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*Archæological and Ethnological Researches in Crete.—Interim Report of the Committee, consisting of Mr. D. G. HOGARTH (Chairman), Professor J. L. MYRES (Secretary), Professor R. C. BOSANQUET, Dr. W. L. H. DUCKWORTH, Dr. A. J. EVANS, Professor A. MACALISTER, Professor W. RIDGEWAY, and Dr. F. C. SHRUBSALL.*

THE Committee has to express its regret that Mr. C. H. Hawes has been prevented by other engagements from carrying out the further programme of work which was foreshadowed in the Committee's report last year. He has, however, made some progress in analysing the observations which he made during his visit to Crete in 1909 (Appendix I.), and hopes to be able to submit the remainder of his conclusions to the Committee without much further delay. The Committee, therefore, asks to be reappointed, with a further grant.

The Committee has received this year a further report from Dr. W. L. H. Duckworth on some of the observations made by him during his journeys in Crete in the year 1903, with comparisons suggested by subsequent journeys in the south of Aragon in Spain. This Report, which forms Appendix II., is an expansion of Section (ii.) of his Special Report (b) presented to the Cretan Committee of the British Association in 1903 and published in *Proc. Brit. Assoc.*, 1903 (Southport), p. 409.

#### APPENDIX I.

*A Report on Cretan Anthropometry.*  
By CHARLES H. HAWES.

Since the completion of my last year's expedition to Crete the tabulation and collation of the statistics gathered in 1905 and 1909 have made considerable progress, though not yet complete. Here I deal with the chief measurements only, and those the usual ones, leaving aside for later report the results of a study of the 1,700 sagittal contours of living subjects.

The total number of living persons measured in the two campaigns of 1905 and 1909, together with 199 measured by Dr. Duckworth in 1903, amounts to 3,183. From these must be deducted foreigners, Russians, French, Italians, Armenians, Greeks, Epirots, Albanians, Ægean and Ionian Islanders, and Cretan women and children. A further expurgation has been made in order to simplify, even in the slightest degree, a complex problem. The further omissions comprise

Cretan Mussulmans (who, it is true, possess but little Turkish blood) and orthodox Cretans either of whose parents or grandparents hail from outside the island, however near.

This reduces our total figure, which is the basis of the comparisons made in this paper, to 2,290.

The interest in Cretan ethnology lies not only in the present distribution of types and their external connections, but in their contrast with the prehistoric inhabitants, the builders and artificers of Knossos, Phaestos, Gourniá, Palaikastro, etc.

#### *Skull Measurements.*

It will be remembered that Dr. Duckworth's examination in 1903 of skulls from Palaikastro (Eastern Crete) showed that the men of ancient Crete of the so-called Middle Minoan Period were dolichocephals, with a small minority of brachycephals. The women were even more dolichocephalic, and the long heads among them in greater proportion than among the men; but, as I shall confine myself to male adults in this paper, I use Dr. Duckworth's figures for men only.

#### *Sixty-four Cretan Males.*

Cranial index (average)	. . . . .	73·4
„ (distribution) dolichocephalic	. . . . .	65·3 per cent.
„ brachycephalic	. . . . .	8·55 „
„ mesaticephalic	. . . . .	26·15 „
Stature (estimated)	. . . . .	1,625 mm.

Since 1903 further ancient Cretan cranial and skeletal remains have passed through my hands, including twenty skulls. By the kindness of Miss Edith Hall the lengths and breadths of five more crania, found this year by Mr. Seager, have recently been communicated to me. These twenty-five skulls, although limited in provenance to the eastern half of Crete, hail from a wider area than the previous sixty-four, namely, from Knossos, Meskiniá, Koumása, Gourniá, as well as Palaikastro. Thirteen of them belong to an equally early period, but yield a rather higher average cranial index—75·5 as compared with 73·4—and include among them two brachycephals. The remaining twelve show an increasing breadth, agreeing with the archaeological evidence for the inroad of invaders. Five skulls from Gourniá, belonging to the beginning of the Late Minoan Period, have a mean cranial index of 76·5, and seven from various sites, belonging to the *end* of this period (L.M. III. after the fall of Knossos), average 79·1, and include no dolichocephals, but three mesocephals and four brachycephals.

It would be more satisfactory to have had a broader foundation, both geographical and numerical, on which to base our knowledge of the physical type of the Minoans; but the evidence of 100 crania (64 male + 13 male + 23 female) from the eastern half of the island, dating back to the beginning of the second millennium B.C., is not to be despised. These are the grounds for assuming the Minoans to have

been dolichocephalic, with a mean cranial index of about 74·0. Alongside of a majority of 60 per cent. long-heads dwelt a minority of about 10 per cent. broad-heads. In stature they were short, scarcely 5 feet 4 inches. This estimate of Dr. Duckworth was confirmed by further measurements made by me last year. This, it is to be remembered, was the condition of things before the prehistoric invasions associated with the names of the 'Achæans' and 'Dorians.'

How do the ancient compare with the modern inhabitants of Crete? Have they changed physically, and how are we to account for the change? Before contrasting the above data with the measurements of 2,290 living male Cretans a word of warning is necessary. We are comparing the *cephalic* index of the living with the *cranial* index of the dead. Assuming a difference of two integers, we shall credit the Minoans with a cephalic index of 76 in place of the cranial index of 74. The modern Cretan has an average cephalic index of 79·0. He is mesaticephalic rather than dolichocephalic, though by no means so broad-headed as the Greek of the mainland, whose mean is about 82·0. The distribution to-day is as follows:—

Dolichocephals (76·9 and below) . . . . .	29·6 per cent.
Brachycephals (82·1 and above) . . . . .	24·0 ..
Mesaticephals (77·0–82·0 inclusive) . . . . .	46·4 ..

The increase of the brachycephals and the mesaticephals at the expense of the dolichocephals since the beginning of the Late Minoan Period is here evident.

While the statistical work is as yet under way it is too early to offer a solution of this complex problem, the cause of the physical change in the Cretan people during the last 4,000 years. When we remember that the island has been subject to several invasions, from prehistoric times down to the seventeenth century, the question is certainly an involved one. I will say here that, in order to do away as much as possible with the effects of the last invasion, that of the Turks, I have excluded all Mussulmans from my figures, although there seems not to be much trace of Turkish blood in the majority of the Cretans who profess Islam. Here and there I believe I have traced an individual of Venetian descent; but, having sought Venetians eagerly wherever name or legend suggested, with but little success, and having regard to the wholesale eviction of them at the end of the sieges, I think that they are a negligible quantity in a general survey like the present. If this is true of the Turkish and Venetian invasions, it is much more true of the Saracenic influence, which was spasmodic and ephemeral. In fact, unless we are to call in other causes than the mixture of races for the broadening of the head, the prevalence of the brachycephals and great mixture of the brachycephalic and the dolichocephalic elements to-day seem to me to call for a considerable *prehistoric* invasion of broad-heads.

The distribution of types may help us to some clear conception and to understand some suggestions which I put forward with some diffidence at this early hour.

It will be necessary to bear in mind the geographical outline of the island. About 160 miles long (due E. and W.), it varies from 35 to 8

miles wide (N. and S.). A chain or backbone of mountains runs throughout its length, broken into three chief *massifs*—the White Mountains (8,000 feet) in the west, Mount Ida (8,000 feet) in the centre, and Mount Dicte (6,000 feet) in the east. In the extreme east, beyond the Isthmus of Hierápetra, lies the upland plain of Sitía, c. 2,000 feet in height. At the widest part of the island, to the south, is the largest plain of Crete, the Messará, which, running westward to the 'gateway' of Phaestos, is shut off from the Libyan Sea by a wall of mountains ranging from 2,500 to 4,000 feet high (Mount Kophinas).

Administratively the island is divided into twenty 'eparchies,' and for many reasons this division has proved the most convenient for a starting-point in anthropometric work. The central eparchies have average cephalic indices of 78 and 79; one only, Lasithi, has a dolichocephalic average of 76·5. Both eastern and western eparchies show an increased breadth—Sélino 80·9 and Sphákia 80·4 in the south-west corner, and Sitía 80·9 in the extreme east.

The percentages of dolichocephalic and brachycephalic individuals are in accord with these differences in averages:—

Central	. . . 36·0	per cent. dolichocephals	17·5	per cent. brachycephals
Lasithi	. . . 54·5	"	6·1	"
Sélino	. . . 13·3	"	39·7	"
Sitía	. . . 16·4	"	38·1	"

The mesaticephals account for the rest. Although we have an identical mean cephalic index of 80·9 in the extreme west and east, these peoples differ not only in stature but in actual head-form, for the Sitians have *short* heads and the Sélinots *broad* heads. In fact, the latter are the broadest-headed on the island, and the Sitians barely escape being the narrowest-headed, although their heads are the shortest. It is possible that we have to deal with an invasion of Northern brachycephals (ultimately of the tall Illyric stock) into the west, and another in the east of Asiatic brachycephals from the uplands of Asia Minor.

If the dolichocephal once possessed the land, and the brachycephal was, in the main, an invader, we might expect to find the original inhabitants driven up into the mountains; and this is the case. But this general statement requires some modification. It would be nearer the truth to say that the dolichocephal is not absent from the plains but predominates in the mountains. The homes of the long-heads are on the slopes of the mountain *massifs*—the White Mountains, Mount Ida, and Mount Dicte—as also in the range which shuts off the rich Messará Plain from the Libyan Sea. Of these, the best example is Mount Dicte, the 'birthplace of Zeus,' where, before the Northern god came to the island with his broad-headed contingent, the Cretan Rhea was worshipped. Here in the mountain-plain of Lasithi, 2,700 feet above the sea, shut in on all sides by towering summits, and only to be reached by toilsome tracks from the plains below, is a true dolichocephalic centre with a cephalic mean of 76·5. The long-heads outnumber the broad-heads by nine to one, more than even among the 64 ancient skulls examined by Dr. Duckworth. This is a *true centre*, for we find this dolichocephalic element radiating in all directions into the neighbouring eparchies of Pedhiádha, Mirabéllo, Hierápetra, and Viánnos.

The other mountain *massifs* are not true centres; for, although the dolichocephals are most numerous, the mountains, towering up 8,000 feet, form a barrier to the south, and the long-heads cluster on the northern slopes only. This is true of the White Mountains, where in one village alone of Upper Kydthonia, Lakkoús, the home of the late Dr. Jannáris, the 65 men I measured averaged 76·9, against 79·9 in the plains of the same eparchy. The other mountain *massif*, Mount Ída, plays a similar part, and on the northern side, in the upper portion of Mylopótamo, my records show 83 subjects averaging 76·5. The mountains to the south of the Messará Plain, though not so lofty, slope steeply to the sea, and being shut off from the main centres, offer a most undesirable region for any invader to occupy in a hostile country. The region is sparsely populated, and the 28 subjects measured in that part which falls within the eparchy of Monophátzion average 76·9, compared with 80·9 in the Messará Plain immediately below.

These four mountainous regions appear to be the strongholds to which the earlier inhabitants have been driven by successive invaders, and strong confirmation of this hypothesis comes from the method by which I arrived at it. A map of the cephalic index eparchy by eparchy offered no clue. A suspicion of differences between mountain and plain suggested the cleavage line of 1,000 feet altitude as a criterion of classification, but this failed in some cases, though successful in others. It was arbitrary and did not always serve as a register of accessibility. It then occurred to me that in a land of such marked physiographical features as Crete, Achæans, Dorians, Venetians, all had probably followed much the same routes as the Turks in the seventeenth century. I therefore made a map of the Turkish occupation of the island according to the census of 1881, before the latter-day exodus. This showed that from centres on the north coast of the island—Canea, Rethymo, Candia, and Sitia—the lines of immigration radiated southward, stopping short at the foot of the mountains, with but one exception, to which I shall refer later. This general truth is particularly well illustrated in the many lines of occupation stretching south from Candia, the greatest Turkish centre, which all stop short abruptly at the foot of the Messará Mountains. Three great blank spaces stand out on the map between these lines of immigration—Mount Dícte with the fringes of the neighbouring eparchies, the northern slopes of Mount Ída, and both northern and southern sides of the White Mountains. These blank areas are those which we have already found occupied by the predominant dolichocephal, with one notable exception, the southern slopes of the White Mountains. This region, where the Turks have never yet held sway, this eparchy of *Sphákia*, where the Sphákiots have successfully repulsed Turk and Venetian alike, and, isolated in a sterile, rocky home, proudly claim Dorian descent, is the one outstanding exception to the rule that the mountains are the refuge of the dolichocephals. I believe this significant exception, when fully understood, will prove extremely instructive in the study of prehistoric migrations.

The Dorian migration into Crete has historical authority, and it is probable enough, apart from the anthropological evidence, that a stream of these people reached this south-western part of the island, since ships

driven by a strong wind southward would find it dangerous to land on the northern coast, as archæologists know to their cost. There is no harbour on the south coast to compare with Loutro, the port of Sphákia, where St. Paul's companions advised wintering; it possesses a double harbour and gives shelter not only from the north-west and north-east, but also from the south-west winds. Modern travellers commonly report the absence of ports on the south coast of Crète, unaware that native Sphákiot ships ply to Odessa with their great cheeses, hides, and charcoal, and that Sphákiot vessels were reported in the Black Sea during the Venetian occupation of the island, and at Constanza in 1821. To-day there are more harbour-men employed at Sphákia City and its port, Loutro, than in any other Cretan towns, excepting Canea, Candia, and Rethymo. Immigrants landing at Loutro had no choice but to settle on the southern slopes of the White Mountains, sterile, and therefore sparsely inhabited, where to-day we find a majority of broad-heads.

I referred above to one exception to the rule that Turkish occupation stopped short at the foot of the mountains. This example is found on the southern slopes of Mount Ida. The longest line of communications of the Turkish occupation was the one which, leaving Candia, passed along the eastern slopes of Mount Ida, swung round to the south *viâ* that ancient shrine of the Minoans, *Kamáres*, and, doubling the southern slopes of the mountain, crossed by a rich valley the eparchy of Amáirion, and ended in the northern port of Rethymo. The northern slope of Mount Ida is a stronghold of the old race; the southern is not, because it was crossed by a high-road of immigration from one base to another.

In all this I would not be misunderstood. I do not attribute the brachycephalic increase to the Turks, but, taking them as guides, I have attempted to show how similar and earlier lines of settlement and communication, pursued by numerous invaders, all broad-headed, with the exception of the Saracens, would account for the present hedging in of the dolichocephalic element.

Before I pass to comparisons of stature let me add some evidence from modern skulls. In the garden of the famous monastery of Arkádhi, besieged by the Turks in 1866, is a memorial tower, the bottom of which is filled with some hundreds of skulls of fallen heroes of the revolutions of 1821 and 1866. Dropping through the floor into the gruesome depths below, I selected 26 crania, which, on examination, yielded an average cranial index of 74.2. Of these, 54 per cent. were dolichocephalic, and only 12 per cent. brachycephalic. These figures are almost identical with those of the Minoan skulls. Arkádhi is on the north-western slopes of Mount Ida, a few miles from the Mylopótamo border. Although not all the fighters came from the immediate neighbourhood, yet they probably hailed in the main from the mountains.

#### *Stature.*

The average stature of Cretans to-day is 1,685 mm. (5 feet 6½ inches), a considerable increase on the estimated stature of the ancient Cretans, which was 1,625 mm. (5 feet 4 inches). In the west the averages are: For the eparchies of Kydhonia 1,723 mm. (5 feet

7 $\frac{3}{4}$  inches) and Sphákia 1,711 mm. (5 feet 7 $\frac{1}{2}$  inches), diminishing in the east to Mirabéllo, 1,664 mm. (5 feet 5 $\frac{1}{2}$  inches), and Hierápetra, 1,665 mm. The statistics of stature mapped out by eparchies, or according to cephalic index, or by mountain and plain, present only a seeming confusion, with but one obvious trend, an increase in stature as we journey westward. Yet I think it is possible to distinguish some significant facts amid this apparent confusion.

The first is that the people in the plains are, with some exceptions, shorter than those in the mountains.

The second is that the long-head is taller than the broad-head in 15 out of 20 eparchies, and as the mountain villages yield a majority of dolichocephals—descendants of the original inhabitants of Crete, as I hope to have established—it seems that they have increased in stature at a higher altitude. When we remember that the Minoans were a short people and dwelt chiefly on the coast, this upward trend in stature and habitat seems to have gone on *pari passu*. This fact comes out more clearly when we turn directly to the mountain areas where we have already found the long-heads. In Lasíthi, where the cephalic index and the proportion of long-heads to broad-heads of the Minoans is almost exactly reproduced, the average stature for 99 men is 1,676 mm., an increase of 51 mm., or 2 inches, on the Minoan average. The dolichocephals of Lasíthi have an average of 1,685 mm., compared with 1,646 mm. for the brachycephals. Kydhonia Province, on the northern slopes of the White Mountains, has an average of 1,740 mm. for the dolichocephals and 1,715 mm. for the brachycephals. This increased stature of the moderns also holds in the Messará Mountains and Mylopótamo on the northern side of Mount Ida, although in this last case it is reduced by the inclusion of the poverty-struck villagers of Kameráki, a hamlet unknown to the map, boasting no *kappheneion* (café), not even the pretence of a store, the poorest village that I have come across in my wanderings in Crete. Here the average stature of 10 men was 1,600 mm. (5 feet 3 inches) only. Another example of the effect of poverty on stature is to be found in the island of Gavdos (anc. *Clauda*), where the average of 20 men was 1,634 mm. (5 feet 4 $\frac{1}{4}$  inches), compared with their nearest neighbours and kinsmen, the Sphákiots, of whom 284 had an average height of 1,711 mm. (5 feet 7 $\frac{1}{2}$  inches).

The third fact, already noted, is that the people of the western half of the island are taller than those of the eastern half. Both dolichocephals and brachycephals are tall, over 1,700 mm. (5 feet 7 inches), and the former have a slight advantage. The distribution is here somewhat peculiar. On the northern side of the mountain are tall long-heads; on the southern, tall broad-heads; in a neighbouring eparchy are short broad-heads alongside tall long-heads. The puzzle is to account for the tall long-heads and broad-heads in the west. If there was a Dorian invasion, it appears to have made its entry on the south coast into Sélino, where the brachycephal outnumbered the dolichocephal by three to one, and into Sphákia, where the ratio is three to two, and 86 out of 284 men are over 1,700 mm. in height. The tall dolichocephal of the west exceeds the long-head of the east in stature by at least 40 mm. A careful comparison of numbers and percentages of



both tall and short dolichocephals and tall and short brachycephals throughout the island reveals an abnormal number of tall dolichocephals in Kydthonia and the neighbouring region. In other words, everywhere else the ratio of tall long-heads to short long-heads and of tall broad-heads to short broad-heads is approximately the same; here the tall dolichocephal is to the short dolichocephal as 50 to 1. Is this due to differences of soil, fertility, a better-watered country, or to special social conditions? After careful consideration I do not think so. The suggestion has been made that the great stature of Kentucky men is due to the bone-building qualities of water in a limestone region; but in Crete, speaking generally, it is the east that is a limestone district, while the west is composed of talcschists.

Nor do I think it necessary to call in an invasion of tall long-heads. May not the Kydthonians, whom Homer (*Od.* xix. 176) mentions as one of the peoples inhabiting Crete, have been taller than the Eteocretans of the eastern half, whose stature we have established as 1,625 mm.? We know that a branch of the Mediterranean race, called by Dr. Deniker the Atlanto-Mediterranean, was of greater stature than the rest. The western end of the island is as yet an archaeological blank, well-nigh until classical times. We have no ancient skulls or bones from the west, saving a tiny fragment from a pavilion-shaped tomb belonging to the end of the Minoan era.

The records of stature for Kydthonia are striking. One hundred and sixty-seven men from the whole of the eparchy average 1,723 mm. (5 feet 7 $\frac{3}{4}$  inches); 67 dolichocephals average 1,740 mm. (5 feet 8 $\frac{1}{2}$  inches), of whom 25 exceed 5 feet 9 inches in stature. Out of the 167 persons there is but one short dolichocephal (under 1,650 mm.), and in the neighbouring eparchy of Sélino out of 83 there is not even one. This tall dolichocephal also exists to the number of 39 out of 284 persons measured in Sphakia. It seems much more likely, considering the isolation, pride of endogamy, and bellicose nature of the Sphakioti, that these tall long-heads are the remnants of an earlier race rather than intruders since the Sphakioti themselves.

Turning to Sitia in the extreme east, where a moderate upland presents no sharp contrast of mountain and plain, where the brachycephals outnumber the dolichocephals by nearly five to two—a complete reversal of the time when the Minoan dolichocephals were to the brachycephals as eight to one—the increase in stature of the modern long-head is not great (1,625 to 1,663), and he is exceeded in stature by the intruding Asiatic brachycephal, whose stature is 1,678 mm.

To sum up, among modern Cretans the dolichocephals are generally taller than the brachycephals. The dolichocephals in the mountains are taller than their ancestors, the Minoans, who lived by the sea. The exceptional tallness in the west of the brachycephals seems to be due to an early inroad from the north; that of the dolichocephals of the west may be due to the greater stature of the ancient Kydthonians as compared with the Eteocretans of the east.

*Eye-colour.*

There remains a word to say on the colour of eyes. These records are only in course of tabulation; I speak, therefore, from a cursory perusal. Classing blue, grey, and green eyes together as light, in contrast with the hazel, light brown, medium brown, and foncé, I find there is a somewhat surprisingly high percentage of light eyes for the whole of Crete, namely, 29. The percentages vary from 18 in Lasíthi eparchy to 40 in Sitia. The distribution offers no obvious clue. Light eyes are about equally divided between east and west, with the highest and lowest averages in the eastern half. Kydhonia 34 per cent. and Sphákia 32½ per cent. in the west are matched by Pedhiádha 33 per cent. and Hierápetra 34 per cent. in the east. Sélino, next door to Sphákia, has the low average of 26 per cent., and compares with Mylopótamo 25 per cent., which two eparchies form so strong a contrast from the point of view of the proportion of long-heads to broad-heads. Sélino has three brachycephals to every dolichocephal, and Mylopótamo has three dolichocephals to every brachycephal.

Speaking of the island as a whole, the numbers of light eyes are equally divided between the short and the tall, the dolichocephals and the brachycephals, in proportion to the number of individuals, so that apparently it is impossible to distinguish by percentage of light eyes one type from another. However, ethnical differences may lie concealed under diverse combinations in different areas, and further study may reveal them. I fail to trace, what is generally expected, a greater frequency of light eyes in the mountains, but it should be remembered that the predominance of the older brunette race in these areas furnishes a more than counteracting tendency. This is well illustrated in Lasíthi, which has the lowest percentage of light eyes (18), as well as the closest approximation in head measurements to our records for Minoans.

My census of 2,000 school-children taken throughout the island, whether compared *in toto* or by eparchies with adults, shows a surprisingly diminished average, 18 per cent. instead of 29 per cent. This striking difference, obtained from figures carefully gathered and compiled, calls for a radical explanation; but, apart from such, is there here a tendency to reversion to type?

I am only too conscious of the fragmentary condition of this report, of the many characteristics and questions of variation which do not receive mention; but the material is gathered, and in the main tabulated, and it should be only a matter of time before the observations made throw light on questions of migration and descent in the most interesting island of the Mediterranean.

## APPENDIX II.

*Observations on 104 School-children at Vori and at Palaikastro in Crete.*

*By W. L. H. DUCKWORTH, M.D., Sc.D.*

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In the course of a journey in 1903 from Candia to Palaikastro, in Crete, I had the opportunity of measuring and observing a number of school-children (fifty-nine boys and twenty-five girls) at Vori, a small village distant about five miles from the southern coast of the island, near the traditional site of 'Fair-Havens,' and about two miles from the well-known prehistoric site called Phaestus. Later on, in the same year, I supplemented these measurements by the addition of twenty more records for school-boys of corresponding age at Palaikastro, or, to be more strictly accurate, at Angathi, the neighbouring village, one of the most eastern settlements in Crete. A preliminary report was submitted to the Committee in 1903, and published by the British Association in the Southport volume of its Proceedings. In the present Report I have worked out the data more fully than was possible in 1903, and in this instalment I shall deal principally with the data relating to Cretan boys, since they were the more numerous; moreover, comparisons with adult males are more easily made; and, lastly, it is interesting to compare the results with those obtained by me last year in the south of Aragon, in Spain, from one hundred school-boys of comparable age. For the publication of the records from Spain I am indebted to the Council of the Cambridge Antiquarian Society.

Little need be said about the conditions of life in Crete and the character of the land, for recent writers have dealt sufficiently with these questions. I may, however, state that my impressions lead me to believe that these conditions are not very different in Crete and in Aragon. At the same time I must add that both the Cretan villages visited are within the zone of malaria, that I saw undoubted cases of the sequels of malaria supervening in childhood, and that this liability, which is probably minimal, or absent, in the part of Aragon available for comparison, is important in its relation to, and effects upon, physical development. In this connection special mention is made of the fact that the physique of these Cretan children is frequently, if not universally, poor, and often a boy was found to claim an age in years greater by about 30 per cent. than that which we would have assigned to a British boy of similar stature and physical development. The relative poorness of the food, both in quantity and quality, taken together with their unavoidable exposure to extremes of temperature according to the season (for the winter is often severe in Crete), contributes to a combination of circumstances with which this deficiency in corporeal development can be justly charged.

## A.—CRETAN SCHOOL-BOYS (ages from 5 to 16 years).

Observations were made under the following heads:—

I.—Colour of the hair.—Table I. exhibits the results of the investigations carried out:—

 TABLE I.—Number, Hair-colour, Eye-colour, and Age:  
 Mean Age 9·9 years.

Seventy-nine Cretan School-boys at Vori and Palaikastro							
Place & No.	Hair-colour	Eye-colour	Age	Place & No.	Hair-colour	Eye-colour	Age
Vori				Vori			
1	Jet black .	Dark brown .	6	43	Brown .	Dark brown .	7
2	Fair . .	Dark brown .	8	43a	Brown .	Dark brown .	7
3	Brown . .	Dark brown .	8	44	Dark brown	v. dk. brown .	9
4	Dark . .	Dark brown .	7	45	Dark brown	Hazel . . .	8
5	Fair . .	Grey . . .	8	46	Black . .	Jet black . .	5
7	Dark . .	Dark . . .	9	47	Fair . . .	Dark brown .	7
8	Black . .	Dark brown .	9	48	Dark brown	Dark brown .	7
9	Black . .	Dark brown .	8	48a	Fair . . .	Dark brown .	7
10	Fair . . .	Hazel . . .	8	48b	Very fair	Hazel . . .	8
11	Black . .	Dark brown .	15	49	Fair . . .	Dark brown .	9
12	Brown . .	Hazel . . .	11	50	Fair . . .	Hazel . . .	10
13	Fair . . .	Grey-green .	7	51	Fair . . .	Hazel . . .	10
14	Black . .	Dark brown .	8	52	Fair . . .	Blue . . .	6
15	Dark brown	Dark brown .	11	53	Fair . . .	Hazel . . .	6
16	Brown . .	Dark brown .	11	54	Brown . .	Dark brown .	5
17	Black . .	Dark brown .	11	55	Dark brown	Dark brown .	5
18	Fair . . .	Dark brown .	11	56	Fair . . .	Green . . .	6
19	Fair . . .	Dark brown .	10				
20	Fair . . .	Grey-green .	10				
21	Fair . . .	Grey . . .	10				
22	Fair . . .	Dark brown .	12				
23	Brown . .	Dark brown .	10				
24	Brown . .	Hazel . . .	16	1	Dark brown	Dark brown .	8
25	Fair . . .	Grey . . .	13	2	Jet black .	Dark brown .	10
26	Brown . .	Hazel . . .	13	3	Light brown	Grey . . .	7
27	Dark brown	Green . . .	13	4	Brown . .	Light brown .	8
28	Brown . .	Dark brown .	10	5	Light brown	Hazel . . .	9
28a	Fair . . .	Light brown .	12	6	Dark brown	Dark brown .	12
29	Dark brown	Dark brown .	12	7	Dark brown	Grey . . .	13
30	Brown . .	Dark brown .	11	8	Dark brown	Grey . . .	13
31	Jet black .	Medium brown.	12	9	Dark brown	Dark brown .	13
32	Dark brown	Dark brown .	10	10	Light brown	Grey . . .	11
33	Dark brown	Dark brown .	15	11	Dark brown	Dark brown .	11
34	Black . .	Dark brown .	12	12	Jet black .	Hazel . . .	12
35	Brown . .	Dark brown .	13	13	Dark brown	Hazel . . .	13
36	Dark brown	Dark brown .	14	14	Dark brown	Dark brown .	13
37	Fair . . .	Blue . . .	14	15	Dark brown	Dark brown .	10
38	Dark brown	Grey . . .	15			{ Grey (1) <sup>1</sup>	
39	Brown . .	Dark brown .	6	16	Brown . .	Dark brown .	13
40	Dark brown	Dark brown .	10	17	Dark brown	Green . . .	16
41	Fair . . .	Blue . . .	6	18	Brown . .	Medium brown.	13
42	Brown . .	Dark brown .	7	19	Brown . .	Dark brown .	10
				20	Light brown	Hazel . . .	7

<sup>1</sup> Different colours in the same individual.

The analysis of this table yields the following percentages:—

TABLE II.—*Hair-colour and Age : Percentages.*

Seventy-nine Cretan School-boys						
Colour	No.	Per Cent.	Mean Age	Colour	Per Cent.	Mean Age
Very fair . . .	1	1.26	8 years	Light	32.80 (adults 3.96) <sup>1</sup>	8.92 years
Fair . . . . .	21	26.50	9.05 "			
Light brown . .	4	5.04	8.5 "	Medium	22.68 (adults 13.3)	9.9 "
Brown . . . . .	18	22.68	9.9 "			
Dark brown . .	22	27.76	11.2 "	Dark	44.14 (adults 83.1)	10.62 "
Dark . . . . .	2	2.52	8.0 "			
Black . . . . .	7	8.82	9.7 "			
Jet black . . .	4	5.04	10.0 "			
Total . . . . .	79	99.62	9.9 "			

This statement shows that the darker tints of hair colouration are preponderant; also that the influence of age in this respect is as distinct as in other cases; and the general rule as to the darkening of the hair during the period from childhood to maturity is evidently followed in this instance. For comparison with another instance from Southern Europe I give a similar table for 100 school-children at Alhama de Aragon in Central Spain. It should be noted that this table differs slightly from that published by me in the Proceedings of the Cambridge Antiquarian Society (vol. xiv.). The table there published has been revised, and stands as follows:—

TABLE III.—*Hair-colour of 100 School-boys at Alhama de Aragon.*

Colour	Per Cent.	Mean Age	Colour	Per Cent.	Mean Age
Very fair . . . .	3	7 years	Light . . . . .	25	8.24 years
Fair . . . . .	6	8.6 "			
Light brown . . .	16	8.31 "	Medium . . . . .	32	8.12 "
Medium brown . .	32	8.12 "			
Dark brown . . .	35	8.77 "	Dark . . . . .	42	8.83 "
Jet black . . . .	7	9.14 "			
Red . . . . .	1	12.0 "	Red . . . . .	1	12.0 "
Total . . . . .	100	8.5 "	(Red . . . . .)	1	(12) "

In this instance (though the full details are not given) the general significance is the same for Aragon as for Crete. But the depth of pigmentation is usually greater in Crete. Beddoe's 'Index of Nigrescence' is +25 (cf. Table XII.). I have no record of a case of red hair among the Cretan children examined by me, and I recall to mind but a single instance in either adult or immature persons in that island.

<sup>1</sup> From my observations on adult Cretans. In England a similar progressive darkening of the hair is the rule (cf. *Proc. British Assoc.* 1883, Table XI., pp. 278, 279).

With regard to the association of hair-colour and eye-colour I may notice that in general the usual rule applies to Crete, that is to say, fair hair or light-coloured hair may be accompanied by dark eyes (cf. on this point the paper on Aragonese school-children, mentioned above), whereas it is much more unusual for the reverse combination to appear. Here, at Palaikastro, this unusual combination did actually occur twice. The dark brown hair in these boys was associated with eyes of a grey tint merging into the hazel colour so distinctive of many Cretans.

In the majority of instances the hair is straight or somewhat wavy, but not closely curled.

II. *Colour of the Eyes.*—Turning to the data (provided in Table IV.) for the colour of the eyes, analysis gives the following summary of the records:—

 TABLE IV.—*Eye-colour and Age.*

Seventy-nine Cretan School-boys						
Colour	No.	Per Cent.	Mean Age	Colour	Per Cent.	Mean Age
Blue . . .	3	3.75	8.66 years	Light	17.5 (Aragon <sup>2</sup> 13.1) (Adults 21.23)	10.2 years (Aragon <sup>2</sup> 7.14 years)
Grey . . .	9	11.25	11.10 "			
Grey-green . . .	2	2.50	8.50 "			
Green . . .	3	3.75	11.66 "	Medium	25.0 (Aragon <sup>2</sup> 46.5) (Adults 65.98)	10.5 years (Aragon <sup>2</sup> 8.98 years)
Light brown . . .	2	2.50	10.00 "			
Hazel . . .	13	16.25	10.07 "			
Medium brown . . .	2	2.50	12.50 "	Dark	57.5 (Aragon <sup>2</sup> 40.4) (Adults 12.98)	9.6 years (Aragon <sup>2</sup> 8.27 years)
Dark . . .	1	1.25	9.00 "			
Dark brown . . .	43	53.75	9.90 "			
Very dark brown . . .	1	1.25	9.00 "			
Jet black . . .	1	1.25	5.00 "			
	80 <sup>1</sup>	100.00	9.90 "			

Upon this table I would comment as follows: First, the gradation in depth of pigmentation does not follow the same sequence in respect of age, as was observed to obtain in the case of the hair. In other words, the eye-colour is seemingly independent of age in years.<sup>3</sup> Again, the Aragonese school-boys provide exactly the same characteristic as those of Crete in this feature of eye-colour: the percentage figures for both series of children will be found in the table. Lastly, the adult Cretans seem to provide a contradictory result. This paradox may well have a two-fold explanation. For the adults include a large proportion of men from the most eastern province of Crete (Sitia), where I suspect the medium tints preponderate. A second contributory cause may be found in the fact that I was obliged perforce to observe the adults in the open air, often in a strong light. The children were seen in a

<sup>1</sup> One individual (Pk. 15) having eyes of different colours, is counted twice.

<sup>2</sup> Comparable data for 100 school-boys at Alhama de Aragon, Spain.

<sup>3</sup> In England the eye-colour seems to darken with age to maturity, but not nearly in such marked degree as the colour of the hair (cf. *Proc. British Assoc.* 1883, Table XI., pp. 278, 279; also Beddoe, *The Huxley Lecture*, 1905).

schoolroom, where the light was to some extent subdued. I am not aware of this matter having been tested, but on reflection it seems likely that where the pupils of the eye are dilated, then, in the dim light productive of that effect, the narrow iridic zone (which is all that appears) may be judged to be of darker tint than when the reverse conditions obtain. At the time I did not think of this as a possibly disturbing factor, but, in any case, the bulk of the school-boys (those at Vori) were first examined, the men coming in only at a later date.

Reference should be made to the tabulations (in Tables XI. and XII.) of the association of hair-colour and eye-colour, and also of the indices based upon these data.

III. *Head-length*.—The mean value of this dimension in seventy-nine boys (of an average age of 9.9 years) is 173.2 mm. This is the greatest length measurable from the glabella. But, as in the Aragonese and in other school children, the maximum head-length will be found between a supra-glabellar (*i.e.*, ophryonic) point and an occipital point. The gradual increase in this dimension may be illustrated as follows:—

Mean value (in mm.) of the maximum glabello-occipital length of Cretans (males only):—

(a)	Boys of the average age of 6 years ( 9 examples) . . . . .	171.0 mm.
(b)	" " " " 9.9 " ( 79 " ) . . . . .	173.2 "
(c)	" " " " 15 " ( 7 " ) . . . . .	179.4 "
(d)	Adults from all parts of Crete (200 " ) . . . . .	186.3 "
(a')	Boys of the average age of 11.1 years	
	from Sitia province . . . . . ( 20 " ) . . . . .	171.2 "
(b')	Adult Cretans of Sitia province . . . . . (131 " ) . . . . .	176.3 "

This table shows that the increase in head-length continues after puberty. The amount of this later increase is not nearly so great as in a distinctly dolichocephalic type, such as the native Aragonese. Comparison of the figures with those provided by Aragonese school-boys (and recorded by me in the *Proc. Camb. Antiq. Soc.*, Vol. xiv.) will show the correctness of this conclusion. It should be noted, lastly, that the inhabitants of Sitia province show a smaller relative increase (*cf.* sections (a') and (b') of the Table) than Cretans in general.

IV. *Head-breadth*.—The mean value of the head-breadth is 140.2 (79 examples): its mean value at different ages is shown in the Table following:—

Mean value (in mm.) of the maximum cephalic breadth (of Cretans):

(a)	Boys of an average age of 6 years ( 9 examples) . . . . .	135.4 mm.
(b)	The whole series; mean age 9.9 years ( 79 " ) . . . . .	140.2 "
(c)	Boys of an average age of 15 years ( 7 " ) . . . . .	143.1 "
(d)	Adults (males) from all parts of Crete (200 " ) . . . . .	148.3 "
(a')	Boys (mean age 11.1 years) of Sitia province (20 examples) . . . . .	143.0 "
(b')	Adult (males) of Sitia province (131 examples) . . . . .	148.7 "

In this case again the increase is comparatively continuous, and the sudden acceleration after puberty, so marked in the dolichocephalic Aragonese boy, is hardly noticeable in Crete. Moreover, the boys of the Eastern province have heads which are even more precocious in attaining the mean breadth for the age of puberty than those in other

districts. At the same time, the same heads (of youths in Sitia province) have to 'make' a greater amount of growth before this is completed.

V. *Cephalic Index*.—The mean value of this index in 79 boys is 80.9. As in the cases of its contributory factors (head-length and head-breadth), I have prepared a list of data giving the values of this index at different ages:—

Mean value of the cephalic or breadth-index of the head (in Cretans):

(a)	Boys of an average age of 6 years	. ( 9 examples )	. . . 79.2 mm.
(b)	The whole series (mean age 9.9 years)	. ( 79 " )	. . . 80.9 "
(c)	Boys of an average age of 15 years	. ( 7 " )	. . . 79.8 "
(d)	Adults (males: from all parts)	. . ( 200 " )	. . . 79.6 "
(e) <sup>1</sup>	Adults (males: from all parts)	. . ( 1600 " )	. . . 79.2 "
(a')	Boys (mean age 11.1) of Sitia province	( 20 " )	. . . 83.53 "
(b')	Adults (males) of Sitia province	. . ( 131 " )	. . . 84.3 "

Having regard to the small number of examples in (a) and (c), I think the first conclusion must be that, in general, the numerical value of this index is very constant from childhood onwards in Crete. This is not the case in Aragon,<sup>2</sup> where the index changes after puberty to a considerable degree. This difference may very likely be constant for the contrast of dolichocephalic and brachycephalic heads. If we confine our attention to Crete, another important inference may be drawn from the last table. It is this: that the most eastern Cretans are distinguished by a degree of brachycephaly higher than the average for that island. A marked degree of brachycephaly is already present in the young Cretan of Sitia (the Eastern province).

As regards the significance of this difference, I have already suggested<sup>3</sup> that the history of the large number of Colonists introduced by the Venetians (during their occupation of Crete) is well worth investigation. The modern peasant of Emilia has a head characterised by brachycephaly in a high degree. But Venetian colonists need not have been, and probably were not, drawn from the immediate surroundings of Venice. When we consider the influence exercised by the Republic over Dalmatia and Illyria before the Venetian expansion commenced on the Italian side of the Adriatic, we may justifiably think of those territories as possible sources whence Crete was re-stocked with inhabitants in the later Middle Ages. In fact, we know that in the year 1471 A.D. the province of Sitia was largely depopulated. This is clearly shown by the Venetian Archives translated by the late Dr. Noiret,<sup>4</sup> and Adrovasti is actually mentioned in a list of the abandoned villages. This depopulation was effected by marauding bands of Turks.

In Dr. Noiret's invaluable translation I find evidence that the interest of the Venetians was almost entirely in their settlers, who seem to have been of Italian origin. In a list of thirty-seven names of such persons (who had got into trouble through raising loans which they

<sup>1</sup> Hawes, *Proc. British Assoc.*, Dublin, 1908.

<sup>2</sup> Cf. Duckworth, *op. cit.* p. 44.

<sup>3</sup> Cf. *Proc. British Assoc.* 1903.

<sup>4</sup> Cf. *Bibl. des Ec. françaises d'Athènes et de Rome*, fasc. lxi. (1892), pp. 520, 521, Univ. Lib. 535c, 40, 34.



proved unable to repay) I find not one definitely Greek, but the name Sclavo occurs thrice.<sup>1</sup> This was in 1428.

But in 1390 a record<sup>2</sup> throws a little light upon the Venetian method of dealing with the aboriginal Cretans, for on June 28 of that year a re-issue is made of an earlier order dating from 1364, whereby prohibition is enacted of settlement, of agricultural labour, and of sowing corn in the plain of Lasithi and on the surrounding heights. The penalties are severe, and evidently the native refugees in the hills were to be given no chance of looting stores or crops.

But direct references to a native population are wonderfully scarce in these Archives.

As regards incoming ethnic elements, there are only three records to notice. These, though vague, are not by any means without interest.

The earliest is in 1414,<sup>3</sup> when Abraynus Anteron, 'the Armenian,' seeks permission to bring from Trebizond 880 'families' to escape from the 'Turks.' He wishes to bring these families to Crete; he is given his choice of Eubœa or Crète: promises are made of good treatment, 'quod loca nostra repleantur gentibus et specialiter personis que (sic) querunt vivere pacifice, juste et ex sudore suo.'

Then in 1417<sup>4</sup> permission is given to the Cretan Government to allow Turkish prisoners to establish themselves and their wives in Crete.

The last record is in 1479,<sup>5</sup> when orders are issued for the protection of forty families, refugees from the island of St. Herinis (Santorin) to Crete.

To my regret, I have been unable to pursue this quest further, either by inquiry on the spot or in libraries, except in regard to the names of these Cretan children (cf. p. 19).

I will conclude this part of the discussion with the mention of a fact that struck me very forcibly in the Balkans—viz., the great similarity in bearing and character that (to my mind at least) exists between the Montenegrins and the Cretans of Sitia (province). If correct, this would provide additional support to the view that South Slavonic elements are to be looked for in modern Cretans; and herein lies an explanation of the marked contrast, in respect of skull-form, between the pre-historic and historic inhabitants of the island.

#### VI. *Variability in head-length, head-breadth, and cephalic index (in Cretans).*

The calculation of the value of the standard-deviation for three characters is given in Table V., with some comparable data for other groups and nationalities. Here it must suffice to remark that the value of the standard-deviation of the cephalic index in the Cretan boys measured by me does not greatly differ in value (4·8 for seventy-nine boys) from the figures (4·1) provided by Mr. Hawes<sup>6</sup> for the 1,600 adult Cretan men measured by him. But both young and adults provide figures indicative of a relatively high degree of variability, and indeed the contrast between, for instance, Sitia and Selino in respect of the mean value of the cephalic index has already emphasised this point. It will

<sup>1</sup> Noiret, *op. cit.* p. 322.

<sup>2</sup> Noiret, *op. cit.* p. 225.

<sup>3</sup> Noiret, *op. cit.* p. 545.

<sup>4</sup> Noiret, *op. cit.* p. 36.

<sup>5</sup> Noiret, *op. cit.* p. 264.

<sup>6</sup> *Proc. British Assoc.* 1908.

be noticed that the Cretan boys are more variable than the men (4.8 for the boys as against the 4.1 for the men). Herein a general rule (formulated as the results of many hundreds of observations by Roberts, Boas, and Bowditch) appears to apply to Crete as well as to England and the United States.<sup>1</sup>

TABLE V.

—	Dimension	Age (Mean)	No. of Ex-amples	Mean	Prob. error of Mean	$\sigma$	Prob. error of $\sigma$	C	Prob. error of C.
<i>Head-length.</i>									
1	Cretan School-boys . . .	(9.9)	79	173	.508	6.67	.353	3.85	.206
2	Aragonese School-boys.	(8.5)	100	178	.354	5.25	.246	2.95	.140
<i>Head-breadth.</i>									
1	Cretan School-boys . . .	(9.9)	79	140	.504	6.65	.352	4.75	.254
2	Aragonese School-boys.	(8.5)	100	138	.285	4.23	.198	3.07	.146
<i>Cephalic Index (on living).</i>									
1	Cretan Adults (Hawes) (Males)	—	1600	79	.069	4.1	.048	5.2	.062
2	Cretan School-boys . . .	(9.9)	79	81	.360	4.8	.254	5.92	.317
3	Aragonese School-boys . . .	(8.5)	100	78	.189	2.81	.132	3.6	.171
4 <sup>2</sup>	British Boys (Herts)	(8 to 14)	57	78	.285	3.20	.201	4.1	.258
5 <sup>3</sup>	British Boys (Beddoe) . . .	(16)	200	78	.128	2.70	.089	3.45	.116
6 <sup>4</sup>	American School-boys . . .	(9)	135	80	.216	3.74	.153	4.675	.191
7 <sup>4</sup>	American School-boys . . .	(5 to 13)	1003	79	.068	3.44	.051	4.3	.064
8 <sup>5</sup>	North African Jewish Boys . . . . .	(6 to 16)	606	78	.083	3.08	.059	3.93	.075

B.—CRETAN SCHOOL-GIRLS (ages from 5 to 11 years, the mean value being 7.7 years).

Twenty-five Cretan girls were examined at Vori, none being available at Palaikastro. The observations have been summarised in the order following:—

TABLE VI.—Hair-colour and Age.

Twenty-five Cretan School-girls. (Mean Age 7.7 years.)						
Colour	No.	Per Cent.	Mean Age	Colour	Per Cent.	Mean Age
Fair . . .	12	48	7.91 years	Light	52 (Boys, 32.76)	7.7 years (Boys, 8.92 " )
Light brown	1	4	6.00 " }			
Brown . . .	8	32	8.12 " }	Medium	32 (Boys, 22.68)	8.12 " " (Boys, 9.9 " )
Dark brown	4	16	6.50 " }			
				Dark	16 (Boys, 44.1)	6.5 " " (Boys, 10.62 " )

<sup>1</sup> Cf. the tables collected by Jenkinson in his *Experimental Embryology*, Oxford, 1909, p. 73.

<sup>2</sup> From measurements by Messrs. Cooper and Ward (unpublished).

<sup>3</sup> From measurements recorded by Beddoe (*Journ. Roy. Anth. Instit.* Vol. xxxiv. 1904, p. 92).

<sup>4</sup> From measurements recorded by West (*Archiv. für Anthr.* Band xxii).

<sup>5</sup> From measurements recorded by Fishberg (*Boas Memorial Volume*).

The smaller number of examples is accountable for the lack of distinctness in the association of age and hair-tint. I have no doubt but that a longer series would show clearly that, as among the boys, the hair darkens with age. Probably, also, the condition observed in this country would also obtain—viz., that in the female sex the darkening never becomes so marked as in the male. It is a matter for speculation whether exposure to the open air has an influence here.

As regards the association of eye-colour with hair-colour, the records show that dark-brown hair is never accompanied (in this series) by eyes of lighter tint, although fair hair (especially, of course, in the younger girls) may be found with dark eyes.

II. The records of eye-colour have been summarised as follows:—

TABLE VII.—*Eye-colour and Age.*

Twenty-five Cretan School-girls. (Mean Age 7·7 years.)						
Colour	No.	Per Cent.	Mean Age	Colour	Per Cent.	Mean Age
Blue . . .	1	4	11 years	Light {	8	8·5 years
Grey . . .	1	4	6 "		(Boys, 17·5)	(Boys, 10·2 "
Green . . .	1	4	13 "	Medium {	40	8·0 "
Hazel . . .	8	32	7·5 "		(Boys, 25·0)	(Boys, 10·5 "
Medium brown	1	4	7 "	Dark {	52	7·3 "
Dark brown .	13	52	7·3 "		(Boys, 57·5)	(Boys, 9·6 "

The inspection of this table shows that the association of eye-tint and age is just as indefinite as among the boys. As in the case of the hair, we find here reason to suppose that the depth of pigmentation is less in the female sex. There may be a real sexual difference here, or the result may be simply due to the more constant exposure of the males (whether boys or men) to the weather; and I incline to lay stress on the latter consideration.

III. *Head-length.*—The mean value of this dimension in 25 girls (at Vori), of an average of 7·7 years, is 166·8 mm. Fifty-nine boys at Vori provide an average of 173·9 mm., but the mean age of the boys was 9·9 years. We have seen that nine boys of a mean age of 6 years gave an average measurement of 171 mm. Evidently the female head is smaller in this dimension.

IV. *Head-breadth.*—The mean value of this dimension in 25 girls (at Vori) is 133·7 mm. The boys at Vori (59 in number) gave an average of 139·3, but their age is greater. Nine boys averaging 6 years of age give a mean value of 135·4. From all this it appears that in childhood the female head is less broad than the male.

V. *The Cephalic or Breadth-index.*—The mean value of this index in 25 girls (at Vori) is 80·1. Boys with a mean age of 6 years provide a mean index of 79·2. All the boys taken together give 80·9 as the mean value. So far, then, it does not seem as though the sexual difference were marked in this respect, though the female head seems rather more

brachycephalic. One girl, however (No. 6), having an index of 94.9, has had a very appreciable effect in raising the average of this series of twenty-five individuals.

VI. Before passing from the consideration of this index, I would remark that in eleven girls (out of twenty-five) the maximum length of the head will be found actually between an ophryonic point and an occipital point. The same occurrence was noted in the boys (cf. p. 20). The indices here employed have been based on the glabello-occipital length. But if we employ the real maximum in the cases in which it was not glabello-occipital, we can calculate a cephalic index which will clearly provide lower numerical (*i.e.*, more dolichocephalic) results than those just described. For this purpose I have data from the following groups:—

TABLE VIII.—*Cephalic Index, calculated not from the glabello-occipital length, but from the maximum length, even when this is measured high above the glabello, the forehead being then bombé, as the French writers describe it.*

Group	No.	Index
(a) Boys at Vori . . . . .	(14)	78.9
(b) Girls at Vori . . . . .	(11)	78.7
(c) Cretan boys in general . . . . .	(23)	80.7
(d) Boys at Palaikastro . . . . .	(9)	83.4

The similarity between boys and girls at Vori, and the independent position of the Palaikastro (*i.e.*, eastern) group come out here very clearly.

The final tables include the whole of the detailed data whence the foregoing summaries have been made. I have also appended a list of the names of the individuals. The chief interest herein will lie in the search for names suggestive of a Venetian or other exotic provenance. Dr. Gerola provides a long list of the names of the Venetian families of Crete.<sup>1</sup> Looking through my list and that of Dr. Gerola, I find very few names in my collection capable of being claimed as Venetian. Of the boys, No. 23, Frangoulakis, may represent Dr. Gerola's family, Franco; and Kondourakis may be derived from Contarini. Nos. 30, 35, 42, 49, and 53 all bear the name Zorzakakis; this almost certainly represents the family Zorzi, mentioned by Dr. Gerola, No. 48A. Zangarakis may represent the name Zangarol. The girls provide no other names needing mention here.

<sup>1</sup> Cf. Gerola, *Monumenti Veneti nell' Isola di Creta*, 1905, p. xlix. Camb. Univ. Lib., Lib. 2, 90, 152.

TABLE IX.—*Cretan School-boys at Vori (59).*

Locality and Number	Age	Maximum Head-length from Glabella	Head-breadth	Cephalic Index	Maximum Head-length Fronto-occipital when not Glabello Occipital	Corresponding Cephalic Index
Vori No.						
1	6	165	131	79·4	—	—
2	8	172	134	77·9	—	—
3	8	156	139	89·1	—	—
4	7	175	135	77·1	—	—
5	8	173	140	80·9	—	—
7	9	160	143	89·4	—	—
8	9	166	134	80·7	—	—
9	8	180	130	72·2	—	—
10	8	175	140	80	—	—
11	15	180	146	81·1	—	—
12	11	183	134	73·2	—	—
13	7	166	152	91·6	—	—
14	8	172	140	81·4	—	—
15	11	177	134	75·7	—	—
16	11	180	140	77·8	—	—
17	11	177	141	79·7	—	—
18	11	170	137	80·6	—	—
19	10	173	139	80·3	—	—
20	10	179	141	78·8	—	—
21	10	171	140	81·9	—	—
22	12	187	137	73·3	—	—
23	10	176	132	75	—	—
24	16	173	144	83·2	—	—
25	13	172	142	82·6	—	—
26	13	185	142	76·8	—	—
27	13	171	142	83	—	—
28	10	175	140	80	—	—
28 <sub>a</sub>	12	171	157	91·8	—	—
29	12	178	135	75·8	—	—
30	11	186	144	77·4	—	—
31	12	177	136	76·8	—	—
32	10	183	138	75·4	—	—
33	15	184	130	70·7	—	—
34	12	180	155	86·1	—	—
35	13	178	154	86·5	—	—
36	14	171	141	82·5	—	—
37	14	186	150	80·6	—	—
38	15	182	151	83	—	—
39	6	178	136	76·4	—	—
40	10	175	141	80·6	—	—
41	6	182	137	75·3	—	—
42	7	163	142	87·1	168	84·5
43	7	166	142	85·5	173	82·1
43 <sub>a</sub>	7	169	129	76·3	—	—
44	9	179	143	79·9	182	78·6
45	8	171	146	85·4	179	81·6
46	5	177	146	82·5	182	80·2
47	7	175	132	75·4	177	74·6
48	7	168	134	77	174	79·8
48 <sub>a</sub>	7	176	137	77·8	182	75·3
48 <sub>b</sub>	8	168	139	82·7	—	—
49	9	166	137	82·5	168	81·5

TABLE IX.—*Cretan School-boys at Vori (59)*  
 (Continued).

Locality and Number	Age	Maximum Head-length from Glabella	Head-breadth	Cephalic Index	Maximum Head-length Fronto-occipital when not Glabello Occipital	Corresponding Cephalic Index
Vori No.						
50	10	170	132	77.6	—	—
51	10	177	141	79.7	181	77.9
52	6	167	137	82	174	78.7
53	6	173	129	74.6	175	73.7
54	5	166	135	81.3	—	—
55	5	166	135	81.3	171	78.9
56	6	165	133	80.6	171	77.8
Palai-kastro No.						
1	8	168	141	83.9	—	—
2	10	168	141	83.9	—	—
3	7	172	148	86	—	—
4	8	169	135	79.9	—	—
5	9	159	152	95.6	—	—
6	12	170	135	79.4	—	—
7	13	176	153	86.9	—	—
8	13	177	140	79.1	—	—
9	13	172	149	86.6	174	85.6
10	11	175	155	88.6	179	86.6
11	11	164	143	87.2	165	86.7
12	12	168	131	78	—	—
13	13	176	137	77.8	180	76.1
14	13	183	152	83.1	187	81.3
15	10	166	144	86.7	168	85.7
16	13	178	150	84.3	182	82.4
17	16	180	140	77.4	—	—
18	13	172	141	82	175	80.6
19	10	162	141	87	164	86
20	7	169	132	78.1	—	—

TABLE X.—*Cretan School-girls at Vori.*

No.	Age	Hair-colour	Eye-colour	Head-length	Head-br'dth	Cephalic Index
1	7	Fair	Dark brown	162	138	(85.2) <sup>1</sup>
2	11	Fair	Blue	175	139	79.4
3	8	Brown	Dark brown	161	130	80.7
4	11	Fair	Hazel	169 (172) <sup>2</sup>	136	80.5(79.1) <sup>2</sup>
5	9	Fair	Dark brown	172 (175)	139	80.8 (79.4)
6	9	Dark brown	Dark brown	155 (157)	149	96.1 (94.9)
7	13	Brown	Green	170	140	82.4
8	6	Fair	Hazel	162 (169)	129	79.6 (76.3)
9	6	Fair	Grey	168	138	82.1
10	10	Fair	Dark brown	173 (177)	130	75.1 (73.4)
11	8	Brown	Dark brown	168	130	77.4
12	7	Brown	Hazel	160	136	85
13	11	Fair	Hazel	173 (176)	135	78 (76.7)
14	6	Fair	Hazel	167 (172)	132	79 (76.7)
15	6	Brown	Hazel	170 (173)	137	80.6 (79.2)
16	5	Fair	Dark brown	170 (173)	141	82.9 (81.5)
17	5	Dark brown	Dark brown	168 (175)	132	78.6 (75.4)
18	7	Brown	Hazel	169	126	74.6
19	6	Light brown	Hazel	170	134	78.8
20	6	Dark brown	Dark brown	160	140	87.5
21	6	Fair	Dark brown	167	128	76.6
22	6	Dark brown	Dark brown	169	125	74
23	8	Brown	Dark brown	166	128	77.1
24	7	Fair	Dark brown	164	130	79.3
25	7	Fair	Medium brown	162	131	80.9
26	8	Brown	Dark brown	167 (177)	129	77.2 (72.9)
Average (excluding No. 1)				166.8	133.7	80.16

TABLE XI.—*Cretan School-boys (79 or 80).<sup>3</sup>*

Eye-colour, Light (Blue, Grey, Grey-green)			Eye-colour, Medium (Green, Light Brown, Hazel, Medium Brown)			Eye-colour, Dark (Dark Brown, Very Dark Brown, Jet Black)					
Very Fair, Fair, Light Brown	Brown	Dark, Dark Brown, Black	Very Fair, Fair, Light Brown	Brown	Dark, Dark Brown, Black	Very Fair, Fair, Light Brown	Brown	Dark, Dark Brown, Black	Jet Black		
	10 12.50%	0 0		4 5.0	0 0		9 11.25	5 6.25	4 5.0	2 2.50	7 8.75
<i>Aragonese School-boys (99 or 100).<sup>3</sup></i>											
5 5.05%	5 5.05	3 3.03	0 0	11 11.11	20 20.20	14 14.14	1 1.01	9+1 red 9.09	6 6.06	18 18.18	6 6.06

<sup>1</sup> Epirote, and therefore excluded.<sup>2</sup> The figures in brackets are the maximum fronto-occipital head-length, and the cephalic index derived from this. Corresponding values for boys are given in Table IX.<sup>3</sup> One Cretan boy had eyes of different colours, and for the purpose of colour statistics was counted in twice (making a total of 80 in this case); one eye was light

TABLE XII.—Indices, Hair- and Eye-colour.<sup>1</sup>

—	—	Crete	Aragon	—
1	Eyes. Beddoe's Index (D—L)	+40	+27·27	(cf. 351 British = +3·4)
2	Hair. Beddoe's Index (D+2B—R—F)	+25	+23·23	(cf. 351 British = —38·74)
3	Eyes and Hair Combined : Beddoe's Compound Index	+90	+73·27	(cf. Dalmatia : mean 108). Range 54—156
4	Collignon's Compound Index	+26·25	+22·22	(cf. 351 British = —17·8).
5	Freire-Marreco's Compound Index	452·5	424·2	(cf. mean for 7 British localities = 363·9).

TABLE XIII.

*Names of Cretan School-boys at Vori, Crete.*

- |   |                                   |
|---|-----------------------------------|
| 1. Miron Capellakis.  | 30. Michael Zorzakakis.           |
| 2. Pavlos Skordhalakis.                                     | 31. Nicolaos Milonakis.           |
| 3. Constantinos Nicolidhakis.                               | 32. Michael Melonidhakis.         |
| 4. Pavlos Polydhakis.                                       | 33. Joannis Sabbakis.             |
| 5. Joannis Nicolidhakis.                                    | 34. Georgios Joseph Skordhalakis. |
| 6. Phortios Phortiidhes, an Epirote<br>boy. See Girl No. 1. | 35. Georgios Zorzakakis.          |
| 7. Georgios Papadhakis.                                     | 36. Emmanuel Piperakis.           |
| 8. Manoli Kamarianakis.                                     | 37. Constantinos Voleykronakis.   |
| 9. Nicolaos Kadhianis.                                      | 38. Georgios Fitsodhaskalakis.    |
| 10. Evangelos Makridhakis.                                  | 39. Joannis Kondourakis.          |
| 11. Nicolaos Mproulidhakis.                                 | 40. Manolis Xenogianakis.         |
| 12. Michael Jannakakis.                                     | 41. Michael Papadhakis.           |
| 13. Charalampos Kapelakis.                                  | 42. Manolis Zorzakakis.           |
| 14. Evangelos Mytolidhakis.                                 | 43. Stylianos Piperakis.          |
| 15. Joannis Mylonakis.                                      | 43a. Michael Milonakis.           |
| 16. Georgios Georgolakis.                                   | 44. Michael Xenakis.              |
| 17. Georgios Papadhakis.                                    | 45. Georgios Askoxylakis.         |
| 18. Joannis Rethymolakis.                                   | 46. Stavros Skordhalakis.         |
| 19. Georgios Skordhalakis.                                  | 47. Antonios Stavrolakis.         |
| 20. Georgios Kourmoulakis.                                  | 48. Demosthenes Polychronakis.    |
| 21. Evangelos Polydhakis.                                   | 48a. Georgios Zangarakis.         |
| 22. Elias Kamarianakis.                                     | 48b. Georgios Polydhakis.         |
| 23. Joannis Frangoulakis.                                   | 49. Georgios Zorzakakis.          |
| 24. Evangelos Makrydhakis.                                  | 50. Michael Georgolakis.          |
| 25. Elias Erygakis.   | 51. Nicholaos Kondourakis.        |
| 26. Joannis Nicolidhakis.                                   | 52. Stavros Polydhakis.           |
| 27. Georgios Kotsfakis. (? Kotsifakis).                     | 53. Georgios Zorzakakis.          |
| 28. Charalampos Dhoulzierakis.                              | 54. Gregorios Nicolidhakis.       |
| 29. Nicolaos Polychronakis.                                 | 55. Evangelos Grigorakis.         |
| 29a. Joannis Polydhakis.                                    | 56. Manolis Makrydhakis.          |

while the other was dark. Among the Aragonese, one eye-record (No. 20) was not taken, so that the numbers are either 99 or 100 accordingly.

<sup>1</sup> Reference for comparisons should be made to Dr. Beddoe's lecture on 'Colour and Race,' published in the *Journal of the Royal Anthropological Institute*, vol. xxxv. 1905; also to Miss Freire-Marreco's valuable paper on 'The Hair and Eye-colour of 591 children of School Age in Surrey,' published in *Man*, 1909, 63. The British records in Table XII. are taken from the latter paper.



*Names of Cretan School-boys at Palaikastro, Crete.*

- |  |   |
|--|---|
| 1. Georgios Mavrokoukoulakis.                    | 11. Gregorios Brylakis.                     |
| 2. Gregorios Papadhakis.                         | 12. Konstantinos Avronidhakis. <sup>1</sup> |
| 3. Konstantinos Avronidhakis. <sup>5</sup>       | 13. Nicholaos Stephanakis.                  |
| 4. Georgios Bonatsakis.                          | 14. Manoel Tsandhakis.                      |
| 5. Georgios Relakis.                             | 15. Manoel Bonatsakis.                      |
| 6. 'Christos' Christodhoulakis.                  | 16. Joannis Xipolitakis.                    |
| 7. Konstantinos Ailamakis.                       | 17. Joannis Gremiakis (Jeremiakis)          |
| 8. Nikolaos Christodhoulakis (brother<br>No. 6). | 18. Emmanoel Tsimitakis.                    |
| 9. Pandelis Gorbadzakis.                         | 19. Konstantinos Scaromariolakis.           |
| 10. Joannis Mavrokoukoulakis.                    | 20. Gregorios Mavrokoukoulakis.             |

*Names of Cretan School-girls at Vori, Crete.*

- |   |                              |
|---|------------------------------|
| 1. Andronike Phortidiades (Epirote—see<br>boy No. 6). | 14. Kallirhoe Makridhakis.   |
| 2. Eirene Nicolitakis.                                | 15. Andronike Amargiolakis.  |
| 3. Ourania Kontsifakis.                               | 16. Kalliope Kapellakis.     |
| 4. Aristeia Zorzakakis.                               | 17. Eugenea Miserlakis.      |
| 5. Katina Papadhakis.                                 | 18. Asymenia Mproulgidhakis. |
| 6. Elene Mpistogianakis.                              | 19. Elene Zorzakakis.        |
| 7. Marianthi Askoxylakis.                             | 20. Evangelia Askoxylakis.   |
| 8. Elene Pitharakis.                                  | 21. Evangelia Dhendhrakis.   |
| 9. Chrysanthi Polydhakis.                             | 22. Kyriakis Xenogianakis.   |
| 10. Pagona Papadhakis.                                | 23. Angelike Frangoulakis.   |
| 11. Chrysanthi Papadhakis.                            | 24. Evangelia Krasadhakis.   |
| 12. Marigo Kardhianis.                                | 25. Elene Makridhakis.       |
| 13. Evangelia Nicolidhakis.                           | 26. Elene Gianakakis.        |

## APPENDIX III.

*Some Remarks on Dr. Duckworth's Report (Appendix II.).*

By CHARLES H. HAWES.

The point I wish to remark upon in Dr. Duckworth's paper is the suggestion that the Venetian occupation of Crete is to be held accountable for the broader heads of the Sitians in Crete.

But before taking this up I should like to mention that, outside of the Venetian question, my large mass of figures in the main bears out Dr. Duckworth's results. To his data for hair-colour, and his remark on the absence of red hair, I may add that out of 2,000 children observed by me, 10 had red hair, and of 2,488 men 11 were red-headed—a proportion of  $\frac{1}{2}$ , and less than  $\frac{1}{2}$  per cent. Also, while the age independence of eye colour compared with hair colour is marked, it is not absolute. I could find no change through the periods of adolescence and maturity save one. Certainly there was no darkening tendency, but rather the opposite, in the case of some dark eyes. This class of eye is perhaps best described as *foncé*; it is bafflingly opaque, and this tempts one to label it black, but no one who has seen the black eye of a Negrito would do so. This eye changes in many cases, not in all, at puberty or before, into a dark-brown or even brown eye.

Turning to the Venetian question, I agree most heartily with Dr. Duckworth that the history of the Venetian occupation of Crete would well repay study, and it is to be regretted that no English student has yet extracted it from the archives of Venice.

<sup>1</sup> Possibly Mavronidhakis.

Dr. Duckworth suggests that the broader heads of the Sitians, as compared with their neighbours of Central Crete, are due to the Venetians and their levies of Dalmatians and Illyrians. I have hinted that this broadening influence may come from Asia Minor.

The best test that we can apply to Dr. Duckworth's theory is to select Cretans of to-day bearing Venetian names, and compare them anthropometrically with the peoples of Venetia, Dalmatia, and Illyria. It is by no means an easy task to decide which are Venetian names under their Cretan disguise; and, again, a name which looks Italian may have a similar derivation in both Greek and Latin. But there are certain well-known Venetian names, such as Cornaro, Dandolo, Dafermo, Modano, Kallergi, Markantonio, and Renero, which may be easily recognised. Examples of others which appear among Cretan cognomens to-day, but which are not so familiar, at any rate in their Cretan dress, are Kavvalos, Maniades, Perakis, Printalos, Saloustros, Soultatos, and Frantzeskos. For many of these I am indebted to Mr. Xanthoudides, the Assistant Ephor of Antiquities at Candia. Perhaps in all I have recognised about 70 different Venetian names. There are possibly more which might yield to a close philological study, and perhaps some additions from these should be made to my totals. Out of a total of 2,298 Cretan men measured throughout Crete by me, 150 bore Venetian names, *i.e.*, 6½ per cent. If we make further additions, I do not think that this figure would exceed 8 per cent. I believe that my figures fully represent the case. Mr. Xanthoudides was good enough to go through the lists of voters of several demes with me, selecting Venetian names, and in comparing the most populous deme I find that my proportion of Venetian names in that deme among the measured is 11½ per cent. more than the proportion among the voters, showing that I had cultivated, or happened upon, the Venetian element. Such a comparatively high percentage will cause surprise when we consider the history of the Venetian occupation, the dislike of the Venetian settlers for a country life among a hostile people continually given to revolution, their desertion of their estates for a city life, a process hastened by the long sieges of Canea and Candia, and the ultimate surrender and withdrawal. If we want to get an idea of the process, we have only to turn to Crete to-day, where we may see it going on, only under a peaceful guise. The Mussulmans, who numbered 73,234 in 1881, had dwindled in 1900 to 33,496, and in 1910 they have probably lost another 50 per cent. In 1881 they occupied farms in the country districts in their thousands, as the census shows. By 1900 these thousands had fled to the seaport towns and to Asia Minor, leaving but a few hundreds in the country regions, mainly within a few hours' ride of Candia. And the steady flight continues; so that, were Crete given up to Greece, there is no doubt that the Mussulmans, though mainly of Cretan blood, would leave but a few hundreds to represent the Turkish occupation of the island.

It is, therefore, somewhat surprising to find, on estimate, that there are perhaps 20,000 out of 300,000 Cretans with Venetian names. The late Dr. Jannaris, the well-known philologist, would admit to me no claims of Cretans to Venetian descent outside of the three or four well-

known families in the cities, and recalling the Cretan fondness for giving nicknames, attributed such names as Venetikos to this habit, the labelling of a native servant with the cognomen of his master's nationality. Mr. Xanthoudides remarked to me that half the names in the Cretan villages were Venetian, but that they meant nothing. The former part of Mr. Xanthoudides' statement was not borne out by reference to the voters' list, *i.e.*, in the names of those over twenty-one years. In the more favourable districts the percentage was 13.

More important for us than these corrections is the consideration that a Venetian name in Crete connotes very little Venetian blood. Nearly nine generations have passed since the Venetians left the island, and their blood must be very thin or bred out by this time, and, what is important to note in this connexion, the national or racial consciousness that would dictate a marriage of Venetian-named with Venetian-named is lost. In the one village in Crete that bears the reputation of being a Venetian colony, Axos, the people were ignorant that they bore Venetian names, and resented the imputation—having, perhaps, a folk-memory of those hard taskmasters, whom their forefathers hated more than the Turks. Those who are sophisticated and well-read among the Venetian-named, such as the local antiquarian and justice of the peace at Vitzari, in Amari, a Siligardi by descent; the scholarly Archimandrite Veneris; the prosperous merchant of Xidhas, Kandherakis, whose great desire to have Lyttos excavated is now to be fulfilled; or the most successful and intelligent carpenter of Candia, Cornaro, can only point to some one far-distant ancestor or to family tradition. Thus, while the years and centuries have gone by, the blood has decreased, and only the names have remained, or even increased with the increase of the population.

But, to turn from general considerations, if we are to attribute, as Dr. Duckworth does, the broadening of the head in Sitia to the Venetian influence, we should expect to find that influence most active and more apparent where the Venetian-named Cretans are thickest. This area is the Deme of Anogeia, in which Axos, with some seven other villages, is situate. Out of 175 names (borne by 992 voters, and representing a population of 4,054), 41 (or 23½ per cent.) are Venetian, and out of 69 measured by me in this deme, 24 (or 35 per cent.) are Venetian in name; an extraordinary average compared with 5½ per cent. for the rest of the island. I may note here that the figures I shall quote for the eparchies take account only of the names recognised as Venetian, and do not include additions for doubtful names. How do these Venetian-named individuals compare in cephalic index with the modern Venetians and their neighbours? The cephalic index of the people of Veneto-Emilia (52,410, quoted by J. Deniker) is 85.1, of Dalmatians (30, by J. Deniker) is 87.0, of Albanians (20, by Pittard) is 83.8. That of the Venetian-named Cretans in their most populous region is 76.7. This figure needs no comment of mine.

Let us turn to Sitia itself, where there are 10½ per cent. of Venetian names. This percentage is not extraordinary, being exceeded by four other eparchies. The average cephalic index for 189 Sitians, including Dr. Duckworth's figures, is 80.9, or nearly 81.0, to be accurate, that of the Sitians bearing Venetian names is 81.3. This suggests the key

to the situation, for we shall find, on comparing the average cephalic index of the Venetian-named and that of the eparchy in which they are located, that in several cases there is close agreement, and most important of all in the grand totals. Where there are variations, they seem to be due to small numbers; and the lowering of the index is more pronounced than the heightening. The following are examples:—

Eparchy	Percentage of the Venetian-named	Cephalic Indices	
		Whole eparchy	Venetian-named
Ierapetra . . . .	8.6	79.6	79.1
Kisamos . . . .	6.8	79.4	79.3
Mylopotamon . . .	22.9	77.9	76.9
Selinon . . . . .	11.6	80.9	77.5

The most important evidence is obtained in the comparison of the totals. The average cephalic index of the 150 Venetian-named individuals, measured throughout Crete by me, is 79.0, which is the exact figure mentioned in my previous paper for the whole of Crete (2,290 individuals).

What is the conclusion to which we are drawn? That the Venetian strain has remained strong and powerful after nine generations without replenishment from the mother country? Scattered through the land, its consciousness of nationality lost, has it not bred out? Where is the Venetian brachycephal or hyper-brachycephal in the most populous of Venetian districts in Crete? What is the dictum of the other eparchies, and what of the whole? They are unaffected by the Venetian element. Where people are dolichocephalic, the Venetian-named among them are dolichocephalic, and where they are mesaticephalic, there the latter are mesaticephalic also.

I need not labour this point. The Venetians are not the determining element, but the determined. Therefore it is that in my report, taking a large view of Cretan ethnology, I treated the Venetian element as negligible.

But what, then, is the cause of the broadening of the head in Sitia? Must we leave it unexplained? I think not. Crete is linked up by the stepping-stones of Karpathos and Rhodes to Asia Minor. Spongedivers from the Asia Minor coast are found off Sitia to-day. Dr. Duckworth mentions the Turks marauding and settling, even during the Venetian occupation, in 1417 and 1471, and no doubt it would be possible to extend these connexions back to Minoan times, when, as Mr. Hogarth found, the little town of Zakro imported from Asia Minor. The connexion is natural and historical, and, for the matter of that, pre-historical.

Has anthropometry anything to confirm this? Let us see.

I have called attention in my previous paper to the fact that the Sitians in the extreme east of Crete, and the Selinots in the extreme west, have the same cephalic index, namely, 80.9, but that there is this difference: that the Selinot is broad-headed and the Sitian is short-headed.

Now, if we turn to Asia Minor, we shall find that it is a region of short-headedness.

For purposes of comparison, as we have a long-headed population in Crete, we will extract the brachycephals of Crete and compare them with peoples in Asia Minor. This gives us 71 brachycephalic Sitians, whose measurements, compared with those of Turks and Tachtadshy (Takh-tadji) of S.W. Asia Minor are as follows:—

—	Number	Head Length	Head Breadth	Cephalic Index
Sitians of Crete . . .	71.	180.1	153.2	85.1
Turks of Asia Minor } (Chantre)	120.	181.0	153.0	84.5
Takhtadji (Petersen } and von Luschan)	13.	178.8	153.2	85.7

Chantre's 297 Armenian men have a cephalic index of 85.5; head-lengths and head-breadths I cannot give, as I write without books of reference by me.

One could hardly demand a closer agreement than with these figures of 120 Turks and 13 Takhtadji, those wild peoples of the marshes and uplands of Asia Minor, who, in the opinion of von Luschan, best represent the prehistoric race of Asia Minor. As we get further away from the Aegean to Lake Van and Russian Armenia, the head is even shorter, but also rather broader (27 Aissori, 22 males and 5 females, are 173 m.m. long and 155 m.m. broad). This may be the result of deformation, but in any case our connexions are naturally nearer at hand.

Now let us try Veneto-Emilia, Dalmatia, and the Illyrian area. [And here I much regret that I am without reference books, and must depend on odd notes.]

The cephalic index of 30 Dalmatians (Deniker) is 87.0, and that of 52,410 inhabitants of Veneto-Emilia is 85.1.

Unfortunately, I cannot give the head-lengths and head-breadths of these, but from 18 Venetian soldiers measured by me I have the following:—

Head Length	Head Breadth	Cephalic Index
185.1	155.2	83.9

and for Pittard's 20 Albanians we have the following:—

Head Length	Head Breadth	Cephalic Index
185.0	155.7	83.8

These figures, which represent not a *short* head but a *broad* head, compare with the Selinots in the western end of Crete, the brachycephals among whom, to the number of 33, have the following:—

Head Length	Head Breadth	Cephalic Index
185.3	157.5	85.0

and I may remind my readers that in my previous reports I have derived this western Cretan brachycephal from the north, and ultimately from Illyria.

It might be thought that with such a notable stature on the part of the Dalmatic and Illyric people, this feature alone ought to settle the whole question. It certainly is more than confirmatory, although one has to be careful in using statistics of stature, a feature which is far less permanent than head form. The Sitian brachycephal has a stature of 1,678 m.m.; the stature of the brachycephalic Takhtadji is 1,679 m.m.; of 287 Armenians (Chantre), 1,680 m.m.; of 18 Armenians from Lake Van, measured by me, 1,678 m.m. That of the Turks varies from 1,710 m.m. (120 measured by Chantre) to 1,670 m.m. (recorded by Elysiëff).

The stature of Albanians awaits further measurements, for Pittard gives the low figure of 1,674 m.m. (for 20 individuals), against mine, 1,777 m.m. for 28 measured in Martino. But we are on safer ground with the Dalmatians (325 individuals), 1,715 m.m., and Montenegrins, 1,711 m.m. These are 33-37 m.m. taller than our Sitians, but approximate to the stature of our brachycephalic Selinots (1,701 m.m.), and their neighbours the Sphakiots (1,710 m.m.).