

CHAPTER XI

OBSERVATIONS AND CONCLUSIONS

BEFORE summing up the conclusions which we may have reached from a consideration of the facts in the preceding pages it will be as well if we briefly touch upon a few of the less important details concerning cranial deformation. Since this sketch is primarily an ethnological account it is not proposed, at any rate in the present work, to discuss questions relating to the measurement of deformed crania and to anatomical, pathological, and similar problems, which ought in any complete treatise to find some space allotted to them. Here we will just pass in review a few of the observations which have been made, and indicate in its proper place where the reader will find further information concerning them.

We have already seen that the earliest known deformed skulls probably date from the period of Late Minoan III, and that the so-called Neolithic specimens in France are not, it would seem, artificially distorted. Although perhaps dental evulsion may have been practised in Europe in early times,¹ it is probable that it was known elsewhere at an earlier period, but we cannot discuss the evidence in this place. As regards the deformed crania doubt as to the artificial character of the distortion did not last long. As time went on and more deformed specimens became known to anatomists the fact of intentional manipulation was gradually recognized, although some remain still unprepared to accept the evidence of the artificial character of certain of the forms.² Before we discuss those forms and some features which can be considered together with them, it may be of interest to some if we glance for a moment at the various attempts that have been made in art to represent cases of cranial distortion. We have already discussed certain of the Egyptian examples and some specimens

¹ See Le Bel, p. 42: Baudouin, 7, pp. 167 ff. ² Cf. Retzius, A., 2, p. 269.

from elsewhere, but apart from these there exists a mass of other examples of which the meaning is more doubtful. It is not easy to tell whether the cases thus portrayed are artificially produced or are the results of pathological causes, unless indeed the productions in stone and paint come from areas where it is known from other sources that artificial distortion was actually practised. Moreover, it may well be in certain cases that the imagination of the artist is responsible for the abnormal appearances. The terra cottas from Central America are good examples of artistic products coming from an area where there is other evidence that deformation was practised, and Africa offers similar examples. Now it is well known that in Egypt representations of deformed persons are not uncommon and that the actual importation of grotesque dwarfs and others was not unusual. Statuettes of achondroplastic³ dwarfs are known,⁴ and one author⁵ has gone so far as to say that in the Gizeh Museum such a figure exhibits the Toulouse form of deformation. Similarly, as we have already said elsewhere, the terra cottas from Asia Minor show a great variety of deformed heads,⁶ and Capitan has pointed out a resemblance between certain Greek terra cottas and some of those from Central America,⁷ with which may be compared specimens from Crete.⁸ Whatever the origin of these deformations may have been it would appear that the artists did not rely solely upon their imagination. Although perhaps we may not go so far as Vram⁹ in asserting that they are faithful pictures of people actually seen by the artist, we may, I think, be certain that in many cases the statuettes really represent persons in actual life, although it may well be that certain of their abnormal traits have been exaggerated.

The difficulty of deciding whether a skull has, or has not, been artificially deformed is greater than may at first be supposed. Not only have pathological factors to be considered, but also we have to remember that posthumous deformation is not uncommon. It is often not easy to recognize posthumous compression of skeletal remains, for occasionally the influence

³ For achondroplasia see Keith.

⁴ Dawson, 3, p. 322: cf. Charcot and Richer, p. 13.

⁵ Regnault, 1, p. 692: cf. Regnault, 2, pp. 157 ff.

⁶ Cf. Regnault, 4, pp. 21 ff.

⁸ Deonna, 2, p. 18.

⁷ Capitan.

⁹ Vram, 5.

✓ { of humidity and of certain chemical constituents is such that skulls become softened and assume grotesque shapes. Under these conditions bones have been known to become as soft as leather and thus will take any shape according to the degree and direction of the pressure exerted upon them.¹⁰ Generally speaking, I would suggest that one of the most marked differences between skulls artificially deformed and those distorted after death is the presence of a great degree of asymmetry in the latter. We have seen how, through the influence of the cradle-board, asymmetrical forms are often produced in the living, but such forms are hardly ever as exaggerated as those produced posthumously. Pressure of earth and similar natural factors are rarely such that they produce the clear forms of intentional deformation that we have been considering. Thus, a clearly marked occipital compression only would not be easy to produce by the mere weight of earth or other materials, whilst it is difficult to see how the conical form of head, the result of bandages, could be thus created. Hence we may say that, as a general rule, skulls deformed posthumously are not to be mistaken for crania which have been submitted to artificial compression during life. Moreover, when considering posthumous deformation the mode of burial is important, since it is obvious that when disposal of the dead occurs in tombs, factors inseparable from inhumation are avoided.

The question of pathological conditions is again of some difficulty. The various forms of skull produced mainly by premature ossification of the sutures are now fairly well recognized, and a good deal of work has been done upon anomalies of the individual bones.¹¹ Accounts have been published of the various pathological features which are found in abnormal human crania¹²; and a few anthropologists have discussed special cases with a good deal of detail.¹³ But taken broadly no one would hesitate to say that a case where bandages have been employed was artificial whilst a case of scaphocephaly was pathological. We have already remarked that premature synostosis is a fruitful cause of abnormal cranial

¹⁰ See Hansen, 65, p. 123: Forster, A.; Broca, 6, pp. 66 ff.; Thomson, W., p. 402.

¹¹ Cf., for example, P. Lucy, on anomalies of the occipital bone.

¹² See Dieterich.

¹³ Cf. Topinard, 2.

form. This was soon recognized and a large literature grew up on the subject.¹⁴ As the study of artificial deformation increased it was suggested that pressure exerted upon the infant bones caused premature ossification and contributed to the formation of the distortion.¹⁵ Virchow pointed out how deformed crania exhibited signs of the ossification of the sutures at ages before such signs appear in normal skulls, and indicated how synostosis caused cranio-stegnosis in a direction perpendicular to the closed suture; and that in the neighbourhood of the sutures which remain open a compensatory increase of the skull must occur at the same time in the direction of the closed suture.¹⁶ Discussion of individual bones has also been published when considering certain aspects of deformed skulls. We have already summarized briefly the theories of Dillenius in her treatment of the parietals in the Calchaqui crania and seen how she thinks that an original dolichocephaly can be concerned in them. Some two years later McGibbon discussed the relation of artificial deformity to the temporal bone and particularly to the tympanic portion. He pointed out that the effects of shortening the skull in an antero-posterior direction are that: (1) the sutures between the squamous part of the temporal and the sphenoid anteriorly, and the squamous part of the temporal and the parietal posteriorly, become more closely approximated; (2) the sutures between the petrous portion of the temporal and the basi-occipital posteriorly and the basi-occipital and sphenoid anteriorly approach one another in such a way that the petrous bone has a more cuneiform appearance; (3) the mastoid process has a compensatory growth downwards, carrying with it the tympanic plate, thus causing little alteration in the size of the auditory meatus. In artificially elongated skulls the linea temporalis is pushed upward towards lambda; the antero-posterior diameter of the mastoid portion of the temporal is increased by an osseous

¹⁴ Cf., for example, Turner, W., 1 and 2.

¹⁵ Cf. Thurnam, 1, pp. 8 ff. &c.; Regnault, 5 and 9.

¹⁶ Virchow, 2, p. 79; cf. Gladstone, p. 189 and Virchow, 1, pp. 936 ff. Marelli, 1, p. 424, believes that the sagittal and lambdoidal sutures in some South American deformed skulls tend to ossify more than the coronal. Cf. Minchin, p. 362, who connects cranial elongation with the absence of the sagittal suture, and believes macrocephaly to be due to premature synostosis with which cf. Rabaud.

extension towards the occiput, and sometimes there is an extension in the temporal fossa of the squamous part of the temporal towards the frontal. In the external auditory canal nodular formations are occasionally observed, and the long axis of the meatus is more nearly perpendicular, the orifice being contracted.¹⁷

Exostoses about the external auditory meatus have been observed by a number of writers from an examination of deformed skulls. Kleiweg de Zwaan reported them from Indonesia¹⁸ and other writers mention similar formations in some of the North American crania, although in South American skulls Virchow, in 1894, and Outes, in 1911, stated that they were not particularly noticeable.¹⁹ Similarly, opinions vary as to the effect of artificial deformation upon the sutures. Generally speaking it would not seem that Wormian bones are produced by deformation, although complicated formations of such bones have been observed in Peruvian crania.²⁰

Some authorities have asserted that cranial distortion has a serious effect upon the eyes, but I am not prepared to say whether this view can be fully justified. We have seen how the bandaging and the application of boards often causes the child's eyes to protrude from their sockets and how bloodshot is their appearance during the operation.²¹ In 1893 Friedenwald drew attention to the possibility of atrophy of the optic nerve in the so-called steeple-shaped skulls (*Turmschädel*) resulting from cranial deformation,²² and in 1904 Enslin contributed a further note upon disease of the optic nerve through synostosis.²³ I do not know of any other author except Hilton, once on the staff at Guy's Hospital, London, who states that deformation has any effect upon the smell by preventing development of the frontal sinuses;²⁴ and those authorities also who have seriously studied the effect upon the

¹⁷ McGibbon, pp. 1172 ff.; *cf.* for defects of the tympanic plate, F. von Luschan, 2.

¹⁸ Kleiweg de Zwaan, 2, p. 12.

¹⁹ Virchow, 20, p. 405; Outes, 4, p. 123; Outes, 2.

²⁰ *Cf.* Sullivan, 3, pp. 242; 256. Cranial capacity also does not appear to be materially altered: *cf.* Ecker, 2, p. 75.

²¹ *Cf.* Rüdinger, 2, p. 22. Malý finds that the orbits of deformed skulls are smaller than those found normally: see Malý, 2, p. 138.

²² Friedenwald, 1, pp. 529 ff., and Friedenwald, 2, pp. 410 ff.

²³ Enslin.

²⁴ Hilton, p. 13.

intellect are few in number. During the second half of the nineteenth century, when the subject of cranial deformation in France was attracting a good deal of attention in Europe, it was thought that the custom must have a serious effect upon the intelligence.²⁵ Since, however, the Toulouse district did not seem to produce many more half-witted folk than other regions of France the idea was gradually abandoned, although in the seventeenth century it was held among certain of the more enlightened community. Thus Bulwer described how a certain man had "divers sonnes." Midwives and nurses had been busy with their headbands and strokings in trying to alter the shape of their heads, and they proved children of very weak understanding. Finally a son was born whose head was left to the care of Nature, and he grew up with more wit and understanding than them all.²⁶

In spite of these stories, however, the idea, as we have seen, was gradually abandoned. The evidence was not considered satisfactory but few experiments could be initiated. Burgerstein conducted certain tests in Vienna in trying to estimate the mental ability of school children with abnormally shaped skulls,²⁷ but in these cases the distortion was apparently not artificial and cannot be considered here. Regarding artificial deformation the matter may perhaps be summed up according to the opinion of Deniker who stated that no positive information could be obtained, but it was possible that such distortion might favour cerebral disturbances in persons so disposed.²⁸

A similar controversy arose on the question of the inheritance of these characteristics. Hippocrates, as is well known, favoured the view that they were inherited, although he does not explain why the same law does not operate in the case of circumcision. Many others followed him until the weight of evidence compelled a negative decision, Virchow in 1891 pronouncing against the view which led continental investigators to accept his verdict.²⁹ It would seem certain that the anomalies produced by artificial deformation are never

²⁵ Cf. Broca, 7, who believed that deformation caused aberration of the mind, and Wyman, who dealt with the same question. That idiocy is found in cases of pathologically deformed skulls is of course well known: cf. Schade, Sommer, and Gonzales.

²⁶ B., J., p. 21.

²⁸ Deniker, 1, p. 176.

²⁷ Konrad, p. 731.

²⁹ See Virchow, 16, p. 371, and cf. Perier.

inherited, although it is possible that other distortions not produced by artificial means may be carried over to future generations through the influences of heredity.³⁰

48 ✓ We have now to consider rather more in detail than has hitherto been possible certain of the principal characteristics of the various types of deformed crania. We have seen in the course of these notes how varied are the different forms of deformation that can be produced and how difficult it is to divide these forms into any classified system except by that which takes the type of apparatus as its basis. I propose to take some of these characteristic forms and make a few remarks about certain points which must arise in any treatment of them based upon the point of view of physical anthropology. I shall not in this place make any attempt to deal in detail with various ways of describing deformed crania according to means and indices. That part of our study must await another opportunity. Here I shall merely indicate in broadest outline a few of the more important features which must strike any student of cranial deformation. One of the most interesting surveys we have of certain of these problems is that which was printed in 1924 and published by J. Imbelloni and appearing under the auspices of the Anthropological Section of the Faculty of Philosophy and Letters in Buenos Aires.³¹ Certain other authors had previously pointed out various facts worthy of consideration, as for example the effect of deformation on the cranial indices, a fact which was indicated by Riccardi³² in 1886; the condition of the temporal fossa treated by S. Sergi³³ in 1910; and the size of the occipital and facial angles in South American skulls discussed by Künike³⁴ in 1918. Here, however, we will not enter into any detailed account but select one or two types and indicate a few broad generalizations. ✓ Virchow pointed out in his *Crania Ethnica Americana* that of the flattened skulls two distinct types were clearly discernible: (a) that in which there was a clear antero-posterior flattening and (b) the simple occipitally flattened form. These he called chamæcephalic and hypsiccephalic and pointed out

³⁰ See Milles and cf. Montoya y Flórez, who inclined to the belief that in certain cases plagiocephaly is inherited.

³¹ Imbelloni, 1, cf. Imbelloni, 3.

³³ S. Sergi, 1.

³² Riccardi.

³⁴ Künike, 2.

that both tended to produce a form of brachycephaly. Now if we compare skulls belonging to these two distinct types a number of observations can be made. In the type when fronto-occipital flattening has been effected by boards it is clear that no position of the piece of wood will permit a flattening over the interparietal region of the occipital bone or of the lambdoidal triangle of the parietal bones.³⁵

If we draw a line from lambda to inion it is clear that the posterior board will be more or less parallel to it, and will be at a tangent to the protuberance at the inion. One result of this pressure is that the region about lambda is pushed upwards and this point is of importance when we consider how the occiput is flattened. Now in the form which is produced by the head being forced to lie upon a hard unyielding surface, pressure is exerted upon the whole occipital region including lambda and thus this point remains more or less in the centre when the skull is viewed in norma occipitalis, instead of being pushed upwards as in the former case. Moreover the two varieties of deforming apparatus are of great importance in considering the different forms produced by their use. It is clear that in the first case a number of factors have to be taken into account, apart altogether from various possibilities inherent in the subject as regards its reaction to them. Thus supposing we have two boards such as those found in the child's grave at Campo Morado. First of all the size of the boards will influence the amount of cranial surface to be flattened; the thickness will be of some importance as regards flexibility under tension; the ligatures if strong will not yield under the same tension, whilst if weak may stretch and allow some play between the head and the wooden surface. Should such play be present then the chances of asymmetry being produced are naturally greater since the wooden slabs may slip to one side or the other and produce unequal pressure. The position and exact method of attachment of the boards are not the only points deserving of consideration. The age of the child at which the apparatus is applied is important, as also is the duration of the time that pressure is continued. Variations in any of these respects will cause changes in the resulting deformation, and thus Imbelloni has proposed to divide the fronto-occipital type

³⁵ Cf. Imbelloni, 1, p. 341.

into four subdivisions depending upon the extent of the deformation. Thus in the first class which he calls curvo-occipital the occipital bone has recovered somewhat from the posterior compression and presents a more rounded surface than is usually the case. Similarly he calls the type curvo-frontal where the frontal area has lost most of its initial flattening even if it ever were vigorously compressed; whilst he adds two more forms—the intermediate and the extreme—to denote types of medium fronto-occipital flattening and of extreme deformation. By calculating the frontal curvature indices and the occipital curvature indices it is doubtless possible to indicate by sets of average indices the curvatures of the various classes of deformed skulls, once it has been decided how to divide up the different types. Such indices give a clear idea of the degrees of flattening, the more extreme forms naturally giving a larger index than the intermediate and moderate examples. Similarly the degree of curvature of the occiput may be described, and thus, by merely giving the index, a better idea of the deformation is obtained than by a verbal account. Another point, which might I think be of considerable interest, is the form of the cranial quadrilateral and the sizes of the different angles at the four points (nasion, bregma, lambda, basion). It is obvious that, on account of the shifting of bregma and lambda due to deformation, the angles, show considerable modifications. We cannot enter further into these questions here, but pass to the other form of deformation, produced by pressure from the cradle-board. Here the pressure has its centre upon the region about lambda and this point is not pushed upward as in the former deformation. The posterior flattening is not almost parallel to a line drawn from lambda to opisthion but rather is more nearly parallel to a line drawn from bregma to basion. Imbelloni has indicated further differences between the two types and those who are interested in following the question may be referred to his work.⁸⁶ Similar methods of describing other forms of deformed skulls, and especially of the types produced by bandages could doubtless be profitably employed, but we must now turn to consider one or two special inquiries before trying to sum up the conclusions to which we have been led.

⁸⁶ Imbelloni, 4, p. 193.

In 1924 Bruno Oetteking published a paper dealing with the declination of the pars basilaris in artificially deformed skulls. Fig. 1, illustrates his argument. P-P' is a line drawn through basion and parallel to FH. Having drawn a line from basion to nasion, the angle P-Bas-Nas is produced. Oetteking takes his examples from the fronto-occipital deformation of the

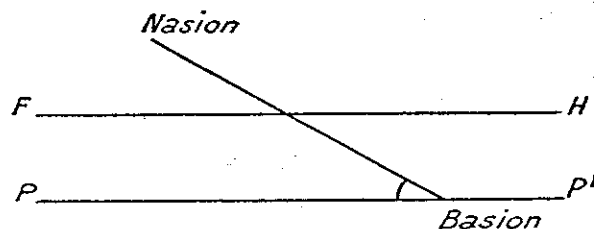


FIG. 1.

Chinook and compares them with normal crania. Taking Sarasin's comparative figures of flattening as:—

Hyperplatyclin	...	...	...	...	X° - 30°
Platyclin	...	...	...	...	30°1' - 35°
Metrioclin	...	...	...	...	35°1' - 40°
Orthoclin	...	...	...	...	40°1' - 45°
Hyperorthoclin	...	...	...	...	45°1' - X°

he finds that the fronto-occipital deformation has tended to produce a hyperplatyclin condition.³⁷

An attempt at obtaining a correction for artificial deformation of skulls was published by Dr. H. L. Shapiro in 1928. By a formula taken from the cranial length and basion-nasion diameter in a series of skulls, he obtains for each unit change in the mean maximum cranial index an equivalent change of 1.49 units in the mean basion-nasion diameter. The corrected mean thus represents the true mean as contrasted with the mean of the deformed, and constitutes an interesting comparison which may deserve further study.³⁸ Falkenburger had previously attempted to obtain certain correlations between parts of normal and deformed skulls,³⁹ and other authors have

³⁷ Oetteking, 3, pp. 7; 24, &c.

³⁸ Shapiro, p. 18. The three formulæ used are max. cran. length + 1.49 : max. cran. width + .99 : bas. breg. height - .80 with reservations (p. 31).

³⁹ Falkenburger, p. 35.

devised methods by which comparative measurements can be estimated. Over 20 years ago Chervin used photography upon squared paper, and by a method of tracing on such transparent sheets was able, by reversal of the line drawings to show clearly certain of the more important points to be observed.⁴⁰ Both Broca and Topinard were of the opinion that the cranial capacity of deformed skulls was less than normal, a fact lately discussed by Marelli⁴¹ in reference to the deformed crania from Argentina, but up to the present the facts do not seem to warrant any definite conclusion.

Having given a slight indication of a few of the more important points connected with the description and measurement of deformed crania we must now turn our attention to the conclusions which may be drawn from the facts or alleged facts related in the preceding pages. We have seen how the practice of artificial cranial deformation is spread over the world to a surprising extent. It is true that there are places in which the custom is not found, and they are of equal importance and significance as are those where the practice is wide-spread. In his *Essays on Museums* (1898) Sir W. H. Flower summed up various possibilities as to the origin and meaning of the custom. Perhaps the most suggestive is that which tends to explain the practice by supposing it is a desire to intensify "prevailing natural peculiarities of conformation,"⁴² although Flower is careful to add that this assumption "does not rest upon any strong basis of fact." Commenting upon the various reasons given by those who practise the distortion and whose explanations have been handed on to us he states, rightly in my opinion, that these were all probably excuses for a blind adherence to custom and the imperious demands of fashion.⁴³ Netter, on the other hand, regards the practice as an intentional method of remedying supposed defects,⁴⁴ and we have already seen how Angrand believed that an attempt to imitate the head of a serpent was the origin of certain of the deformations. Another widespread theory is that deformation is an attempt to intensify natural racial characteristics, and there would seem some reason to suppose that, whatever may have been the origin of the custom,

⁴⁰ Chervin, 1, vol. II, pp. 31-35.

⁴¹ Marelli, 3: cf. Ecker, 2, p. 75.

⁴² Flower, 5, p. 331.

⁴³ Flower, 5, p. 331.

⁴⁴ Netter, p. 100.

its effects did in fact in some instances achieve that result.⁴⁵ Apart from these suppositions, which appear to me rather inconclusive, we have no definite theory until the suggestion of Professor Elliot Smith that head deformation together with certain other odd customs were part of the so-called Archaic civilization which spread round the world.⁴⁶ The theory that this custom, together with mummification of the dead, circumcision, &c. were derived from Egypt was adopted by Mr. Warren Dawson in 1927, when he suggested that the idea arose from the fact that Akhenaten had an abnormally shaped skull, which was imitated by certain of the Egyptians,⁴⁷ a theory previously advanced by Prof. Elliot Smith. We have seen that during the Tell el-Amarna period the daughters of the heretic king were represented as having what can be supposed to be deformed heads, and that the art of the period provides examples in other persons also. It is supposed, according to those who agree with Mr. Dawson, that the custom was dispersed from Egypt about the time of the Tell el-Amarna epoch and thus would give us a date which would fix the time of departure of at least one of the components of the so-called Archaic culture. It may be supposed that, according to this theory, one of the routes by which the custom was diffused was by way of the Hittites. In the course of its spread methods may have become confused whilst the original intention may have been misunderstood and misinterpreted. Whatever may be the truth of this theory it is clear that in one particular at least it is radically opposed to those which seek an independent origin of the custom in the chief centres where it is found. We may well ask, however, with Quatrefages whether it is coincidental that the deformed skulls of the Caucasus, France and America are so similar. His reply to this question is also suggestive. Writing in 1889 he says that it is indeed difficult to admit that the idea of deforming the human head in such an extraordinary way has been independently evolved in each of those peoples where we see its manifestations. He adds that in this case one is forced to admit evidence both of diffusion and the contact of cultures.⁴⁸ There is no doubt, I

⁴⁵ Cf. Bordier, p. 18.

⁴⁶ G. Elliot Smith, 2.

⁴⁷ Dawson, 1.

⁴⁸ Quatrefages de Bréau, p. 476. Deutsch, however, arguing on the same basis comes to the precisely opposite conclusion (p. 6).

think, that the opinion of Quatrefages is not to be passed over lightly. The custom of cranial deformation is not uniform in all parts of the world. It cannot be the response to some innate human impulse, since if this were so it would be found more widely distributed than it is. Moreover, we can see the custom fading away, as it were, from those centres where it flourished and where succeeding generations clung to it with tenacity. This same phenomenon is to be observed in Asia, Africa, Oceania and America. Again the custom of deforming only some of the population, and moreover confining that custom almost exclusively to a certain class suggests that the idea is either derived from, or connected with, some notion concerning differences between aristocracy and commoners. This is further strengthened by the fact of the apparent connection between the practice of cranial deformation and the dual organization, the two phenomena often appearing in the same region. Can we suppose, even on the evidence that we at present possess, that the practice was independently invented by, for example, the people of south-west Malekula and by the Mangbetu, and that having ideas of beauty which demanded an elongated head, they thereupon proceeded to invent the same special methods of compressing infants' heads to produce this result? Does it not appear more probable, judging from what we know of man in his different environments, to suppose that the practice was imposed from without and that it was continued owing to certain ideas of importance that were attached to it? Now if we admit that the custom was diffused through Indonesia, Melanesia and Polynesia, what reason have we to suppose that the area of diffusion was not much larger? Whatever may be the truth regarding Polynesian or Asiatic influences upon the American continent, the possibility of the spread of cranial deformation from the old world must, I think, at least be considered. In America itself the custom was in full sway in the early Maya period, and it would not seem impossible that from this centre a gradual spread may not be detected both towards north and south America.

It would appear from the evidence that we already possess that the custom of cranial deformation dates to a period at least as early as Late Minoan III; that it occurs in Europe, Asia, Africa, Oceania and America; and that the practice appears to break down the further we proceed from areas which

may be considered as centres of the custom. This degradation usually consists of three steps. First of all methods of deformation become mixed and besides the use of apparatus, manipulations are practised. The use of apparatus then entirely disappears, moulding and pressing surviving, till finally these also disappear leaving sometimes, perhaps, general massage of the body.

Another fact, which is of some interest, is that the custom is particularly associated with ideas of nobility and aristocracy,⁴⁹ suggesting that it did not originate in a simple community of food-gathering peoples but rather that it is one of the elements of civilization. If we take all these facts into consideration, the theory that the custom originated in one place and that it slowly spread round the world does not appear to me to be wholly unreasonable. We know for certain that in one particular part of the world, at the earliest date yet fixed, royal personages were being represented as having deformed heads of a very peculiar shape: and that the king himself, having naturally a head of very similar shape, it is not perhaps too much to suppose that they were imitating him. It is not difficult to suppose that the idea of these deformations spread, just as similar ideas have spread within historical times. How far such diffusion extended, if it be granted at all, each must decide for himself, but I would submit that in some cases at least this hypothesis must be accepted.

It may be thought that after such a lengthy and tedious discussion as that which is now brought to a close some more definite conclusions ought to be attained. If that be so then my readers may come to them by themselves. I have tried to present the facts fairly and have, I hope, given a representative selection of the literature, not excluding those authors on whose testimony I myself place little reliance. From this material they can draw any further information that they require. But I must be excused from making up their minds for them. Theories are excellent as long as it is clearly understood that they are merely provisional, and, as fresh facts are elicited, may have to undergo complete abandonment or considerable modification. When archæologists have freed themselves from their senseless dislike of skeletal material, and anthropologists

⁴⁹ Cf. Jäger, p. 68.

of their frequent scorn of flints, and other scientific men of the idea that the whole subject is merely concerned with rags and bones, then will excavations be more generally conducted on a scientific plan instead of being merely means of gathering relics for wealthy museum collectors. The loss of skeletal material through archæological excavations has been enormous, and even to-day many "digs" are carried out with an almost total disregard for anything but discoveries of grave goods interesting to the collecting archæologist. Our knowledge of the early sites where deformed crania have been found is extremely meagre, and, indeed, many more facts are required before we can hope to obtain a fuller knowledge of the custom. Some of the questions to be answered I have indicated in the appendix.

I have stressed the point of view of those who regard head deformation as part of the so-called Archaic civilization emanating from Egypt, not because I may be thought to hold this opinion myself, but because it is one which supports the highly laudable attempt to see anthropology and archæology as a connected whole and not as a collection of isolated facts without any relation to the whole complex fabric of which they are a part. I cannot bring myself to believe that any understanding of anthropology or archæology will be properly achieved unless the student makes himself familiar with the biological background, and has some more than passing acquaintance with the evolution of the human mind as seen in the development of the brain and of man's anatomical structure. It is precisely here, I think, that the so-called diffusionist school has made its greatest contribution to the advancement of interpretation. By insisting on a knowledge of somatology as a prerequisite to anthropological study it has stressed the importance of man the animal in the development of *homo sapiens*. The picture of human civilization that it presents may be blurred in places and distorted in others. The glass through which we peer is sometimes very dark. But the substitution of that picture for the kaleidoscopic confusion of earlier times is no mean achievement. It is a synthesis only to be fabricated by men of genius.

We have seen some of the difficulties inherent in the view that head deformation is a custom arising from an original desire to imitate the cranial peculiarity of the heretic king. No artificially deformed skulls of early date have ever been

found in Egypt, and it is clear that if deformed crania are at any time discovered dating from a period before Late Minoan III then the theory would have to undergo very considerable modification.

On the other hand I cannot pretend that the other theories hitherto advanced can be held to be sufficient in view of the facts. In any explanation that is offered two facts, at least, have to be taken into account: (1) association with ruling classes and (2) degradation, as seen, for example, in Africa, South America and Asia.

Another fact to which our study has led us is the true influence of the cradle-board as regards artificial cranial deformation. The resulting distortion due to this cause is undoubtedly unintentional in the majority of cases, there being only a few rare instances where intention can be detected.