A Study of the Relations of the Brain to the Size of the Head
Author(s): Reginald J. Gladstone
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A STUDY OF THE RELATIONS OF THE BRAIN TO THE SIZE OF THE HEAD.

By REGINALD J. GLADSTONE, M.D.

One of the main objects of the investigation which forms the subject of this paper, has been to obtain a series of reconstruction formulæ, by which it will be possible, when in possession of certain chief measurements of the head, to predict within the limits of normal variation, the approximate weight of the brain.

The collection of data for this purpose, which has occupied a period of over three years, has been carried out with the permission of the Resident Medical Officer, in the 'post-mortem' room of the Middlesex Hospital, whereas the mathematical treatment, in the following paper, is chiefly the work of Mr J. Blakeman, M.Sc., of University College, London.

Briefly, the method which we have adopted has been to measure the heads of 'post-mortem' room subjects, and afterwards in each case to take out the brain and weigh it. In each case, therefore, a comparison can be made between the outside measurements of the head, and the weight of the brain.

The individuals measured have been a few presumably healthy subjects, who have died an accidental death; the ordinary subjects of post-mortem examination at the Middlesex Hospital, London; and a fairly large proportion of subjects who have died from malignant disease in the Cancer Department of the same Hospital. They may be regarded, therefore, as forming a fairly typical sample of what has been termed a 'hospital population'; containing, however, owing to the inclusion of 'cancer cases,' a rather larger proportion of individuals who have died from wasting diseases than is ordinary. A comparison, however, of the ratio that the brain-weight bears to the outside measurements of the head in a series of cases in which death took place from accident, or acute illness, with cases of death from wasting diseases, has shown that the diminution of brain-weight in the latter, although measurable, is small; and that their inclusion, therefore, with the acute cases does not seriously affect the general result.

No case has been included in which the brain showed a distinctly pathological condition which would have obviously affected its weight; nor have individuals with foreign or Jewish names been included.

For permission to make use of this valuable material, and for assistance in many ways, I am indebted to Dr R. A. Young, Pathologist, and Lecturer on Morbid Anatomy at the Middlesex Hospital, and to Mr W. T. Hillier, Pathological Assistant in the Cancer Department of the Middlesex Hospital.

In each case the following items have been recorded: (*a*) name, (*b*) age, (*c*) sex, (*d*) cause of death, (*e*) remarks: on general condition, degree of emaciation, &c., (*f*) stature, (*g*) measurements of head:

These were: *L*, the length of the head from the glabella to the occipital point.

B, the maximum transverse diameter of the head above the level of the zygomatic arches.

H, the height of the cranium as indicated by the vertical distance from the biauricular line * to the bregma.

U, the horizontal circumference, taken in a plane passing in front through a point just above the glabella, and behind through the occipital point.

S, the longitudinal or sagittal arc, measured from the glabella, over the vertex to the external occipital protuberance.

Q, the transverse or coronal arc, measured from the tragus of one side, over the vertex to the tragus of the opposite side.

These measurements of the head having been obtained, the scalp was reflected, and (𝔏) the length, (𝔅) the breadth, (𝔎) the height, and (𝔘) the circumference were measured on the bared skull. The vault of the skull was then removed, and the brain taken out and weighed in the usual manner, without removing the pia and arachnoid membranes†, the weight being recorded in grammes‡.

The longitudinal and transverse diameters of the head have been taken with a Flower's craniometer, made by Aston and Mander, of 25 Old Compton Street,

* Taken at the *centre* of the auricular orifices.

† The pia and arachnoid membranes vary considerably in their total weight and an increase in their weight accompanies an increase in age; thus according to Broca, the weight of the 'pia' at different ages in males, averages

20—30	years	...	45 grammes
31—40	,,	...	50 ,,
60	,,	...	60 ,,

The variations ranged between 38 and 130 grammes. The mean weight of the 'pia' in the case of 133 females was 48·7 grammes, and of 273 males 55·8 grammes. The term 'pia' as used by Broca obviously includes both the pia and arachnoid membranes.

‡ The weight of the brain in ounces was in a large number of cases also ascertained, and recorded in the Hospital Reports; and a reference to these reports proved to be a useful means of verifying the recorded weight in grammes, of certain cases in which there was a considerable deviation from the usual relation between the brain-weight, and the outside measurements of the head.

London, and the vertical diameter by an instrument, Fig. 1, similar to the one which I have previously described and figured in the *Report of the Proceedings of the Anatomical Society*, November, 1901; the instrument which we have used for the post-mortem measurements has, however, been improved by the adoption of a suggestion made by Mr J. Gray, namely, the substitution of a vertical screw to act upon the indicator, for the rack and pinion with which the first instrument was fitted. Any slipping of the measuring rod, from the instrument working loose, is thus avoided.

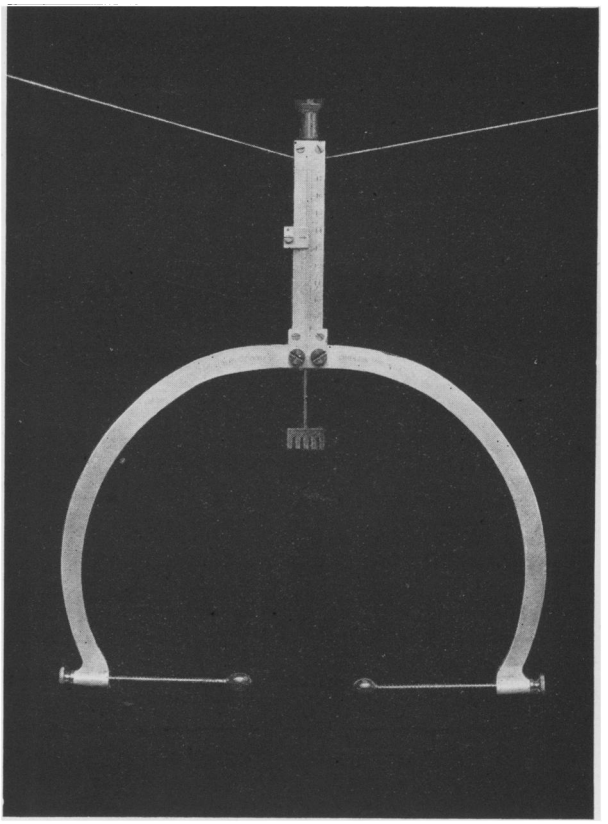


FIG. 1. Instrument for measuring the vertical height of the head, from the biauricular line to the vertex.

The circumference and the longitudinal and transverse arcs have been taken with a Chesterman's steel tape-measure.

Although the longitudinal and transverse arcs were measured, and are preserved in each case, we have not made use of them in constructing any of the tables or formulæ. The diameters being in our opinion the more trustworthy measurements, since they are less influenced by variations in the amount and thickness of the hair, and because the points between which the measurements are

taken are in the case of the diameters much more precise. In many individuals the external occipital protuberance, even when the muscles of the neck are thoroughly relaxed, is difficult to localize. This is the case in the living subject, and still more in the cadaver, so much so that in some subjects it is impossible to determine its exact position. Moreover, when prominent and easily felt, there may be as much as 1 cm. difference between the measurement taken by one individual and that by another, according to whether the top or bottom of the projection has been taken as the starting point. The small tubercle on the tragus from which the measurement is taken in recording the transverse arc is also relatively to the centre of the external auditory meatus, a somewhat variable point. I regard these measurements, therefore, as less reliable than the diameters. The measurement of the arcs and circumference has this important advantage, however—they can

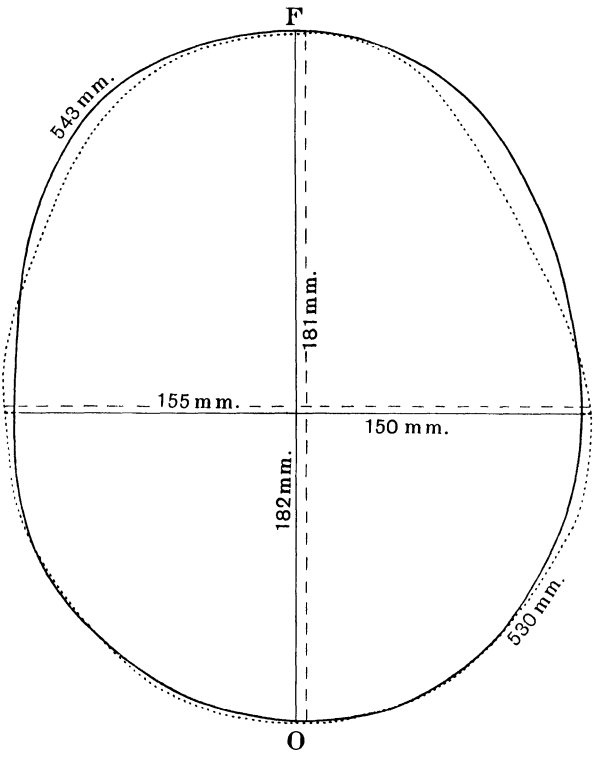


Fig. 2.

be taken by a tape measure, which can be carried in the waistcoat pocket, and they can thus be more readily ascertained by travellers who would be unable to carry a more bulky instrument. Moreover the measurement of the longitudinal and transverse arcs, and of the horizontal circumference, will in some cases give a truer estimate of size than the greatest diameters taken through the principal axes, as will be seen by the accompanying Fig. 2, which shows tracings of the horizontal circumference of two heads, one of which, represented by a continuous line, was narrow in the frontal region, but wide in the parietal, whereas the other, represented

by broken lines, although having a wider frontal region, had a less maximum transverse or interparietal diameter. The total area of the latter is greater than the former, as is indicated by the circumference, which is 543 mm. in the broken tracing as compared with 530 mm. in the continuous. The product of the two principal diameters of the continuous tracing ($L = 181 \times B = 155$) is 28,055, whereas that of the broken curve ($L = 182 \times B = 150$) is 27,300, or 755 less than the continuous. The product of the diameters thus gives in this case an erroneous indication of the area enclosed by the tracings*. We have accordingly made use of the horizontal circumference, although discarding the longitudinal and transverse arcs for the reasons stated above.

The correlation between brain-weight and the outside measurements of the *head* is naturally not nearly so close as that which exists between the outside measurements of the *skull* and the capacity of the *skull*. For in addition to variations in the thickness and shape of the skull, we have to deal with variations in the thickness of the scalp and hair, and also with the very considerable variations in the amount of space which exists between the surface of the brain and the internal surface of the skull. Moreover the weight of the brain is modified by variations in density†, the size of the cerebral ventricles‡, and by the amount of blood contained in its vessels.

The weight of the brain also, as is well known, varies considerably with age, a progressive decrease of weight and most probably also of size taking place after middle age. This decrease, however, appears according to both Boyd's§ and Vierordt's‖ statistics, to commence at a much earlier age, the highest average brain-weights for different ages occurring between 14 and 20 in both sexes.

The brain in children and in youth is both actually and relatively to the body weight and stature very large. According to Vierordt's statistics, the average brain-weight of 35 boys, between 12 and 16 years of age inclusive, was as much as 1423 grammes; and in a table published by the same author, showing the average brain-weight for each year from birth up to the age of 25, the highest average brain-weights, 1490 grm. ♂, and 1345 grm. ♀, occur at the ages of 15 and 14 respectively; whereas, according to Boyd's statistics, the average brain-weights of adult British subjects (mostly of the lower classes), are:

Males between 20 and 40 ..... 1360 grm. or 48 oz.
Females „ 20 and 40 ..... 1230 grm. or 43½ oz.

[* The problem really is which gives the better *average* result. It may be worth noting that the volume of an ellipsoid is proportional to the diametral product, but not to the product of the three circumferences. ED.]

† According to Professor Donaldson's statistics, "the average specific gravity of the entire encephalon should be for the adult male 1·0363, and for the adult female 1·0360." H. H. Donaldson: *Growth of the Brain*, p. 95.

‡ "The cast of the ventricles as made by Welcker displaces 26 cm.^{3} of water so that the fluid filling such a cavity would weigh a trifle over 26 grammes." H. H. Donaldson: *Growth of the Brain*, p. 87. The specific gravity of the cerebro-spinal fluid is about 1·009.

§ See table compiled from the observations of R. Boyd, *Phil. Trans.* 1860, in Quain's *Anatomy*, Vol. III. Part I. p. 178.

‖ Table 17, p. 104, H. H. Donaldson: *The Growth of the Brain.*

The maximum, average and minimum weights of the brain, in four groups, arranged according to age and sex, of the 'post-mortem' room subjects of the Middlesex Hospital, may be seen in the following table:

The weight of the brain is expressed in grammes, and each group contains 50 subjects.

Age	Males			Females		
	Max.	Aver.	Min.	Max.	Aver.	Min.
20—46 ...	1635	1370·5	1207	1520	1223·5	1027
46 upwards ...	1588	1316·1	1120	1408	1195·7	955

It will be noticed that in passing from the younger to the older groups there is a decrease in the average brain-weight of 54·4 grm. in the male, and of 27·8 grm. in the female, the mean decrease for both male and female being approximately 40 grammes.

This result corresponds very closely with the table compiled from the observations of R. Boyd, and published in Quain's *Anatomy*, Vol. III. Part I. p. 178, in which it is shown that "the brain is absolutely heavier between 14 and 20 years of age than at any other period of life, and that at the age of 80 it has lost about 90 grammes, or rather more than 3 ozs., i.e., $\frac{1}{15}$ of its total weight."

Not only is there a marked change in brain-weight corresponding with different periods of life, but there are also considerable variations in the thickness of the skull and its coverings.

The scalp is thin in infants and young children, and a sensible attenuation of the scalp occurs in old age, which is probably largely due to atrophy of the hair follicles following the loss of hair. The amount, although small, is measurable, and is sufficient to affect the general result of a statistical investigation. The amount of atrophy may be seen by a comparison of the figures in the following tables, which show the average differences between the diameters of the head and the diameters of the skull as measured before and after the scalp has been turned down in order to remove the 'skull cap.'

18 *Males between* 20 *and* 46 *years of age.*

	mm.
Height of head minus height of skull	= 4·05.
Length „ „ length „	= 8·47.
Breadth „ „ breadth „	= 8·27.

27 *Males from* 46 *years upward.*

	mm.
Height of head minus height of skull	= 3·79.
Length „ „ length „	= 7·25.
Breadth „ „ breadth „	= 7·40.

17 *Females from* 20—46 *years of age.*

				mm.
Height of head	minus	height of skull		=3·82.
Length	„	length	„	=7·52.
Breadth	„	breadth	„	=7·88.

27 *Females from* 46 *years upward.*

				mm.
Height of head	minus	height of skull		=3·50.
Length	„	length	„	=7·12.
Breadth	„	breadth	„	=6·98.

It will be observed that the scalp is thinner in female subjects than in males and that there is a diminution in the thickness of the scalp, which amounts to:

♂ : 0·26 mm. ♀ : 0·32 mm. at the vertex.
1·22 mm. 0·40 mm. at the glabella and occipital point together.
0·87 mm. 0·90 mm. on the two sides.

There is thus a diminution in the length of the principal diameters of the head, attributable to the atrophy attendant on old age, which amounts if the mean of both sexes be taken to:

0·29 mm. in the vertical diameter.
0·81 mm. „ longitudinal „
0·885 mm. „ transverse „

The thickness of the skull also varies with age, as will be noted on comparing the cut surface of the vault of a skull shown in Plate II. Fig. D, which is a photograph of the vault of the skull of a child about four years old, with that in Fig. C, which is the photograph of the vault of a normal adult skull.

The difference in thickness of the skull of a child, and that of an adult will also be seen on comparing Fig. A, Plate II. with Fig. B on the same plate. Fig. A represents the right half of the skull of a child about five or six years of age; Fig. B the right half of a thick, adult skull. Note also the absence of frontal sinuses in Figs. A and C.

The extent to which the thickness of the skull may be affected by disease, may be seen in Fig. 3, which represents part of the vault of a skull, from a case of 'osteitis deformans*,' the walls of which averaged about one inch in thickness. The increase in thickness of the skull in these cases takes place partly on the outer and partly on the inner surface of the skull, so that although the size of the head is enlarged the capacity of the skull is diminished, and compression exerted on its contents.

The reverse condition is met with in cases of chronic hydrocephalus in which the size of the head is increased by an augmentation in the volume of its contents.

* Specimen 1239. Museum of the Royal College of Surgeons, England.

An extreme case of this disease is seen in Figs. E and F in Plate III., which are photographs of specimen 3878 in the Hunterian Museum of the Royal College of Surgeons, England. It is described in the catalogue as "The skeleton of a man who died with hydrocephalus at the age of 25 years. Its greatest horizontal circumference is 914 cms.! Besides the enlargement of the frontal and parietal bones by which the greater part of the enlarged cranial cavity is formed rows of Wormian bones from 2·5 to 3·8 cms. in breadth are placed in the whole course of the lambdoid and sagittal sutures, and in great part of the length of the squamous sutures."

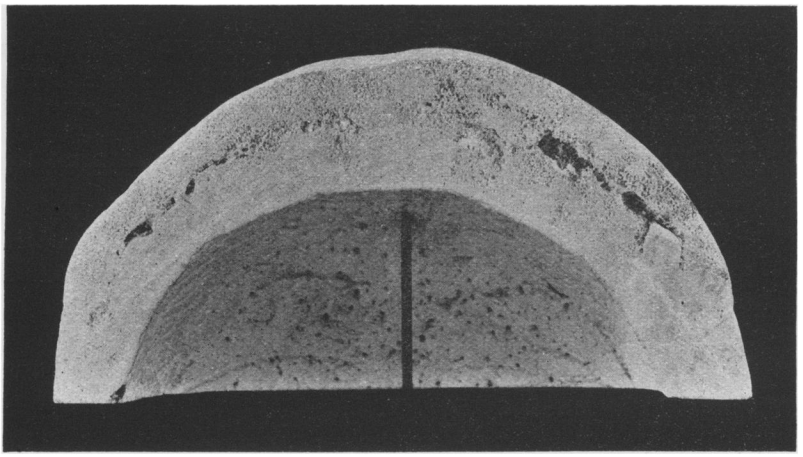


Fig. 3.

The enlargement of the head in hydrocephalus is associated with an increase in the amount of the cerebro-spinal fluid, which is found either in the space between the arachnoid and pia mater, outside the brain, within the cerebral ventricles, or in both these situations. In the case of James Cardinal, the skeleton of whom is preserved in the Museum of Guy's Hospital, seven pints of cerebro-spinal fluid were found between the membranes, whereas the ventricles contained one pint. In this case "it appeared that the fluid had been originally contained within the ventricles, but had burst through an opening in the corpus callosum *."

It is obvious that both in the case of *osteitis deformans*, and *hydrocephalus* the size of the brain cannot be gauged by the size of the head.

The enlargement of the head in hydrocephalus is also of interest, as it indicates one means by which the size of the cranium is increased in the course of normal growth, namely by an expanding force acting from within. In the early stages of development the fœtal brain has a smooth even surface, at a later stage from the 8th week of intrauterine life to the 4th month, what are called the 'transitory fissures' make their appearance; these are infoldings of the thin walls of the

* See description of case in *Tumours, Innocent and Malignant*, p. 448, J. Bland Sutton.

hemisphere vesicles, which appear to be occasioned by the growth of the brain being more rapid than the capsule which confines it. At a still later stage following a more rapid enlargement of the skull many of the early fissures disappear, but they are afterwards replaced by the permanent fissures or sulci of the adult brain. The appearance and disappearance of these fissures seem to indicate that there are two counteracting forces concerned in the growth of the brain, namely an expanding force due to increase in brain matter, and cerebro-spinal fluid, and a passive restraining force exerted by the skull.

In anencephalic monsters the brain is imperfectly developed; the hemisphere vesicles appear at an early stage of development to have ruptured and collapsed, and the cerebro-spinal fluid to have escaped through a triangular aperture, which may often be recognized at the time of birth in the position of the anterior fontanelle. The cerebro-spinal fluid thus passes into the cavity of the amnion, and the amount of fluid within this sac becomes thereby much increased.

In these cases the expanding force concerned in the growth of the skull is absent, and consequently the bones forming the vault of the skull, if they are developed at all, grow only to a sufficient size to cover over the base of the skull, and rudiments of the brain, whereas the bones of the face, and of the skeleton generally, grow to their normal size.

In rickets on the other hand the bones of the skull are abnormally soft and yielding, and apparently do not afford the usual resistance to the expanding pressure from within, and as a result the cranial portion of the skull enlarges, and the well-known square overhanging forehead of a typical rickety child is produced, while the face remains of the normal size and owing to the enlargement of the head above, appears unusually small.

In the course of normal growth the two forces continue to counteract one another until the brain has attained its maximum size. Later a progressive diminution in the weight and probably also of the size of the brain takes place, and the sutures of the skull afterwards, gradually consolidate.

Not only is there the difference mentioned above in the general thickness of the skull at different ages, but there is also a considerable difference in the frontal region, due to the development after puberty of the frontal air sinuses, which tend to increase in size with the advance of age, and which are usually considerably larger in the male than in the female. Their position and the size which they may attain are well seen in Fig. 4, D, and Plate II., Figs. B and C.

It is obvious, therefore, that in any attempt to calculate the weight of the brain age must be taken into account, since it affects not only the brain itself, but also the thickness of the scalp and of the skull. It may be noted, however, that after middle age the variations attributable to age are so far as the thickness of the scalp and the weight of the brain are concerned, in the same direction, namely diminution, so that the proportion between the outside measurements of the head and the brain-weight is not very materially altered. The diminution in brain-

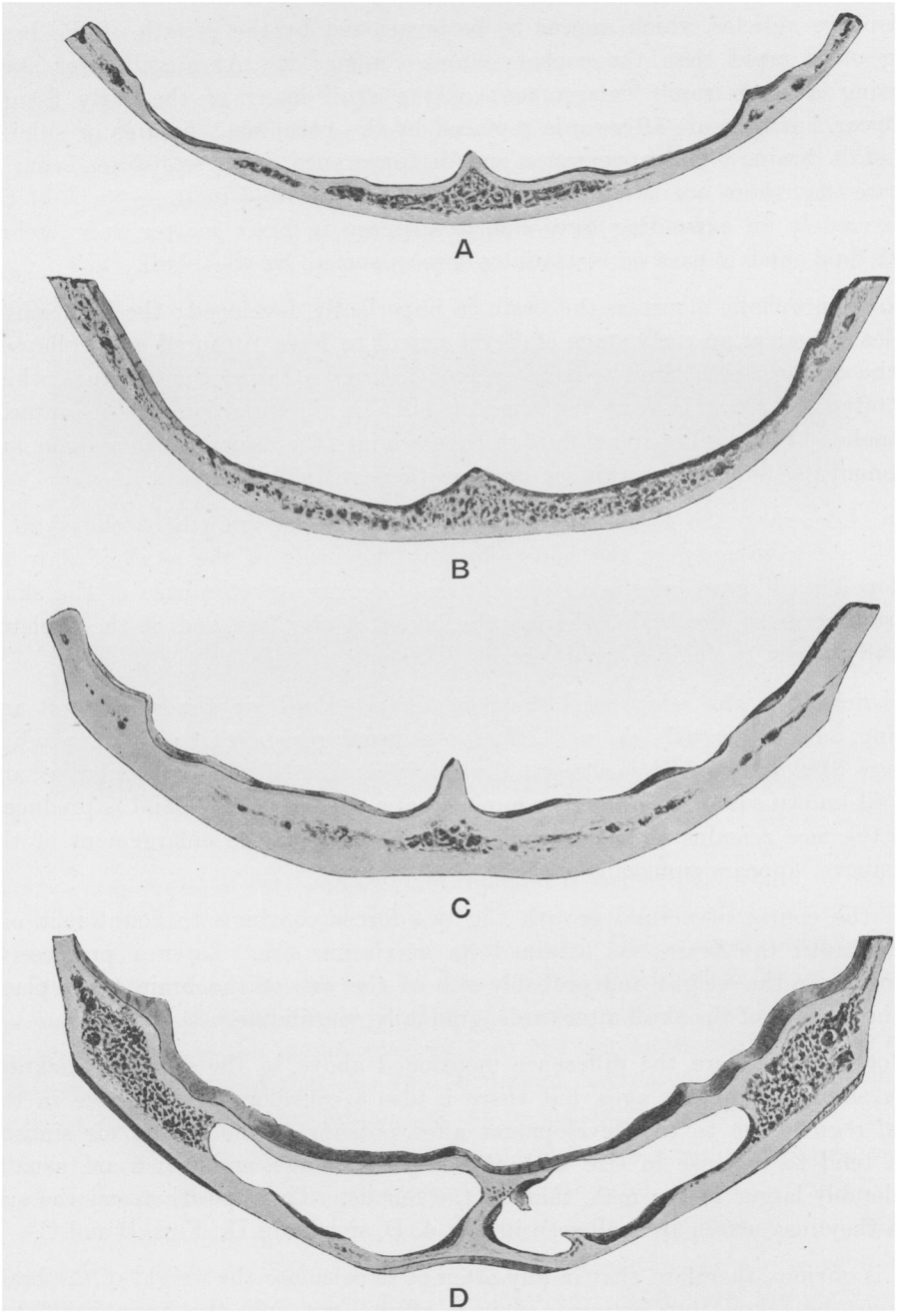


FIG. 4. Four horizontal sections through the frontal bone, showing the condition of the bone at various ages.

A. Male, aged 9. Bone thin, no frontal sinuses.
B. ,, ,, 14. Bone considerably thicker, no frontal sinuses.
C. ,, ,, 32. Illustrating the occasional absence of the frontal sinuses in an adult.
D. ,, ,, 54. Unusually large frontal sinuses.

From specimens in the Museum of the Royal College of Surgeons, London.

weight follows very closely the diminution in the size of the head, as is shown by the following table, which gives the proportion between these two quantities in 4 groups of 50, arranged according to age and sex. The size of the head is here indicated by a figure obtained from the product of the three principal diameters ($L \times B \times H$) expressed in millimetres, the first four figures of this number represent the number of cubic centimetres which would be contained in a rectangular block having the same diameters as the cranial portion of the head, and I shall refer to it subsequently as the 'index of size' of the head, thus:

$$(196) \times (156) \times (138) = 4219488.$$

4219, the 'index of size' of the head, represents cubic centimetres and may therefore be conveniently compared with the weight of the brain expressed in grammes.

Males	*H*	*L*	*B*	Index of size	Brain-weight	Index of Size / Brain-weight	Number in each group
Age, *20—46* ...	134·8	190·8	149·5	3876	1370·5	2·806	50
„ *46* and upwards	132·4	189·8	148·7	3736	1316·1	2·838	50
Females							
Age, *20—46* ...	129·8	183·4	144·9	3449	1223·5	2·818	50
„ *46* and upwards	128·2	182·1	143·5	3350	1195·7	2·801	50

By combining the male with the female groups, we obtain the following ratios between the size of the head and the brain-weight:

Age, 20–46 . . .	2·812
„ 46 and upwards .	2·819

In comparing the extreme ends of the series, however, it appears that the diminution in brain-weight, with the advance of age, is more rapid than the diminution in the size of the head; thus taking the mean of 4 ♂ and 3 ♀ cases over 70 years of age, the ratio between size of head and brain-weight is 2·821, whereas an equal number of cases between 20 and 25 years of age give 2·702.

The influence of stature upon the ratio between the outside measurements of the head and the brain-weight is apparently very small; but it has a marked influence on the actual size of the head as compared with the general mean, and a less but measurable influence on the proportion of the size of the head to the body in the individual. In other words, tall men in the aggregate have larger heads than short men, but proportionally to the size of their bodies their heads are considerably smaller than those of short men.

The formula which I have employed to express this relationship of the size of the head to the stature is the following:

$$100 \times \frac{\sqrt[3]{\text{Index of size}}}{\text{Stature in centimetres}} = \text{Capitulo-statural index.}$$

$$\text{Ex.} \quad \frac{\sqrt[3]{3921 \text{ cm.}^3} \times 100}{170 \text{ cm.}} = \frac{15{\cdot}77 \text{ cm.} \times 100}{170 \text{ cm.}} = \frac{1577}{170} = 9{\cdot}27.$$

It will be seen on referring to the table given below that a considerable diminution of the capitulo-statural index takes place with increase in stature; and also that the size of the head increases with the stature, but that the enlargement of the head does not keep pace with the increase in stature.

Table showing the proportion that the size of the head bears to the stature in groups of individuals arranged according to their height, the degrees of which are expressed in intervals of 3 inches.

Number of cases in each group	Stature		Index of size $(L \times B \times H)$ cm.^{3}	$\sqrt[3]{\text{Index of size}}$ cm.	Capitulo-statural index $\frac{\sqrt[3]{\text{Index of size}} \times 100}{\text{Stature}}$
	Inches	cm.			
37	74—72	185·3	4135	16·05	8·66
120	71—69	177·7	4071	15·97	8·98
124	68—66	170·0	3993	15·87	9·00
67	65—63	162·4	3902	15·75	9·69
15	62—60	154·8	3778	15·56	10·05

This table is based upon the measurements of 363 male subjects of all classes in England above 20 years of age, the larger number of these belong to the professional class, so that both the mean stature and mean size of the head are slightly above the general average.

The increase in size of the head, accompanying increase in stature, is shown also in the following chart, which is planned from the same figures as the preceding table:

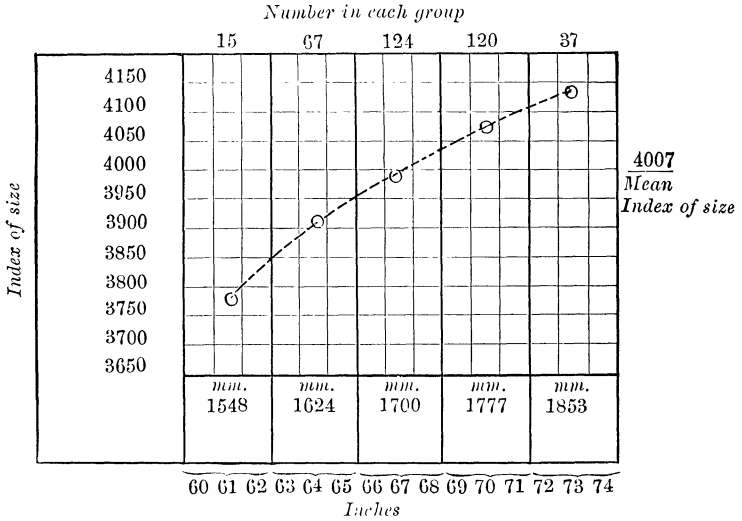
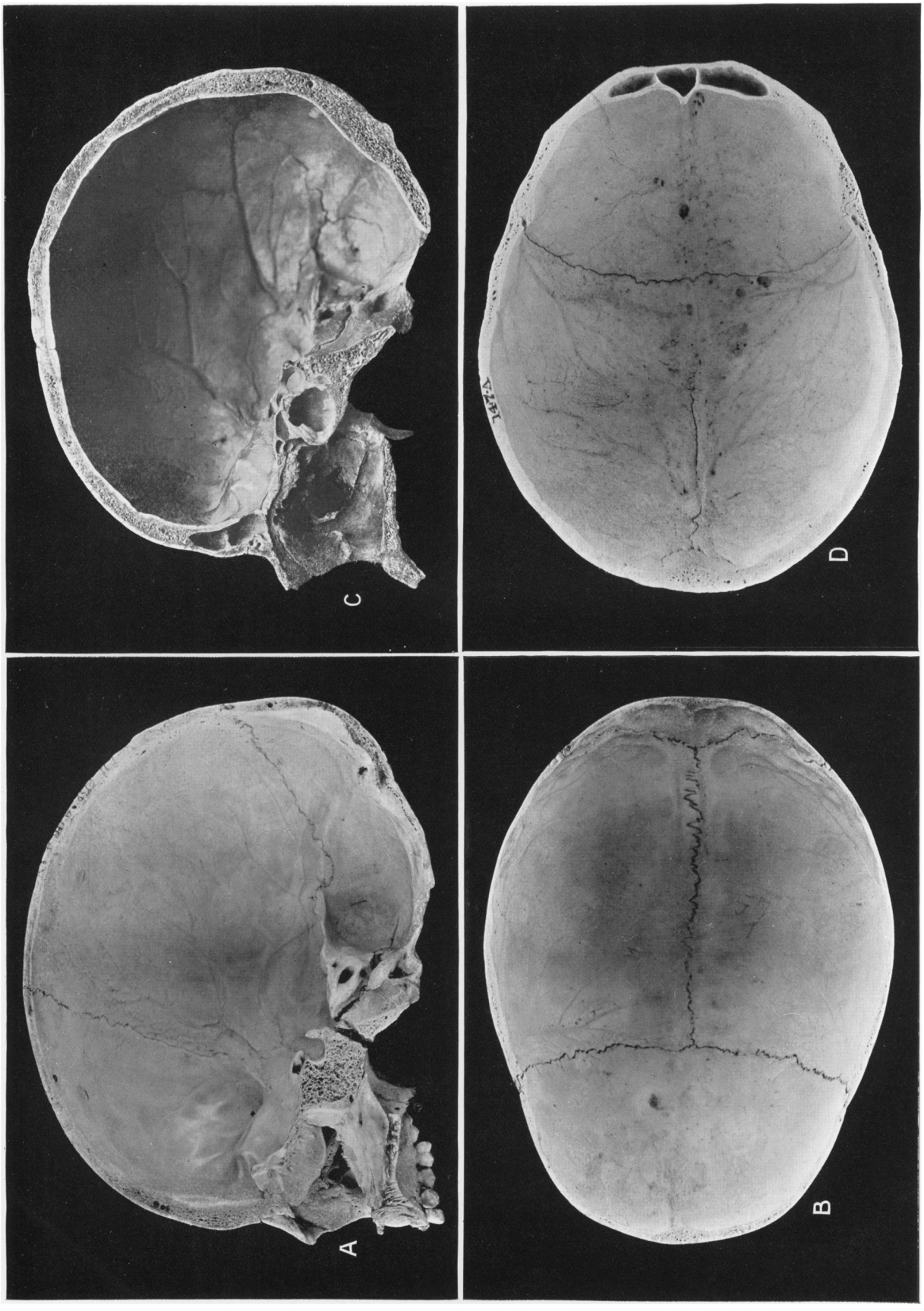
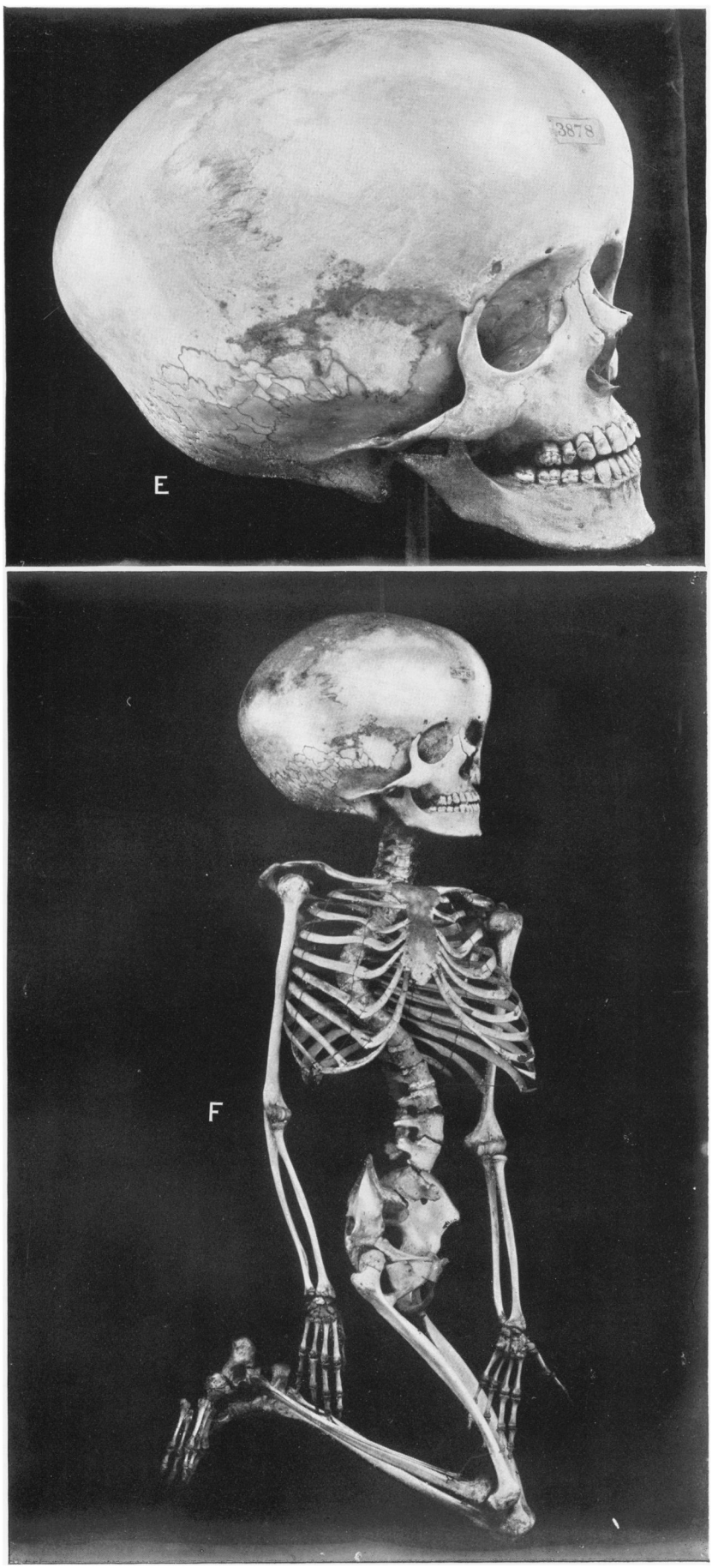


FIG. 5. Chart showing the increase in the size of the head which takes place with increase of stature. The chart is based on the measurements of 363 adult male subjects, above 20 years of age. The individuals have been grouped according to their stature, which is expressed in intervals of 3 inches. The figures indicating the size of the head are shown in the column on the left.





The following table is also of interest, as exemplifying the same law in certain extreme cases, in giants and dwarfs*.

	Stature			Index of size	$\sqrt[3]{\text{Index of size}}$	Capitulo-statural index $\frac{\sqrt[3]{\text{Index of size}} \times 100}{\text{Stature}}$
	ft.	in.	cm.			
Irish giant, O'Brian ...	7	7	231·1	4557	16·58	7·17
American giant, Freeman	6	9	205·7	4085	15·99	7·77
363 All classes, British, ♂	5	7	170·0	4007	15·88	9·33
Dwarf from Kiel, ♂ ...	4	0	121 9	2788	14·07	11·55
Dwarf from Holstein, ♂ ...	3	2½	97·8	2699	13·92	14·23

In conclusion I must express my thanks to Mr Freke Field, who has worked out most of the tables in this section of the paper, and to Mr J. W. Stockwell and Mr G. Fairclough, who have taken the majority of the measurements.

DESCRIPTION OF PLATES.

PLATE II. FIG. A. Longitudinal section through skull of a child between five and six years of age.

FIG. B. Longitudinal section through a normal adult skull. From the Anatomical Department, Middlesex Hospital.

FIG. C. Interior of the vault of the skull of an adult male. Note the thickness of the sawn edge of the bone, and the size of the frontal sinuses. From a specimen 417 A, in the Museum of the Royal College of Surgeons, London.

FIG. D. Interior of the vault of the skull of a child, aged about four. Note the thinness of the sawn edge of the bone, and the absence of the frontal sinuses. From a specimen in the Museum of the Royal College of Surgeons, London.

PLATE III. E skull, F skeleton of man of 25 years with hydrocephalus. From specimen 3878 in the Hunterian Museum of Royal College of Surgeons.

* For permission to measure the skeletons of the two giants, which are contained in the Hunterian Museum of the Royal College of Surgeons, England, I am indebted to Professor C. Stewart. In calculating the 'indices of size' of the heads, 4·5 mm. were added to the vertical diameter, and 9 mm. to the longitudinal and transverse diameters, as taken on the bare skull, thus allowing about 0·5 mm. on each diameter for shrinkage of the skull in drying. See table, p. 110, 'Males 20—46 years of age.'

APPENDIX OF MEASUREMENTS.

A. *Male Subjects between* 20 *and* 46. *Middlesex Hospital.*

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) *H*	*L*	*B*	(Cm.^{3}) $H \times L \times B$	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
1	—	—	67	141	200	160	4512	1530	574	80·0	Chronic nephritis. Cardiac degeneration
2	*A*	39	68	137	182·5	149·5	3738	1297	550	81·9	Accident. Fractures of bones
3	*C*	35	71	139	201	152·5	4261	1335	569	75·9	Pulmonary tuberculosis
4	*C*	35	70	134·5	193	145·5	3777	1282	542	75·4	Malignant growth affecting mouth
5	*A*	37	68	140	195	153	4177	1590	576	78·5	Accident. Fracture of skull
6	—	34	65	132	186	146	3585	1300	547	78·5	Cerebral hæmorrhage
7	*C*	38	68	137·5	192·5	143	3785	1400	549	74·2	Pulmonary tuberculosis. Skull thin
8	*C*	45	69·5	134·5	189	140	3559	1255	535	74·1	Carcinoma of stomach
9	—	45	68	132·5	185·5	147	3613	1355	555	79·2	Pneumonia. Pleural effusion
10	—	40	64	135	196	150·5	3982	1375	565	76·7	Cerebral hæmorrhage
11	*C*	21	66	132	185	141	3443	1340	537	76·2	Meningitis. Mastoid disease
12	—	42	63	136·5	197	148·5	3993	1380	570	75·4	Cellulitis of upper lip. Septicæmia
13	—	25	69·75	136	188·5	142	3640	1355	558	75·3	Basal meningitis. Pulmonary tuberculosis
14	*A*	23	66·5	138	198	154	4208	1522	576	77·8	Fracture of skull. "Large pear-shaped head'
15	—	45	71	132	191	152	3832	1208	561	79·6	
16	*A*	41	60·5	135	194	148	3876	1405	569	76·3	Fracture of skull [hæmorrhage
17	*A*	28	63·5	130	183	147	3497	1358	551	80·3	"Run over." Rupture of liver. Cerebral
18	*C*	45	65	130	184·5	144·5	3466	1292	541	78·3	Malignant growth. R. ext. auditory meatus
19	*A*	20	71·5	126	178	138	3095	1340	517	77·5	Burns. Congestion of brain
20	*C*	43	68	144	192	160	4424	1400	580	83·3	Fatty liver and kidneys. Delirium tremens
21	*C*	43	68·5	137	190	149	3878	1357	568	78·4	Tubercular nephritis. Thin skull
22	—	25	68·5	130	197	158	4046	1287	582	80·2	Fatty heart. Congestion of lungs
23	*C*	29	68·5	137·5	189·5	146	3804	1275	554	77·0	Morbus cordis
24	*C*	40	68·5	135	182	151	3710	1270	541	83·0	Carcinoma of œsophagus, and stomach
25	*A*	?	71	142	199	168	4747	1635	602	84·4	Impaction of food in pharynx
26	*A*	40	72·5	135	195	168	4423	1505	577	86·2	Inguinal hernia. Pulmonary embolism
27	—	29	69·25	135	198	151	4036	1490	564	76·3	Appendicitis. Thick skull. Foreign
28	—	35	70·5	138	193	151	4022	1485	570	78·2	
29	—	27	69·5	135	184	139	3454	1310	537	75·5	Appendicitis. General peritonitis
30	*A*	20	69	142	200	147	4175	1420	574	73·5	Purulent meningitis. Fracture of nasal bones
31	*C*	38	68·5	136	182	153	3787	1318	567	84·1	Malignant growth of kidney
32	—	24	69·75	135	190	148	3796	1432	564	77·9	Lymphatic leukæmia. Punctiform hæm. c'blm.
33	—	41	70·5	138	187	159	4103	1364	574	85·0	Lobar pneumonia. Enlgemt. of liver. Foreign
34	*C*	45	71	137	191	159	4161	1405	584	83·2	Chronic laryngitis. Thin skull. Scalp very thick
35	*C*	41	67	139	195·5	153	4158	1432	574	78·3	Malignant growth of lip. Metastasis
36	—	37	61	134	191	149	3814	1207	548	78·0	Fracture of tibia. Delirium tremens
37	—	29	65	135	184	142	3527	1375	530	77·2	Cerebral tumour
38	*A*	36	61·5	131	187	153	3748	1350	560	81·8	"Run over." Fractures of ribs and sternum
39	*C*	21	61	129	182	142	3334	1236	528	78·0	Pulmonary tuberculosis
40	*C*	38	62·5	129	192	141	3492	1250	540	73·4	Malignant growth in floor of mouth
41	*C*	42	61·5	134	194·5	152	3962	1350	558	78·1	Ulceration of larynx
42	*C*	43	62·5	129	190	143	3505	1320	539	75·3	Carcinoma of omentum. Emaciation
43	*C*	37	66	138·5	201	155	4315	1525	587	77·1	Cerebral abscess following empyema
44	*A*	31	67·5	130	190	154	3804	1570	550	81·1	Pulmonary embolism. Inguinal hernia
45	*C*	34	69	131·5	192	153	3863	1340	563	79·7	Diabetes
46	*C*	44	69	134	193	156	4034	1422	578	80·8	Cirrhosis of liver. Morbus cordis
47	*C*	24	69·5	142	192	158	4308	1506	569	82·3	Chronic nephritis. Œdema of lung. Foreign
48	*C*	28	68·5	124	181	141	3165	1215	510	77·9	Infective endocarditis. Skull very thin
49	*C*	44	67	134	190	143	3641	1311	545	75·3	Renal calculus
50	*A*	43	66·5	132·5	191	144	3644	1300	555	75·4	Pneumonia. Well nourished
51	*C*	44	68·5	130·5	193	154·5	3891	1224	570	80·1	Cirrhosis of liver. Well nourished
52	*A*	38	68·5	132	193·5	148·5	3793	1350	560	76·7	Fractures of sternum and ribs
53	*C*	35	70	136	195	161	4270	1335	558	82·6	Aortic regurgitation. Well nourished
54	*A*	39	69	132	190	162	4063	1390	557	85·3	Meningitis. Bullet in brain 14 years
55	*A*	36	69	135	193	154	4012	1400	569	79·8	Fall down lift. Well nourished
56	*C*	43	66	125	182	152	3458	1225	538	83·5	Fibroid degeneration of heart
57	*C*	42	60·5	134	191	152	3890	1310	549	79·6	Bronchitis and emphysema. Thick scalp

B. *Male Subjects from 46 and Upwards. Middlesex Hospital.*

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	($Cm.^3$) $H \times L \times B$	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
58	—	50	68	140	192	155	4166	1560	560	80·7	Fatty degeneration of heart
59	*C*	47	69	139	190	149	3935	1330	544	78·4	Calculous nephritis. Pericarditis. Pleurisy
60	—	47	67	132	193	144	3669	1222	556	74·6	Pneumonia
61	*C*	49	64·5	133	190	153	3866	1415	553	80·5	Epithelioma of lower lip [ribs
62	*A*	50	69	130	180	145	3393	1175	530	80·6	Injuries to head. Fracture of clavicle and
63	*C*	48	69·5	139	201	159	4442	1330	585	79·1	Tubercular nephritis. Pulmonary tubercu-
64	—	47	69	136·5	201	155	4253	1485	585	77·1	losis. Foreign
65	*A*	50	72·25	129·5	195	148	3737	1470	568	75·9	Strangulated umbilical hernia
66	*A*	48	64·5	124·5	182·5	146·5	3329	1135	541	80·3	Cerebral hæmorrhage. L. hemisphere
67	—	47	67	132	183·5	141	3415	1310	548	76·8	
68	—	50	68	122	188	147	3372	1154	550	78·2	Fracture of base of skull
69	*C*	48	68	141	204	154	4430	1510	583	75·5	Carcinoma of stomach
70	—	49	68·5	139	197	160	4381	1415	589	81·2	Pleurisy, Pericarditis. Skull thick
71	*C*	48	69·5	138·5	191	151·5	4008	1468	564	79·3	Malignant growth of pharynx
72	—	49	69	135	188	152	3858	1390	563	80·9	Cerebral hæmorrhage into L. ventricle
73	—	48	66	137	188	160	4121	1380	576	85·1	Foreign
74	*A*	50	69·5	131	196	158	4057	1432	575	80·6	Subdural, and intrapontine hæmorrhage
75	*C*	69	69·5	136	190	148	3824	1240	560	77·9	Fatty degeneration of heart and kidneys
76	—	?	63	126	184·5	146	3394	1195	540	79·1	Cardiac failure
77	*A*	58	67	131	183·5	148	3558	1225	540	80·7	Tetanus
78	—	57	69	130·5	184	140	3362	1188	544	76·1	Lymphosarcoma of neck
79	*C*	67	68·5	137	187·5	153	3930	1252	569	81·6	Cerebral hæmorrhage. Fibroid kidneys
80	*A*	61	66	136	188	150	3835	1315	552	79·8	Fracture of spine, R. femur, and ribs
81	—	53	69	138	185	150	3830	1245	545	81·1	
82	*A*	60	68·5	139	190	146	3856	1430	564	76·8	Compound fracture of R. tibia and fibula
83	*C*	58	70	128	180	141	3249	1279	532	78·3	Malignant disease of R. lung
84	*C*	55	67·5	131	187	146	3577	1245	572	78·1	Carcinoma of soft palate
85	*A*	57	67	132	196	152	3933	1309	569	77·6	Fracture of skull
86	—	75	67·5	133	193	150	3850	1412	553	77·7	Burns. Receding forehead
87	—	63	61	125·5	187	141	3309	1120	534	75·4	Cerebral hæmorrhage. Heavy drinker
88	—	69	67·25	128·5	188	141	3406	1220	540	75	Cerebral hæmorrhage
89	*A*	?	65	130	186	145	3506	1280	538	78	Fracture of base of skull
90	*C*	52	63·25	132	196	151	3907	1440	552	77	Carcinoma of stomach. Skull thick
91	*C*	66	71·5	142	194	151	4160	1370	570	77·8	Carcinoma of œsophagus
92	*C*	67	69·5	128	180	144	3318	1192	531	80·0	Malignant growths in liver. Skull thick
93	—	67	67	138	183	145	3662	1230	524	79·2	Carcinoma of stomach
94	*A*	53	63	137	191	149	3899	1346	568	78·0	Compound fracture of tibia and fibula
95	*C*	55	63	132	196	143	3700	1290	551	73·0	Epithelioma of R. cheek
96	*A*	56	65	133	192	148	3779	1165	558	77·1	Fracture of base of skull
97	*C*	54	65	130	185·5	144	3473	1240	530	77·6	Epithelioma of tongue. Skull very thin
98	*C*	59	63	136	182	141	3490	1132	528	77·5	Coma. Alcoholic dementia. Skull thick
99	*A*	65	65·5	128	183	156	3654	1242	544	85·2	Fracture of skull and ribs. Skull and scalp thin
100	*C*	59	64	128	190	143	3478	1270	536	75·3	Carcinoma of stomach. Skull and scalp thin
101	*C*	60	65·5	128	184·5	148	3495	1218	525	80·2	Epithelioma of lips [drinker"
102	*A*	60	69	130·5	192	153	3834	1430	579	79·7	Fractured ribs. Syncope. "Heavy malt
103	*C*	60	68	135	194	148	3876	1588	555	76·3	Carcinoma of stomach. Skull and scalp thin
104	*C*	62	65	130·5	187	150	3661	1320	548	80·2	Chronic nephritis. Alcoholism. Skull thin
105	*A*	70	67	128	191	148	3618	1290	565	77·5	Rupture of heart. "Dropped dead in street"
106	*A*	59	67·5	126·5	191	151	3648	1260	558	79·0	Fracture of arm and ribs. Pneumonia
107	*A*	51	68	140·5	200	143·5	4032	1425	565	71·7	Acute colitis. Peritonitis
108	*C*	57	66	128·5	185	143	3399	1226	542	77·3	Malignant disease of liver. Emaciated
109	*C*	51	68·5	133·5	193	152	3916	1360	556	78·8	Malignant disease of glands in neck
110	*A*	65	70·5	139	203	157	4430	1620	585	77·3	"Brought in dead." Fatty heart. Syncope
111	*C*	56	66	130	189·5	150	3695	1310	549	79·2	Chronic interstitial nephritis. Cerebral hæm.
112	*C*	75	72·5	125·5	193	145·5	3524	1250	555	75·3	Chronic interstitial nephritis. Fatty heart
113	*C*	47	69·5	124	192	150	3571	1295	561	78·1	Carcinoma of tongue
114	*C*	57	67·25	129	187	149	3594	1290	555	79·7	Carcinoma of tongue. Emaciated

B. *Male Subjects from* 46 *and Upwards. Middlesex Hospital. (Continued.)*

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	(Cm.³) H×L×B	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
115	*C*	62	69·75	123	184	149·5	3383	1290	536	81·2	Carcinoma of liver
116	*C*	84	50·5	127	190	145	3499	1275	545	76·3	Epithelioma of lip. Scalp thin
117	*C*	48	61·5	128·5	190	147	3589	1250	549	77·4	Cardiac failure. Pulmonary tuberculosis
118	*C*	58	68·5	134	189	154	3900	1270	557	81·5	Carcinoma of tongue. Emaciated [& spleen
119	*A*	63	67·5	136	199	152	4114	1362	588	76·4	Fracture of skull and ribs. Rupture of liver
120	*C*	52	67	133	191	155	3937	1300	558	81·2	Carcinoma of rectum. Well nourished
121	*A*	57	66	126	183	147	3399	1173	544	80·3	Meningeal hæmorrhage. Cerebral compression
122	*A*	52	69	132	192	164	4200	1256	563	85·4	Fracture of scapula and ribs. Foreign. 18 stone
123	—	58	72	134	212	158	4488	1440	585	74·5	Cerebral hæmorrhage. Skull and scalp thick
124	*C*	63	65	129	188	149	3614	1180	551	79·3	Papilloma of stomach. Emaciated. Foreign
125	*A*	57	67·5	133	194	157	4051	1306	573	80·9	Cerebral hæmorrhage. Well nourished
126	*A*	46	69	134	196	144	3782	1350	556	73·5	Pneumonia. Fairly well nourished
127	*C*	61	64	128	184	144	3391	1125	531	78·3	Malignant ulceration of face. Emaciated
128	—	58	66	126	171	145	3124	1165	534	84·8	Foreign
129	—	55	65	141·5	186	154	4053	1312	558	82·8	Apoplexy. Skull thin. Scalp thick
130	*C*	50	66	125·5	189	151	3582	1300	547	79·9	Chronic interstitial nephritis. Scalp thin
131	*C*	52	66	129	196	145	3666	1270	556	74·0	Carcinoma of scrotum. Wasted
132	—	51	67	128	189	146	3532	1335	553	77·2	Tumour of stomach. Well nourished
133	—	63	69	131	198	156	4046	1450	583	78·8	Fracture of skull. Cerebral hæmorrhage
134	—	72	66·5	132	184	151	3667	1310	554	82·1	Fracture of skull. Subdural hæmorrhage

C. *Female Subjects from* 20 *to* 46 *Years of Age. Middlesex Hospital.*

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	(Cms.³) H×L×B	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
135	*C*	36	—	114	179	140	2857	1027	570	78·2	Cirrhosis of liver. Excess of subarachnoid
136	—	20	63	133·5	184·5	139·5	3436	1235	523	75·6	Cerebro-spinal meningitis [fluid
137	—	35	63·5	132·5	187	153	3791	1260	558	81·8	Cellulitis and œdema of pharynx. Thick
138	—	40	60	126	182	144	3302	1165	532	79·1	Carcinoma uteri. Thin skull [skull
139	—	30?	51	126	178·5	138	3104	1080	498·5	77·3	Uræmia
140	—	33?	58	122·5	181	143	3171	1127	531	79·0	Valvular disease of heart. Emboli in brain
141	—	?	64	137	175	149	3572	1270	532	85·1	Pneumonia. Pericarditis
142	—	42	62	132	187	143	3530	1252	552	76·5	Fatty heart
143	—	35	66	126	180	140	3175	1200	521	77·8	Rheumatism. Bronchitis
144	—	31	66	131	181	145	3438	1290	539	80·1	Raynaud's disease
145	*C*	35	64	128	193	158	3903	1334	554	81·9	Carcinoma. Cervix uteri
146	*A*	23	69	142	176	156	3899	1380	555	88·6	Gun-shot wound in L. breast
147	*A*	38	65·5	129	185	142·5	3401	1140	542	77·0	Burns of neck and chest
148	—	23	67·5	128	181	141	3267	1243	540	77·9	Septicæmia
149	—	32	70	133	184	141	3451	1340	532	76·6	Pneumonia. Bronchitis
150	*C*	34	58	126	179	137	3090	1168	505	76·5	Carcinoma mammæ. Skull thin
151	*C*	37	60	132	186	139	3413	1322	532	74·7	Carcinoma mammæ. Skull and scalp thin
152	—	39	64	129·5	182	141	3323	1249	521	77·5	Broncho-pneumonia
153	—	34	63	134·5	190	144	3680	1321	552	75·8	Pneumonia. Skull very thick
154	—	41	66·5	127·5	183·5	147	3439	1192	533	80·1	Morbus cordis. Skull very thick, scalp thin
155	*C*	43	66·5	136	187	151·5	3853	1373	565	81·0	Carcinoma mammæ. Skull and scalp thick
156	*C*	33	59	128	180	137	3156	1170	530	76·1	Carcinoma of stomach. Skull thick behind
157	*C*	28	64	129	179	142	3279	1265	528	79·3	Intestinal ulceration probably syphilitic
158	*C*	33	67	132	186	151	3707	1235	560	81·2	Sarcoma of frontal bone
159	*A*	34	66	138	191	152	4006	1302	546	79·6	Pulmonary embolism. Fibromyoma of uterus
160	*C*	38	65·5	131	177	141	3269	1241	523	79·7	Carcinoma uteri. Scalp thin. Foreign

C. *Female Subjects from* 20 *to* 46 *Years of Age. Middlesex Hospital. (Continued.)*

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	(Cm.³) H×L×B	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
161	*C*	45	68	125	178	138	3071	1078	514	77·5	Carcinoma uteri. Thick scalp. Thick bushy hair
162	*A*	25	67	136	181	153·5	3779	1520	550	84·8	Unresolved lobar pneum. Cerebral congestion
163	—	39	62	133	184	145	3548	1460	535	78·8	Carcinoma uteri. Thick hair. Thin scalp
164	*C*	36	61	131	179·5	140	3292	1075	519	78·0	Carcinoma uteri. Skull thick, except at sides.
165	*C*	36	62·5	130	183	147	3497	1280	535	80·3	Carcinoma mammæ [Foreign
166	*C*	40	60	123·5	174·5	143	3082	1180	513	81·9	Malignant dis. R. side of face. Emaciated
167	—	22	58·5	126	179	144	3248	1250	513	80·4	Diabetic coma. Scalp rather thin
168	*C*	40	63·5	125	184	146	3358	1190	528	79·3	Carcinoma uteri. Scalp thin
169	*C*	40	61·5	130·5	193	151	3803	1374	548	78·2	Addison's disease. Skull rather thick [thick
170	*C*	40	65	128·5	185	150	3566	1306	535	81·1	Tubercular nephritis. Skull very thin. Scalp
171	*C*	30	63	126	177	141	3145	1202	502	79·7	Malignant disease of R. ear. Skull very thin
172	*C*	42	64·5	128·5	188	145	3503	1240	539	77·1	Carcinoma mammæ. Skull thick
173	*C*	34	63·5	131	188	145	3571	1316	540	77·1	Pernicious anæmia. Well nourished
174	*C*	42	62·5	130·5	189	151	3724	1280	543	79·9	Carcinoma uteri. Skull thin
175	*C*	39	63·5	126	190	151	3615	1350	555	79·5	Cirrhosis of liver. Ascites
176	*C*	39	62·5	128	175	143	3203	1180	515	81·7	Carcinoma uteri. Skull thin. Scalp thick
177	*C*	24	64	132	186	147	3609	1210	560	79·0	Pyonephrosis. Foreign
178	*C*	44	64·5	128·5	188·5	147	3561	1127	541	78·0	Softening and growth in brain
179	*C*	24	64·5	136	190	154	3979	1324	552	81·1	Bronchitis. Empyema. Dilated heart
180	*C*	30	63·5	134	187	141	3533	1210	540	75·4	Diabetic coma. Wasting. Skull thick
181	*C*	37	63·75	137	187	144	3689	1290	530	77·0	Carcinoma mammæ. Wasted
182	*C*	33	55	120	179	147	3158	1100	490	82·1	Carcinoma uteri. Emaciated. Alcoholic
183	*C*	38	67	132	197	154	4005	1280	578	78·2	Calcareous tumour of cerebellum
184	*A*	26	64·5	128	175	142	3181	1175	545	81·1	Chorea. Well nourished
185	*C*	25	61·5	129	186	145	3479	1160	542	78·0	Tuberculosis of lungs and intestine
186	*C*	35	63	129·5	190	148	3642	1205	547	77·9	Pulmonary tuberculosis. Emaciated
187	*C*	21	66·5	128·5	191	148	3632	1163	541	77·5	Sarcoma of maxilla. Emaciated. Scalp thin

D. *Female Subjects from* 46 *Years of Age and Upwards. Middlesex Hospital.*

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	(Cm.³) H×L×B	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
188	*C*	46	66	116	185	143	3069	1022	?	77·3	Carcinoma uteri
189	*C*	50	60	132	187	137·5	3394	1243	528	73·5	Carcinoma of breast, and pleura
190	*C*	46	66	139	185	144	3703	1350	532	77·8	Malignant growths in peritoneum
191	*C*	50	63	124	181	141	3165	1237	522	77·9	Epithelioma of scalp and face
192	*C*	46	67·5	130	183	141	3354	1204	522	77	Carcinoma of urethra
193	*C*	49	60·5	123	173	141	3000	1090	514	81·5	Carcinoma uteri. Scalp and hair thin
194	*C*	49	65·5	132	185	151	3687	1355	545	81·6	Cystic kidneys. Uræmia. Skull thin
195	*C*	48	64	129	185	149	3556	1250	530	80·5	Carcinoma uteri. Skull thin
196	*C*	47	66·5	120·5	177	130	2773	1076	516	73·4	Carcinoma mammæ. Skull very thick
197	*C*	53	64	130	168	140	3058	1120	515	83·3	Carcinoma uteri
198	*C*	56	60	131	187	136·5	3344	1220	531	73·0	Carcinoma mammæ
199	—	64	61·5	132	182·5	145	3493	1240	540	79·7	Diabetes. Gangrene of foot
200	*C*	69	62·5	125·5	185	142	3297	1220	525	76·8	Morbus cordis
201	*C*	60	61	130	182	142	3360	1095	515	78·0	Carcinoma uteri. Skull thick
202	*C*	55	61·5	129	180	139	3228	1235	518	77·2	Chronic bronchitis. Skull thin
203	*C*	55	59	129	174	146	3277	1105	506	83·9	Bronchitis. Alcoholism. Skull soft and thick
204	—	53	61	133	188	154	3851	1405	577	81·9	Cerebral hæmorrhage. Thick skull and scalp
205	*C*	60	60·5	126	179	136	3067	1150	518	76·0	Multiple sarcomata. Very thin skull & scalp

D. *Female Subjects from* 46 *Years of Age and Upwards. Middlesex Hospital. (Continued.)*

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	(Cms.³) H×L×B	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
206	*C*	54	60·5	129·5	181	157·5	3692	1305	548	87·0	Carcinoma. Metastases in L. hip. Thin skull
207	*C*	60	64·5	132	179	144	3402	1220	523	80·4	Chronic interstitial nephritis. Scalp thin
208	—	62	62·5	136	192	153	3995	1296	561	79·7	Chr. nephritis. Fatty degen. of Heart. Very thick skull
209	*C*	53	61	128	180	144	3318	1175	523	80·0	Carcinoma mammæ. Skull thick. Scalp thin
210	*C*	68	61	120	173	131	2720	955	502	75·7	Carcinoma uteri. Scalp thin
211	*C*	63	62·5	126·5	172	135	2937	1070	520	78·5	Sarcoma of nose
212	—	51	66	134	183	146	3580	1320	532	79·8	Appendicitis. Hair and skull thin
213	*C*	78	58·5	121	176	138	2939	1060	509	78·4	Carcinoma recti. Skull very thin
214	*C*	57	61	123	180	135	2989	1130	525	75·0	Carcinoma mammæ. Emaciated
215	—	68	64	128	188	149	3586	1250	540	79·3	Carcinoma of pancreas. Well nourished
216	*C*	58	60·5	124	178	143	3156	1225	515	80·3	Carcinoma mammæ. Cerebral abscess
217	*C*	59	65	127	180	142	3246	1180	524	78·9	Carcinoma mammæ. Skull thin
218	*C*	49	57	126	181	139	3170	1178	512	76·8	Carcinoma uteri. Fairly nourished
219	*C*	56	60	122	186	144	3268	1142	541	77·4	Carcinoma. Sigmoid flexure of colon
220	*C*	58	59	133	182	140	3389	1130	520	76·9	Carcinoma uteri
221	*C*	62	62·5	128·5	184	143	3381	1185	528	77·7	Carcinoma uteri. Wasted
222	*C*	67	63	124	175	132	2864	1012	509	75·4	Carcinoma uteri. Well nourished
223	—	47	64	133	185	152	3740	1280	547	82·2	
224	*C*	64	59	131·5	180	147	3479	1103	532	81·7	Carcinoma mammæ
225	*C*	47	65	131	192	145	3647	1408	565	75·5	Carcinoma mammæ. Skull rather thick
226	*A*	74	63	128	191	152	3716	1300	564	79·6	Strang. femoral hernia. Well nourished
227	*C*	67	62	125	185	142	3284	1246	528	76·8	Cerebral hæm. Interstitial nephritis. Emac.
228	*A*	50	—	142	191	155	4204	1380	559	81·2	Fall. Rupture of aorta. Fracture of ribs. Fat
229	*C*	63	63	130	189	152	3735	1350	548	80·4	Malignant dis. of intestines. Very fat. Skull
230	*A*	74	62	121	186	143	3218	1060	542	76·9	Fractured ribs. Skull and scalp thick [thin
231	*C*	49	65·5	137	185·5	145	3685	1350	535	78·2	Carcinoma of omentum. Very fat. Skull thin
232	*C*	46	67	135	196	140	3704	1220	521	71·4	Carcinoma uteri. Emaciated. Skull thick
233	*C*	46	62·5	126·5	174	146	3214	1110	532	83·9	Pulmonary tuberculosis. Skull thick & spongy
234	*C*	50	64·5	125	181	150	3394	1215	542	82·9	Carcinoma uteri. Emaciated. Scalp thin
235	*C*	63	58·5	127	178	143	3233	1104	522	80·3	Carcinoma mammæ. Emaciated. Skull thin
236	*C*	56	64·5	126·5	184	144	3352	1170	533	78·3	Carcinoma of stomach. Slight wasting
237	*C*	63	62	128	179	148	3391	1120	537	82·7	Carcinoma uteri. Emaciated. Scalp thin

E. *Children* ♂.

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	(Cms.³) H×L×B	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
238	*C*	2·5 ms.	22	89·5	125	95	1063	450	361	76·0	Broncho-pneumonia
239	*A*	9 ms.	28	114	155	117	2067	—	—	75·5	Peritonitis
240	—	1 y.–8 m.	37·5	119	168	125	2499	1052	481	74·4	Tubercular meningitis
241	—	2 y.–6 m.	31·75	111	160	131	2327	1015	474	81·9	Acute general tuberculosis
242	—	2 y.–6 m.	33	121	172	135·5	2820	1120	486	78·8	Broncho-pneumonia. Foreign
243	—	2 y.–8 m.	38	116	162	139	2612	1240	483	85·8	
244	*A*	3	37	124·5	181	137	3087	1310	514	75·7	Meningitis
245	*C*	3 y.–6 m.	35·5	121	170	129·5	2664	1095	476	76·2	Septic broncho-pneumonia. Emaciated
246	*C*	3 y.–10 m.	34	127	174	135	2983	1080	501	77·6	Otitis media. Emaciated
247	—	4	39	127	173	134	2944	1202	501	77·5	—. Skull very thin
248	—	5	37·5	125	170	132	2805	1200	490	77·7	Death by suffocation. Foreign
249	*C*	7	46	127	175	140	3112	1375	504	80·0	Tubercular cervical glands
250	—	8	43	131·5	192	140	3535	1450	530	72·9	Pericarditis. Head large and long

E. *Children* ♂. *(Continued.)*

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	(Cms.³) H×L×B	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
251	—	10	52	137·5	187	149·5	3844	1417	539	79·9	Pericarditis. Foreign
252	*C*	11	55	130	181	145	3412	1412	532	80·1	Morbus cordis [spleen
253	*A*	12	65	136	183	141	3509	1379	540	77·1	"Run over." Fracture of ribs. Rupture of
254	*C*	12	48·5	122·5	183	142	3183	1322	528	77·6	Broncho-pneumonia. Pulm. tuberculosis
255	—	12–13	56·5	134	184	143	3526	1454	530	77·7	
256	*C*	15	62·5	141	190·5	151	4056	1618	547	79·2	Diabetes. Coma
257	*C*	17	67	129	189	150·5	3669	1095	536	79·6	Morbus cordis. Wasted. Foreign
258	*C*	18	71	131	172	142	3200	1230	520	82·6	Tubercular meningitis. Foreign
259	*C*	19	67	143	187	146	3904	1460	556	78·1	Psoas abscess. Tubercular meningitis
260	*A*	19	67·5	135	191	157	4048	1278	558	82·2	Bullet wound in head
261	*A*	19	65·5	133	188·5	147·5	3698	1412	540	78·2	Pneumonia
262	—	19	69·5	138	189	149	3886	1450	547	78·8	Cerebral abscess. Meningitis

F. *Children* ♀.

No.	Acute or Chronic	Age	(Inches) Stature	(Millimetres) H	L	B	(Cms.³) H×L×B	Grms. Brain weight	Mm. Circ.	Cephalic Index	Cause of Death, etc.
263	—	3 wks.	21·5	92·5	114	88·5	933	385	324	77·6	Bronchitis. "Brought in dead"
264	*C*	2·5 ms.	22	94·5	129·5	99	1212	490	369	76·4	Gastro-enteritis. Foreign
265	*C*	5 ms.	22·5	88·5	129	95	1085	512	368	73·6	Convulsions
266	*C*	6 ms.	24·5	100	132·5	104·5	1385	503	385	78·8	Malignant growth of orbit (? sarcoma)
267	*C*	8 ms.	25	118	144	126	2141	960	437	87·5	Rickets. Gastro-enteriti. Foreign
268	*C*	2 y.–6 ms.	33·5	124	172	132	2815	995	496	76·7	Tuberculosis. Emaciated
269	*A*	3 y.–6 ms.	38·5	114	164	126	2356	1100	475	76·8	Fracture of base of skull
270	—	7	47	121	169	131	2679	1120	493	77·5	Pulmonary tuberculosis. Meningitis
271	*C*	7	48	118	174	133	2731	1205	485	76·4	
272	*C*	15	61·5	128	185	139	3292	1205	518	75·1	Otitis media. Thrombosis of R. lateral sinus
273	*C*	17	61	125·5	178	143·5	3206	1180	524	80·6	Tubercular meningitis. Skull thick. Emac.
274	*C*	18	53·5	125	179	135	3021	1147	507	75·4	Mitral regurgitation. Gangrene of hands
275	*C*	18	66	139	186	151	3904	1419	554	81·2	Chronic otitis media. Cerebellar abscess
276	—	19	65	131	179	141	3306	1245	512	78·8	