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DEPARTMENT OF MEDICINE

(Diseases of Children,
) and
(Alienist Medicine.

THE

MONGOLIAN TYPE

of

MENTAL-FEEBLENESS IN INFANTS.

with

TWENTY-SIX CASES.

GRADUATION THESIS FOR THE DEGREE OF M.D.

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THE MONGOLIAN TYPE OF MENTAL-FEEBLENESS IN INFANTS.

liminary
note.

On choosing "Mongolism" as a subject for a Graduation Thesis one is struck by the paucity of the literature bearing on it, both in Great Britain and abroad. The whole range of German and Austrian writings contains only two short original referen-
ces. ^{(1) & (2)} From French sources no original communica-
tions and only a few abstracts from English papers are discoverable. The magazine and other medical literature of the United States show only ^{three} ~~two~~ short reports of individual cases. ^{15, 32 & 39} Neumann in 1899 said "This form of idiocy is nowhere mentioned in German "literature", but states that on the contrary it is better known in England. (23) It is strange that such a well-marked group of cases should be so long ignored on the Continent. Though almost all that has been written on "Mongolism" is the work of British observers, the number of papers is surprisingly few. Two fairly full descriptions of the appearances of the type, and a small number of shorter notices constitute all that has been done. Many of these observations differ not only on minor, but on important/

ant points. These discrepancies are due in some instances to the disease being confused with Cretinism. The remarks contained in the following pages are the result of a study of ^{twenty-six} ~~eighteen~~ well marked cases, where the diagnosis was always carefully confirmed by several men, and which were placed at my disposal, or have come under my observation or treatment as Clinical Assistant at the Great Ormond Street Hospital for Children. Such a large number of examples could not easily have been brought together except by the kindness of the Staff and especially of *Drs Still. ^{& Hutchison.} I have, nevertheless, tried to free myself from preconceived notions and from the undue influence of the opinions of others. A bibliography, a series of photographs, and a short summary of the main features of each case are appended.

In 1866 Dr Langdon-Down made an attempt to arrange the various classes of idiots round certain ethnic standards - other than those from which they have sprung: as for example a Negro type, a North-American Indian type and some others. (18) He suggested the term "Mongol" or "Kalmuc" to describe a genus of

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congenital imbecility the members of which presented certain physiognomical resemblances to the members of this ethnological group. The chief features in both were the obliquity of the eyes, and supraorbital ridges, and the narrow palpebral fissure. This ethnic classification has now been abandoned, as it is unscientific to found classes on merely physiognomical traits. The term "Mongol", however, being expressive and descriptive, has survived.

ition of
e Mongol
Group.

Several definitions more or less unsatisfactory have been offered. They have been called "furfuraceous cretins", whatever that may mean. F. Beach classifies them under "simple congenital cases", (20) without any other defect of skull or limbs; a description which is inadmissible because, first, it includes cases other than Mongols, and second, brachycephaly, or at any rate a diminution of the normal difference between the lengths of the antero-posterior and transverse diameters - which is surely a cranial defect - is one of the constant features of the affection. Mongolism is, however, different from other congenital types such as cretinism, congenital hydrocephaly, microcephaly, and the birth palsies. By some writers, the Mongols are ranked as imbeciles, by others as idiots. My own cases varied/

varied greatly, some being of a distinctly low grade though others again are the opposite. The general term "Mental Feebleness" seems more satisfactory. Mongolism might perhaps be defined as a type of mental feebleness, always congenital in origin, characterised by certain constant cranial and lingual changes. These changes will be described later.

raphical
tribution

This seems to be co-equal with that of the Caucasian race. Most large asylums of Europe and North America possess examples, though not so common there as in the outpatient practice of our large Childrens' Hospitals owing to the liability of Mongols to early death. At the Royal Hospital in Edinburgh cases are not uncommon, and in such institutions for the Insane as that at Kinross, ~~etc.~~, which serves a large surrounding district, there are, or have been examples. (1) In England the distribution is general. I have seen cases at Liverpool and elsewhere, and at the Lancaster County Asylum there is usually a considerable number. (2) My own cases represent London, Poplar, Kingston, Ponders End, Homerton, Southend on Sea, Woolwich, Leyton, Hampstead, Tottenham, Edmonton, Harrow-on-the-Hill, etc. I had another case from Magdeburg, Germany in which country Neumann (the only German writer who has given attention/

tion to the subject) saw 13 cases in between three and four years);⁽²³⁾ and another from Roumania. Carl Looft reports cases in Norway⁽²²⁾ and it is known in Austria.⁽²¹⁾ Lombroso long ago gave an account from Italy of Martinette Colomba evidently a "Mongol".⁽³³⁾ The Colonies are not exempt: I have seen a case at home in South Africa, and Dr Ireland mentions another from Australia.⁽⁴⁾ Case XXI came from Bermuda. Several authors mention instances in the United States.^(15, 25, 26, 39.) Thus, though little interest has so far been taken in Mongolism until perhaps the last year or two, judging by the published writings, it is certain that it exists everywhere. It is found in the country as well as in the towns, and no white race, including the Jewish to which two of my cases belong, is exempt.

quency. It seems considerably less common in Scotland than in England. While in the former 3% of all cases of mental feebleness are Mongols,⁽³⁸⁾ in the latter the proportion has been calculated to be from 5 to 10%.⁽¹⁾⁽⁸⁾ For every new case of Cretinism, I have seen at least four of Mongolism. In Germany Neumann saw thirteen cases in between four and five years. In America West saw nine cases in four years.⁽³⁹⁾

Sex.

6.

As regards sex it occurs slightly more often among males than among females. In my own series there were 15 males and 11 females. Of 80 cases from all sources 56% belonged to the male sex and 44% to the female.

Despite the relative frequency of the two conditions Cretinism is much better known to general practitioners than Mongolism.

ptom-
logy.

There are certain features which are characteristic of and peculiar to Mongolism, and others which though present in this type are common to other forms of mental feebleness as well. I will confine myself to those appearances which I have myself seen in my own cases, merely mentioning when necessary wherein they differ or agree with those of other observers. The symptoms are present from birth, a point insisted on by Dr John Thomson.Ⓒ. Two of my cases confirm this in a remarkable way. In Case I (see Appendix II) the aunt remarked when the child was born, "Oh! isn't she like a Chinese baby." When Case VI. was eight weeks old the grandfather said, "Well baby, you didn't have to go to Japan for "your eyes." In well marked cases there is no difficulty in the diagnosis, the peculiar physiognomy attracting the attention even of the laity. The trunk and limbs are at birth perfectly well formed, but are on a small scale. Those features which are characteristic/

characteristic occur in the skull, eyes, tongue and hands and will be described first.

skull. The circumference of the head is always diminished, and should be taken at the level of the external occipital protuberance behind, above the ears laterally, and the lower portion of the frontal bones in front. Table I. gives this measurement in ^{nearly} all the cases, and the normal circumferences calculated according to sex and age in parallel columns for purposes of comparison. Page 71.

The youngest patients I have seen are two aged two months, with a circumference of 14 ins and 15 ins respectively. This compares well with the normal measurement at birth in healthy children, viz 14 ins. In the older children, however, where growth has been retarded, the difference is clearer. Of twenty such cases the average diminution was $1\frac{3}{10}$ inches, and practically the same in both boys and girls, the average difference between them being $\frac{1}{20}$ inch only. The extent of the diminution varied from nil to $2\frac{1}{4}$ inches, which was the maximum.

Brachycephaly - a shortening of the normal antero-posterior diameter - is always present in typical cases. Owing to this shortening the difference in length between the antero-posterior and transverse diameters is less than in healthy children. This is shown in Table II. Page 72.

No statistics, so far as I have been able to discover, exist in any language, giving the normal measurements of the antero-posterior and transverse cranial diameters in healthy children at different ages. Among my series of cases I was fortunate enough to get no less than 7 of almost identical age, thus forming a group representing the Mongols. Measurements were then made of the heads of 50 healthy children, for purposes of comparison, the ages in both groups namely two years being the same. The average length of the antero-posterior diameter in the Mongols is $5\frac{1}{4}$ inches; in the healthy children $6\frac{1}{2}$ inches — difference $\frac{1}{4}$ in. The Mongolian transverse diameter averages 5 ins, the normal is $5\frac{1}{4}$ ins. — difference $\frac{1}{4}$ ins.

The back of the head is flattened both laterally and vertically and is steep, so that it is often difficult to make out the occipital protuberance in taking measurement. It is not often, only once out of 26 cases, that this flattening is absent. In Case III. the occiput was decidedly prominent forming a marked exception to the rest of the series. I have, however, never seen a case of actual depression of this region, such as Sutherland describes having sometimes met with. (4) The absence of the usual rounded condition of the occiput results in a tendency of the frontal and occiput planes to become parallel. This and the altered ratio of the diameters of the skull are clearly shown/

shown in the actual tracing of the occipito-frontal circumference of Case I. here shown. (Fig. 1). The general shape of the head still, however, remains an oval. Page 67.

The fontanelles remain open until long after babyhood. Normally the anterior fontanelle closes at about 18 months, and this is the earliest date at which I have seen it close in a Mongol. The latest at which I have seen it remain open is four years, but a case has been reported even up to four years and nine months.⑦ From my own cases the usual date of union is at about $2\frac{1}{2}$ years of age.

The posterior fontanelle which is obliterated usually about the end of the second month is still open often at the 4th, 5th and even the 10th month. The union of the lambdoidal, coronal, and sagittal sutures is also delayed.

Face.

The face is also flat and frequently depressed as a whole. The lower part of the forehead extending right across is then less prominent and on a plane posterior to that of the upper. (Photo XV.) This depression of the lower frontal region sweeping downwards forms a continuous concave curve with the broad, flattened sunken bridge of the nose, which is not much elevated above the level of the cheeks. The lower part of the nose has the alae laterally extended, /

ed, the tip is pre-morse, and the nostrils look upwards. This is beautifully shown in some of the annexed photographs, e.g. those of Case XV. and I. Looking at the face in profile therefore, there is presented in typical cases a double curved line; the upper with the convexity outwards formed by the upper portion of the frontal region, the lower with the concavity outwards comprising the lower frontal region and running out to the tip of the nose. From the malar region on each side extending inwards towards the root of the nose there is frequently another hollow. The complexion is as a general rule good, except in the early weeks of life or when the child is of the thick skinned strumous type as in Case I. In cretinism on the other hand it is dark and muddy and not rosy. The cheeks are broadened out in both lateral directions below as shown in the photos of Cases I. and VI., and in their upper part help in producing the idea of general flatness of the face. The features seem to be smoothed into one another as if modelled from some plastic material with the pulp of the finger. There is no fine chiselling even in older children, and in consequence no ^{facial} evidence of character. The forehead is often/

often transversely wrinkled, apparently by the levator palpebrarum and occipito-frontalis muscles. The presence of these furrows, which are very well marked in all my low grade cases, has been carefully removed by the art of the photographer in the portraits shown here.

The lower lip often protrudes slightly in front of the upper, but in no case was there prognathism. As will be seen from the photos, the mouth is open and in low grade cases the tongue can be observed lying forwards on the teeth or against the lower lip. It is uncommon to see it hanging out as in cretinism.

The most noticeable thing about the face, however, is the eyes. They are obliquely set, apparently rather far apart, and the palpebral fissure is narrow. The external canthus is at a higher level than the internal one. This "Mongolian Eye" which one so commonly sees in the East has given its name to the type.

The flattened "pan cake" face, the narrow, obliquely set eyes, the broad sunken nose, the gaping mouth, the pink colour of the cheeks frequently covered with a fine desquamation, and the vacuous, expressionless cast of countenance are the chief physiognomical characteristics of a typical, fairly low-grade case of Mongolism.

The Eyes.

Some of these points must now be studied in greater detail. Strabismus, always convergent and concomitant, occurred in ~~six~~^{seven} cases. Nystagmus was present ~~three~~^{five} times; and is more common laterally than vertically. Sutherland states that both these symptoms tend to disappear after the first six months. (4) This does not agree with my experience, as in three cases it appeared in infancy and persisted, and in two others it appeared first at 18 months and 26 months. I have only met with one instance of squint or nystagmus which dated from birth passing off later, though of course, they may do so more frequently, just as nystagmus when associated with spasmus nutans does. Ametropia is commonly ^{seen} associated with these defects or independently. I have observed no noteworthy fundal changes even where nystagmus was present. The iris ^{is} more commonly blue or grey than brown or black, like the hair, and congenital pigmentary flecks are frequent. Ophthalmia tarsi is described as almost universal, but was seen in only two cases. When present it is among older children, and in cases with a marked tuberculous history; and leads as is usual to loss of eyelashes and rawness of the lids.

Epicanthus/

Epican-
thus.

Epicanthus occurred ^{seven} ~~five~~ times, and when present has two results:-

- a. It increases the obliquity of the palpebral fissure.
- b. It gives an appearance of greater width between the eyes.

Those children with epicanthus are much more Mongolian looking than those without, e.g. photo of Case XV.; indeed, owing to its being physiologically present in that race, it is sometimes called the "Mongolian fold".

Width be-
tween the
Eyes.

It is an interesting point, to which so far no writer has paid special attention, whether the appearance of greater width between the eyes is actual or not. I have measured the distance between the centres of the pupils in all my cases, and the results are shown in Table III. To measure the distance between the internal canthi would be fallacious. The widening seems to be both apparent and actual. The actual increase is comparatively little as will be seen from the figures, which are not much ^{if any} above what are usual. ^{in healthy children.} A more important factor is that which causes the apparent widening, namely the increased width of the broad, sunken, nasal bridge; and epicanthus when present is also a cause. Dr John Thomson⁶ remarks that the eyes are often rather near one/

one another, but I have not met with such a case.

Another question that is worth considering is, "Are the causes of the obliquity of the eyes in "Mongolism and in the Mongolians identical in both?"

The capable Japanese observer Kōmotō states as the conclusion of his researches, that the differences between the characteristic eye of the Mongolian and Caucasian races are caused solely by the epicanthus, which, rare among the latter, exists physiologically among the Japanese. (34) In the majority of cases it runs in and down from the upper lid, so that the inner canthus is not round, as in white people, but is sharp. When the fold is large, the upper lid does not cross the cornea horizontally, but obliquely, giving the peculiar expression to the eye often met with in Japanese.

Now in Mongolism the epicanthus merely increases the obliquity of the palpebral fissure, which is really due to skeletal peculiarities, and remains when the epicanthus is absent. If Kōmotō is correct and the obliquity among Mongolians is solely epicanthic in origin and not due to anatomical differences in the skull, then the causes are different in the two classes. From examinations of Chinese and Japanese which I have made in the East, I had always/

ways thought that it was due in their case not only to the epicanthus, but to the shape and direction of the bony orbit, and supra-orbital ridges.

Mouth.

As these children are commonly mouth-breathers, the mouth is usually kept open, but not to the same degree as in cretinism. It is sometimes closed during sleep in high grade cases but exceptionally so. In moderate and low grade cases there is dribbling of saliva over the lips, as in most forms of idiocy, and as a result the latter get thick, fissured vertically, and often bleed. This fissuring is well seen in Photo I. The buccal cavity like the naso-pharynx is smaller than in healthy children.

Tongue.

The condition of the tongue is one of the most characteristic and constant features in Mongolism. I have never seen this organ much enlarged and hanging out of the mouth. Slight protrusion (shown in some of the photographs) is almost always present; more marked when the child cries. During sleep it may be entirely within the mouth. The position of the tongue is important in the diagnosis from cretinism, and some cases that have been described as Mongols with very large protruding tongues were possibly/

ibly cases of Cretinism. In many instances it is long, narrow and pointed; but on the whole, up to the age of two years it is like that of any other child. The first change is that the fungiform papillae commence to hypertrophy and appear as little red discs. This goes on until the papillae in bad cases become very large and the surface of the tongue presents a piled appearance. In moderate cases there is a less degree of overgrowth. These papillae stop short along certain lines and give rise to an arrangement of fissures, whereby the surface of the tongue is divided into irregular areas. There is no fixed plan which they follow and they may be transverse, longitudinal or oblique in direction. There are usually some transverse fissures on the middle dorsal region of the tongue. Towards the margins they are frequently oblique, and between these two sets and separating them there may be some longitudinal ones. (Fig. 2). No fixed pattern however, obtains. This fissuring is always preceded by, and is due to the hypertrophy of the fungiform papillae, and both are invariably present after a certain age. I have never seen this appearance in microcephaly, hydrocephaly, cretinism/

cretinism or in any other form of mental feebleness. It is, according to Dr John Thomson, always present over the age of four years, but he has not seen it under two years. (6) In Case XV. there was slight, though distinct fissuring at twenty-two months, which is the earliest date in any of my cases. From notes of other cases, I find the following:-

In 8 under 12 months no hypertrophy or fissuring

In 2 aged 24 & 26 " " " " "

In 3 " 24, 26 & 30 months, hypertrophy commencing, no fissures.

In Case III. at $26\frac{1}{2}$ months there was typical transverse and longitudinal fissuring.

In 6 aged $2\frac{3}{4}$, 4, 4, 10, 11 & 11 years fissuring was present.

The onset, therefore, varies not only according to age, but to other conditions as well.

Palate.

Deformity of the palate is commoner in this than in any other type of mental feebleness, according to R. Jones (24). This is what one might expect in a congenital type of mental feebleness like this.

Palatal deviations from the normal were evident in 65% of my cases. These varied much in type.

In seven the palate was of the high narrow keel-shaped type.

In two it was 'high' merely, and in one it was high with a median ridge.

In one it was narrow, but not high.

In two the palate was broad and approaching the circular type.

In four it was flatter than in healthy children, but the abnormality of such a minor degree, that it may be described as 'fair'.

In nine cases no deformity whatever was present.

The mucous membrane lining the ^{palatal &} inner alveolar surfaces in many instances thickened, wrinkled and sodden-looking, and helps in some cases to give an appearance of increased height to the palate.

Nose.

Besides the features already noticed in the nose, rhinitis with more or less discharge is very frequent.

Naso-pharynx.

The size of the nasopharynx is diminished, not only by changes in the skull, but often also by catarrh of the mucous membrane, and adenoids; and this/

this leads again to mouth-breathing, snoring, and snorting. Once or twice there was insufficient space to admit the finger for purposes of exploration.

Ears.

Usually the ears are normal; sometimes they are too small or large and spreading, or the lobules are adherent. ^{in six cases.} They are occasionally deficient in finer modelling. In none of my cases were they set too far back.

Teeth.

The first dentition is in the great majority of cases delayed. In one case the teeth which appeared first were the lower central incisors at 10 months, in another the upper central incisors at 9 months. These are the earliest I have seen, in all others the date of eruption was much later. The lower incisors appeared from 16-26 months: usual time 6-9 mos. The four upper incisors appeared from 17-19 mos: usual time 8-12 mos. Right upper molar appeared from 14-18½ mos: usual time 12-15 mos. Left upper molar appeared from 14-23 mos: usual time 12-15 mos. The lower molars, and lower lateral incisors appear late in the same way.

One child of 26 months had only four teeth, another of 2½ years had six, and a third of 22 months the same.

Nor do they appear in the usual order. The usual teeth to appear first are the lower central incisors just as in healthy children; this occurs in about one half the cases. In a large proportion of cases the first to appear are the upper anterior molars, and it is common also for the upper central incisors to break through first. To take some typical examples:- In Case I. the right upper molar appeared first at $18\frac{1}{2}$ months, the left upper molar at 23 months, and the two lower central incisors at 26 months.

In Case III. the upper molars came first, then all four lower incisors, then the four upper incisors, followed by the lower molars.

In Case XIII. the upper incisors appeared first at 18 months; the lower at 19 months, and the upper premolars later.

The second dentition is also delayed so that the six-year molars may not appear until two years later.

The teeth themselves show usually greater or less irregularity in position, especially the upper and lower incisors. They may be crowded together or widely spaced. While the molars are fairly normal, the incisors are often small and pointed. Deficient enamel, and pits and grooves are common conditions in
my/

my cases, so that caries quickly appears. The upper incisors are often screwed round on a vertical axis so that the anterior surfaces look towards one another; thus interfering with the accurate meeting together of the upper and lower teeth. The first teeth to decay are the premolars. At 26 months all the teeth may be bad, but in a few cases as at 5 years, they are still good.

Nails.

The nails are usually broader than long, ribbed, pitted, or striated. In older children they are often gnawed short. Some of these defects are due to imperfect development.

Hair.

In Mongolism the hair may be of any colour, though it is more often light than dark, but in Cretinism it has a tendency to be sandy. It is often said that in Mongols it is coarse and scanty, but this is untrue in the general way in which it is usually put. My experience is that in infancy it is usually soft and in most cases abundant. In some cases the hair is long, fine, dry and stands straight up from the head. In only five out of 18, could it be described fairly as scanty. In several instances the occiput was rubbed bare of hair through incessant rolling, and banging of the head.

Skin.

In the same way it is exceptional to find the skin "coarse and furfuraceous" in my cases. Except in Case I. - a strumous sluggish infant with a thick skin - it is always soft both in infancy and subsequently. The only place where it is furfuraceous is in the face, and then as a fine yellowish-white scalliness showing up against the pink cheeks. The elasticity is diminished in many children.

GENERAL CONTOUR.Stature.

Though in a large proportion of cases, ten out of eighteen cases, these children are weak from birth (my own experience confirming Sir A. Mitchell's in this respect) ⁽ⁱⁱ⁾ the body is well formed. The stature is less than normal; ^{in 14 of 18 cases measured} the average decrease being $3\frac{1}{2}$ inches, and less in boys than girls, as 23 : 25 ; but there is no deformity as occurs in Cretinism. Table IV. gives the height in each case, the age and the average in healthy individuals. It is interesting to note that in seven adult males, the range was from 50 - $63\frac{1}{2}$ inches, average 54, and in fifteen females from 49-61 inches, average 53 (Mitchell). ⁽ⁱⁱ⁾ Mongols are small boned, small limbed children so that it is natural to expect their height to be less. In the remaining 4 cases the Mongols were $\frac{2}{5}$ - $\frac{1}{2}$ inch above ~~the~~ the average height for their ages.

Body-Weight

A comparison of the body weight reveals a corresponding difference as shown in Table V. The average diminution is 6lbs, 9ozs. Sometimes, however, a Mongol becomes very fat, when the diminution is less apparent. Page 75.

Limbs.

The long bones such as the humerus and femur are shorter and more slender than usual. I have measured and compared in a few cases the length of the upper and fore arm. This was suggested to me by a passage in Dr Ireland's book concerning idiocy in general. (4). In one case they were equal, in another the difference was $\frac{3}{8}$ inch, but in the others no alteration was ascertainable. In the foetal condition, up to the 50th day, and in apes, the forearm is longer than the upper arm, in man it is vice versa.

Hands.

The hands are short, frequently fat, broad, and sometimes, but only in the very young children, soaked looking. The carpus and metacarpus are small. The thumb and little finger are relatively very short, while the second, middle and fourth fingers are often about the same length. The tips are tapering, not square as in cretinism. In 1896 Dr Telford Smith (2) described a peculiar outward curving of the little finger, wherein he wrote, "The second phalanx of the "little/

"little finger is considerably shorter than normal, and there is much lateral displacement of the terminal phalanx." This was so constant, he observed, as to be almost distinctive of the type. His observations were on asylum cases, who are young adults as a rule, and are certainly not confirmed by a study of the hands of infants. In paying special attention to this point, I found this curvature present twelve times:-

In 9 it was quite well marked. Fig. 3 shows such a case. Page 68.

In 3 it was slight and could easily be overlooked.

In 13 it was entirely absent.

It is thus not constant, and as I have seen it in microcephaly, cretinism, and healthy children, it is not distinctive of Mongolism. In one case the father had a similar curvature, and in another the mother. Case XIII. had bilateral Dupuytren's contraction, a congenital condition. *Since this was written J.P. West in America has confirmed these observations. (39).*

Feet.

The feet are clumsy, splayed out especially in the fore part and broad. In my cases the toes were never deformed, as is described in adults, and there was never overlapping. They were frequently abnormal/

mal in length however. In some cases the second toe was much longer than the hallux which was equal to the third toe. In some, the 2nd and 3rd toes were the longest. In others the hallux was very long, and the next three toes very short. Case XIV. had webbing of the 4th and little toe of one foot, and Case XVIII. the same on both sides. In one instance a supernumerary toe was present.

Joints &
Ligaments.

There is great laxity of the ligaments in Mongolism and in consequence a great range of movement at the joints. This continues to a late age, and some of the movements permitted can probably only be accomplished by a slight dislocation of the joint. One little girl at 26 months goes to sleep every night with her leg held tightly in her arms upright against her body and face like a doll. She also can sit with one leg straight out on the bed in front, and the other straight out behind, a feat known on the stage as the "splits". Hyperextension is permitted at the knee, and is often voluntary to an extreme degree at the wrist. Another case can place the leg upright against the face with ~~the~~ the aid of the hands. The mother was afraid in one case to wash the child in a bath, as its limbs bent about in such an extraordinary fashion.

Circulation.

As in so many other organs and systems, congenital malformations of the heart are not infrequent, which one might expect in such a half-finished type as Mongolism. I have seen ~~two~~^{five} such cases. Sometimes the condition tends to improve as in Case I., who at 26 months still has a very faint congenital basal systolic murmur which, however, was much more distinct at birth. At three months the public vaccinator refused vaccination as she had "heart disease".

Case VI. aged $2\frac{3}{4}$ years when seen on August 16th had a loud murmur, systolic in time, in the pulmonary, aortic and mitral areas; the fingers and toes being clubbed. This was the most urgent condition present, and the child quickly went down-hill.

Those having these malformations - usually of the foramen ovale, or ductus arteriosus^{or combinations of these} - die early, so that they are rarely found in older children. A. E. Garrod says they are more common in this type than in other forms of idiocy.②.

Respiratory System.

Mouth breathing and snoring were present in almost all my cases, due to narrowing of the upper respiratory passages, caused by alteration in the skull, swelling/

swelling of the mucous membrane and adenoids. The latter are usually to be found, and in one case the child had been operated on owing to the snoring, without the mental condition being noticed. A peculiar snorting noise often heard is perhaps due to the same causes. The limitation of space due to the skull alone, is, however, sufficient when adenoids are absent to produce snoring.

Abdomen.

The abdomen is often very large as in rickets. Umbilical hernia was found in ~~three~~^{four} cases. Constipation was complained of specially in 28% of my cases; mucous disease (of Eustace Smith) was present in two instances, and diarrhoea in others. In spite of the muscular weakness, they are always able to take the breast well at birth.

Reproductive System.

Sir A. Mitchell met with unilateral cryptorchidism in five cases. (11). I have seen it once, bilateral in a child of 26 months; in others the organs were so soft that they are often impalpable. The molimina appear late. In such a vegetable existence one can hardly expect active eroticism.

Cerebral & Mental Functions

The mental condition in Mongolism is usually termed "Imbecility", but in a large proportion 14 out of 24 it was one of idiocy of a low grade; in ~~two~~/

~~four~~ ^{seven} it was medium, and in ~~four~~ it was high grade.

Some of these children are lethargic, and like to be left alone. They will, however, watch anything moving such as horses, with interest. This would be true in three of my cases. The majority, however, are bright, stirring and active. In all cases in early infancy the mothers often say how good they are, and how little trouble they cause in comparison with the others. Some will lie quietly on the back for hours, smiling at nothing, or looking at their toes, the legs being held up vertically at right angles to the body, every now and again nodding the head and rubbing the feet together in pleasure. It has been wittily said that "Mongols have a secret joy, and cretins a secret sorrow." (4).

They are affectionate, sometimes jealous, but I have never seen any displays of bad temper or moral delinquency which are met with in ^{other forms of} idiocy. As a rule they recognise friends and parents, but one child of $26\frac{1}{2}$ months did not know her sisters. They will turn their faces away and hide them in the mother's dress if made fun of, and are sensitive and shy in this respect.

Whatever ministers to pleasure through the eye or ear delights them, such as music, pictures, dancing/

ing, and anything moving. A few learn to hum tunes with a fair idea of time and rhythm, but not to sing the words.

In everything their powers of imitation are great, their originality is nil. They are the parrots and magpies of the idiot race. They like scribbling, opening and closing doors, and imitating soldiers.

They have various peculiar ways of expressing pleasure. One child draws in his breath and makes a squeak which the mother compares to that of a chicken, another always rocks herself to and fro and makes no sound, but the commonest is a peculiar strident inspiratory noise impossible to describe. Only one child clapped his hands like most other children.

They are cleanly and can be taught to attend to the *primae viae*. Many of them, 10 out of 18, give some sort of warning, usually a grunt or other sound before defaecation, but much less frequently before micturition. This was seen as early as ten months, but in another no warning was given at $2\frac{1}{4}$ years.

The higher mental processes, such as calculation, tested by counting fingers, are beyond them.

Peculiar
Habits.

Mongol children have several very peculiar and common habits. While looking at something they often suddenly roll the eyes quite upwards so as to show the sclerotic, or they may turn the eyes laterally and look out of the corners. Many of them are fond of holding one hand close to the eyes, with the fingers spread out, for long periods, as if counting them. Another common habit is a rapid protrusion and withdrawing of the tongue in a reptile-like way. Tongue sucking is another trait often met with.

Speech.

Speech comes very late. Normally the average child begins to say "mama" and "papa" towards the end of the first year. Five children between the age of 26 months and four years could not talk at all. One at 26 months could say only one word "Dada". Several between 18-24 months could say the same words, and two called the cat by its name. Speech proper does not develop until much later, in two cases at 6 and 7 years respectively. In Mongolism the development of speech is in the same order as in healthy children. The words "mama", "papa", "tata" are learnt first, then the names of persons, then the names of things, and next verbs. Case V., my most accomplished Mongol, went no further than this.

Adverbs/

Adverbs and adjectives would naturally come next, and then the articles, but no Mongol got so far. Case V. never made use of any pronouns at all. The intonation of the voice is guttural and nasal.

The facial expression and the sound in crying are quite different from those of healthy children. Sutherland describes that the lower lip protrudes before the upper in a special way, and that the eyelids become sometimes everted so as to show the conjunctival surface.④. I have seen nearly all my cases cry, but have never seen the eyelids everted. The protrusion of the lower lip in the way he describes was seen in four cases.

All the different varieties of facial expression are altered in Mongolism owing to the anatomical peculiarities of the skull.

Sensory Functions. With regard to the sensory system, there is no perversion to be found, and the same is true of the motor functions.

Motor Functions. There is nothing abnormal clinically about the reflexes, except that the extensor reflex of the foot, which disappears usually about the end of the first year, persists somewhat longer, in Case XIV. up to $2\frac{1}{2}$ years. The pyramids therefore are probably/

ly late in developing. None of my cases had ever had convulsions.

The above traits are exemplified for the most part by the following three cases, one being low-grade and two high-grade.

Case I.

Girl, 26 months, low grade case. She hears acutely and is easily awakened by sounds. If she hears children crying in the streets she becomes excited, works her legs, and grunts to draw attention. When she smiles it is chiefly with the upper part of the face, closing one eye, and keeping the other open. She has the habit of suddenly turning the eyes laterally, so that the neighbours remark how sly she looks. She recognizes the members of the family, and says, "Ah, Dada", but no other words. Can't sit up, nor support head. She is affectionate, lethargic, but doesn't like strangers. She gives no warning before defaecation. There is great mobility of the joints. She has not learnt to hold even a piece of cake in her hands, much less to feed herself.

Case II.

Boy, age 10 years. A very remarkable case. Began to talk between 6 and 7 years. He is now cleanly/

cleanly in his habits, and attends to primae viae. He is affectionate, but when teased by other children, is sometimes spiteful, and is rather rough. He likes to sit still, but is the reverse of lethargic. Is very fond of music, and often tries to play on the piano. Clog-dancing he does very well, and step-dancing also. He starts dancing when a street organ plays, or will imitate others dancing. He knows all the latest comic and music-hall tunes, and sang for me "Why can't every man have three Wives", so that I was able at least to recognise the tune. He is fond of horses and likes to stroke them in the street. He can give his name and address, and find his way about to some extent. He can repeat any word fairly correctly. Comprehension of spoken orders and questions is remarkably good. He will answer "Yes" or "No", but if sulky nods or shakes his head instead. He likes to be in a crowd, and see people moving about. He gave me good pantomimic descriptions of soldiers in the park, saluting, firing, working the lever of the magazine, presenting, standing to attention and at ease; some of these at my command, and better than most sane children could have done. He is very deliberate, and acts with great verve. He imitated a cyclist-corps/

corps volunteer riding his bicycle, and men marching and carrying rifles. His speech is simple, consisting of nouns, adjectives and participles, but few finite verbs. If asked what the Volunteers were doing in the park, he answers very gruffly, "Fighting". He enjoys football matches, and when he comes home, gives descriptions in pantomime, exclaiming at intervals, "Football", "Man fall over". He saw a horse slip on the street one day and said, "Horse dead". His voice is gruff, harsh, each word given with a jerk of the head, surly, ~~and~~ with a strange ventriloquial timbre, and sounding far away. It is nasal but the nasal quality is not the characteristic thing about it. The g is as in the Dutch language. The c is very nasal. He h is accompanied by a downward pull or twitch of the alae nasi.

Case X.

Boy, age 11. Talked at 7 years. Wonderfully intelligent, talks fairly well and answers questions. Fond of gardening, which he does well. Likes to put on his brother's Volunteer uniform. When he saw me first, he gave the military salute. Cannot count fingers, and blushes at his inability to do so. Repeats numerals to ten. Clean in habits. Can dance/

Congenital heart disease. Umbilical hernia.
Palate: Deformities of. Teeth.
Moles: Naevi in three cases.
 Cryptorchidism, phimosis. Skin.

Mention is made of other malformations in magazine literature such as spina bifida occulta, congenital club foot and imperforate anus, etc. (4).

II. PHYSIOLOGICAL.

Late walking and talking, nystagmus, ametropia, stammering, alalia, diminished resistance to disease, retarded puberty.

III. PSYCHICAL.

Idiocy, imbecility, tongue sucking, etc.

I have followed here the classification adopted by Holt from Peterson in dealing with degenerates in general. (37).

In out patient practice one does not often see Mongols until the early months of infancy have passed, and then very often for constipation or diarrhoea. Nystagmus was the cause of the child being brought in one case. After the first year has passed and the child does not hold its head up, and can/

can not sit, the mother often thinks there is something the matter with the back. They rarely suspect any mental defect.

From two cases quoted it will be seen that the obliquity of the eyes is noticeable even by the laity at birth. Under two years nothing is seen in the tongue as a rule. The brachycephaly is seen, and the usual symptoms of mental feebleness common to all types, such as a failure to notice things, delayed talking, etc., ensues; slavering after the end of a year is suspicious. After the end of the second year the characteristic features in the tongue appear. Clinically, however, the diagnosis is easy if a typical, well marked case has first been seen as a standard. The question is usually one of diagnosing the presence of mental deficiency, as the physiognomical resemblances to the Mongolians are usually patent.

Normal
Children.

Some normal children have sometimes a facies something like that of Mongolism. In looking over the cases presented during a morning in the waiting room, I have several times been deceived by healthy children whom I took at a distance to be Mongols. An examination of the hands, skull and tongue soon shows/

shows the error, and the diagnosis must only be made after a careful examination into all the signs and symptoms present.

Syphilis.

The fissured lips, sunken bridge of the nose, and snoring, snuffling respiration might suggest this. An examination of the skin on buttocks and hands, mouth, skull and glands, and the history are sufficient guides. The eyes, hands, skull and tongue in Mongolism are quite different.

Cretinism

This is usually the chief source of error. The greatest differences are in the skull, the hands, the eyes and the tongue. They are most marked in infancy. The chief resemblances are in the general symptoms of idiocy and backwardness, diminished stature, broad flat nasal bridge, prominent abdomen, broad hands and open mouth. The differences are shown comparatively in the annexed table.

MONGOLISM.

CRETINISM.

1. <u>Hands</u> : Fingers tapering, little finger commonly curved, thumb and little finger very short.	Fingers blunt and square at ends, little finger rarely curved. Size of fingers bearing proper proportion to each other.
2. Skull brachycephalic.	Large. Nothing special.
3. <u>Face</u> : obliquely set eyes, round broad face often depressed, pink colour on cheeks.	Eyes not oblique, thick heavy lips and features, earthy colour often.
4. Epicanthus common.	None.
5. Congenital heart disease common.	Rare.
6. Thyroid gland normal, rarely it seems slightly smaller.	Absent or not felt.
7. Hair of any colour, & usually normal in amount and texture.	Hair often sandy, coarse, scanty.
8. Skin normal.	Dry, coarse: solid oedema present.
9. No local deposits of fat.	Frequent in neck, and other parts.
10. <u>Tongue</u> : Protrudes slightly, not large; hypertrophied papillae fissured later.	Tongue protrudes, large. no hypertrophy of papillae. No fissures.
11. Happy, imitative, active.	Lethargic.
12. Stature below normal; body well formed.	Stature greatly stunted. deformity.
13. Symptoms noticeable from birth.	Seldom before 6th month (Thomson).@.
14. Thyroid treatment useless.	Beneficial.

Comparison
with Mon-
golian
Children.

Some photographs of Chinese and Japanese children which I obtained in the Far East are appended for purposes of comparison. There are important facial differences between them, and the type of mental deficiency named after them, as well as facial resemblances. In the true Mongols the hair is black, coarser among the Japanese; the eyes are dark; the complexion is yellow, more so among the Chinese and not pink as in Mongolism. In many Chinese and Japanese there is a less degree of orbital obliquity than in well-marked cases of Mongolian mental-feebleness. To one acquainted with these races, the resemblance is not so very close, nor does the term "Mongol" as applied to this type seem a happy one.

Prognosis.

The prognosis is better in some cases than others, and can be made fairly definitely. Cases where the head is very small, where little interest is shown in surroundings, where no warning is given before movement of the bowels, which, in short are evidently of a low grade, afford a bad prognosis mentally. As an immediate prognosis, one may say with safety that the child will talk late and cut its teeth late. Co-ordination of the muscles such as/

DATE.

CASUALTY.

a =

Mongol Letters

x

4 =

Mongol Figures

4

x =

x

3 =

3

g =

o

8 =

8

o

s =

s

10 =

10

B =

B

25 =

25

97 =

97

as is required in taking meals and in walking will only come very slowly. The higher grade cases will learn to feed themselves in time, and walk about, and even the lower grade will in most cases be taught habits of cleanliness. Instead of holding up its head at four months, the Mongol may not do so until 10 months and even in one instance $2\frac{1}{2}$ years. He may not sit up until 12 to 28 months instead of at 7 months; and may walk at as late as $3\frac{1}{2}$ years instead of at 13-14 months. At 28 months the child may not be able to bring sweets to its mouth, nor feed itself until 4 or 5 years; in bad cases not even then.

The remote prognosis as to the mental condition is bad. One case had been taught to read a few words, could read and recognize such names as "Reginald" and "Anerley", could spell "Monday", and knew the year and the month. He could spell no other words, and could not recognize "pig" when written. What he knew was chiefly in a parrot-like way. He evidently knew some of the letters, and still better, the figures. His attempts to write such exercises from memory are shown in pencil on the accompanying slip of paper; I have written in ink/

ink what they were intended to represent. It proves also that the hands - so unsuitable for fine movements - can be taught to co-ordinate by education. Even this most accomplished Mongol was refused admission to the Special Classes of the London School Board, which are intended for backward children. Advantage can be taken of their imitative powers, and one of my cases was extremely clever at gardening. ~~Most, if not~~ All of those children I have seen would always be unable to earn a livelihood, however; and, with two exceptions, to take care of themselves. It is not the ugliest children physically, who are the most hopeless, but rather the opposite.

The prognosis as to life is still worse. The oldest I have heard of reached the age of 43 years.①. Naturally cold and chilly, they bear the winter badly, are miserable, and suffer from chilblains. ~~then.~~ Rickets was present in three instances. Measles and whooping-cough are deadly, their powers of resistance being very limited. All the mucous membranes are subject to catarrh, of the respiratory tract as bronchitis, naso-pharyngeal catarrh, and broncho-pneumonia, of the alimentary tract as mucous-diarrhoea. Most die of tuberculosis, usually/

ly of the lungs. Neumann mentions that of 13 cases seen during between 3 and 4 years, only 6 are now * living. (23) I have not had my cases long enough under observation to have had any deaths yet. Convulsions and epilepsy are uncommon; I have seen no such case. * Since writing the above, one has died of congenital morbus cordis, and one of broncho-pneumonia.

Pathology

& Morbid

Anatomy.

I have not yet had the good fortune to make or see a post-mortem on a Mongol, but I have been able to collect the results of nine, five being in the United States and four in Great Britain. Practically no important coarse, and no fine lesions or abnormalities have been discovered. One thing is certain: there is a shortening of the antero-posterior diameter of the base of the skull. This may theoretically be due to one of two causes:-

Skull.

I. To premature primary ossification of the os tri-basilare. There is no evidence in favour of this. There is a considerable amount of evidence against it. Frazer in a report on a female Mongol aged 40, found a wide interval between the petrous bones and the basilar portions of the occipitals, containing Wormian bones of poor cancellous tissue. The suture between the lesser wings of the sphenoid and/

and frontal bone was open, and thus the base could have expanded in every direction. (10). Sutherland (4) quotes a case where unossified cartilage was found at the base. Dr Dalton of Kings College Hospital (quoted by Dr Still) found no premature ossification of the os tri-basilare. (7).

II. To premature union secondary to arrested development of structures at the base of the brain. The first theory supposes that the skull closes first, and prevents the growth of the brain. There is evidence for this, of the positive kind; there is none against it. Wilmarth in America in five cases found the pons and medulla about half the normal size on an average. (5). Sutherland confirms this in one case. Dalton found the pons and medulla small, but not markedly so. There is a Mongol brain in the G.I. Ormond S.I. Hospital Museum, London.

Brain.

Except that the cerebral vessels were very thin, Wilmarth's cases had otherwise normal brains. All are agreed on this. The brain is simple in development, and the convolutions large and coarse. Frazer in his case found the Island of Reil small, undivided, and without convolutions springing from external margin, on both sides, but nothing else of any importance.

The/

The skull at the base is therefore shortened antero-posteriorly, and the structures at the base of the brain are diminished in size. The bulk of the evidence shows that the brain condition is primary, and the skull condition secondary to it. An exactly similar question arises in the consideration of the pathology of microcephaly which is due to arrested development of the upper part of the brain, and not to premature ossification of the cranial sutures.

This shortened cranial diameter at the base is the cause of the depression of the bridge of the nose; the obliquity of the orbits, as the outer part can grow upwards unrestrainedly; and the small nasopharynx. In one case, that quoted by Dr Still, a very marked extension of the vomer backwards into the naso-pharynx still further limited the space. (7). I have examined all my cases for this, but without result.

No further pathological condition which can be considered essential has so far been discovered. The ductless glands are normal.

It/

Comparison
with Micro
& Hydro-
cephalic
Skulls.

It is interesting to compare the Micro- and Hydro-~~s~~cephalic skulls with that of the Mongol:-
 In microcephaly the forehead is small and rapidly recedes, running back to a pointed vertex. The occiput is flat, the circumference is very small, the anterior fontanelle closes very early. The teeth appear about the usual time.

In Primary Hydrocephaly the circumference is increased, the head is symmetrically enlarged, globular, obovate as seen from above, the fontanelles are large and close late. The frontal region is high, projecting, and there is a prominence at the root of the nose. The teeth appear early. In Mongolism the skull is a short oval with a tendency to parallelism of the frontal and occipital planes, brachycephalic with a flattened occiput. The circumference is diminished. The fontanelles close late. The orbits and supraciliary ridges are oblique. Dentition is late. Outlines of these different varieties of skulls are attached showing actual measurements which I took in the respective cases. (Figs. 1, 4 and 5). pp. 67, 69, & 70.

Comparison
with Micro
& Hydro-
cephalic
Brains.

In comparing the brains in the same way we find important distinctions.

In microcephaly the evidence of arrested development is chiefly in the occipital and temporo-sphenoidal lobes/

lobes, though the frontal and parietal lobes are also small.

In Hydrocephaly there is great thinning and atrophy of the brain substance, owing to increase in and pressure by the cerebro-spinal fluid.

In Mongolism the arrest is chiefly in the pons and medulla at the base of the brain. The brain is not necessarily small, but very simple as to its convolutions.

Aetiology.

Some definite cause must exist in order to produce so exact a type as this, but so far it has not been ascertained. Such general causes as drunkenness of the parents, extreme age on the part of one or both parents, consanguinity (such as the marriage of cousins), and heredity could hardly alone or combined produce a form with such definite well-marked characteristics. Nevertheless heredity has a certain influence, and a neurotic tendency may by injudicious marriage, intemperance and other influences be intensified in the children.

A history of drunkenness was found in four cases; of consanguinity in not a single ^{one of the 26} cases. All the children were born in wedlock. In some cases the environment was good, and the child was born and lived/

lived in the country, in other cases it was bad; so that no special connection was traceable. As heredity is ^{a factor according to Ireland in} ~~the cause of~~ from 20 - 50% of all cases of idiocy, I enquired accordingly in every case, but found nothing specially interesting. In four cases there is a family history of insanity, or ^{*} eccentricity; in three the father was passionate and violent in temper; apoplexy in one, epilepsy in one, the mother was neurotic and excitable, (in one case with suicidal impulses), in four. Sometimes there is something peculiar about the history of the pregnancies, in three cases there were twins or triplets in the family, in three the intrauterine movements were hardly felt, in three the Mongol was premature, in one a previous child was anencephalous, in ^{eight} ~~four~~ the confinement was prolonged, or complicated, and in about half the cases the mother volunteered a statement of a fright or mental worry to which she attributed the condition of the child.

Three conditions have, however, been supposed to have a special relationship to the causation of Mongolism, viz:., phthisis, syphilis, and exhaustion or bad health on the part of the mother.

Langdon-Down/

* [In one instance where the child was hopelessly and appallingly idiotic, the father in horror committed suicide. Such a man is exactly more liable to produce mentally-deficient offspring.]

Phthisis

Langdon-Down said that Mongolism arises chiefly from tuberculosis in the parents. (6). Ireland says that two-thirds of all idiots are scrofulous. (9). It was present in the family history of only 38% of my cases and does not seem important.

Syphilis.

Sutherland found evidence of syphilis in 11 out of 25 cases, and suspected it in three others. (4) Dr Still on the other hand has only seen one such case, and in others has been able to absolutely exclude syphilis. (7). Antispecific treatment has no effect. moreover, as far as the mental condition is concerned. It was present three times in my series, and I am certain that in some cases there was no evidence of the disease.

Exhaustion
of
Mother.

A great deal of stress has been laid on the fact that in a large number of cases the mothers' health was bad during the pregnancy. This occurred in ^{fifteen}~~ten~~ of my own cases. The bad health resulted from various causes, such as insufficiency of food, dyspepsia, phthisis, etc. In the remainder the state of health was perfect. In one, the mother had two healthy children, and then a Mongol, her health being bad all the time, but better during the/

the last than on the former occasions. Dr Still is inclined to regard this as the chief cause of Mongolism. In Sir A. Mitchell's cases, the mothers were almost invariably in a bad state of health. (11).

In proof of this theory it has been stated by various observers that Mongols are often the last of a large family, 40% according to Shuttleworth, (1), 10 out of 18 cases according to Still. My own cases show that Mongols are fairly often first children, that these may be followed by healthy children, and that the Mongol may be anywhere on the list from the first to the twelfth.

In three	^{of my}	cases	the Mongol	was the first	born
" four	"	"	"	"	third
" ^{seven}	"	"	"	"	fourth
" four	"	"	"	"	fifth
" ^{six}	"	"	"	"	sixth
" four	"	"	"	"	seventh
" one	"	"	"	"	eighth
" one two	"	"	"	"	ninth
" one two	"	"	"	"	tenth
" one	"	"	"	"	twelfth
" one	"	"	"	"	"
" one	"	"	"	"	"
" one	"	"	"	"	"

In the cases of all the first-born children, and in the sixth-born case, healthy children have been born since: also in one third case.

I formerly thought that the advanced ages of the parents, ^{very frequent} as shown in Table VI. bore out this theory of exhaustion, but am not now inclined to think so, and the parents may be of any age.

Whatever the cause is, heredity seems to have little to do with it. According to Mr Mill's Canons of Induction the cause should always be present when the effect is present, and absent when it is absent, and it is hardly likely that syphilis, phthisis, and exhaustion on the part of the mother, which are present or absent in the most arbitrary way, and are not even present in the majority of cases, can be the definite causes of Mongolism. The anatomical and clinical features are besides so definite that one can hardly believe them to be the result of such very general causes.

Clinical and post-mortem evidence have as yet given us very little assistance. There is no internal secretion wanting, as of the thyroid in cretinism. The cause is, nevertheless, a very profound one. Microscopic examination has not hitherto revealed the absence or arrested development of any special group of cells in the brain, though such may exist. Mongolism seems to affect chiefly the lower/



lower part, and microcephaly the upper part of the brain, and it may be that these will be found later to be different manifestations of the same disease.

As far as heredity is concerned as a cause, the following lines seem to possess a greater degree of humour than truth:-

"That swollen paunch you are doomed to bear
 "Your gluttonous grandsire used to wear;
 "That tongue at once so slight and dull,
 "Wagged in your grandma's empty skull;
 "That leering of the sensual eye
 "Your father when he came to die,
 "Left yours alone; and that cheap flirt,
 "Your mother gave you from the dirt,
 "The simper which she used upon
 "So many men ere he was won."

"Your vanity, and greed, and lust,
 "Are each your portion from the dust,
 "Of those that died, and from the tomb
 "Made you what you must needs become.
 "I do not hold you aught to blame,
 "For sin at second hand, and shame.
 "Evil could but from evil spring." (32)

Treatment

Because of the special susceptibility to disease and complications, they should be seen regularly. They require plenty of fat especially during the winter, and with cod liver oil, malt and iron much can be done. They should have warm clothing. In one case a Mongol aged 14 months and weighing only 15 $\frac{1}{4}$ lbs. was given cod liver oil and malt, and in/

in eight months' time she weighed $20\frac{1}{2}$ lbs. She improved mentally as well as physically, sat up unusually early, and began to talk at 21 months. Other cases have shown corresponding improvement.

There is no specific treatment. Carl Looft^(2a) found thymus gland of no benefit. Telford Smith^(2b) found mental and physical improvement under thyroid treatment; there was less apathy, speech improved, and the tarsal ophthalmia got better. The mental reflexes improved and the existence became less like a vegetable one. He thinks it should be given a trial. Thomson and others have not confirmed this.^(2c)

In my cases the mothers and myself saw little or no difference. The temperature previously sub-normal did not react *to thyroid treatment.*

Antisyphilitic and supra-renal treatment produce no mental improvement.

At about seven years of age they should be sent to an Institution for the requisite physical, mental and moral training.

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NOTES OF SELECTED CASES.

Case I: V.H. age 26 months. Born June 5. 1899.

Of normal weight and well formed at birth. Parents of artizan class. Neighbourhood not salubrious.

Head brachycephalic, occiput flat, not depressed. Face flat, depressed. Bridge of nose, broad, flat and sunken, alae wide, nostrils looking up. Eyes oblique, palpebral fissure narrow, lateral nystagmus. No blepharitis. Slight squint lately not at birth. Tongue against teeth, hypertrophy of papillae and roughness just commencing. Palate high and narrow. Lips cracked and often bleed. Teeth v. Page 20. Gums on inner aspect of alveolus thick and corrugated. Adenoids. Mouth open. Anterior fontanelle still very large.

Occipito-glabella (horizontal) \odot^{ce} $17\frac{1}{2}$ "

Occipito " (longitudinal) " $10\frac{1}{2}$ "

Bimastoid circumference $10\frac{1}{4}$ "

Distance between centres of eyeballs 2"

Vertical measurement of ears $1\frac{3}{4}$ "

Height $29\frac{3}{4}$ "

Transverse Diam. of Skull $5\frac{1}{8}$ "

Longitudinal " " " $5\frac{3}{4}$ "

Hair dry, scanty, coarse. Skin soft. Fig. 3.
 Hands broad, fat. Indesc, middle and ring
 fingers of almost equal length, tapering.
 Nails delicate, ribbed longitudinally and
 transverse. Little fingers slightly curved.
 Feet clumsy. For cerebral condition see P. 32.

There are no external malformations
 present. There is a systolic murmur loudest
 at the base, which has been present from
 birth.

She can't support her head or sit up.
 There is very great mobility of the joints.

Mother and father both 44 when
 she was born. Mother had shivering fits,
 and insufficient food during pregnancy,
 owing to husband being out of work.
 The child is the 12th in the family. No
 consanguinity, fits, phthisis. One paternal
 uncle insane. Grandfather died of alcoholism.
 Parents temperate. There were 15 in the
 mothers family (twice triplets). Parturition
 long and difficult. Three children in
 family have interstitial keratitis.

For cranial measurements v. Figs 1, 4, 5.

Photo appended.

Case VI. H. H. Age $2\frac{3}{4}$ years. ♀

First child, one born since healthy.

Full time. Mother's age 23, father's 24.

Mother's health always good. History of phthisis & apoplexy. No history of insanity, fits, consanguinity, intemperance or syphilis. Brought because nearly 3, and takes no notice, can't walk sit up or talk except "mama" and "papa".

Pink complexion, marked epicanthus, formerly strabismus but not now.

Circumference of Head $17\frac{1}{2}$ "

Long. Occ $12\frac{1}{2}$ " Binast. Occ $13\frac{1}{2}$ "

Long. Diam. $5\frac{3}{8}$ " Trans. Diam. $4\frac{3}{8}$ "

Between eyes $2\frac{1}{8}$ " Height $31\frac{3}{4}$ ".

Lower incisors cut first at 10 months. Could support head at 10 months. Tongue small, pointed, papillae enlarged, transverse fissures. Snake like action of tongue. Palate high with median ridge. A loud systolic murmur in pulmonary mitral and aortic areas; fingers and toes clubbed and blue.

Pl. T. all dead

Case XI. F.W.

Age 4 years.

♀

First child, one born since, healthy.
 Full time, confinement normal, intrauterine
 movements hardly felt. Mother's health
 always good. Mother's age 23, father's 23.
 No consanguinity, fits, intemperance,
 insanity, or eccentricity in family.
 No syphilis. History of phthisis present.

Occ of head $18\frac{1}{2}$ " A.P. Diam. $6\frac{1}{8}$ "

A.P. Occ $12\frac{1}{2}$ " Trans. Diam. 5"

Trans. Occ $13\frac{1}{2}$ " Height $33\frac{7}{8}$ "

Weight $26\frac{1}{2}$ lbs Temp. 96.0° F.

Distance between eyes $2\frac{1}{16}$.

Facies typical. Little fingers bent.
 Tongue not large, fairly fissured.
 Twenty teeth, upper incisors first at 9 mos.
 Strong, active and stirring. Mouth
 breather: adenoids. Deficient ear
 lobes. Walked at 2 years. Clean in
 habits. Nervous system normal.
 Photo appended.

Case XIII. C. G. Age $2\frac{1}{2}$ years. ♂.

Youngest of 9 children, all others healthy.
 First child still born. Mother's health
 not good, age 39. Husband 45, sailor.
 No phthisis, consanguinity, intemperance,
 insanity. Syphilis? three miscarriages.
 Full time, confinement difficult.

Occ of head $17\frac{7}{8}$ "	Height $29\frac{1}{4}$ ins.
A.P. Diam. $5\frac{7}{8}$	Weight $20\frac{1}{2}$ lbs
Trans. Diam. $4\frac{7}{8}$	Between eyes $1\frac{7}{8}$ "
A.P. occ $13\frac{1}{4}$ "	Bimast. occ $12\frac{1}{4}$ "

Difference between upper fore arms, 1 inch.
 Epicanthus. Slight convergent squint
 from birth. Facies typical.

Upper incisor appeared first at 18 months.
 teeth deficient in enamel. Little fingers
 not bent, but Dupuytren's contraction
 in both. No fissuring of tongue, papillae
 only slightly hypertrophied.

Nothing abnormal in reflexes clinically.
 Can't walk or talk. Sat up at $2\frac{1}{4}$ yrs.
 Fontanelles still open.

Photo appended.

Case XV. K. M. Age $1\frac{10}{12}$. ♀

Full time. Three miscarriages at 7 mos, 10 weeks, and 10 weeks. Then a premature boy at 8 months who lived 6 weeks. Then a miscarriage and then the Mongol = third viable child. Phthisis in family. Mother suffered mentally, and has double hernia. Epicanthus, squint. Sat up at 14 months. Fissuring commencing. Tongue protruded, mouth open. Face scaly. Hair dry, not coarse. Got upper premolars first at 17 months. After nine months treatment with malt and oil she notices well, plays with toys, & has improved mentally.

☉ of head $16\frac{3}{4}$ " Between eyes $1\frac{7}{8}$ "

A.P. Diam. $5\frac{3}{8}$ " Height $29\frac{5}{8}$ "

Trans. Diam. $4\frac{7}{8}$ " Weight $19\frac{3}{4}$ lbs.

No curving of little finger.

Fontanelle open.

Photo appended.

Case XIX. E. G. Age 7 months ♀.
 Fifth child. Father 42. Mother 40.
 No consanguinity, insanity, fits or
 intemperance. No syphilis.
 Mother suffered mentally during
 pregnancy.

Labour easy, full time.

Epicanthus, squint, nystagmus.

Ear lobes adherent.

Skull moderately brachycephalic.

Occ 16" Coronal measurement $10\frac{1}{4}$.

Palate good. Height $25\frac{1}{2}$ ins.

Weight 14 lbs.

Little fingers not bent.

Roaring systolic bruit, loudest
 over mid-sternum: congenital
 heart disease.

Case XXII. F. H. Age 4 months ♂.

Third case.

No consanguinity, syphilis &c.

Mother's health bad during pregnancy.

Hernia.

A systolic bruit at base, congenital.

This child died of bronchopneumonia.

Case XXIII. S. B. Age 11 mos.

Seventh child.

Mother in bad health during pregnancy

No consanguinity, insanity, syphilis.

Labour long and difficult.

Epicanthus.

Ear lobes adherent.

⊙ of head $16\frac{1}{2}$ " Coronal meas^t. 11.

Palate not high.

Decided rickets.

Can't sit up.

Little fingers not bent.

Umbilical protrusion.

Case V. J. M. Age 10. †

Sixth child. One child since healthy.
 Mother has phthisis, age 44. Father 57.
 Father died of drink. No consanguinity,
 insanity, syphilis. Other children well.
 Convergent strabismus. Naevus. Crypt-
 orchidism. Hair abundant, brown.
 Occiput deficient, flat. Tongue typically
 fissured. Little fingers curved. Nil
 in heart.

⊙^{ce} of head $19\frac{1}{8}$ ins A.P. Diam. $6\frac{3}{8}$ "

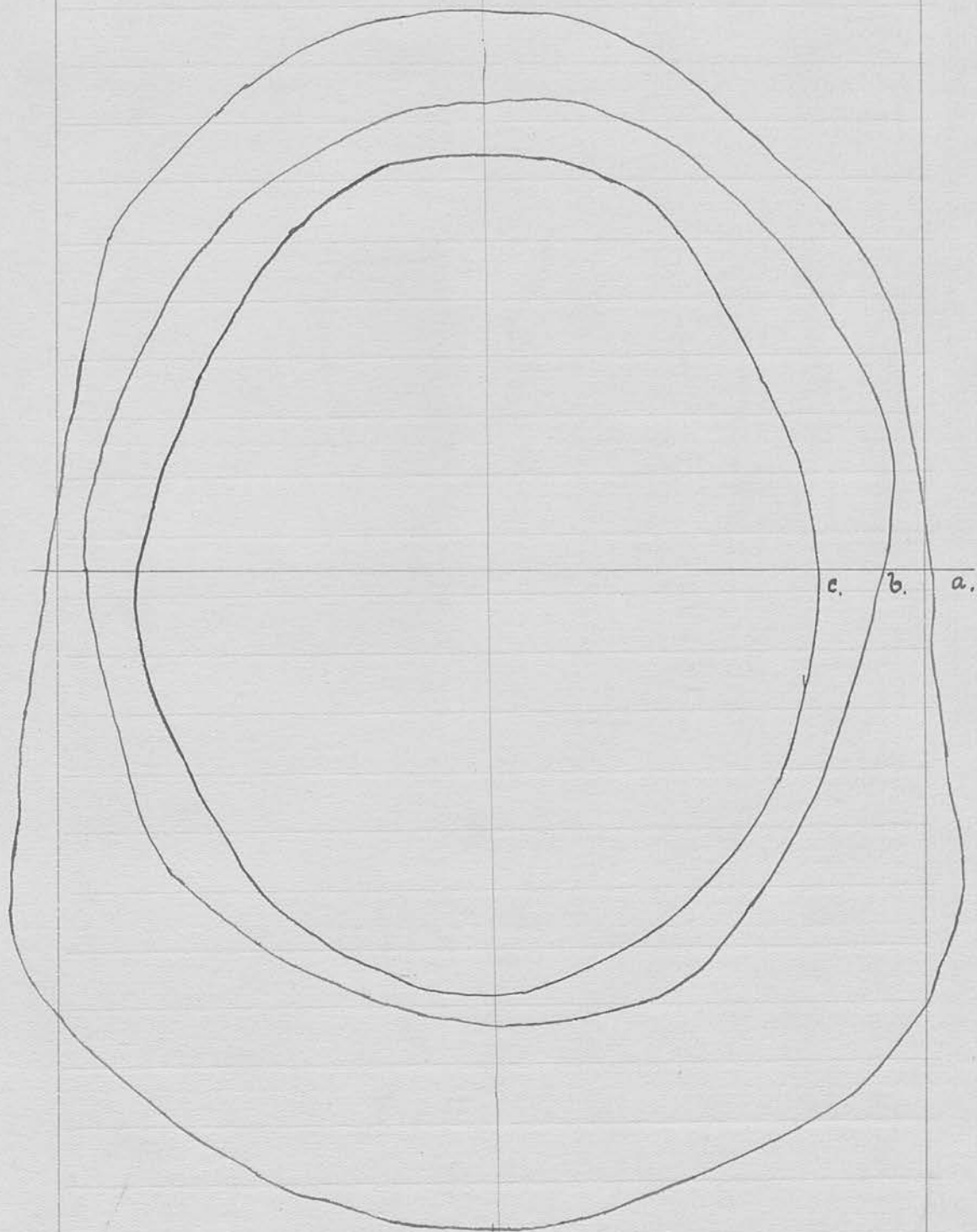
Long. $\frac{1}{11}$ ⊙^{ce} 12 " Trans. Diam. $5\frac{3}{8}$ "

Bimastoid ⊙^{ce} $13\frac{1}{2}$ " Between eyes $2\frac{1}{4}$ "

Temp. 97° Height $45\frac{3}{4}$ "

Cerebral condition. v. Page 32.

Fig I.



Actual Occipito-frontal \odot ^{ces} in:—

a. Hydrocephaly.

b. Mongolism.

c. Microcephaly.



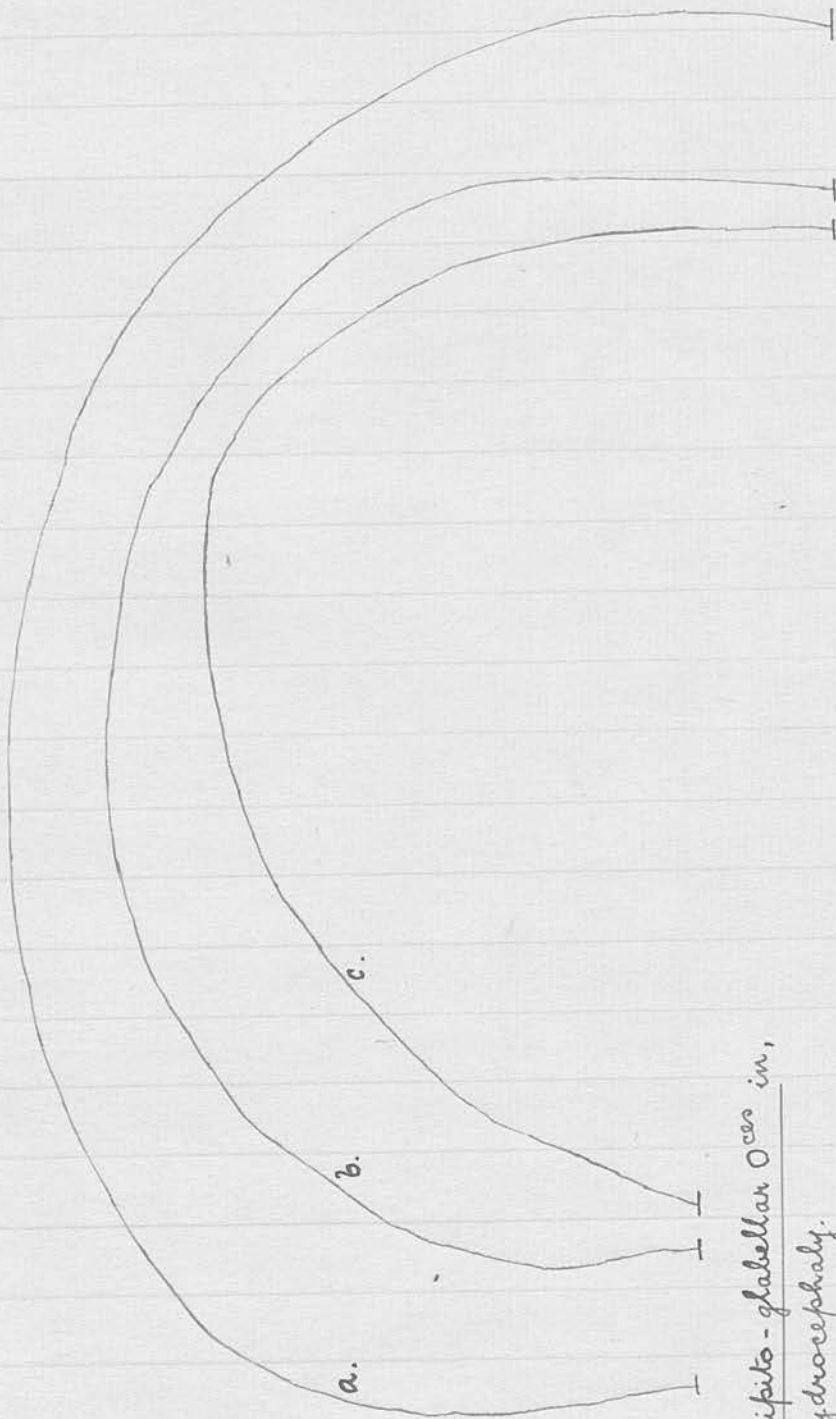
Fig III.



Fig II.

Showing fissuring of the tongue.

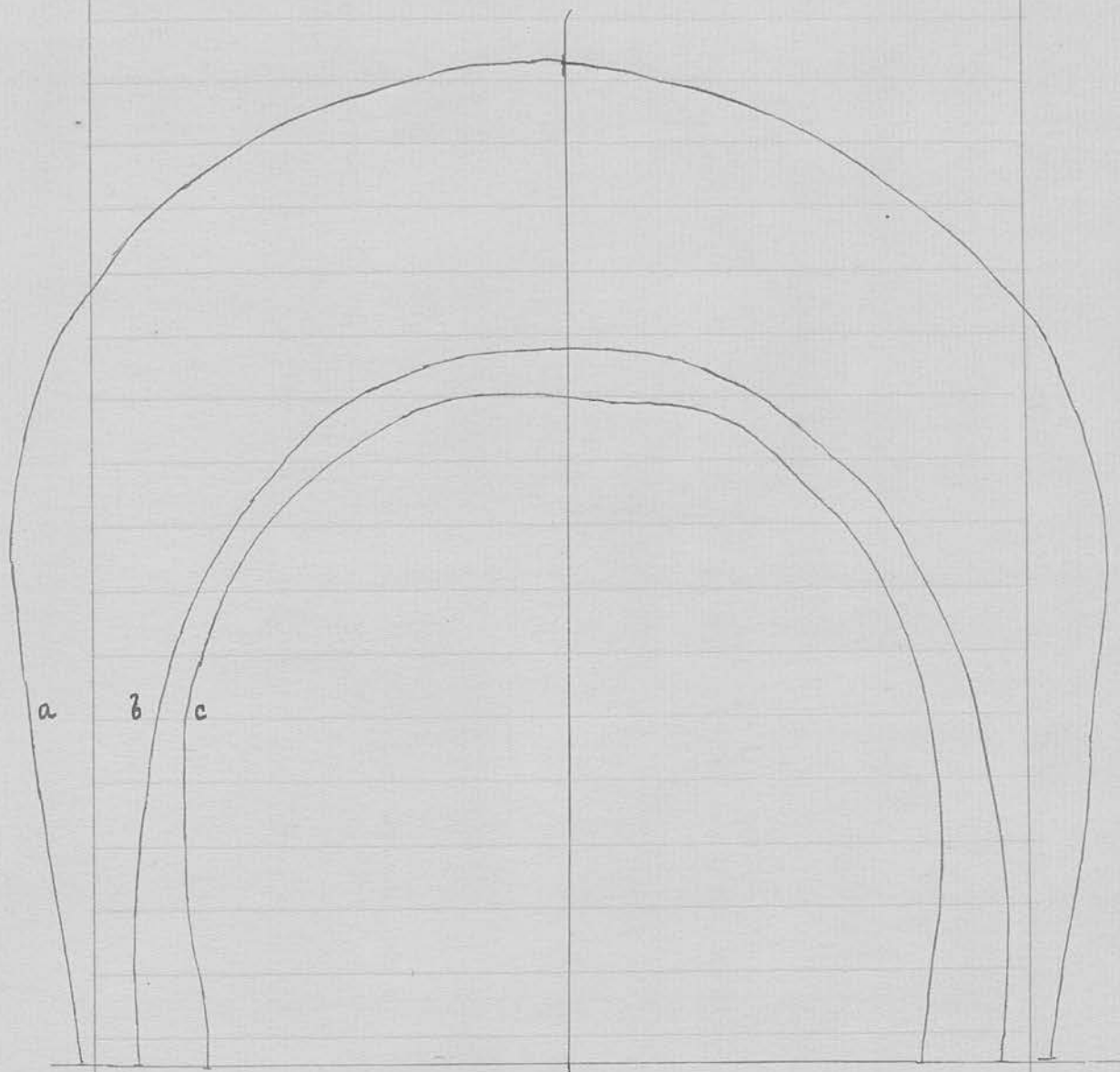
Fig. IV.



Actual Occipito-glabella O_{100} in,

- a. Hydrocephaly.
- b. Mongolism.
- c. Microcephaly.

Fig. V.



Actual Bimastoid Ocellus in,

- a. Hydrocephaly.
- b. Mongolism.
- c. Microcephaly.

	Age.	O ^{ce} of Head	Normal.
♂	$\frac{2}{12}$ year	14 ins	13.9 (birth)
♂	$\frac{3}{12}$	15	13.9
♀	$\frac{4}{12}$	$14\frac{3}{4}$	15.5
♀	$\frac{5}{12}$	14	16.6
♀	$\frac{7}{12}$	16	16.6
♀	$\frac{10}{12}$	16	17.3
♂	$\frac{11}{12}$	16	17.9
♂	$\frac{11}{12}$	$16\frac{1}{2}$	17.9
♂	$1\frac{1}{2}$	$17\frac{1}{4}$	18.5
♀	$1\frac{10}{12}$	$16\frac{3}{4}$	18.4
♀	2	$16\frac{1}{4}$	18.6
♂	2	18	18.6
♀	$2\frac{2}{12}$	$17\frac{1}{2}$	18.66
♂	$2\frac{2}{12}$	18	18.96
♂	$2\frac{2}{12}$	18	18.66
♀	$2\frac{1}{2}$	$17\frac{7}{8}$	19.10
♀	$2\frac{3}{4}$	$17\frac{1}{2}$	18.87
♀	4	$18\frac{1}{2}$	19.5
♂	5	$19\frac{1}{4}$	20.5
♂	$10\frac{1}{2}$	$19\frac{1}{8}$	21.0
♂	$11\frac{2}{12}$	$19\frac{3}{4}$	21.0
♂	11	19	21.0

Table I: circumference of head in my cases.

Age.	A.P. Diam.	Tr. Diam.
$\frac{2}{12}$ year	$4\frac{7}{16}$ ins	$4\frac{1}{6}$ ins
$\frac{4}{12}$	$4\frac{7}{8}$	$4\frac{3}{8}$
$\frac{7}{12}$	$5\frac{1}{4}$	$4\frac{1}{4}$
$\frac{10}{12}$	$5\frac{1}{2}$	$4\frac{1}{2}$
$\frac{11}{12}$	$5\frac{1}{2}$	$4\frac{3}{4}$
$1\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{8}$
$1\frac{10}{12}$	$5\frac{3}{8}$	$4\frac{7}{8}$
2	$5\frac{1}{2}$	$4\frac{5}{8}$
2	$6\frac{1}{8}$	$5\frac{1}{8}$
$2\frac{2}{12}$	$5\frac{3}{4}$	$5\frac{1}{8}$
$2\frac{2}{12}$	$5\frac{3}{4}$	5
$2\frac{2}{12}$	$6\frac{1}{8}$	$5\frac{1}{16}$
$2\frac{1}{2}$	$5\frac{7}{8}$	$4\frac{7}{8}$
$2\frac{3}{4}$	$5\frac{3}{8}$	$4\frac{3}{8}$
4	$6\frac{1}{8}$	5
5	$6\frac{3}{4}$	$5\frac{1}{4}$
$10\frac{1}{2}$	$6\frac{3}{8}$	$5\frac{3}{8}$
$11\frac{2}{12}$	$6\frac{3}{4}$	$5\frac{1}{2}$

Table II. Antero-posterior & Transverse Cranial Diameters in Mongolism. The measurements were made with a parallel head gauge.

Age.	Dist. bet. Eyes.
$\frac{2}{12}$ year.	$\frac{1}{2}$ ins
$\frac{4}{12}$	$1\frac{5}{8}$
$\frac{7}{12}$	$1\frac{5}{8}$
$\frac{10}{12}$	$1\frac{3}{4}$
$\frac{11}{12}$	$1\frac{3}{4}$
$1\frac{1}{2}$	$1\frac{3}{4}$
$1\frac{10}{12}$	$1\frac{7}{8}$
2	$1\frac{3}{4}$
2	$1\frac{3}{4}$
$2\frac{2}{12}$	2
$2\frac{2}{12}$	$2\frac{1}{4}$
$2\frac{2}{12}$	$2\frac{1}{8}$
$2\frac{1}{2}$	$1\frac{7}{8}$
$2\frac{3}{4}$	$2\frac{1}{8}$
4	$2\frac{1}{16}$
5	$2\frac{1}{2}$
$10\frac{1}{2}$	$2\frac{1}{4}$
$11\frac{2}{12}$	$2\frac{1}{4}$

Table III. Distance between Eyes in Mongolism.

Age.	Height	Normal Ht.
$\frac{2}{12}$ year	21 ins	$20\frac{3}{8}$ ins
$\frac{4}{12}$	21	$23\frac{1}{2}$
$\frac{7}{12}$	$25\frac{1}{2}$	25
$\frac{10}{12}$	24	$27\frac{1}{2}$
$\frac{11}{12}$	27	$28\frac{2}{3}$
$1\frac{1}{2}$	$30\frac{1}{2}$	30
$1\frac{10}{12}$	$29\frac{5}{8}$	$31\frac{1}{2}$
2	$26\frac{1}{2}$	$32\frac{1}{2}$
2	33	$32\frac{1}{2}$
$2\frac{2}{12}$	$29\frac{3}{4}$	33,0
$2\frac{2}{12}$	$31\frac{1}{4}$	33
$2\frac{2}{12}$	$27\frac{3}{4}$	33
$2\frac{1}{2}$	$29\frac{1}{4}$	$33\frac{3}{4}$
$2\frac{3}{4}$	$31\frac{3}{4}$	$34\frac{1}{3}$
4	$33\frac{7}{8}$	38,0
5	$40\frac{3}{4}$	$41\frac{1}{4}$
$10\frac{1}{2}$	$45\frac{3}{4}$	53
$11\frac{2}{12}$	$49\frac{1}{2}$	$54\frac{1}{3}$

Table IV. Height in Mongolism.

Age	Weight	Normal Wt.
$\frac{4}{12}$ year	7 lbs	$12\frac{3}{5}$ lbs.
$\frac{4\frac{1}{2}}{12}$	$7\frac{1}{2}$	$12\frac{3}{5}$
$\frac{4}{12}$	14	$15\frac{1}{2}$
$\frac{11}{12}$	$14\frac{1}{2}$	19
$1\frac{1}{2}$	19	$22\frac{4}{5}$
$1\frac{10}{12}$	$19\frac{3}{4}$	$24\frac{2}{5}$
2	$10\frac{3}{4}$	$25\frac{1}{2}$
2	24	$25\frac{1}{2}$
$2\frac{1}{2}$	$20\frac{1}{2}$	$28\frac{4}{5}$
4	$26\frac{1}{2}$	34
5	$36\frac{3}{4}$	$41\frac{1}{5}$
$11\frac{2}{12}$	57	$74\frac{1}{5}$

Table V. Weight in Mongolism.

Grade	Mothers Age at Birth	Fathers Age at Birth.
Low	44	44
"	27	—
Medium.	28	41
Low	40	40
High	40	42
Low	44	41
High	44	51
Medium	—	—
Medium	23	24
High	—	—
Low	40	?
Medium	40	42
Low	35	42
"	39	39
High	23	23
High	34	37
Low	41	45
"	39	45
High	22	31
Low	40	40
Low	24	25
High	34	37
Low	29	31
"	43	—
"	40	42.

Table VI. Ages of Parents in my Cases.



Case I.

Levy & Sons



PHOTOGRAPHERS.



W. Williams.

3. CLIFFTOWN ROAD,
SOUTHEND.



XT

JOHN HART

179 & 181
CITY ROAD E.C.

275
LEYTONSTONE ROAD E.



XIII.

H · FINDLATER & C^o

250, High Road

SOUTH TOTTENHAM

