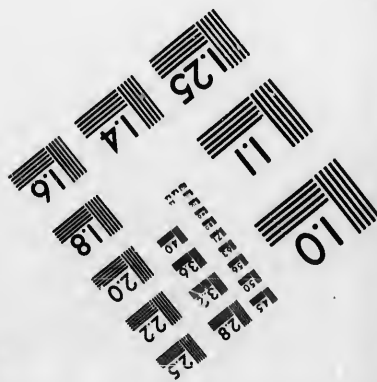
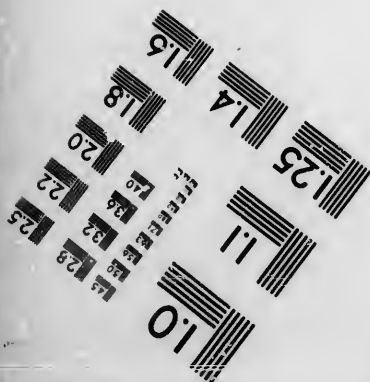
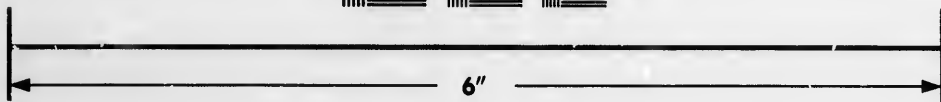
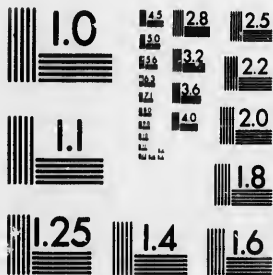


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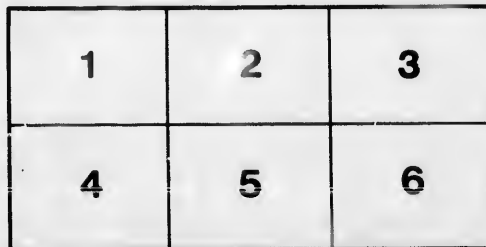
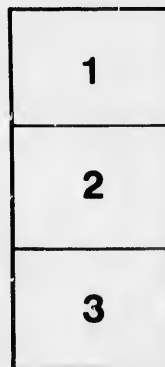
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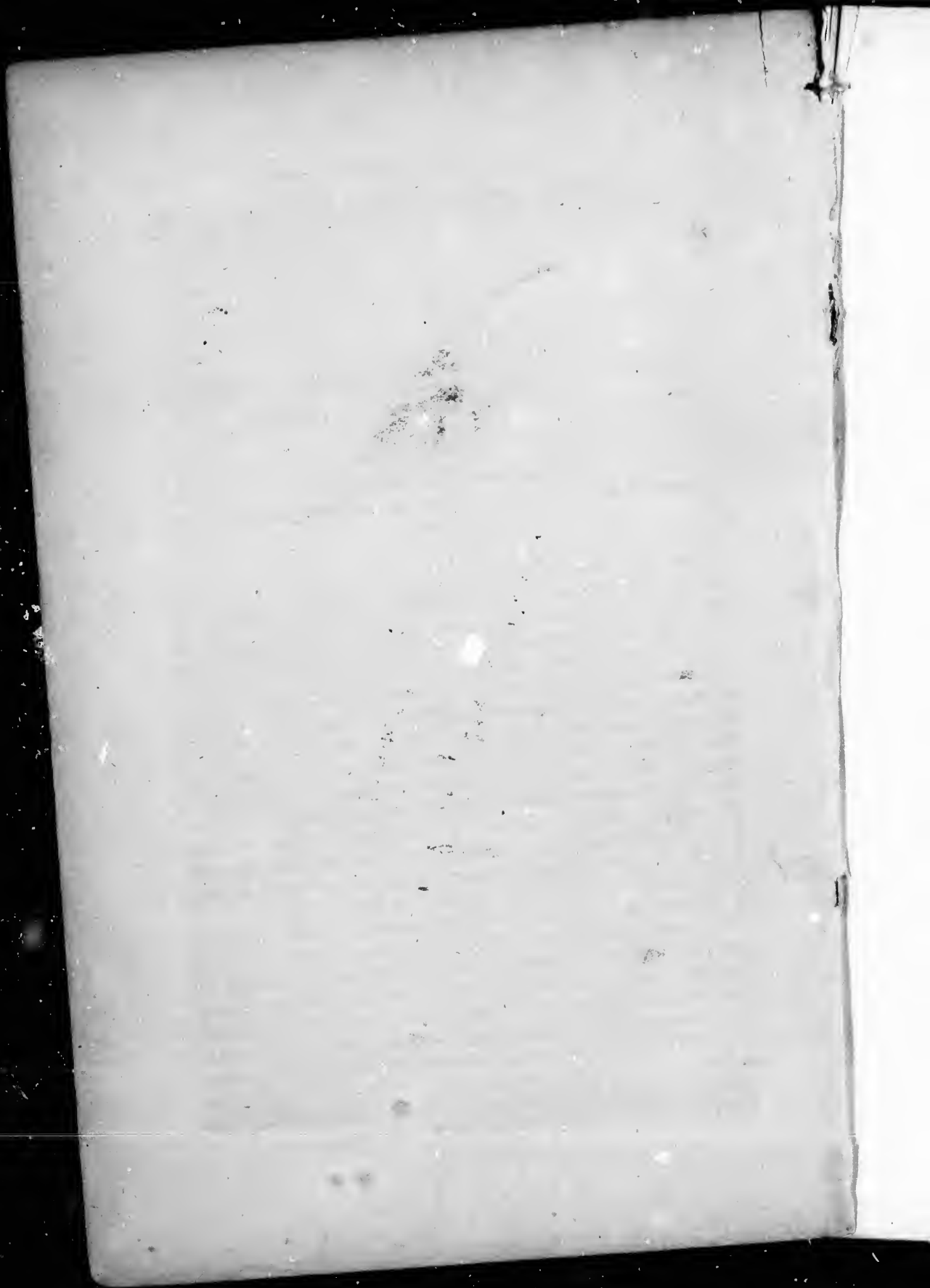
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ILLUSTRATIONS

OF THE

SIGNIFICANCE OF CERTAIN ANCIENT  
BRITISH SKULL FORMS.

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*From the Canadian Journal for March, 1863.*

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ILLUSTRATIONS OF THE SIGNIFICANCE OF CERTAIN  
ANCIENT BRITISH SKULL FORMS.

—  
BY DANIEL WILSON, LL.D.,  
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—

During a recent visit to Washington, I availed myself of the facilities afforded me by Professor Henry, the learned Secretary of the Smithsonian Institution, to examine with minute care the ethnological collections preserved there, including those formed by the United States Exploring Expedition; and especially a highly interesting collection of human crania. The latter includes those of Esquimaux and Tchuktchi, a number of compressed and greatly distorted Chinook and other Flathead skulls, as well as examples of those of other Indian tribes, both of North and South America; and of Fiji, Kanaka, and other Pacific islanders. On my return I spent a short time in Philadelphia chiefly for the purpose of renewed study of the valuable materials of the Mortonian collection; and while there enjoyed the opportunity of examining, in company with Dr. J. Aitken Meigs, a series of 125 Esquimaux crania obtained by Dr. Hayes during his Arctic Journey of 1854.

The materials for craniological investigation which such collections supply can scarcely be surpassed in some of their departments; and invite to very diverse researches by the illustrations they are calculated to afford. It chanced, however, that my attention had been recently recalled to an old subject of speculation, relative to the possible modification of the forms of ancient British crania by some of the very causes which so materially alter those of many American tribes; and this accordingly influenced me in part, in the notes I made of the collections both at Washington and Philadelphia; and will now give direction to some remarks bearing on the same inquiry.

Among the most prized crania in the collection of the Academy of Natural Sciences at Philadelphia is the celebrated Scioto Mound skull. But though on a former visit, I made the ancient mound crania an object of special study, this most remarkable example of the series was not then included among them; and I now examined the original for the first time. The result of this examination was to satisfy me that the remarkable form and proportions of that skull are much more due to artificial influences than I had been led to suppose from the views published in the *Smithsonian Contributions to Knowledge*.\* The vertical view, especially, is very inaccurate. In the original it presents the peculiar characteristics of what I have before designated as the truncated form: passing abruptly from a broad flattened occiput to its extreme parietal breadth, and then tapering with slight lateral swell, until it reaches its least breadth immediately behind the external angular processes of the frontal bone. The occiput has been subjected to the flattening process to a much greater extent than is apparent from the drawings; but at the same time it is accompanied by no corresponding affection of the frontal bone, such as inevitably results from the procedure of the Chinooks and other Flathead tribes; among whom the desired cranial deformation is effected by bandages crossing the forehead and consequently modifying the frontal as much as the parietal and occipital bones. On this account, great as is the amount of flattening in this remarkable skull, it is probably due solely to the undesigned pressure of the cradle-board acting on a head of markedly brachycephalic proportions and great natural posterior breadth. The forehead is fully arched, the glabella prominent, and the whole character of the frontal bone is essentially different from the Indian type. The sutures are very much ossified; and even to some extent obliterated. So early as 1857, when discussing Dr. Morton's theory of one uniform cranial type pervading the whole ancient and modern tribes of North and South America, with the single exception of the Esquimaux, I remarked: I think it extremely probable that further investigation will tend to the conclusion that the vertical or flattened occiput, instead of being a typical characteristic, pertains entirely to the class of artificial modifications of the natural cranium familiar to the American ethnologist alike in the disclosures of ancient graves, and in the customs of widely separated living tribes.†

\* *Ancient Monuments of the Mississippi Valley*: pl. xlvii. and xlviii.

† *Edinburgh Philosoph. Journal, N. S.*, vol. vii. p. 24. *Canadian Journal*, vol. ii. p. 406.



This idea received further confirmation from noticing the almost invariable accompaniment of such traces of artificial modification, with more or less inequality in the two sides of the head. In the extremely transformed skulls of the Flathead Indians, and of the Natchez, Peruvians, and other ancient nations by whom the same barbarous practice was encouraged, the extent of this deformity is frequently such as to excite surprise that it could have proved compatible with the healthful exercise of any vital functions. But the aspect in which it is now purposed to review the subject of artificial modifications of the human cranium, in relation to ancient British skull-forms, was suggested, in the same paper above referred to, when pointing out the mistaken idea adopted by Dr. Morton, that such an unsymmetrical conformation, or irregularity of form, is peculiar to American crania.\* The latter remark, I then observed, is too wide a generalization. I have repeatedly noted the like unsymmetrical characteristics in the brachycephalic crania of Scottish barrows; and it has occurred to my mind, on more than one occasion, whether such may not furnish an indication of some partial compression, dependent, it may be, on the mode of nurture in infancy, having tended, in their case also, if not to produce, to exaggerate the short longitudinal diameter, which constitutes one of their most remarkable characteristics.

The idea thus expressed, in a paper read before the American Scientific Association at Montreal, as well as at the Dublin meeting of the British Association in 1857, was the result of observations made before leaving Scotland in 1853. One section of the *Pre-historic Annals of Scotland* is devoted to a discussion as to the ethnological significance of the crania of Scottish Tumuli; and after its publication I availed myself of every favourable opportunity for adding to the rare materials illustrative of that interesting department. In pursuing such researches my attention was repeatedly drawn to the unsymmetrical proportions of ancient brachycephalic skulls, and to their peculiar truncated form, accompanied, as in the mound skull of the Sciote Valley, by an abrupt flattening of the occiput which I soon began to suspect was due to artificial causes. Since then the facilities derived from repeated examinations of American collections have familiarized me, not only with the extreme varieties of form of which the human head is susceptible under the influence of artificial compression; but also with the less marked changes undesignedly resulting from such seemingly slight causes as the constant

\* *Crania Americana*, p. 115. *Types of Mankind*, p. 444.

pressure of the Indian cradle-board. The examination and measurement of several hundred specimens of American crania, as well as of the living head in representatives of various Indian tribes, have also satisfied me not only of the existence of dolichocephalic and brachycephalic heads as tribal or national characteristics, but of the common occurrence of the same exaggerated brachycephalic form, accompanied with the vertical or obliquely flattened occiput, which had seemed to be characteristic of the crania of the Scottish tumuli. There are indeed ethnical differences apparent, as in the frontal and malar bones, but so far as the posterior region of the head is concerned, both appear to exhibit the same undesigned deformation resulting from the process of nursing still practised among many Indian tribes.

The light thus thrown on the habits of the British mother of prehistoric times, by the skull-forms found in ancient barrows, is replete with interest, from the suggestions it furnishes of ancient customs hitherto undreamt of. But it has also another and higher value to the craniologist, from its thus showing that some, at least, of the peculiar forms hitherto accepted as ethnical distinctions, may be more correctly traced to causes operating after birth.

The first example of this peculiar cranial conformation which attracted my attention, as possibly traceable to other causes than inherited characteristics, or natural deviations from the typical skull-form of an extinct race, occurred on the opening of a stone cist at Juniper Green, near Edinburgh, on the 17th of May, 1851. Soon after the publication of the *Prehistoric Annals of Scotland*, in which the special characteristics of the crania of the Scottish tumuli were first discussed, I learned of the accidental discovery of an ancient tomb in a garden on the Lanark road, a few miles to the north-west of Edinburgh, and immediately proceeded to the spot. The cist occupied a slightly elevated site, distant only a few yards from the road; and as this had long been under cultivation as a garden, if any mound originally marked the spot it had disappeared, and no external indication distinguished it as a place of sepulture. A shallow cist formed of unhewn slabs of sandstone enclosed a space measuring three feet eleven inches in length, by two feet one inch in breadth at the head, and one foot eleven inches at foot. The joints fitted to each other with sufficient regularity to admit of their being closed by a few stone chips inserted at the junction, after which they appeared to have been carefully cemented with wet loam or clay. The slab which covered the whole projected

over the sides, so as effectually to protect the sepulchral chamber from any infiltration of earth. It lay in a sandy soil, within little more than two feet of the surface; but it had probably been covered until a comparatively recent period by a greater depth of earth, as its site was higher than the surrounding surface, and possibly thus marked the traces of the nearly levelled tumulus. Slight as this elevation was it had proved sufficient to prevent the lodgment of water, and hence the cist was found perfectly free from damp. Within this a male skeleton lay on its left side. The arms appeared to have been folded over the breast, and the knees drawn up so as to touch the elbows. The head had been supported by a flat water-worn stone for its pillow; but from this it had fallen to the bottom of the cist, on its being detached by the decomposition of the fleshy parts, and, as is common in crania discovered under similar circumstances, it had completely decayed at the part in contact with the earth. A portion of the left side is thus wanting; but with this exception it was not only nearly perfect when found, but the bones are very heavy; and the whole skeleton appeared to me so well preserved as to have admitted of articulation. Above the right shoulder, a neat earthen vase had been placed, probably with food or drink. It contained only a little sand and black dust when recovered, uninjured, from the spot where it had been deposited by affectionate hands many centuries before, and is now preserved along with the skull in the Scottish Museum of Antiquities.

As the peculiar forms of certain skulls, such as one described by Dr. Thurnam, from an Anglo-Saxon cemetery at Stone, in Buckinghamshire, \* and another from an Indian cemetery at Montreal in Lower Canada, † as well as those of numerous distorted crania, from the Roman site of Uriconium and other ancient cemeteries, have been ascribed to posthumous compression: the precise circumstances attendant on the discovery of the Juniper Green cist are important, from the proof they afford that the body originally deposited within it, had lain there undisturbed and entirely unaffected by any superincumbent pressure from the day of its interment. Two, if not three, classes of skulls have been recovered from early British graves. One with a predominant longitudinal diameter, in the most marked examples differs so essentially in its elongated and narrow forehead, and occiput from the modern dolichocephalic head, that I was led to assign it to

\* *Crania Britannica*, Dec. I. p. 38.

† *Edin. Philosoph. Journal*, N. S. XVI. p. 269.

a separate class under the title kumbecephalic.\* Another has the longitudinal diameter little in excess of the greatest parietal breadth, and is no less strikingly distinguished from the prevailing modern head, whether of Celtic or Saxon areas, by its shortness, than the other is by its length, when viewed either in profile or vertically. The Anglo-Saxon type of skull appears to be intermediate between those two forms, with a more symmetrical oval, such as is of common occurrence in modern English skulls.

If cranial conformation has any ethnical significance, it appears to me inconceivable that the two extreme forms above referred to can both pertain to the same race; and the circumstances under which the most characteristic examples of the opposite types have been found, confirm me in the belief which I advocated when the evidence was much less conclusive, that the older dolichocephalic or kumbecephalic skull illustrates the physical characteristics of a race which preceded the advent of the Celtæ in Britain, and gradually disappeared before their aggressions. As, however, the opposite opinion is maintained by so high an authority as Dr. J. Barnard Davis, the comparison of the following measurements, illustrative of the three types of head, will best exhibit the amount of deviation in opposite directions from the intermediate form. The measurements are taken from those furnished in the *Crania Britannica*, and include the *longitudinal diameter, frontal, parietal, and occipital breadth, parietal height, and horizontal circumference*. No. 1, like the majority of the same class, is derived from a megalithic chambered barrow, and has been selected by Dr. Davis as a characteristic example of the class to which it belongs;† though, according to him, that is one of aberrant deviation from the typical British form. No. 2, obtained from a barrow at Codford, in Wiltshire, has also been selected by Dr. Davis as one of three typical British crania. It is of the same type as the Juniper Green skull, and its strongly marked characteristics are thus defined by him: "Its most interesting peculiarities are its small size, and its decidedly brachycephalic conformation. This latter character, which commonly appertains to the ancient British cranium, and even to that form which we regard as typical, is seldom met with expressed in so marked a manner."‡ No. 3, is a skull from an Anglo-Saxon cemetery near Litlington, Sussex, one of two of which Dr. Davis remarks: "There is

\* *Prehistoric Annals of Scotland*, p. 177.

† *Proceedings of the Acad. Nat. Sciences*, Philadelphia, 1857, p. 42.

‡ *Crania Britannica*, Dec. ii., pl. 14.

a general indication of good-form in these fine capacious skulls, which is apparent in every aspect. . . . On a review of the whole series of Anglo-Saxon crania which have come under our notice, we are led to conclude that this pleasing oval, rather dolichocephalic form, may best be deserving the epithet of typical among them.\* All the three examples are male skulls:

	L. F.	F. B.	P. B.	O. B.	P. F.	H. C.
1. Uley Chambered Barrow Skull . . . . .	8.1	4.7	5.7	5.	5.1	21.
2. Godford Skull . . . . .	6.8	4.6	5.7	5.1	4.7	20.
3. Litlington Skull . . . . .	7.5	4.7	5.3	4.6	4.9	20.9

Each of the above examples presents the features of the type to which it belongs with more than usual prominence, so that if the means of a large series were taken, the elements of difference between the three would be less strongly defined. The differences are, however, those on which their separate classification depends; and they thus illustrate the special points on which any craniological comparison for ethnological purposes must be based. Of the three skulls, the era and race of one of them (No. 3) are well determined. It is that of a Saxon, probably of the seventh or eighth century, of the race of the South Saxons, descended from Ælla and his followers; and recovered in a district where the permanency of the same ethnic type is illustrated by its predominance among the rural population at the present day. Another of the selected examples, No. 2, is assumed by Dr. Davis, perhaps on satisfactory grounds, to be an ancient British, *i.e.*, Celtic Skull. It is indeed a difficulty, which has still to be satisfactorily explained, how it is that if this brachycephalic type be the true British head-form, no such prevalence of it on modern Celtic areas is to be found, as in the case of Saxon Sussex connects the race of its ancient pagan and christian cemeteries, by means of the characteristic ovoid skull, with the Anglo-Saxon population of the present day. The historical race and era with which Dr. Davis appears to connect the Barrow-builders of Wiltshire, is thus indicated in the *Crania Britannica*:—"Region of the Belgæ, Temp. Ptolemæi, A.D. 120." The Belgæ of that era—then apparently comparatively recent intruders, and by some regarded as not Celtic but Germanic—were displaced, if not exterminated; but the modern Britons of Wales are

\* *Crania Britannica*, Dec. iv., pls. 39, 40.

undoubted descendants of British Celts of Ptolemy's age. Though doubtless mingling Saxon and Norman with pure British blood, they probably preserve the native type as little modified by such foreign admixture as that of its supplanters in the most thoroughly Saxon or English districts of England. It is therefore a question of some importance how far the extreme brachycephalic proportions of the so-called British type may be traceable to other than inherited ethnical characteristics; whether in fact it is not entirely due to the undesigned flattening of the occiput, and lateral expansion of the brain and skull, consequent on the use of the cradle-board.

Meanwhile, turning from this supposed British skull of Roman times, to the one derived from Uley chambered barrow, No. 1, the most ancient of the series, and assuming their chronological order to be undisputed, as it appears to be: we find no gradation from an abbreviated to an elongated form, but, on the contrary, an extreme brachycephalic type interposed between the ovoid dolichocephalic Anglo-Saxon of the Christian era, and the extreme dolichocephalic, or kumbecephalic one belonging to a period seemingly so remote that Dr. Thurnam, when noting the recurrence of the same type in another chambered barrow at Littleton Drew, Wiltshire, remarked: "It is not necessary to admit the existence of any pre-Celtic race, as the skulls described may be those of Gaelic, as distinguished from Cymric, Celts; or the long-headed builders of these long, chambered, stone barrows, may have been an intrusive people, who entered Britain from the South-west. Can they have been some ancient Iberian or Ibero-Phœnician settlers?"\*

Among the rarer crania of the Morton collection is one to which a peculiar interest attaches, and which may possibly have some significance in reference to this inquiry. Its history is thus narrated in Dr. Henry S. Paterson's Memoir of Dr. Morton: During a visit of Mr. Gliddon to Paris, in 1846, he presented a copy of the *Crania Ægyptiaca* to the celebrated oriental scholar, M. Fresnel, and excited his interest in the labours of its author. Upwards of a year after he received at Philadelphia, a box containing a skull, forwarded from Naples, but without any information relative to it. "It was handed over to Morton," says Dr. Paterson, "who at once perceived its dissimilarity to any in his possession. It was evidently very old, the animal matter having almost entirely disappeared. Day after day would Morton

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\* *Crania Britannica*, Dec. iii. pl. 24, (4.)

be found absorbed in its contemplation. At last he announced his conclusion. He had never seen a Phœnician skull, and he had no idea where this one came from; but it was what he conceived a Phœnician skull should be, and it could be no other.\* Six months afterwards Mr. Gliddon received, along with other letters and papers forwarded to him from Naples, a slip of paper, in the handwriting of M. Fresnel, containing the history of the skull, which had been discovered by him during his exploration of an ancient tomb at Malta. Dr. Meigs refers to this in his catalogue of the collection, (No. 1352,) as an illustration of "the wonderful power of discrimination, the *tactus visus*, acquired by Dr. Morton in his long and critical study of craniology." Such was my own impression on first reading it; but I confess the longer I reflect on it, the more am I puzzled to guess by what classical or other data, or process short of absolute intuition, the ideal type of the Phœnician head could be determined. I suspect, therefore, if we had the statement in Dr. Morton's own words, it would fall short of such an absolute craniological induction. The following is the sole entry made by him in his catalogue: "Ancient Phœnician? I received this highly interesting relic from M. F. Fresnel, the distinguished French archæologist and traveller, with the following memorandum, A. D. 1847:—Crâne provenant des caves sépulchrales de Ben-Djemma, dans l'île de Malte. Ce crâne paraît avoir appartenu à un individu de la race qui, dans les temps les plus anciens, occupait la côté septentrionale de l' Afrique, et les îles adjacentes." The sepulchral caves of Ben-Djemma, are a series of galleries with lateral chambers or catacombs hewn in the face of the cliffs on the southwest side of the island of Malta. Other traces besides the rock-hewn tombs indicate the existence of an ancient town there, although no record of its name or history survives. M. Frédéric Lacroix remarks, in his *Malte et le Goze*, "Whoever the inhabitants of this city may have been, it is manifest from what remains of their works, that they were not strangers to the processes of art. The sepulchral caves, amounting to a hundred in number, receive light by means of little apertures, some of which are decorated like a finished doorway. In others, time and the action of the humid atmosphere, have obliterated all traces of such ornament, and left only the weathered rock.

. . . The chambers set apart for sepulture are excavated at a considerable distance from the entrance, in the inmost recesses of

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\* *Memoir of S. G. Morton; Types of Mankind*, p. xi.

the subterranean galleries. The tombs are of admirable design and style of art, and the details of their execution exhibit remarkable ingenuity and purity of taste. The author of the *Voyage pittoresque de Sicile* does not hesitate to declare that they surpass in elegance any that he has seen executed on the same scale. What hand has hewn out these gloomy recesses in the rock? To that we can give no reply. The chronicles of Malta are silent on this point. Time has defaced the vestiges which might otherwise have helped to the solution of the problem."\*

Other and very remarkable remains of antiquity abound in Malta and the neighbouring island of Goza, including the cyclopean ruins styled *La tour des Géants*, which have also been assigned by some writers to a Phœnician or Punic origin, as a temple dedicated to Astarte; and the *Tadarnadur Isrira*, a megalithic structure for which a Pelasgic origin is assumed. But in drawing any comparison between the chambered galleries of Ben-Djemma and the megalithic chambered barrows or cairns of the British Islands, we are at best reasoning from the little known to the less known indices of prehistoric races; between whom the points in common may amount to no more than those which admit of a comparison being drawn between the Brachycephali of the British Stone-Period, and the corresponding physical form and rude arts of American gravemounds.

Nevertheless the Ben-Djemma skull in the Mortonian collection is not improbably what it has been assumed it to be; and it is in many respects a remarkable one. A deep indentation at the nasal suture gives the idea of an overhanging forehead, but the superciliary ridges are not prominent, and the peculiar character of the frontal bone is most strikingly apparent in the vertical view, where it is seen to retreat on either side, almost in a straight line from the centre of the glabella to the external angular processes of the frontal bone. The contour of the coronal region is described by Dr. Meigs as "a long oval, which recalls to mind the kumbecephalic form of Wilson."† It is of more importance, perhaps, to note that the remarkable skull recovered by Dr. Schmerling, from the Engis Cavern, on the left bank of the Meuse, buried five feet in a breccia, along with the tooth of a rhinoceros and other fossil bones, appears to be of the same elongated dolichocephalic type. Its frontal development is long and narrow;

\* *Malte et le Goze*, p. 21.

† Catalogue of Hurian Crania in the Academy of Nat. Sciences of Philadelphia, p. 29.



and its greatest relative proportions, in length and breadth, are 7·7 by 5·25 inches, so that it closely corresponds in those respects to the most characteristic British kumbecephalic crania.\*

Whatever be the final conclusion of ethnologists, as to the evidence which led me to adopt that name to indicate the characteristics of a preceltic British race; the necessity appears to be acknowledged for some such term to distinguish this form from the ordinary dolichocephalic type. The Ben-Djemma skull is narrow throughout, with its greatest breadth a little behind the coronal suture, from whence it narrows gradually towards front and rear. The lower jaw is large and massive, but with less of the prognathous development than in the superior maxillary. The skull is, no doubt, that of a man, and the nose has been prominent; but the zygomatic arches are delicate, and the whole face is long, narrow, and tapering towards the chin. The parietals meet at an angle, with a bulging of the sagittal suture, and a slight but distinctly defined pyramidal form running into the frontal bone. The occiput is full, round, and projecting a little more on the left side than the right. The measurements are as follows:—

Longitudinal diameter.....	7.4
Parietal diameter.....	5.1
Frontal diameter.....	4.
Vertical diameter.....	5.3
Intermastoid arch.....	12.3
Intermastoid arch.....	15. (?)
Intermastoid line.....	4.3 (?)
Occipito-frontal arch.....	14.2
Horizontal circumference.....	20.2

I have been thus particular in describing this interesting skull, because it furnishes some points of comparison with British kumbecephalic crania, bearing on the inquiry, whether we may not thus recover traces of the Phœnician explorers of the Cassiterides in the long-headed builders of the chambered barrows. When contrasting the wide and nearly virgin area with which Dr. Morton had to deal, with that embraced in the scheme of the *Crania Britannica*, I remarked in 1857:—Compared with such a wide field of investigation, the little island home of the Saxons may well seem narrow ground for exploration. But to the ethnologist it is not so. There, amid the rudest traces of primeval arts, he seeks, and probably not in vain, for the remains of primitive European allophy-

\* *Natural History Review*, vol. i.

liæ. There it is not improbable that both Phœnicians and early Greek navigators have left behind them evidences of their presence, such as he alone can discriminate.\*

Before, however, we can abandon ourselves to the temptations of so seductive a theory,—which, after all, finds only such support as may be deduced from a certain general analogy of cranial form; and derives no confirmation from the works of art accompanying the remains of the long-headed barrow builders;—it has to be borne in remembrance that the question is still disputed with reference to this class of British dolichocephalic crania: are they examples of an essentially distinct type, preserving evidence of the characteristics of a different race, or are they mere exceptional aberrant deviations from the supposed brachycephalic Celtic, or British type? Much stress is laid on the fact that the two forms of skull have occasionally been recovered from the same barrow; from which it may be inferred that the two races to which I conceive them to have belonged, were for a more or less limited period contemporaneous. More than this I cannot regard as a legitimate induction from such premises, in relation to crania of such extremely diverse types. But this amounts to little; for the same is undoubtedly true of the ancient British and the modern Anglo Saxon race; and the discovery of Celtic and Saxon skulls in a common barrow or tumulus of the 6th century is no proof that the latter race was not preceded by many centuries in the occupation of the country, by the Britons, among whom they then mingled as conquerors and supplanters.

But the elongated skulls of the Uley barrow type are no rare and exceptional forms. They have been most frequently found in tombs of a peculiar character, and of great antiquity. Many have been recovered in too imperfect a state to admit of more being deduced from the fragments than that these conform to the more perfect examples of this peculiar form. Nevertheless the number already obtained in a sufficiently perfect state to admit of detailed measurement is remarkable, when their great age, and the circumstances of their recovery are fully considered. Of this the following enumeration will afford satisfactory proof. Only two perfect crania from the chambered tumulus of Uley, in Gloucestershire,—of which the proportions of one are cited above,—have been preserved. But in the later search of Mr. Freeman, and Dr. Thurnam, in 1854, the fragments of eight or nine other skulls were recovered, and of these

\* *Canadian Journal*, vol. ii. p. 445.

the latter remarks: "The fragments are interesting, as proving that the characters observed in the more perfect crania were common to the individuals interred in this tumulus. Three or four calvaria are sufficiently complete to show that in them likewise the length of the skulls had been great in proportion to the breadth."\* Again in the megalithic tumulus of Littleton Drew, North Wilts, at least twenty-six skeletons appear to have been found, from several of which imperfect crania were recovered, and of those Dr. Thurnam remarks: "Eight or nine crania were sufficiently perfect for comparison. With one exception, in which a lengthened oval form is not marked, they are of the dolichocephalic class."† So also the four nearly perfect skulls from West Kennet are described as "more or less of the lengthened oval form, with the occiput expanded and projecting, and presenting a strong contrast to skulls from the circular barrows of Wilts and Dorset."‡ To these may be added those of Stoney Littleton, Somersetshire, first pointed out by Sir R. C. Hoare; || and examples from barrows in Derby, Stafford, and Yorkshire, described by Mr. Thomas Bateman in his "Ten Years' Diggings in Celtic and Saxon Grave Hills;" including those from Bolehill, Longlow, and Ringham Low, Derbyshire; from the galleries of the tumulus on Five Wells Hill; and from the Yorkshire barrow near Heslerton-on-the-Wolds. Several of the above contained a number of skulls; and of the last, in which fifteen human skeletons lay heaped together, Mr. Bateman remarks: "The crania that have been preserved are all more or less mutilated; but about six remain sufficiently entire to indicate the prevailing conformation to be of the long or kumbecephalic type of Dr. Wilson."§ The crania occurring in graves of this class mentioned by Mr. Bateman alone, exceed fifty in number, of which the majority are either of the elongated type, or too imperfect to be determined. The others include between thirty and forty well-determined examples, besides a greater number in too imperfect a state to supply more than indications of their correspondence to the same characteristic form. Alongside of some of these are also found brachycephalic crania; but in the most ancient barrows the elongated skull appears to be the predominant, and in some cases the sole type; and of the examples found in Scotland, several

\* *Archæol. Journal*, vol. xi. p. 313. *Crania Britannica*, Dec. I. pl. 5, (6).

† *Crania Britannica*, Dec. III. pl. 24, (3).

‡ *Ibid.*, Dec. V. pl. 50 (4).

|| *Archæologia*, vol. xix. p. 47.

§ *Ten Years' Diggings in Celtic and Saxon Grave Hills*, p. 330.

have been recovered from peat bogs, or others under circumstances more definitely marking their great antiquity.

The variations of cranial form are thus, it appears, no gradual transition, or partial modification, but an abrupt change from an extreme dolichocephalic to an extreme brachycephalic type; which, on the intrusion of the new and essentially distinct Anglo-Saxon race, gives place once more to a dolichocephalic form of medium proportions. The three forms may be represented, reduced to an abstract ideal of their essential diversities by means of the following diagram :\*—

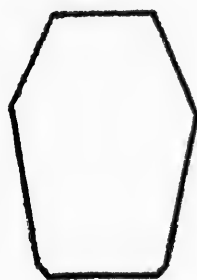


Fig. 1.



Fig. 2.



Fig. 3.

Leaving, meanwhile, the consideration of the question of distinct races indicated by such evidence, it will be well to determine first if such variations of skull-form can be traced to other than a transmitted ethnical source. The Juniper Green skull, already referred to, presents in profile, as shown in the full sized view in the *Crania Britannica*, the square and compact proportions characteristic of British brachycephalic crania. It also exhibits in the vertical outline, the truncated wedge form of the type indicated in Fig. 2. In the most strongly marked examples of this form, the vertical or flattened occiput is a prominent feature, accompanied generally with great parietal breadth, from which it abruptly narrows at the occiput. The proportions of this class of crania were already familiar to me before the discovery of the Juniper Green example; but it had not before occurred to me to ascribe any of their features to other than natural causes. But the circumstances attending its exhumation gave peculiar interest to whatever was characteristic in the skull and its accompanying relics, handled for the first time as evidences of the race and age of the freshly opened cist, discovered almost within sight of the Scottish Capital, and yet pertaining to prehistoric times. The skull was carried home in my

\* Owing to inaccurate copying on the part of the wood engraver, the diagrams, especially fig. 3, do not correspond on opposite sides, as they ought to do.

hand a distance of several miles, and its truncated outline, and still more, its flattened occiput attracted special attention, and gave rise to conversation with my friend Mr. Robert Chambers, who had accompanied me on this exploratory excursion. With the temptation of a novel discovery, I was at first disposed to recognise the traces of art in this abbreviated form, not only as exaggerating the natural characteristics, but as a possible source of their production. But a comparison with examples of the true dolichocephalic skull, to which I had already assigned priority in point of time, sufficed to dispel that illusion, and to satisfy me—of what the examination of the corresponding classes of Peruvian crania has still more strongly confirmed,—that no artificial modification can entirely efface the distinctions between two such diverse forms. At a subsequent meeting of the Society of Antiquaries of Scotland, I accompanied the presentation of the cranium and urn with an account of the circumstances of their discovery, and some remarks on the novel features noticeable in the skull. Unfortunately the printing of the Society's Proceedings, which had been suspended for some time, was not resumed till the following season; and no record of this communication was preserved beyond the title.

Another skull in the same collection, found under somewhat similar circumstances in a cist at Lesmurdie, Banffshire, has the vertical occiput accompanied by an unusual parietal expansion and want of height, suggestive of the idea of a combined coronal and occipital compression.\* A third Scottish skull, procured from one of a group of cists near Kinaldie, Aberdeenshire, also exhibits the posterior vertical flattening. But a more striking example than any of those appears in the one from Codford, South Wiltshire, selected above to illustrate this type.† Dr. Davis remarks in his description of it:—"The zygomatic arches are short, a character which appertains to the entire calvarium, but is most concentrated in the parietals, to which the abruptly ascending portion of the occipital lends its influence. The widest part of the calvarium is about an inch behind, and as much above the auditory foramen, and when we view it in front we perceive it gradually to expand from the outer angular process of the frontal to the point now indicated." The entire parieto-occipital region presents in profile an abrupt vertical line; but when viewed vertically it tapers considerably more towards the occiput than is usual in crania of the same class.

The cause of the vertical occiput, as well as the oblique parieto-oc-

\* *Crania Britannica*, Dec. ii. pl. 16.

† *Ibid.*, Dec. ii. pl. 14.

cipital flattening in this class of British Crania, I feel no hesitation in believing to be traceable to the same kind of rigid cradle-board as is in constant use among many of the Indian tribes of America, and which produces precisely similar results. Its mode of operation, in effecting the various forms of oblique and vertical occiputs, will be considered, when describing some of the phenomena of compressed Indian crania; but another feature of the Juniper Green skull, which is even more obvious in that from Lesmurdie, in the same collection, is an irregularity amounting to a marked inequality in the development of the two sides. This occurs in skulls which have been altered by posthumous compression; but the recovery of both the examples referred to from stone cists, precludes the idea of their having been affected by the latter cause; and since I was first led to suspect the modification of the occiput, and the exaggeration of the characteristic proportions of British brachycephalic crania by artificial means, familiarity with those of the Flathead Indians, as well as other ancient and modern artificially distorted American crania, has led me to recognise in them the constant occurrence of the same unsymmetrical inequality in opposite sides of the head.

But another class of deformations, of a less marked character than the well-known distortions produced on many American crania, both by the undesigned action of the cradle-board, and by protracted compression purposely applied with a view to change the form, merits the careful attention of craniologists. The normal human head may be assumed to present a perfect correspondence in its two hemispheres; but very slight investigation will suffice to convince the observer that few living examples satisfy the requirements of such a theoretical standard. Not only is inequality in the two sides frequent, but a perfectly symmetrical head is the exception rather than the rule. The plastic condition of the cranial bones in infancy, which admits of all the strange malformations of ancient Macrocephali and modern Flatheads, also renders the infant head liable to many undesigned changes. From minute personal examination I have satisfied myself of the repeated occurrence of inequality in the two sides of the head, arising from the mother being able to suckle her child only at one breast, so that the head was subjected to a slight but constantly renewed pressure in the same direction. It is surprising, indeed, to how great an extent such unsymmetrical irregularity is found to prevail, when once the attention has been drawn to it. The only example of

the Greek head possessed by Dr. Morton, was a cast presented to him by Dr. Retzius, and which, from its selection by the distinguished Swedish craniologist for such a purpose, might reasonably be assumed to illustrate the Greek type. It is accordingly described by Dr. J. Aitken Meigs, in his "Cranial characteristics of the Race of Man," as very much resembling that of Constantine Demetriades, a Greek native of Corfu, and long a teacher of the modern Greek language at Oxford, as engraved in Dr. Prichard's *Researches*. Its cranial characteristics are thus defined in the Catalogue of the Mortonian Collection: (No. 1354,) "The calvarial region is well developed, the frontal line expansive and prominent, the facial line departs but slightly from the perpendicular." On recently visiting Philadelphia for the purpose of renewed examination of its valuable collections, I was surprised to find this head,—instead of being either oval or as Blumenback describes the example selected by him, sub-globular,—presenting the truncated form, with extreme breadth at the parietal protuberances, and then abruptly passing to a flattened occiput. It measures 6.5 longitudinal diameter; 5.7 parietal diameter; and 19.2 horizontal circumference. But the most noticeable feature is the great inequality of the two sides, the right side is less tumid than the left, while it projects more to the rear, and the whole is fully as unsymmetrical as many American crania. Were it not that this feature appears to have wholly escaped Dr. Morton's attention, as he merely enters it in his catalogue as a "Cast of the skull of a young Greek, Prof. Retzius;" I should be tempted to suppose it had been purposely sent to him to illustrate the phenomena of unsymmetrical development; and of the influence of undesigned artificial causes on skull-forms.

Dr. Morton was not unobservant of such indications of the frequent dissimilarity between opposite sides of the skull, nor did he entertain any doubt as to its cause when occurring as the accompaniment of other artificial changes, though he entirely overlooked its more general prevalence. When first noticing the probable origin of the flattened occiput of certain British skulls, I drew attention to the fact that he had already recognised undesigned artificial compression as one source of abnormal cranial conformation, and he accompanied its demonstration with a reference to the predominant unsymmetrical form in all such skulls. "This irregularity," he added, "chiefly consists in the greater projection of the occiput to one side than the other;" and "is not to be attributed to the intentional application of mechanical force." Such want of uniformity in the two

sides of the head is much more strongly marked in the Flathead skulls, which have been subjected to great compression. It is clearly traceable to the difficulty of subjecting the living and growing head to a perfectly uniform and equable pressure, and to the cerebral mass forcing the skull to expand with it in the direction of least resistance. Hence the unsymmetrical form accompanying the vertical occiput in the Lesmurdie and Juniper Green skulls, and, as I conceive also in the Greek skull of Retzius. To me, at least, the study of the latter skull-form has tended strongly to confirm the belief that the extreme abbreviated proportions of many naturally brachycephalic crania are due to artificial causes. Wherever a very noticeable inequality exists between the two sides of a skull, it may be ascribed with much probability to the indirect results of designed or accidental compression in infancy; and by its frequent occurrence in any uniform aspect, may, quite as much as the flattened occiput, furnish a clue to customs or modes of nurture among the people to whom it pertains.

Dr. Struthers of Edinburgh has in his collection an interesting example of a modern skull, measuring 7.5 longitudinal diameter, 6.5 parietal diameter, 21.4 horizontal circumference, in which the truncated form is even more strongly marked by the abrupt flattening, immediately behind the parietal protuberances, accompanied with inequality in the two sides of the head. It was obtained from a grave digger in Dundee, who stated it to be that of a middle aged female whom he had known during life. There was nothing particular about her mental development.

I have also drawn attention in former papers to the fact that such peculiar forms and examples of inequality in the development of the two sides of the head, are familiar to hat manufacturers. Occasionally the eye is attracted by very unusual cranial forms revealed by baldness; but the hair suffices generally to conceal abnormal irregularities, some of which, as illustrated by hatters' shapes, are extremely odd and fantastical. My attention was originally directed to this familiar test by a remark of the late Dr. Kombst, who had never been able to obtain an English-made hat that would fit his head. He added that he believed such was the general experience of Germans, owing to the greater length of the English head. I subsequently found the shapes of a Yorkshire hatter to be shorter than some furnished me from Dublin; and I believe that such comparisons of the shapes most



in demand in different parts of the British Islands, and on the Continent, will supply important craniological results.

The novel forms thus occurring in modern heads, though chiefly traceable, as I believe, to artificial causes, are not the result of design. But the same is true of the prevalent vertical and obliquely flattened occiput of many ancient and modern American crania, as well as of the British brachycephalic class already described. Nor are such changes of the natural form necessarily limited to skulls of short longitudinal diameter, in which this typical characteristic is exaggerated by the pressure of the cradle-board in infancy. Now that this source of modification begins to receive general recognition among craniologists, its influence is assumed as a probable source of the most diverse aberrant forms. Dr. Thurnam, when referring to two skulls of different shapes, recovered from the same group of British barrows, of "a somewhat late though pre-Roman period," on Roundway Hill, North Wiltshire, thus indicates their contrasting characteristics, and suggests the probable source of such divergence from the supposed British type: "The general form of the cranium (pl. 43.) differs greatly from that from the adjoining barrow, (pl. 42). That approaches an acrocephalic, this a platycephalic form; that is eminently brachycephalic, this more nearly of a dolichocephalic character. As the eye at once detects, the difference is much greater than would be inferred from a mere comparison of the measurements. The respective peculiarities of form in the two skulls, may possibly be explained by supposing that both have been subject to artificial deformation, though of a different kind,—the one appearing to have been flattened on the occiput, the other showing a depression immediately behind the coronal suture, over the parietal bones, which seems to indicate that this part of the skull was subject to some habitual pressure and constriction, perhaps from the use of a bandage or ligature tightly bound across the head and tied under the chin, such as to this day is employed in certain parts of the west of France, producing that form of distortion named by Dr. Gosse, the sincipital, or *tête bilobée*."\* The influence of the recognition of this source of change, is indeed very manifest throughout the fifth Decade of the *Crania Britannica*. An extremely brachycephalic skull of a youth, obtained from a barrow on Ballard Down, Isle of Purbeck, is described as unsymmetrical, and as affording "tolerably clear evidence that this form, if not always produced, was at least

\* *Crania Britannica*, Dec. v. pl. 43.

liable to be exaggerated by an artificial flattening of the occiput, such as is practised by many American and Polynesian tribes."\* In the same Decade another skull of the type most dissimilar to this, is described and illustrated. It was recovered in fragments from the remarkable chambered barrow at West Kennet, Wiltshire; and its most characteristic features are thus defined by Dr. Thurnam:—"It is decidedly dolichocephalic, narrow, and very flat at the sides, and realizes more nearly than any we have yet had to figure the kumbecephalic or boatshaped form described by Dr. D. Wilson. The frontal region is narrow, moderately arched and elevated at the vertex, but slopes away on each side. The parietal region is long, and marked by a prominent ridge or *carina* in the line of the sagittal suture, which is far advanced towards obliteration, whilst the other sutures are quite as perfect as usual. The occiput is full and prominent; the supra-occipital ridges only moderately marked. There is a deep digastric groove, and a slight paroccipital process on each side. The external auditory openings are somewhat behind the middle of the skull, and very much behind a vertical line drawn from the junction of the coronal and sagittal sutures." Its extreme length and breadth are 7·7 and 5·1, and an inequality in the development of the two sides is obvious in the vertical view. As the brachycephalic skull recalls certain American and Polynesian forms, so such examples of the opposite type suggest the narrow and elongated skulls of the Australians and Esquimaux: and he thus proceeds:—"The Ballard Down skull bears marks of artificial flattening of the occiput; this calls to mind the artificial lateral flattening of the skull characteristic of the ancient people called Macrocephali, or long-heads, of whom Hippocrates tells us that 'while the head of the child is still tender, they fashion it with their hands, and constrain it to assume a lengthened shape by applying bandages and other suitable contrivances, whereby the spherical form of the head is destroyed, and it is made to increase in length.' This mode of distortion is called by Dr. Gosse the *temporo-parietal*, or '*tête aplatie sur les côtés*.' It appears to have been practised by various people, both of the ancient and modern world, and in Europe as well as the East. The so-called Moors, or Arabs of North Africa, affected this form of skull; and even in modern times, the women of Belgium and Hamburgh are both described as compressing the heads of their infants into an elongate form. Our own observations lead at least to a presumption that this form of arti-

\* *Crania Britannica*, Dec. v. pl. 45.

ficial distortion may have been practised by certain primeval British tribes, particularly those who buried their distinguished dead in long chambered tumuli."

Accordingly Dr. Thurnam draws attention to the obliteration of the sagittal suture, both in the skull in question, and to a still greater extent in one figured by Blumenbach, under the name of "Asiatic Macrocephali," and expresses his belief that this "has been produced by pressure or manipulations of the sides of the head in infancy, by which it was sought to favour the development of a lengthened form of skull; to which, however, there was probably, in the present instance at least, a natural and inherent tendency." It is perhaps worthy of note here, that a long narrow head has been observed as characteristic of certain Berber tribes, the occupants of ancient Punic sites in North Africa.

It thus appears that a class of variations of the form of the human skull, which becomes more comprehensive as attention is directed to it, is wholly independent of congenital transmitted characteristics. Kumbocephalic, acrocephalic, and platycephalic, unsymmetrical, truncated, or elongated heads, may be so common as apparently to furnish distinctive ethnical forms, and yet, after all, each may be traceable to artificial causes, arising from an adherence to certain customs and usages in the nursery. It is in this direction, I conceive, that the importance of the truths resulting from the recognition of artificial causes affecting the forms of British brachycephalic or other crania chiefly lies. The contents of early British cists and barrows prove that the race with which they originated was a rude people, ignorant for the most part of the very knowledge of metals, or at best in the earliest rudimentary stage of metallurgic arts. They were in fact in as uncivilized a condition as the rudest forest Indians of America. To prove, therefore, that like the Red Indian squaw, the British allophylian or Celtic mother formed the cradle for her babe of a flat board, to which she bound it, for safety and facility of nursing, in the vicissitudes of her nomade life,—though interesting, like every other recovered glimpse of a long-forgotten past,—is not in itself a discovery of much significance. But it reminds us how essentially man, even in the most degraded state of wandering savage life, differs from all other animals. The germs of an artificial life are there. External appliances, and the conditions which we designate as domestication in the lower animals, appear to be inseparable from him. The most untu-

tored nomades subject their offspring to many artificial influences, such as have no analogy among the marvellous instinctive operations of the lower animals. It is not even unworthy of notice that man is the only animal to whom a supine position is natural for repose; and with him more than any other animal, the head when recumbent, invariably assumes a position which throws the greatest pressure on the brain-case, and not on the malar or maxillary bones. Without, therefore, running to the extreme of Dr. Morton, who denied, for the American continent at least, the existence of any true dolichocephalic crania, or indeed any essential variation from one assumed typical form, it becomes an important point for the craniologist to determine, if possible, to what extent certain characteristic diversities may be relied upon as the inherited features of a tribe or race; or whether they are not the mere result of artificial causes originating in long perpetuated national customs and nursery usages. If the latter is indeed the case, then they pertain to the materials of archæological, rather than of ethnological deduction, and can no longer be employed as elements of ethnical classification.

Every scheme of the craniologist for systematising ethnical variations of cranial configuration, and every process of induction pursued by the ethnologist from such data, proceed on the assumption that such varieties in the form of cranium are constant within certain determinate limits, and originate in like natural causes with the features by which we distinguish one nation from another. By like means the comparative anatomist discriminates between the remains of the *Bos primigenius*, the *Bos longifrons*, and other kindred animal remains, frequently found alongside of the human skeleton, in the barrow: and by a similar crucial comparison the craniologist aims at classifying the crania of the ancient Briton, Roman, Saxon, and Scandinavian, apart from any aid derived from the evidence of accompanying works of art. But if it be no longer disputable that the human head is liable to modification from external causes, so that one skull may have been subjected to lateral compression, resulting in the elongation and narrowing of its form; while another under the influence of occipital pressure may exhibit a consequent abbreviation in its length, accompanied by parietal expansion; it becomes indispensable to determine some data whereby to eliminate this perturbing element before we can ascertain the actual significance of national skull-forms. If, for example,—as appears to be the case,—the crania from British graves of Roman times reveal a different form from that of

the modern Celtic Briton, the cause may be an intermixture of races, like that which is clearly traceable among the mingled descendants of Celtic and Scandinavian blood in the north of Scotland; but it may also be, in part, or wholly, the mere result of a change of national customs following naturally on conquest, civilization, and the abandonment of paganism for christianity.

It is in this respect, that the artificial causes tending to alter the natural conformation of the human head, invite our special study. They appear at present purely as disturbing elements in the employment of craniological tests of classification. It is far from improbable, however, that when fully understood they may greatly extend our means of classification; so that when we have traced to such causes certain changes in form, in which modern races are known to differ from their ethnical precursors, we shall be able to turn the present element of disturbance to account, as an additional confirmation of truths established by inductive craniology. Certain it is, however, whatever value may attach to the systematising of such artificial forms, that they are of frequent occurrence; apart altogether from such configuration as is clearly referrible to the application of mechanical pressure in infancy with that express object in view; or again, as is no less obviously the result of posthumous compression. But, though the deforming processes designedly practised among ancient and modern savage nations lie beyond the direct purpose of the present inquiry, they are calculated to throw important light on the approximate results of undesigned compression and arrested development.

Among the Flathead Indian tribes of Oregon and the Columbia River, where malformation of the skull is purposely aimed at, the infant's head is tightly bound in a fixed position, and maintained under a continuous pressure for months. But it is a mistake to suppose that in the ordinary use of the cradle-board the Indian pappoose is subject to any such extreme restraint. The objects in view are facility of nursing and transport, and perfect safety for the child. But those being secured it is nurtured with a tenderness of maternal instinct surpassing that of many savage nations. The infant is invariably laid on its back, but the head rests on a pillow or mat of moss or frayed bark, and is not further restrained in a fixed position than necessarily results from the posture in which the body is retained by the bandages securing it in the cradle. This fact I have satisfied myself of from repeated observations. But the consequence necessarily is, that the soft and pliant bones of the infant's head are subjected to a slight but con-

stant pressure on the occiput during the whole protracted period of nursing, when they are peculiarly sensitive to external influences. Experiments have shewn that at that period the bones specially affected by the action of the cradle-board are not only susceptible of changes, but liable to morbid affections, dependent on the nature of the infant's food. Lehmann supposes the *craniotabes* of Elsässer to be a form of rachitis which affects the occipital and parietal bones during the period of suckling; and Schlossberger ascertained by a series of analyses of such bones that the 63 per cent. of mineral constituents found in the normal occipital bones of healthy children during the first year, diminished to 51 per cent. in the thickened and spongy bone.\* The fluctuations in proportion of the mineral constituents of bones are considerable, and vary in the different bones, but in the osseous tissue they may be stated at from 67 to 70 per cent. It is obvious, therefore, that, under the peculiar physiological condition of the cranial bones during the period of nursing, such constant mechanical action as the occipital region of the Indian pappoose is subjected to, must be productive of permanent change. The child is not removed from the cradle-board when suckling, and is not therefore liable to any counteracting lateral pressure against its mother's breast. One effect of such continuous pressure must be to bring the edges of the bones together, and thereby to retard, or arrest the growth of the bone in certain directions. The result of this is apparent in the premature ossification of the sutures of artificially deformed crania.

At Washington I had an opportunity of minutely examining thirty-four Flathead skulls brought home by the United States Exploring Expedition; some of them presenting the most diverse forms of distortion. In the majority of those the premature ossification of the sutures is apparent, and in some they are almost entirely obliterated.—The same is no less obvious among the corresponding class in the collection of the Academy of Natural Sciences of Philadelphia; and especially in skulls of the Chinooks, who carry the process of deformation to the greatest extent. But I have also been struck, not only with the frequent occurrence of wormian bones in such altered skulls, but also with the distinct definition of a true supraoccipital bone.

It is marvellous to see the extraordinary amount of distortion to which the skull and brain may be subjected without seemingly affecting either health or intellect. The coveted deformity is produced partly

\* Schlossberger, Arch. f. phys. Heilk. Lehmann, Physiol. Chem. Vol. III. p. 28.

by actual compression, and partly by the growth of the brain and skull being thereby limited to certain directions. Hales, the Ethnographer of the Exploring Expedition, after describing the process as practised among the Chinooks, remarks: "The appearance of the child when just released from this confinement is truly hideous. The transverse diameter of the head above the ears is nearly twice as great as the longitudinal, from the forehead to the occiput. The eyes, which are naturally deep set, become protruding and appear as if squeezed partially out of the head."\* Mr. Paul Kane in describing to me the same appearance, as witnessed by him on the Columbia River, compared the eyes to those of a mouse strangled in a trap. The appearance is little less singular for some time after the child has been freed from the constricting bandages; as shown in an engraving from one of Mr. Kane's sketches of a Chinook child seen by him at Fort Astoria.\* In after years the brain as it increases, partially recovers its shape; and in some of the deformed adult skulls one suture gapes, while all the rest are ossified, and occasionally a fracture, or false suture remains open. An adult skull of the same extremely deformed shape, among those brought home by the Exploring Expedition, illustrates the great extent to which the brain may be subjected to compression and malformation without affecting the intellect. It is that of a Nasqually chief, procured from his canoe bier in Washington Territory. (No. 4549.) The internal capacity, and consequent volume of brain, is 95 cubic inches. The head is compressed into a flattened disc, with the forehead receding in a straight line from the nasal suture to the crown of the head, while the lambdoidal suture is on the same plane with the foramen magnum. The sutures are nearly all completely ossified; and the teeth ground quite flat, as is common with many of the tribes in the same region, and especially with the Walla-walla Indians on the Columbia River, who live chiefly on salmon, dried in the sun, and invariably impregnated with the sand which abounds in the barren waste they occupy. I assume the unimpaired intellect of the Nasqually chief from his rank. The Flathead tribes are in the constant habit of making slaves of the Roundheaded Indians; but no slave is allowed to flatten or otherwise modify the form of her child's head, that being the badge of Flathead aristocracy. As this has been systematically pursued since ever the

\* Ethnography of the U. S. Exploring Expedition, p. 216.

† Prehistoric Man, Vol. II. p. 320.

tribes of the Pacific coast were brought under the notice of Europeans, it is obvious that if such superinduced deformity developed any general tendency to cerebral disease, or materially affected the intellect, the result would be apparent in the degeneracy or extirpation of the Flathead tribes. But so far is this from being the case, that they are described by traders and voyagers, as acute and intelligent. They are, moreover, an object of dread to neighbouring tribes who retain the normal form of head; and they look on them with contempt as thus bearing the hereditary badge of slaves.

The child born to such strange honours is laid, soon after its birth, upon the cradle-board, an oblong piece of wood, sometimes slightly hollowed, and with a cross board projecting beyond the head to protect it from injury. A small pad of leather stuffed with moss or frayed cedar-bark is placed on the forehead and tightly fastened on either side to the board; and this is rarely loosed until its final removal before the end of the first year. The skull has then received a form which is only slightly modified during the subsequent growth of the brain. But the very same kind of cradle is in use among all the Indian tribes. It is indeed varied as to its ornamental adjuncts, and non-essential details; but practically it resolves itself, in every case, into a straight board to which the infant is bound; and as it is retained in a recumbent position, and thus the pressure of its own weight during the period when, as has been shown, the occipital and parietal bones are peculiarly soft and compressible, is made to act constantly in one direction. This, I assume to have been the cause of the vertical or otherwise flattened occiput in the ancient British brachycephalic crania. The same cause must tend to increase the characteristic shortness in the longitudinal diameter, to produce the premature ossification of certain sutures, and to shorten the zygoma, with probably also some tendency to make the arch bulge out in its effort at subsequent full growth, and so to widen the face.

Dr. J. Barnard Davis has applied the term "parieto-occipital flatness," where the results of artificial compression in certain British skulls extend over the parietals with the upper portion of the occipital; and he appears to regard this as something essentially distinct from the vertical occiput.\* But it is a form of common occurrence in Indian skulls, and is in reality the most inartificial of all the results of the undesigned pressure of the cradle-board. This will be understood

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\* *Nat. Hist. Review*, July, 1862. *Athenæum*, Sept. 27th, 1862, p. 402.



by a very simple experiment. If the observer lie down on the floor, without a pillow, and then ascertain what part of the back of the head touches the ground, he will find that it is the portion of the occiput immediately above the lambdoidal suture, and not the occipital bone. When the Indian mother places a sufficiently high pillow for her infant, the tendency of the constant pressure will be to produce the vertical occiput; but where, as is more frequently the case, the board has a mere cover of moss or soft leather, then the result will be just such an oblique parietal flattening, as is shewn on a British skull from the remarkable tumulus near Littleton Drew, Wiltshire. *Crania Britannica*, Decade III. plate 24.

But there are other sources of modification of the human skull in infancy, even more common than the cradle-board. More than one of the predominant head-forms in Normandy and Belgium are now traced to artificial changes; and by many apparently trifling and unheeded causes, consequent on national customs, nursing usages, or the caprices of dress and fashion, the form of the head may be modified in the nursery. The constant laying of the infant to rest on its side, the pressure in the same direction in nursing it, along with the fashion of cap, hat, or wrappage, may all influence the shape of head among civilized nations, and in certain cases tend as much to exaggerate the naturally dolichocephalic skull, as the Indian cradle-board increases the short diameter of the opposite type. Such artificial cranial forms as that designated by M. Foville, the *Tête annulaire*, may have predominated for many centuries throughout certain rural districts of France, solely from the unreasoning conformity with which the rustic nurse adhered to the traditional or prescriptive bandages to which he ascribes that distortion. All experience shows that such usages are among the least eradicable, and long survive the shock of revolutions that change dynasties and efface more important national characteristics.

But now that attention has been directed to the subject of undesigned changes thus effected on the human head, its full bearings begin to be appreciated; and there is even, perhaps, a danger that more may be ascribed to them than is legitimate. Such was undoubtedly the effect on Dr. Morton's mind from his familiarity with the results of artificial deformation on American crania; and were we to follow his example, we should be tempted to designate all the extreme varieties of the elongated dolichocephalic, acrocephalic, and brachycephalic skulls of British barrows, as mere modifications of the same ethnical form.

In his latest recorded opinions, when commenting on some of the abnormal forms of Peruvian crania, he remarks: "I at first found it difficult to conceive that the original rounded skull of the Indian could be changed into this fantastic form: and was led to suppose that the latter was an artificial elongation of a head remarkable for its length and narrowness. I even supposed that the long-headed Peruvians were a more ancient people than the Inca tribes, and distinguished from them by their cranial configuration. In this opinion I was mistaken. Abundant means of observation and comparison have since convinced me that all these variously-formed heads were originally of the same shape, which is characteristic of the aboriginal race from Cape Horn to Canada, and that art alone has caused the diversities among them."\* The repeated opportunities I have enjoyed of examining the Mortonian and other American collections, have satisfied me of the occurrence of both dolichocephalic and brachycephalic crania not only as the characteristics of distinct tribes, but also among the contents of the same Peruvian cemeteries,—not as examples of extreme latitudes of form in a common race, but as the results of the admixture either of conquering and subject races, or of distinct classes of nobles and serfs, most generally resulting from the predominance of conquerors.† Among the Peruvians the elongated cranium pertained to the dominant race; and some of the results of later researches in primitive British cemeteries, and especially the disclosures of the remarkable class of chambered barrows, seem to point to an analogous condition of races. That the Uley and West Kennet skulls may have been laterally compressed, while the Codford barrow and other brachycephalic skulls have been affected in the opposite direction, appears equally probable. But such artificial influences only very partially account for the great diversity of type; and no such causes, even if brought to bear in infancy, could possibly convert the one into the other form.

But as the cranial forms, both of the Old and New World, betray evidences of modification by such artificial means: so also we find in ancient Africa a diverse form of head, to which art may have contributed, solely by leaving it more than usually free from all extraneous influences. Such at least is the conclusion suggested to my mind from the examination of a considerable number of Egyptian skulls. Among familiar relics of domestic usages of the ancient Egyptians is the pil-

\* *Physical Type of the American Indian*. Schoolcraft: p. 320.

† *Prehistoric Man*, vol. ii. p. 225.

low designed for the neck, and not the head, to rest upon. Such pillows are found of miniature sizes, indicating that the Egyptian passed from earliest infancy without his head being subjected even to so slight a pressure as the pillow, while he rested recumbent. The Egyptian skull is long, with great breadth and fulness in the posterior region. In its prominent, rounded parieto-occipital conformation, an equally striking contrast is presented to the British brachycephalic skull with truncated occiput, and to the opposite extreme characteristic of the primitive dolichocephalic skull; though exceptional examples are not rare. This characteristic did not escape Dr. Morton's observant eye; and is repeatedly indicated in the *Crania Aegyptiaca* under the designation, "tumid occiput." It also appeared to me after careful examination of the fine collection formed by him, and now in the Academy of Natural Sciences of Philadelphia, that the Egyptian crania are generally characterised by considerable symmetrical uniformity: as was to be anticipated, if there is any truth in the idea of undesigned artificial compression and deformation resulting from such simple causes as accompany the mode of nurture in infancy.

The heads of the Fiji Islanders supply a means of testing the same cause, operating on a brachycephalic form of cranium; as most of the Islanders of the Fiji group employ a neck pillow nearly similar to that of the ancient Egyptians, and with the same purpose in view: that of preserving their elaborately dressed hair from disshelment. In their case, judging from an example in the collection of the Royal College of Surgeons of London, the occipital region is broad, and presents in profile a uniform, rounded conformation passing almost imperceptibly into the coronal region. Indeed the broad, well rounded occiput is considered by the Fijians a great beauty. The bearing of this, however, in relation to the present argument depends on whether or not the Fiji neck-pillow is used in infancy, of which I am uncertain. The necessity which suggests its use at a later period, does not then exist; but the prevalent use of any special form of pillow for adults is likely to lead to its adoption from the first. In one male Fiji skull brought home by the United States Exploring Expedition (No. 4581), the occiput exhibits the characteristic full, rounded form, with a large and well defined supra-occipital bone. But in another skull in the same collection, that of Veindovi, Chief of Kantavu, who was taken prisoner by the

United States ship *Peacock*, in 1840, and died at New York in 1842, the occiput, though full, is slightly vertical. The occipital development of the Fiji cranium is the more interesting as we are now familiar with the fact that an artificially flattened occiput is of common occurrence among the islanders of the Pacific Ocean. "In the Malay race," says Dr. Pickering, "a more marked peculiarity, and one very generally observable, is the elevated occiput, and its slight projection beyond the line of the neck. The Mongolian traits are heightened artificially in the Chinooks; but it is less generally known that a slight pressure is often applied to the occiput by the Polynesians, in conformity with the Malay standard."\* Dr. Nott, in describing the skull of a Kanaka of the Sandwich Islands who died at the Marine Hospital at Mobile, mentions his being struck by its singular occipital formation; but this he learned was due to an artificial flattening which the Islander had stated to his medical attendants in the hospital, was habitually practised in his family.† According to Dr. Davis, it is traceable to so simple a source as the Kanaka mother's habit of supporting the head of her nursling in the palm of her hand.‡ Whatever be the cause, the fact is now well established. The occipital flattening is clearly defined in at least three of the Kanaka skulls in the Mortonian Collection; No. 1300, a male native of the Sandwich Islands, aged about forty; No. 1308, apparently that of a woman, from the same locality; and in number 695 a girl of Oahu, of probably twelve years of age, which is markedly unsymmetrical, and with the flattening on the left side of the parietal and occipital bones. The Washington Collection includes fourteen Kanaka skulls; besides others from various Islands of the Pacific, among which several examples of the same artificial formation occur: *e.g.* No. 4587, a large male skull, distorted and unsymmetrical; and No. 4367, (female?) from an ancient cemetery at Wailuka, Mani, in which the flattened occiput is very obvious.

The traces of imposed deformation of the head among the Islanders of the Pacific have an additional interest in their relation to one possible source of South American population by oceanic migration, suggested by philological and other independent evidence. But for our present purpose the peculiar value of those modified skulls lies in the disclosures of influences operating alike undesignedly, and with a well defined purpose, in producing the very same cranial conforma-

\* *Pickering's Races of Man*, p. 45.

† *Types of Mankind*, p. 436.

‡ *Crania Britannica*, Dec. III. pl. 24, (4.)

tion among races occupying the British Islands in ages long anterior to earliest history; and among the savage tribes of America, and the simple Islanders of the Pacific in the present day. They illustrate, with even greater force than the rude implements of flint and stone found in early British graves, the exceedingly primitive condition of the British Islanders of prehistoric times.

