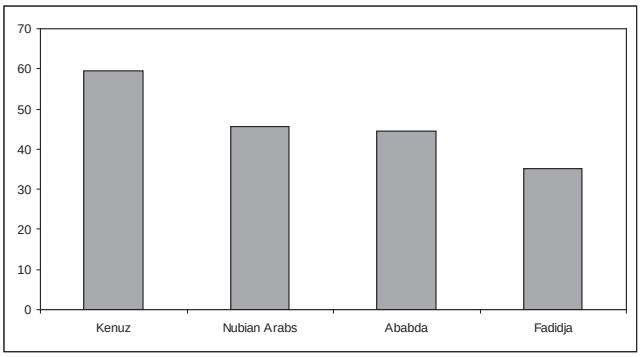


FIGURE 9. Percentage of dark, brown black and black skin colour (shades nos. 20–29) in ethnic groups of adult Nubians and Ababda.

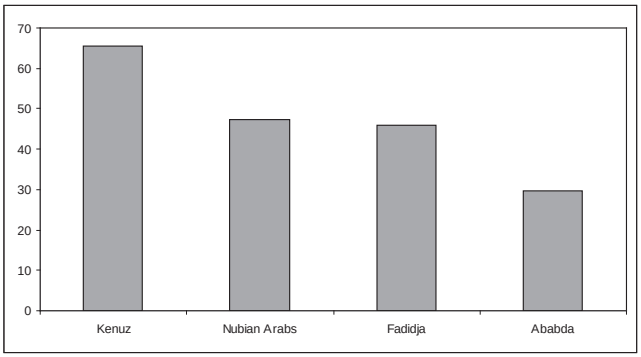


FIGURE 10. Percentage of black and dark brown eye colour (shades nos. 1–2) in ethnic groups of adult Nubians and Ababda.

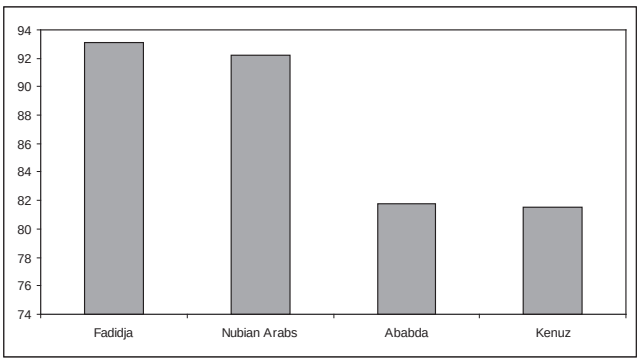


FIGURE 11. Percentage of black hair colour (shades Y–Z) in ethnic groups of adult Nubians and Ababda.

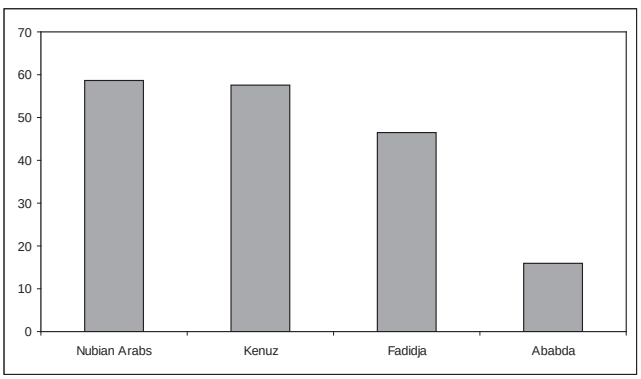


FIGURE 12. Percentage of curly and crinkly hair (categories f–g) in ethnic groups of adult Nubians and Ababda.

TABLE 46. Eye colour of the Nubians and Ababda. Legend: Shades 1 = black, 2 = dark brown, 3 = less dark brown, 4 = brown, 5 = light brown, 6 = more light brown, 7a = brown-greenish.

Shade	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
1	5	14.3	23	22.5	12	22.2	40	23.4
2	16	45.7	38	37.3	18	52.9	72	42.1
3	12	34.3	32	31.4	12	35.3	56	32.7
4	2	5.7	7	6.9	1	2.9	10	5.8
5–7a	–	–	2	2.0	1	–	–	1.2
Sum	35		102		34		171	

Shape	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
1	3	21.4	13	12.3	16	12.4	–	–	2	8.3	2	7.4
2	4	28.6	41	35.7	45	34.9	1	33.3	5	20.8	6	22.2
3	6	42.9	42	36.5	48	37.2	2	66.7	9	37.5	11	40.7
4	1	7.1	16	13.9	17	13.2	–	–	7	29.2	7	25.9
5–7a	–	–	3	2.6	3	2.3	–	–	1	4.2	1	3.7
Sum	14		115		129		3		24		27	

Shade	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
1	12	22.2	10	5.7	–	–	22	9.4
2	16	29.6	68	38.9	1	25.0	85	36.5
3	20	37.0	76	43.4	1	25.0	97	41.3
4	6	11.1	19	10.9	2	50.0	27	11.6
5–7a	–	–	2	1.1	–	–	2	0.9
Sum	54		229		4		233	

TABLE 47. Hair colour of the Nubians and Ababda. Legend: T, W = brown black, Y, Z = black.

Shade	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
Y–Z	35	100	94	91.3	12	34.3	141	81.5
grey-white	–	–	9	8.7	23	65.7	32	18.5
Sum	35		103		35		173	

Shade	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
W	–	–	–	–	–	–	–	–	1	5.3	1	4.5
Y–Z	14	100.0	104	91.2	118	92.2	3	100.0	15	78.9	18	81.8
grey	–	–	10	8.8	10	7.8	–	–	3	15.8	3	13.6
Sum	14		114		128		3		19		22	

Shade	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
T	–	–	1	0.6	–	–	1	0.4
W	2	3.7	4	2.3	1	25.0	7	3.0
Y–Z	52	96.3	163	93.1	3	75.0	218	93.6
grey	–	–	7	4.0	–	–	7	3.0
Sum	54		175		4		233	

TABLE 48. Hair shape of the Nubians and Ababda. Legend: b = slight wavy, c = long wavy, d = wide wavy, e = narrow wavy, f = curly, g = crinkly, h = loose woolly, i = tight woolly.

Shape	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
b	–	–	1	1.2	–	–	1	0.7
c	1	2.9	4	4.8	6	30.0	11	8.0
d	4	11.8	7	8.4	5	25.0	16	11.7
e	6	17.6	20	24.1	4	20.0	30	21.9
f	17	50.0	41	49.4	5	25.0	63	46.0
g	6	17.6	10	12.0	–	–	16	11.7
Sum	34		83		20		137	

Shape	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
b	–	–	1	1.4	1	1.1	–	–	1	10.0	1	7.7
c	1	7.1	3	4.1	4	4.6	–	–	1	10.0	1	7.7
d	1	7.1	21	28.8	22	25.3	–	–	3	30.0	3	23.1
e	2	14.2	7	20.6	9	10.3	2	66.7	4	40.0	6	46.2
f	6	42.9	31	65.8	37	42.5	1	33.3	1	10.0	2	15.4
g	4	28.6	10	13.7	14	16.1	–	–	–	–	–	–
Sum	14		73		87		3		10		13	

Shape	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
c	–	–	2	1.4	–	–	2	1.0
d	11	20.4	36	24.3	–	–	47	23.0
e	13	24.0	39	26.4	2	100.0	54	26.5
f	18	33.3	55	37.1	–	–	73	35.8
g	12	22.2	10	6.8	–	–	22	10.8
h–i	–	–	6	4.0	–	–	6	2.9
Sum	54		148		2		204	

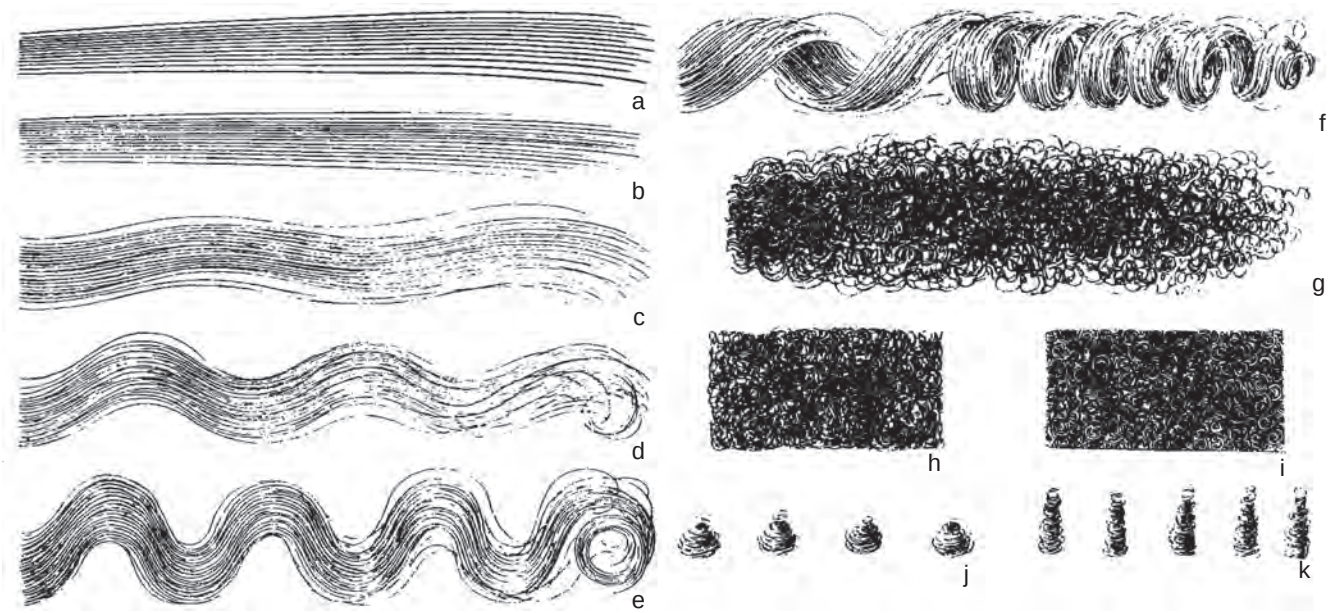


FIGURE 13. Scheme for determination of hair shape by Martin and Saller 1957 (Fig. 196): a = straight, b = slight wavy, c = long wavy, d = wide wavy, e = narrow wavy, f = curly, g = crinkly, h = loose woolly, i = tight woolly, j = low tufts, k = high tufts.

14.5. Facial hair (beard)

The extent of growth of facial hair was assessed according to the scheme by K. Conrad (in Martin, Saller 1959, Fig. 1037, p. 1363). This was possible in all probands except for one old Arab and two adult Fadidja. For simplification of the results each two degrees of the scheme (*Figure 14*) were united together. Degree 8 was omitted, being not found in any proband (*Table 49*).

In most of the young of all groups there was either no facial hair (0) or it just started on the upper lip and chin (1). Less probands showed moustache, more distinct hair on the chin and above the mandibular angle (2–3). Higher grades of almost continuous (4) or continuous beard (5) occurred rarely.

In adult and old Kenuz these grades increased in number. Grades 6 and 7 (broad continuous beard) had decreasing numbers, strongly in adults and less so in olds. In Nubian Arabs the picture was nearly identical, but without grades 6–7. The Ababda had slightly more of grades 2–3 and less of 4–5. The other grades (0–1 and 6–7) were rare.

The Fadidja showed similar distribution to the Kenuz and Arabs with almost non-existing grades 6–7.

14.6. Body hair

Because no scheme was available, we divided its presence into four degrees of density (*Table 50*).

In 50–100% of young males no body hair was present. Also a relatively large part of adults – a third of Nubian Arabs, more than a third of the Kenuz, almost half of the Fadidja and more than half of the Ababda – were practically hairless. Sparse hair was present in more than a third of the Fadidja, somewhat more often in the Ababda and Kenuz, and in more than half of Nubian Arabs. Medium developed hair was encountered in only about 10% of the probands – more than that in the Kenuz, around 10% in the Fadidja, less in the Arabs and least in the Ababda. The same category was found in more than a third of the old Kenuz and a half of the old Fadidja. A single old Arab (not included in *Table 50*) had sparse hair.

As a whole the growth of body hair was found to be very scarce in the Nubians and Ababda, as an adaptive feature to hot dry climate.

14.7. Eyelids

Special forms of eyelids were recorded according to the scheme of Eickstedt (1944: 1002, Fig. 690) complemented by ptosis of the upper lid. Their occurrence was relatively low (*Table 51*).

Most often epicanthus (f) was encountered, especially in adult Nubian Arabs. It is followed by the hanging fold (d), known from the Europeans. Ptosis of the upper lid (h) was occurring less often, mostly in the adult Fadidja. Only in one instance less the inner fold (g), appeared also especially in the adult Fadidja. The other four forms were encountered only sporadically.

14.8. Nasal profile

Nasal profile was recorded according to a scheme by Eickstedt (1944, Fig. 712). Data are missing from one old Kenuz (*Table 52*).

The leading form of the nasal profile in the Nubians and Ababda is the straight one (1), occurring in adults in more than half cases (except for the Kenuz – in one third

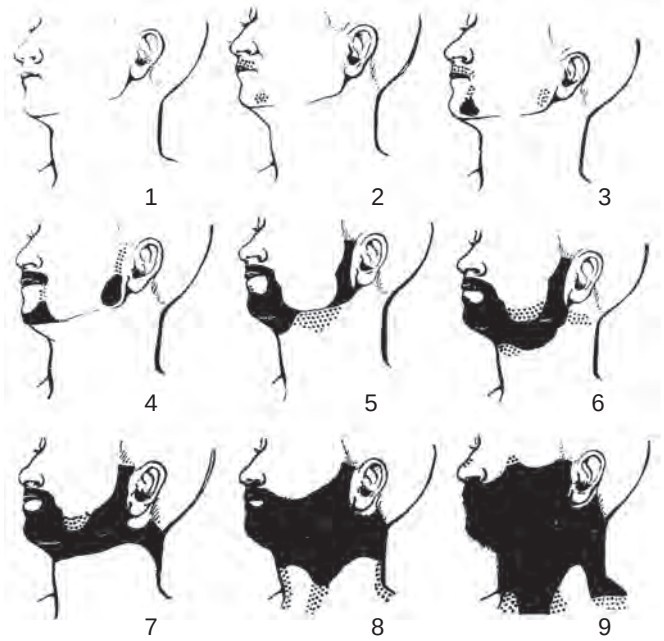


FIGURE 14. Scheme for determination of stages of developement of facial hair (beard) by Conrad (in Martin and Saller 1959, Fig. 1037).

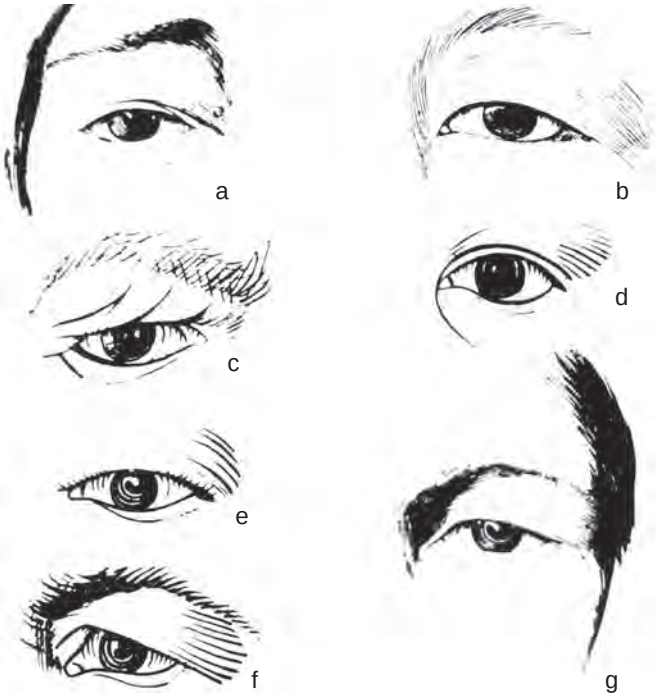


FIGURE 15. Scheme of special forms of eyelids by Eickstedt 1944 (Fig. 690): a = medial edge fold (Negro I), b = curtain fold (Hottentotic), c = lateral edge fold (Negro II), d = hanging fold (Nordic), e = beak-form fold (Mongolian), f = epicanthus, g = inner fold (American Indian).

TABLE 49. Extent of growth of facial hair in the Nubians and Ababda.

Degree	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
0–1	28	80.0	24	23.3	4	11.4	56	32.9
2–3	6	17.1	30	29.1	9	25.7	45	26.0
4–5	1	2.9	39	37.9	14	40.0	54	31.2
6–7	–	–	10	9.7	8	22.9	18	10.4
SUM	35		103		35		173	

Degree	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
0–1	8	57.1	10	8.8	18	14.2	3	100.0	1	4.2	4	14.8
2–3	6	42.9	45	39.8	51	40.2	–	–	11	45.8	11	40.7
4–5	–	–	58	51.3	58	45.7	–	–	10	41.7	10	37.0
6–7	–	–	–	–	–	–	–	–	2	8.3	2	7.4
Sum	14		113		127		3		24		27	

Degree	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
0–1	43	79.6	21	13.0	–	–	64	27.5
2–3	9	16.7	68	38.9	2	50.0	79	33.9
4–5	2	3.7	85	48.6	2	50.0	89	38.2
6–7	–	–	1	0.6	–	–	1	0.4
SUM	54		175		4		233	

TABLE 50. Density of body hair. Legend: 0 = no body hair, 1 = sparse hair, 2 = medium developed hair, 3 = dense hair, 4 = very dense hair.

Degree	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
0	21	60.0	39	37.9	13	37.1	73	42.2
1	12	34.3	45	43.7	8	22.9	65	37.5
2	2	5.7	14	13.6	13	37.1	29	16.8
3	–	–	3	2.9	1	2.9	4	2.3
4	–	–	2	1.9	–	–	2	1.2
Sum	35		103		35		173	

Degree	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
0	14	50.0	37	33.0	51	37.4	3	100.0	13	54.2	16	59.3
1	14	50.0	59	52.7	73	52.1	–	–	9	37.5	9	33.3
2	–	–	11	9.8	11	7.9	–	–	2	8.3	2	7.4
3	–	–	3	2.7	3	2.1	–	–	–	–	–	–
4	–	–	2	1.8	2	1.4	–	–	–	–	–	–
Sum	28		112		140		3		24		27	

Degree	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
0	41	75.9	83	47.7	1	25.0	125	53.9
1	11	20.4	62	35.6	1	25.5	74	31.9
2	1	1.9	19	10.9	2	50.0	22	9.5
3	–	–	9	5.2	–	–	9	3.9
4	1	1.9	1	0.6	–	–	2	0.9
Sum	54		174		4		232	

TABLE 51. Special forms of eyelids. Legend: a = medial edge fold (Negro I), b = curtain fold (Hottentotic), c = lateral edge fold (Negro II), d = hanging fold (Nordic), e = beak-form nasal-lid fold (Mongolian), f = epicanthus, g = inner fold (American Indian), h = ptosis of upper lid.

	Kenuz			Arabs		Ababda		Fadidja			Sum
	young	adult	old	young	adult	young	adult	young	adult	old	
	n	n	n	n	n	n	n	n	n	n	n
a		2					1				3
b		2					3		2		7
c							3				3
d		5	8		7			1	7		28
e									1		1
f	5	3		1	12	1		4	7		33
g		1			1			3	15		20
h		2			8		1		9		20
Sum	5	15	8	1	28	1	8	8	41		115
n	35	103	35	14	115	3	24	54	175	4	562
%	14.3	14.6	22.9	7.1	24.3	33.3	33.3	14.8	23.4	–	20.5

TABLE 52. Forms of nasal profile. Legend: 1 = straight, 2 = slightly convex, 3 = highly convex, 4 = slightly concave, 5 = deeply concave, 6 = wavy.

Degree	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
1	14	40.0	35	33.7	10	29.4	59	34.1
2	5	14.3	15	14.4	9	26.5	29	16.8
3	1	2.9	5	4.8	2	5.9	8	4.6
4	10	28.6	23	22.1	5	14.7	38	22.0
5	–	–	5	4.8	–	–	5	2.9
6	5	14.3	21	20.2	8	23.5	34	19.7
Sum	35		104		34		173	

Degree	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
1	2	14.3	64	55.7	66	51.2	2	66.7	12	50.0	14	51.9
2	4	28.6	12	10.4	16	12.4	–	–	3	12.5	3	11.1
3	–	–	5	4.3	5	3.9	–	–	–	–	–	.–
4	6	42.9	20	17.4	26	20.2	–	–	5	20.8	5	18.5
5	–	–	2	1.7	2	1.6	–	–	–	–	–	–
6	2	14.3	12	10.4	14	10.9	1	33.3	4	16.7	5	18.5
Sum	14		115		129		3		24		27	

Degree	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
1	20	37.0	103	59.9	1	25.5	124	53.2
2	5	9.3	16	9.1	1	25.5	22	9.4
3	2	3.7	4	2.3	–	–	6	2.6
4	11	20.4	30	17.1	1	25.5	42	18.0
5	2	3.7	6	3.4	–	–	8	3.4
6	14	25.9	16	9.1	1	25.5	31	13.3
Sum	54		175		4		233	

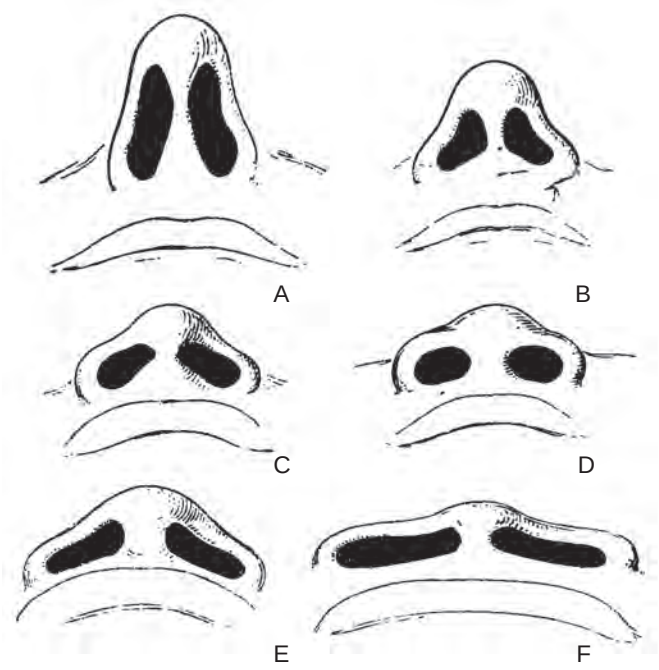


FIGURE 16. Scheme of the nasal base by Topinard (in Martin and Saller 1959, Fig. 249): A = long narrow, sagittal narines, B = triangular, oblique and slightly angulated narines, C = slightly depressed, more oblique narines, D = more depressed, transversal oval narines, E = broad, slightly depressed, oblique narines, F = very broad and depressed, transversal narines.

of cases). The next category of slightly concave noses (4) is more numerous than the one with slightly convex noses (2). The last frequented category is the wavy noses (6), less numerous in Nubian Arabs. The remaining categories of highly convex (3) or deeply concave noses (4) are rare. A single old Arab had nasal profile of degree 6.

14.9. Nasal base

The evaluation of the nasal base according to Topinard (Martin, Saller 1959, Fig. 249) is much more important than the nasal profile for the determination of environmental influences and/or genetic background of the examined ethnic groups (*Figure 16*). Of the 6 forms, the last two (known from Subsaharan Africans) are omitted here because they were not found in our probands (*Table 53*). Data of two adult Arabs and an adult Fadidja are missing.

The European A form was present, but in low numbers (5–15%) and mostly in the Ababda, followed by the Kenuz, less in Nubian Arabs and least in the Fadidja. The B form was the leading one, the highest in Arabs, in other groups between 50–60%. The C form occurred in 20–30%, mostly in the Fadidja and Kenuz. A single old Arab had nasal base of type C. The D form – which occurs often in Sub-Saharan Africans – was present in both the Kenuz and Fadidja in about 10%, but less frequently in the Ababda and Nubian Arabs. The sequence Arab, Ababda, Kenuz, and Fadidja is regularily spaced (*Figure 17*). This *Figure* can be compared with a graph showing nasal breadth, including the Egyptians

TABLE 53. Forms of the nasal base. Legend: A = sagittal narines, B = oblique, slightly angulated narines, C = more oblique narines, D = transversal oval narines.

Degree	**Kenuz**							
	young		**adult**		**old**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
A	2	5.7	10	9.7	4	11.4	16	9.2
B	18	51.4	57	55.3	19	54.3	94	54.3
C	13	37.1	25	24.3	6	17.1	44	25.4
D	2	5.7	11	10.7	6	17.1	19	11.0
Sum	35		103		35		173	

Degree	**Arabs**						**Ababda**					
	young		**adult**		**all**		**young**		**adult**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
A	1	6.7	8	7.1	9	7.0	1	33.3	3	12.5	4	14.8
B	9	60.0	77	68.1	86	67.2	–	–	15	62.5	15	55.6
C	4	26.7	26	23.0	30	23.4	2	66.7	5	20.8	7	25.9
D	1	6.7	2	1.8	3	2.3	–	–	1	4.2	1	3.7
Sum	15		113		128		3		24		27	

Degree	**Fadidja**							
	young		**adult**		**old**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
A	2	3.7	7	4.0	–	–	9	4.9
B	31	57.4	96	55.5	3	75.0	130	56.3
C	19	35.2	50	28.9	–	–	.69	29.9
D	2	3.7	20	11.6	1	25.0	23	10.0
Sum	54		173		4		231	

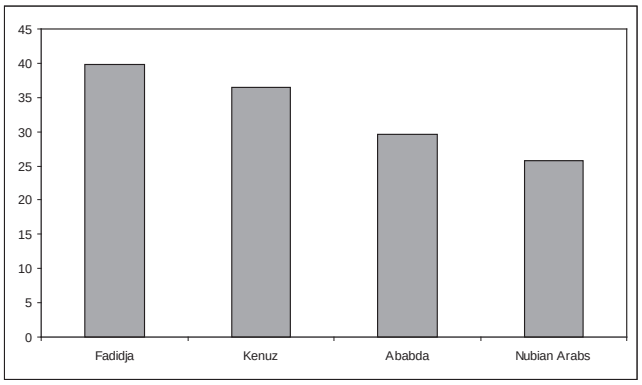


FIGURE 17. Percentage of slightly depressed and more depressed nasal base (categories C and D) in ethnic groups of adult Nubians and Ababda.

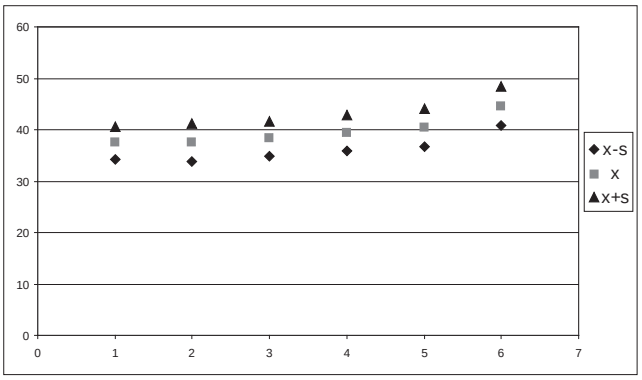


FIGURE 18. Comparison of nasal breadth of the ethnic groups of adult Nubians and Ababda with Egyptians and Sudanese Blacks. 1 = Egyptians, 2 = Ababda, 3 = Nubian Arabs, 4 = Fadidja, 5 = Kenuz, 6 = Sudanese Blacks.

and Sudanese Blacks (*Figure 18*). The Ababda are similar to the Egyptians, the ethnic groups of the Nubians follow in regular distances towards broader noses, while the Sudanese Blacks are four times more distant.

14.10. Lip form

Lips, external parts of the mucosal membrane of the mouth, have been adapted to play an important role in thermoregulation. All 4 forms included in the scheme by Martin and Saller (1959, Fig. 237) were recorded in our probands (*Table 54*).

Thin lips and swollen lips were found rarely in all groups. In the Kenuz the number of medium lips increases from the young to old, while the three times bigger number of thick lips decreases in the same direction.

In Nubian Arabs, on the contrary, the leading category is medium lips, almost twice exceeding the number of thick lips.

In the Ababda the picture resembles that of the Arabs, while the dominance of medium lips is still bigger. The share of swollen lips is paradoxically elevated, perhaps due to the small number of cases.

In the Fadidja as compared to the Kenuz, half more of medium lips and less of thick lips appear as a whole. However, in the adults both categories are well-balanced; while in the young thick lips are present six-and-half times more often than the medium ones. Swollen lips occur more often, especially in the young.

Thus considering this feature the Kenuz are more Negroid than the other groups, followed by the Fadidja permeated by Black Sudanese probands. Nubian Arabs and the Ababda have more of medium and thin lips (*Figure 19*).

14.11. Profile of forehead

The profile of the forehead was divided in three categories (*Table 55*).

The leading form is the smoothly arched forehead (60–70%), even more numerous in the adult, old and especially young Fadidja. The oblique shape occurs in about 10%, more in the Kenuz and especially in the Ababda. The bomb form was found in 15–25%, more in the young Arabs and Kenuz. Among the Fadidja it was recorded in seven men of Sudanese origin, while three others had a smoothly arched forehead. A single old Arab had that same type of forehead.

14.12. Prognathism

In recording this feature we distinguished straight vertical profiles (orthognath) from slight, medium and strong degree of prognathism (1–3). The latter category, frequent in Sub-Saharan Africa, never occurred in our probands. This feature expresses the degree of protrusion of the upper jaw or both jaws (*Table 56*).

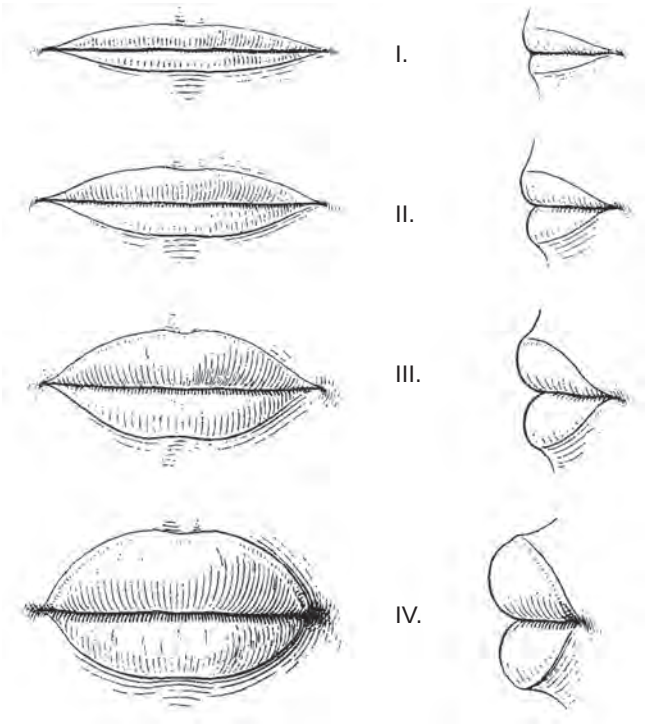


FIGURE 19. Scheme of the lip form by Martin and Saller 1959 (Fig. 237): I = thin, II = medium, III = thick, IV = swollen.

TABLE 54. Lip forms. Legend: I = thin, II = medium, III = thick, IV = swollen, inflated, A = excluded lips thinned by jaw atrophy.

Degree	**Kenuz**							
	young		**adult**		**old**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
I	–	–	–	–	1	3.6	1	1.6
II	1	2.9	23	23.5	16	57.1	40	24.8
III	32	91.4	73	74.5	11	39.3	116	72.0
IV	2	5.7	2	2.0	–	–	4	2.5
Sum	35		98		28		161	
A	–		5		7		12	

Degree	**Arabs**						**Ababda**					
	young		**adult**		**all**		**young**		**adult**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
I	–	–	3	3.4	3	2.9	–	–	–	–	–	–
II	1	7.1	54	60.7	55	53.4	–	–	16	69.6	16	61.5
III	11	78.6	32	36.0	43	41.7	2	66.6	5	21.7	7	26.9
IV	2	14.3	–	–	2	1.9	1	33.3	2	8.7	3	11.5
Sum	14		89		103		3		23		26	
A	–		4		4		–		1		1	

Degree	**Fadidja**							
	young		**adult**		**old**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
I	–	–	5	2.9	–	–	5	2.2
II	6	11.1	79	46.2	2		87	38.3
III	39	72.2	81	47.4	–	–	120	52.9
IV	9	16.7	6	3.5	–	–	15	6.6
Sum	54		171		2		227	
A	–		4		2		6	

TABLE 55. Profile of the forehead. Legend: 1 = pronounced masculine oblique shape, 2 = smoothly arched forehead, 3 = prominent "bomb" form.

Degree	**Kenuz**							
	young		**adult**		**old**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
1	2	5.7	17	16.5	10	28.6	29	16.8
2	26	74.3	71	68.9	22	62.9	119	68.8
3	7	20.0	15	14.6	3	8.6	25	14.5
Sum	35		103		35		173	

Degree	**Arabs**						**Ababda**					
	young		**adult**		**all**		**young**		**adult**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
1	–	–	13	11.3	13	10.1	–	–	6	25.0	6	22.2
2	10	71.4	77	67.0	87	67.4	3	100.0	14	58.3	17	63.0
3	4	28.6	25	21.7	29	22.5	–	–	4	16.7	4	14.8
Sum	14		115		129		3		24		27	

Degree	**Fadidja**							
	young		**adult**		**old**		**all**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
1	1	1.9	18	10.3	–	–	19	8.2
2	47	87.0	125	71.4	3	75.0	175	75.1
3	6	11.1	32	18.3	1	25.0	39	16.7
Sum	54		175		4		233	

TABLE 56. Orthognathism and prognathism. Legend: 0 = orthognath, 1 = slightly prognath, 2 = medium prognath, 3 = very prognath (no case found).

Degree	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
0	12	34.3	52	50.5	18	51.4	82	48.4
1	21	60.0	49	47.5	17	48.6	87	50.3
2	2	5.7	2	1.9	–	–	4	2.3
Sum	35		103		35		173	

Degree	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
0	7	50.0	86	74.8	93	72.1	2	66.7	19	79.2	21	77.7
1	7	50.0	28	24.3	35	27.1	1	33.3	4	16.7	5	18.5
2	–	–	1	0.9	1	0.8	–	–	1	4.2	1	3.7
Sum	14		115		129		3		24		27	

Degree	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
0	21	38.9	145	83.8	2	50.0	168	72.7
1	29	53.7	22	12.7	2	50.0	53	22.9
2	4	7.4	6	3.5	–	–	10	4.3
Sum	54		173		4		231	

TABLE 57. Prominence of zygomatic arches. Legend: 0 = no prominence, 1 = slight prominence, 2 = medium prominence, 3 = strong prominence (no case found).

Degree	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
0	13	37.1	47	45.6	19	54.3	79	45.6
1	21	60.0	53	51.5	16	45.7	90	52.0
2	1	2.9	3	2.9	–	–	4	2.3
Sum	35		103		35		173	

Degree	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
0	3	21.4	45	39.2	48	37.2	3	100.0	14	58.4	17	63.0
1	10	71.4	55	47.8	65	50.4	–	–	5	20.8	5	18.5
2	1	7.1	15	13.0	16	12.4	–	–	5	20.8	5	18.5
Sum	14		115		129		3		24		27	

Degree	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
0	23	42.6	68	38.9	–	–	91	39.1
1	28	51.9	92	52.5	4	100.0	124	53.2
2	3	5.5	15	8.6	–	–	18	7.7
Sum	54		175		4		233	

Only in the Kenuz slight and medium prognathy dominates over orthognathy. All other groups are overwhelmingly orthognath, especially the Ababda, followed by the Fadidja, and Nubian Arabs (*Figure 21*). The Sudanese men living with the Fadidja were medium prognath in four cases, slightly in three cases and in three cases surprisingly orthognath. Data of two adult Fadidja are missing. A single old Arab was orthognath.

TABLE 58. Profile of the back of the head. Legend: 1 = strongly vaulted, 2 = medium vaulted, 3 = slightly vaulted, 4 = flattened.

Degree	Kenuz							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
1	6	17.1	16	15.6	10	28.6	32	18.5
2	18	51.4	59	57.3	20	57.1	97	56.1
3	11	31.4	26	25.2	5	14.3	42	24.3
4	–	–	2	1.9	–	–	2	1.2
Sum	35		103		35		173	

Degree	Arabs						Ababda					
	young		adult		all		young		adult		all	
	n	%	n	%	n	%	n	%	n	%	n	%
1	3	21.4	20	17.4	23	17.8	2	66.7	2	8.6	4	14.8
2	5	35.7	67	58.3	72	55.8	1	33.3	3	12.5	4	14.8
3	6	42.9	28	24.3	34	26.4	–	–	16	66.7	16	59.3
4	–	–	–	–	–	–	–	–	3	12.5	3	11.1
Sum	14		115		129		3		24		27	

Degree	Fadidja							
	young		adult		old		all	
	n	%	n	%	n	%	n	%
1	6	11.1	17	9.7	1	25.0	24	10.3
2	36	66.6	108	61.7	2	50.0	146	62.7
3	12	22.2	44	25.1	1	25.0	57	24.5
4	–	–	6	3.4	–	–	6	2.6
Sum	54		175		4		233	

14.13. Zygomatic arches

Similarly to the previous case, prominence of zygomatic arches was classified as none, slight, medium or strong. The latter category did not occur at all (*Table 57*).

The leading category of slight prominence (1) was ascertained in more than half of the Fadidja, Kenuz and Nubian Arab probands, much less in the Ababda. The category of medium prominence (2) occurred mostly in the Arabs, Fadidja and least in the Kenuz. The rest and a single old Arab had no prominence. The Sudanese men showed slight prominence (5 cases), medium (5 cases), but never a strong prominence.

14.14. Back of the head

Vaulting or flattening of the occiput was recorded according to the scheme by Eickstedt (1944: Fig. 597). His categories f and m were joined together as degree 3 (*Table 58*).

In the Fadidja the back of the head was medium vaulted in more than 80 % cases. In the Nubian Arabs more only slightly vaulted heads occurred, which dominated in the Ababda. Flattened occiputs were extremely rare except for a few adult Fadidja (*Figure 23*).

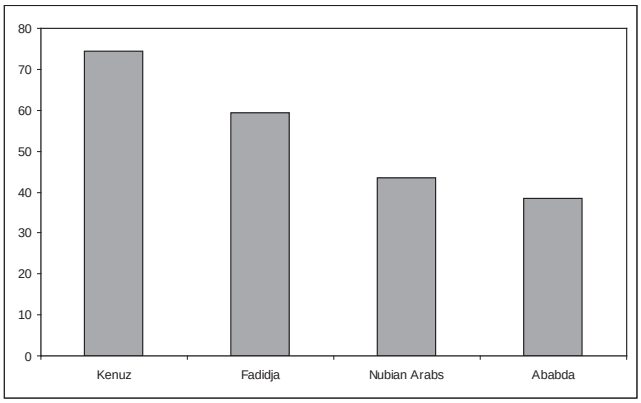


FIGURE 20. Percentage of thick and swollen lips (categories III and IV) in the ethnic groups of adult Nubians and Ababda.

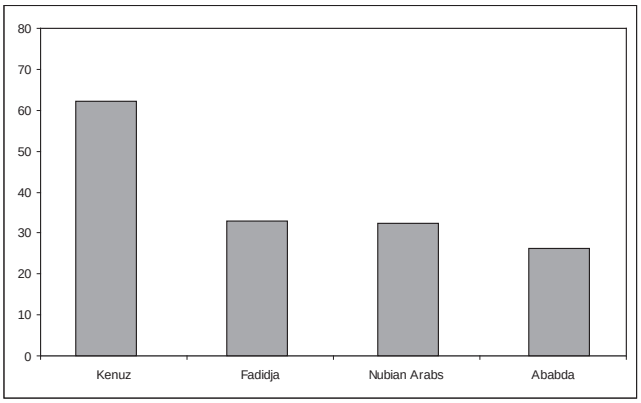
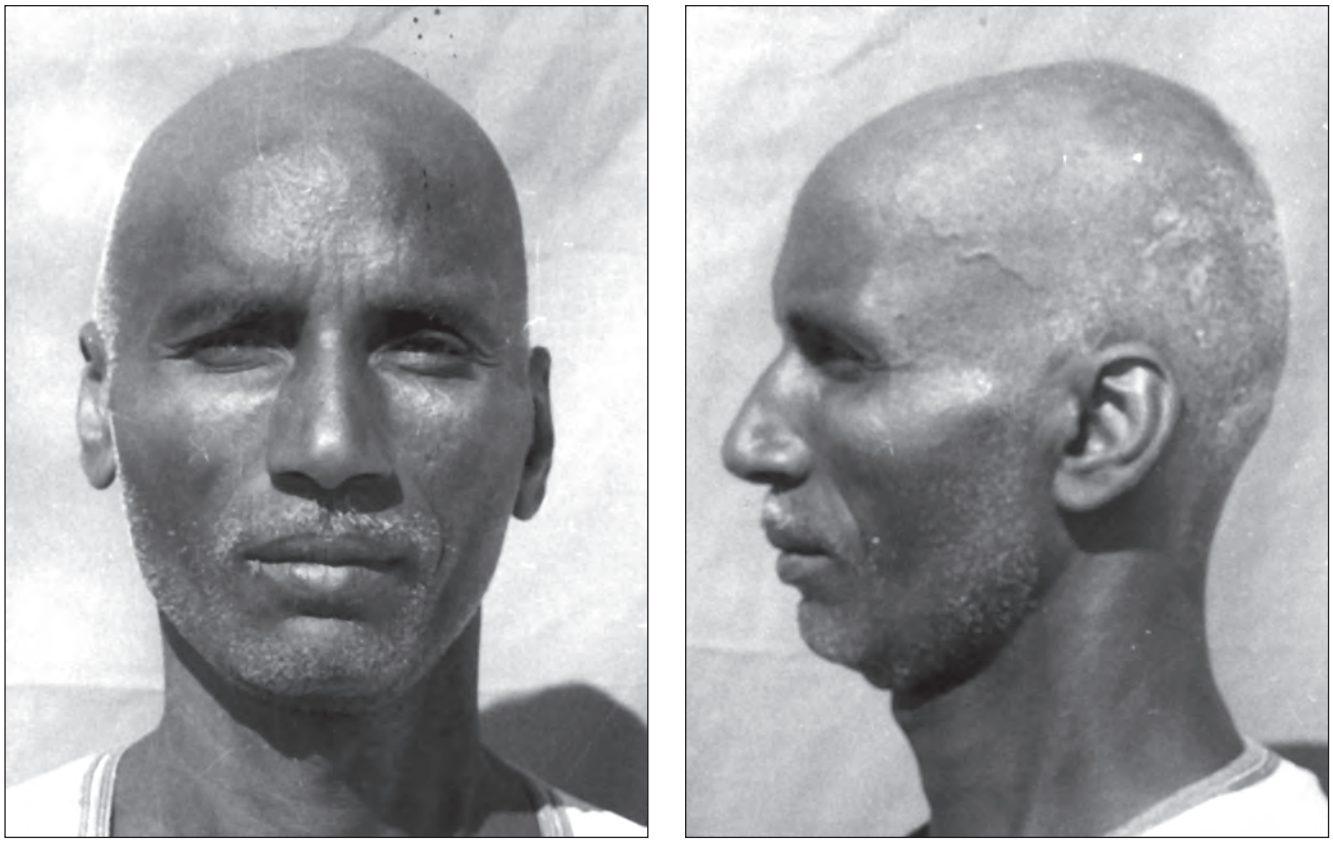


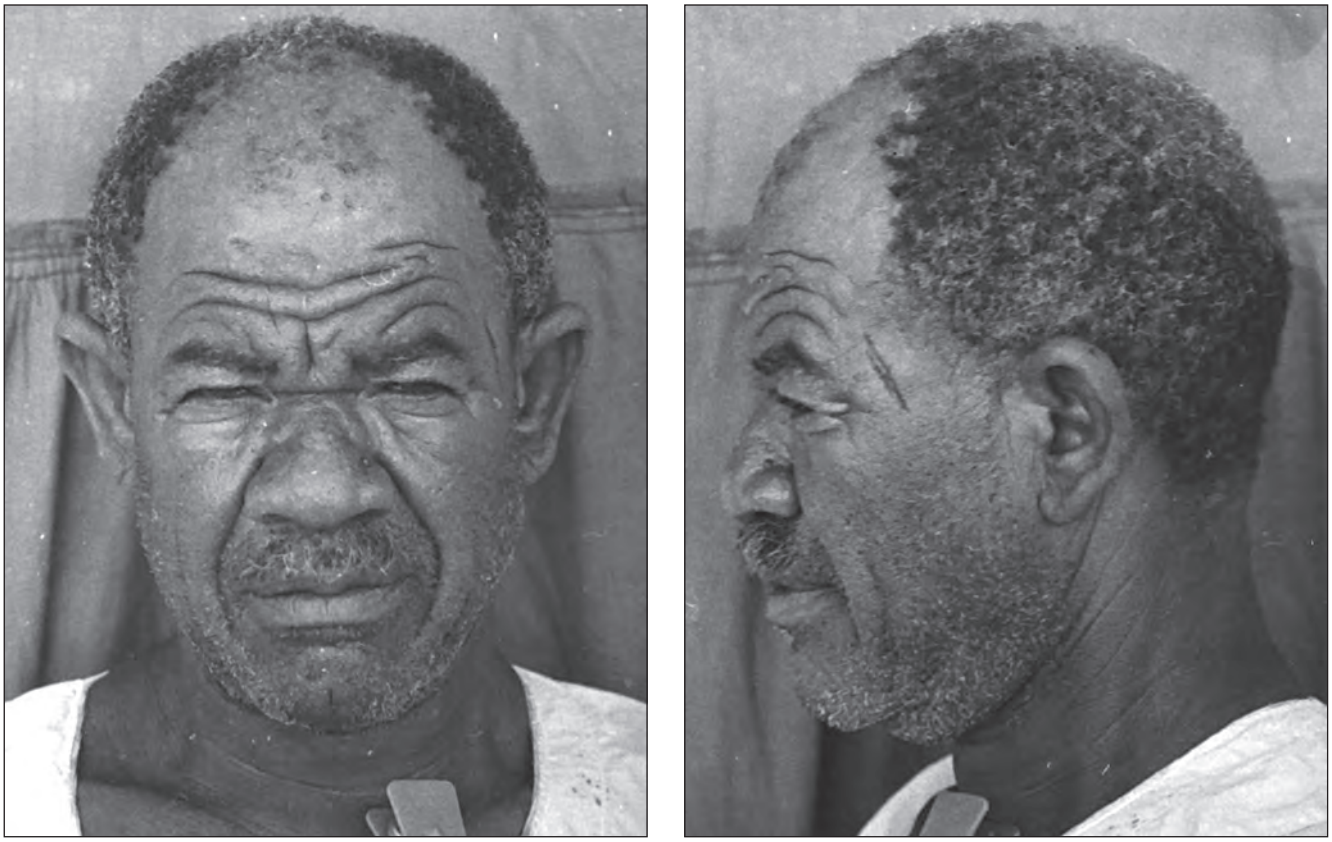
FIGURE 21. Percentage of slight and medium prognatism (categories 1 and 2) in the ethnic groups of adult Nubians and Ababda.



1

2

PLATE XXIII. 1) 47-year-old Kenzi A 13 from Dehmit. 2) 21-year-old Kenzi A 17 from Dehmit.



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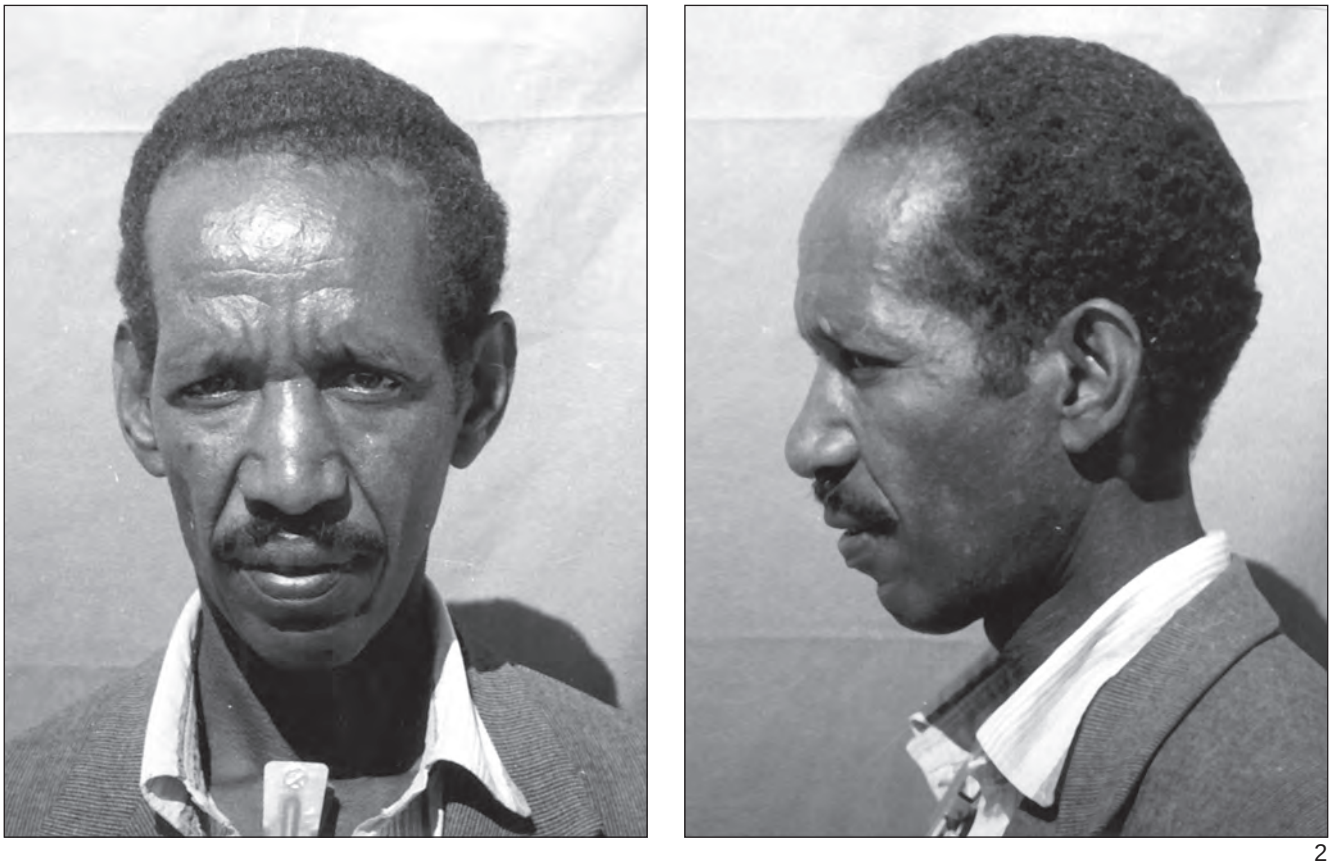
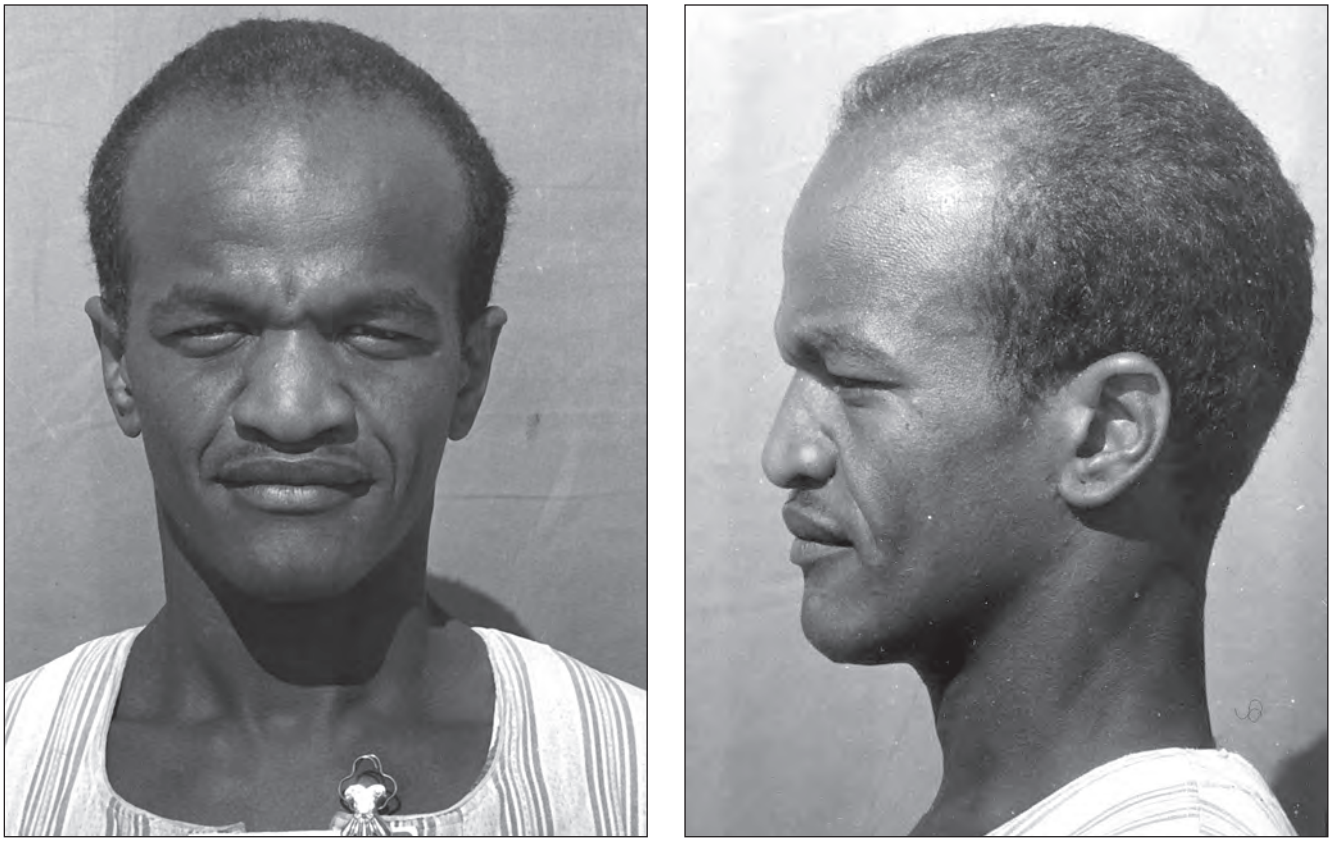


2

PLATE XXIV. 1) 50-year-old Kenzi A 1 from Umbarakab. 2) Adult Kenzi A 6 from Umbarakab.



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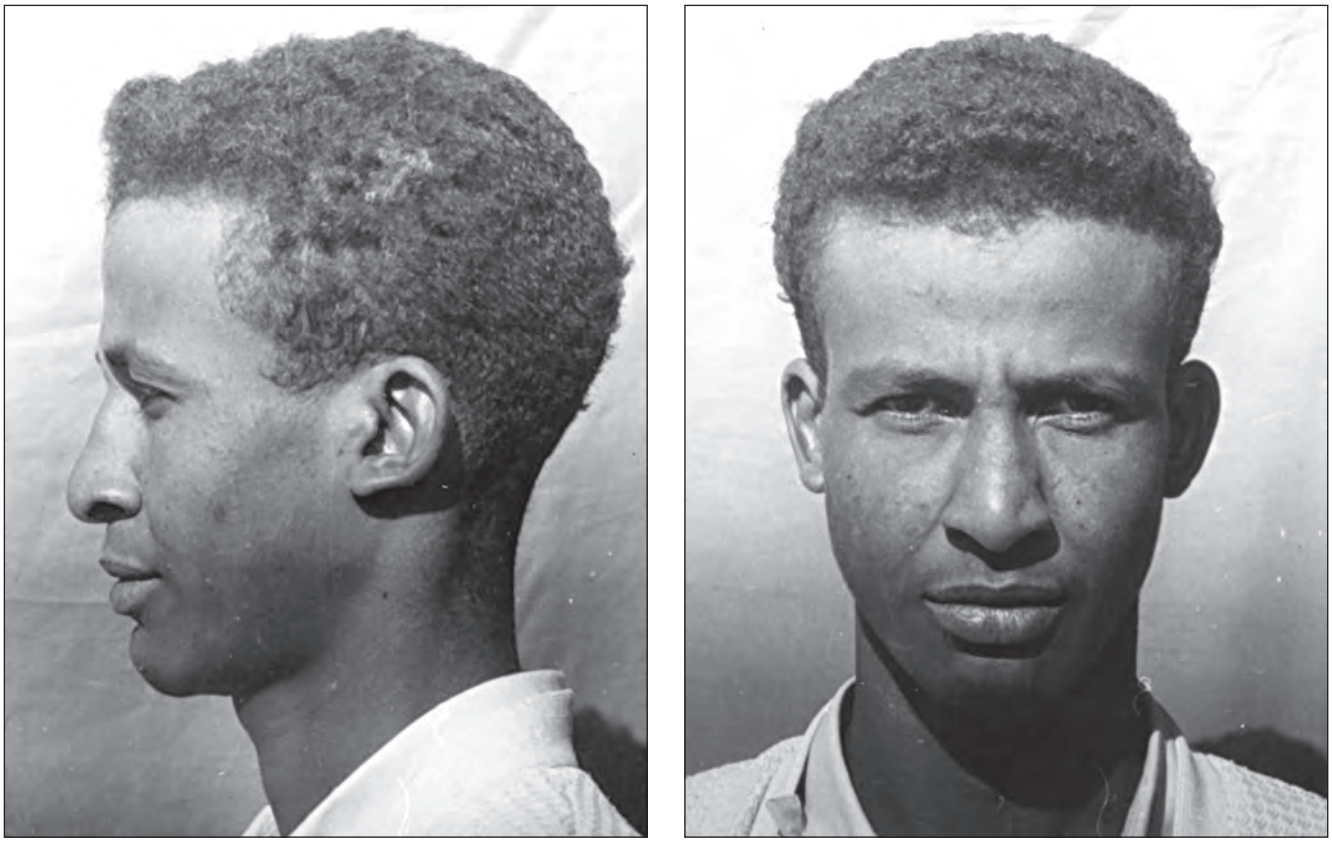
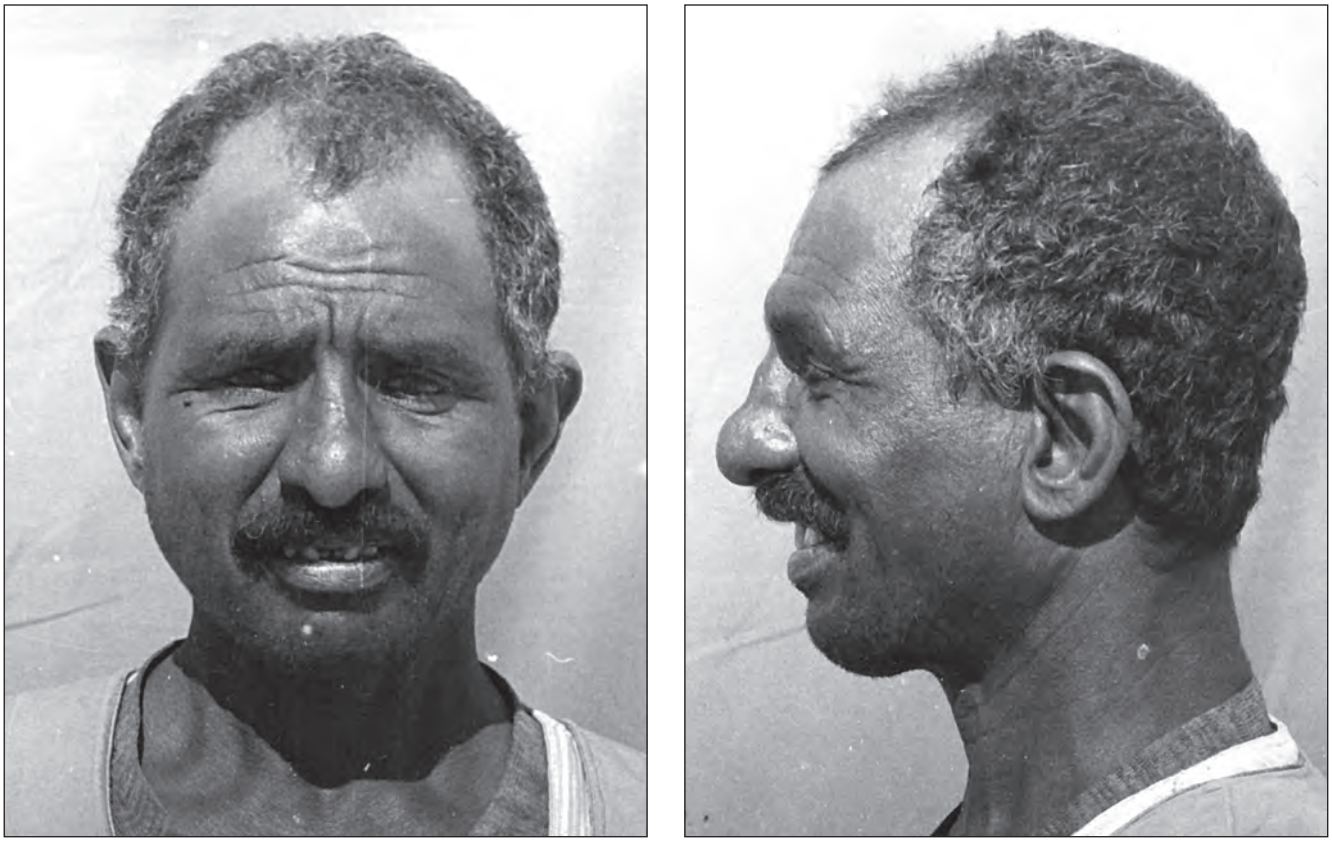


2

PLATE XXV. 1) 27-year-old Kenzi A 115 from Umbarakab. 2) 22-year-old Kenzi E 92 from Koshtamna.



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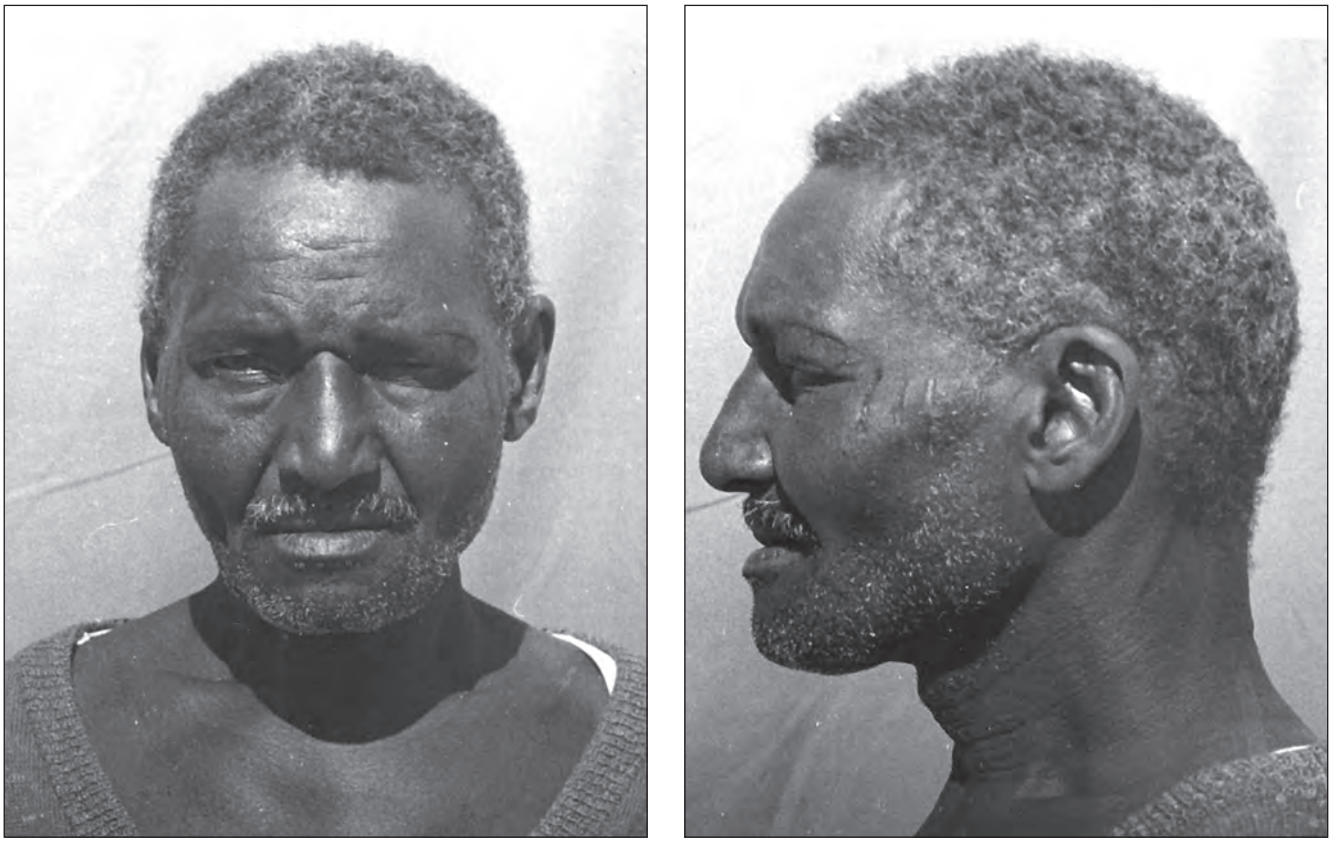
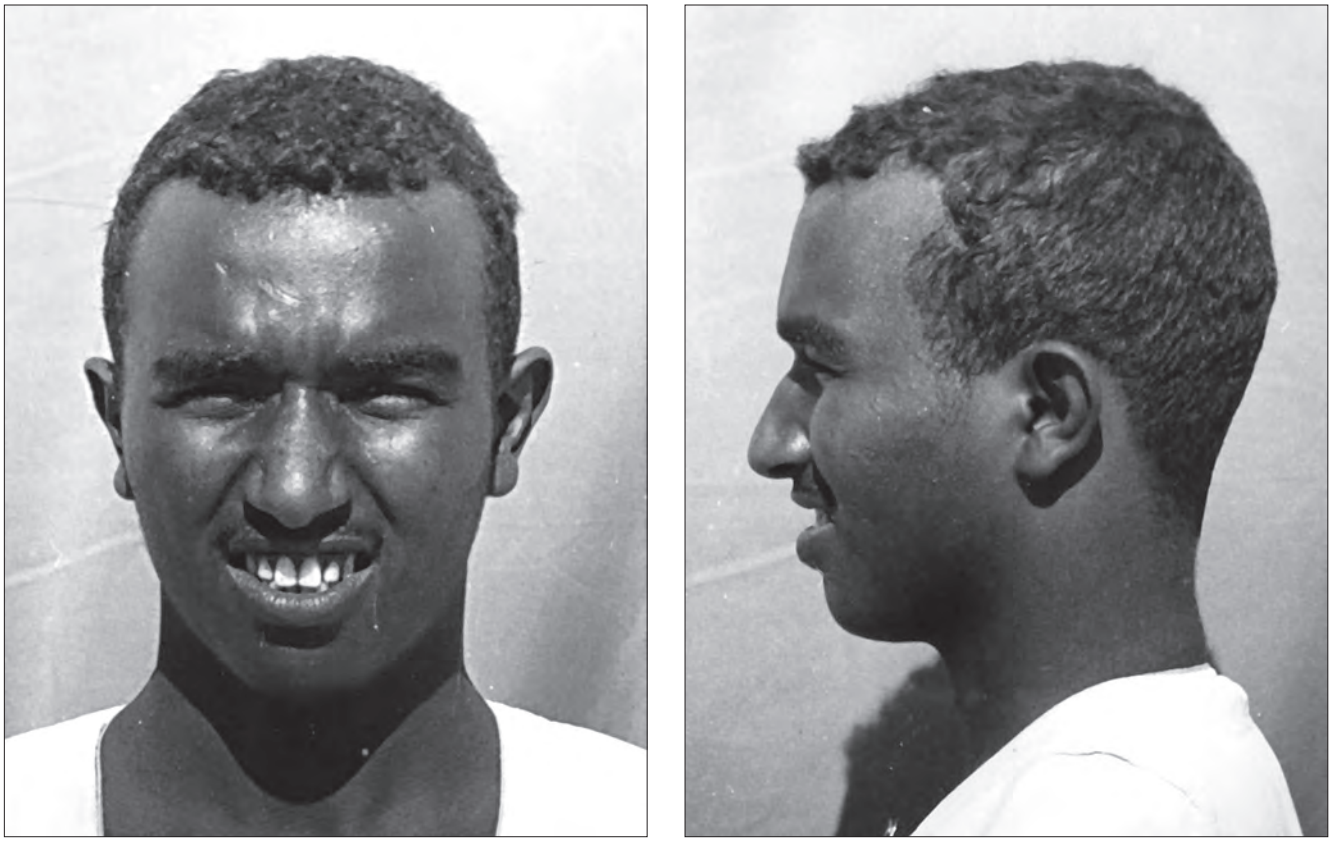


2

PLATE XXVI. 1) 45-year-old Kenzi A 78 from Koshtamna. 2) 50-year-old Kenzi A 79 from Koshtamna.



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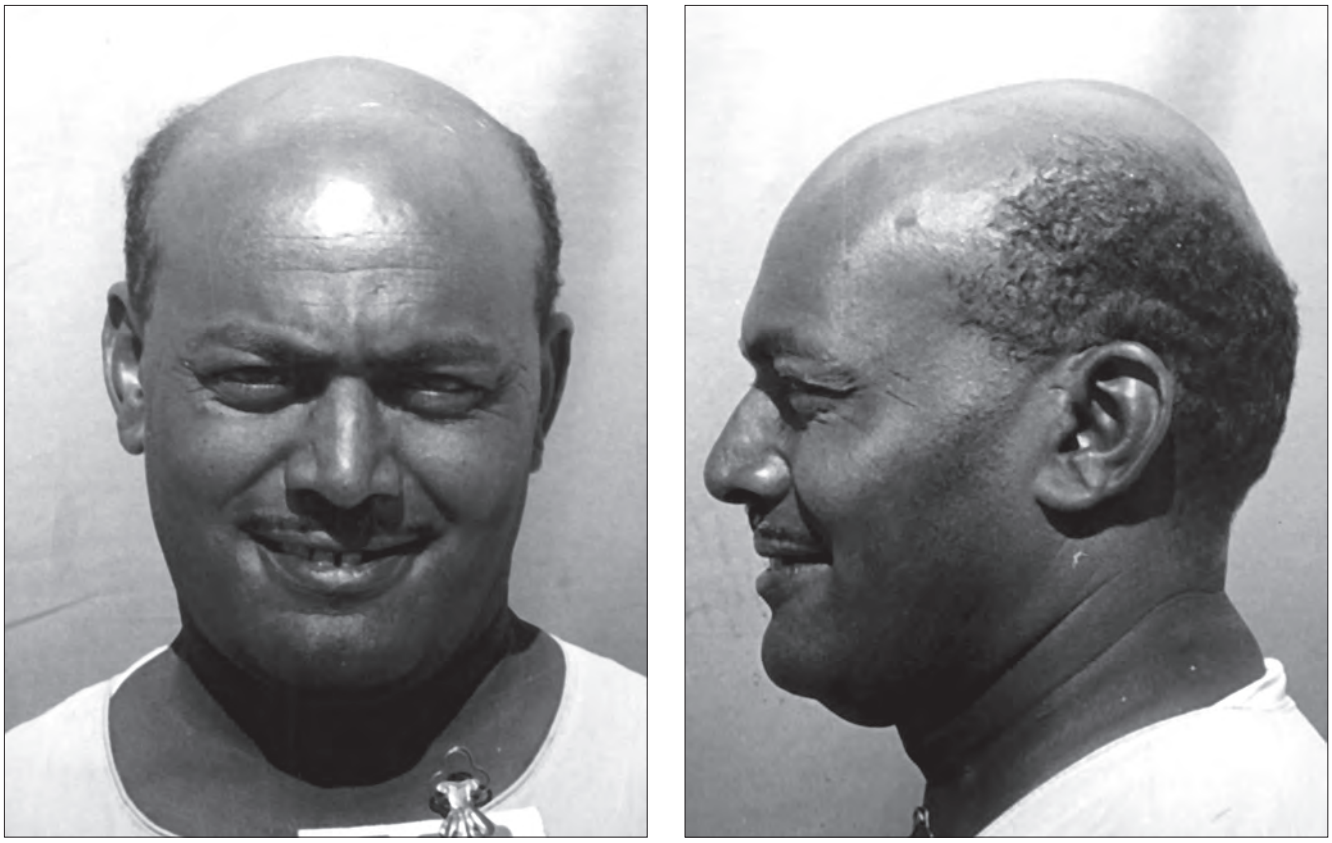

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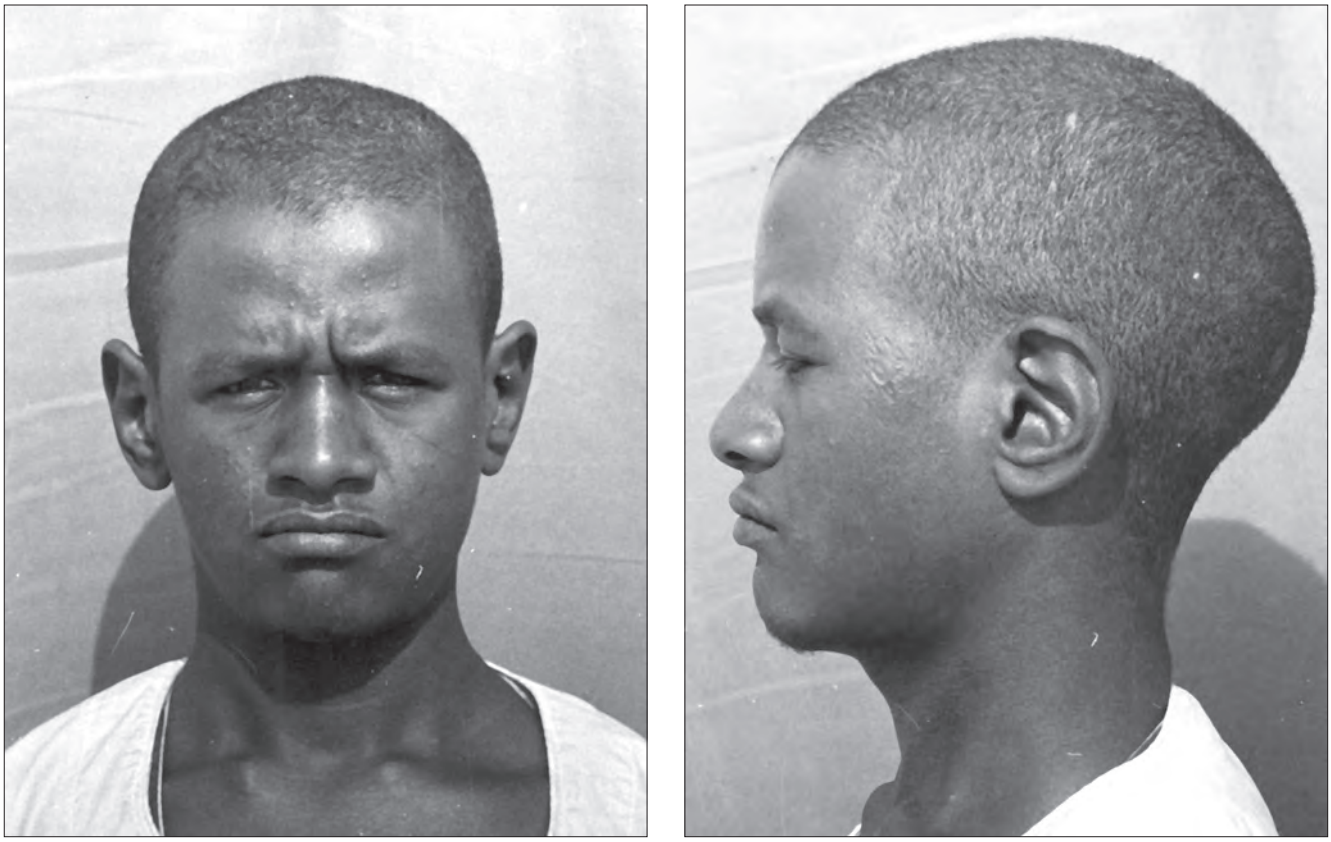
PLATE XXVII. 1) 21-year-old Kenzi A 80 from Koshtamna. 2) 41-year-old Kenzi A 83 from Koshtamna.



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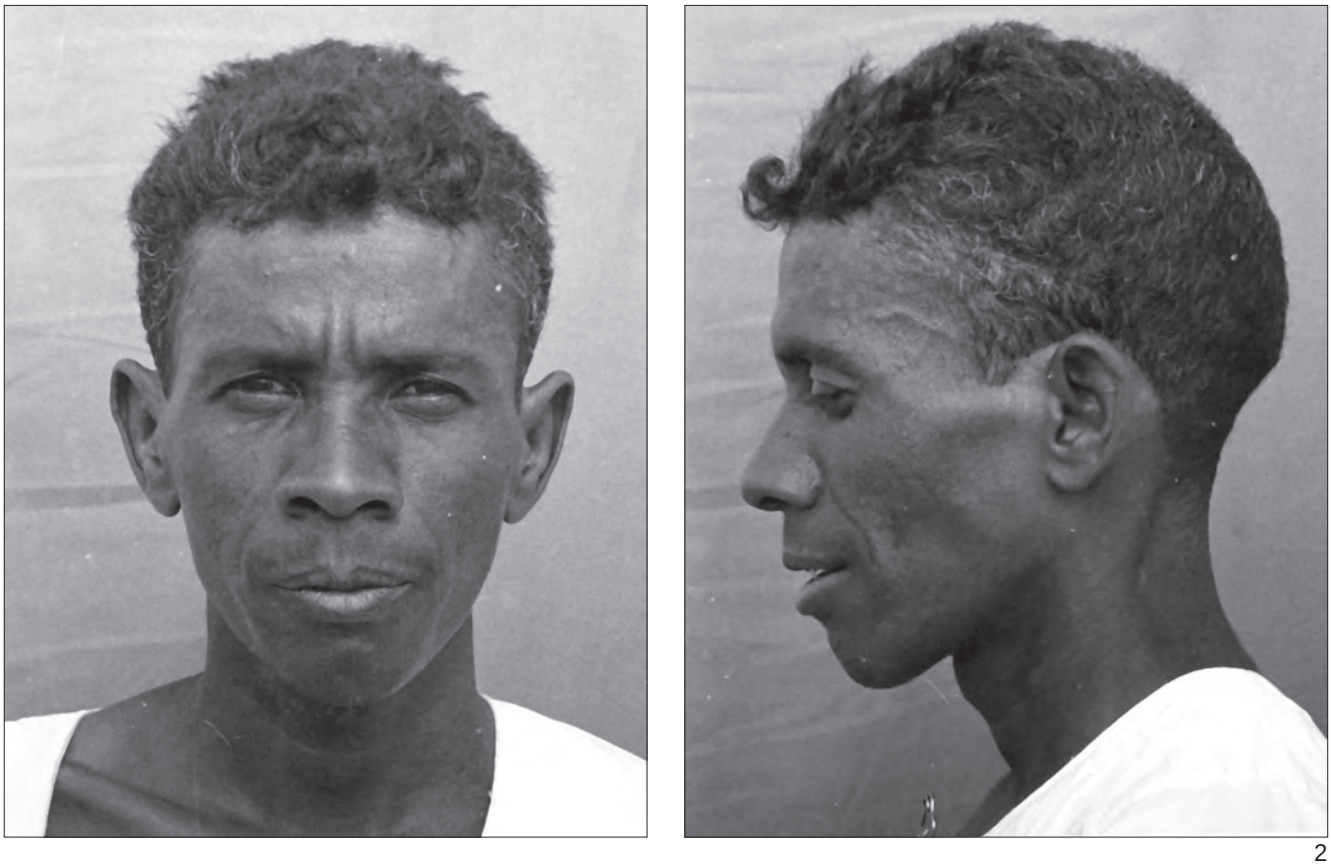


2

PLATE XXVIII. 1) 21-year-old Kenzi A 121 from Dakka. 2) 30-year-old Kenzi A 122 from Dakka.

1

2

PLATE XXIX. 1) 24-year-old Nubian Arab O 92 from Wadi el-Arab. 2) 38-year-old Nubian Arab O 93 from Wadi el-Arab.

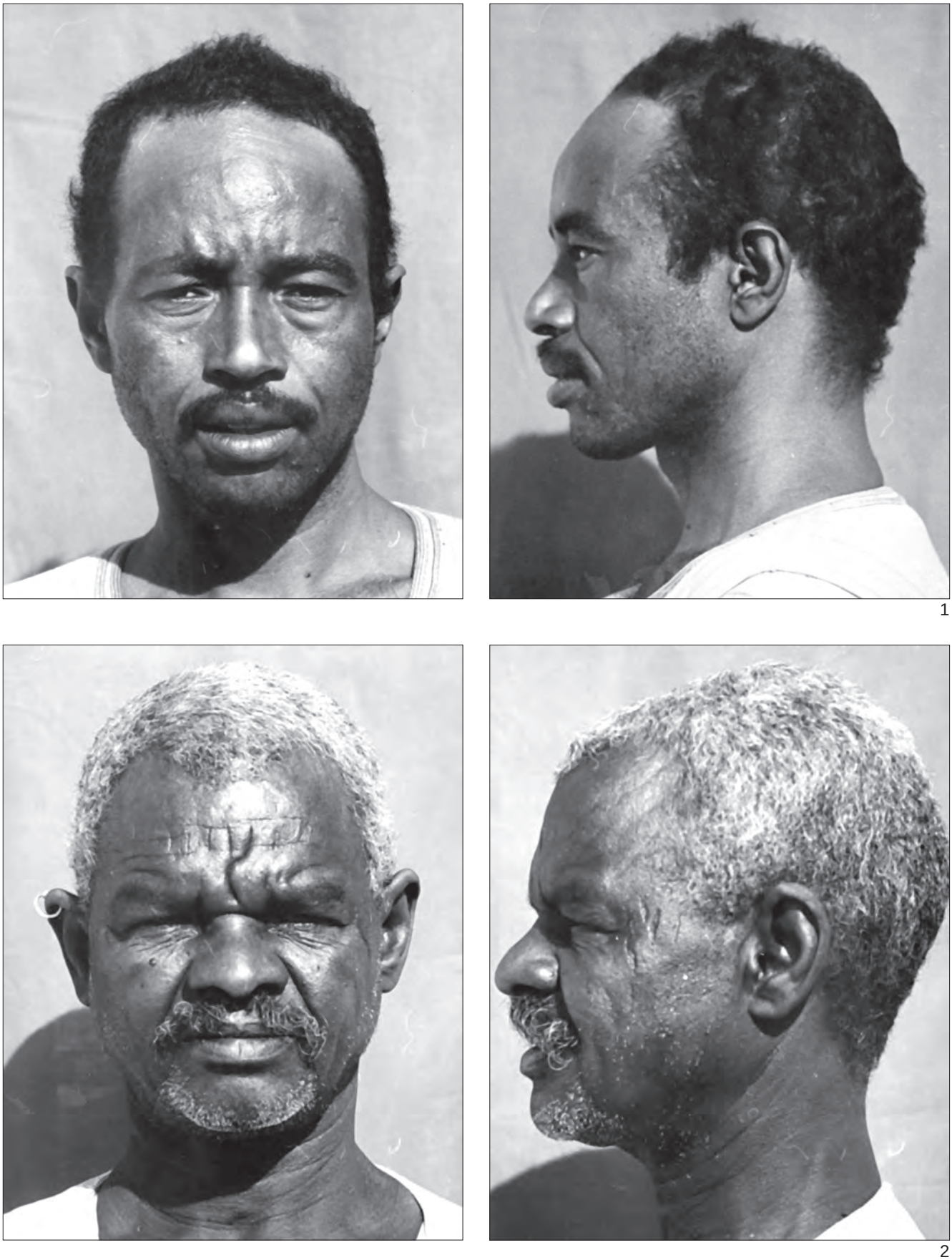
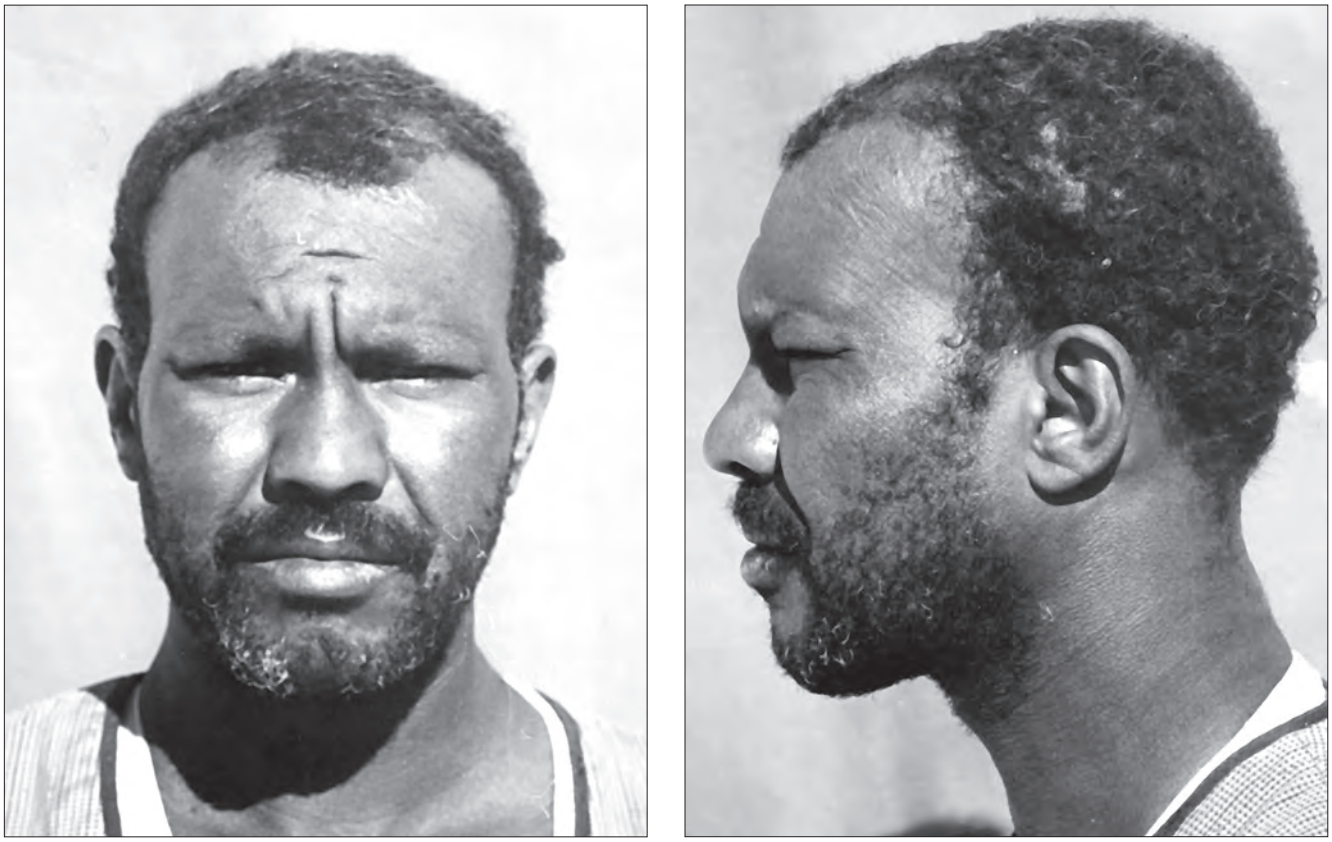


PLATE XXX. 1) 35-year-old Nubian Arab O 14 from Shaturma. 2) 46-year-old Nubian Arab O 15 from Shaturma.



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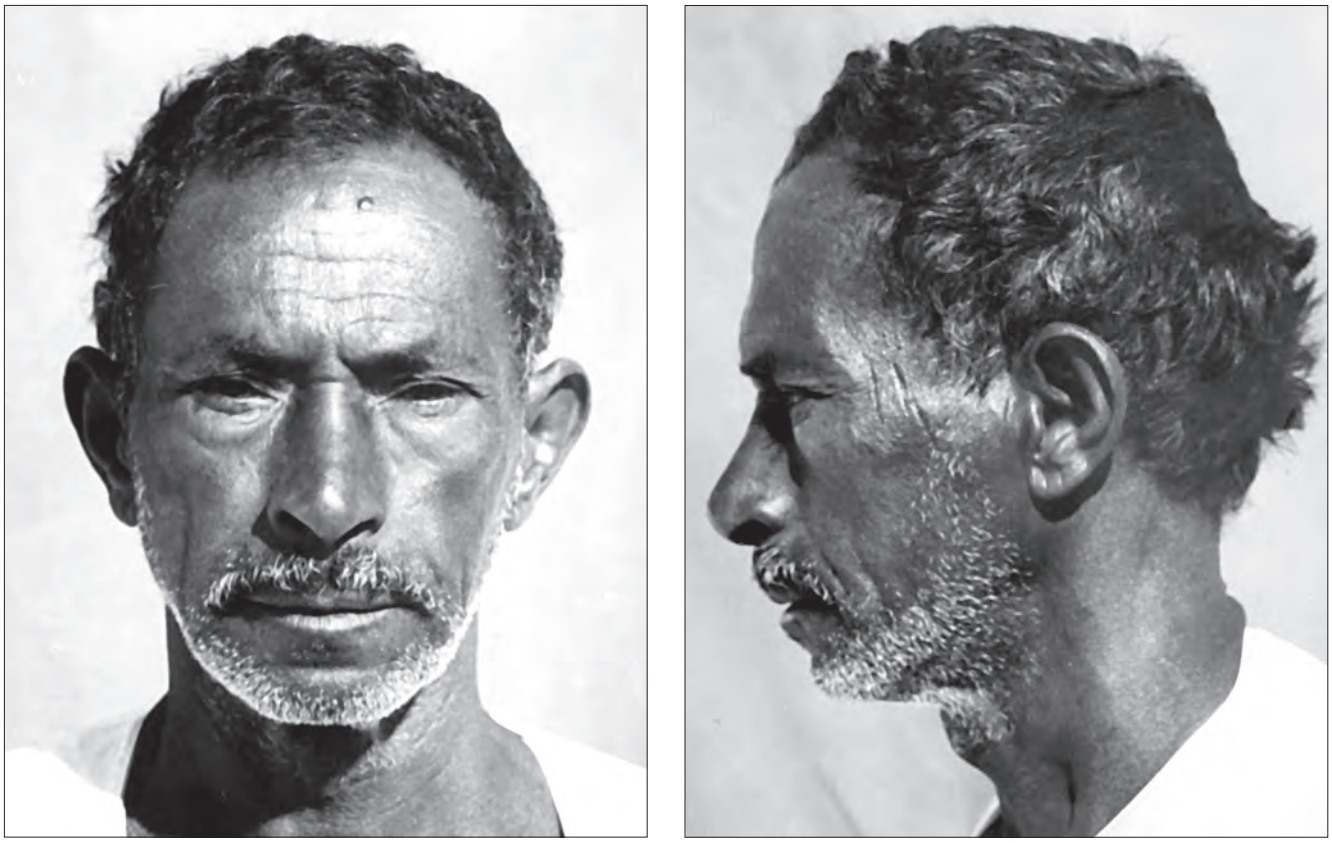
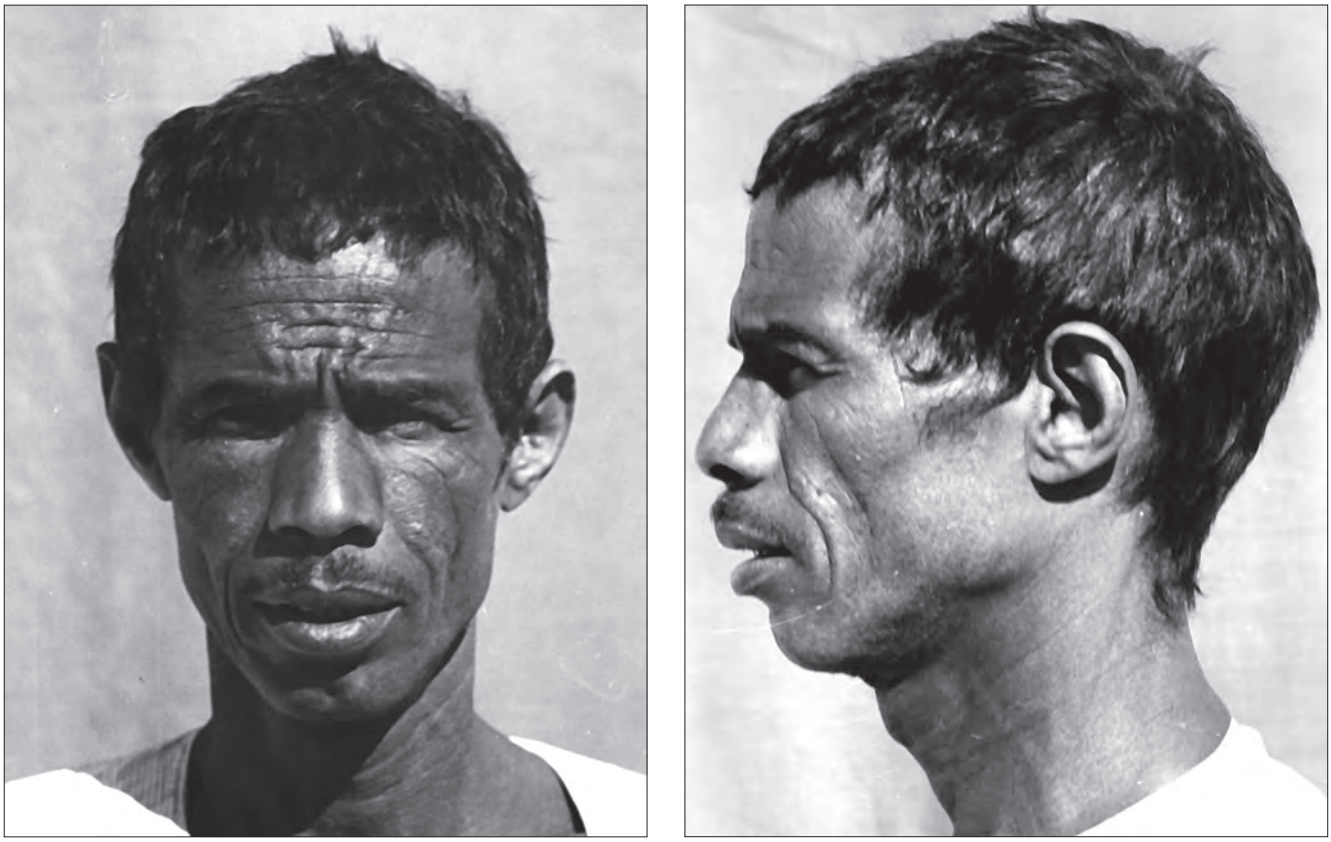


2

PLATE XXXI. 1) 45-year-old Nubian Arab O 35 from Maliki. 2) 55-year-old Nubian Arab O 38 from Maliki.



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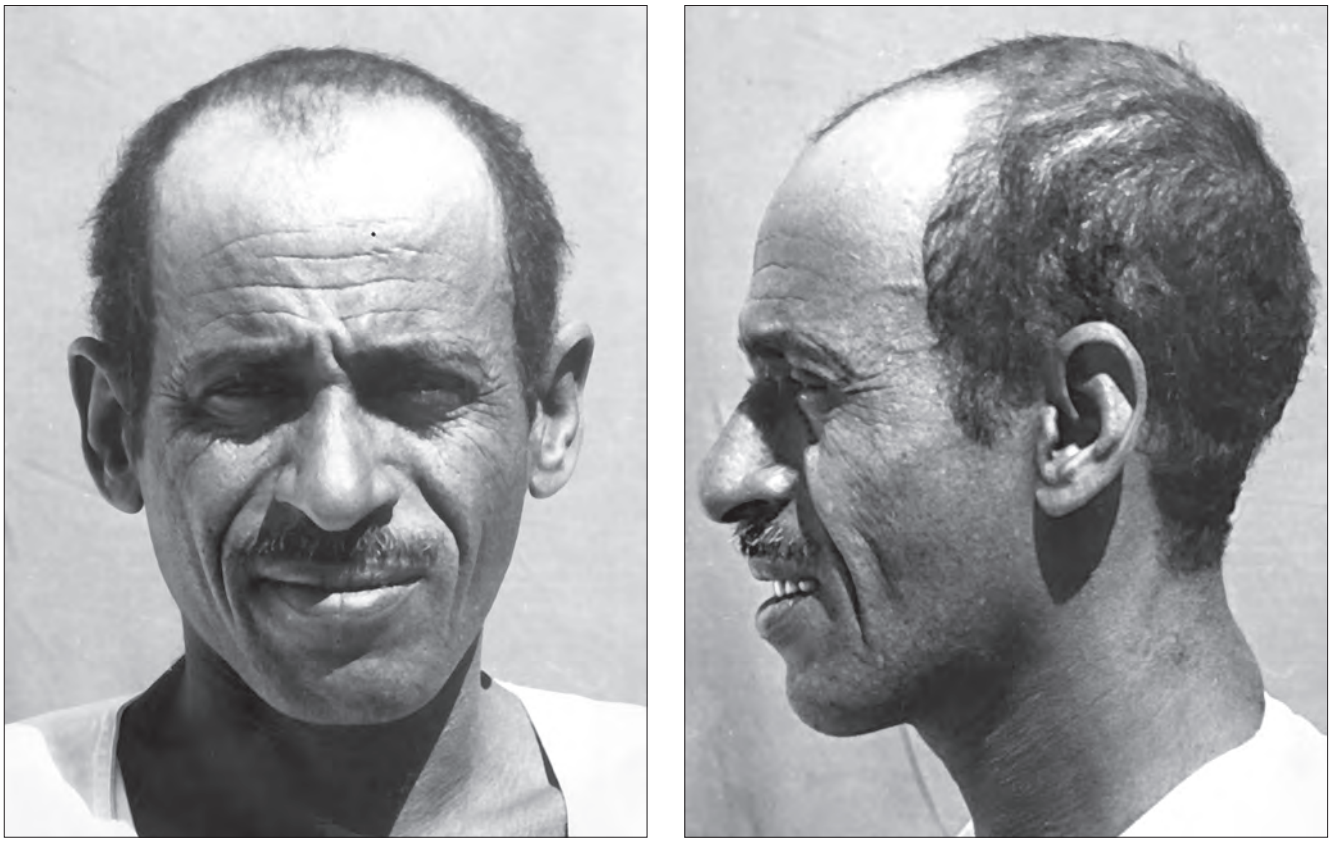
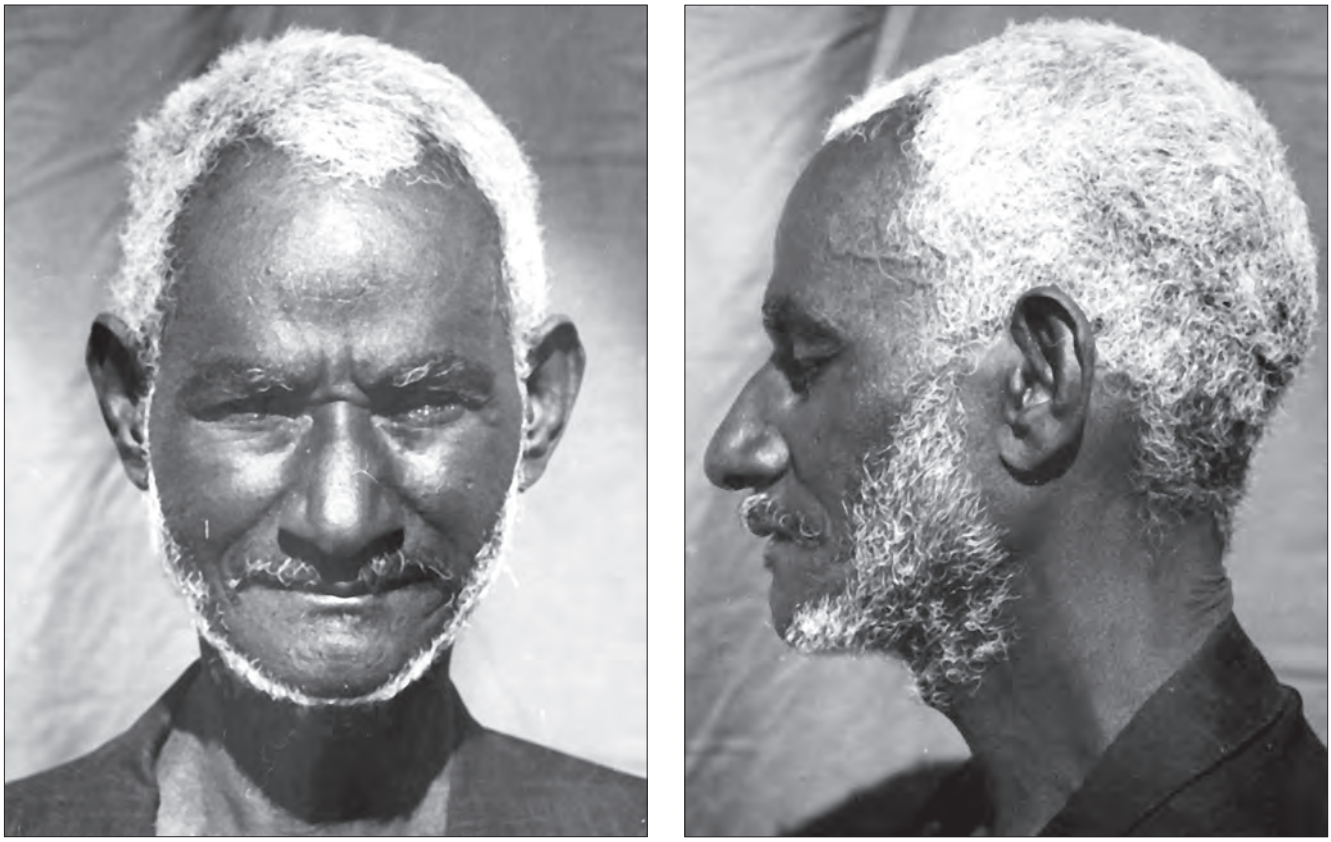


2

PLATE XXXII. 1) 40-year-old Nubian Arab O 42 from Maliki. 2) 40-year-old Nubian Arab O 44 from Maliki.



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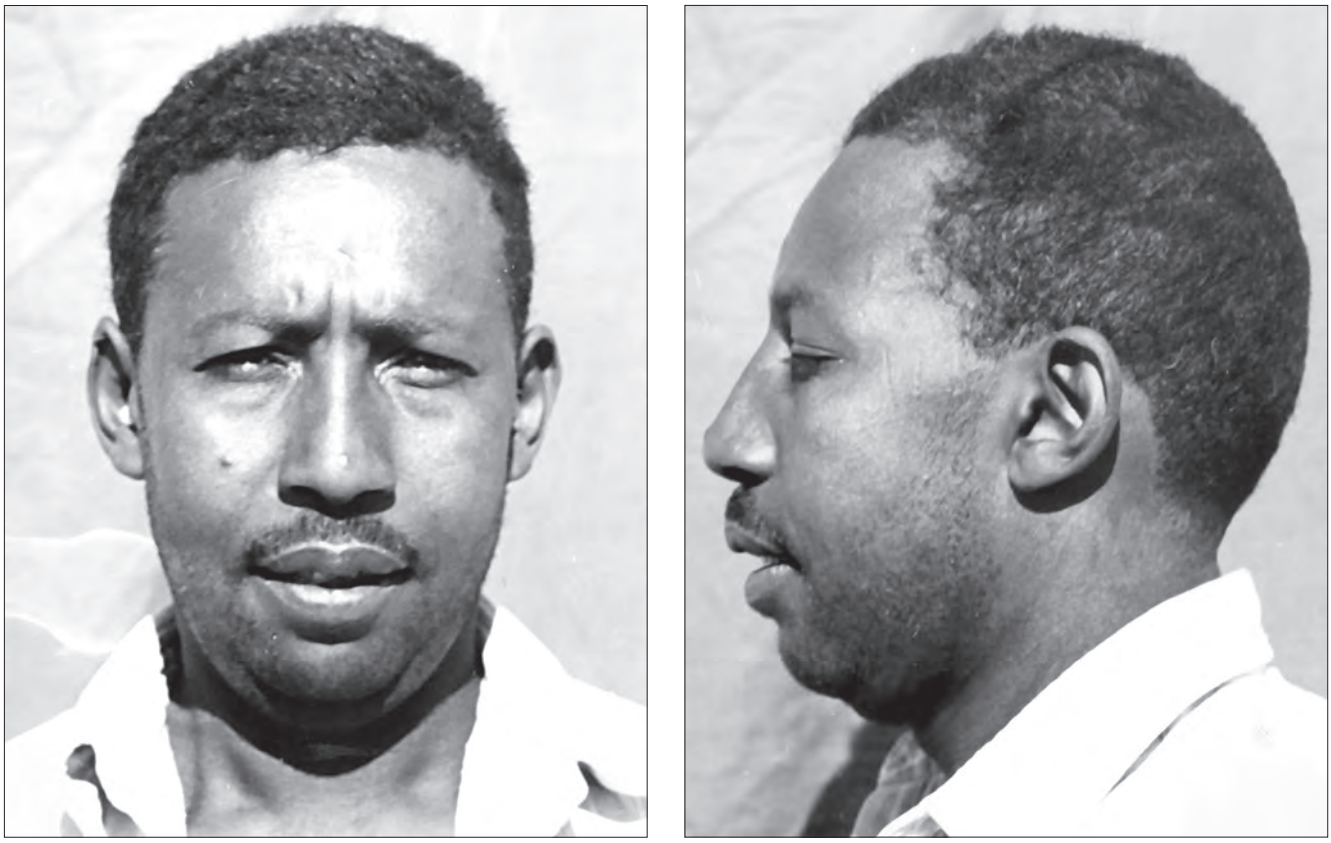
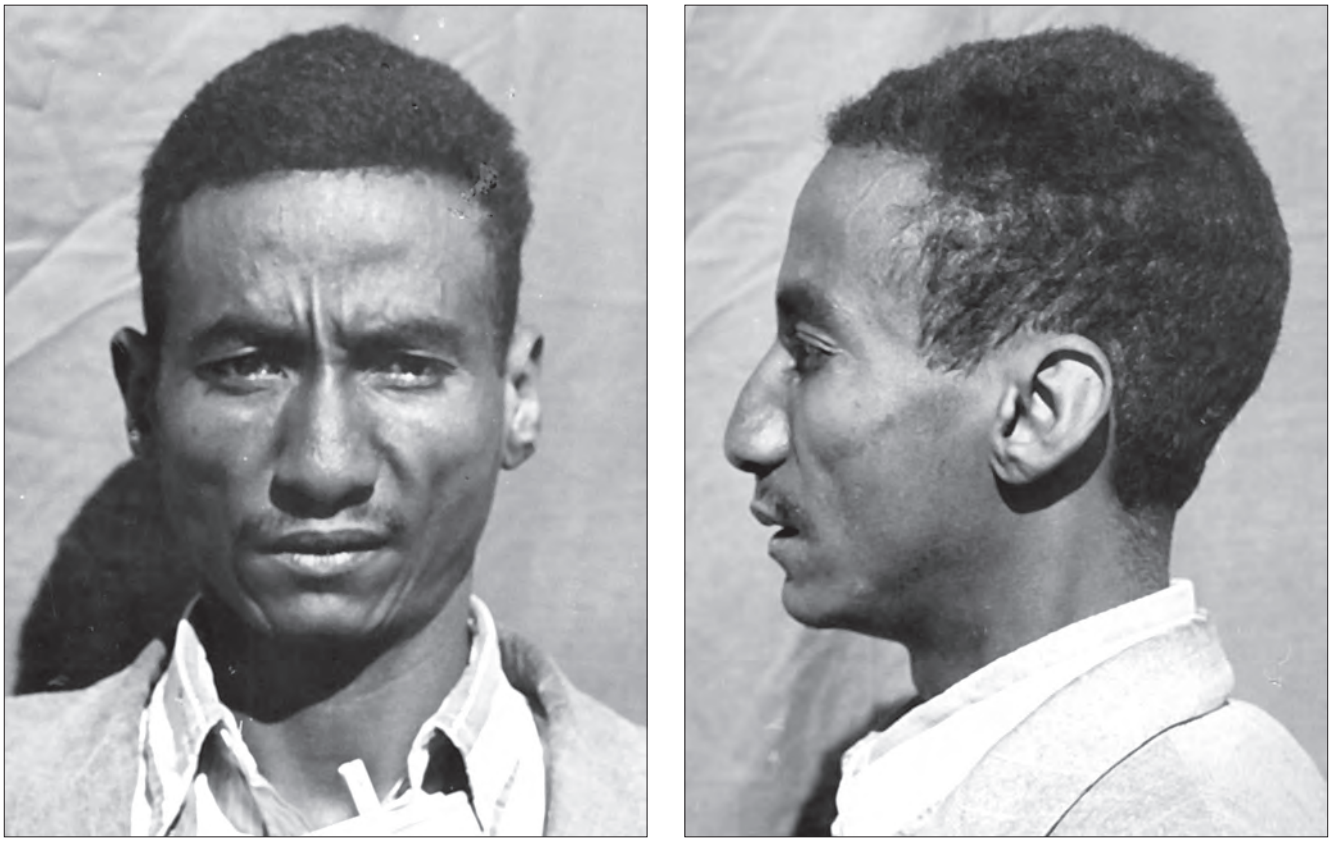


2

PLATE XXXIII. 1) 49-year-old Nubian Arab O 52 from Wadi es-Sebua. 2) 33-year-old Nubian Arab O 53 from Wadi es-Sebua.



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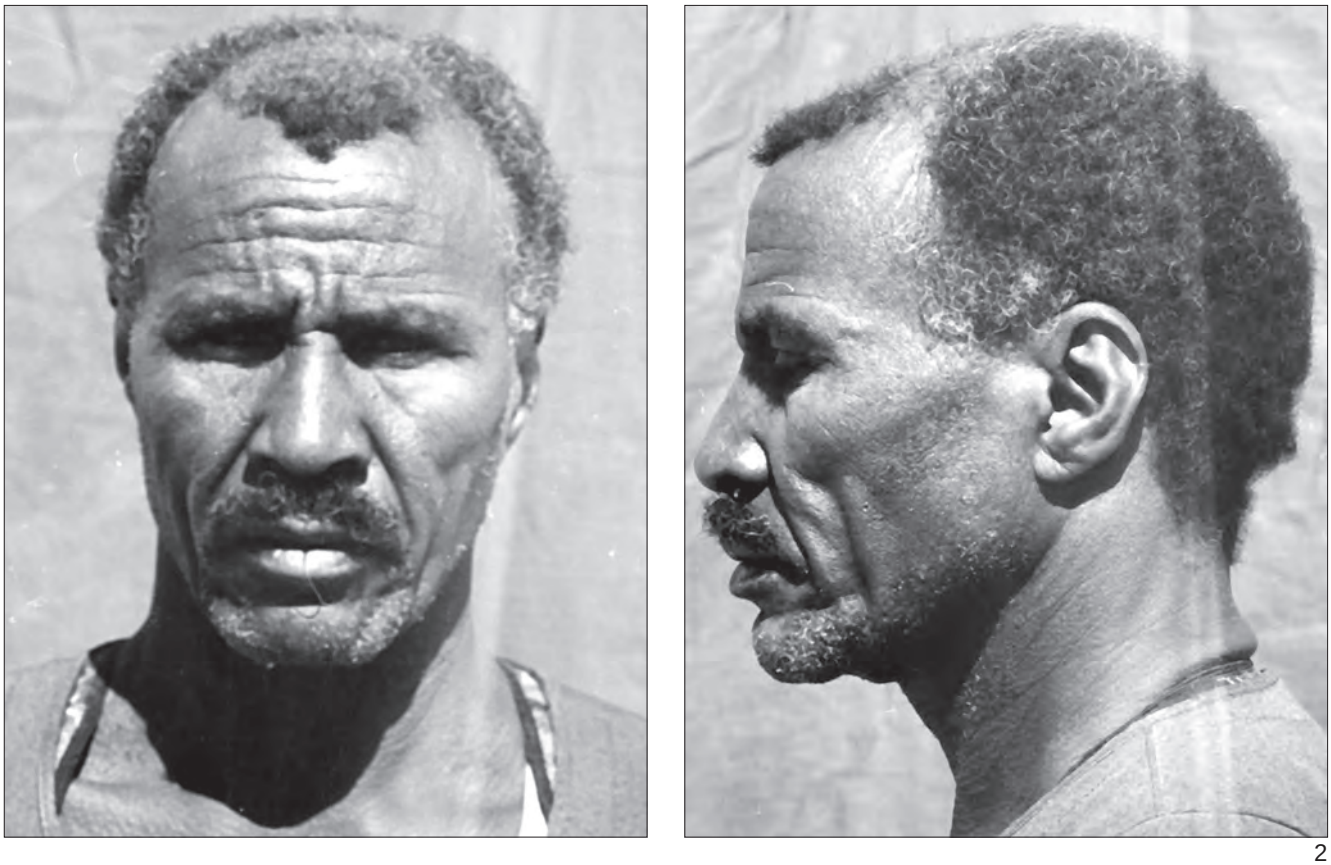
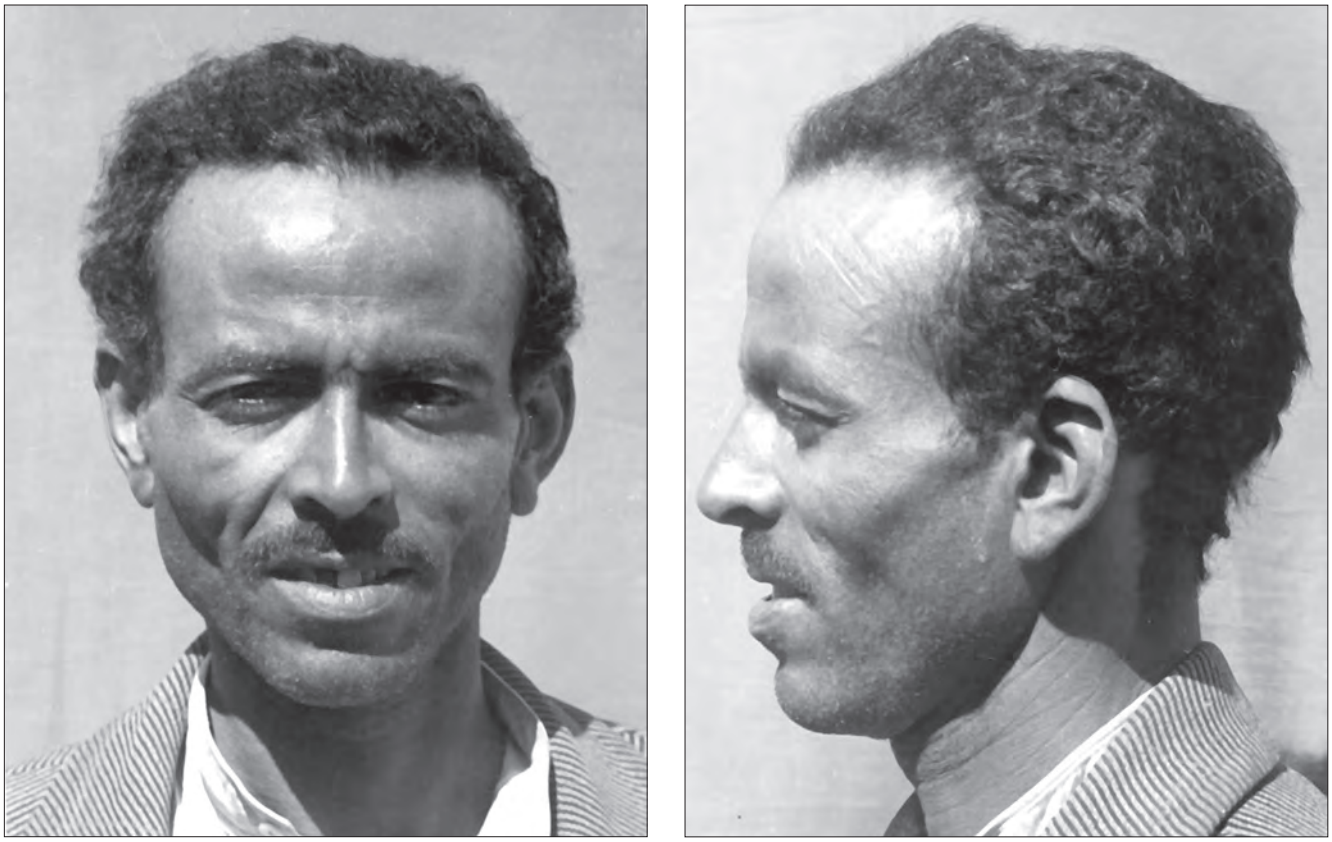


2

PLATE XXXIV. 1) 25-year-old Nubian Arab O 56 from Wadi es-Sebua. 2) 53-year-old Nubian Arab O 59 from Wadi es-Sebua.



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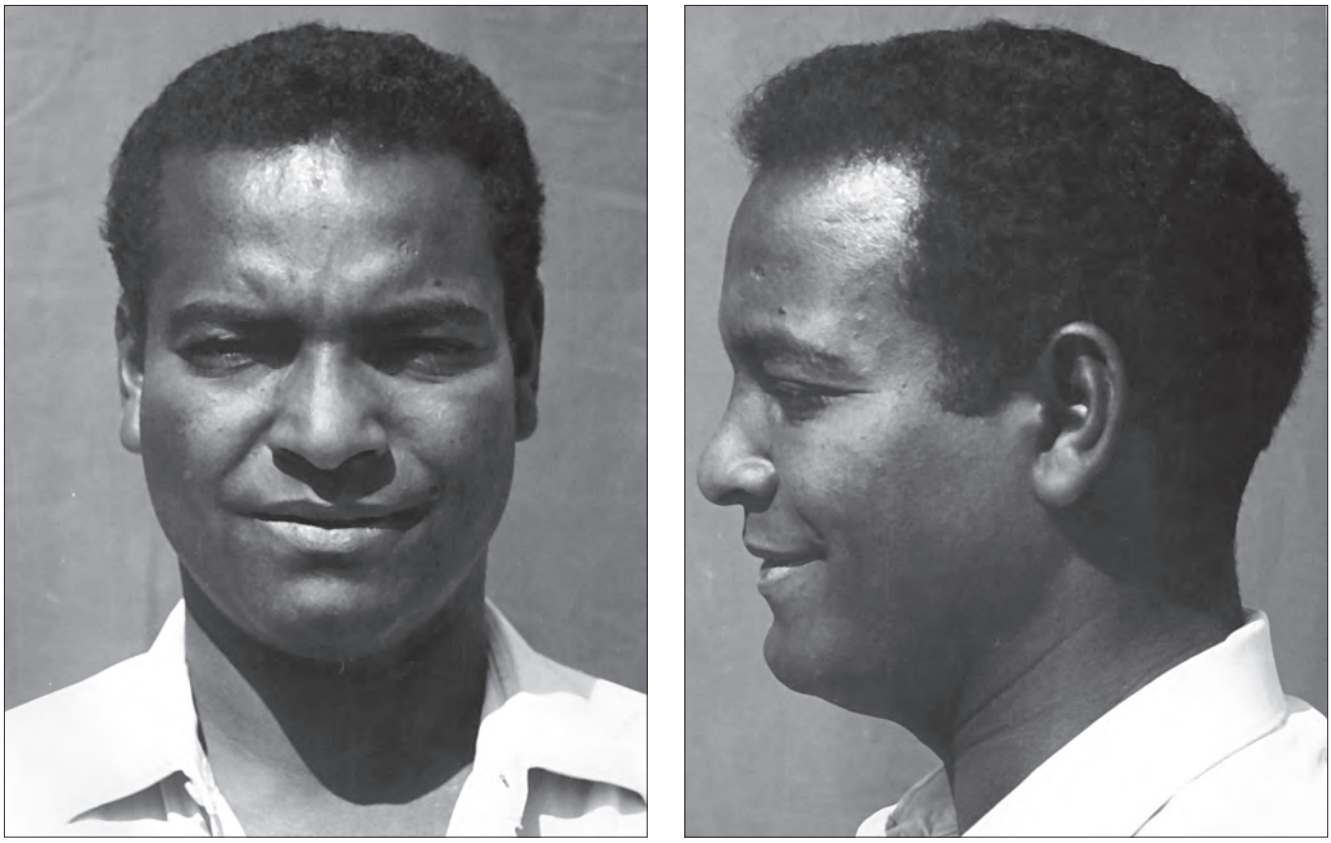
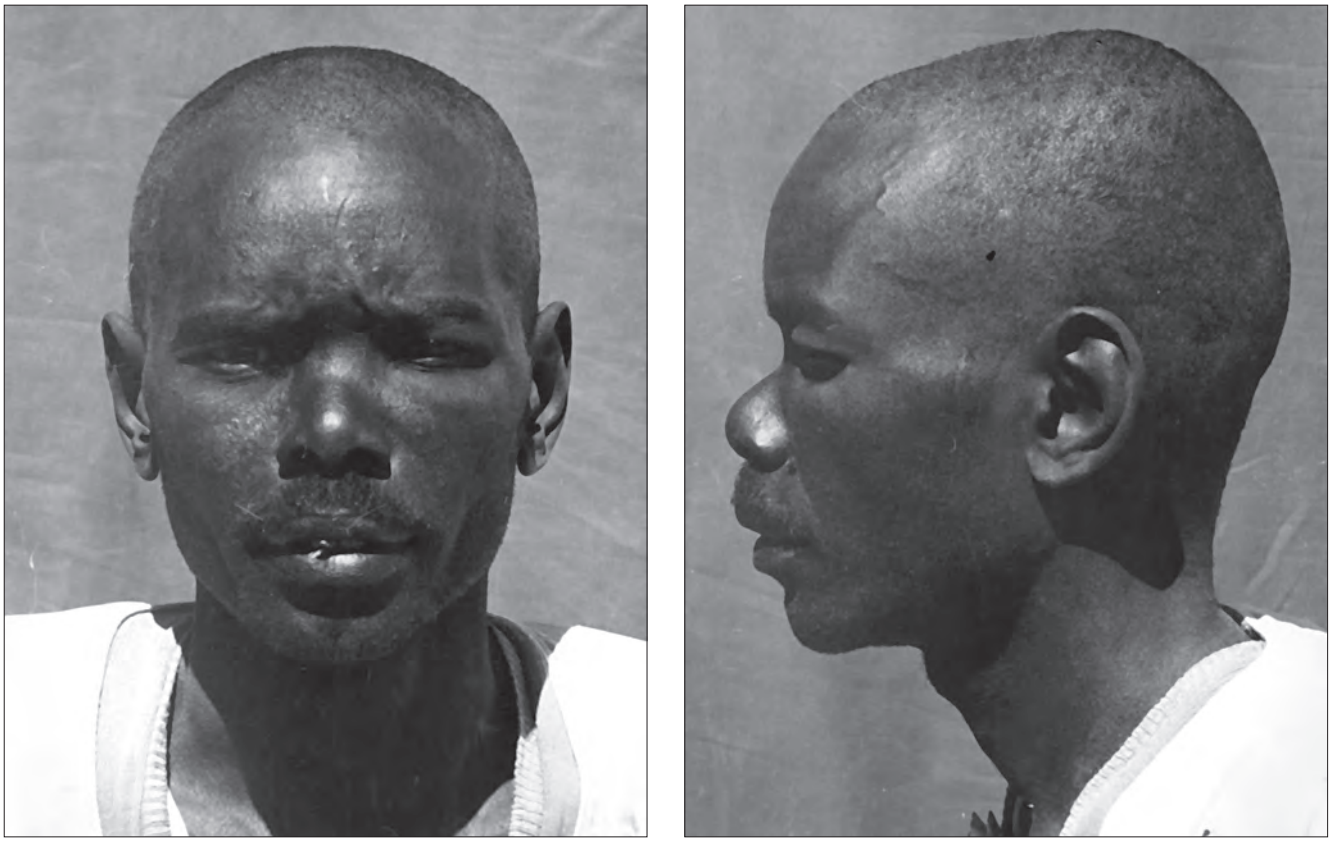


2

PLATE XXXV. 1) 37-year-old Fadidja K 54 from Diwan. 2) 30-year-old Fadidja K 55 from Diwan.



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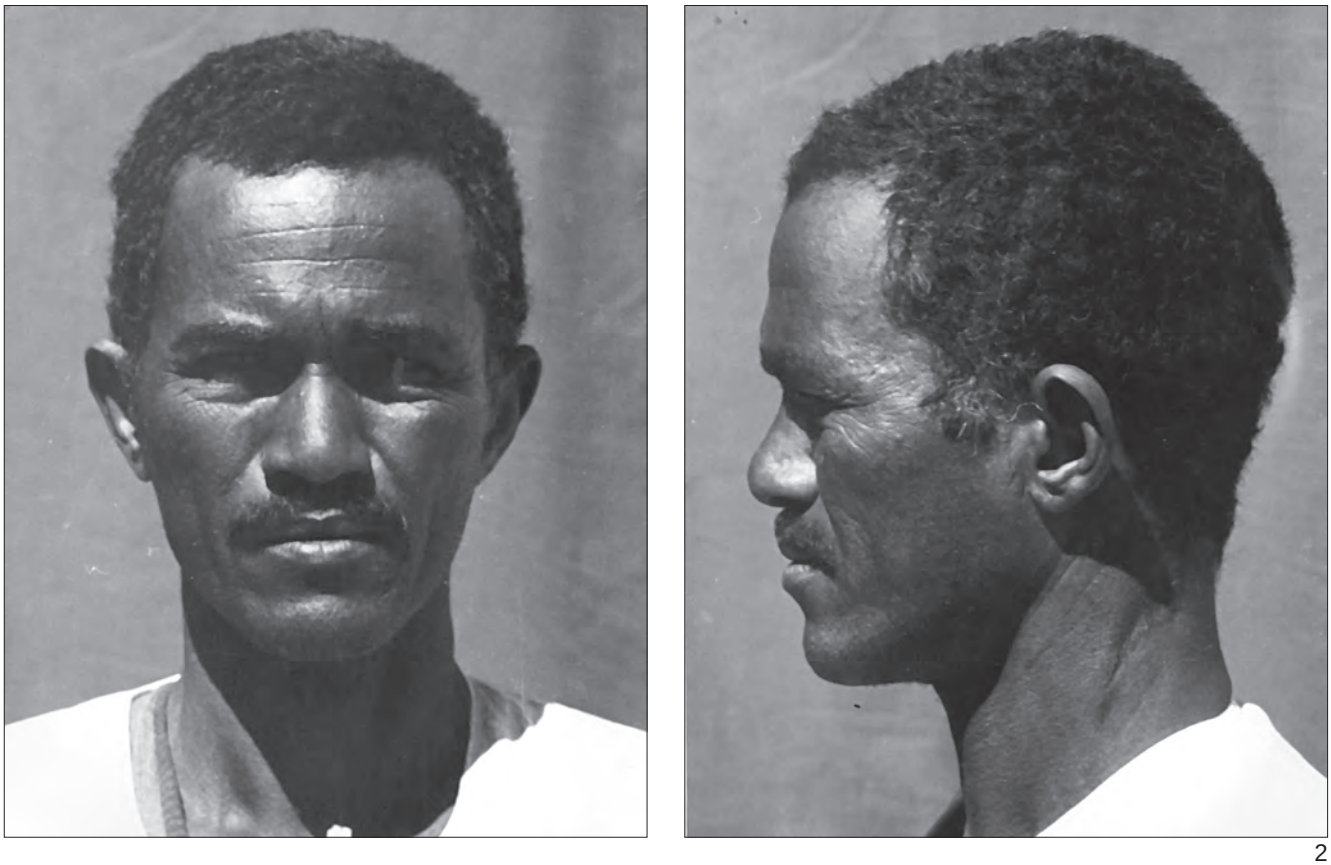

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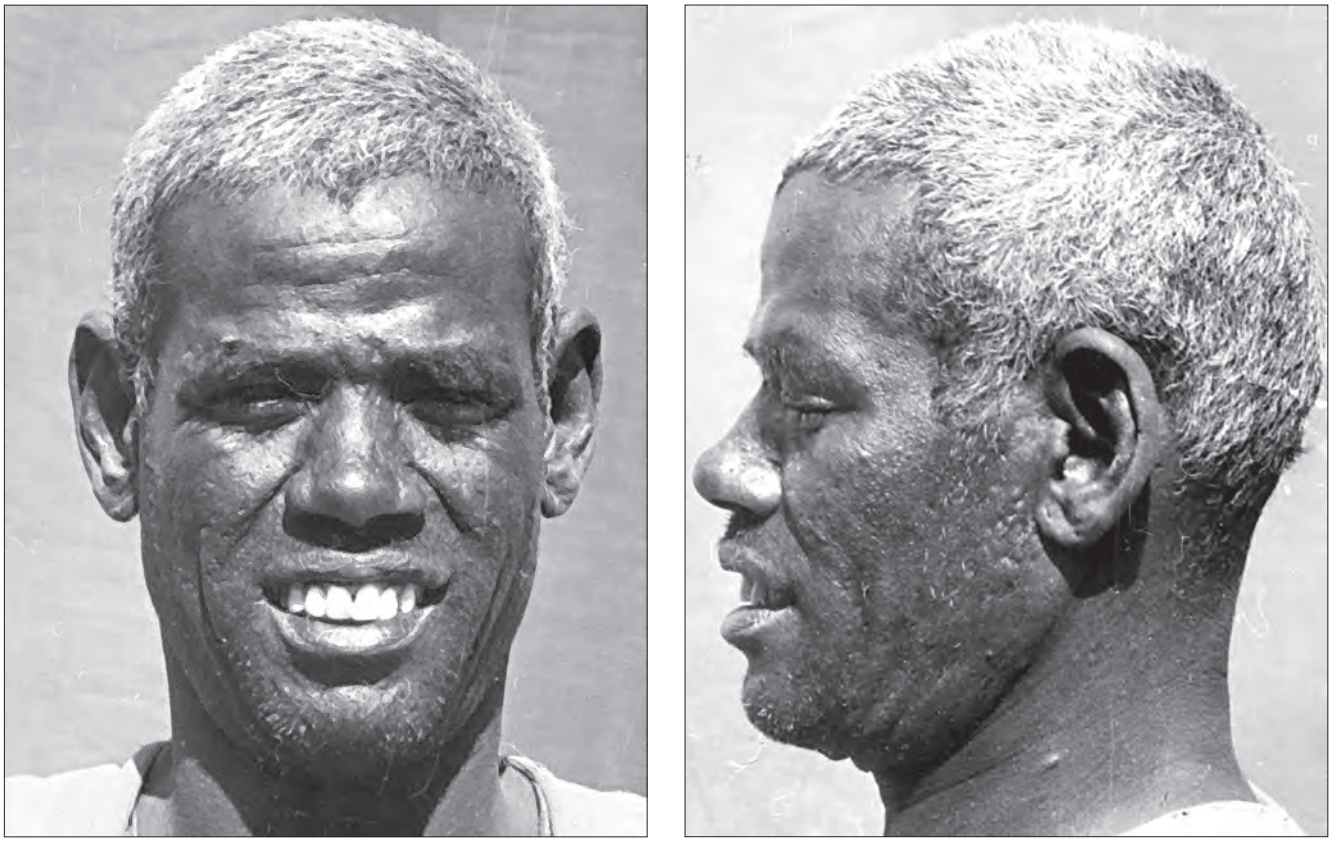
PLATE XXXVI. 1) 37-year-old Fadidja K 58 from Qatta. 2) 36-year-old Fadidja K 59 from Qatta.



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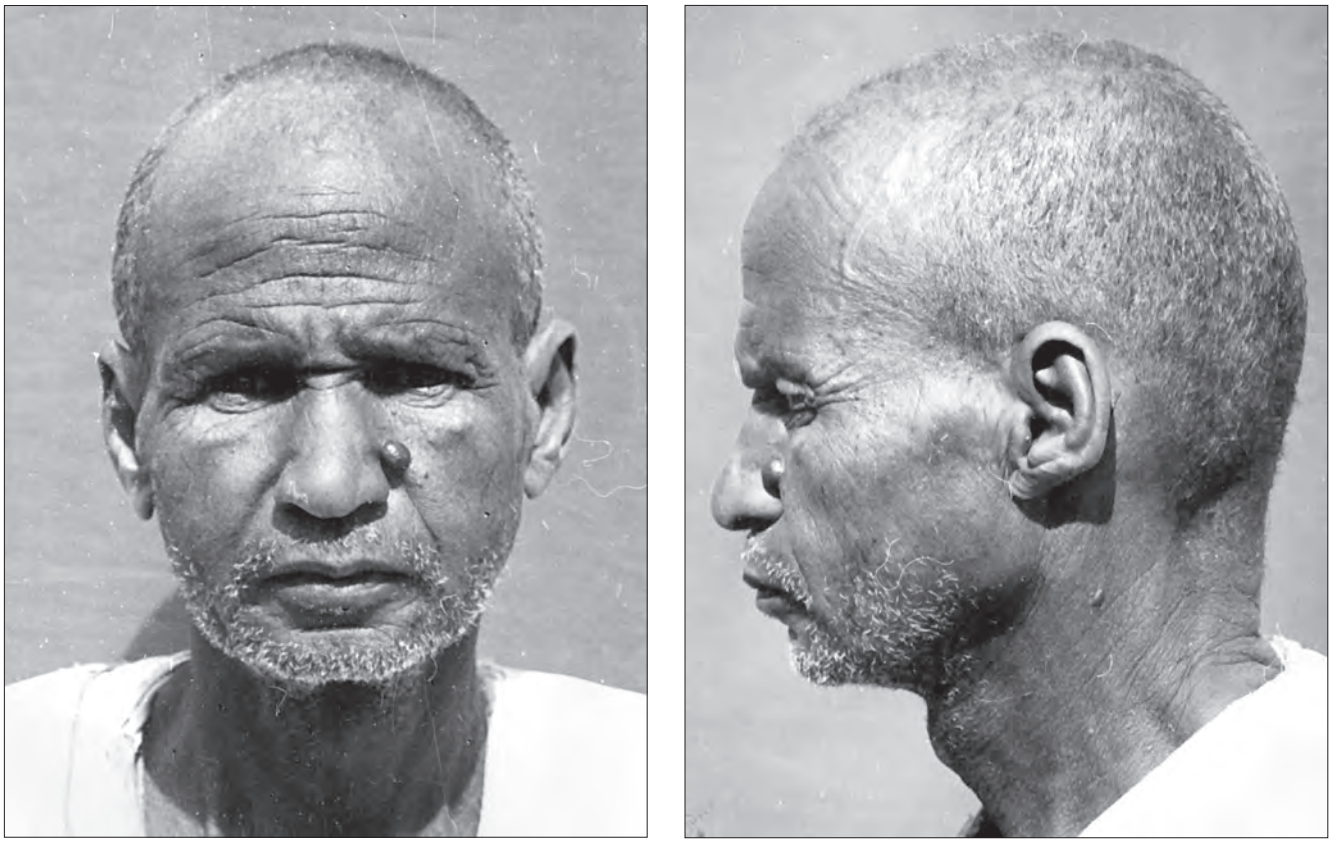

2

PLATE XXXVII. 1) 41-year-old Fadidja K 69 from Qatta. 2) 53-year-old Fadidja K 70 from Qatta.

1

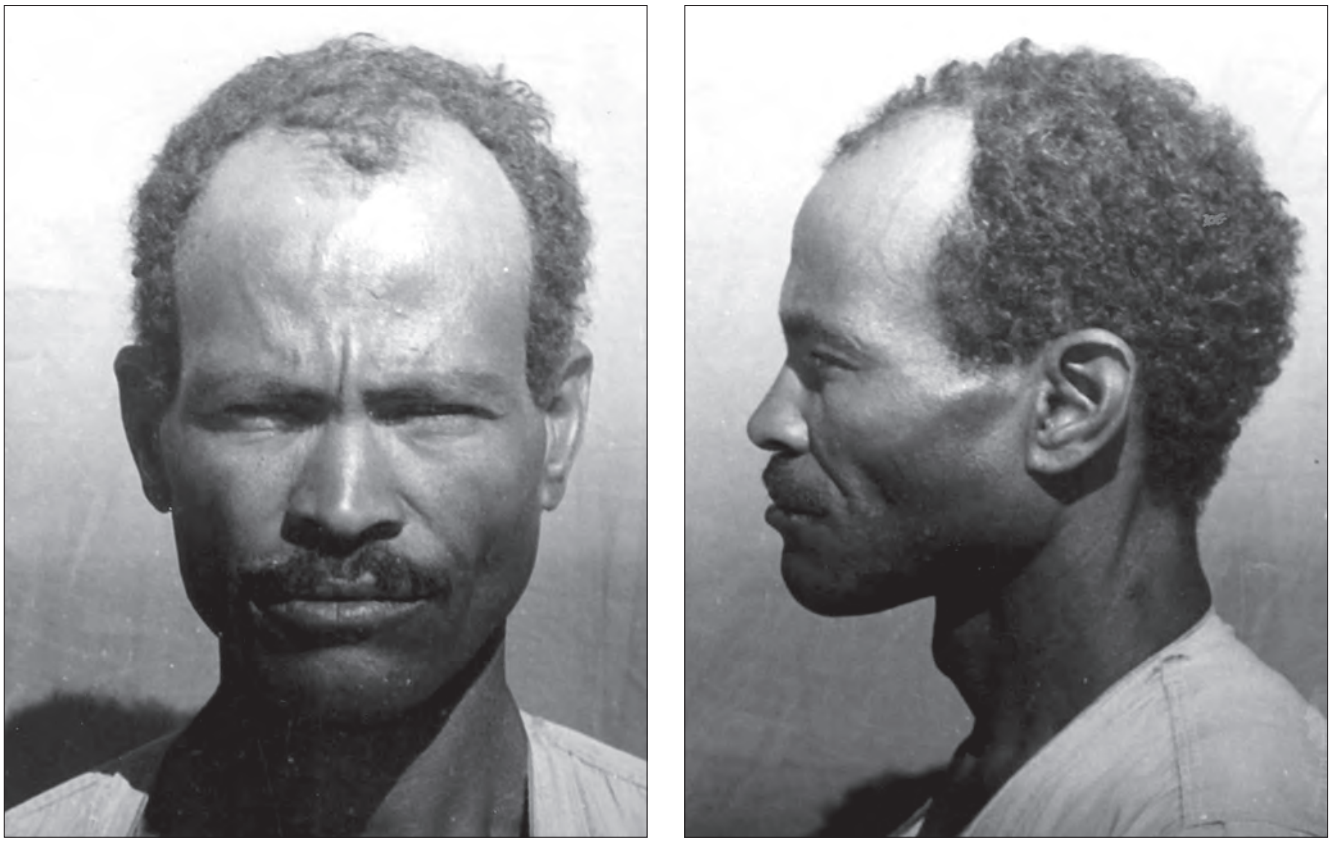

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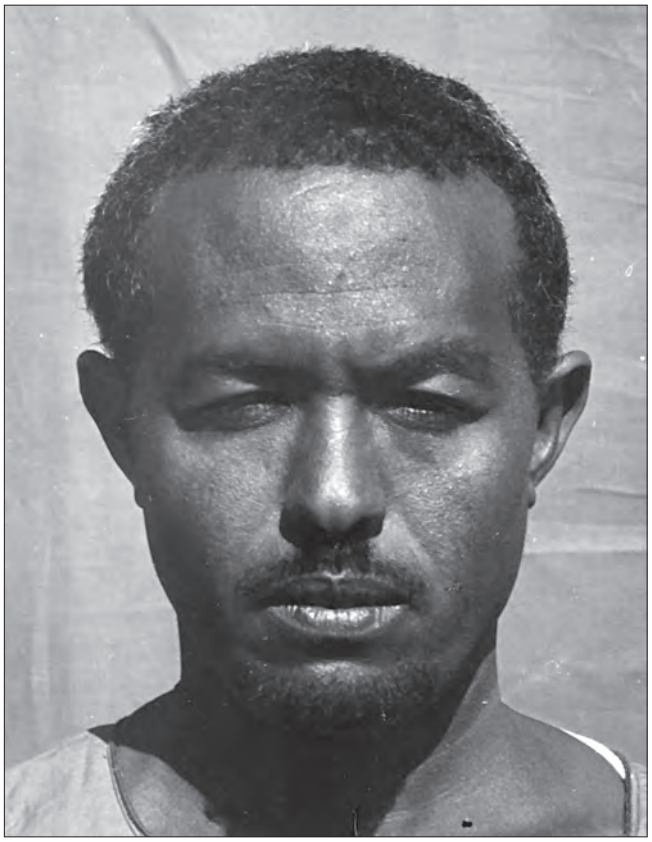
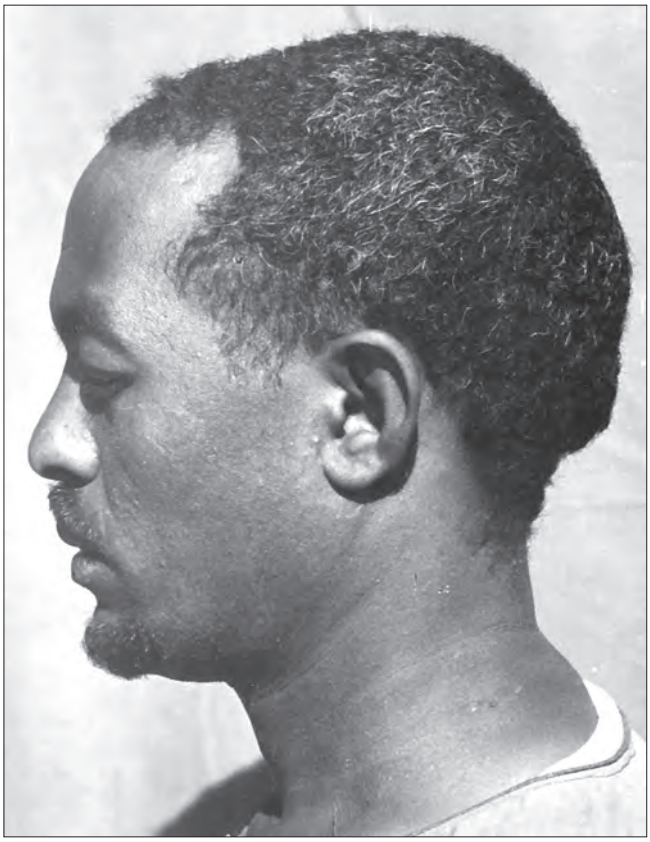
PLATE XXXVIII. 1) 39-year-old Fadidja K 35 from Ibrim. 2) 44-year-old Fadidja K 36 from Ibrim.





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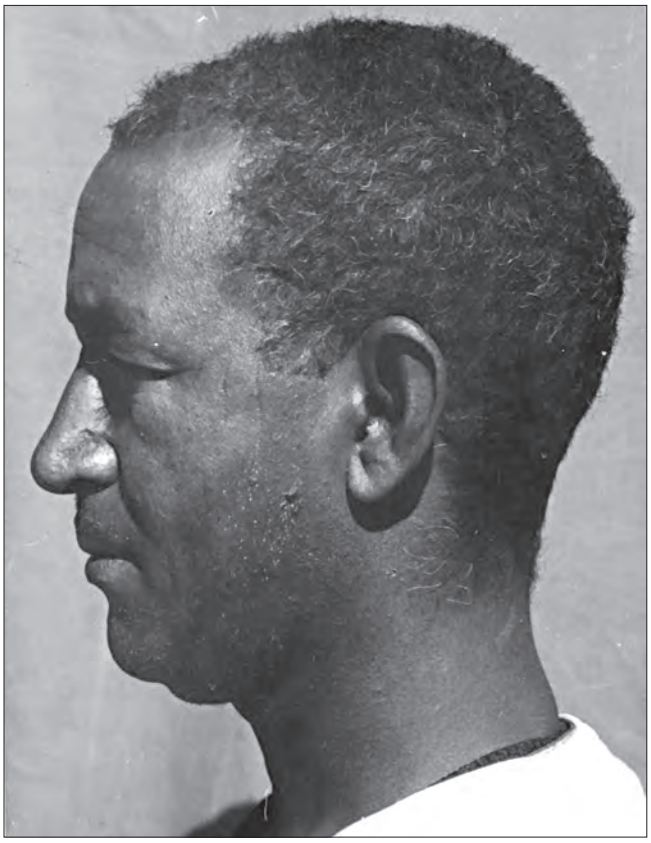
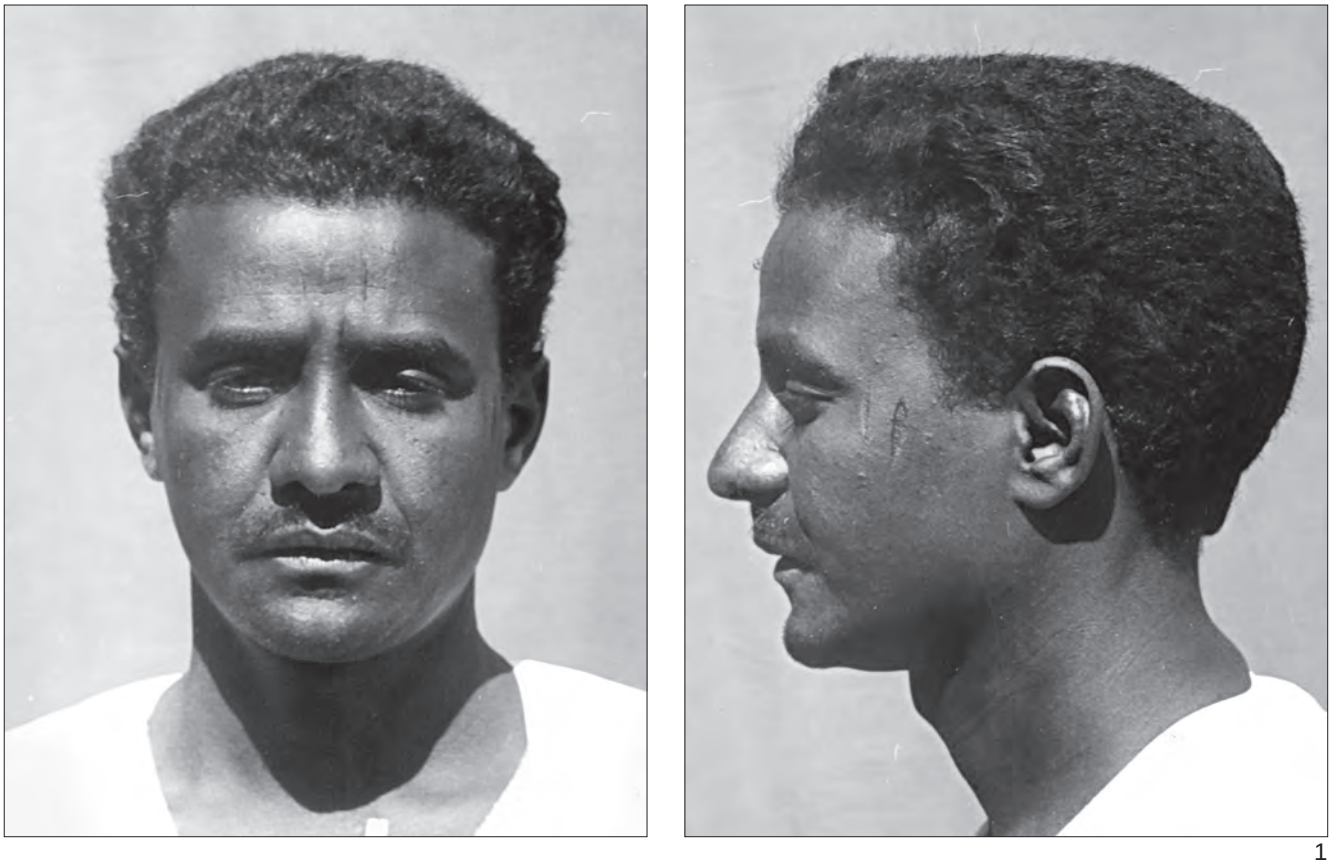


2

PLATE XXXIX. 1) 34-year-old Fadidja S 71 from Qustul. 2) 37-year-old Fadidja S 72 from Qustul.



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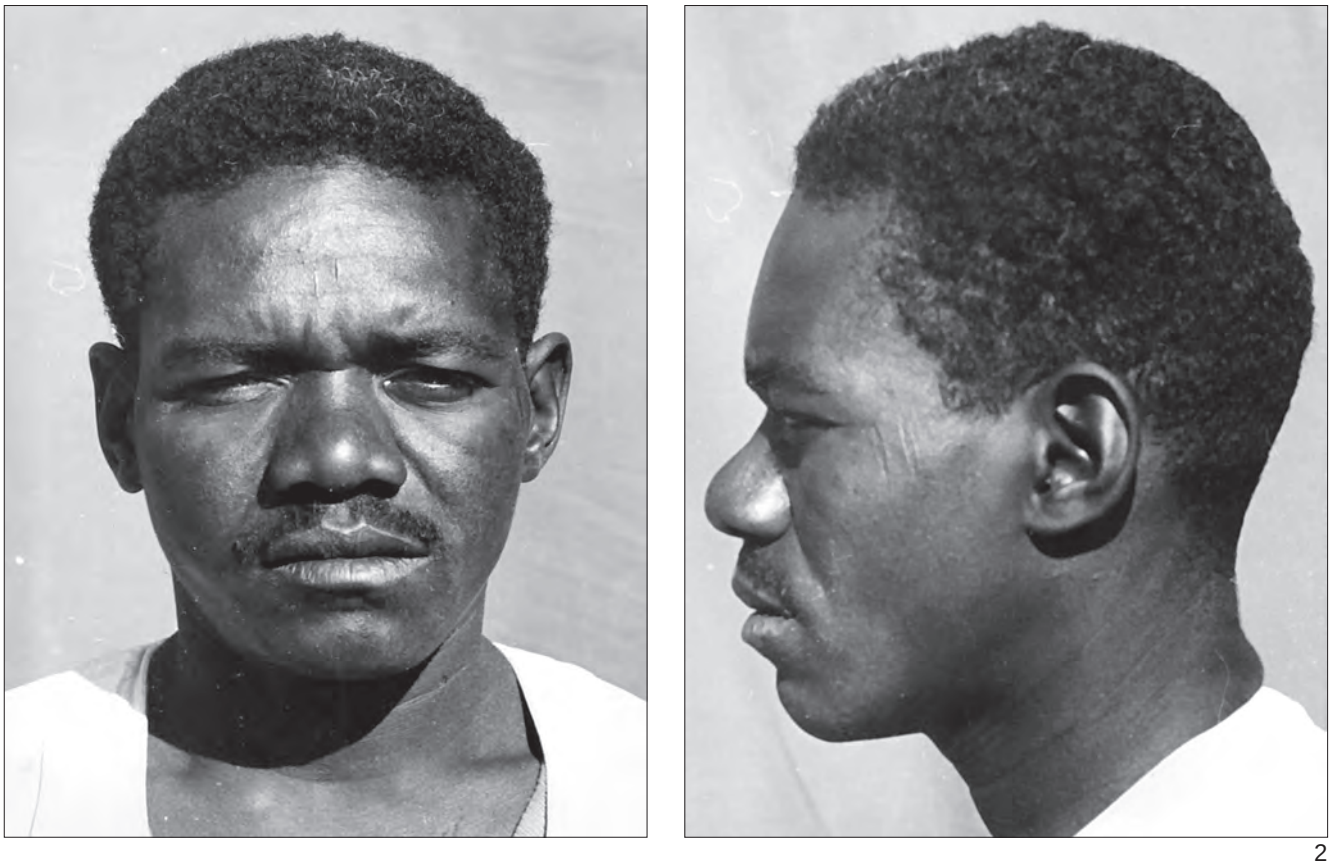
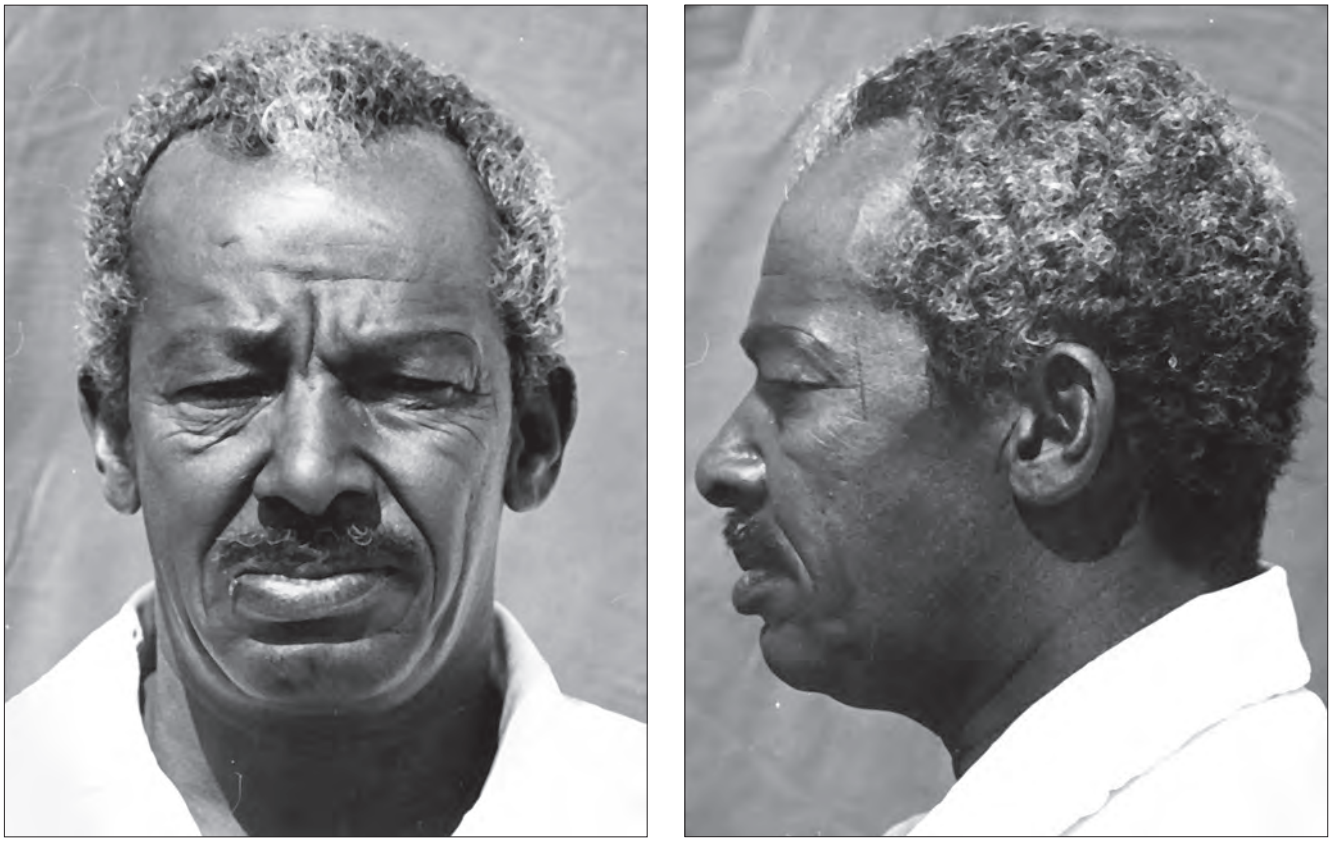


2

PLATE XL. 1) 35-year-old Fadidja S 47 from Balana. 2) 29-year-old Fadidja S 50 from Balana.



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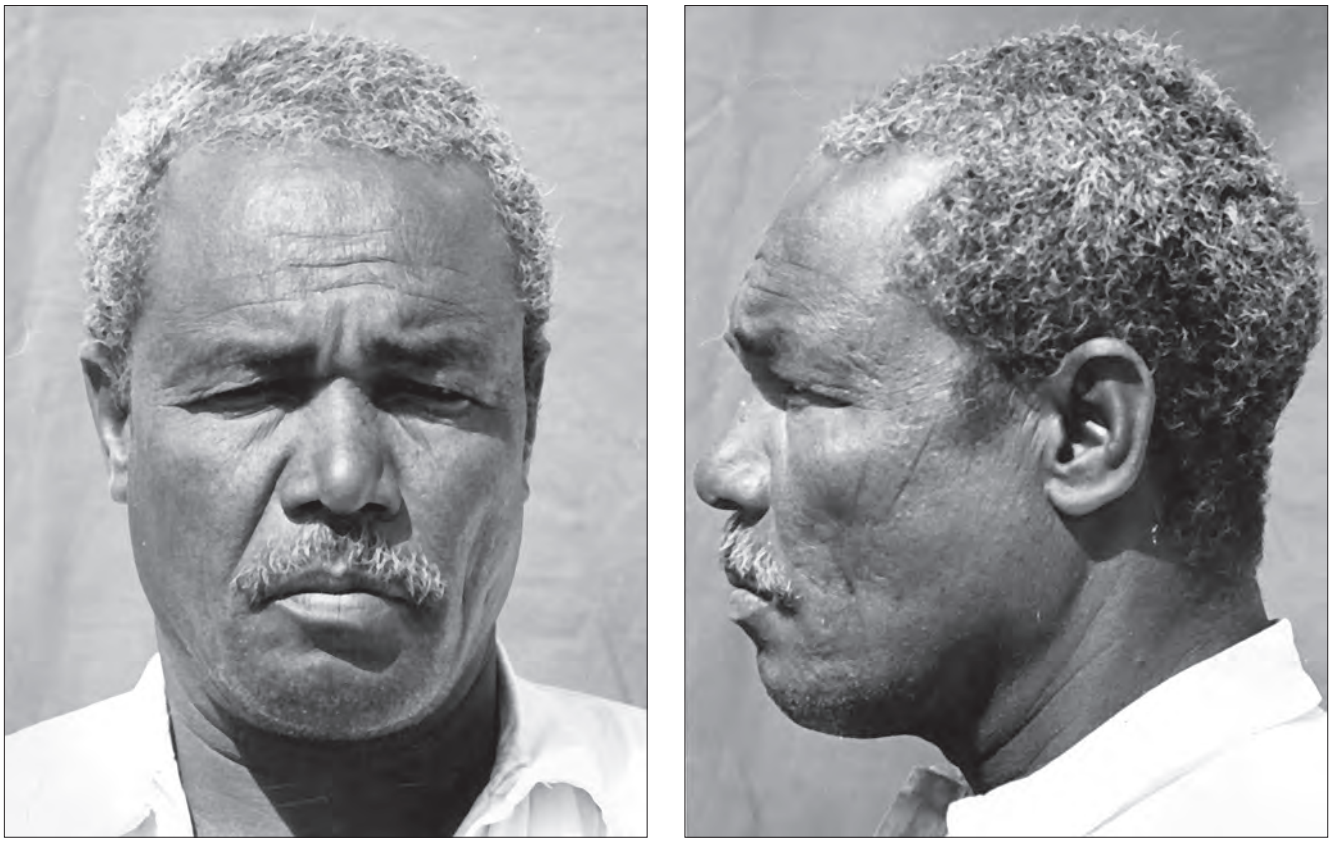
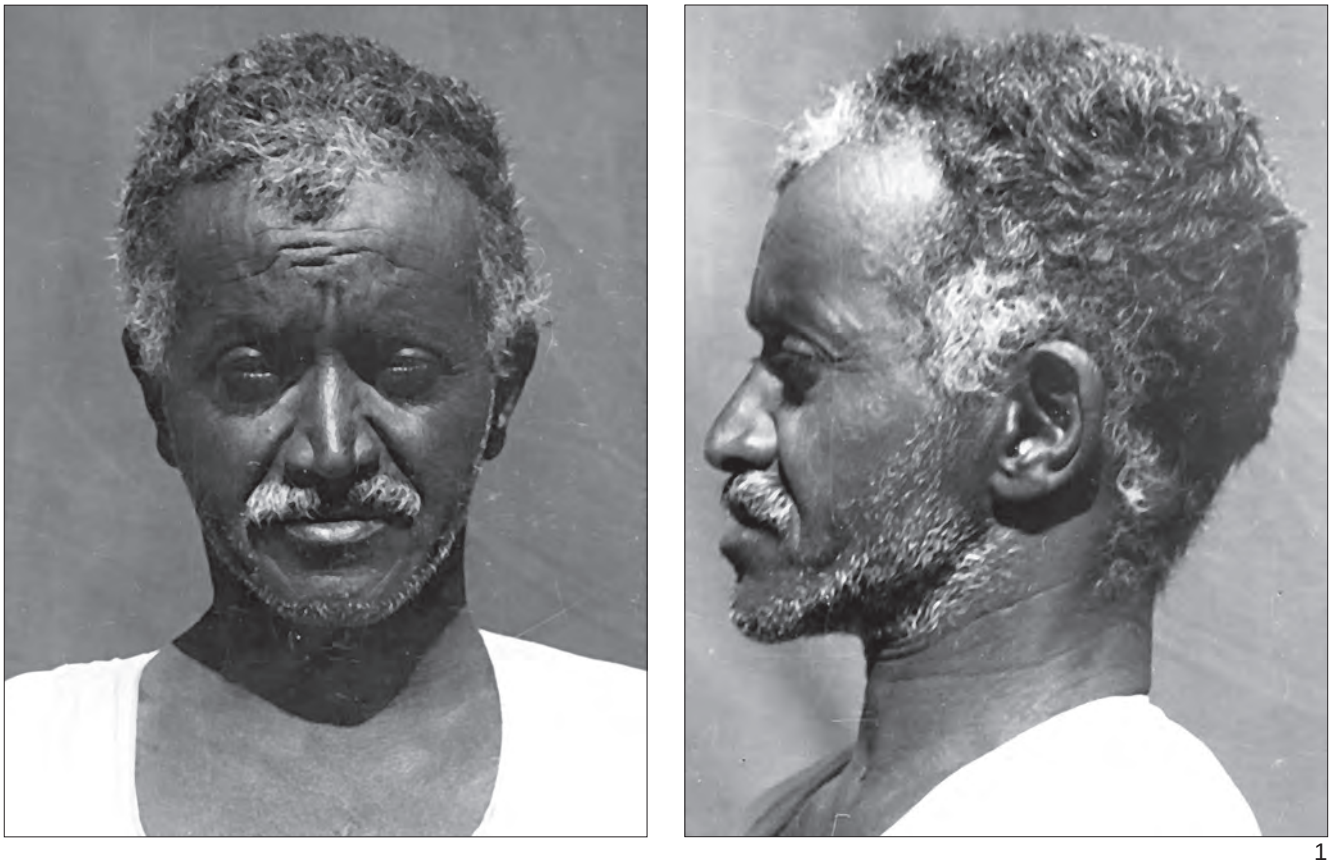


2

PLATE XLI. 1) 52-year-old Fadidja O 3 from Abu Handal. 2) 52-year-old Fadidja O 4 from Korosko.



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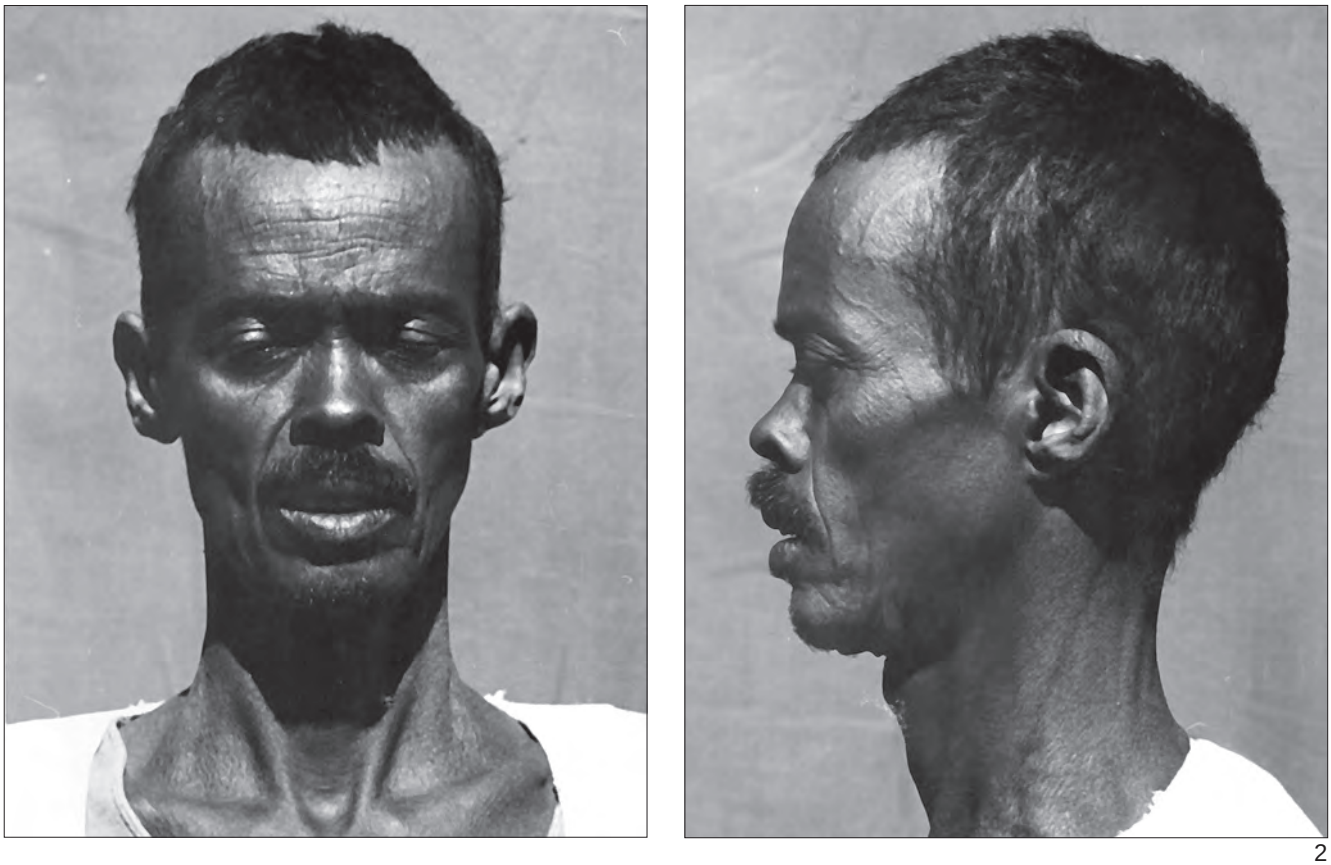
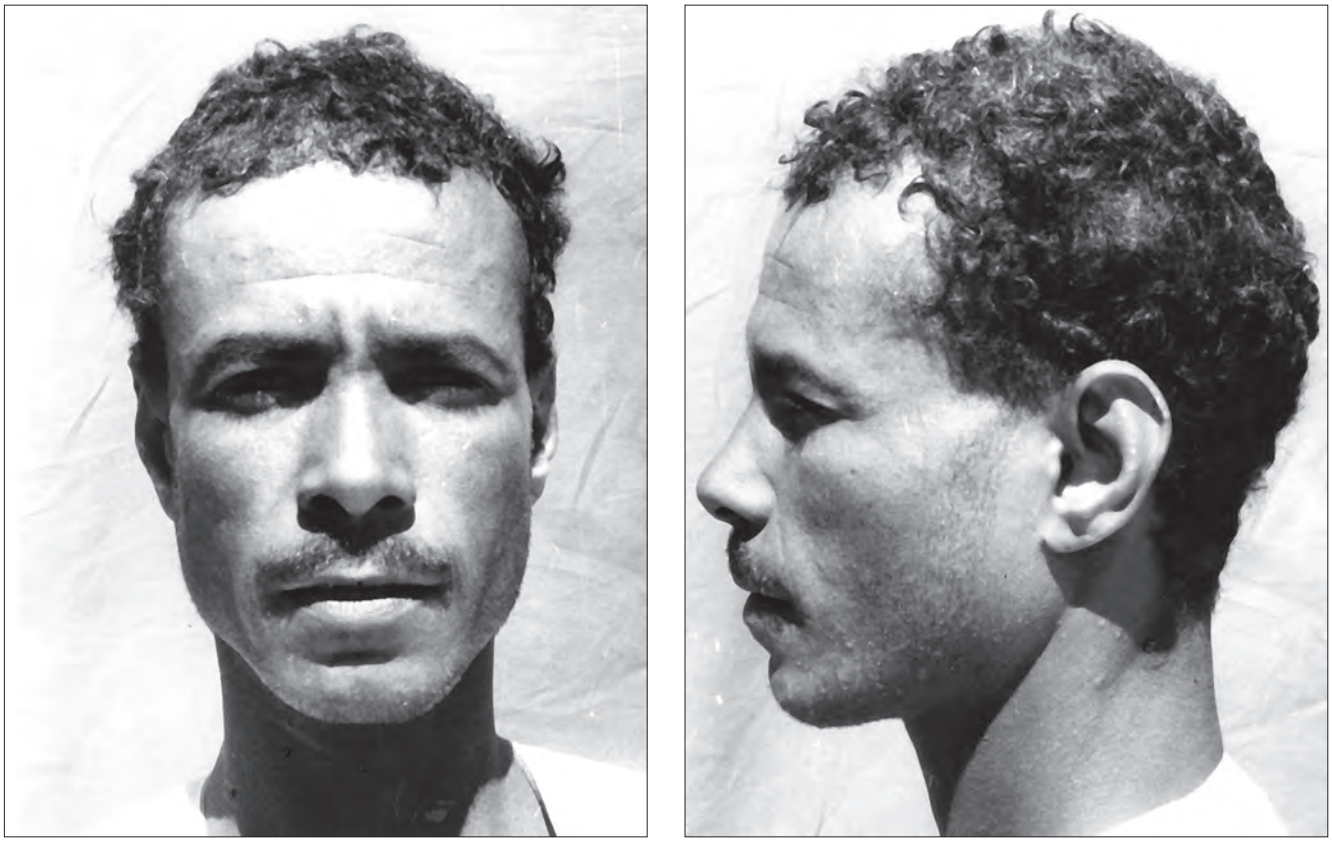


2

PLATE XLII. 1) 47-year-old Ababda O 85 from Wadi el-Arab. 2) 53-year-old Ababda O 109 from Shaturma.



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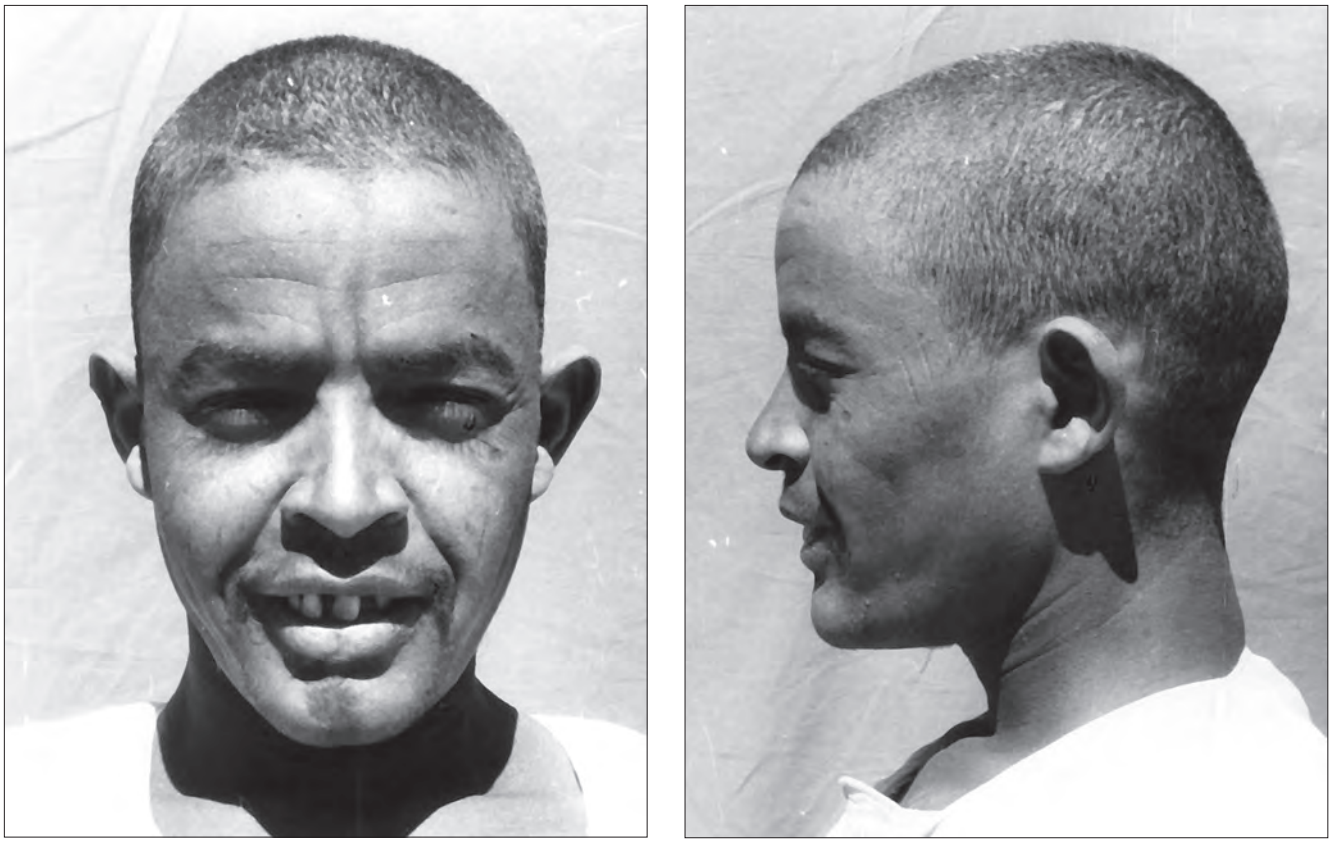
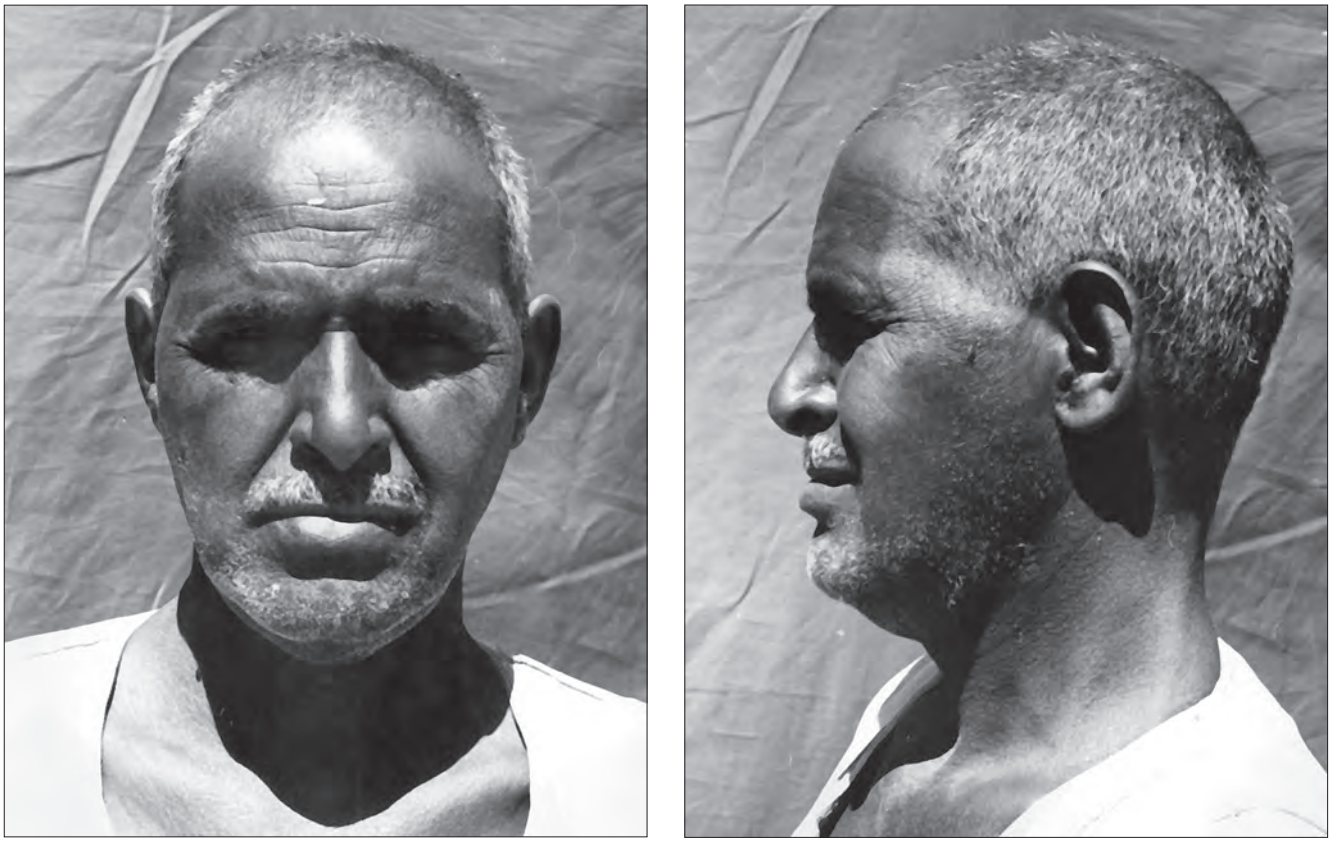


2

PLATE XLIII. 1) 34-year-old Ababda X 1 from Wadi Allaqi. 2) 28-year-old Ababda X 2 from Wadi Allaqi.



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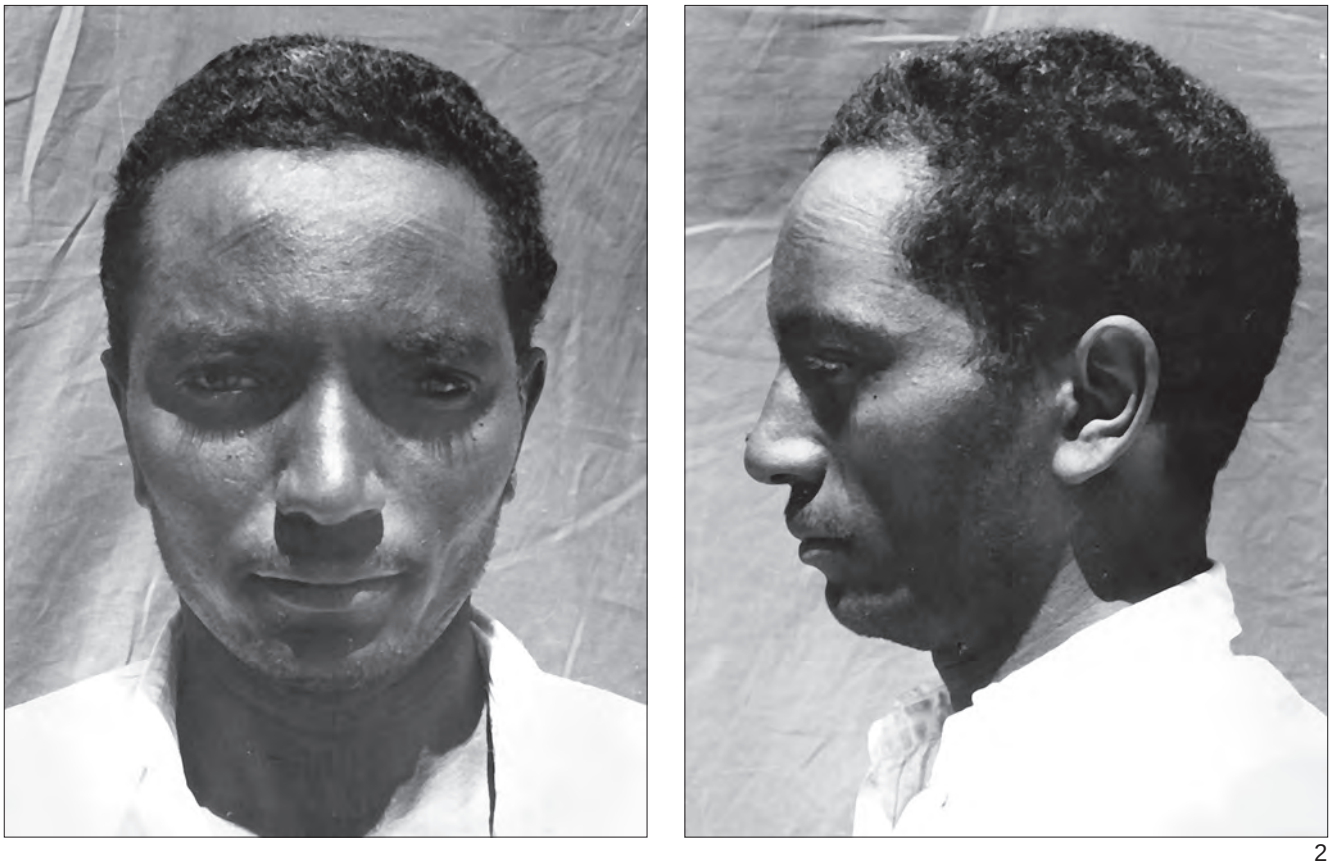
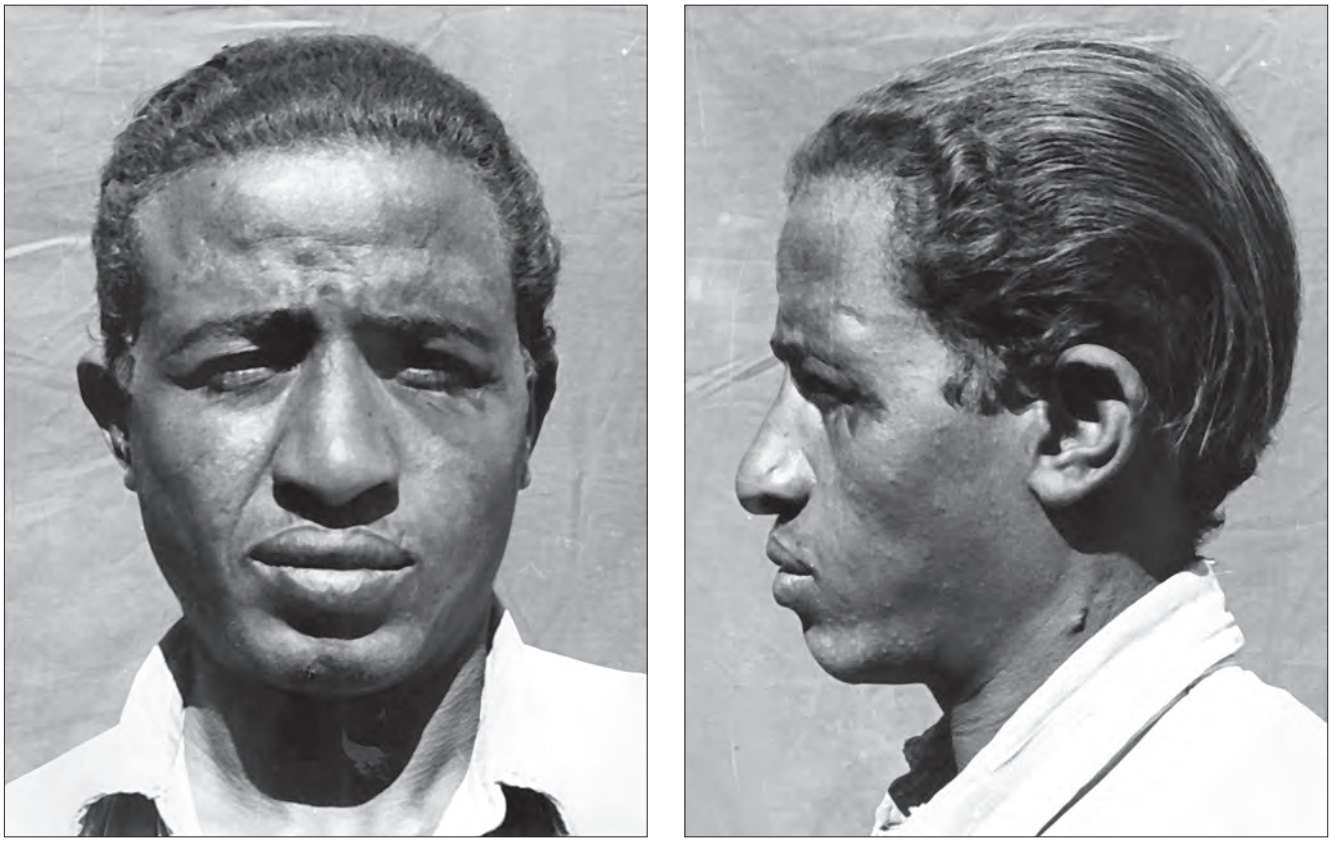
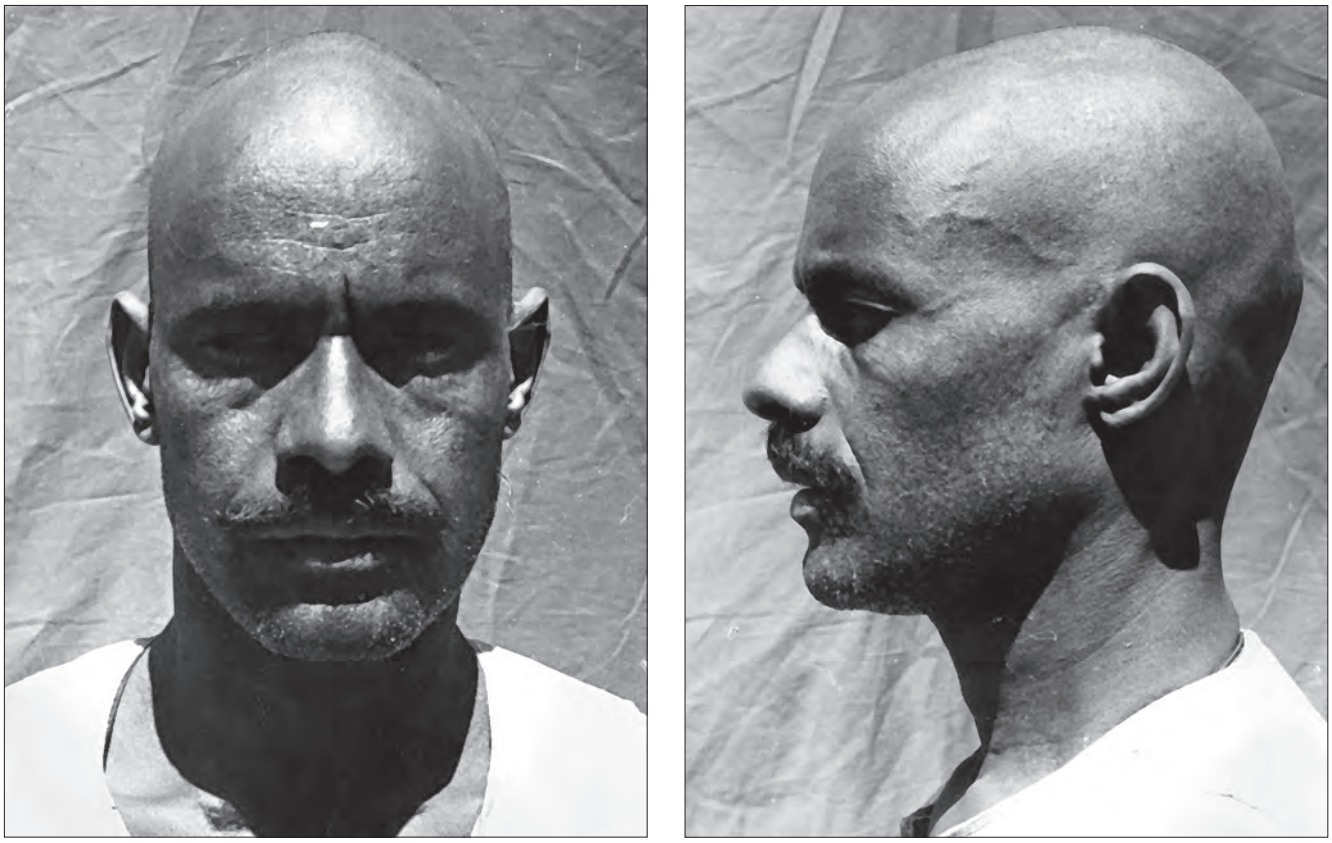


2

PLATE XLIV. 1) 45-year-old Ababda X 21 from Maharraka. 2) 29-year-old Ababda X 22 from Maharraka.

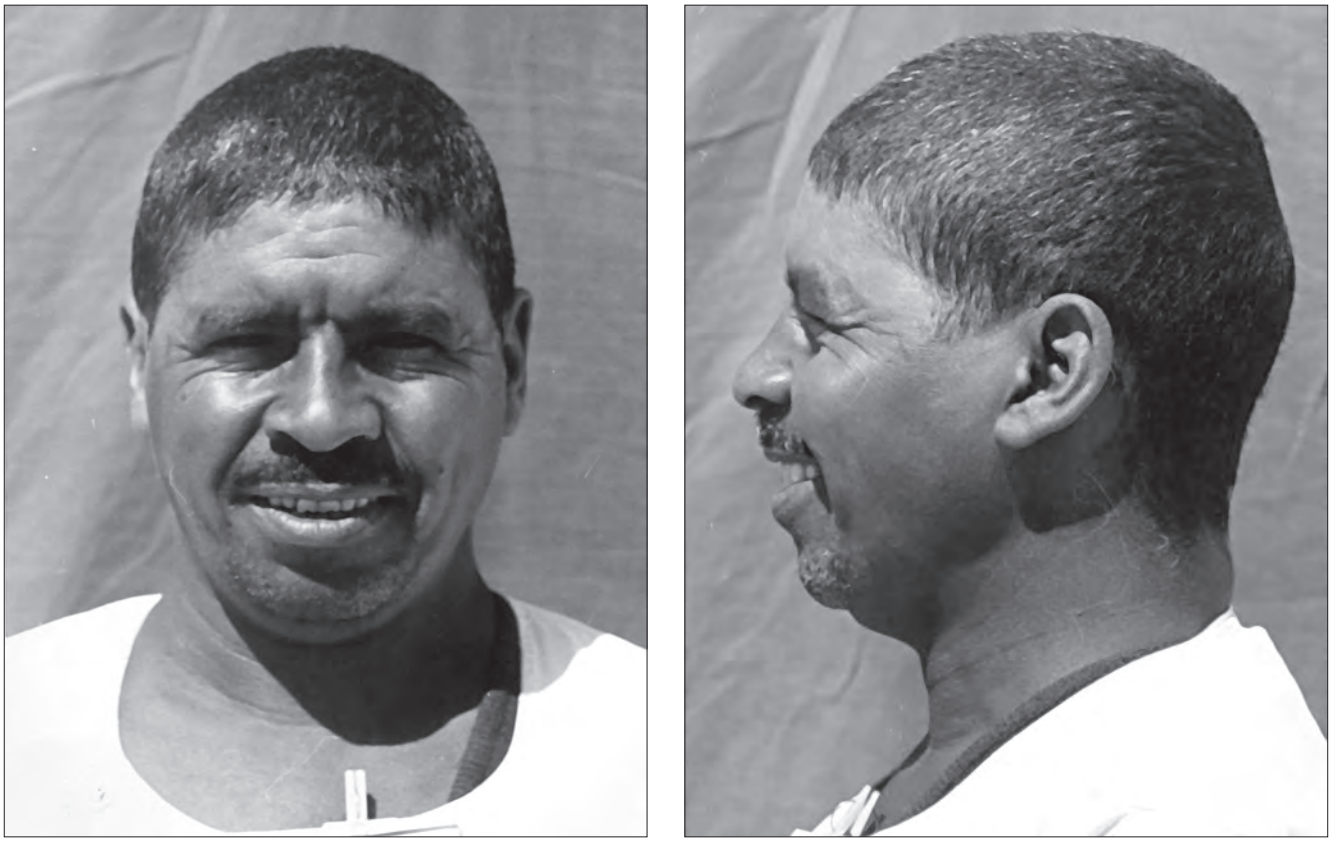


1

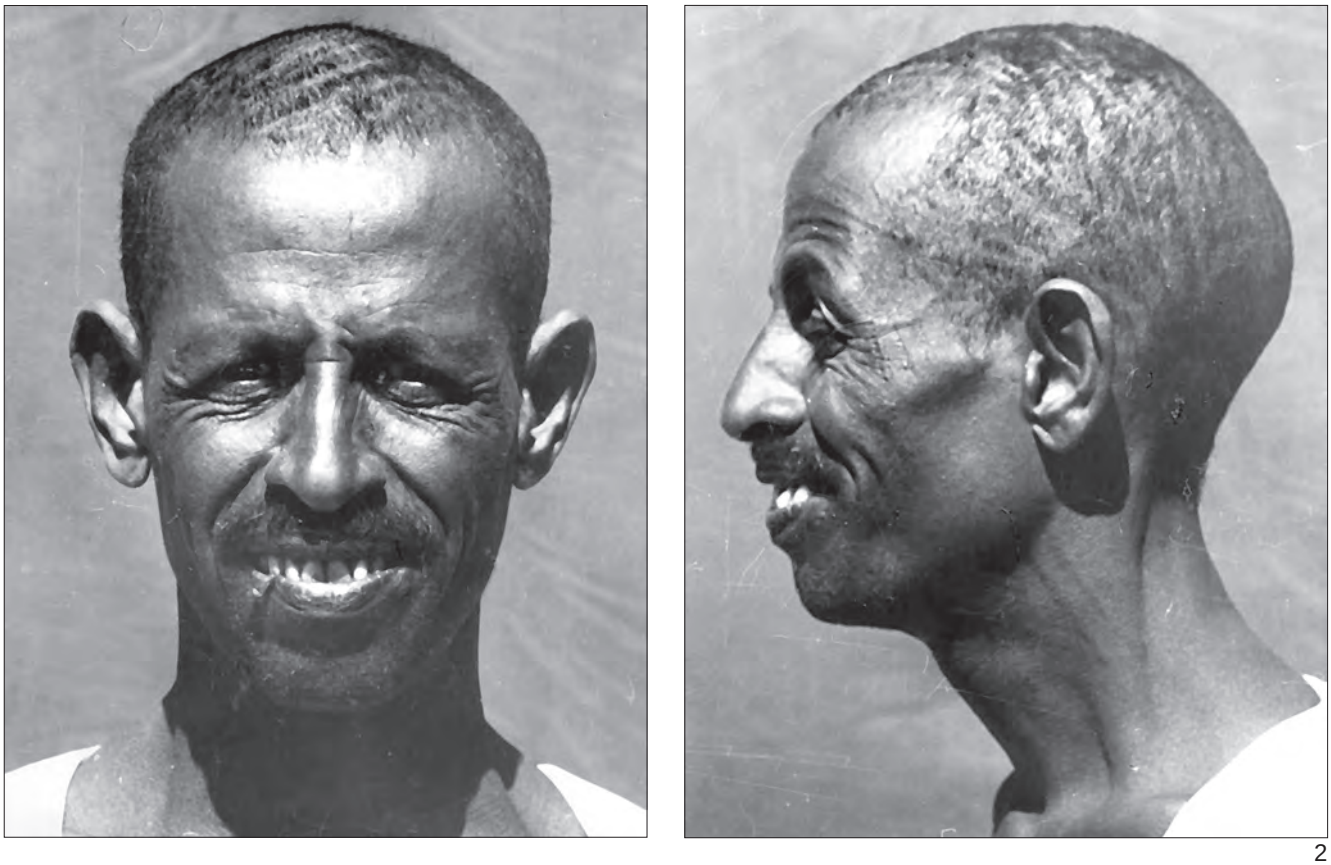


2

PLATE XLV. 1) 26-year-old Ababda X 23 from Sayala. 2) 38-year-old Ababda X 26 from Dakka.



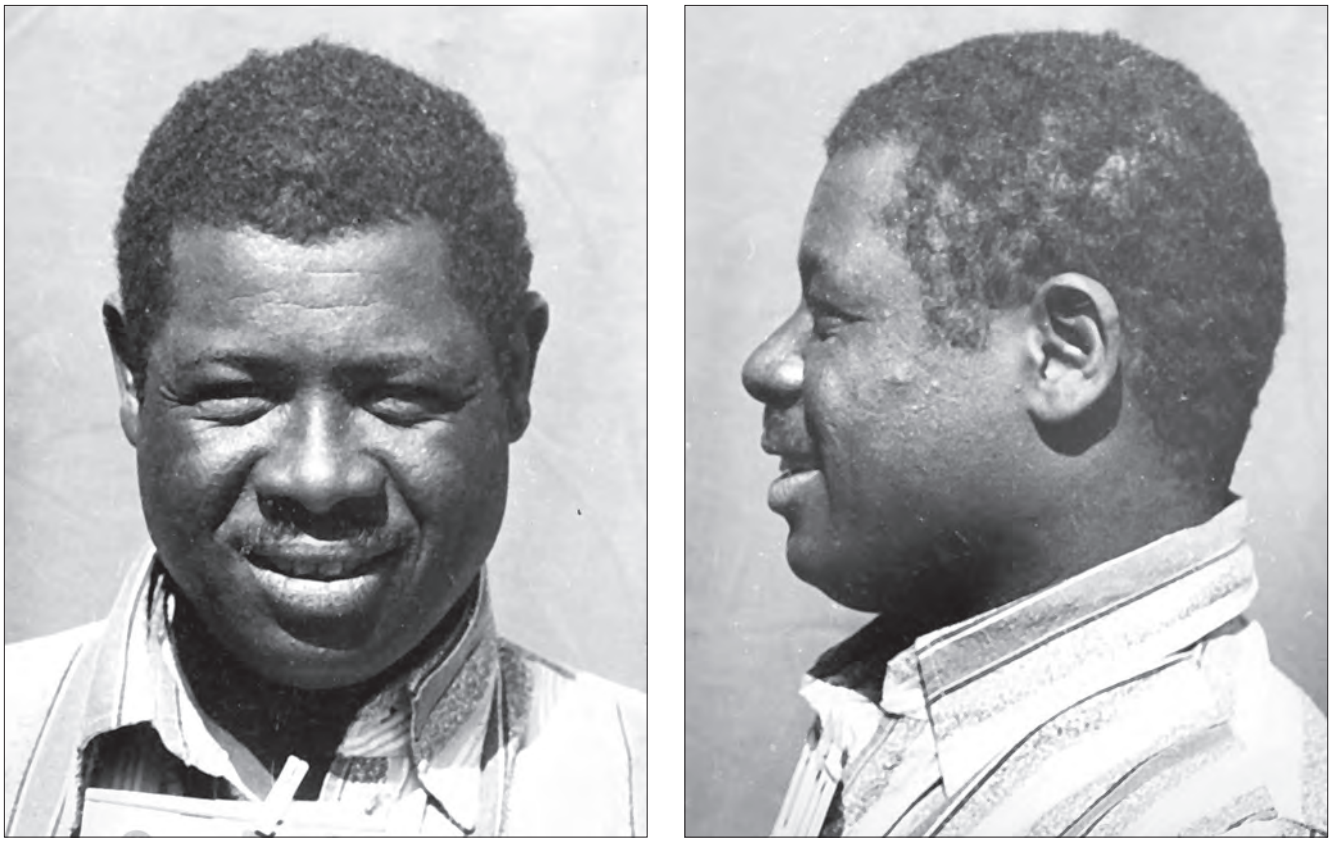
1



2

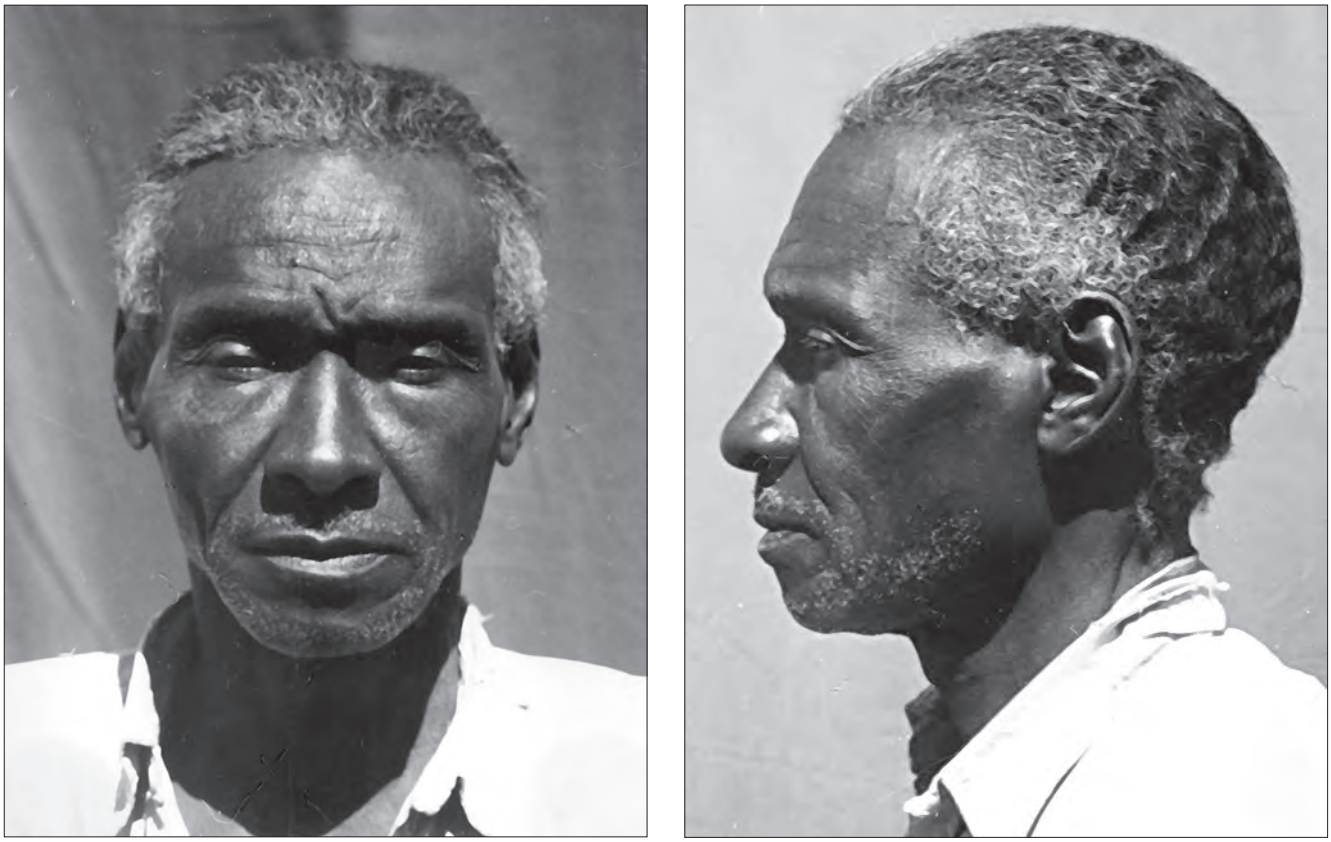
PLATE XLVI. 1) 52-year-old descendant of an Arab father and a Kenzi mother O 68 from Maliki. 2) 43-year-old descendant of an Ababda father and a Nubian Arab mother O 86 from Wadi el-Arab.

1



2

PLATE XLVII. 1) 37-year-old descendant of an Ababda father and a Kenzi mother A 62 from Dakka. 2) 29-year-old descendant of an Egyptian father and a Nubian Arab mother 71 from Wadi es-Sebua.



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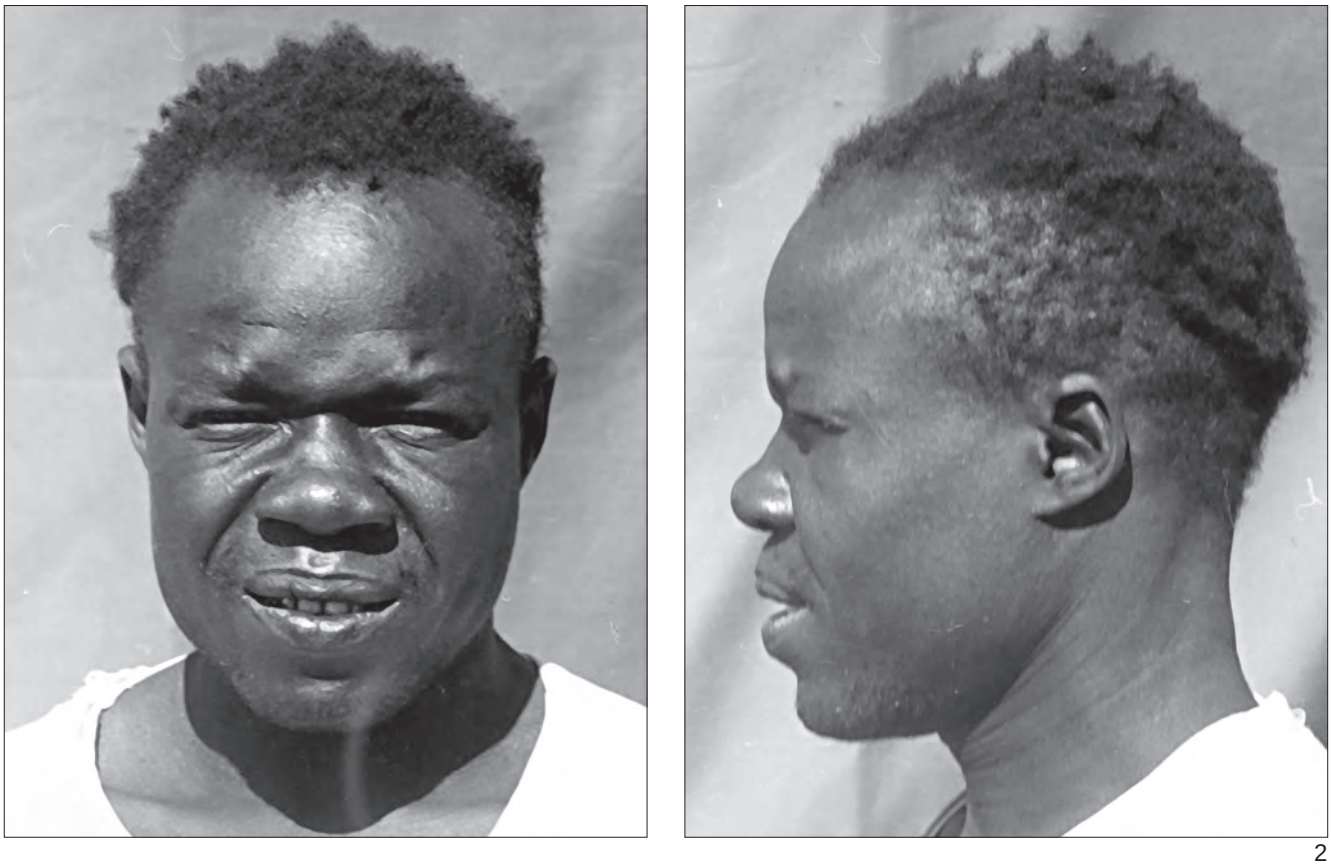


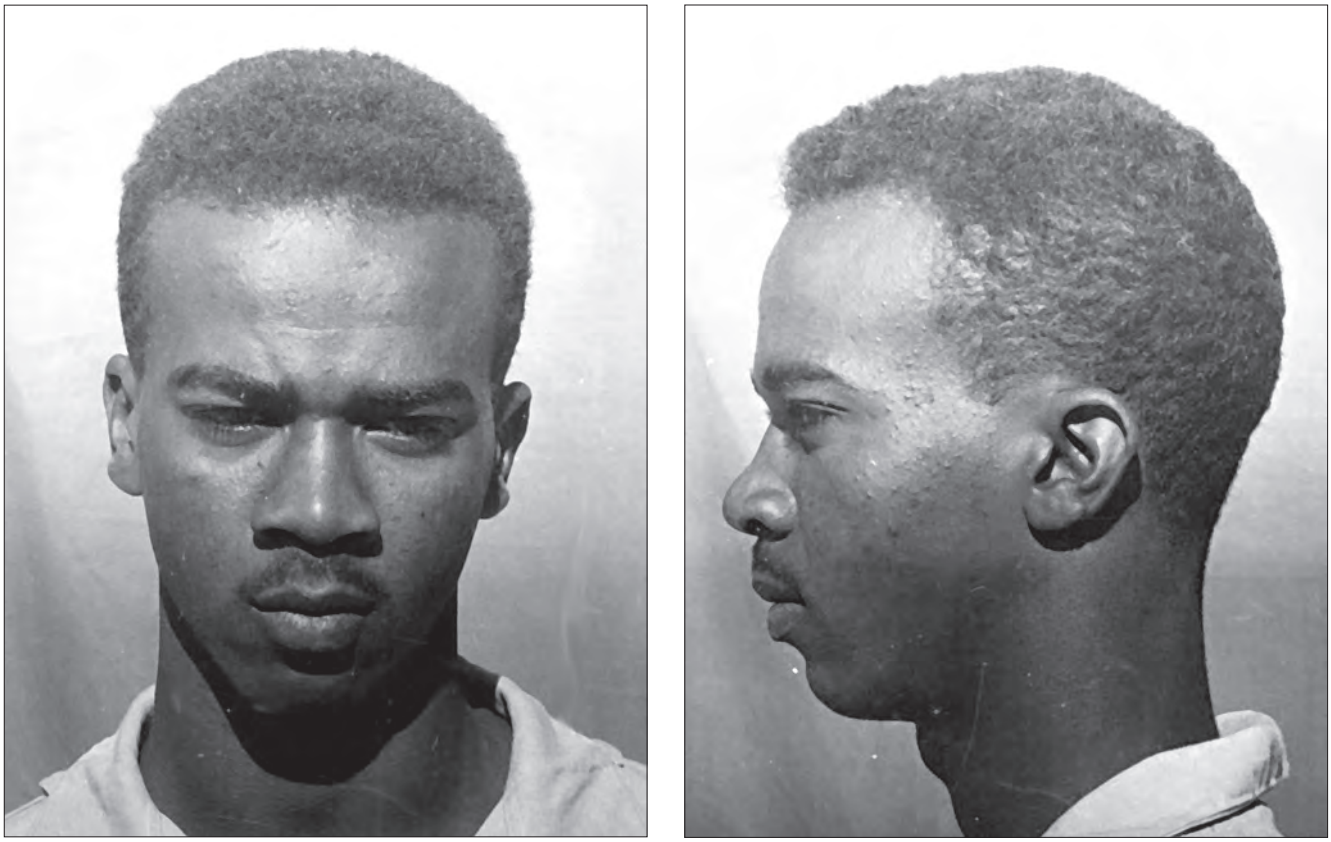
2

PLATE XLVIII. 1) 51-year-old descendant of a Sudanese father and a Fadidja mother K 75 from ed-Derr. 2) 34-year-old descendant of a Sudanese father and a Fadidja mother K 87 from ed-Derr.

1

2

PLATE XLIX. 1) Young Kenzi E 31 (20 years) from el-Mediq. 2) Young Kenzi E 53 (20 years) from Abu Hur.



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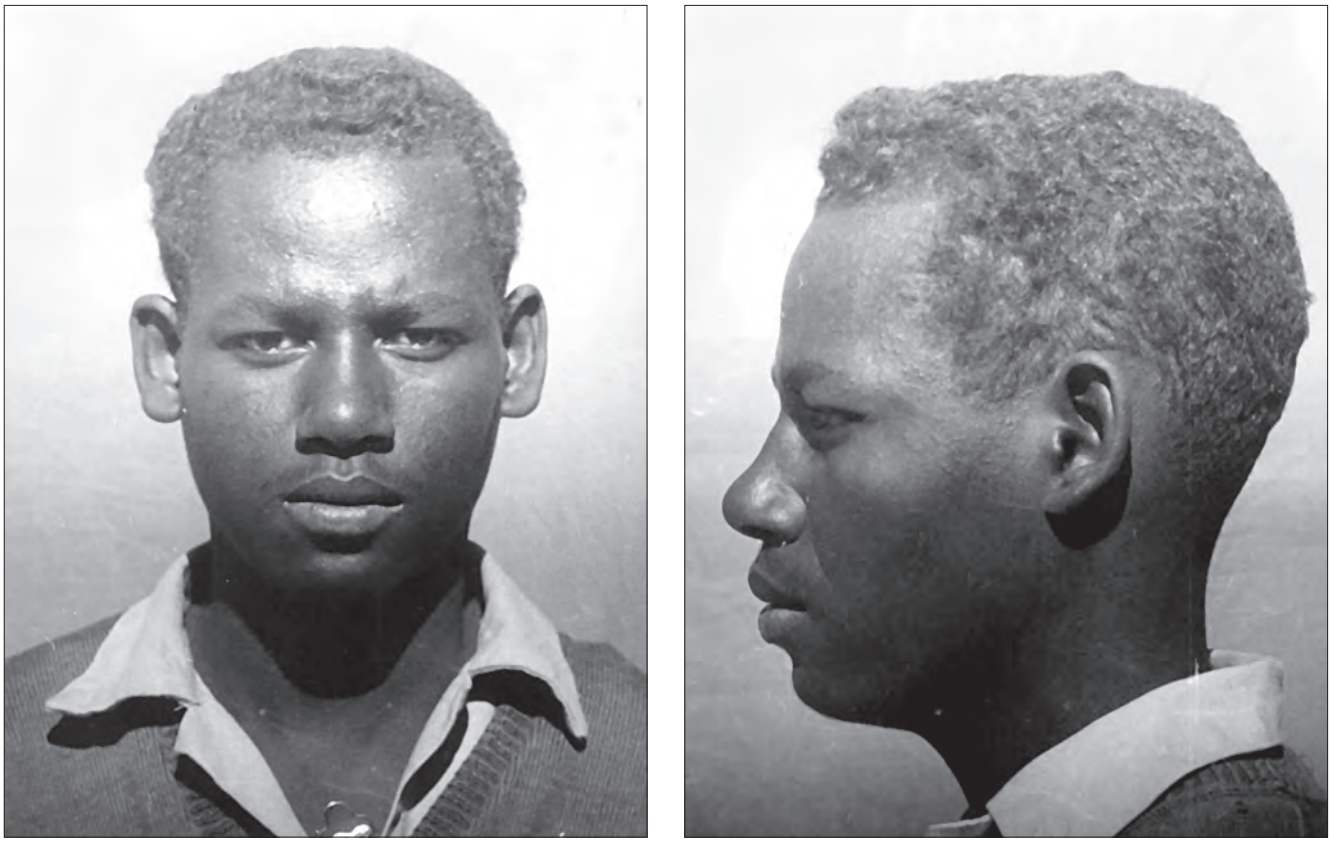

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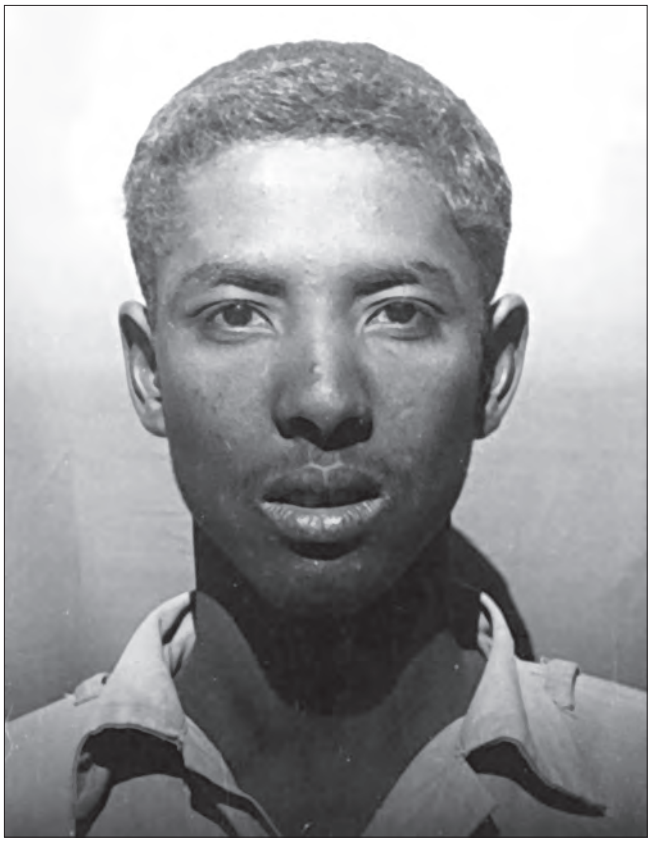
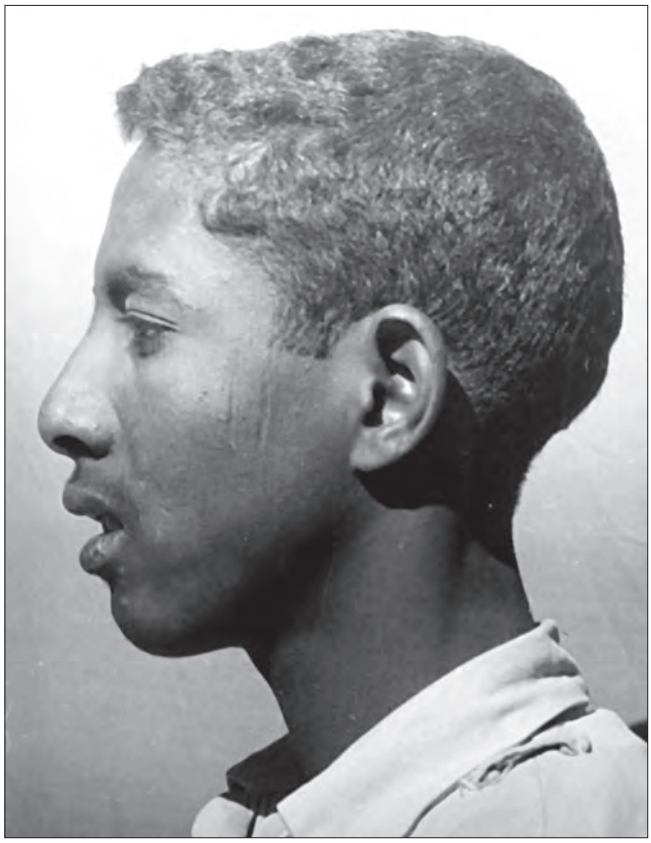
PLATE L. 1) Young Kenzi E 167 (20 years) from Qurta. 2) Young Kenzi E 169 (20 years) from Dehmit.

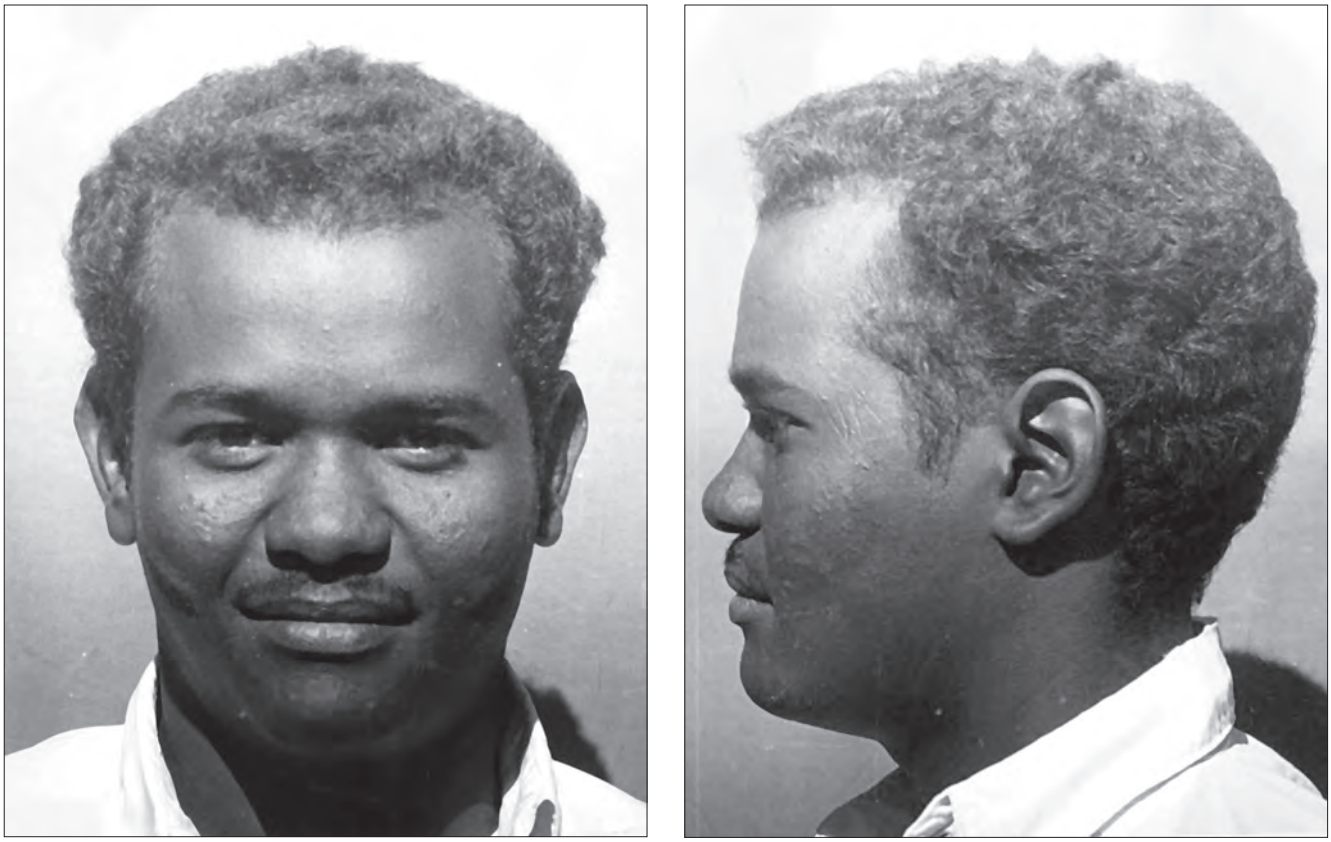
1





2

PLATE LI. 1) Young Ababda E 94 (20 years) from Masmas. 2) Young Ababda E 24 (20 years) from Maharraka.



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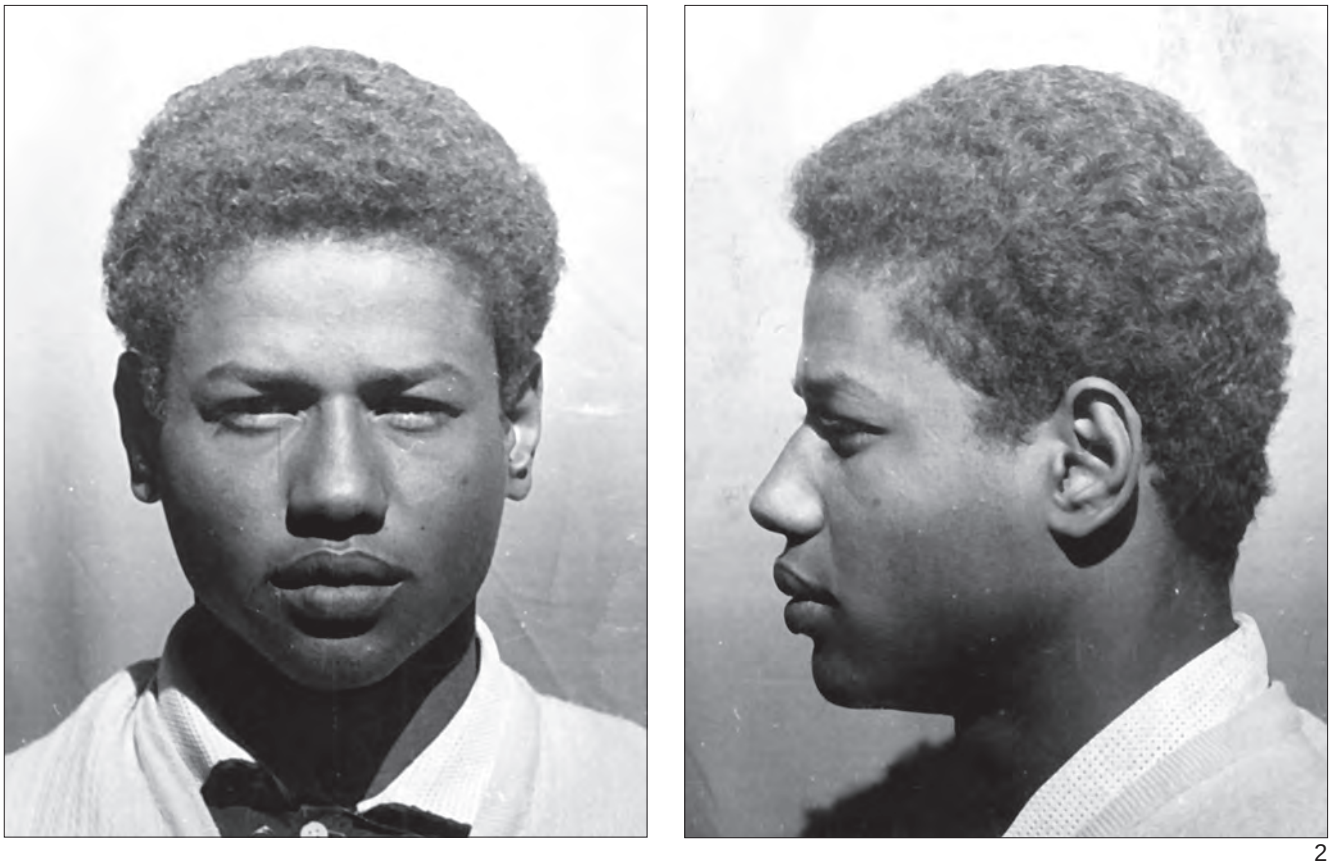
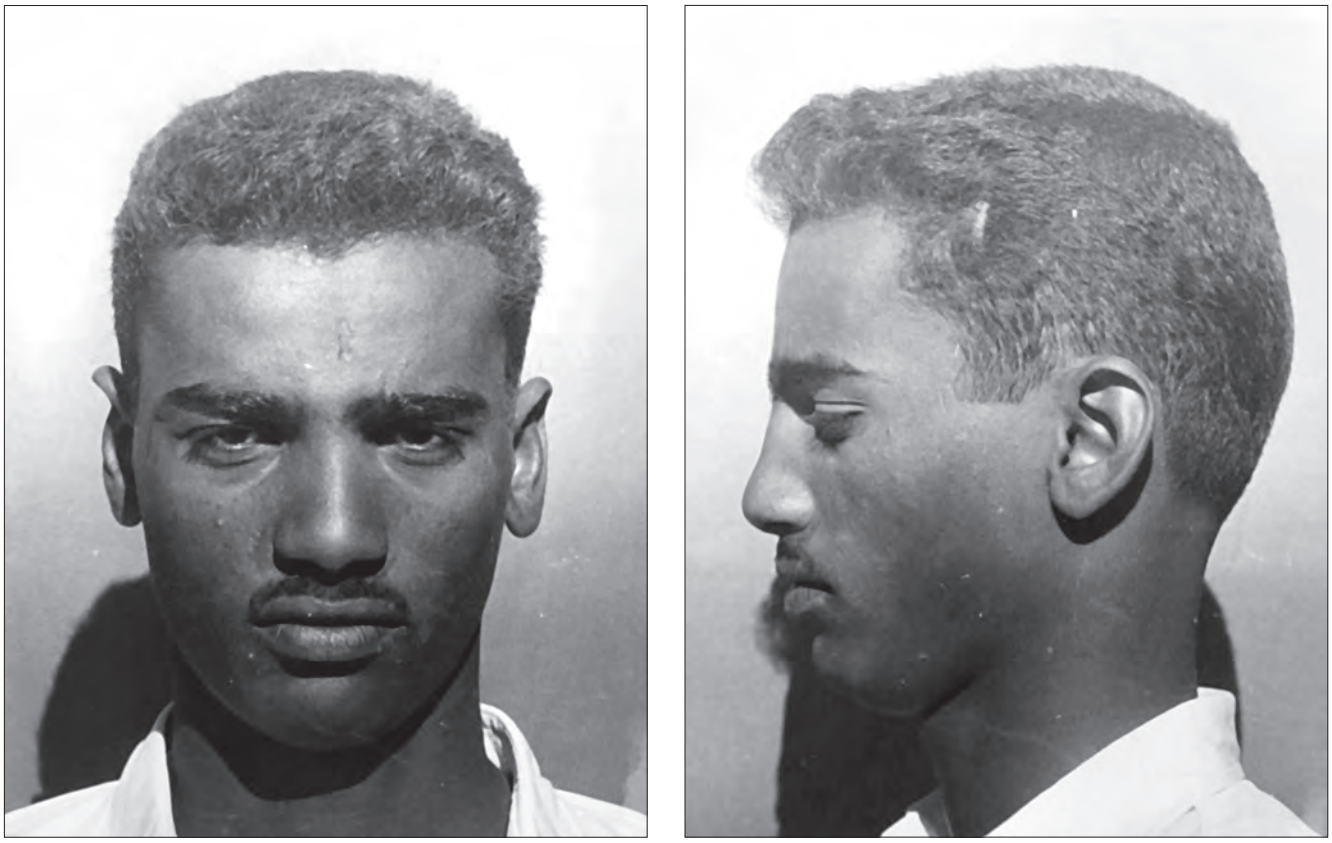


2

PLATE LII. 1) Young Nubian Arab E 46 (19 years) from Sinqari. 2) Young Nubian Arab E 61 (19 years) from Wadi el-Arab.

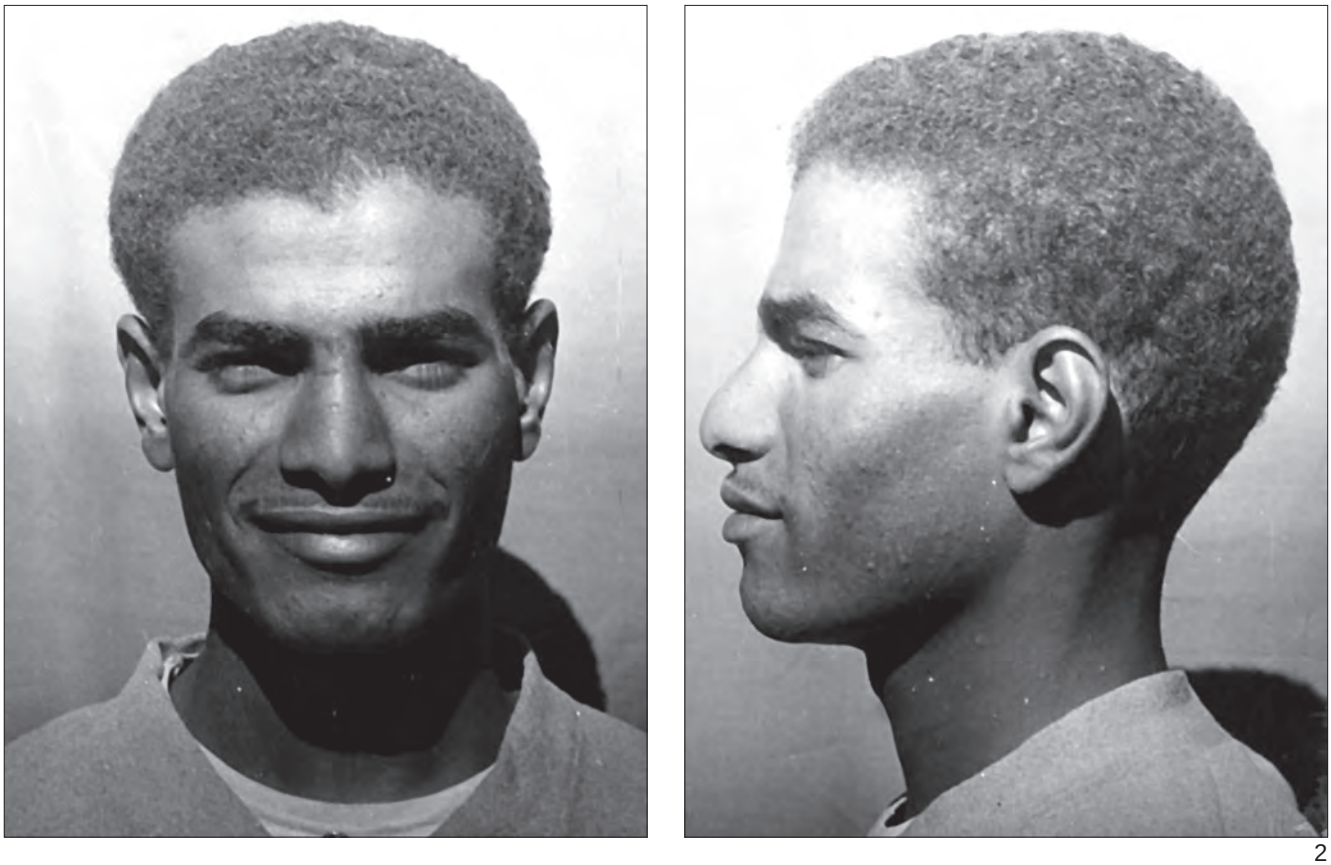
1



2

PLATE LIII. 1) Young Fadidja E 10 (19 years) from Ibrim (born in Cairo). 2) Young Fadidja E 12 (19 years) from Tomas (born in Cairo).

1



2

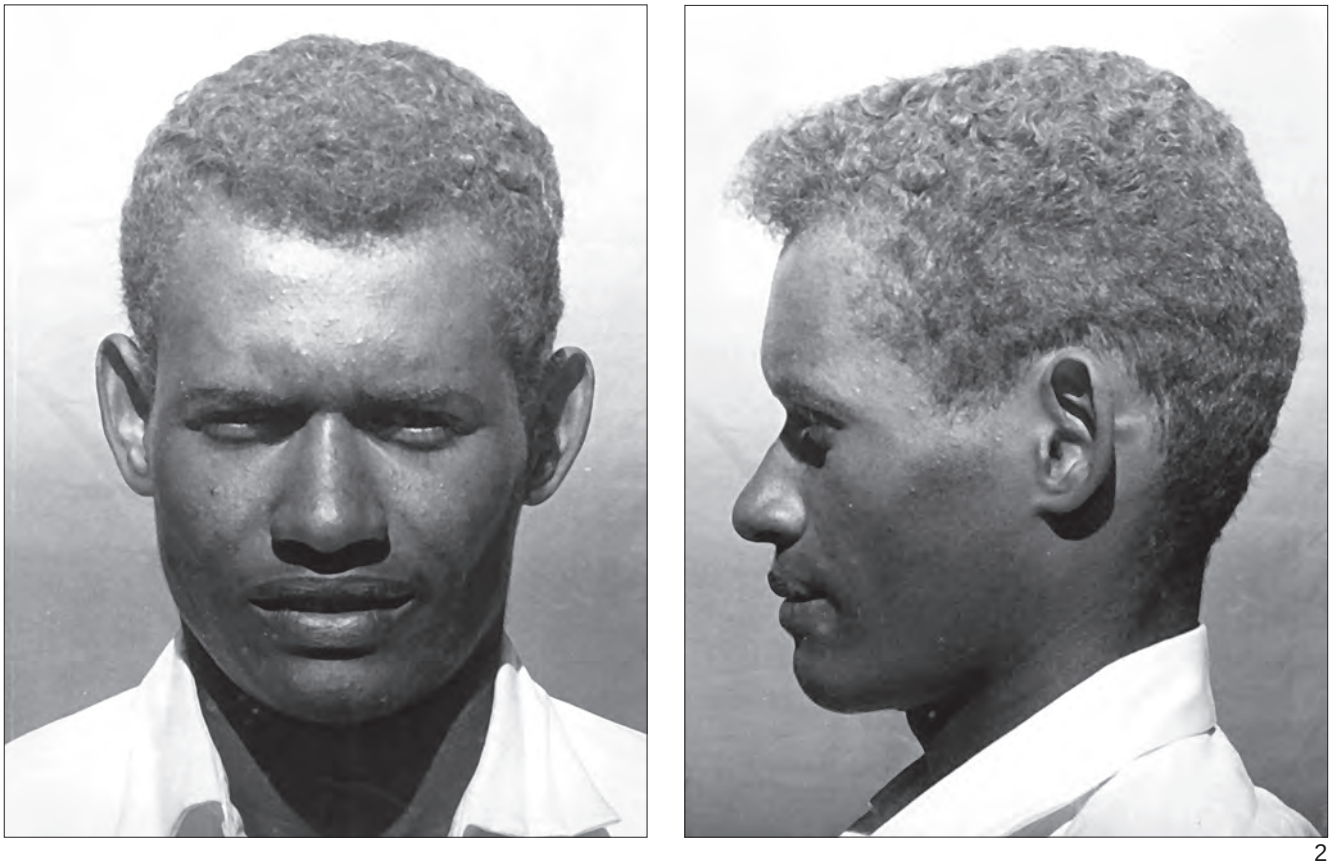
PLATE LIV. 1) Young Fadidja E 27 (20 years) from Ginena (born in Alexandria). 2) Young Fadidja E 30 (20 years) from Diwan.

1

2

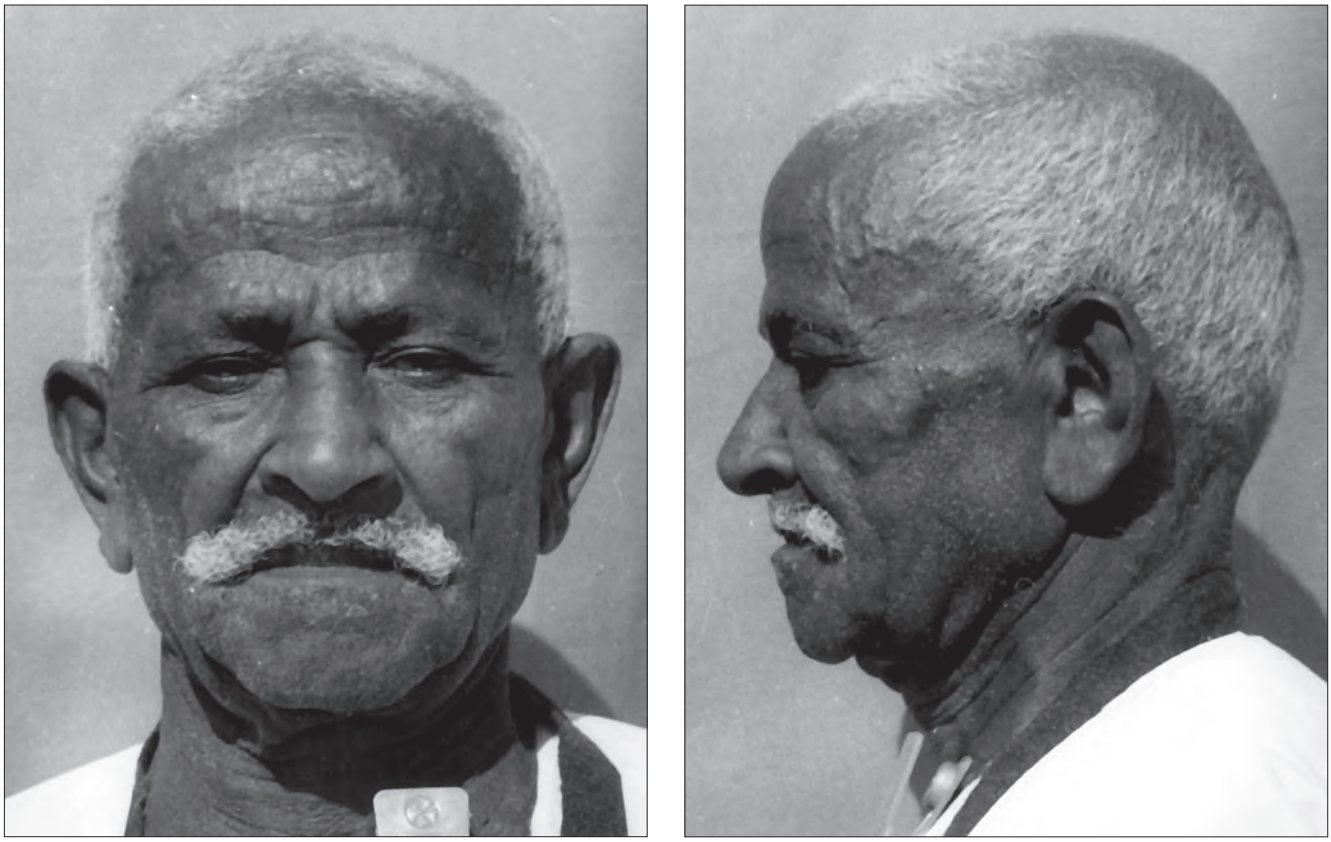
PLATE LV. 1) Young Fadidja E 78 (20 years) from Adindan (born in Wadi Halfa. 2) Young Fadidja E 79 (20 years) from Aniba.

1



2

PLATE LVI. 1) Young descendant of a Nubian Arab father and a Kenzi mother E 4 (19 years) from Gerf Hussien. 2) Young descendant of a Fadidja father and a Nubian Arab mother E 47 (19 years) from Tomas.



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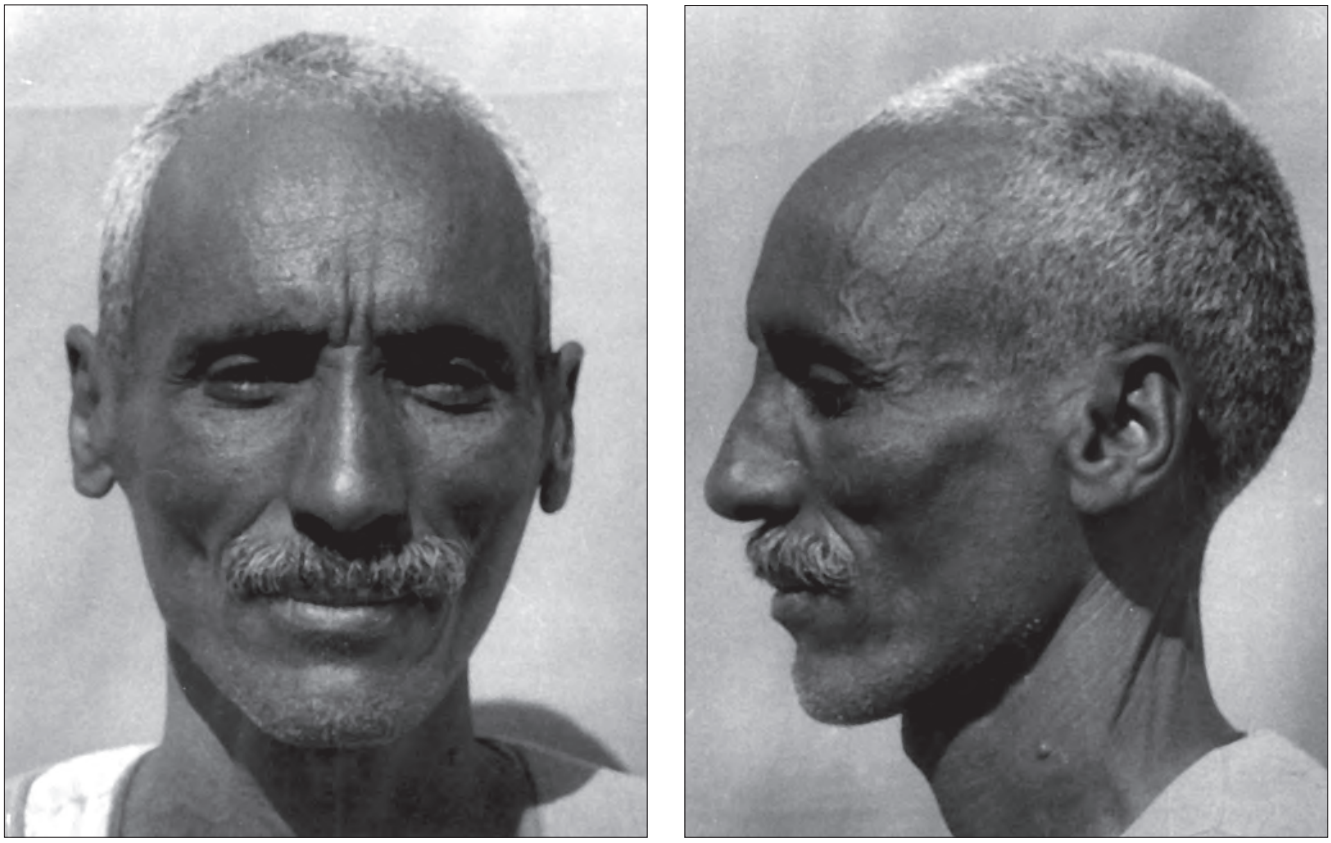
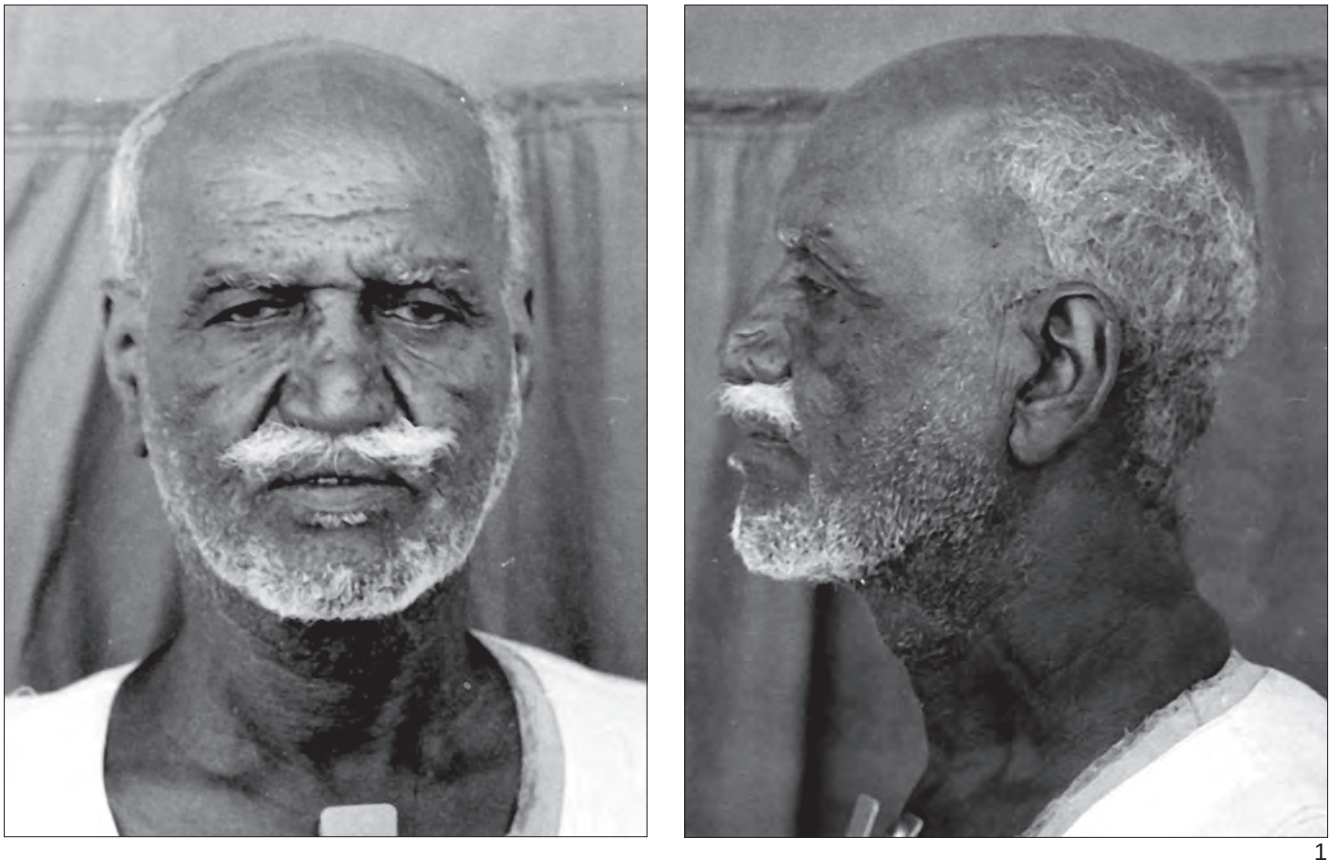


2

PLATE LVII. 1) Old Kenzi A 20 (70 years) from Dehmit. 2) Old Kenzi A 23 (62 years) from Dehmit.



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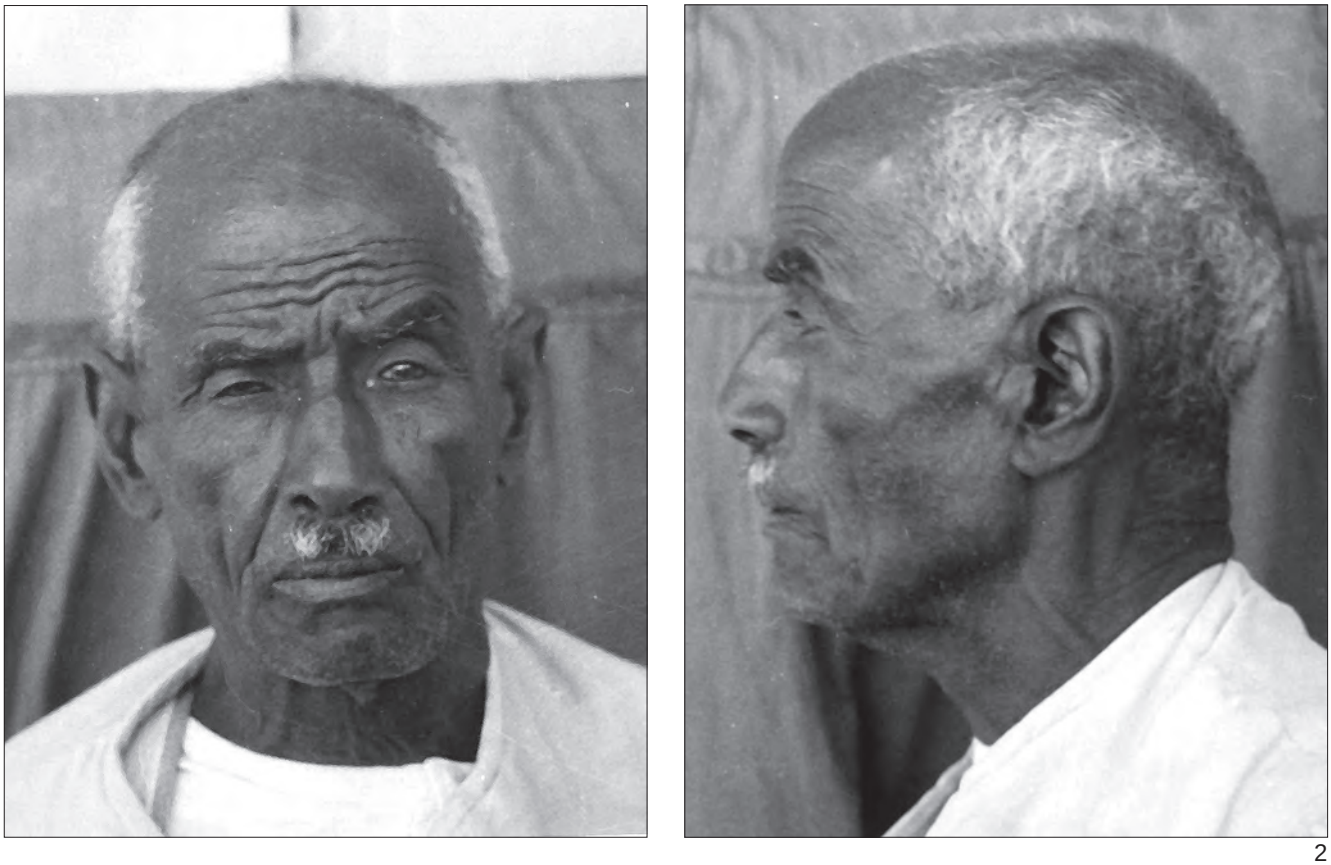
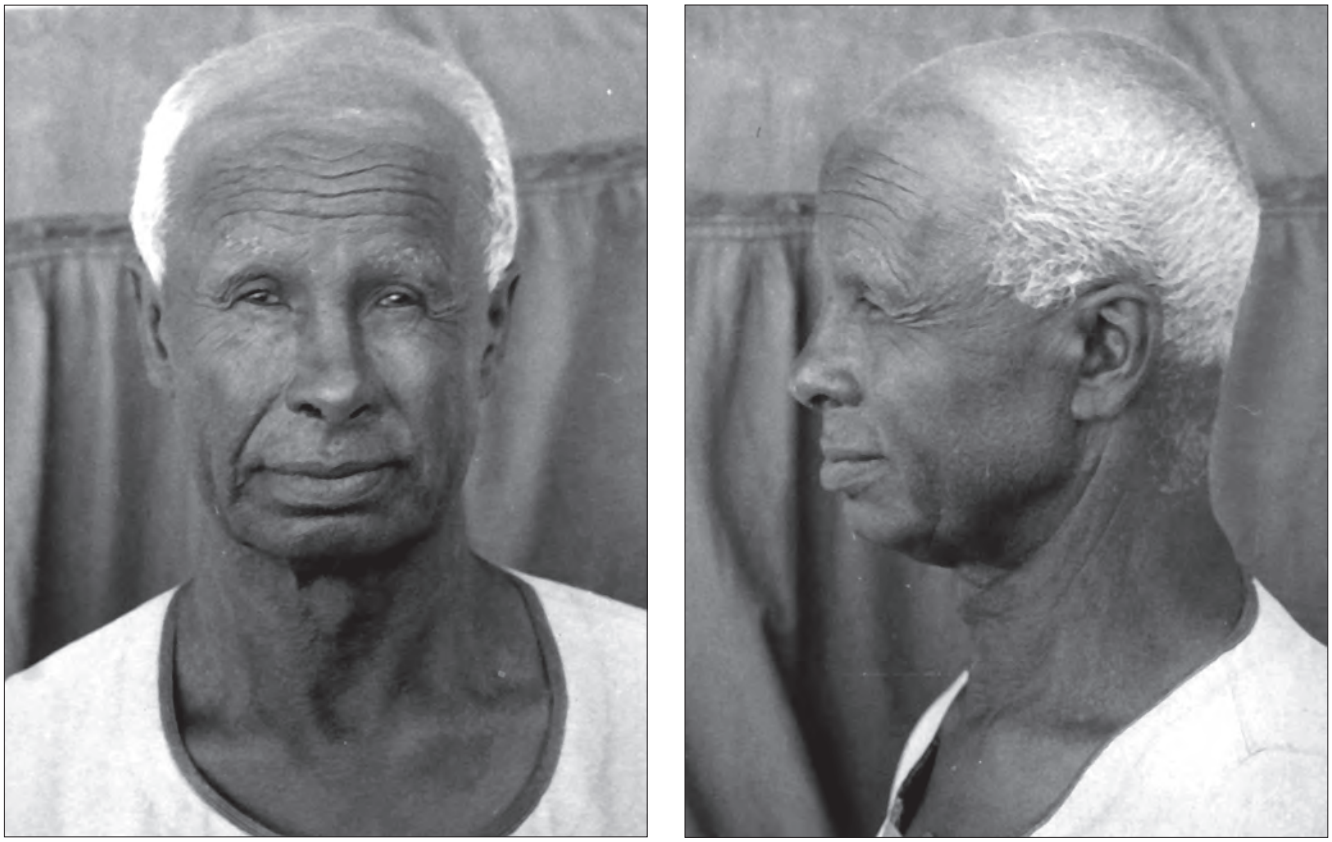


2

PLATE LVIII. 1) Old Kenzi A 3 (63 years) from Dehmit. 2) Old Kenzi A 2 (67 years) from Umbakarab.



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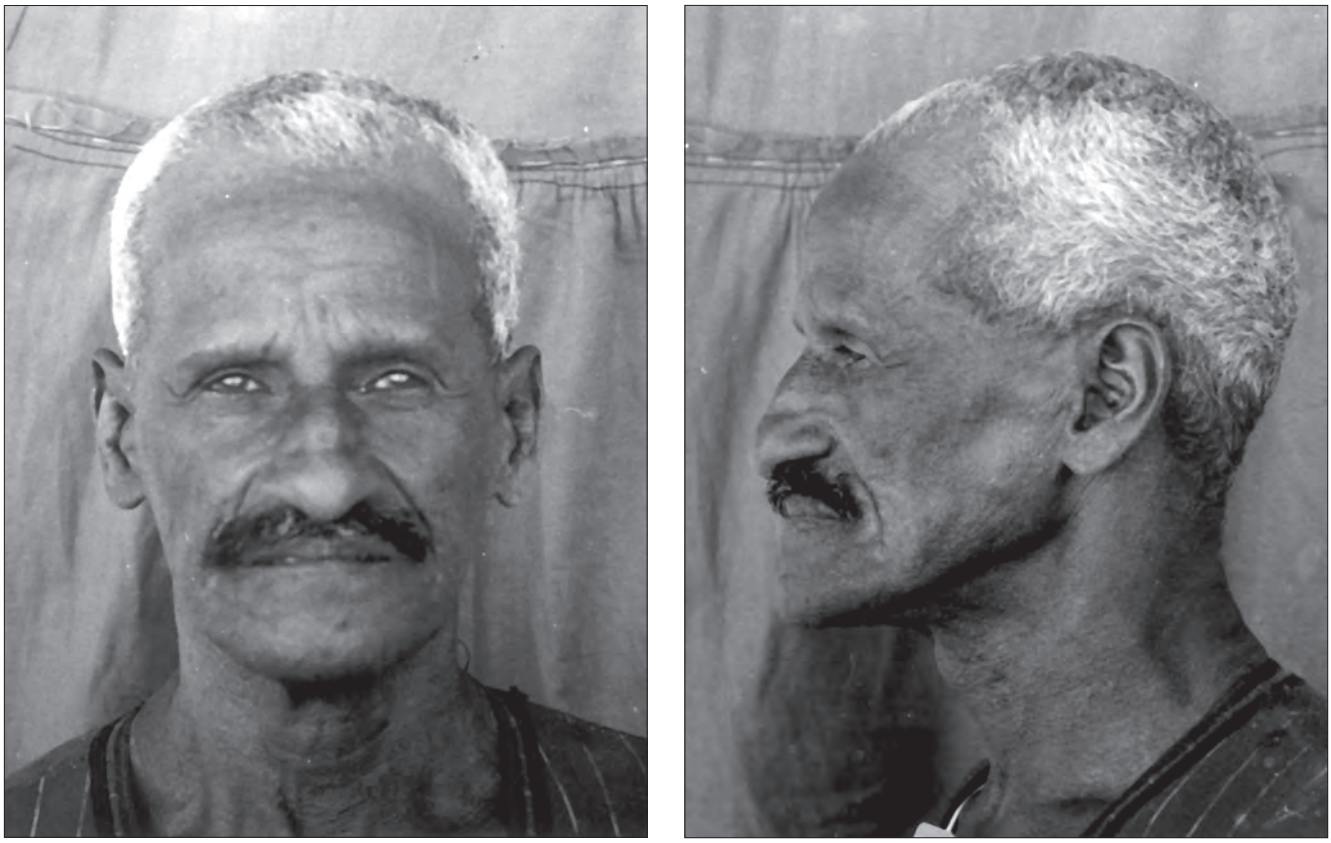
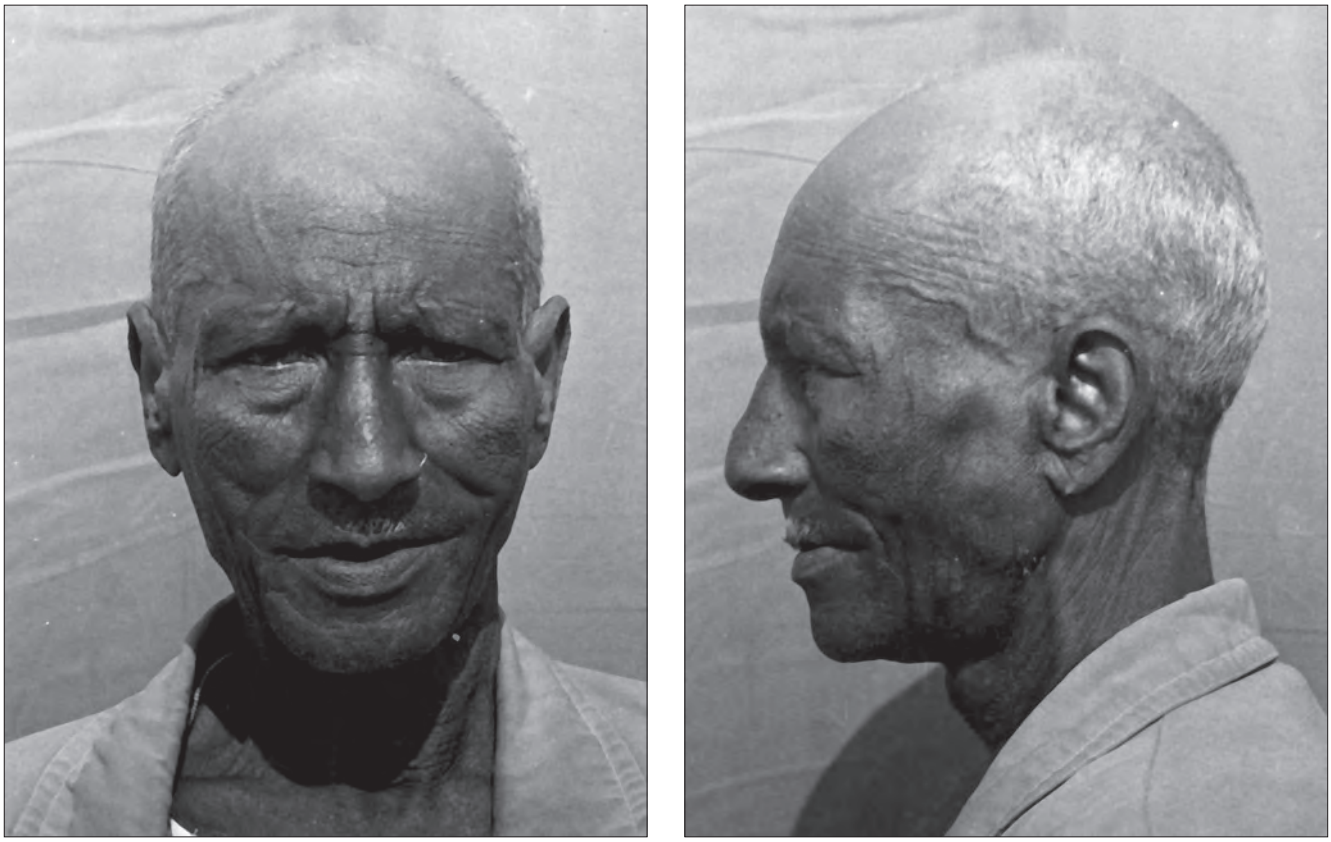


2

PLATE LVIX. 1) Old Kenzi A 4 (68 years) from Koshtamna. 2) Old Kenzi A 5 (69 years) from Koshtamna.



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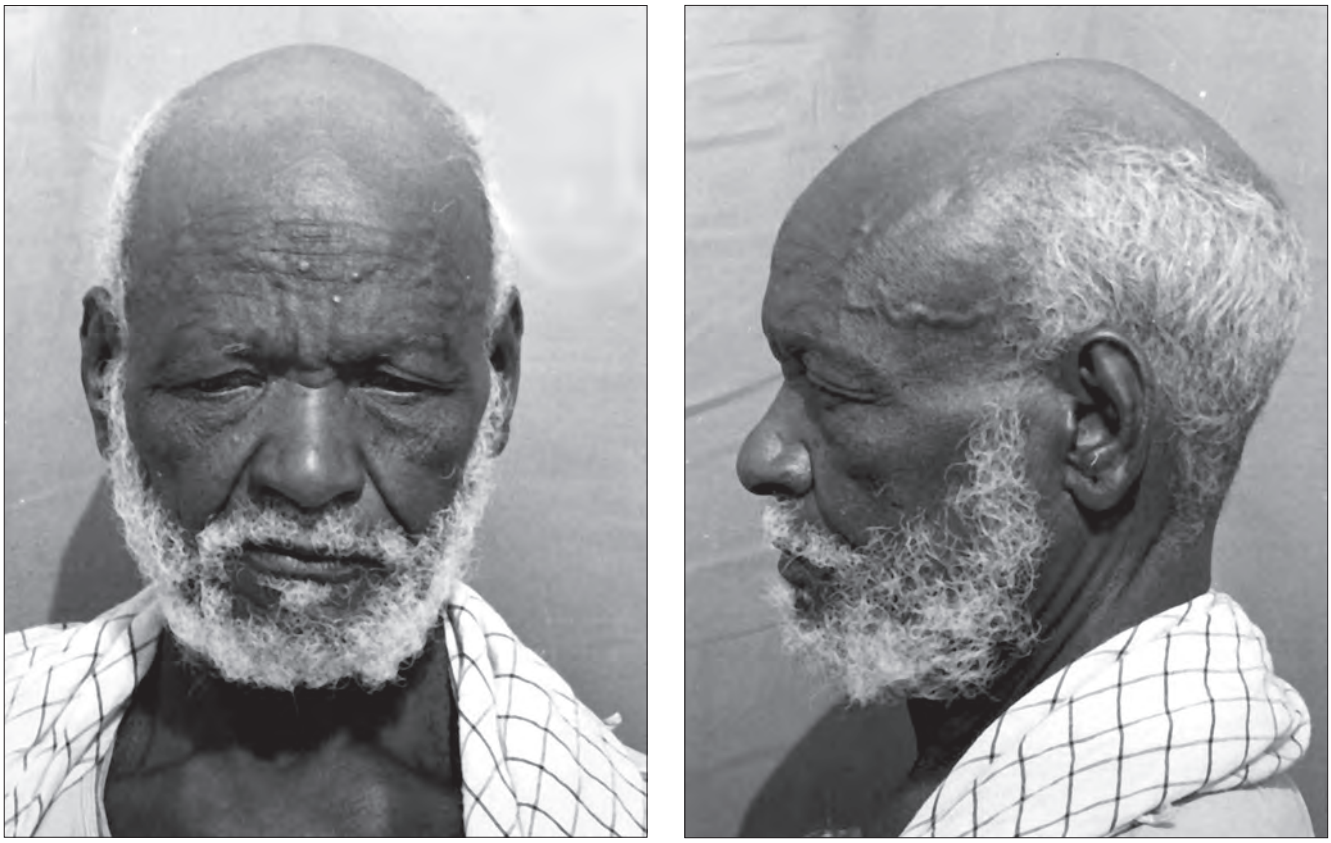

2

PLATE LX. 1) Old Kenzi A 118 (65 years) from Dakka. 2) Old Kenzi A 117 (70 years) from Shellal.

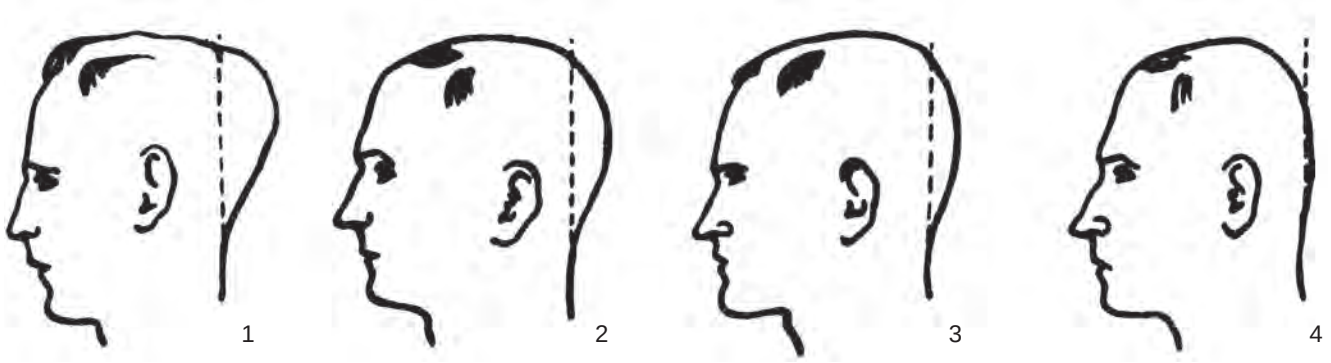

FIGURE 22. Scheme of profile of back of the head by Eickstedt 1944 (Fig. 597): 1 = strongly vaulted, 2 = medium vaulted, 3 = slightly vaulted, 4 = flattened.

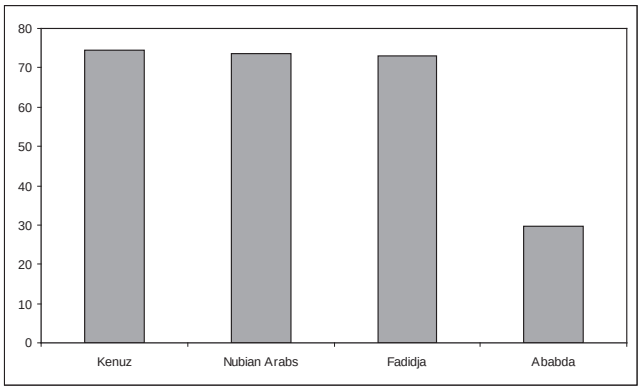

FIGURE 23. Percentage of strongly and medium vaulted back of the head (categories 1–2) in the ethnic groups of adult Nubians and Ababda.

14.15. Evaluation of some features

Some anthroposcopic features which have been traditionally used for distinction between Europoids (Caucasoids) and the Subsaharan Africans (*Figure 9–11, 13, 17, 18, 20, 21, 23*) are not following the climatic gradient with increasing temperature and humidity from north to south of Egyptian Nubia, but express well the genetic backround of the four ethnic groups studied here. Thus the Ababda stand in most features apart of the Nubian groups, or they approach Nubian Arabs (*Figure 17, 20*) or the Fadidja (*Figures 9, 21*). Out of the Nubian groups, the greatest amount of Subsaharan African features (and genes) is apparent in the Kenuz, in spite of the fact that the Fadidja sample includes several Sudanese Blacks.

15. IS THE DESCENT GROUP CONCEPT VALID PHYSICALLY?

15.1. Comparison of descent groups with others

In order to test the physical validity of the descend group concept, considered by the probands as very important (see Chapter 6), members of one descent group were compared with members of different other descent groups from the same village in 19 cephalometric features and a selection of 5 somatometric features (*Table 59*).

In the Kenuz village Umbarakab, 9 members of Salumab descent group were tested against 11 members of different other groups, and in the Fadidja village Ibrim, 11 members of Abu Rasab descent group were tested against 12 members of other groups.

In any of these comparisons a significant result of the t-test was obtained and the t-test values were always smaller than 1.49. There were only three significant differences in variability between the descent groups at Umbarakab (in minimum frontal breadth, nasal height and facionasal index) and two at Ibrim (in breadth-height index of the head and jugonasal index).

It seems probable that the concept of descent group does not have physical consequences. There is, however, a possibility that the number of cases in our comparison was not sufficient to prove its significance.

15.2. Comparison of descent groups with names of different origin

Since some earlier authors (Burckhardt 1819, Crowfoot 1907) observed that members of families of Turkish origin differed in physical appearance from other Fadidja, we tried to ascertain it with anthropometric data collected by our mission.

Differences between members of descent groups with names of Nubian (including Early Christian), Arab and Turkish origin (including those of people subdued to Turks; see Chapter 6) were tested by t-test (Student's test).

Twelve measurements (head length and breadth, auricular height, minimum frontal breadth, height and bizygomatic breadth of the face, bigonial breadth, height and breadth of the nose, body weight, stature and sitting heigh) and 12 indices (cephalic, length-height and breadth-height of the head, transverse fronto-parietal, facial, jugofrontal and jugomandibular, nasal, jugonasal and facionasal, Rohrer's and cormic) were tested. Altogether 19 cephalometric and 5 somatometric features were included.

Not significant differences between members of the descent groups with names of Nubian, Arab or Turkish origin were omitted, while the significantly different ones are recorded in *Table 60*.

Between members of descent groups of Nubian and Arab origin, no significant differences in measurements were

TABLE 59. Anthropometric comparison of members of single descent groups with members of different other descent groups from the same village.

Measurement or index	Umbarakab									Ibrim								
	Salumab (n=9)			other descent groups (n=11)			t-test	F-test		Aburasab (n=11)			other descent groups (n=12)			t-test	F-test	
	x̄	s	V%	x̄	s	V%	result	result	limit F 0.05	x̄	s	V%	x̄	s	V%	result	result	limit F 0.05
1. Maximum head length (1)	188.8	6.3	3.3	191.5	9.2	4.8	0.71	2.07	4.30	189.4	7.2	3.8	188.2	7.1	3.8	0.39	1.06	3.37
2. Maximum head breadth (3)	150.7	7.4	4.9	149.8	5.7	3.8	0.29	1.72	3.90	142.7	4.7	3.3	144.2	4.4	3.0	0.75	1.09	3.37
3. Auricular height (15)	124.1	5.9	4.8	127.4	5.4	4.1	1.23	1.21	3.90	119.6	6.5	5.4	121.5	4.7	3.9	0.76	1.96	3.37
4. Minimum frontal breadth (4)	106.9	2.5	2.3	105.2	5.7	5.4	0.85	5.14	4.30	101.6	3.3	3.2	103.3	4.9	4.7	0.92	2.25	3.48
5. Morphological height of the face (18)	121.4	6.6	5.4	118.6	8.7	7.3	0.76	1.67	4.30	119.6	7.8	6.5	119.3	5.5	4.6	0.10	2.03	3.37
6. Bizygomatic breadth (6)	134.4	6.1	4.5	136.1	3.6	2.6	0.74	3.00	3.90	132.6	4.6	3.5	134.6	6.1	4.5	0.84	1.74	3.48
7. Bigonial breadth (8)	98.7	5.4	5.5	102.4	5.2	5.1	1:48	1.14	3.90	100.6	5.8	5.8	100.8	7.2	7.1	0.07	1.54	3.48
8. Height of the nose (21)	54.8	2.0	3.6	56.0	5.3	9.5	0.66	6.20	4.30	54.2	2.7	5.0	54.1	4.7	8.7	0.06	3.00	3.48
9. Breadth of the nose (13)	41.6	5.6	13.5	42.6	3.8	9.0	0.45	2.19	3.90	38.7	4.5	11.6	38.8	3.5	9.0	0.06	1.57	3.37
10. Cephalic index	79.9	4.6	5.8	78.3	2.8	3.6	0.92	2.92	3.90	75.3	3.8	5.0	76.7	2.6	3.4	1.01	2.17	3.37
11. Length-height index	65.8	3.3	5.0	66.6	2.2	3.3	0.59	2.24	3.90	63.2	3.0	4.7	64.6	1.9	2.9	1.10	2.60	3.37
12. Breadth-height index	82.6	5.1	6.2	85.1	3.2	3.8	1.26	2.53	3.90	83.9	4.6	5.5	84.3	2.4	2.8	0.24	3.92	3.37
13. Transverse frontoparietal index	71.1	3.2	4.5	70.2	3.4	4.8	0.57	1.10	4.30	71.3	2.9	4.1	71.6	2.6	3.6	0.26	1.23	3.37
14. Morphological facial index	90.4	4.0	4.4	86.2	6.8	7.9	1.53	2.91	4.30	90.3	6.3	7.0	88.8	4.2	4.7	0.66	2.28	3.37
15. Jugofrontal index	79.6	3.8	4.8	77.2	3.2	4.1	1.44	1.43	3.90	76.7	2.4	3.1	76.8	2.2	2.9	0.14	1.21	3.37
16. Jugomandibular index	73.5	4.9	6.7	75.3	4.4	5.8	0.80	1.31	3.90	75.9	3.5	4.6	74.8	3.9	5.2	0.65	1.22	3.48
17. Nasal index	76.0	11.3	14.9	77.0	11.5	14.9	0.17	1.01	4.30	71.5	7.6	10.6	72.2	8.1	11.2	0.20	1.12	3.48
18. Jugonasal index	30.9	3.8	12.3	31.3	2.4	7.7	0.29	2.48	3.90	29.2	3.5	12.0	28.8	1.9	6.6	0:32	3.51	3.37
19. Facionasal index	45.2	2.5	5.5	47.5	6.2	13.0	1.06	5.96	4.30	45.4	2.2	4.8	45.3	2.7	6.0	0.09	1.50	3.48
20. Weight (71)	60.4	12.0	19.9	57.0	10.1	17.7	0.66	1.43	3.90	60.6	8.4	13.9	61.5	14.8	24.1	0.18	3.07	3.48
21. Stature (1)	168.0	4.3	2.6	167.7	6.0	3.6	0.13	1.90	4.30	168.4	6.2	3.7	169.6	11.1	6.6	0.29	3.13	3.48
22. Sitting height (23)	85.8	2.4	2.8	85.3	3.4	4.0	0.32	1.94	4.30	87.3	3.1	3.6	87.2	3.1	3.6	0:10	1.00	3.48
23. Rohrer's index	1.27	0.23	1.8	1.21	0.20	1.6	0.65	2.36	3.90	1.28	0.25	2.0	1.26	0.29	2.3	0.17	1.29	3.48
24. Cormic index	51.0	1.1	2.2	50.9	1.0	2.0	0.31	1.23	3.90	51.9	1.8	3.5	51.5	2.2	4.3	0.38	1.49	3.48

TABLE 60. Significant differences between descent groups with names of different origin. Legend: n = number of individuals, x = arithmetic mean, t-value = significant on the probability level of 5%; all measurements are in mm.

Feature	n	x̄	n	x̄	t-value
			Descent group names		
		NUBIAN		ARAB	
Frontoparietal index	24	72.3	73	70.7	2.318
Zygomaticofrontal index	24	78.8	73	76.8	2.715
			Descent groups		
		NUBIAN		TURKISH	
Head breadth	24	143.3	26	146.7	2.540
Bizygomatic breadth	24	131.9	26	136.0	2.372
Facial index	23	91.0	26	87.0	2.182
			Descent groups		
		ARAB		TURKISH	
Auricular height of head	74	125.8	26	129.2	2.713
Minimum frontal breadth	73	102.8	26	105.4	2.767
Breadth-height index of head	73	86.5	26	88.1	2.077

revealed, while 2 of the 12 indices (16.7%), viz. the higher frontoparietal and zygofrontal ones, were significantly bigger in members of descent groups with Nubian names than in members of descent groups with Arab names.

Between members of descent groups of Nubian and Turkish origin, 2 of the 12 measurements (16.7%), viz. narrower head and face in the former than in the latter, and one of the 12 indices (8.3%), viz. higher facial index in the former than in the latter, were significantly different.

Between members of descent groups of Arab and Turkish origin, 2 of the 12 measurements (16.7%), viz. lower heads and narrower foreheads in the former than in the latter, and one of the 12 indices (8.3%), viz. smaller breadth-height index in the former than in the latter, were significantly different.

Even though the number of significant differences is low and they only concern cephalometric features, none of the five tested somatometric ones, we cannot wholly reject the possibility that there are remnants of physical differences between members of descent groups with different names. They are, however, very small, due to the long-lasting process of hybridization.

The differences between members of descent groups with names of Nubian and Arab origin are the smallest (on the whole 8.3%). This can be explained by the fact that no social and biological obstruction has existed from the 14th century onwards between the Nubians and Arabs, since the adoption of Islam by the Nubians.

The differences between members of descent groups with names of Nubian or Arab and Turkish origin are slightly more marked (in both comparisons on the whole 12.5%). Since the arrival of the Turks (and members of their subdued nations) to Nubia in the 16th century, Turkish (and subdued) girls were not allowed to marry in non-Turkish families. On the other hand, however, girls of descent groups with names of Nubian or Arab origin entered Turkish families and often intermarried with Turkish men. There was also a gene flow, but one way, which caused the gradual approach of the Turkish physical features to the morphology of the descent groups with names of Nubian and Arab origin, limited to the Fadidja area.

At the same time, the names of Egyptian Nubian descent groups can disclose the degree of "Nubization" of members of descent groups with non-Nubian names on the one hand, and the degree of "Arabization" of non-Arab names on the other hand, when their suffixes are examined.

In contrast with the above-mentioned predominant Arab stem in all Nubian names, the frequency of names with a Nubian suffix (-ab) with non-Nubian names (Arab and Turkish) is far greater than the frequency of an Arab suffix with non-Arab names (Nubian and Turkish). The former combination was found in 73.8% of the Kenuz, in 58.3% of the Arabs, and in 44.3% of the Fadidja.

The frequency of a Nubian suffix with a Turkish stem was, however, the same among the Fadidja as was the frequency of a Nubian suffix with an Arab stem among the Kenuz (76.2%). This reveals that the influence of the Nubian language on the adaptation of names of foreign (Arab or Turkish) origin was more important than the influence of the Arabic language. It applies also to the Nubian Arabs, perhaps as an ancient Nubian survival or by the impact of Nubian speaking neighbours.

In contrast to this, there is the far smaller share of an Arab suffix with a Nubian stem in the Kenuz (6.2%), Nubian Arabs (12.5%) and none in the Fadidja, or the combination of an Arab suffix with a Turkish stem (14.2%), as an expression of "Arabization".

16. DISTINCTIVE FEATURES OF THE IMMIGRATED SUDANESE BLACKS

Immigration to Nubia from the south has been a permanent process from the dawn of history (see Section 1.4.), which contributed to the gene pool of the Nubians. With the arrival of Turks to the southern part of Egyptian Nubia in the 16th century, the influx of Black African slaves increased. They were often ordered to operate *saqiyas,* to irrigate higher lying fields in the southern part of Lower Nubia. In the past, the Fadidja did not usually intermarry with them officially, but used their women as concubines (Fiedler 1970). Some of them can still be easily recognized, in spite of the fact that with the end of the Turkish rule in the late 19th century they gradually became members of Fadidja descent groups and village communities (see Chapter 6).

To visualize the degree of their distinction from the Fadidja we compared the anthropometric data of 12 adult Sudanese Blacks living within the Fadidja area, with the Qustul village sample (*Tables 61, 62, 63*).

16.1. Cephalometric features

In men of Sudanese Black origin, a majority of the features were bigger than in the Fadidja of Qustul (*Table 61*). Significant differences concerned nasal breadth, frontoparietal, cephalofacial, nasal and jugonasal indices, while the insignificant ones minimum frontal, bizygomatic and bigonial breadths, the three main head indices, as well as the jugofrontal and jugomandibular indices. Significantly smaller were their head length, nasal height and facionasal index, insignificantly the head breadth and height, facial height and facial index. Significantly different variability was shown only in the facionasal index.

TABLE 61. Comparison of Black Sudanese from Fadidja area with the Qustul village sample in cephalometric features.

Measurement or index	Black Sudanese				Qustul				t-test values of sample differences
	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	
1. Maximum head length (1)	12	188.5	1.54	5.1	25	192.9	1.25	6.1	3.2	2.111
2. Maximum head breadth (3)	12	143.8	1.48	4.9	25	146.3	0.92	4.5	3.1	1.486
3. Auricular height (15)	12	127.0	1.96	6.5	25	128.0	0.82	4.0	3.1	0.470
4. Minimum frontal breadth (4)	12	106.1	1.21	4.0	25	104.0	0.75	4.8	4.6	0.982
5. Morphological height of the face (18)	12	121.1	2.11	7.0	25	122.1	1.14	5.6	4.6	0.454
6. Bizygomatic breadth (6)	12	136.7	1.24	4.1	25	133.9	1.05	6.8	5.1	0.937
7. Bigonial breadth (8)	12	103.6	1.72	5.7	25	102.1	1.29	6.3	6.2	0.681
8. Height of the nose (21)	12	51.6	0.90	3.0	25	56.5	0.92	4.5	8.0	3.355
9. Breadth of the nose (13)	12	44.7	1.18	3.9	25	38.0	0.57	2.8	7.4	5.785
10. Cephalic index	12	76.3	1.15	3.8	25	75.9	0.55	2.7	3.6	0.356
11. Length-height index	12	67.4	1.24	4.1	25	66.4	0.63	3.1	4.7	0.800
12. Breadth-height index	12	88.4	1.42	4.7	25	87.5	0.61	3.0	3.4	0.685
13. Transverse frontoparietal index	12	73.8	0.93	3.1	25	71.7	0.45	2.2	3.1	2.324
14. Morphological facial index	12	88.7	1.93	6.4	25	90.3	1.12	5.5	6.1	0.764
15. Jugofrontal index	12	77.7	0.90	3.0	25	77.5	0.51	2.5	3.2	0.207
16. Jugomandibular index	12	75.8	0.81	2.7	25	75.4	0.88	4.3	5.7	0.288
17. Transverse cephalofacial index	12	95.1	0.63	2.1	25	92.6	0.47	2.3	2.5	3.101
18. Nasal index	12	86.9	2.68	8.9	25	67.5	1.39	6.8	10.1	7.079
19. Jugonasal index	12	32.7	0.90	3.0	25	28.1	0.43	2.1	7.5	5.257
20. Facionasal index	12	42.6	0.48	1.6	25	46.3	0.73	3.6	7.8	4.274±

TABLE 62. Comparison of Black Sudanese from Fadidja area with the Qustul village sample in somatometric features.

Measurement or index	Black Sudanese				Qustul				t-test values of sample differences
	n	$\bar{x}$	s	V%	n	$\bar{x}$	s	V%	
1. Weight (71)	12	61.2	2.08	6.9	11.3	25	65.4	2.33	11.4	17.4	1.149
2. Stature (1)	12	171.6	1.78	5.9	3.4	25	168.9	1.06	5.2	3.1	1.372
3. Sitting height (23)	12	85.9	0.99	3.3	3.8	25	87.0	0.61	3.0	3.4	0.985
4. Total upper extremity length (45)	12	80.3	0.72	2.4	3.0	25	77.6	0.61	3.0	3.9	2.618
5. Length of the cubit (48, 3)	12	49.6	0.48	1.6	3.2	25	47.4	0.41	2.0	4.2	3.289
6. Biacromial breadth (35)	12	38.1	0.30	1.0	2.6	25	39.0	0.31	1.5	3.8	1.843
7. Bicristal breadth (40)	12	25.3	0.63	2.1	8.3	25	26.9	0.29	1.4	5.2	2.739
8. Breadth of the thorax (36)	12	26.4	0.27	0.9	3.4	25	27.0	0:29	1.4	5.2	1.286
9. Depth of the thorax (37)	12	19.4	0.33	1.1	5.7	25	19.8	0:41	2.0	10.1	0.751+
10. Rohrer's index	12	1.21	0.036	0.12	9.9	25	1.36	0.045	0.22	16.2	2.655±
11. Cormic index	12	50.1	0.42	1.4	2.8	25	51.6	0.24	1.2	2.3	3.165
12. Relative total upper extremity length	12	46.7	0.33	1.1	2.4	25	45.9	0:22	1.1	2.4	2.026
13. Relative length of the cubit	12	29.0	0.27	0.9	3.1	25	28.1	0:14	0.7	2.5	3.207
14. Relative biacrominal breadth	12	22.2	0.30	1.0	4.5	25	23.1	0.16	0.8	3.5	2.892
15. Relative bicristal breadth	12	14.7	0.33	1.1	7.5	25	15.9	0.14	0.7	4.4	3.197+
16. Relative breadth of the thorax	12	15.4	0:24	0.8	5.2	25	16.0	0.16	0.8	5.0	2.080
17. Relative depth of the thorax	12	11.4	0.24	0.8	7.0	25	11.8	0.27	1.3	11.0	0.986
18. Length of the cubit in % of the total upper extremity length	12	62.0	0.30	1.0	1.6	25	61.2	0.20	1.0	1.6	2.166
19. Acromio-iliac index	12	66.1	1.42	4.7	7.1	25	69.0	0.73	3.6	5.2	2.001
20. Thoracic index	12	73.6	1.18	3.9	5.3	25	74.0	1.78	8.7	11.8	0.187+

TABLE 63. Comparison of Black Sudanese from Fadidja area with the Qustul village sample in body composition and functional features.

Measurement or index	Black Sudanese					Qustul					t-test values of sample differences
	n	$\bar{x}$		s	V%	n	$\bar{x}$		s	V%	
1. Lower radio-ulnar breadth (52, 4)	12	5.8	0.118	0.39	6.7	25	5.6	0.078	0.38	6.8	1.453
2. Maximum circumference of the upper arm (65)	12	27.2	0.60	2.0	7.4	25	28.0	0.63	3.1	11.1	0.801
3. Maximum circumference of the calf (69)	12	32.6	0.51	1.7	5.2	25	32.8	0.63	3.1	9.5	0.244+
4. Skinfold thickness in the tricipital area	12	0.42	0.127	0.15	35.7	25	0.77	0.088	0.43	55.8	3.543+
5. Skinfold thickness in the subscapular area	12	0.68	0.054	0.18	26.5	25	1.15	0.174	0.85	73.9	2.568±
6. Skinfold thickness in the supracristal area	12	0.39	0.024	0.08	20.5	25	0.83	0.151	0.74	89.2	2.884±
7. Pulse rate	12	71.5	2.89	9.6	13.4	24	71.2	1.92	9.2	12.9	0.088
8. Systolic blood pressure	12	115.0	3.32	11.0	9.6	25	124.4	2.69	13.2	10.6	2.076
9. Diastolic blood pressure	12	78.3	2.08	6.9	8.8	25	83.4	1.67	8.2	9.8	1.810
10. Maximum grip force of the right hand	11	40.5	2.69	8.5	21.0	25	37.8	1.49	7.3	19.3	0.948
11. Maximum grip force of the left hand	12	36.0	2.23	7.4	20.6	25	33.4	1.67	8.2	24.6	0.905
12. Relative lower radio-ulnar breadth	12	3.4	0.069	0.23	6.8	25	3.3	0.025	0.16	4.8	1.418
13. Relative maximum circumference of the upper arm	12	15.8	0.33	1.1	7.0	25	16.7	0.37	1.8	10.8	1.543
14. Relative maximum circumference of the calf	12	19.0	0.33	1.1	5.8	25	19.4	0.35	1.7	8.8	0.723

16.2. Somatometric features

Still more of the characteristic differentiation of the Sudanese Blacks living with the Qustul Fadidja has been shown in the body measurements and proportions (*Table 62*).

They are insignificantly lighter in weight, taller, but smaller in sitting height because of their longer legs. This is in harmony with their significantly longer arms and cubits. Concerning the measurements on the trunk, the biacromial breadth was only insignificantly narrower; the bicristal breadth was significantly narrower. Both thoracic measurements were slightly smaller.

This is reflected in significantly smaller Rohrer's and cormic indices, almost significantly longer arms and significantly longer cubits, reflected also by the latter in % of the total upper extremity length – another typical proportional feature of the Sub-Saharan Africans. Their relative biacromial and bicristal breadths are significantly smaller, but the latter more, as reflected by the almost significantly higher acromio-iliac index. Both relative thoracic measurements and the thoracic index are insignificantly smaller than in the local Fadidja. Significantly different variabilities were found in features 9, 10, 15 and 20.

16.3. Body composition and functional features

The osseous component (radio-ulnar breadth) and muscular component (circumference of the arm and calf), both absolute and relative, are insignificantly smaller in Sudanese Blacks, while the skinfolds as fat components are significantly thinner. While the pulse rate is almost the same as in Qustul Fadidja, both blood pressure data are much smaller, the systolic one significantly, the diastolic one insignificantly. The tall and lean Sudanese people have also insignificantly stronger grip force of both hands. Significantly different variabilities were revealed in measurements nos. 3–6 (*Table 63*).

It may be concluded that we ascertained the preservation of typical Black African features of 12 men in contrast to the probands from Qustul. They were mostly aware of their Sudanese origin, in spite of living for a few centuries among the Fadidja, who accepted them socially as members of their descent groups.

17. SEXUAL DIFFERENTIATION BETWEEN NUBIAN MEN AND WOMEN

Means of measurements of men were compared with means of women (Hussien 1972) in three Nubian ethnic groups to visualize the sexual differences. The Kenuz women were examined mainly in Dehmit, Umbarakab, *Kalabsha,* Koshtamna and Dakka, Nubian Arab ones in *Es-Sebua,* Shaturma and Maliki, and the Fadidja ones in Balana and Ibrim. Only two localities, marked in *italics*, were different than in the male samples. The samples comprised 102–103 Kenuz men and 83 Kenuz women, 114–115 Nubian Arab men and 75 Nubian Arab women, and 173–175 Fadidja men and 123 Fadidja women (*Tables 64, 65, 66*).

17.1. Cephalometric features

All measurements were found to be bigger in men than in women, except for the minimum frontal breadth in Nubian Arab women, which was paradoxically by 1.5 mm bigger according to Hussien (1972). Her value of 104.2 mm exceeds by far her data for the Kenuz (100.1 mm) and the Fadidja (101.8 mm), being perhaps a measuring error or a coincidence result.

The sexual differences as a whole are biggest in the Kenuz with the mean of differences 8.9 mm and range of 7.4 mm. They are medium in the Fadidja with a mean of 7.3 mm and a range of 9.1 mm, and smallest in Nubian Arabs, whose mean (without the questionable minimum

TABLE 64. Comparison of male and female means of cephalometric features. Legend: x_1 = mean of men, x_2 = mean of women, d = difference, x_3 = means of differences, nos. = number of measurements.

Nos.	Kenuz			Arab			Fadidja		
	x_1	x_2	d	x_1	x_2	d	x_1	x_2	d
Head length	190.6	179.4	11.2	188.9	180.3	8.6	190.5	181.5	9.0
Head breadth	147.8	139.7	8.1	144.0	138.7	5.3	145.2	137.4	7.8
Minimum frontal breadth	105.0	100.1	4.9	102.7	104.2	1.5	103.9	101.8	2.1
Morphological height of the face	122.0	111.8	10.2	118.3	112.9	5.4	119.4	110.8	8.6
Bizygomatic breadth	135.1	122.8	12.3	133.6	124.0	9.6	134.1	122.9	11.2
Bigonial breadth	102.0	91.6	10.4	101.2	.92.6	8.6	101.2	93.8	7.4
Height of the nose	55.2	47.8	7.4	53.9	.48.5	5.4	54.7	47.1	7.6
Breadth of the nose	40.4	33.4	7.0	38.3	.34.3	4.0	39.4	34.4	5.0
x_3	–	–	8.9	–	–	5.7	–	–	7.3

TABLE 65. Comparison of male and female means of somatometrics. Legend: x_1 = mean of men, x_2 = mean of women, d = difference, x_3 = means of differences.

Nos.	Kenuz			Arab			Fadidja		
	x_1	x_2	d	x_1	x_2	d	x_1	x_2	d
Weight	62.7	53.5	9.2	58.8	52.6	6.2	61.9	53.4	8.5
Stature	169.8	158.4	11.4	166.2	157.3	8.9	168.5	157.1	11.4
Sitting height	86.6	80.9	5.7	84.9	81.0	3.9	86.4	81.2	5.2
Total upper limb length	77.2	70.4	6.8	76.1	70.3	5.8	77.3	69.6	7.7
Cubit length	47.0	43.2	3.8	46.4	42.8	3.6	47.3	42.8	4.5
Biacromial breadth	37.7	33.8	3.9	37.7	33.2	4.5	38.5	33.7	4.8
Bicristal breadth	27.2	26.1	1.1	26.7	26.4	0.3	26.8	26.1	0.7
Breadth of the thorax	26.6	24.1	2.5	26.0	23.3	2.7	26.3	23.5	2.8
Depth of the thorax	19.7	16.4	3.3	19.4	15.6	3.8	19.6	15.6	4.0
x_3	–	–	5.3	–	–	4.4	–	–	5.5

TABLE 66. Comparison of male and female means of body composition and functional features. Legend: x_1 = mean of men, x_2 = mean of women, d = difference, x_3 = means of differences.

Nos.	Kenuz			Arab			Fadidja		
	x_1	x_2	d	x_1	x_2	d	x_1	x_2	d
Lower radio-ulnar breadth	5.6	5.0	0.6	5.4	4.9	0.5	5.5	5.1	0.4
Maximum upper arm circumference	27.1	26.1	1.0	26.1	27.1	–1.0	26.7	26.5	0.2
Maximum calf circumference	33.3	30.7	2.6	32.0	31.0	1.0	32.6	31.3	1.3
Skinfold thickness in the tricipital area	0.60	1.34	–0.74	0.69	1.25	–0.56	0.66	1.29	–0.54
Skinfold thickness in the subscapular area	0.94	1.26	–0.32	1.12	1.40	–0.28	1.09	1.46	–0.37
Skinfold thickness in the supracristal area	0.71	1.24	–0.53	0.82	1.15	–0.33	0.73	1.19	–0.46
Pulse rate	76.5	82.6	–6.1	74.2	82.1	–7.9	73.0	82.1	–9.1
Systolic blood pressure	124.6	127.8	–3.2	118.5	127.6	–9.1	118.2	129.7	–11.5
Diastolic blood pressure	80.4	79.5	0.9	79.0	83.8	–4.8	77.7	79.8	–2.1
Maximum grip force of the right hand	34.6	19.3	15.3	36.6	23.2	13.4	34.6	21.3	13.3
Maximum grip force of the left hand	31.2	19.1	12.1	32.3	21.7	10.6	31.6	22.7	8.9
x_3	–	–	21.5	–	–	1.5	–	–	0.0

frontal breadth) is 5.9 mm and range 5.6 mm. This is connected with the biggest mean values of measurements in the Kenuz, medium in the Fadidja and smallest in the Arab men. In females this is encountered only in features 2, 3, 6, 8, while it is variable in the remaining ones. The range of the differences mean makes 3.2 mm (*Table 64*).

17.2. Somatometric features

All measurements proved bigger in men than in women. On a whole they are biggest in the Fadidja with the mean of differences 5.5 mm and range 10.7 mm. They are only slightly lesser in the Kenuz with the mean of differences 5.3 mm and range 10.3 mm. Like in cephalometrics, they are smallest in Nubian Arabs, who have the mean of differences 4.4 mm and range of 8.6 mm. The range of the mean of the differences makes only 1.1 mm (*Table 65*).

17.3. Body composition and functional features

These heterogeneous features do not yield straightforward data as the two previous groups. Some of them are bigger in men than in women (nos. 1, 3, 10, 11, radio-ulnar breadth, calf circumference and grip force), in others values are bigger in women than in men – in the Arabs (no. 2, arm circumference), in the Arabs and Fadidja (no. 9, diastolic blood pressure) and in all ethnic groups (nos. 4–8, skinfold thicknesses, pulse rate and systolic pressure). The resulting means of differences are, therefore, bizarre, similar in the Fadidja and Arabs, slightly higher in the Kenuz (*Table 66*).

18. COMPARISON OF EGYPTIAN NUBIANS WITH OTHER NORTH-EASTERN AFRICANS

Anthropometric results of the three Egyptian Nubian ethnic groups can be compared with selected samples of populations living north and south of Egyptian Nubia, namely: 1) Abusir, Egyptians of Middle Egypt (Strouhal, Reisenauer 1963, 1964); 2) Kharga, Egyptians from the Oasis of Kharga in the Western Desert (Twiesselmann 1951); 3) Qift, Egyptians from the Upper Egyptian town (Strouhal, Reisenauer 1963, 1964); 4) Mahasi, Sudanese Nubian tribe from Abka, ethnically akin to the Fadidja, Second Cataract, south of Wadi Halfa (Field 1952); 5) Rubatab, a tribe of the Monasir Arabs from Abu Hamed, a township in a bend of the Nile above the Fourth Cataract (Field 1952); 6) Nuers, a Nilotic tribe living isolated in a marshy region of Southern Sudan (Twiesselmann 1951); 7) Oromos, the largest Ethiopian ethnic group, speaking their own language, which used to be oppressed in the past by the Amharic government of Ethiopia (Twiesselmann 1951). Comparison of the Nubian groups with the three Egyptian samples will be dealt with in Section 18.1. (*Table 67*), comparison with the two north Sudanese samples in Section 18.2. (*Table 68*) and comparison with distant Sudanese Nilotes and an Ethiopian tribe in Section 18.3. (*Table 69*).

18.1. Comparison of Egyptian Nubians with Egyptians

18.1.1. Abusir sample

The three Nubian ethnic groups as compared to the Middle Egyptian sample from Abusir (*Table 67*) have significantly broader heads (2), which are also longer (1) in Arabs. All have mesocephalic indices (10), while the Abusir sample ranges into dolichocephaly. Broader heads combined with narrower minimum frontal breadth (4) result in very low values of the frontoparietal index (13). Bizygomatic breadth (6) is very similar in the Nubian and Abusir samples, but the narrow forehead of the Nubians conditions significantly low values of the jugofrontal index (15). At the same time, the Nubians have narrower lower jaws (7), causing low values of the jugogonial index (16). On the other hand, the nose is much higher (8) in the Nubians than in Abusir, as well as the face, but this is significant only in the Kenuz. At the same time the nasal breadth is larger in the Nubians than in Abusir, but proven as significant only in the Fadidja. The resulting nasal index (18) of the Nubians is mesorrhine, clearly lower than in Abusir, but significantly only in the Arabs and Fadidja. On the other hand, the significantly different jugonasal index (19) reflects broader noses in the Nubians as compared to the Abusirians.

Somatometric data show significant differences in weight (20) and stature (21) between the heavier and taller Kenuz and Fadidja than the Abusirians. While no significance was revealed in sitting height (22), the cormic index (29) of all Nubians was significantly smaller than in Abusir, revealing thus their longer lower extremities.

To determine the amount of significant differences of compared features, we added together their numbers with Kenuz (K), Arabs (A), Fadidja (F) and with all three Nubian groups (multiplied by three), expressed in percentage of the total number of compared features multiplied by three.

Egyptian Nubians compared with Middle Egyptians from Abusir showed significantly different features; 1 with K, 2A, 4F and 10 with all Nubians, which equals 37/60=61.7% of significant differences.

18.1.2. Oasis of Kharga sample

Compared with the sample from the Oasis of Kharga, the same measurements as in the previous comparison (2, 5, 8) differ significantly in all Nubians, while the minimum frontal breadth (4) differs significantly only in the Arabs, and nasal breadth (9) in the Kenuz and Fadidja. The frontoparietal index (13) is, however, significantly lower in all Nubian groups than in Kharga, while the cephalic (10) and facial indices (14) are significantly higher in the Nubians. The nasal index (18) proved to be significantly lower in the Nubian Arabs and Fadidja than in Kharga. Another feature differing significantly in all Nubians is the higher auricular height (3) contrasting with the low one at Kharga, which is expressed as well in the pertaining indices: (11) with all Nubians, (12) only with the Kenuz.

TABLE 67. Comparison of anthropometric features of Egyptian Nubians with Egyptians. For standard deviations of Nubian ethnic groups see *Tables 68 and 69*. Legend: S = samples, n = number of cases, nos. = number of measurements (in cephalometrics mm, in somatometrics cm, in weight kg) or indices (i.): 1 = maximum head length, 2 = maximum head breadth, 3 = auricular height, 4 = minimum frontal breadth, 5 = morphological height of the face, 6 = bizygomatic breadth, 7 = bigonial breadth, 8 = height of the nose, 9 = breadth of the nose, 10 = cephalic index, 11 = length-height i., 12. = breadth-height i., 13 = transverse frontoparietal i., 14. = morphological facial i., 15 = jugofrontal i., 16 = jugogonial i., 17 = transverse cephalofacial i., 18 = nasal i., 19 = jugonasal i., 20 = weight, 21 = stature, 22 = sitting height, 23. = total upper extremity length, 24 = biacromial breadth, 25 = bicristal breadth, 26 = breadth of the thorax, 27 = depth of the thorax, 28 = Rohrer's i., 29 = cormic i. Statistical significance (0.05) of differences: + = with Kenuz, # = with Arabs, * = with Fadidja, $ = with the all three Nubian groups.

S	Kenuz	Arabs	Fadidja	Abusir		Kharga		Qift	
n	103	115	174	64		36–52		28	
No.	$\bar{x}$	$\bar{x}$	$\bar{x}$	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
1	190.6	188.9	190.5	191.5	7.1 #	190.2	7.6	189.5	6.3
2	147.8	144.0	145.2	142.1	4.9 $	141.6	4.6 $	141.6	6.4 $
3	125.8	124.0	126.6	–	–	120.3	5.7 $	–	–
4	105.0	102.7	103.9	108.1	4.8 $	104.8	4.0 #	104.8	4.0 #
5	122.0	118.3	119.4	117.9	6.8	115.7	6.9 $	115.1	6.6 $.
6	135.1	133.6	134.1	134.5	4.6	134.2	6.2	133.2	4.2
7	102.0	101.2	101.2	104.9	5.7 $	101.3	5.7	101.1	5.6
8	55.2	53.9	54.7	49.6	3.4 $	50.4	4.2 $	49.0.	3.3 $
9	40.4	38.3	39.4	37.4	3.2 *	37.8	3.8 *	39.6.	2.5
10	77.6	76.3	76.3	74.3	3.3 $	74.7	3.3 $	74.7	2.7 $
11	66.1	65.7	66.5	–	–	63.3	2.9 $	–	–
12	85.2	86.1	87.2	–	–	84.7	3.8 $	–	–
13	71.1	71.3	71.6	76.2	3.1 $	73.7	2.5 $	74.1	2.8 $
14	90.3	88.6	89.2	87.8	5.9	86.1	5.5 $	86.4	5.5 $
15	77.8	76.9	77.6	80.5	3.2 $	–	–	78.6	3.0 #
16	75.6	75.8	75.5	78.1	3.9 $	75.4	3.0	76.1	4.5
17	91.4	92.8	92.4	–	–	–	–	–	–
18	73.6	71.2	72.3	75.8	8.2 #*	75.2	9.2 #*	81.3	5.8 $
19	29.9	28.7	29.4	27.8	2.2 $	–	–	29.8	2.0 #
20	62.7	58.8	61.9	58.2	5.5 *	–	–	55.8	5.2 $
21	169.8	166.2	168.5	165.8	5.8 +*	165.8	6.9 +*	166.1	6.9 +
22	86.6	84.9	86.4	85.8	3.5	86.3	3.0 #	84.6	3.0 +*
23	77.2	76.1	77.3	–	–	75.7	3.9 +*	–	–
24	37.7	37.7	38.5	–	–	37.2	2.2 *	–	–
25	27.2	26.7	26.8	–	–	27.5	1.4 #*	–	–
26	26.6	26.0	26.3	–	–	27.1	1.6 #*	–	–
27	19.7	19.4	19.6	–	–	20.1	1.7 $	–	–
28	1.28	1.28	1.29	1.28	0.1	–	–	1.22	1.12 *
29	51.0	51.1	51.3	51.8	1.6 $	52.6	1.5 $	51.0	1.4

TABLE 68. Comparison of anthropometric features of Egyptian Nubians and northern Sudanese ethnic groups. Legend: see *Table 67*.

S	Kenuz		Arabs		Fadidja		Mahasi		Rubatab	
n	103		115		174		26		36–38	
No.	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
1	190.6	7.5	188.9	6.1	190.5	6.4	192.7	6.4 #	191.0	6.4
2	147.8	5.7	144.0	4.6	145.2	4.8	142.1	5.6 +*	142.7	5.5 +*
3	125.8	5.3	124.0	4.1	126.6	5.4	–	–	–	–
4	105.0	4.8	102.7	4.8	103.9	4.6	116.3	4.1 $	115.0	6.5 $
5	122.0	7.0	118.3	7.0	119.4	7.1	122.6	6.4 #*	122.9	6.8 #*
6	135.1	5.8	133.6	4.6	134.1	5.5	135.4	4.4	132.0	5.6 +*
7	102.0	6.0	101.2	5.4	101.2	5.7	114.1	6.0 $	110.7	6.4 $
8	55.2	4.5	53.9	3.1	54.7	4.1	56.4	5.2 #	59.5	9.1 $
9	40.4	3.7	38.3	3.4	39.4	3.5	40.7	3.0 #	38.0	2.7 +*
10	77.6	3.6	76.3	3.0	76.3	3.1	75.0	5.3 +	75.4	2.9 +
11	66.1	3.0	65.7	2.5	66.5	3.0	–	–	–	–
12	85.2	4.0	86.1	3.5	87.2	3.6	–	–	–	–
13	71.1	3.2	71.3	2.9	71.6	3.1	80.9	4.5 $	80.8	7.0 $
14	90.3	5.7	88.6	5.1	89.2	5.6	90.8	5.0 #	93.2	6.4 $
15	77.8	3.5	76.9	3.1	77.6	3.3	85.8	2.2 $	87.2	5.1 $
16	75.6	4.0	75.8	3.6	75.5	3.7	84.4	3.5 $	84.0	5.5 $
17	91.4	3.3	92.8	2.9	92.4	3.2	94.4	3.2 $	92.9	4.6
18	73.6	9.1	71.2	6.9	72.3	8.2	72.0	10.4	68.4	10.8 +*
19	29.9	2.6	28.7	2.5	29.4	2.6	–	–	–	–
21	169.8	6.8	166.2	6.3	168.5	5.8	171.4	4.4 #*	167.5	5.8

TABLE 69. Comparison of anthropometric features of Egyptian Nubians with Sudanese and Ethiopian ethnic groups. Legend: see *Table 67*.

S	Kenuz		Arabs		Fadidja		Nuers			Oromos		
n	103		115		174		38–51			34–45		
No.	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s		$\bar{x}$	s	
1	190.6	7.5	188.9	6.1	190.5	6.4	196.2	6.3	$	188.7	6.4	
2	147.8	5.7	144.0	4.6	145.2	4.8	137.4	4.5	$	142.2	4.1	$
3	125.8	5.3	124.0	4.1	126.6	5.4	120.8	6.0	$	121.3	5.3	$
4	105.0	4.8	102.7	4.8	103.9	4.6	104.2	4.9		103.5	3.8	
5	122.0	7.0	118.3	7.0	119.4	7.1	114.4	6.8	$	110.5	5.2	$
6	135.1	5.8	133.6	4.6	134.1	5.5	133.9	4.7		131.4	5.2	$
7	102.0	6.0	101.2	5.4	101.2	5.7	98.9	5.9	$	95.2	4.9	$
8	55.2	4.5	53.9	3.1	54.7	4.1	47.2	3.6	$	45.9	3.1	$
9	40.4	3.7	38.3	3.4	39.4	3.5	40.6	3.4	#*	36.8	2.7	$
10	77.6	3.6	76.3	3.0	76.3	3.1	70.1	2.8	$	75.4	2.6	+
11	66.1	3.0	65.7	2.5	66.5	3.0	61.8	3.0	$	64.5	2.7	$
12	85.2	4.0	86.1	3.5	87.2	3.6	88.2	5.0	+#	85.4	4.2	*
13	71.1	3.2	71.3	2.9	71.6	3.1	75.8	3.3	$	72.8	3.3	$
14	90.3	5.7	88.6	5.1	89.2	5.6	85.4	5.5	$	84.2	4.6	$
15	77.8	3.5	76.9	3.1	77.6	3.3	–	–		–	–	
16	75.6	4.0	75.8	3.6	75.5	3.7	73.9	4.4	$	72.4	3.6	$
17	91.4	3.3	92.8	2.9	92.4	3.2	–	–		–	–	
18	73.6	9.1	71.2	6.9	72.3	8.2	86.3	8.9	$	80.5	8.1	$
19	29.9	2.6	28.7	2.5	29.4	2.6	–	–		–	–	
20	62.7	12.8	58.8	9.9	61.9	10.1	–	–		–	–	
21	169.8	6.8	166.2	6.3	168.5	5.8	184.9	7.1	$	170.0	6.7	#
22	86.6	3.8	84.9	3.2	86.4	3.2	88.2	2.8	$	85.1	2.9	+*
23	77.2	3.5	76.1	3.7	77.3	3.4	86.2	3.8	$	75.4	4.1	+*
24	37.7	2.0	37.7	1.9	38.5	1.9	37.6	1.9	*	36.1	1.7	$
25	27.2	2.0	26.7	2.2	26.8	1.7	25.9	1.6	$	26.1	1.2	$
26	26.6	2.1	26.0	1.8	26.3	1.8	25.9	1.4	+	26.1	1.2	
27	19.7	2.1	19.4	1.6	19.6	1.8	20.1	1.4	#	20.3	1.7	#*
28	1.28	0.22	1.28	0.21	1.29	0.20	–	–		–	–	
29	51.0	1.3	51.1	1.5	51.3	1.4	–	–		–	–	

Of somatometric features, stature (21) appears to be higher in the Kenuz and Fadidja than in Kharga. The sitting height (22) is bigger than in Kharga, proved as significant in the Kenuz. The arm length (23) is significantly longer in the Kenuz and Fadidja than in Kharga. The biacromial breadth (24) is bigger in all Nubians, but proved significant only in the Fadidja. The bicristal breadth (25) and thoracic breadth (26) show significantly lower values in the Arabs and Fadidja than in Kharga. Also the thoracic depth (27) is smaller, significantly proven with Arabs. The cormic index (29) proves to be significantly lower in all Nubian groups compared with Kharga, revealing once more longer lower extremities of the Nubians.

In comparison with Upper Egyptians from Kharga, Egyptian Nubians show these significantly different features: 4 with K, 1A, 7F, and 11 all Nubians, which equals 45/72=62.5% of significant differences.

18.1.3. Qift sample

Compared with the sample from the Upper Egyptian Qift, the same measurements as in the previous comparison differ significantly in Nubians (2, 5, 8; no. 4 only in Arabs). This is reflected in significantly different indices of all Nubians: mesocephaly (10, while Qift on the upper limit of dolichocephaly), very narrow forehead (13) compared with a broader one in Qift, leptoprosopy (14) compared with mesoprosopy in Qift, and low mesorrhiny (18) compared with a high one in Qift. Low values of the Arabs differ in jugofrontal (15) and jugonasal (19) indices compared with Qift.

Of the somatometric features, all Nubian groups are significantly heavier (20) than the Qift sample. Except for Nubian Arabs of almost identical stature (21) as in Qift, the Kenuz are significantly bigger and the Fadidja insignificantly bigger. Also the sitting height (22) is significantly bigger in the Kenuz and Fadidja. Rohrer's index (28) is bigger, significantly only in the Fadidja. The Nubians and Qiftians were found to be almost identical in the cormic index.

Egyptian Nubians as compared to the Upper Egyptians from Qift show these significantly different features: 2 with K, 3A, 2F, and 8 with all Nubians, which equals 31/60=51.7% of significant differences. This distance is smaller than both previous ones, which is in harmony with Qift's shortest distance to the northern limit of Nubia (about 260 km). It may be concluded that the Nubian ethnic groups compared to Egyptian samples are nearest to Qift, medium distant to Abusir and only slightly more to the Oasis of Kharga.

18.2. Comparison of Egyptian Nubians with northern Sudanese

18.2.1. Abka sample

In comparison with the northern Sudanese sample of Mahasi from Abka (*Table 68*), the three Nubian ethnic groups have shorter heads (1), significantly in Nubian Arabs. Their heads are broader (2), significantly in the Kenuz and Fadidja. They are mesocephalic (10), while the Mahasi are dolichocephalic, differing significantly from the Kenuz.

All three Egyptian Nubian groups show a narrow forehead (4), while their relatives, the Sudanese Nubians from Abka, are reported as having very significantly broader forehead (12.4 mm on the average) , as well as significantly greater frontoparietal (13; by 10 index units!) and jugofrontal indices (15; by a mean of 8.4 index units!). Because this has been the case also in the following comparison with the Rubatab of Abu Hamed and both groups were measured by the same author (Field 1952), it might be assumed that he had perhaps measured *maximum* frontal breadth instead of the *minimum* breadth. Therefore, these data have been omitted in further analyses.

The morphological height of the face (5) was, as compared to the Mahasi, significantly lower in the Arabs and Fadidja, while only slightly lower in the Kenuz. Because of only slightly lesser bizygomatic breadth (6), the facial index was proved to be significantly lower in Nubian Arabs only as compared to the Mahasi. The transverse cephalo-facial index (17) was significantly lower in the three Egyptian Nubian groups than in the Mahasi.

The reason for the very significantly larger bigonial breadth (7) and jugogonial index (15) of the Mahasi from Abka as compared to all Egyptian Nubian groups seems to be rather enigmatic, perhaps due to Field's different technique of taking measurements. Also these two features have therefore been omitted in our analysis.

Height (8) and breadth of the nose (9) appears to be somewhat lower in Egyptian Nubians than in the Mahasi, significantly differing between Nubian Arabs and the Mahasi. The resulting nasal index (18) is the same in Egyptian Nubians as in the Mahasi.

The stature (21) of Egyptian Nubian groups is shorter than in the Mahasi, significantly with the Arabs and Fadidja.

After exclusion of the methodologically incorrect data, the Egyptian Nubians in comparison with the Sudanese Nubians from Abka show these significant differences: 2 with K, 6A, 3F, and 6 with all Nubians, which equals 29/48=60.4%. This is the second close comparison after Qift, due to ethnic identity and smaller distance of 80 km.

18.2.2. Abu Hamed sample

The three Egyptian Nubian groups compared with the Sudanese Arab tribe of Rubatab from Abu Hamed (*Table 68*) show slightly, insignificantly shorter (1) and broader (2) heads, the latter proving to be significant with the Kenuz and Fadidja. While all Egyptian Nubians are mesocephalic (10), the Rubatab fall in the upper reach of dolichocephaly. This difference was found significant between the Kenuz and the Rubatab.

Concerning the too high values of minimum frontal (4) and bigonial (6) breadths and their participation in frontoparietal (13), jugofrontal (15) and jugogonial (16) indices, these data have to be omitted, as mentioned above with the Mahasi.

The morphological height of the face (5) is, as compared to the Rubatab, significantly lower in Nubian Arabs and the Fadidja, but only slightly lower in the Kenuz. The bizygomatic breadth (6) is, on the contrary, larger in Egyptian Nubians than in the Rubatab, significantly larger when compared with the Kenuz and Fadidja. The resulting facial index (14) is significantly lower in the Nubians, leptoprosopic, while in the Rubatab it is on the treshold of hyperleptoprosopy. The transverse cephalofacial index (17) is only slightly, insignificantly lower in the Kenuz and Fadidja, while in Nubian Arabs it is almost identical to that of the Rubatab.

Height of the nose (8) surpasses, in the Rubatab, very significantly the means of all Egyptian Nubians. On the opposite, the breadth of the nose (9) is significantly bigger in the Kenuz and Fadidja than in the Rubatab, while Nubian Arabs are close to them. The resulting nasal index (18), mesorrhine in Egyptian Nubians, lies in the upper reach of leptorrhiny in the Rubatab. The difference was proved significant with the Kenuz and Fadidja, but the smaller one with Nubian Arabs is insignificant.

Stature of Egyptian Nubians and Sudanese Rubatab was not proved significantly different, although the Kenuz and to a lesser degree the Fadidja appear to be higher than the Rubatab, whose stature is nearer to that of the Nubian Arabs.

These results reveal reliably the proximity of Nubian Arabs with the Sudanese Arab tribe Rubatab (except for the higher face and facial index in the latter).

Excluding the methodologically aberrant data, the distance of Egyptian Nubian groups from the Sudanese Arab tribe Rubatab of Abu Hamed shows these significant differences: 5 with K, 1A, 5F, and 7 with all Nubians, which equals 32/48=66.7%. Abu Hamed is geographically more distant (about 350 km from Wadi Halfa). Its people proved to be distinct anthropometrically from both the Kenuz and Fadidja, but closer to Nubian Arabs, being akin to them.

18.3. Comparison of Egyptian Nubians with Nilotes and Ethiopians

18.3.1. Nuers sample

The Nuers, one of the main ethnic groups of Nilotes, inhabiting marshy regions of the upper White Nile in southern Sudan, are the result of millennia of successful adaptation to the environment and living conditions of their homeland. If we have chosen their sample for comparison with the Egyptian Nubians, we wanted to show them as two contrasting populations of different origin and environment (*Table 69*).

The majority of compared features showed highly significant differences: All Nubian groups have much shorter (1) and broader heads (2) than the Nuers, and their mesocephaly (10) contrasts with expressed dolichocephaly of the latter.

The lower auricular height (3) of the Nuers is significantly different as compared to the Nubians, similarly as the derived lower length-height index (11) and higher breadth-height index (except for the Fadidja).

While in the minimum frontal breadth (4) the Nuers range well among the means of the Nubians (being closest to the Fadidja), the frontoparietal index (13) is significantly higher than in the Nubians.

The height of the face (5) is significantly lower in the Nuers than in the Nubians, but their bizygomatic breadth (6) ranges well among the Nubian means (closest to Nubian Arabs). The facial index (14), leptoprosopic in the Nubians, is therefore significantly lower, mesoprosopic, in the Nuers.

The bigonial breadth (7) and jugogonial index (16) are significantly lower in the Nuers than in the Nubians.

The nasal height (8) is significantly lower in the Nuers than in the Nubians, while the nasal breadth (9) is closely similar in the Kenuz and Nuers, but significantly higher in the Nuers than in Nubian Arabs and the Fadidja. The nasal index (18) is mesorrhine in all groups, in the lower reach of the category in the Nubians, significantly higher in the Nuers.

Also most of the somatometric features are very significantly different when comparing the Nubians to the Nuers.

In the stature (21) the Nuers belong to the highest ethnics of the world, being in average by 15.1 cm taller than the tallest Nubian group – the Kenuz. The sitting height (22) is also significantly greater in the Nuers than in the Nubians, but only by 1.6 cm as compared to the Kenuz, which means that roughly 13.5 cm in average goes to the length of the Nuers' lower extremity.

This has been supported by the arm length (23), which is by almost 9 cm longer (i.e. significantly) in the Nuers than in the Kenuz and Fadidja, and over 10 cm longer as compared to Nubian Arabs.

The biacromial breadth (24) is almost identical in the Nuers as in the Kenuz and Arabs, while in the Fadidja it is significantly bigger than in the former ones.

At the same time bicristal breadth (25) is significantly smaller in the Nuers than in the Nubians. The breadth (26) of the thorax is significantly smaller as compared to that of the Kenuz, and the depth of the thorax (27) is significantly bigger as compared to Nubian Arabs.

In conclusion we assess the distance between Egyptian Nubians and the Nuers in a large number of significant differences: 2 with K, 3A, 2F, and 16 with all Nubians =53/69=76.8%. This comparison shows the greatest anthropometric distance revealed in our analysis.

18.3.2. Oromos sample

The last comparison of Egyptian Nubians with the sample of the big Ethiopian nation of the Oromos features people living in very different mountainous surroundings as well as economic conditions than used to be those of the riverain Egyptian Nubians. Together with the great distance between these two groups and their different origin they also suggest to be very distinct anthropometrically.

In head length (1) no significant difference was found, the mean of the Oromos being almost identical with that of Nubian Arabs. At the same time, however, the Oromos have significantly narrower heads (2). The cephalic index (10) is lower in the Oromos, at the upper reach of dolichocephaly, than in the mesocephalic Nubians, significantly proved between the Oromos and the Kenuz. The auricular height (3) is also significantly lower in the Oromos than in the Nubians, similarly to the hypsicephalic length-height index (11). The acrocephalic breadth-height index (12) is near the value of the Kenuz and Arabs, significantly lower in the Oromos than in the Fadidja.

While the minimum frontal breadth (4) is similar between the Oromos, Arabs and Fadidja and insignificantly lower in the Kenuz, the frontoparietal index of the Oromos is significantly higher than in the Nubians (due to the Oromos's narrower heads).

The height of the face (5) and the bizygomatic breadth (6) are very significantly smaller in the Oromos than the in Nubians (the former having smaller faces). The resulting facial index (14) is significantly lower, mesoprosopic in the Oromos than in the letoprosopic Nubians.

The bigonial breadth (7) and jugogonial index (16) are significantly smaller in the Oromos than in the Nubians.

Both height (8) and breadth (9) of the nose are also significantly smaller in the Oromos than in the Nubians. The mesorrhine nasal index (18) reaches very significantly bigger values in the Oromos than in the Nubians.

The stature (21) of the Oromos is similar to the Kenuz and slightly smaller than that of the Fadidja, being significantly bigger than in Nubian Arabs.

The sitting height (22) and arm length (23) of the Oromos are similar to Nubian Arabs, significantly smaller than in the Kenuz and Fadidja.

The biacromial (24) and bicristal (25) breadths of the Oromos are significantly smaller than in the Nubians.

The thoracic breadth (26) is similar in the Oromos and the Nubians, while the depth (27) is bigger in the Oromos, living in high mountains, than in the Nubians, and significantly proved when compared to Nubian Arabs and the Fadidja.

The distance of the Egyptian Nubian groups from the sample of the Ethiopian ethnic group of Oromos by significantly different features: 3 with K, 2A, 4F, 2KF, and 14 with all Nubians =51/69=73.9%. This also expresses a great distance, however, slightly smaller than the previous one (*Table 69*).

18.4. Survey of significant differences

Mostly significant differences between means of features of all three Egyptian Nubian groups and means of the individual comparative groups were found. As to groups showing single significant differences, mostly the Fadidja

TABLE 70. Significant differences between the Egyptian Nubian ethnic groups and the comparative samples. Legend: n_1 = number of significant differences, n_2 = number of measurements and indices, % = per cents of significant differences.

Ethnic group	Locality	Kenuz	Arabs	Fadidja	All Egyptian Nubian groups	n_1/n_2	%
Calculation		1x	1x	1x	3x		
	Abusir	1	2	4	10	37/60	61.7
Egyptian	Kharga	4	1	7	11	45/72	62.5
	Qift	2	3	2	8	31/60	51.7
Mahasi	Abka	2	6	3	6	29/48	60.4
Rubatab	Abu Hamed	5	1	5	7	32/48	66.7
Nuers	South Sudan	2	3	2	16	55/69	79.7
Oromos	Ethiopia	3	2	4	14	51/69	73.9
Sum		21	17	27	72	280/426	65.7

were concerned, followed by the Kenuz, and least by the Arabs.

The sample closest to Nubian groups appears to be the Upper Egyptian one from Qift, while the Lower Egyptians and inhabitants of Kharga Oasis are more distant. In the Sudanese direction the sample of Mahasi is the second most similar to all Nubians, while the Rubatab one is more distant, nearer only to Nubian Arabs.

The geographically and ethnically most distant samples of the Ethiopian Oromos and south Sudanese Nilotic Nuers yielded three quarters of significant differences, expressing their great anthropometric distance from the Egyptian Nubians. At the same time, the Ethiopian Oromos stand relatively nearer to the Nubians than the sample of the Nilotic Nuers that is absolutely the most distant one.

CONCLUSIONS

The Egyptian Nubian males represent a distinctive population consisting of three ethnic groups. Its origin can be traced by historical anthropological investigations from Neolithic times onwards, in Islamic times also by Arab historical sources.

Many groups of immigrants from the north and south, but also from the east (the Ababda, a branch of the large nomadic ethnic group of Bedja) and the west (e.g. the Howara Bedouins) have settled down among the original inhabitants of Lower Nubia. In historical times there were also different Arab tribes settling down between the areas of the Kenuz and Fadidja and labelled Nubian Arabs.

After the fall of the Christian Nubian Kingdom of Makuria, the Nubians changed their religion to Islam, but retained their language (in most females until recently the only one); the men and a part of women adopted also Arabic for communication with their neighbours. Many of them live as labour force in big Egyptian cities. Egyptian Nubia used to be a country of women, children and old or invalid men.

Especially the Kenuz were overrun by different Arab tribes, from whom they partially took over a part of their genealogies. On the other hand, the Fadidja had been dominated since the 16th century by the Turks, who became eventually "Nubizated", but still retained a slight residual physical distinction.

On a whole and speaking in anthropometric and anthroposcopic terms, Egyptian Nubians are a historically coalesced amalgam of people well adapted to the climate and physical properties of the region that they inhabited. They are more Caucasoid than Negroid, with very dark skin and eyes, which is the result of adaptation to intense sunshine and of the almost permanent Black Sudanese gene flow.

Of the three Nubian ethnic groups, the Kenuz are physically more similar to the Fadidja than are both these groups to Arabs, who are the late incomers after the 14th century AD. They had gradually occupied the barren section of the Nile Valley and thus cut the connection between both aboriginal Nubian groups.

At the same time, the Fadidja are considered to be a local branch of the north Sudanese Mahasi ethnic group, split across the political boundary between Egypt and Sudan. They traditionally maintained mutual connections (except for some time during the Egyptian Middle Kingdom, when immigration from the south was prohibited, as mentioned in the Semna dispatches). Alas, contact was probably cut forever in the 1960's by the exodus of the former to New Nubia near Kom Ombo and of the latter to the area of Khashm el-Ghirba in southwest Sudan.

Egyptian Nubians kept many old traditions, as descent group origin, cousin marriage, African language, folk culture, houses adapted for the hot dry climate with natural "air conditioning", a habit to decorate the outer walls of their houses, etc. In Old Nubia their health condition was mediocre because of harsh environment and insufficient medical care. Their country was too narrow, hilly and rocky, which precluded adequate nutrition, with food having to be imported from Egypt.

The ancient Arab custom of endogamous marriages caused an inbreeding depression. As the result of both factors growth and development (tested on the eruption of third molars) were delayed. All these drawbacks will

hopefully be improved in New Nubia by better living conditions and gradual decline of the traditional marriage concept, bringing along heterotic effect – luxuriation of the hybrids.

The descent group concept is still an important social bond, but does not play any major role in the physical characteristics of the Egyptian Nubians. However, linguistic analysis of descent group names, combined with anthropological examination, showed the existence of remnants of physical differences between members of descent groups with names of Nubian, Arab and Turkish origins. They are, however, very small, due to the slow, but long-lasting process of hybridization. In the future this will also involve the descendants of Sudanese Blacks, mainly of the Fadidja area, former slaves, of which some are still living apart.

Sexual differences are similar in the three ethnic groups: as expected small in cephalometrics, bigger in somatometrics and body composition features, miscellaneous in the functional ones.

The Upper Egyptian sample from Qift followed by the Northern Sudanese one from Abka proved to be closest to the Egyptian Nubians. More distance was found between the Middle Egyptians from Abusir, the people of Kharga Oasis and the Sudanese Arab tribe of the Rubatab from Abu Hamed, which showed some proximity to Nubian Arabs. From the geographically and ethnically most distant samples, the Ethiopian Oromos and south Sudanese Nilotic Nuers yielded about three quarters of significant differences, thus showing their great anthropometric distance.

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