**Anthropometry of modern Egyptians / by J.I. Craig.**

8

FROM BIOMETRIKA, A JOURNAL FOR THE STATISTICAL STUDY OF BIOLOGICAL PROBLEMS VOL. VIII. NOS. 1 AND 2, JULY, 1911

# ANTHROPOMETRY OF MODERN EGYPTIANS

BY

J. I. CRAIG, M.A., F.R.S.E.


CAMBRIDGE
AT THE UNIVERSITY PRESS

LONDON: FETTER LANE, E.C.
(C. F. CLAY, MANAGER)
AND H. K. LEWIS, GOWER STREET
EDINBURGH: 100, PRINCES STREET
NEW YORK: G. P. PUTNAM'S SONS
BERLIN: A. ASHER AND CO.
LEIPSIC: BROCKHAUS
BOMBAY AND CALCUTTA: MACMILLAN AND CO., LIMITED

Entered at New York Post Office as Second Class Matter

[*From Biometrika, Vol. VIII. Nos.* 1 *and* 2. *July,* 1911.]

# ANTHROPOMETRY OF MODERN EGYPTIANS.

By J. I. CRAIG, M.A., F.R.S.E. Director of the Computation Office, Egyptian Survey Department.

(1) When in 1905 the Egyptian Government decided to raise the level of the Aswan Dam, they determined to make a thorough archaeological survey of the stratum of Nubia that would be affected by the elevation of the water-level when the reservoir was filled to its highest capacity. Although a large amount of work was done by non-official bodies, the chief share was carried out under Government auspices, and the general control of this portion was entrusted to the Director-General of the Survey Department. The services of Professor Elliot Smith, F.R.S., were retained for the investigation of the anatomical finds and he has described the first season's work in a report already published*. The measurements of the skulls and other bones found were made by Professor Elliot Smith or his assistants, Dr Wood Jones and Dr Douglas Derry, and the measurements were handed over to the Computation Office of the Survey Department to be dealt with statistically. At the same time some measurements of skulls from other parts of Egypt were also handed over for reduction.

(2) Professor Elliot Smith fully realized that there would be a considerable gain if the measurements of the various series of skulls could be compared with a modern series, and accordingly by the good offices of Dr Harold Nolan, medico-legal expert to the Egyptian Government, and of Harvey Pasha, Commandant of Police in Cairo, a series of 10,000 measurements of modern Egyptian criminals was obtained from the Anthropometric Bureau, and handed to the writer. These records were taken from the whole collection absolutely at random in the first instance. The original intention was to select from them only the cephalic records pertaining to subjects originating in Nubia and Giza, for comparison with the figures belonging to the ancient skulls, but on the writer representing the benefit that would accrue if all the measurements could be systematically reduced, permission was accorded to apportion a small sum from the budget of the Computation Office to this work. To all these gentlemen the writer desires to present his acknowledgments for their help.

(3) The series of records originally obtained included only thirty from subjects of undoubted Nubian origin, and Monsieur Aupest, Director of the

* *The Archaeological Survey of Nubia*, Vol. II. Cairo, 1910.

Anthropometrical Bureau, kindly searched his collection and sent a further sixty-five.

The series included a few records of women and boys or youths under twenty. Both of these classes were rejected, but this was the only conscious selection operative on the statistics, which therefore deal with adult male Egyptian criminals, or rather adult male Egyptians accused of crime.

It may be objected that criminality is in itself a determinating factor of selection, but the objection does not hold in Egypt. Here it cannot be said that there exists a definite criminal class, and criminals are rather amateurs than professionals. This state of things is in all probability due to the easy conditions under which the lower classes live. There is practically no abject poverty, and but little drunkenness among them, and two of the most frequent incentives to crime are thus eliminated. It is, however, possible that wealth may have acted indirectly as a selecting factor, for it is without doubt still true that the number of witnesses for the defence is sometimes regulated by the depth of the defendant's purse; but in some respects this selection, if it does exist, will result in a distinct gain. The wealthier classes are generally, though not always, of foreign—Turkish, Albanian, Circassian, Tunisian, etc.—descent, while the poorer classes, on the other hand, are mainly autochthonous, but subject to a possible slight admixture with immigrant negro blood in the south and the foreign blood in the north*. It may be concluded, then, that the statistics are representative of the Egyptian and Nubian races with their local variations.

(4) The measurements available are the length and breadth of the head, the stature, the lengths of the left cubit, of the left middle finger and of the left foot. The photograph is not attached, nor are the stigmata noted. Mutilations, including in this term tattoo marks, are common. The cephalic measurements are made in the usual manner. In noting the stature, a sudden, firm pressure is exerted on the abdomen, with the result that the subject draws himself slightly more erect, and it should be mentioned that all the measurements are taken between the hours of 9 a.m. and 12 noon, so that the stature has not undergone the diminution to which it is subject later in the day. When the lengths of the cubit and foot are being determined, the body is thrown forward, so that the weight is supported almost entirely by the left arm and flexed left leg.

(5) One of the largest collections of anthropometrical statistics relating to Egypt is that made by Professor C. S. Myers† from the measurements of Egyptian soldiers, but this collection can hardly be described as a random sample of the population. The recruits are selected from a large number for physique, including

* Incidentally it may be mentioned that there is an opinion prevalent in Egypt that foreigners cannot settle in the country, but die out gradually. I am not aware that any statistics have been published bearing on this question, but the crude material for a discussion of the fertility of the Northern races in Egypt would be available if access could be obtained to the various consular registers. The results of such an investigation could not fail to be of considerable anthropogeographical interest.

† *Journ. Anthrop. Inst.* xxxvi. (1906), p. 237.

stature and chest measurement as the chief factors. The statistics here discussed show that, for natives of Alexandria at least, there is a positive correlation of $0{\cdot}112 \pm 0{\cdot}022$ between stature and cephalic index (which might be expected to be independent of stature*) on 643 subjects†. If we may extend this result to the rest of Egypt proper, it follows of course that Professor Myers' series, although not primarily selected by cephalic index, are still so selected to the extent implied in the above coefficient of correlation. The evaluation of the correlations for other parts of the country will form the subject of a later investigation. A further selection was made by rejection of the Copts from his statistics‡, and also by eliminating those subjects whose parents were natives of different mudirias (provinces), but this last procedure is probably not altogether objectionable, since it tends to assure homogeneity of the material.

(6) The arrangement of the subjects of the present paper into classes according to place of origin has been made by birthplace without reference to the origin of the parents, on which no information is available, and it becomes necessary to consider to what extent migration may have affected the figures.

The statistics resulting from the census of 1907 show that, while there is a large influx from the provinces into the towns, there is but little inter-migration between the provinces themselves. Thus out of a total native male population of 306,000 in Cairo, 105,000 (341 per thousand) were born outside the city, and of these 8,700 (28·6 per thousand) came from Girga, one of the most active centres of emigration; but for Qaliubia, a province which lies just to the north of Cairo, the figures give 15,000 (75 per thousand) male immigrants out of a total native male population of 201,000, and of these only 760 (3·8 per thousand) came from Girga. Railway statistics for Egypt show that the number of third-class passengers has increased very considerably in recent years, from which we may reasonably conclude that migration also has increased, so that the figures given above may be considered as an upper limit. In the provinces therefore, migration is so small that its effects (except possibly when integrated through long intervals) may be neglected. Where the influence is appreciable, as in the towns, it will tend to produce a recession towards the general mean of the population.

(7) *Reduction of the Cephalic Index*§ *to the Cranial Index.* The primary object of this paper was to give data for the comparison of the modern Egyptian

* [Stature and cephalic index correlation $= -{\cdot}08 \pm {\cdot}02$ for Cambridge Undergraduates, $= -{\cdot}13$ for Oxford Undergraduates (see *Biometrika*, Vol. VIII. p. 51), and the interracial correlation between stature and cephalic index was found by Tschepourkowsky from two different series to be $-{\cdot}18$ and $-{\cdot}22$ respectively (*Biometrika*, Vol. IV. p. 288). It has usually been supposed that there is a small *negative* correlation between stature and cephalic index, due to the fact that the taller races are more dolichocephalic. EDITOR.]

† Since this was written the coefficient of correlation for stature and cephalic index in Nubia has been found to be $-0{\cdot}237 \pm 0{\cdot}065$.

‡ Since this was written the differences between Copts and Moslems in the present statistics have been found to be very small.

§ Throughout this paper "cephalic index" will be employed to refer to the measures on the head over the flesh, and "cranial index" to refer to measures on the skull.

people with the ancient Egyptians, and it is accordingly necessary to consider how far this is possible.

Deniker* says: "La mesure principale, l'indice céphalique, ne paraît pas toujours correspondre sur le crâne et sur le vivant. A priori la tête à l'état vivant devrait avoir un indice un peu plus fort que la crâne, les muscles de la région temporale étant plus épais que ceux de la région sus-occipitale et frontale; cependant, les expériences faites à ce sujet sont contradictoires. D'après Broca il faut soustraire deux unités à l'indice pris sur le vivant pour obtenir l'indice sur le crâne; c'est encore l'opinion de MM. Stieda et Houzé, et d'un grand nombre d'anthropologistes, tandis que MM. Mantegazza et Weisbach préconisent la réduction de trois unités; Virchow et Topinard n'en admettent aucune..... Cependant d'une façon générale on peut admettre la différence de deux unités entre les indices du crâne et du vivant."

(8) It is reasonable to expect that there may exist a correlation between the shape of the head and that of the skull, and on certain assumptions the correlation may be demonstrated.

Let $l$, $b$, be the length and breadth respectively of the head;

$\lambda, \beta$, the amounts to be subtracted from the length and breadth to obtain these measurements for the skull;

$y$, $x$, the cranial and cephalic indices respectively.

Then by definition

$$x = 100b/l, \quad \text{and} \quad y = 100\,(b-\beta)/(l-\lambda) = (100b/l) \times (1-\beta/b)/(1-\lambda/l).$$

Since the magnitudes of $\beta/b$ and of $\lambda/l$ are of the order of 8·5/144 and 7/190 respectively, we may write this equation:—

$$y = x\,(1-\beta/b+\lambda/l) - \text{other terms}.$$

The other terms will be small, and may be allowed for by assigning a mean value, so that the equation becomes

$$y = mx - c,$$

where

$$m = 1-\beta/b+\lambda/l.$$

The ratio of $\beta/b$ is in general greater than that of $\lambda/l$, so that $m$ is a fraction slightly less than unity. In Egyptian bodies, Dr Douglas Derry has found that $\beta = 8{\cdot}5$, $\lambda = 7$, $b =$ about 144 and $l = 191$†. Hence in this case $m = 0{\cdot}976$ approximately, and the reduction is about $0{\cdot}024x$ or about two units.

(9) Since this theoretical reasoning suggests that the formula $y = mx - c$ is capable of giving results not inconsistent with practice, I have assumed its truth, and have used it to find average values of $m$ and $c$. Deniker‡ has given 43 cases

* *Races et peuples de la terre* (Paris, 1900), p. 86.

† Elliot Smith, *loc. cit.* p. 25. [Dr Derry's results seem rather smaller than those for Europeans: see Lee and Pearson, *Phil. Trans.* Vol. 196, A, 1901, p. 250 *et seq.* Cf. Gladstone on post-mortem cases, *Biometrika*, Vol. IV. p. 110 *et seq.*, however. EDITOR.]

‡ *Loc. cit.* pp. 667 *et seq.*

where both cranial and cephalic indices have been found for the same race. The means are in general of different weights for the two indices, but no attention was paid to the difference, and equal weights were assumed.

The coefficient of correlation between the indices is $+0{\cdot}818 \pm 0{\cdot}034$. The mean cephalic index is 80·90 and the mean cranial index 78·32; the respective standard deviations are 3·663 and 4·282 (so that skulls are more variable than living heads), and the equation to the line of regression is:

$$\Delta\alpha_s = 0{\cdot}9562\Delta\alpha_h,$$

where $\Delta\alpha_s$ and $\Delta\alpha_h$ are the deviations of the cranial and cephalic indices respectively from their means.

The equation may be written also in the form:

$$\alpha_s = 0{\cdot}9562\alpha_h + 0{\cdot}96,$$

which, it will be noticed, does not altogether agree with the form of that obtained from the above theory, since the absolute term differs in sign.

The amount to be subtracted from the cephalic index is $(\alpha_h - \alpha_s)$, or $0{\cdot}0438\alpha_h - 0{\cdot}96$, an expression which gives the following corrections:

| $\alpha_h = 60$ | $-(\alpha_h - \alpha_s) = -1{\cdot}67$ |
|---|---|
| 70 | $-2{\cdot}11$ |
| 80 | $-2{\cdot}54$ |
| 90 | $-2{\cdot}88.$ |

For average skulls, therefore, the resulting correction has a value intermediate between those mentioned by Deniker.

(10) The accompanying figure exhibits the general dependence of the one index on the other, and had a few outlying discrepant cases—mostly of small weight—been rejected, the general agreement would have been more marked.

The conclusion is that we may reduce the mean cephalic index by subtracting 2·5 units on the average*.

(11) The material has been classified by mudirias (provinces), and governorships (large towns), and with the original purpose for which the work was undertaken in mind, I have subdivided the subjects from Aswan mudiria into those from Aswan Town, those born north of the town, and those born to the south of it, who may be considered as Nubians proper. The population of Aswan Town is very heterogeneous, and besides a large number of Nubians there are many Egyptians, and a greater proportion of Sudanese than in any other town. The effect of this heterogeneity is manifested in the relative greatness of the coefficient of variation which is the greatest in all the tables except the first (i.e. that of head length).

* [This is not really applicable to the case of the *individual* head; it is an interracial and not an intraracial result. Editor.] An investigation of the intraracial correspondence is in progress at the School of Medicine, Cairo.

The people of Daqahlia, Qaliubia, and especially Sharqia, are generally considered to have a considerable strain of Arab (Bedawi) blood. The Fayum, which is the most isolated portion of the country, was colonized by Macedonian and other Greeks in Ptolemaic times: it is for anthropologists to say whether the dolichocephaly of that province is the result of this foreign colonization, or is due to the isolation of the province and the freedom of the inhabitants from admixture.

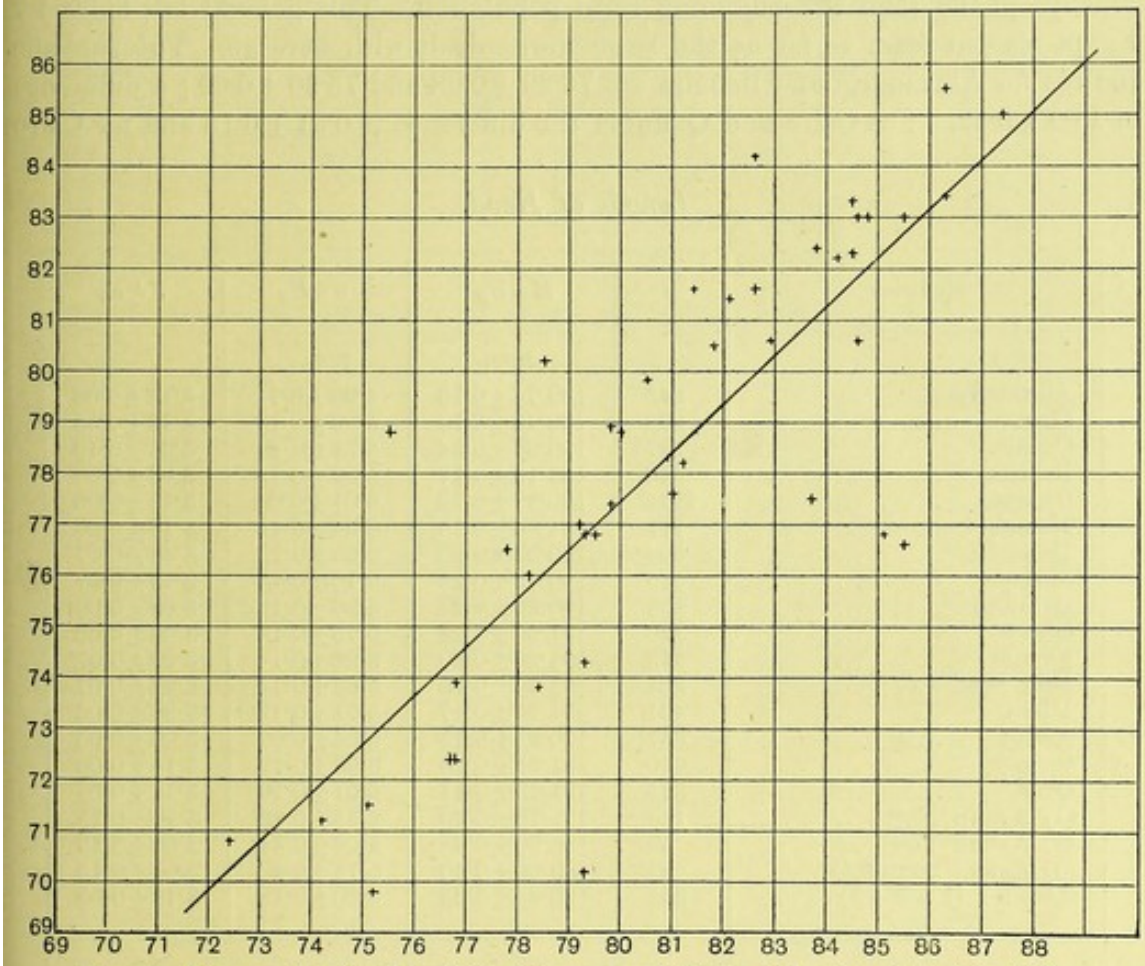


Fig. 1. Diagram showing the relation between cranial index ($a_s$) and cephalic index ($a_h$).
$a_s = 0{\cdot}9562 a_h + 0{\cdot}96$.

(12) For purposes of computation, the material was classified into arrays with intervals selected so that the whole of the population of each mudiria would fall into from 12 to 20 arrays. In the case of the two smaller groups of 52 and 95 from Aswan, the means, etc., were derived from the expanded and not the condensed statistics. To ensure the accuracy of the arithmetic, all means, standard deviations and correlations have been computed twice with independent bases, which generally differed by the unit of one array. The extra labour has, of course, been considerable, but the gain in certainty warrants it.

(13) The tables are self-explanatory. $n$ is the number of subjects in each district; $M$ is the mean; $\sigma$ the standard deviation; $V$ the coefficient of variation; $E_M$, $E_\sigma$ and $E_V$ the respective probable errors of these quantities.

In what follows, a difference between two similar quantities will be considered significant if it exceeds thrice the probable error of the difference. (The odds against the chance occurrence of such an event are 22 to 1.)

(14) The following inferences may be of interest:

1. It has been stated* that an urban population is, in general, more brachycephalic than the adjoining rural population. This general law holds for Egypt also, at least as far as the large towns dealt with here go. The cephalic indices for Alexandria and Beheira are $76{\cdot}29 \pm 0{\cdot}08$ and $75{\cdot}20 \pm 0{\cdot}09$; a difference of $1{\cdot}09 \pm 0{\cdot}12$. For Cairo and Qaliubia the difference is $0{\cdot}51 \pm 0{\cdot}13$ and for Cairo

*Length of Head.*

| Mudirias | $n$ | $M \pm E_M$ | $\sigma \pm E_\sigma$ | $V \pm E_V$ |
|---|---|---|---|---|
| | | mm. | mm. | |
| Alexandria ... ... ... | 643 | $189{\cdot}74 \pm 0{\cdot}16$ | $5{\cdot}99 \pm 0{\cdot}11$ | $3{\cdot}16 \pm 0{\cdot}06$ |
| Cairo ... ... ... | 802 | $190{\cdot}46 \pm 0{\cdot}14$ | $5{\cdot}96 \pm 0{\cdot}10$ | $3{\cdot}13 \pm 0{\cdot}05$ |
| Canal ... ... ... | 127 | $190{\cdot}61 \pm 0{\cdot}34$ | $5{\cdot}74 \pm 0{\cdot}24$ | $3{\cdot}01 \pm 0{\cdot}13$ |
| Beheira ... ... ... | 526 | $191{\cdot}18 \pm 0{\cdot}17$ | $5{\cdot}89 \pm 0{\cdot}12$ | $3{\cdot}08 \pm 0{\cdot}06$ |
| Gharbia ... ... ... | 1104 | $190{\cdot}97 \pm 0{\cdot}12$ | $6{\cdot}01 \pm 0{\cdot}09$ | $3{\cdot}15 \pm 0{\cdot}05$ |
| Menufia ... ... ... | 717 | $191{\cdot}06 \pm 0{\cdot}15$ | $6{\cdot}04 \pm 0{\cdot}11$ | $3{\cdot}16 \pm 0{\cdot}06$ |
| Daqahlia ... ... ... | 504 | $190{\cdot}35 \pm 0{\cdot}20$ | $6{\cdot}65 \pm 0{\cdot}14$ | $3{\cdot}49 \pm 0{\cdot}07$ |
| Sharqia ... ... ... | 515 | $190{\cdot}79 \pm 0{\cdot}18$ | $6{\cdot}16 \pm 0{\cdot}13$ | $3{\cdot}23 \pm 0{\cdot}07$ |
| Qaliubia ... ... ... | 295 | $190{\cdot}82 \pm 0{\cdot}23$ | $5{\cdot}90 \pm 0{\cdot}16$ | $3{\cdot}09 \pm 0{\cdot}09$ |
| Giza[a] ... ... ... | 326 | $191{\cdot}66 \pm 0{\cdot}22$ | $5{\cdot}75 \pm 0{\cdot}15$ | $3{\cdot}00 \pm 0{\cdot}08$ |
| Fayum ... ... ... | 413 | $191{\cdot}20 \pm 0{\cdot}20$ | $5{\cdot}92 \pm 0{\cdot}14$ | $3{\cdot}09 \pm 0{\cdot}07$ |
| Beni Suef ... ... ... | 384 | $191{\cdot}70 \pm 0{\cdot}19$ | $5{\cdot}65 \pm 0{\cdot}14$ | $2{\cdot}95 \pm 0{\cdot}07$ |
| Minia ... ... ... | 491 | $191{\cdot}73 \pm 0{\cdot}17$ | $5{\cdot}71 \pm 0{\cdot}12$ | $2{\cdot}98 \pm 0{\cdot}06$ |
| Assiut ... ... ... | 887 | $190{\cdot}91 \pm 0{\cdot}13$ | $5{\cdot}84 \pm 0{\cdot}09$ | $3{\cdot}06 \pm 0{\cdot}05$ |
| Girga[b] ... ... ... | 610 | $191{\cdot}51 \pm 0{\cdot}16$ | $6{\cdot}03 \pm 0{\cdot}12$ | $3{\cdot}15 \pm 0{\cdot}06$ |
| Qena ... ... ... | 824 | $191{\cdot}19 \pm 0{\cdot}14$ | $6{\cdot}01 \pm 0{\cdot}10$ | $3{\cdot}15 \pm 0{\cdot}05$ |
| (1) Aswan North ... ... | 115 | $191{\cdot}78 \pm 0{\cdot}40$ | $6{\cdot}32 \pm 0{\cdot}28$ | $3{\cdot}30 \pm 0{\cdot}15$ |
| (2) Aswan Town ... ... | 52 | $188{\cdot}90 \pm 0{\cdot}48$ | $5{\cdot}09 \pm 0{\cdot}34$ | $2{\cdot}69 \pm 0{\cdot}19$ |
| (3) Aswan South[c, d, e] ... | 95 | $189{\cdot}66 \pm 0{\cdot}40$ | $5{\cdot}71 \pm 0{\cdot}28$ | $3{\cdot}01 \pm 0{\cdot}15$ |
| Aswan: (1 + 2 + 3) ... | 262 | $190{\cdot}44 \pm 0{\cdot}25$ | $6{\cdot}00 \pm 0{\cdot}18$ | $3{\cdot}15 \pm 0{\cdot}09$ |
| *Skull Measurements.* | | | | |
| [a] Necropolis, close to Great Pyramid, 8 miles from Cairo, about 3500 B.C. | 128 | $184{\cdot}02 \pm 0{\cdot}32$ | $5{\cdot}41 \pm 0{\cdot}23$ | $2{\cdot}94 \pm 0{\cdot}12$ |
| [b] Predynastic, from Naga ed-Deir, 100 miles north of Thebes, about 5000 B.C. | 50 | $183{\cdot}26 \pm 0{\cdot}50$ | $5{\cdot}20 \pm 0{\cdot}35$ | $2{\cdot}84 \pm 0{\cdot}19$ |
| [c] From Pits at Shellal, east bank of river, 1st cataract, about 1500 B.C. | 111 | $184{\cdot}69 \pm 0{\cdot}92$ | $6{\cdot}52 \pm 0{\cdot}65$ | $3{\cdot}53 \pm 0{\cdot}35$ |
| [d] Nubians, both sides river, as far as 60 miles south of Aswan, about 2000 B.C. | 41 | $182{\cdot}32 \pm 0{\cdot}56$ | $5{\cdot}30 \pm 0{\cdot}40$ | $2{\cdot}91 \pm 0{\cdot}22$ |
| [e] Island of Biga, south of 1st cataract, Christian cemetery, 4th–7th century A.D. | 81 | $182{\cdot}90 \pm 0{\cdot}46$ | $6{\cdot}08 \pm 0{\cdot}32$ | $3{\cdot}32 \pm 0{\cdot}18$ |

* Pearson, *Chances of Death*, Vol. I, p. 288.

*Breadth of Head.*

| Mudirias | $n$ | $M \pm E_M$ | $\sigma \pm E_\sigma$ | $V \pm E_V$ |
|---|---|---|---|---|
| | | mm. | mm. | |
| Alexandria ... ... ... | 643 | 144·66 ± 0·13 | 5·00 ± 0·09 | 3·46 ± 0·07 |
| Cairo ... ... ... | 799 | 144·43 ± 0·11 | 4·72 ± 0·08 | 3·27 ± 0·06 |
| Canal ... ... ... | 127 | 145·13 ± 0·34 | 5·59 ± 0·24 | 3·85 ± 0·16 |
| Beheira ... ... ... | 526 | 143·61 ± 0·14 | 4·64 ± 0·10 | 3·23 ± 0·07 |
| Gharbia ... ... ... | 1104 | 143·53 ± 0·10 | 4·85 ± 0·07 | 3·38 ± 0·05 |
| Menufia ... ... ... | 717 | 143·56 ± 0·12 | 4·63 ± 0·08 | 3·22 ± 0·06 |
| Daqahlia ... ... ... | 504 | 143·99 ± 0·15 | 4·87 ± 0·10 | 3·38 ± 0·07 |
| Sharqia ... ... ... | 516 | 143·63 ± 0·14 | 4·85 ± 0·10 | 3·37 ± 0·07 |
| Qaliubia ... ... ... | 295 | 143·71 ± 0·19 | 4·78 ± 0·13 | 3·33 ± 0·09 |
| Giza[a] ... ... ... | 326 | 143·16 ± 0·17 | 4·63 ± 0·12 | 3·24 ± 0·09 |
| Fayum ... ... ... | 413 | 141·85 ± 0·16 | 4·75 ± 0·11 | 3·35 ± 0·08 |
| Beni Suef ... ... ... | 384 | 142·69 ± 0·17 | 4·88 ± 0·12 | 3·42 ± 0·08 |
| Minia ... ... ... | 491 | 142·61 ± 0·14 | 4·55 ± 0·10 | 3·19 ± 0·07 |
| Assiut ... ... ... | 887 | 142·52 ± 0·10 | 4·43 ± 0·07 | 3·04 ± 0 05 |
| Girga[b] ... ... ... | 610 | 142·28 ± 0·12 | 4·40 ± 0·08 | 3·09 ± 0·06 |
| Qena ... ... ... | 824 | 142·32 ± 0·11 | 4·75 ± 0·08 | 3·34 ± 0·06 |
| (1) Aswan North ... ... | 115 | 143·98 ± 0·30 | 4·77 ± 0·21 | 3·32 ± 0·15 |
| (2) Aswan Town ... ... | 52 | 143·48 ± 0·55 | 5·91 ± 0·39 | 4·12 ± 0·27 |
| (3) Aswan South[c, d, e] ... | 95 | 145·16 ± 0·35 | 5·10 ± 0·25 | 3·51 ± 0·17 |
| Aswan : (1 + 2 + 3) ... | 262 | 144·31 ± 0·22 | 5·18 ± 0·15 | 3·59 ± 0·11 |
| ♂ *Skull Measurements.* | | | | |
| [a] (as above) ... ... | 128 | 139·02 ± 0·30 | 5·09 ± 0·21 | 3·66 ± 0·15 |
| [b] ( „ ) ... ... | 50 | 128·76 ± 0·38 | 3·97 ± 0·27 | 3·08 ± 0·21 |
| [c] ( „ ) ... ... | 110 | 135·41 ± 0·30 | 4·70 ± 0·21 | 3·47 ± 0·16 |
| [d] ( „ ) ... ... | 41 | 132·93 ± 0·46 | 4·39 ± 0·33 | 3·30 ± 0·25 |
| [e] ( „ ) ... ... | 81 | 138·04 ± 0·46 | 6·08 ± 0·32 | 4·40 ± 0·23 |

*Left Middle Finger.*

| Mudirias | $n$ | $M \pm E_M$ | $\sigma \pm E_\sigma$ | $V \pm E_V$ |
|---|---|---|---|---|
| | | mm. | mm. | |
| Alexandria ... ... | 643 | 115·56 ± 0·15 | 5·61 ± 0·11 | 4·86 ± 0·09 |
| Cairo ... ... ... | 802 | 114·07 ± 0·15 | 6·13 ± 0·10 | 5·37 ± 0·09 |
| Canal ... ... ... | 127 | 113·59 ± 0·34 | 5·72 ± 0·24 | 5·03 ± 0·21 |
| Beheira ... ... ... | 525 | 115·84 ± 0·17 | 5·85 ± 0·12 | 5·05 ± 0·11 |
| Gharbia ... ... .. | 1104 | 115·23 ± 0·12 | 6·04 ± 0·09 | 5·24 ± 0·08 |
| Menufia ... ... ... | 716 | 115·06 ± 0·15 | 5·79 ± 0·10 | 5·03 ± 0·09 |
| Daqahlia ... ... ... | 504 | 115·66 ± 0·17 | 5·79 ± 0·12 | 5·01 ± 0·11 |
| Sharqia ... ... ... | 516 | 115·16 ± 0·18 | 6·19 ± 0·13 | 5·37 ± 0·11 |
| Qaliubia ... ... ... | 295 | 115·86 ± 0·25 | 6·32 ± 0·18 | 5·45 ± 0·15 |
| Giza... ... ... ... | 326 | 115·89 ± 0·21 | 5·55 ± 0·15 | 4·79 ± 0·13 |
| Fayum ... ... ... | 413 | 115·19 ± 0·18 | 5·57 ± 0·13 | 4·82 ± 0·11 |
| Beni Suef ... ... ... | 384 | 115·57 ± 0·20 | 5·68 ± 0·14 | 4·92 ± 0·12 |
| Minia ... ... ... | 491 | 116·13 ± 0·18 | 5·90 ± 0·13 | 5·08 ± 0·11 |
| Assiut ... ... ... | 887 | 116·23 ± 0·13 | 5·78 ± 0·09 | 4·97 ± 0·08 |
| Girga ... ... ... | 610 | 116·63 ± 0·16 | 5·70 ± 0·11 | 4·88 ± 0 09 |
| Qena ... ... ... | 823 | 115·85 ± 0·14 | 5·76 ± 0·10 | 4·97 ± 0·08 |
| (1) Aswan North ... ... | 115 | 117·57 ± 0·40 | 6·36 ± 0·28 | 5·41 ± 0·24 |
| (2) Aswan Town ... ... | 52 | 114·44 ± 0·65 | 6·99 ± 0·46 | 6·11 ± 0·40 |
| (3) Aswan South ... ... | 95 | 115·74 ± 0·46 | 6·58 ± 0·32 | 5·68 ± 0·28 |
| Aswan : (1 + 2 + 3) ... | 262 | 116·29 ± 0·28 | 6·68 ± 0·20 | 5·75 ± 0·17 |

*Left Foot.*

| Mudirias | $n$ | $M \pm E_M$ | $\sigma \pm E_\sigma$ | $V \pm E_V$ |
|---|---|---|---|---|
| | | mm. | mm. | |
| Alexandria ... ... ... | 643 | 261·49 ± 0·31 | 11·75 ± 0·22 | 4·50 ± 0·08 |
| Cairo ... ... ... | 802 | 257·67 ± 0·30 | 12·40 ± 0·21 | 4·81 ± 0·08 |
| Canal ... ... ... | 127 | 258·38 ± 0·78 | 13·10 ± 0·55 | 5·07 ± 0·21 |
| Beheira ... ... ... | 525 | 261·21 ± 0·36 | 12·14 ± 0·25 | 4·65 ± 0·10 |
| Gharbia ... ... ... | 1104 | 259·16 ± 0·25 | 12·43 ± 0·18 | 4·80 ± 0·07 |
| Menufia ... ... ... | 717 | 258·33 ± 0·32 | 12·67 ± 0·23 | 4·91 ± 0·09 |
| Daqahlia ... ... ... | 504 | 260·20 ± 0·37 | 12·22 ± 0·26 | 4·69 ± 0·10 |
| Sharqia ... ... ... | 516 | 258·69 ± 0·37 | 12·62 ± 0·26 | 4·88 ± 0·10 |
| Qaliubia ... ... ... | 295 | 260·38 ± 0·51 | 12·96 ± 0·36 | 4·98 ± 0·14 |
| Giza ... ... ... | 326 | 259·96 ± 0·44 | 11·91 ± 0·31 | 4·58 ± 0·12 |
| Fayum ... ... ... | 413 | 259·13 ± 0·39 | 11·74 ± 0·28 | 4·53 ± 0·11 |
| Beni Suef ... ... ... | 384 | 258·71 ± 0·42 | 12·29 ± 0·30 | 4·75 ± 0·12 |
| Minia ... ... ... | 491 | 259·55 ± 0·37 | 12·10 ± 0·26 | 4·66 ± 0·10 |
| Assiut ... ... ... | 887 | 259·87 ± 0·27 | 11·83 ± 0·19 | 4·55 ± 0·07 |
| Girga ... ... ... | 610 | 261·53 ± 0·32 | 11·84 ± 0·23 | 4·53 ± 0·09 |
| Qena ... ... ... | 824 | 259·65 ± 0·28 | 11·99 ± 0·20 | 4·62 ± 0·08 |
| (1) Aswan North ... ... | 115 | 262·36 ± 0·81 | 12·92 ± 0·58 | 4·92 ± 0·22 |
| (2) Aswan Town ... ... | 52 | 255·17 ± 1·38 | 14·78 ± 0·98 | 5·79 ± 0·38 |
| (3) Aswan South ... ... | 95 | 258·55 ± 0·93 | 13·44 ± 0·66 | 5·20 ± 0·25 |
| Aswan : (1+2+3) ... | 262 | 259·55 ± 0·57 | 13·78 ± 0·41 | 5·31 ± 0·16 |

*Left Cubit.*

| Mudirias | $n$ | $M \pm E_M$ | $\sigma \pm E_\sigma$ | $V \pm E_V$ |
|---|---|---|---|---|
| | | mm. | mm. | |
| Alexandria ... ... | 643 | 462·05 ± 0·54 | 20·26 ± 0·38 | 4·39 ± 0·08 |
| Cairo ... ... ... | 802 | 457·52 ± 0·51 | 21·52 ± 0·36 | 4·70 ± 0·08 |
| Canal ... ... ... | 127 | 458·97 ± 1·22 | 20·41 ± 0·86 | 4·44 ± 0·19 |
| Beheira ... ... ... | 525 | 468·57 ± 0·62 | 21·08 ± 0·44 | 4·50 ± 0·09 |
| Gharbia ... ... ... | 1104 | 465·38 ± 0·44 | 21·49 ± 0·31 | 4·62 ± 0·07 |
| Menufia ... ... ... | 717 | 466·45 ± 0·55 | 21·73 ± 0·39 | 4·66 ± 0·08 |
| Daqahlia ... ... ... | 504 | 467·21 ± 0·63 | 21·14 ± 0·45 | 4·52 ± 0·10 |
| Sharqia ... ... ... | 516 | 468·10 ± 0·64 | 21·64 ± 0·45 | 4·62 ± 0·10 |
| Qaliubia ... ... ... | 295 | 467·72 ± 0·84 | 21·32 ± 0·59 | 4·56 ± 0·13 |
| Giza... ... ... ... | 326 | 470·42 ± 0·79 | 21·23 ± 0·56 | 4·51 ± 0·12 |
| Fayum ... ... ... | 413 | 469·25 ± 0·70 | 21·18 ± 0·50 | 4·51 ± 0·11 |
| Beni Suef ... ... ... | 384 | 467·54 ± 0·74 | 21·39 ± 0·52 | 4·58 ± 0·11 |
| Minia ... ... ... | 491 | 470·00 ± 0·67 | 22·12 ± 0·48 | 4·70 ± 0·10 |
| Assiut ... ... ... | 887 | 472·58 ± 0·50 | 21·89 ± 0·35 | 4·63 ± 0·07 |
| Girga ... ... ... | 610 | 474·29 ± 0·58 | 21·17 ± 0·41 | 4·46 ± 0·09 |
| Qena ... ... ... | 824 | 474·96 ± 0·51 | 21·77 ± 0·36 | 4·58 ± 0·08 |
| (1) Aswan North ... ... | 115 | 479·50 ± 1·45 | 23·04 ± 1·02 | 4·80 ± 0·21 |
| (2) Aswan Town ... ... | 52 | 464·48 ± 2·59 | 27·73 ± 1·83 | 5·96 ± 0·39 |
| (3) Aswan South ... ... | 95 | 468·86 ± 1·86 | 26·94 ± 1·32 | 5·75 ± 0·28 |
| Aswan : (1+2+3) ... | 262 | 472·66 ± 1·09 | 26·23 ± 0·77 | 5·55 ± 0·16 |

*Stature.*

| Mudirias | $n$ | $M \pm E_M$ | $\sigma \pm E_\sigma$ | $V \pm E_V$ |
|---|---|---|---|---|
| | | cm. | cm. | |
| Alexandria ... ... ... | 643 | 166·62 ± 0·16 | 5·97 ± 0·11 | 3·59 ± 0·07 |
| Cairo ... ... ... | 802 | 165·79 ± 0·14 | 6·03 ± 0·10 | 3·64 ± 0·06 |
| Canal ... ... ... | 127 | 165·87 ± 0·32 | 5·42 ± 0·23 | 3·26 ± 0·14 |
| Beheira ... ... ... | 525 | 167·68 ± 0·17 | 5·74 ± 0·12 | 3·42 ± 0·07 |
| Gharbia ... ... ... | 1105 | 167·33 ± 0·12 | 5·94 ± 0·09 | 3·55 ± 0·05 |
| Menufia ... ... ... | 718 | 167·70 ± 0·16 | 6·25 ± 0·11 | 3·73 ± 0·07 |
| Daqahlia ... ... ... | 504 | 166·06 ± 0·18 | 6·00 ± 0·13 | 3·61 ± 0·08 |
| Sharqia ... ... ... | 516 | 165·54 ± 0·19 | 6·33 ± 0·13 | 3·82 ± 0·08 |
| Qaliubia ... ... ... | 295 | 166·24 ± 0·25 | 6·31 ± 0·18 | 3·80 ± 0·10 |
| Giza... ... ... ... | 326 | 167·80 ± 0·22 | 5·88 ± 0·16 | 3·50 ± 0·09 |
| Fayum ... ... ... | 413 | 167·20 ± 0·20 | 5·92 ± 0·14 | 3·54 ± 0·08 |
| Beni Suef ... ... ... | 384 | 166·23 ± 0·20 | 5·91 ± 0·14 | 3·55 ± 0·09 |
| Minia ... ... ... | 491 | 166·97 ± 0·17 | 5·66 ± 0·12 | 3·39 ± 0·07 |
| Assiut ... ... ... | 889 | 166·89 ± 0·14 | 6·03 ± 0·10 | 3·62 ± 0·06 |
| Girga ... ... ... | 610 | 167·77 ± 0·16 | 5·92 ± 0·11 | 3·53 ± 0·07 |
| Qena ... ... ... | 824 | 167·80 ± 0·14 | 5·90 ± 0·10 | 3·52 ± 0·06 |
| (1) Aswan North ... ... | 115 | 168·33 ± 0·39 | 6·23 ± 0·28 | 3·70 ± 0·16 |
| (2) Aswan Town ... ... | 52 | 163·64 ± 0·84 | 8·97 ± 0·59 | 5·48 ± 0·36 |
| (3) Aswan South ... ... | 95 | 165·06 ± 0·48 | 6·94 ± 0·34 | 4·21 ± 0·21 |
| Aswan : (1+2+3) ... | 262 | 166·21 ± 0·31 | 7·36 ± 0·22 | 4·43 ± 0·13 |

*Cephalic Index.*

| Mudirias | $n$ | $M \pm E_M$ | $\sigma \pm E_\sigma$ | $V \pm E_V$ |
|---|---|---|---|---|
| | | mm. | mm. | |
| Alexandria ... ... ... | 643 | 76·29 ± 0·08 | 3·13 ± 0·06 | 4·10 ± 0·08 |
| Cairo ... ... ... | 799 | 75·87 ± 0·07 | 2·95 ± 0·05 | 3·89 ± 0·07 |
| Canal ... ... ... | 127 | 76·18 ± 0·18 | 3·05 ± 0·13 | 4·01 ± 0·17 |
| Beheira ... ... ... | 526 | 75·20 ± 0·09 | 3·04 ± 0·06 | 4·04 ± 0·08 |
| Gharbia ... ... ... | 1104 | 75·22 ± 0·06 | 2·91 ± 0·04 | 3·86 ± 0·06 |
| Menufia ... ... ... | 717 | 75·21 ± 0·08 | 3·02 ± 0·05 | 4·02 ± 0·07 |
| Daqahlia ... ... ... | 504 | 75·69 ± 0·10 | 3·29 ± 0·07 | 4·35 ± 0·09 |
| Sharqia ... ... ... | 515 | 75·39 ± 0·09 | 3·09 ± 0·06 | 4·10 ± 0·09 |
| Qaliubia ... ... ... | 295 | 75·36 ± 0·11 | 2·85 ± 0·08 | 3·78 ± 0·10 |
| Giza[a] ... ... ... | 326 | 74·75 ± 0·11 | 2·83 ± 0·08 | 3·79 ± 0·10 |
| Fayum ... ... ... | 413 | 74·24 ± 0·08 | 2·27 ± 0·05 | 3·06 ± 0·07 |
| Beni Suef ... ... ... | 384 | 74·47 ± 0·10 | 2·98 ± 0·07 | 4·00 ± 0·10 |
| Minia ... ... ... | 491 | 74·46 ± 0·09 | 2·83 ± 0·06 | 3·80 ± 0·08 |
| Assiut ... ... ... | 887 | 74·70 ± 0·06 | 2·74 ± 0·04 | 3·67 ± 0·06 |
| Girga[b] ... ... ... | 610 | 74·38 ± 0·08 | 2·84 ± 0·05 | 3·82 ± 0·07 |
| Qena ... ... ... | 824 | 74·48 ± 0·07 | 2·85 ± 0·05 | 3·83 ± 0·06 |
| (1) Aswan North ... ... | 115 | 75·14 ± 0·20 | 3·15 ± 0·14 | 4·19 ± 0·19 |
| (2) Aswan Town ... ... | 52 | 75·99 ± 0·31 | 3·31 ± 0·22 | 4·35 ± 0·29 |
| (3) Aswan South[c, d, e] ... | 95 | 76·57 ± 0·18 | 2·65 ± 0·13 | 3·46 ± 0·17 |
| Aswan : A. M. (1+2+3)... | 262 | 75·83 ± 0·13 | 3·08 ± 0·09 | 4·06 ± 0·12 |
| ♂ *Skull Measurements.* | | | | |
| [a] (as above) ... ... | 128 | 75·58 ± 0·16 | 2·66 ± 0·11 | 3·52 ± 0·15 |
| [b] ( „ ) ... ... | 50 | 70·31 ± 0·26 | 2·70 ± 0·18 | 3·84 ± 0·26 |
| [c] ( „ ) ... ... | 110 | 73·38 ± 0·20 | 3·17 ± 0·14 | 4·32 ± 0·20 |
| [d] ( „ ) ... ... | 41 | 72·98 ± 0·31 | 2·95 ± 0·22 | 4·05 ± 0·30 |
| [e] ( „ ) ... ... | 81 | 75·50 ± 0·31 | 4·13 ± 0·22 | 5·47 ± 0·29 |

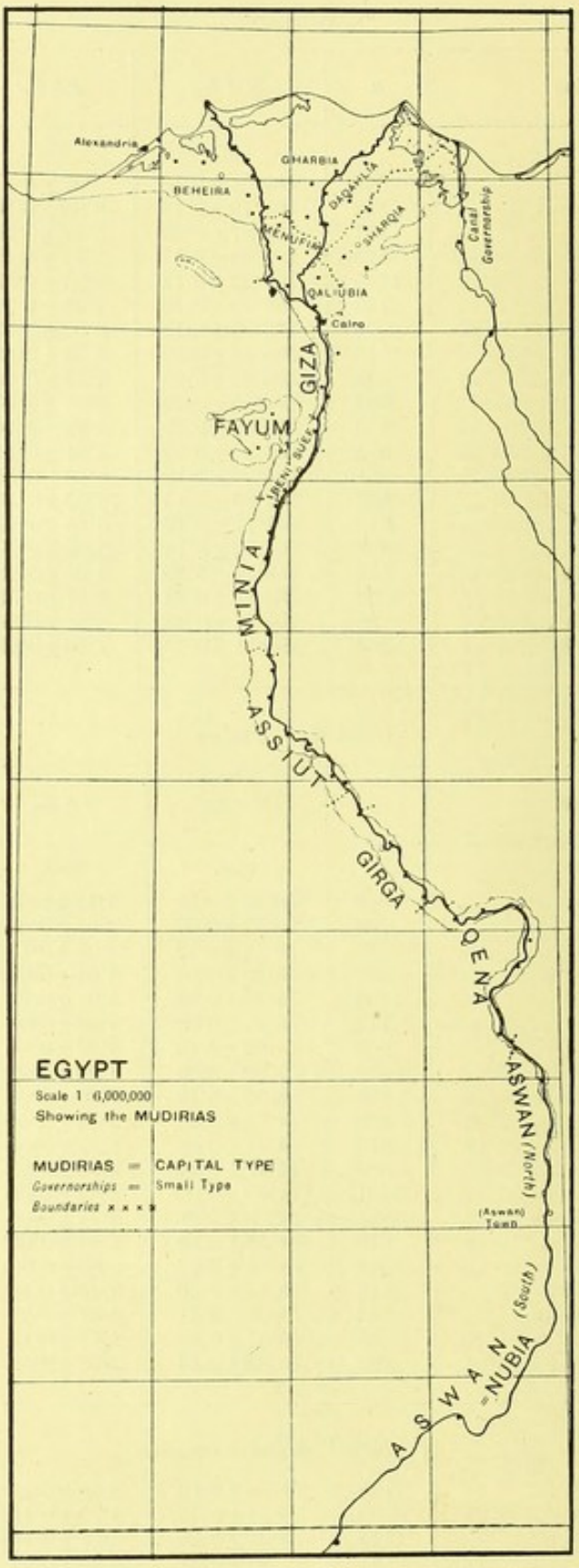
Alexandria
GHARBIA
BEHEIRA
DAQAHLIA
MENUFIA
SHARQIA
Canal Governorship
QALUBIA
Cairo
GIZA
FAYUM
BENI SUEF
MINIA
ASSIUT
GIRGA
QENA
ASWAN (North)
(Aswan) Town
ASWAN (South)
NUBIA
EGYPT
Scale 1 6,000,000
Showing the MUDIRIAS
MUDIRIAS = CAPITAL TYPE
Governorships = Small Type
Boundaries x x x x

FIG. 2.

and Giza the difference is still more marked. Further, if the composition of the Cairene population is remembered (p. 68), the index for natives of the city must be still more increased, and the brachycephaly becomes more significant. If the population has been for some time composed as it now is, the cephalic index of native Cairenes must be corrected to 75·87 + 0·85 or 76·72, but the assumption made here is doubtful. The same tendency to relative brachycephaly is to be observed in the Canal Governorship, but the difference between the indices for this district and Daqahlia is not so significant as in the other cases. This perhaps is not to be wondered at, seeing how largely the towns of Port Saïd and Ismailia are the products of comparatively recent colonization, and that 17 per cent. of the present population of this district and probably at least 35 per cent. of the whole originally are from Daqahlia. The difference from Sharqia, which also adjoins the Canal district, but contributes much more sparsely to its population, is much more marked (0·79 ± 0·21).

2. The dwellers in towns are very markedly shorter in the arms than the rural populations. This holds for all four towns dealt with here. The difference is probably to be accounted for by the large amount of hard work, much of it lifting of water on to the land, that the fellahin undergo. This lengthening of the cubit increases towards the South, where the manual labour of cultivation is heaviest, but it *may* be connected with increase of negro blood.

3. There is some justification for the usual division of Egypt into Upper and Lower, as far as cephalic index goes. The cephalic indices for the six mudirias of the latter lie between 75·21 and 75·69, the weighted mean being 75·31. For Upper Egypt (excluding Aswan as being inhabited by a race largely composed of Barabra) the index varies between 74·24 and 74·75, with a weighted mean 74·51. The gap between the highest of the one and the lowest of the other is 0·46 ± 0·14, which is probably significant.

4. There is a slight increase of stature in moving from east to west across the Delta, and also a slight but less clearly marked increase in moving southward. The former may be due to an infusion of Bedawi blood, which is said to be more common in the east, and the latter has been attributed to an increased infusion of negro blood. There is not any sharp division between Upper and Lower Egypt.

5. The people of Upper Egypt are on the whole bigger boned than those of Lower Egypt. The former have longer but narrower heads, longer fingers, longer feet, and longer forearms, than the latter.

6. The measurements made by Professor Myers give distinct evidence of the selection already mentioned, as may be seen from the following comparative tables:

*Head Length.*

| | Myers | Craig | M. – C. |
|---|---|---|---|
| | mm. | mm. | mm. |
| Beheira ... ... | 196·82 ± 0·60 | 191·18 ± 0·17 | 5·64 |
| Daqahlia ... | 193·00 ± 0·39 | 190·35 ± 0·20 | 2·65 |
| Sharqia ... ... | 196·75 ± 0·73 | 190·79 ± 0·18 | 5·96 |
| Giza ... ... | 194·56 ± 0·54 | 191·66 ± 0·22 | 2·90 |
| Girga ... ... | 194·53 ± 0·43 | 191·51 ± 0·16 | 3·02 |
| Qena ... ... | 194·79 ± 0·54 | 191·19 ± 0·14 | 3·60 |

*Head Breadth.*

| | Myers | Craig | M. – C. |
|---|---|---|---|
| | mm. | mm. | mm. |
| Beheira ... ... | 144·38 ± 0·42 | 143·61 ± 0·14 | 0·77 |
| Daqahlia ... | 144·64 ± 0·28 | 143·99 ± 0·15 | 0·65 |
| Sharqia ... ... | 145·40 ± 0·74 | 143·63 ± 0·14 | 1·77 |
| Giza ... ... | 143·41 ± 0·37 | 143·16 ± 0·17 | 0·25 |
| Girga ... ... | 144·33 ± 0·34 | 142·28 ± 0·12 | 2·05 |
| Qena ... ... | 143·91 ± 0·35 | 142·32 ± 0·11 | 1·59 |

*Cephalic Index.*

| | Myers | Craig | M. – C. |
|---|---|---|---|
| | mm. | mm. | mm. |
| Beheira ... ... | 73·42 ± 0·2 | 75·20 ± 0·09 | −1·78 |
| Daqahlia ... | 75·01 ± 0·1 | 75·69 ± 0·10 | −0·58 |
| Sharqia ... ... | 73·94 ± 0·4 | 75·39 ± 0·09 | −1·45 |
| Giza ... ... | 73·76 ± 0·2 | 74·75 ± 0·11 | −0·99 |
| Girga ... ... | 74·25 ± 0·2 | 74·38 ± 0·08 | −0·13 |
| Qena ... ... | 73·94 ± 0·2 | 74·48 ± 0·07 | −0·54 |

It will be noticed that the differences are in every case systematic, and that in all cases but two they are so great that they can hardly be due to accident*.

Since Professor Myers' subjects are larger men than those measured here, but have smaller cephalic indices, there appears to be a negative correlation between cephalic index and stature, contrary to what has been found for Alexandrian criminals, but similar to the result obtained in Nubia (see p. 68, footnote).

* [Differences of head-spanner used, and exact method of measurement deserve to be fully considered. The correlation of stature and cephalic index within the race is very small and it is difficult to believe that the selection of the former could be the source of the systematic differences recorded of the latter. Editor.]