

NOTES ON THE ARTIFICIAL DEFORMATION OF CHILDREN  
AMONG SAVAGE AND CIVILIZED PEOPLES.

[WITH A BIBLIOGRAPHY.]

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The accompanying notes are collected from various sources as a supplement to Professor Mason's paper on "The Cradles of the American Aborigines."\* The time allotted did not permit the compiler to exhaust the subject, but enough is here given to show the practices concerning children in their first year throughout the world, and the varied beliefs obtaining as to the effects of such treatment. In the future the subject will receive more careful and systematic study.

The author embraces this opportunity to express his obligation to the librarians of the State, War, and Navy Departments at Washington for many courtesies.

Intentional modifications of the form of the head, although less general than other fashions by which conformity to an ideal of beauty has been attempted, have, nevertheless, been widely prevalent among races of men, but can not be said to include all the variations from an average cranial type actually existing in nature. The ethnical classification of M. Topinard (*Éléments d'Anthropologie Générale*) displays deformation with reference to race in a manner which fulfills all practical requirements. Deformity is, however, as real when slight as when excessive, and apart from those distortions he has described, from the many which are due to pathological causes, and the yet more numerous deviations from symmetry which unintentionally exerted pressure produces in the incompletely ossified skull, there still remain those variations in the processes of nutrition and growth through which assymetry becomes the rule not in the head and not in man only, but in the homologous parts of all axially developed animals.

As a matter of fact, and exclusive of the embryological identity of their elements, an ideal head is no more demonstrable than an ideal vertebra; and whatever may be hereafter accomplished, at present the anatomical and physiological constants of neither can be determined in detail. It therefore appears to be inexact to speak of the deformities of an organ whose conformation has not been distinctly ascertained. In addition to this, only a small portion of mankind have arrived at any common judgment on the subject of cranial contour, and wherever a standard is furnished by such a consensus of opinion, this is derived from art and not from science. Both empirical knowledge and physiological principles justify the general conclusion that the artistic form is that which is usually associated with superior brain power; but it does not at all follow that an alteration of outline that would destroy the former would similarly affect the latter. Such facts undoubtedly dis-

\* Most of the bibliography relating to the artificial deformation of children in North America is embodied in Professor Mason's work.

parage alike the methods and the results of anthropological research in certain directions, but they neither obviate the necessity of initiating further study from existing information, nor impugn its value as a whole.

In considering the natural history of the human head, account must be taken of the fact that man, while not alone in this respect, is nevertheless an exceedingly aberrant form among the Mammalia. On any theory of life, however, except that of special creation, and independently of conflicting estimates of the systematic implications of structure, the organization of this most highly specialized being must be regarded as the outcome of descent, with modification, and should therefore be considered in connection with that of the groups to which man is affiliated.

As has been said, there is no absolute form for the head or for the vertebræ of which it is composed, and the fact that all classifications resting upon its features have failed, does not encourage the hope that the results sought through craniometry will be attained by means of its descriptive anatomy. All that can be properly affirmed is, that during the immemorial series of adjustments by which the mammals culminated in man, and in which evolutionary changes of all orders are included, the human head assumed an incompletely distinctive form, which is, both in itself and in the causes which determine its variations, more or less clearly revealed in the tribal history of mankind. The statement that the anthropoid head becomes less human with development has been generally united with the assumption that this implies important generic differences between them, and if the observation were true in the sense in which it is for the most part understood, it would do so. Its special significance is, however, detracted from by the general truth that in zoology the rule is that, for obvious reasons, young creatures are less differentiated than those which are mature; while, on the other hand, the difficulty of discriminating between the adult brains of some of the higher apes and those of certain savages, may be considered as qualifying the former assertion to so great a degree as to suggest error, or at least inexactness, in the observation. No doubt the mistake is partially attributable to misconceptions arising from an idea of the fixity of species, but in itself, the error is involved in all comparisons between unlike things. To found a parallel upon the external tables of the skull, as if these were equally characteristic and similarly developed in a gorilla and a man, is to include in the terms dissimilar elements, and thereby vitiate the comparison. The contours of the head in these instances are differently related, and, considering the plates of the skull especially, the external table of the ape's cranium is much more prominently associated with the muscular apparatus than is the case with man, in whom the subordination of the entire head to the encephalon is exceptional. This is but a single illustration of the general fact that throughout the vertebrate class the cranium proper, amid innumerable subordinate variations, assumes the

more specialized character of a brain-case as we ascend in the organic scale. In fishes, where the head contains other organs than those of the nervous system, its indefinite relations to the cerebro-spinal axis are conspicuous. Among the Reptilia, though containing only the brain, the extreme disproportion between the head and its contents indicates that its conformity with the cerebral ganglia is subsidiary to other conformities; while in birds the limited range of the cranial cavity, as contrasted with its range when compared with the bulk of the body, conveys in a modified form the implication of increasing specialization of the head. As might be expected, the anatomical evidence furnished by the Mammalia is corroborative of that derived from lower groups. No variation, however extreme, is competent to free a structure from the influence of heredity, and it might be argued *a priori* that the human head would have the outlines of its history delineated in the morphology of the primates.

The facts in this instance justify the anticipation. As in the developmental record of birds, among which the ornithic stamp, either general or special, is but gradually and indirectly evolved, so also with the more immediate congeners of man, where the more salient characteristics of his type, distributed throughout a group of anthropoids, do not admit of consecutive arrangement, and can not be attributed in their totality to any specific form. From the primates, as from the other mammalian sub-classes, a cranial figure involved in the metameric development of the encephalon, gradually disengages itself and becomes more regular and more definite in its cerebral relations as the grade of organization is elevated; so that the profiles associated with ganglionic mass increase in prominence, while those which are otherwise associated correspondingly diminish.

These anatomical traits link themselves naturally with physiological co-ordinates. Everywhere encephalic structure is related, though not directly, to function. Enhanced importance in the brain implicates increased solidarity in the entire organism. As the cerebral elements grow in multiplicity, variety, and complexity, this development is concomitant with cranial amalgamation, with progressive obliteration of the features attaching to lower forms, with condensation of the encephalic ganglia, with a more direct correspondence between the skull and brain, and finally with a greater conformity of the body with the head.

Whatever phylogenetic significance may be found in these facts, their morphological and physiological bearing is unmistakable. Through quite various structural gradations there appears, though not in linear sequence, "a series of forms," which ultimately display in modifications of cranial contour a more definite coaptation of the envelope to its contained viscus in developmental progress, and in the falling away and weakening of its muscular attachments, the paramount function of the skull as a brain-case, and the subordination of its structure to that of the organ which it incloses.

It is not necessary here to consider the elements which compose organic form or the conditions that determine their arrangement. The process, so far as the head is concerned, has been, to a great extent, masked among the vertebrates by adaptation to other than encephalic relations, while the part was carried through the cartilaginous, semi-osseous, unamalgamated, and consolidated types of crania, to one which, as representative of the most important organ in the body, has been commonly selected by the anthropologists for investigation, and generally believed to promise results corresponding with its position and the function it sustains. Tried by the tests afforded by craniometry, however, it appears to have little or no taxinomial value, since the outcome of these measurements is to transpose races and fuse peoples otherwise known to be distinct.

At the same time, in man, cranial outlines are unquestionably preponderantly determined by the brain, while the features by which its action is obscured have been so frequently and completely described that they need not be recapitulated. But although this statement holds on the morphological side of the question, from the physiological standpoint the case is not the same. The brain limits the shape of the head and is itself limited by the laws of growth, heredity, and structural correlativity; but in the phenomenal series cerebral development is antecedent to cranial evolution, and the relation subsisting between these—a relation which is in its nature causal, so far as shape is concerned—places the factors upon different planes. In virtue of preponderant function and equivalent preponderance of structure in special ganglia, a general form of head has been attained; but from fluctuations in the energies by which it was produced in correspondence with variations in the conditions of life, this form varies both in human and pre-human history, and so widely as to have thus far prevented classification.

That the organ through which all adjustments to the environment are primarily made should vary among groups whose lowest aggregates are nearly as passive to the direct action of natural selection as beasts, and whose higher forms are but partially and incompletely adjusted, is not surprising; and while it must be assumed upon biological grounds that the plasticity of the brain has lessened since its deviation from the ancestral type, whence issued in divergent lines that of man and his congeners, still, the facts of descent suggest that to its organic variability, and to that expressed in specific adaptations, there must be added a strong inherited tendency in this direction.

The cerebral history of the primates seems to warrant the theoretical conclusion that among these great variability of the head exists.

In Lemuridæ, where the cranium relatively to the face is small, and the ethmoidal, tentorial, and occipital planes are greatly inclined towards the basi-cranial axis, the brain scarcely exceeds the base of the skull in length, whereas in Simiadæ the encephalon is more than twice as

long. The anterior cerebral lobes in the *Arctopithecini* compare in mass with those of anthropoids, while the posterior lobes are more developed than in certain races of men. Among the *Platyrrhini* great cranial variations correspond with extreme contrasts in brain structure and mass. The low facial angle, inclined tentorial plane, and perpendicularity of the axis of the occipital foramen to that of the cranial base, belong, as in *Mycetes*, to a type in which the cerebellum is scarcely covered, while in *Chrysothrix* the posterior lobes of the cerebrum are of relatively greater proportions than in any of the *Mammalia*; and, moreover, the vertex is arched, the facial angle large, the basi-cranial axis short, as compared with its cavity, and the planes of the occipital foramen and tentorium are in correspondence. The surface of the brain in *Cebus* is nearly as much convoluted as that of the catarrhine apes, but the sulci fade almost to obliteration through *Pithecia*, *Chrysothrix*, and *Nictipithecus*. On the other hand, by the nearly total structural masking of the annectant gyri of the external perpendicular fissure, the brain in *Ateles* rises above the catarrhine type.

Diversities such as these, occurring within the limits of a single group, put craniological classification out of the question; but in *Catarrhines* and *Anthropidæ* differences obtain, which, though less extreme, are equally decisive, and without anatomical details, for which there is no space, it may be said that the heads and brains of *Semnopithecini* and *Colobi* vary from those of *Macaci* and *Cynocephali* as significantly as the same structures do in the man-like apes. Apparently, then, no typical cranium exists among the simians any more than among men, from whom an artistic preconception has to a great extent concealed its absence.

With regard to this standard of art, also, it must be remembered that it is primarily one of *form*, while, physiologically, form has no necessary connection with the constitution of a ganglion. Such expressions as "nervous arc" and "reflex action" emphasize as if essential, that which, except contingently, has nothing to do with either curves or angles. In "the building of a brain" the terminal elements of nervous tracts are cellular, and agglomeration therefore results in the composition of a mass attached to a pedicle. Nothing which is generally more exact than this can be advanced. Components like these make up the parts and wholes of all nervous systems, and how they have combined in man and his class, and with what degree of uniformity, has already been indicated.

Of course it is not meant that the human head has not an average shape, or that this or any other part whose conformation is due to actions and reactions between an ancestral group and its entire environment, could alter otherwise than infinitesimally under the incidence of discontinuous forces. Nor is it intended to say that the harmony which exists in other instances between an organ and its properties is here ignored. No more than in any other machine or structure can the skull be considered as unaffected by the laws which co-ordinate mechan-

ical and functional fitness with functional and mechanical requirements. But resemblances of this kind are not those which are contemplated in anthropometry, where the relations of structure and function, and of these to the conditions of life, have been disregarded in a search for morphological constants, whose occurrence, under the circumstances, was biologically impossible. Much but not all has been done towards a science of man, when the divergent forms of his class have been united by forms that are intermediate, and when his pedigree has been reconstructed on the basis of kinship. The whole question of race is included in this generalization, although it is not thereby fully explained, neither is it likely to be elucidated by measurements.

Without pursuing the subject further it may be remarked that, abstractly, structure and function are determined in all organisms by the affinities of their units of composition; that complete homogeneity in a group of protoplasts is impossible, and that initial diversities will increase during evolution. The minuteness of these ultimates may not add to the difficulty of comprehension more than is the case with those dealt with by molecular physics and chemistry, but it is otherwise when the plasticity of life is added. That adaptation is connected with changes in function and structure is obvious, but neither in an organism, an organ, nor in the plastidules which compose them, is adaptation a final term in the progress from homogeneity to heterogeneity, from simplicity to complexity, from indefiniteness to definiteness; since, without alteration of elementary composition, there are no conceivable circumstances under which re-adjustment can be effected.

As it is with these phenomena which lie at the foundation of life, so is it with all the vital phenomena to which natural and sexual selection, growth, survival, genesis, heredity apply. Amid all degrees of composition and recomposition, function constitutes the substance, adaptation the form of life. Every statical or dynamical distribution of organic energy by which incident forces are met is included in function; and though in large groups of organisms, correlative changes, structural and functional, occur slowly and within comparatively narrow limits, yet they are, in the nature of things, relatively indefinite, but contingently permanent, and do not afford on this subject the data which systematic ethnology requires. Not less than its co-ordinate, the evolution of form, does physiological development press for interpretation in every question relating to race, and the doctrine that all factors by which differences among men are worked out are resolvable into results of the intercourse between these and the conditions under which they are placed, is essentially a corollary from the persistence of force.

Space has permitted but the merest sketch of this subject, but there yet remains a question which sooner or later confronts the investigator of cranial deformities, and this is that of their transmission. Present opinion almost unanimously opposes the belief that these may, in any

degree, be perpetuated when of artificial origin; nevertheless it may be maintained with reason that the grounds upon which unqualified denial rests, are theoretically as untenable, in the present state of anthropological science, as those upon which an unqualified assent could be founded. Future results in this direction will depend largely upon the possibility of connecting facts of observation with those furnished by the experimental physiology of the nervous system. The question is a biological one, and without adverting to what has been said concerning variation, it may be urged that in this, as in all such problems, the first necessity is to view them under biological conditions. This requirement has not in this instance been complied with. Teleological preconceptions seem to have been more or less obstructive of the view, and equally so, incorrect parallels between alterations apparently within the limits of health, and those which involve morbid consequences.

There is no doubt that modifications of development involve functional modifications, and that imperceptible molecular changes in the brain rest on precisely the same basis as perceptible ones in other parts of the body. The inconceivability of spontaneous variation, properly so called, the heredity of function as well as of structure, the certainty that if structure changed by function is transmitted, any alterations of structure which have physiologically altered function must be also inherited, appear to suggest an explanation of certain phenomena connected with this subject, which, except on the principle of descent, do not seem to be interpretable at all.

According to the statements of Mr. Spencer, there is reason to think that special structures of all varieties proceed from the special polarities of their organic units, and that any tissue or combination of tissues will impress the modifications it may have experienced upon its component elements, between which and the aggregate life implies perpetual action and reaction. If this process, as must be generally the case, takes place under normal conditions, the forces manifested tend towards equilibrium without reaching, practically, an exact physiological balance. During these adjustments and re-adjustments, however, one of two alternative results inevitably occurs. Either the structure will take the shape determined by the pre-existing tendencies of its elements, or the aggregate's altered form will mould these into harmony with itself. The question thus becomes one of affection of function, because, for every reason, it must be assumed that structural elements organically changed will, when acting as reproductive centers, engender similar changes.

To oppose to these statements the common assertion that mutilations do not become congenital, is to misconceive their character, and to confound pathological conditions with those which must be normal in order to be effective. It may readily be suspected that the impossibility of inheriting artificial alterations has been too hastily assumed, since this involves an additional assumption, which has not been demonstrated,

viz, that such changes do not become organic because they may occur without implicating function. The profound alterations effected by artificial selection are, of course, due to functional modifications, but it has not been shown that these can not be artificially induced, or that deformation must be universally morbid in character because it is a departure from such standards of organic type as now exist in imagination.

On the morphological side the question seems equally uncertain. Given, however, any cause which will effectually modify function, and modification of structure is inevitable. No naturalist supposes that the digital variations recorded as inherited, or those of the teeth, skin, etc., are attributable to any other cause than physiological change; and the same with transmitted club-foot, harelip, amaurosis, deafness. Further, adjustments by involution take place in nature as well as those by evolution, and although there are no structures whose properties are not originally ascribable to predetermined structural traits, there are yet structures which have no discoverable physiological features; and while morphological species, or species whose specific forms have no biological value, are recognized in zoology, and which, whether permanently or not, are withdrawn from the action of natural selection, it is difficult to see why the production of variety by any means that would effectually change function should be disallowed.

As was stated, there are reasons for suspecting that some such process has occurred among mankind to a limited extent; but whether or not, when all accessible information on the subject is organized, this may not prove to be a misconception attributable to insufficient knowledge, remains to be determined.

#### GENERAL NOTES ON DEFORMATION.

Malte-Brun. (*Géographie Universelle*. Ed. of Lavallée. Paris, 1858. 4to, t. 1.) General remarks on the causes and modes of distortion of the head (p. 303).

Humboldt & Bonpland. (*Voyage, etc.* Paris, 1811. 4to, 3<sup>e</sup> partie, t. 1. "Essai Politique, etc.") Remarks on head-flattening, its character and cause among Indians of North and South America. (Note, pp. 89, 90.)

Jefferys remarks upon the fine forms of the Indians of North America, and says the fact is attributable to "their bodies not being swathed and straitened in the cradle" (part 1, p. 96). The cradle-board was in use among all the tribes described by him; but this error is not surprising in an author who characterizes the Eskimaux as "tall of stature," and speaks of "their flaxen hair, their beards, the whiteness of their skin \* \* \* quite as fair as that of Europeans" (part 1, p. 43). Certain blond tribes do occur among the Hyperborean races, but not where Jefferys places them; although the Eskimaux are not really dark-skinned. With regard to the fine forms so constantly noted among the American and other savages, most writers have ascribed it to their modes of life; Humboldt adding, in the case of the Americans, a certain racial im-  
plasticity. Most of the earlier authorities have evidently judged an assumed ethnological fact from the stand-point of a social theory. There does not appear to be any natural reason why a savage should be better shaped than a civilized man, and that this is the case remains to be shown. There is, however, an excellent reason why those who are physically defective should be eliminated from all aggregates in



a state of savagery, both by the action of natural selection and by that of their fellow-creatures. A very large body of proof could be readily brought forward to support the view that Wrangell's statement concerning the Chukchees held true of most peoples in a similar social phase, viz: "La mort attend l'enfant qui a le malheur de naître avec quelque difformité." *Le Nord de la Sibirie*. Paris, 1843, vol. I, p. 267. Kennan and Bush made like observations in the same region, and Capt. John G. Bourke, U. S. Army, has pointed out that in the south this custom is mentioned by Padre Gumilla ("Orinosc." Madrid, 1741, p. 344), and by Clavigero (*Historia de la Baja California*. Mexico, 1852, p. 27). I do not recall any reference of the same kind in Hennepin, Le Clerc, Charlevoix, etc.; but though the custom may have existed among the northern tribes, despite Robertson's assertion that all the American Indians killed the children who "appeared feeble or defective" (*Hist. Dis. & Set. of America*. N. Y., 1856, p. 144), there is no doubt that in the literature of travel it is more frequently mentioned as occurring among the southern tribes; and this may have been one reason why the earlier discoverers, Columbus, Vespucci, Verrazzano, &c., have spoken only of the fine appearance of the natives. The same contrasts, however, are found in savage life in this as in other respects. Captain Bourke confirms from personal observation the statement made in Emory's "Reconnaissance" (p. 61), that among the Apaches the deformed are sometimes well cared for. He also refers to a like mention in Francis Parkman (*The Jesuits in North America*. Boston, 1867, Introductory, XL), and also to Peter Martyr's narrative (*Hakluyt, Voyages*, vol. 5, p. 357).

In connection with head-flattening in America, Humboldt (*Political Essay on New Spain*. London, 1814. 8vo, vol. I) asserts that the back-head is naturally flat (p. 155). Also that the American cranium is normally "depressed backwards \* \* \* among nations to whom the means of artificially producing deformity are \* \* \* unknown." The Aztecs "never disfigure the heads of their children." The Mexican, Peruvian, and Aturean heads—all flattened; those Bonpland and himself procured were natural. "Certain hordes do compress the heads of children" (pp. 154, 155).

Squier (*The States of Central America*. N. Y., 1858. 8vo) quotes Valenzuela to the effect that among the Indians found by the Spanish at Lacandon (Dolores), Guatemala, "the cradles for their children were made of reeds" (p. 567).

Under the heading *Tête*, *Encyclopedie des Sciences*, etc., Neufchatel, 1765, is the following: "Il est parlé dans les voyages et dans les geographies modernes, de certains peuples qui se rendent la tête plat que la main, et qui mettent la tête de leurs enfans, dès qu'ils sont nés, entre deux presses, ou planches, sur le front et le derrière de la tête pour l'applatir."

## NOTES ON AMERICA.

Bancroft. (*Native Races of the Pacific States*, N. Y., 1873, vol. I.) Chichimec women carried their infants on the back, "wrapped in a coarse cotton cloth, leaving the head and arms free" (p. 633). The cradle was a wicker basket suspended from a beam or bough (p. 633).

Gomara (*Con. Mex.*, fol. 318) states that the occiput was flattened among the Nahuas by an arrangement of the cradle, this form being considered becoming. (Bancroft, *Native Races*, etc., vol. II, p. 281.)

Humboldt's statement that the Aztecs did not distort the head was, as Bancroft remarks (*Native Races*, vol. II, p. 281), too sweeping. That the custom "was practiced to a considerable extent in remote times by people inhabiting the country seems to be shown by the deformed skulls found in their graves, and by the sculptured figures upon the ruins." Klemm states that "the cradle consisted of a hard board to which the infant was bound in such a manner as to cause the malformation."

Sahagun, Torquemada, Clavigero, Brasseur de Bourbourg, Carbazal Espinosa say that when a Teochichimec child was born on a journey "the new-born babe was placed in a wicker basket and thrown over the back of the mother." (Bancroft, *Native Races of the Pacific States*. N. Y., 1875, vol. II, p. 271, note.)

"Torquemada (Book XIV, ch. 24) states that the Indians," in Mexico, "used to deform their heads with a view to appear more formidable." (Spencer, Des. Soc. Ancient Mexicans, Central Americans, etc., p. 27.)

Landa (§ xx). "The Indians of Yucatan are, \* \* \* as a rule, \* \* \* bow-legged, for in their infancy their mothers carry them about suspended at their haunch-bones. They were made 'squint-eyed,'" and their heads were flattened artificially. (Spencer, Des. Soc. Ancient Mexicans, Central Americans, etc., p. 27.)

Landa (§ xxx) describes the process: "Four or five days after birth the child was put on a small bed made of rods, and there, the face being underneath, the head was put between two boards, in front and behind. Between these they compressed it \* \* \* until the head was flattened and shaped like their own." (*Idem*, p. 27.)

Bancroft. (Native Races of the Pacific States. N. Y., 1873, vol. I.) The Quiché woman (Central America) carries her baby on her back "in a cloth passed around her body" (p. 704).

Bancroft. (Native Races of the Pacific States. N. Y., 1875, vol. II, 8vo.) The Nicaragua and Yucatan infants' heads were compressed and permanently flattened between two boards as a sign of noble birth. Squier asserts that occipital flattening was effected by the cradle-board among the Quichés, Cakchiquels, and Zutugils (pp. 731, 732). Don Horatio Guzmán, minister from Nicaragua, informs me that no compression of the head and no swathing of the infant is now practiced in any part of that country.

Bancroft. (Native Races of the Pacific States. N. Y., 1873, vol. I.) The Smoos Indians of the Mosquito Group flatten the forehead by a process like that in use among the Columbians (p. 717).

Fuentes. (Palacio, p. 106.) In Guatemala children were fastened "to a board by means of straps wound round the body \* \* \* from the feet to the shoulders, in consequence of which all the Indians have the backs of their heads smooth and flat." (Spencer, Des. Soc. Ancient Mexicans, Central Americans, etc., p. 28.)

Jefferys, T. (Nat. and Civil Hist. of French Dominions in North and South America. London, 1760, fol.) Among the aborigines of Hispaniola "the singular conformation of the head \* \* \* is effected by art." Mothers pressed their infant's skull, either by hand or with boards, until it was distorted, "and in a manner bent back upon itself" (Part II, p. 8).

Oviedo. (Historia General y Natural de Indias, book 11, chap. 5.) His statement of head-flattening is rather vague. "Porque al tiempo que nacen los niños les aprietan las cabezas," etc. The width of the front head, which he remarks as the result of artificial interference, points to the same form, and like appliances, noticed by Porto-Seguro, and others, in Brazil. (*Idem*, book 42, chap. 3.) Gomara is cited as giving the same evidence concerning the natives of San Domingo. He says they flattened the head with cotton compresses for the purpose of enlarging the face. "Aprietan á los niños la cabeza muy blando, pero mucho entre dos almohadillas de algodón, para ensancharles la cara," etc.

There seems to have been some confusion in Gomara's mind on this subject—Bernal Diaz says there was on all subjects. At all events he gives another account of the manner in which the infant's head was distorted, which amounts to this: that it was done by the midwife at the moment of birth, or shortly after. In this case, a very common one among different tribes, the fact apparently indicates gradual extinction of the custom, since the effect of simple manipulation would be temporary, and where distortion implies as much as it sometimes does, its absence exposes the individual to the greatest misfortunes.

Topinard. (Éléments d'Anthropologie Générale. Paris, 1885. 8vo.) Remarks of forms of distortion by manipulation alone that they must be impermanent—"incapables de produire une déformation soutenue" (p. 756). Prof. William H. Flower holds the same views, and, indeed, the fact is physiologically self-evident unless the manipulation were of an unprecedented kind.

Las Casas (Apologética Historia. Madrid, 1875, chap. 34) remarks that in Peru head distortion was distinctive of the Inca family and of the highest nobility. "Privilegio grande concedian los del Perú á algunos señores y que ellos querían favorecer" (p. 396, *vide* Marcot, notes).

Major, R. H. (Select Letters of Christopher Columbus, etc. London, 1870. Second edition, Hakluyt So. Pub.) Dr. Chanca, fleet surgeon on Columbus's second voyage, says, of the native and Carib women in the West Indies, that the latter wore "on each leg two bands of woven cotton, the one fastened round the knee, the other round the ankle; by this means they make the calves of their legs large, and the above-mentioned parts very small. \* \* \* By this peculiarity we distinguished them" (p. 30).

Dr. Chanca supposed this custom to depend upon an idea that the distortion was becoming—"que esto me parece que tienen ellos por cosa gentil" (p. 30).

De Rochefort, C. (Histoire Naturelle, etc., des Iles Antilles. Rotterdam, 1658. 4to.) Notice of head and nose flattening among the Caribs (p. 382).

Humboldt and Boupland. (Voyage, etc. Paris, 1819. 4to, seconde partie, p. 11. Relation Historique.) Distortions practiced by the Caribs on the Orinoco (p. 235).

Squier, E. G. (Nicaragua, etc. New York, 1852. 8vo, Vol. II.) Head-flattening among aborigines. Process and local origin of custom (p. 345). *Vide* Relacion of Fray Bobadilla on the same points. (Archivo de Indias.) ?

Heriot, G. (Travels Through the Canadas. London, 1807. 4to.) "The Caraihs have their foreheads flattened. \* \* \* The head of the infant is compressed into this shape by placing on its brow a piece of board tied with a bandage, which is allowed to remain until the bones have acquired consistence" (p. 348).

Heriot, G. (Travels Through the Canadas. London, 1807. 4to.) Carib girls have a cotton sock woven to the leg, and "so closely \* \* \* that the calf thereby acquires more thickness and solidity than it would naturally possess" (p. 307).

Armas, Juan I. de. (Les Crânes dits Déformés. Havana, 1885.) This is a paper read before the Anthropological Society of Havana, November, 1885, to prove that mechanical deformation of the head was never practiced in the West Indies or on the continent.

Graells, Vilanova and Areas. (Rapport présenté à Madrid, le 24 Mars, 1871.) This was to the effect that certain crania from Cuba, taken to be flattened Carib skulls, could not be identified as artificially deformed, but were probably natural heads. The text is, "having noticed that in the front and back part of the head the depression is not uniform, the commission is inclined to consider the flattening as natural, etc." These skulls seem to have been found by Don R. Ferrer, who very truly says that they can not be regarded as specimens of head-flattening among the Caribs, because there were never any Caribs in Cuba. (De Armas, Crânes dits Déformés, p. 7.)

De Armas (Les Crânes dits Déformés) says that no such practice could have been general in America for various reasons, viz, it was difficult, tedious, and painful, and would have been destructive to the intellect (?); also that the Indians, though savages, were men with natural feelings toward their offspring which would have prevented them from perpetrating a custom so destructive as distortion of the head (p. 14 *et seq.*). Having given this illustration of his knowledge of the literature of anthropology, he declares that neither among the Peruvian mummies nor in the existing race could von Tehudi and Rivero discover a justification of the theory of mechanical deformation. A fact, and a singular one, but no more decisive than Robertson's statement that the mound skulls of North America are all normal (pp. 14, 15). In conclusion he remarks that "there is no basis, scientific, historical, or rational, on which to rest the affirmation that there were \* \* \* and are \* \* \* parts of America in which the natural formation of the head was (or is) modified by mechanical means." And more particularly is this a self-evident truth with regard to the Caribs of the Lesser Antilles: first, because none of the earliest chroniclers speak of the custom; and second, because the crania of this people have not the form attributed to them. Of course it was not possible for de Armas to deny the unsym-

metrical contour of certain skulls, but he asserted that this was natural, and if the statement could be relied on, none could be made of more importance. The weight of evidence is, however, overwhelmingly against him.

De Armas also asserts that Oviedo was the originator of the idea that distortion of the cranium was customary among the Indians of San Domingo, etc., but Gomara, Las Casas, De Leon, and Garcilasso de la Vega make like statements, and the evidence includes West Indian, Peruvian, Floridian tribes.

Walker (Colombia. London, 1822. 8vo) quotes Humboldt to the effect that among the Caribs of Panapana "the women \* \* \* carried their infants on their backs." They also, for the sake of adornment, compress the thighs and legs by "broad strips of cotton cloth, by which" the flesh \* \* \* was swelled in the interstices. \* \* \* They attach great importance to certain forms of the body. (Vol. I, p. 545.)

Heriot, G. (Travels through the Canadas. London, 1807. 4to.) "The natives of South America generally make use of hammocks of cotton or of the interior bark of trees. \* \* \* This they suspend in their cabins and sometimes on the boughs of trees" (p. 287).

Señor Mutis Duran, of the Colombian legation at Washington, states that no tribe of Indians known to him in New Granada or Colombia distorts the head, but that cranial compression may be practiced by other tribes of this area which he had not observed. Bandaging infants with the idea of preserving the symmetry of their forms is general among all classes. The cradles used by the wealthy are imported or made after European models. Among the poorer classes there are two forms of cradle in use—one a boat-shaped case of light wood or bamboo, which will rock on any plane surface, and another constructed of similar materials and of like form, which is suspended from the end of a crooked rod and swung in the air.

Hilhouse, William. (Warow Land of British Guiana. Jour. Roy. Geo. Soc. London, 1834. Vol. iv.) Dr. Hancock remarks (note, pp. 332, 333, on Hilhouse's account of the Indians seen here) that "these tribes have also," *i. e.*, like the coast tribes of the Marañon, "the spread in the foot, or duck's foot. \* \* \* Their feet and toes are spread out in the manner most suitable for walking on the muddy shores and marshes they inhabit."

Im Thurn, E. F. (Among the Indians of Guiana (*i. e.*, British Guiana). London, 1883. 8vo.) Head-flattening customary among people of upper Essequibo River; formerly prevalent among chief tribes throughout Guiana and among all "true Caribs" (p. 191). Distortion of women's legs by Caribs (p. 192).

Ploss, Dr. H. (Das Kind im Brauch und Sitte der Völker. Leipzig, 1884. 2 Aufl., 2 Band.) Description of the treatment of infants in Peru under the Incas (*Idem*, p. 57). The same with respect to children in Asiatic Turkey and Chinese Turkestan (*Idem*, p. 60). Remarks on the effects of position at rest (*Idem*, pp. 81, 82). Statements concerning the cradle-board and head-flattening in America (*Idem*, pp. 101, 102). Description of the suckling-board and swaddling of infants among the Maronites and Modern Germans (*Idem*, p. 113, 114).

Squier, E. G. (Peru, etc. New York, 1877. 8vo.) Distorted Aymara skull from Chulpas (p. 244).

Appendix B. Extract from Fourth Annual Report of Peabody Museum. Cambridge. Remarks of Professor Wyman "On crania. Two modes of distortion, their effects," etc. (pp. 580, 581). *Vide* Padre Arriaga on this custom.

Prichard, J. C. (Researches into the Physical History of Mankind. London, 1841. 4th ed. 8vo) quotes Spix and Martius on the separation of the great toe among the Puris, Coropos, and Coroados, South America.

Marcy, P. (Travels in South America. London, 1875. 4to.) Head-flattening formerly practiced by Peruvian Conibos. Obsolete within two generations. All very old people seen by Marcy had distorted crania; no young persons. (Vol. II, p. 40, and note.)

Acosta, Joaq. (p. 24). The Panches (Chibchas) compressed the skulls of infants be-

tween boards into a "pyramidal" shape. (Spencer, Des. Soc. Ancient Mexicans, Central Americans, etc., p. 28.)

*Idem.* Lengthening (apart from piercing) the lobe of the ear was a royal fashion of the first four Incas. After Mayta-Cupas it became designative of the Curacas (Caciques) of the body guard. Now prevalent among certain tribes of the Amazons, *e. g.*, the Orejones (Spanish), broad-ears. (Vol. II, p. 270.)

Piedrahita. (Book 1, ch. 2.) The Coyaimas and Natagaymas (Chibchas) "have the custom of putting the tender head of a new-born child between two boards \* \* \* in such a way that it \* \* \* gets flattened." The Pichaos and Panches of the same stock do this also. (Spencer, Des. Soc. Ancient Mexicans, etc., p. 28.)

*Idem.* Compression of the head into the shape of "a bishop's mitre." (*Vide* Porto-Seguro.) Now obsolete among the Omaguas or Flatheads—a Spanish corruption of the Quichua Omahuas. These are an emigrant stock—the Umañas, called by the Tupinambas of Brazil Icanga-peña (flatheads), which was contracted and corrupted by the Portuguese into Cambebas, whence La Condamine's mistake. (*Vide* Ref.) He mistook a title for a race name. (Vol. II, 340-342.)

Cieza (ch. 100) says of the Peruvian Collas that "their heads are very long and flattened behind, because they are pressed and flattened into what shape they choose during childhood." (Spencer, Des. Soc. Ancient Mexicans, Central Americans, etc., p. 28.)

Owen, Prof. R. (Anatomy of the Vertebrates. London, 1866. 8vo.) In the Inca race the skull "is high behind, owing to the habit of carrying the infant with the back of the head resting on a flat board, the pressure usually producing unsymmetrical distortion of the occipital part of the skull." (Vol. II, p. 567.) The same statement is made concerning the Patagonians. (Vol. II, p. 568.)

Cieza (ch. 50). Among the Caragues of Peru the child's head was pressed between boards, so that it "was long and broad, but flat behind." The Indians said this was conducive to health and vigor. (Spencer, Des. Soc. Ancient Mexicans, Central Americans, etc., p. 28.)

*Idem.* Pls. Nos. 386, 387, and 388, vol. 11, p. 567, exhibit artificially distorted skulls of the ancient Peruvians from Titicaca.

Meyen (p. 36) mentions a decree of the Lima Synod of 1585 against flattening the head. Rivero and Tschudi say that the irregularities in crania from the coast of Peru "were undoubtedly produced by mechanical causes" (p. 32). Santa Cruz, Narratives, p. 78, states that Manco Capac introduced head-flattening to make the people silly and easily ruled. (Spencer, Des. Soc. Ancient Mexicans, etc., p. 28.)

Marcy, P. (Travels in South America. London, 1875. 4to.) Notice of custom of distorting the head among the Aymaras. (Vol. I, pp. 67, 68.) Old Aymara sculptures showing vertical and antero-posterior flattening. (Vol. I, p. 185.) This work contains many "typical portraits" (1, 103) "taken from life" (1, 518). If correct at all, the Quichuas on the west, and Antis and Chonlaquiro Indians east of the Andes, distort their heads *now*, though Marcy does not say so. (*Vide* pls. Vol. I, pp. 103, 476, 515.)

Torquemada (Book XIV, ch. 25) affirms that permission to shape the heads of their children was a favor granted by the Inca to some nobles, *e. g.*, the artificial contour was that of the royal family. (Spencer, Des. Soc. Ancient Mexicans, Central Americans, etc., p. 28.)

In all these contemporary fac-similes, and in the portrait medallions (Vol. I, pp. 210, 216, sixteenth century) of Incas and Coyas—"The Imperial Tree"—it is noteworthy that, if the delineation is at all accurate, some heads are distorted and some not. It is not possible in this instance to reconcile the portraits with Las Casas' statement that after the fourth Inca the custom ceased.

Ulloa, Juan and Antonio de. (Voyage to South America. London, 1807. 8vo.) Among the Quito Indians, "their beds consist of two or three sheepskins, without pillows or anything else." (Vol. I, pp. 408, 409.) Children are carried on the mothers' shoulders. (Vol. I, p. 409.)

Miers, J. (Travels in Chili and La Plata. London, 1826. 8vo.) The Pampa Indians "never walk any distance \* \* \* some use saddles, but not all; \* \* \* they are ill made." (Vol. I, pp. 256, 257.) Dr. Leighton says of the "horse" Indians of Chili, that "their legs are generally bandy." (Vol. II, p. 473.)

Among the Indians of Chili, "the child is slung in a kind of basket, formed of a wooden hoop having a net-work stretched across it; it is hung by thongs to the roof of the hut." (Vol. II, p. 462.)

De La Condamine. (Relation Abrégée d'un Voyage, etc. Maestricht, 1778. 12mo.) Derivation of the tribal names, Omaguas and Camberas, from the custom of flattening the head; notice of the process (p. 70). *Vide* Porto-Seguro, *Historia Geral do Brazil*. Vol. I, pp. 18, 19.

Porto-Seguro. (*Historia Geral do Brazil*. Rio de Janeiro, 1878. 8vo. Vol. I. Head-Flattening.) Etymological remarks on the derivation of the name of certain Tupi (Guarani) tribes, from what appears to be antero-posterior compression. "Parecidas a mitras de bispos." (Vol. I, pp. 18, 19.)

Southey remarks (*History of Brazil*. London, 1819. 4to. Vol. III, p. 703) that when Ribeiro encountered the remains of the Omagua at Olivença in 1774, "they had left off the apparatus for flattening the foreheads and elongating the heads of their infants; still they admired the old standard of beauty so much that they moulded them by hand; but the custom is now wholly disused." In Note 32, Vol. III, p. 896, he adds that "several tribes of the Rio Negro flattened their heads like the Omaguas." Humboldt (*Political Essay on New Spain*. London, 1814. 8vo. Vol. I, p. 154) says, "the barbarous custom \* \* \* of pressing the heads of children between two boards" in South America, "was, like the Greek exaggeration of the facial angle, the Kalmuck nose, the Hottentot lips, an attempt to conform to an ideal of beauty."

Spix and Martius. (Travels in Brazil. London, 1824. 8vo.) It is stated that the women of the Coroados of East Brazil "carry their children about on their backs," and from the context, as well as the fact that the sleeping-cradle is a hammock, it seems probable that they are carried in a sling. (Vol. II, p. 247.)

Brown and Lidstone. (Fifteen Thousand Miles on the Amazon, etc. London, 1878. 8vo.) They mention another exception to the use of the hammock. The Pamary Indians, on the Rio Negro, "have not the peculiarity of using hammocks, but sleep on the floor of their tents" on "mats of plaited palm leaves" (p. 433).

Heriot, G. (Travels Through the Canadas. London, 1807. 4to.) "The Brazilians, and several other nations in South America," plunge the new-born infant into water. It is then "swaddled to little boards lined with cotton, and more frequently with moss" (p. 343).

In connection with references to nose-flattening as a custom among Brazilian and other South American Indians, the following indicates both the variability of the facial type and that of the standard to which nasal contour conforms when artificially modified. De Moussy, V. M. (*Description, etc., de la Confédération Argentine*. Paris, 1860. 8vo.) quotes d'Orbigny's *L'homme américain*, etc., to the effect that in the Peruvian branch of the Ando-Peruvian race the nose is long and high—"nez long, très aquilin." In the Antisian branch of same race it varies—"nez variable." In the Araucanian branch of same race it is "très court." The Pampa branch of the Pampean race have the "nez très-court, très-épaté, à narines larges, ouvertes." Among the Chiquiteau branch of this race the nose is "court, un peu épaté." In the third or Moxcan branch of the Pampean race it is "court, peu large." Among the Guarani tribes of the Brazilio-Guaranian race, the feature is described as "nez court, étroit, narines étroites." *Length* is a natural characteristic; the rest may be natural or artificial, but no doubt are largely modifications. *Vide* references, *passim*. (Vol. II, pp. 145-147; note.)

Dobrizhoffer, M. (*An Account of the Abipones*. London, 1822. 8vo.) Father Dobrizhoffer was in Paraguay from 1749 to 1767, and his ethnological matter is ex-

ceptionally valuable. Of a certain tribe at Mbaevera he says: "The mothers put their babies in wicker baskets, and carry them on their shoulders." (Vol. I, p. 62.) This is the first notice of any cradle but a sling in this region.

Dobrizhoffer, M. (An Account of the Abipones, London, 1822. 8vo.) The mounted tribes—Indios bravos—of Paraguay "do not use stirrups, and most of them are unfurnished with saddles, even." This fact accounts for the excessive curvature of the legs noticed in previous references. (Vol. I, p. 236.)

Dobrizhoffer remarks of the Abipones of Chaco, also "an equestrian people," but who are provided with saddles, though "stirrups are not in general use," that "you never see an Abipone with \* \* \* bandy legs." Like the Kirghiz, all these Indians ride more than they walk, and are placed on horseback at the earliest age. Father Dobrizhoffer's statement is not in accordance with the facts of common observation in this regard; but, taken with some reservation, the greater symmetry of limb among the tribes of Chaco is evidently due to the difference of position involved in the use of a saddle. (Vol. II, p. 113.)

King, Col. J. A. (Twenty-four Years in the Argentine Republic. London, 1846. 8vo.) The Chirivione Indians of Gran-Chaco would not eat mutton for fear "their noses would become flat" (p. 109).

Parrish, Sir W. (Buenos Ayres. London, 1852. 8vo.) Speaking of the Pehuenches—"Pine Trees"—a Pampa branch, he says: "I have seen some of these Indians who, from being so constantly on horseback, had become bow-legged to such an extent of deformity that the soles of their feet were turned inward, etc." (p. 173). This points to the absence of a saddle, such as used, at least, by their congeners, the Tehuelches-Patagonians.

Harris, J. (Navigantium atque Itinerantium Bibliotheca. London, 1744. Folio.) Sebald de Weert speaks of the "crooked legs" of a certain Indian woman found in the Straits of Magellan. (Vol. I, p. 42.) From what is said afterwards (*Idem*, p. 43) this was evidently a Fuegian.

There are several references to the distortion of limbs among the Fuegians, and to its cause. As an example of the uncertainty attaching to reports of the early voyagers, Harris', Navigantium, etc., quotes Jaques le Hermite, Voyage of Circumnavigation, 1623, to the effect that the inhabitants of Terra del Fuego were "as fair as any in Europe; \* \* \* very strong and well proportioned, and generally about the height of the people in Europe." (Vol. I, p. 71.) Of the same kind is Captain Cowley's statement, made from personal observation, that the Hottentots "are born white, but make themselves black with soot." (Harris's Bibliotheca, Vol. I, p. 83.)

Cook, Captain. (Voyages, etc. London, 1773. 8vo.) Describing the beds of the natives of Terra del Fuego, says that "a little grass \* \* \* served both for bed and chairs." (Vol. II, p. 55.)

#### NOTES ON EUROPE.

Rae, Ed. (The White Sea Peninsula. London, 1881. 8vo.) Bowed legs are mentioned as characteristic of the Norwegian Lapps. Not a pure race like those of South Finmark and Terski Lapland. Distortion probably due to the skin-bag cradle (p. 232).

Laing, S. (Journal of a Residence in Norway. London, 1836. 8vo.) He describes as a characteristic the bowed legs of the Norwegian Lapps. "They form a curve with the leg-bone down to the foot, so that in standing with their feet close together all above is far apart" (p. 247). Pressure in the hood, etc., during infancy probably causes this.

Panofka, T. (Manners and Customs of the Greeks. London, 1849. 4to.) Description of the *Δίκνον*, or wicker, shoë-shaped swinging cradle of Greece (Pt. II).

Guhl and Koner. (Life of the Greeks and Romans. London, —. 8vo.) "The antique cradle," *i. e.*, the *Δίκνον* of the Heroic age, "consisted of a flat swing of basket-work." The child, enveloped in the *σπάργαλα*, must necessarily have been bound

to this. In the shoe-shaped basket-cradle the infant occupied a sitting position (*vide pl.*, p. 195). The last-named cradle had handles, by which it could be carried or swung. Subsequently, when communication with Asia was constant, other forms of the cradle came into use, "cradles similar to our own modern ones" (pp. 195, 196). The *σπάργανα*, used everywhere in Greece, except in Sparta, were designed to prevent distortion. Besides the swaddling-clothes, however, there was in common use a sufficient variety of bed-clothes to make any kind of resting place for the child soft enough to insure safety against pressure, viz, the *κλίβη* of Homer was covered with hides (*κώεα*), and over this lay the *ρήγεια*, blankets or mattress, perhaps. At all events, the later *κνέραλον* was a sack of some kind of stuff filled with feathers, picked wool, etc., and was laid across the straps of the *δέμνια*, or folding bed (*cot*). There were also linen sheets, the blankets before mentioned, and some kind of a heavier covering, presumably of wool, since it was rough on both sides—*περιστρόματα*, *ἐπιβλήματα*, etc.—together with stuffed pillows and bolsters.

Professor Becker (Charicles, London, 1860; *Excursus*, pp. 221, 222) gives much the same account of the Greek bed and bedding as Guhl and Koner, *Life of the Greeks and Romans* (p. 136, *et seq.*). Cradles, he says, are first mentioned by Plutarch. "Plato knew nothing of them." No author of his age can be said to have mentioned "a regular cradle." Mothers probably carried their children in their arms, and these "were not encouraged to walk very early." Wet-nurses were commonly employed, and among these the Spartan women were the most famous.

Potter, Dr. J. (*Archæologia Græca*. New York, 1825. 8vo.) It appears that observation had taught the Greeks the effects of pressure on immature bones, since everywhere, except in Sparta, where the end was otherwise secured, the infant was wrapped "in swaddling-bands \* \* \* lest its limbs \* \* \* should happen to be distorted" (p. 628).

De Perthes, B. (*Voyage en Russie*. Paris, 1859. 12mo.) Remarks on nose-flattening in Asiatic Russia, and probable cause of the custom (p. 288).

Burton and Drake. (*Unexplored Syria*. London, 1872. 8vo.) Cranium said to be Turanian, exhibiting "unilateral flattening \* \* \* from use of the suckling-board." (Appendix, vol. II, p. 277.)

Burton and Drake. (*Unexplored Syria*. London, 1872. 8vo. Vol. II, Appendix.) Distortion of cranial contour referred to "custom of swathing the child's head tightly after birth" (*vide Foville on the process*). This distortion of the calvaria was in the case of a Semitic (probably Jewish) skull (p. 346), (*ibid.*, Appendix, vol. II). Specimen of brachycephalous Græco-Roman cranium, exhibiting asymmetrical parietal and supra-occipital flattening, partially due to "suckling-board" (pp. 356, 357).

Seebohm, H. (*Siberia in Asia*, London, 1882. 8vo), describes an Ost'-yak cradle as "a wooden box, about 3 inches deep, with rounded ends, almost the shape of the child." The oval bottom covered with sawdust. Infant wrapped in flannel and furs, and lashed in the cradle. The child is nursed while in this position (pp. 62, 63).

Prichard, J. C. (*Researches into the Physical History of Mankind*. London, 1841. 4th ed. 8vo.) He quotes Pallas to the effect that the only deformity visible among Kalmuks is "an outward bending of the arms and legs, resulting from the practice of causing children to rest in their cradles on a kind of saddle" (vol. I, p. 263).

Prejvalsky, Col. N. (*Mongolia*. London, 1876. 8vo. Vol. I.) Chapter II, page 47 *et seq.*, "is especially devoted to the ethnology of Mongolia." He says of the Mongol, "his legs are bowed by constant equestrianism;" but nothing of any form of cradle, or mode of carrying infants, or of malformations other than the above, is said anywhere.

In Pumpelly's *Across America and Asia*, La Farge (p. 199) has given fac-similes of wood-cuts representing various deformities of the head, evidently artificial. Japanese art, and especially genre art, is of a high order, not relatively, but positively, and as it can not be supposed that such should be the case without a knowledge of



the fact that all caricature depends for its effect upon an exaggeration of well-known characteristics to the degree of grotesqueness, it would be well to inquire if now or formerly any custom, etc., justified these contours.

From Dr. W. W. Rockhill the information is received that in China and Mongolia children are carried in the same way as described by Mr. Akabané in Japan, except that the crossed bands to secure the child on the mother's back are not made use of. Capt. John G. Bourke, U. S. Army, states that the Navajos use a cradle-board similar to that described by Major Powell on the Colorado, viz, a buckskin sack fastened to a board, into which the infant is put without being swathed. No cradles are used by the Japanese, Chinese, or in Mongolia.

## NOTES ON ASIA.

The Emperor of China, Kien-hing (1736-1796), in his work *Mandchou-yuen-tion-kas*, says: "The ancient Mandchou some days after the birth of a child prepared for it a little hard bed, and laid it thereon face up. Little by little the back of the head was flattened and became larger. The Chinese have a custom opposite to this. They lay the new born upon its side, first right, then left, wherefore the head is made narrower." This would make the Mandchous brachycephals and the Chinese dolicocephals.

Busk, George (*Jour. Anthrop. Inst. Great Britain and Ireland*, Nov., 1878, "Notes on a skull termed Nabathæan") says that regarding the norma lateralis, its outlines "almost suggest that the skull has been constricted by a bandage."

Spencer, H. (*Descriptive Sociology*, N. Y. Asiatic Races among the Nomadic Arabs.) "Noble families used to alter the shape of children's heads." (Table XXXI.) This was done in the age of Abou-Zeyd. (*Bastian. Mensch.* II, 229. *Id.*, p. 21.)

Vambéry, A. (*Sketches of Central Asia*. London, 1868. 8vo.) The Turkoman head is "proportionally small" and oblong. This form "is, ascribed to the circumstance" that infants are not cradled, but "placed \* \* \* in a swing made of linen cloth" (p. 296). The Turkomans commonly have "their feet bent inwardly; probably the consequence of their continually riding on horseback" (p. 296).

Pallas. (I, 98, *et seq.*) The Kalmucks "are well made, with the exception of the legs, which are generally bent (arising from being so much on horseback), and slender, like the arms." (Spencer, *Des. Sociol. Asiatic Races*, p. 3.)

Featherman, A. (*Social History of the Races of Mankind*, 2d division. London, 18-7. 8vo.) The women among the Néasesa, "who are accustomed to bear heavy burdens, have their knees turned inward, and their hips are more or less deformed" (p. 347).

Featherman, A. (*Social History of the Races of Mankind*, 2d division. London, 1887. 8vo.) Among the Nicobar Islanders "the skull is depressed by art" (p. 239). "A block of wood answers the purpose of a pillow" (p. 240).

Langsdorf, G. H. von (*Voyages and Travels*, London, 1813. 4to) describes the Ainos (Japan) as having "compressed noses" (vol. I, p. 328). He says the same of the people of Oonalashka (vol. II, p. 31). It is not stated that this peculiarity is produced by artificial means. In this, as in a great number of other instances, nothing is said of the appliances used; but the inference is that such must have existed in the case of infants. The following information, communicated by Mr. Shiro Akabané, secretary of the Japanese legation at Washington, exhibits a very simple mode of carrying infants on the back. No cradles of any kind are used in Japan. The child is never bandaged. It is wrapped loosely in a cloth of some kind, and placed on a soft mattress on the floor. There it remains, except when nursed, until it is old enough to clasp the body of its parent with its legs, when it is placed on the back beneath the outer garment, and supported by two bands passing over its back like cross-belts.

History of Kamtchatka (translated and abridged from official Russian account, based on all voyages and travels to Kamtchatka and Kurile Islands, by Dr. James Grieve. Gloucester, 1764. 4to). The Koreki (Koriaks) "use neither cradle nor swaddling-cloths." No mention of any kind of bodily malformation (p. 233).

As Grieve says he only mentions facts concerning the Koriaks and Kurile Islanders, which are *not* true of Kamtchatdales, it may be true that in Kamtchatka and the Kuriles cradles *are* used.

Both among the Aïnos and Tartars, Rollin's descriptions point to distortions. The following are his cranial measurements in Saghalien and at the Baie de Castries: Island of Tchoka (Saghalien), circumference of head, 1 foot, 10 inches, 4 lines; long diameter, 9 inches, 8 lines; short diameter, 5 inches, 8 lines. Baie de Castries, circumference of head, 1 foot, 9 inches, 4 lines; long diameter, 9 inches; short diameter, 5 inches, 4 lines.

Bush, R. J. (Reindeer, Dogs, and Snow-Shoes. N. Y., 1871. 8vo.) In October Bush saw among the Gilaks, on the Amoor, "a babe tightly bandaged in a wooden box or cradle, something like that used by our American Indians, but with its legs from the knee downwards unfettered." This cradle was hung vertically to the "ridge-pole" of a "lean-to" shelter, and, the child's feet touching the ground, it "swung itself" (p. 123). In northeast Siberia in January, Bush saw "two little boys," belonging to the nomad Tungusians, "lashed together and thrown over a pack-saddle, the one balancing the other. \* \* \* They were each sewed up in single garment \* \* \* made of heavy reindeer fur." Only the eyes and nose were visible (pp. 240, 241).

A. E. Nordenskiöld (Voyage of the Vega, London, 1881, 8vo, Vol. II) describes "a wide skin covering with the legs and arms sewed together downwards" as the substitute for the cradle among the Chukchis. Similar devices used by most polar tribes apparently. No visible cause for distortion (p. 102).

#### NOTES ON AFRICA.

Wood, J. G. (Uncivilized Races of Men. Hartford, 1871. 8vo.) The Abyssinian midwives mold the features of infants "to make them handsome" (p. 658).

Wood, J. G. (Uncivilized Races of Men. Hartford, 1871. 8vo.) Among the Fans the child is carried astride of a bark belt (p. 530). The "paingkoont" or circular mat cloak of Australians serves to carry the child, vertically placed. The Australian form is exceptionally fine (p. 699). The cradle of the New Zealand infant is a mat wrap (p. 817). In New Guinea the child lies "in a sort of sling" of leaves or bark, and is so carried (p. 901).

Alexander, Captain (Jour. Royal Geogr. Soc., London, 1835, Vol. v, p. 318, note) says of the Fingoes (or Wanderers) of South Africa, that their "children are carried behind wrapped in the kaross."

Little, H. (Madagascar. Edinburgh and London, 1884. 12mo.) The Magalasy "mother carries her infant upon her back, and not in her arms" (p. 64). No description of the means used to support the child.

On page 193 of M. C. Bnet's Madagascar la Reine des Iles Africaines, there is a plate of a woman carrying a child, placed in a sort of hood formed of a fold of the outer garment, which may explain Little's statement.

Wilkinson, Sir J. G. (Manners and Customs of the Ancient Egyptians, New York, 1879) states that the head-rest, or according to Porphyry "a half-cylinder of wood in lieu of a pillow," was in general use in Egypt. (Vol. I, pp. 185, 186.)

Wilkinson adds that the same kind of a pillow is found in China, Japan, and among the Ashantees and Kaffirs. This is a very incomplete statement of the peoples who use the head-rest; but there is a slight incongruity between his assertion of the universal use of this kind of pillow, and that made (Vol. I, p. 417) to the effect that the Egyptians commonly slept on couches, because many of those depicted in his plates would not have permitted the head-rest to be used on account of their form. He says also that the Egyptian bed was often a skin placed on the ground or a frame of palm wicker-work like the modern caffass, and in these cases a wooden pillow, cushioned as in Japan and China, for the rich, might have been employed.

The Madi women carry their infants in skins which have been dried in the sun and scraped clean and smooth with a stone and softened with butter. The skins of

goats, gazelles, sheep, and calves are used, the legs being tied together and strung over the mother's shoulders. The baby is placed in the skin under the woman's arm, with its head behind. Sometimes a gourd is placed over the head to protect it from the sun. When older, the child is carried on the arm. (Proc. Roy. Soc., Edinburgh, 1883-'84, p. 325.)

## NOTES ON OCEANICA.

Forbes, H. O. (A Naturalist's Wanderings in the Eastern Archipelago. New York, 1885. 8vo.) In Timor-Laut infants are laid "quite naked \* \* \* on a hard palm spathe," which is spread in a siwela or "rough rattan basket" (pp. 315, 316). Every one sleeps on a banquette covered with bamboo mats, and they "rest their heads on a piece of squared bamboo with rounded edges" (p. 318).

Dr. J. G. Garson (Appendix to Part IV, p. 343), describing the Timor-Laut crania procured by Forbes, remarks that "all the brachycephalic skulls \* \* \* exhibit more or less flattening in the occipital and parieto-occipital region, such as would be produced by laying an infant, without any soft material under its head, in a cradle like that described." Owing to race intermixture there are two types of cranial contour in Timor-Laut; but it is evident that the same conditions must be operative whether the head is short or long. The difference is one of degree, not of kind. Dr. Garson observes also that "the height of the skulls is in all instances less than the breadth," a fact which (although not mentioned as such) is of the same class as that of occipital flattening, and apparently due to the same cause, viz, the weight of a head incompletely ossified resting on an unyielding surface, and in which restitution during growth is prevented by the subsequent use of a wooden pillow. An isolated fact, and of course having only that value in this connection, is stated by Major Cambell (Geographical Memoir of Melville Island, north coast of Australia, in Jour. Royal Geogr. Soc. London, 1834, Vol. IV). He says that the pillows he saw were made of "pieces of soft silky bark, rolled up in several folds" (p. 157), and also that their cranial characteristic is that "the back of the head projects very much (p. 153). \* \* \* The aborigines of Melville and Bathurst Islands are of the same race \* \* \* as those throughout New Holland (p. 158). Hard or wooden pillows are not universal in warm countries. The Ovahs of Madagascar sit on cushions, lie on mats, and have a matted bolster." (Jour. Roy. Geogr. Soc., 1835, Vol. V, p. 332; Captain Lewis.)

Flower, William H. (Fashion in Deformity. Humboldt Library, New York. Vol. II, No. 28.) The author reports a statement made to himself by Mr. H. B. Law, to the effect that the Dyaks of Arawak practiced artificial flattening of the occiput (p. 12).

Featherman, A. (Social History of the Races of Mankind. 2d division. London, 1887. 8vo.) Among the Dyaks a mat like the Mexican petate, which serves the same purpose, is used for a bed. "A bag stuffed with grass answers the purpose of a pillow" (p. 258).

Reynolds, J. H. (voyage of the U. S. frigate *Potomac*, New York, 1835, 8vo) states that the heads of the Achenese "are somewhat flat or compressed," but gives no reason for this (p. 183).

Guillemard, Dr. F. H. H. (Cruise of the *Marchesa*, London. 1886. 8vo.) In the Sulu Archipelago the cradle used is a "little basket-woven cot" hung in the middle of a long bamboo supported at the ends. The vibrations of the bamboo when pulled rock the child. (Vol. II, p. 14.) Among the Hatam Papuans he saw a number of women "with babies strapped upon their backs." (Vol. II, p. 294.)

Featherman, A. (Social History of the Races of Mankind. 2d division. London. 1887. 8vo.) Among the Sumatras "the nose is flattened and the skull is compressed from early infancy as a mark of beauty" (p. 289).

Marsden (p. 44). "The Sumatrans flatten the noses, and compress the noses of children newly born. They likewise pull out the ears of infants to make them stand

at an angle from the head." (Spencer, Des. Soc. Negritto and Malayo-Polynesian Races, pp. 20.)

Featherman, A. (Social History of the Races of Mankind. London, 1887. 8vo.) Among the Melville Island tribes "a roll of thin, silky bark serves as a pillow at night and as a seat in the day-time." (Papuo-Melanesians, 2d divis., p. 120.)

Featherman, A. (Social History of the Races of Mankind. London, 1887. 8vo.) The aboriginal Tasmanian women (Papuan) "throw over their shoulders the skin of an untanned kangaroo or opossum," in which they place their children "when carrying them on the back." (Papuo and Malayo Melanesians, 2d divis., p. 100.)

Cook, Captain. (Voyage towards the South Pole, etc., II, p. 34.) Natives of Mallicollo wear a belt which "they tie so tight over the belly that the shape of their bodies is not unlike that of an overgrown pismire." (Spencer, Des. Soc. Negritto and Malayo-Polynesian Races, p. 20.)

Busk, George (Jour. Anthrop. Inst. Great Britain and Ireland, Jan., 1877) speaks of the "extreme flattening \* \* \* of the frontal region" in certain Mallicollo skulls as "artificial."

Cheever, H. T. "The unnatural flattening of the occiput" (in the Hawaiian head) "is thought to be owing to the way the mother holds her babe, which is by the left hand supporting the back of its head." (Spencer, Des. Soc. Negritto and Malayo-Polynesian Races; pp. 20, 21.) Occipital flattening also promoted by the use of a mat pillow or one of wood.

D'Albortis, L. M. (New Guinea. London, 1881. 8vo.) On Yule Island "children were carried \* \* \* in netted bags, resting on the backs of their mothers, suspended by a cord that passed round the women's heads. \* \* \* Their legs were small in proportion to their bodies." (Vol. I, p. 262.) Both on the coast and in the interior of Yule Island the natives wear a tight, broad belt, "sometimes woven on the body." Compression from this results in distortion, giving the figure a "very peculiar appearance." (Vol. II, p. 302.)

Featherman, A. (Social History of the Races of Mankind. London, 1887. 8vo.) State that the Riara women (Papuo-Melanesian group) carry their children "on their backs in a bag of net-work \* \* \* suspended from the forehead by a band" (p. 51). Other Papuans carry their infants in the "flap" of a cloak made of cocoa-nut fiber (p. 21). The Tasmanians carried them "wrapped in a kangaroo-skin, which hung behind the back" (p. 21).

United States Exploring Expedition (Wilkes). (4to. Vol. VI. "Ethnography." Horatio Hale. Philadelphia, 1846.) General remarks on prevalent occipital flattening among Polynesians (p. 10).

In connection with the references to occipital flattening among the Polynesians (a fact variously explained), but not in any case, so far, referred to the general custom of laying infants on hard mats in warm countries, and especially so in Oceanica, thus undesignedly compressing the head by its own weight, the following statements are made: Sir J. Bowring (Philippine Islands, London, 1859, 8vo) quotes the ethnological tables of Buzeta to the effect that the "pure Indians" (Tagals) of the Philippines have this characteristic, whereas among the Mestizos and Negrittos it is not mentioned (p. 176). Wood (Uncivilized Races of Men; Hartford, 1871; 8vo) states that *in childhood* the Bushman skull exhibits excessive occipital *projection*, and this naturally (p. 249). Further, that the same is the case with the Ovambo at all ages (p. 316). Finally, that marked convexity of the front as well as the back head distinguishes the Wahuma (p. 400). These facts, *by themselves*, cancel any inferences from the exceptional contour of a *single* cranial bone unsupported by evidence of abnormal growth or mechanical interference. Hard mats and a wooden pillow explain the fact of occipital flattening, where a vertical occiput is not a decided race feature.

Wallace, A. R. (Australasia, London, 1879, 12mo) quotes Captain Erskine to the effect that among the Polynesian or Mahori race it is the custom to flatten the nose during infancy (p. 493). He remarks that the occipital flattening may be artificial

(p. 494). Throughout this work and the ethnological appendix by Keane, there are no notices of distortion other than the above. On page 476 is a portrait of a "chief of Vanitoro, Santa Cruz Islands," whose skull appears to have been compressed and elevated by circular bandages.

Pritchard W. T. (*Polynesian Reminiscences*. London, 1866. 8vo.) Without describing the process, he states the fact that the Tongans, Samoans, and Fiji Islanders have the custom "of squeezing the heads of infants into \* \* \* a shape in conformity with their ideal of beauty" (p. 417). Remarks on contour of distorted skull (pp. 427, 428).

Martin, Dr. J. (*An Account of the Natives of the Tonga Islands*. London, 1818. 8vo.) On Yule Island "children were carried in netted bags, resting on the backs of the mothers, suspended by a cord that passed round the women's heads." (Vol. I, p. 202.)

Buller, J. (*Forty Years in New Zealand*. London, 1878. 12mo.) Description of nose-flattening and modification of shape of limbs by manipulation (pp. 215, 216).

Foster, Dr. J. R. (*Observations made during a Voyage round the World*. London, 1778. 4to). Notice of antero-posterior depression of skull in Mallicollo (pp. 242, 267, 268). People of Tierra del Fuego, constantly in canoes, have "the legs bent, the knees large, and the toes turned inwards" (pp. 251, 268). Remarks on nose-flattening in Tahiti (pp. 593, 594). Says Hottentots and natives of Macassar have same custom (p. 594).

Foster describes the process of flattening the nose in Tahiti, and quotes his description of the process used by the Hottentots and in Macassar from Gomara, *Historia General de las Indias* (pp. 593, 594).

Turnbull, John (*Voyage Round the World*, London, 1813, 8vo) remarks that the noses of the Otaheitans are "universally flat, occasioned by pressure during their infancy" (p. 344). Nothing further said.

Ellis, William. (*Polynesian Researches*. London, 1829. 8vo.) "During the period of infancy" in the Society and Caroline Islands "the children were seldom clothed, and were generally laid or carried in a horizontal position. They were never confined in bandages or wrapped in tight clothing." In Tahiti "the shape of the child's head" and its features were carefully observed, and parents and nurses "often pressed or spread out the nostrils of the females, as a flat nose was considered by them a mark of beauty." (Vol. I, p. 343.) In Tahiti "the forehead and the back of the head of the boys were pressed upwards, so that the upper part of the skull appeared in the shape of a wedge. This, they said, was done to add to the terror of their aspect." (Vol. I, p. 343.)

In general remarks on the "South Sea Islanders," *i. e.*, natives of the Georgian, Society, Caroline, "and adjacent isles," Ellis says they "are generally above the middle stature," but their limbs are not correspondingly muscular, though "well formed." In mountainous parts they have turned feet and an "exceedingly awkward" gait, from using the naked feet in climbing rocks and ravines. Except when distorted, "the facial angle is frequently as perpendicular as in the European." Nose-flattening is not so general as it was formerly, and the nose "is seldom flat," but "rectilinear or aquiline." (Vol. II, pp. 13-15.) The bed of the majority is a single mat. The chiefs have many. The pillow is wooden. (Vol. II, p. 67.)

On Carpentaria Gulf, Australia, the mothers flatten the nose of their young children by pressing it with the hand on the point and laying the child on its face.

Dr. Karl Scherzer. (*Voyage of the Norara*. London, 1863. 8vo. Vol. III.) Opinion that artificial flattening of occipital region prevails among women of Tahiti (p. 220). Remarks on artificial distortion of head on west coast of North and South America (*ibid.*, pp. 347, 348, 393).

Wood, J. G. (*Uncivilized Races of Men*. Hartford, 1871. 8vo.) Occipital flattening and nose-flattening among the Tahitans, with description of the process (p. 1059).

United States Exploring Expedition, i, 339. Method of carrying children illustrated.

Calvert, T. W. and J. (Fiji and the Fijians. N. Y., 1-59. 8vo.) The bed of a chief, made on the banquette, "is covered with mats, varying in number from two to ten, and spread over a thick layer of dried grass and elastic ferns, while on them are placed two or three neat wooden or bamboo pillows" (p. 108). There was an elaborate form of general bed. An infant is "anointed with oil and tumeric," but apparently not swathed in any way. The friends "plait small mats, measuring about 2 feet by 1, for the mother to nurse her babe upon." There is no notice that its bed is not like that described above (p. 138). "Natives nurse the child sitting quite naked astride the mother's hip, where it is kept from falling by her arm" (p. 139).

The Calverts also describe the nose as "well shaped, with full nostrils, yet distinct from the negro type." The "lower extremities" are "of the proportion generally found among white people." The "mold of the body is decidedly European" (p. 82). Dr. Pickering (Races of Men, p. 147) says the Fijian crania are unique, have "rather the negro outline," while "the profile" appears to be "as vertical, if not more so, than in the white race."

Nind, S. (Jour. Royal Geogr. Soc. London, 1832. 8vo. Vol. 1.) Describing natives of King George's Sound (Swan River colony), Australia, he says: "For the first few weeks the child is carried on the left arm in a fold of the cloak, but subsequently is suspended on the shoulders" (p. 39).

Foville, A. (Influence des Vêtemens sur nos Organes, etc. Paris, 1834), describes cases of cranial deformity and mental incapacity produced by bandaging the head during infancy.

Foville quotes Blumenbach (Collectio Craniorum) with reference to cases of antero-posterior flattening accompanied by occipital protrusion, and to instances of the pyramidal form of the Peruvian skull. He states that Turkish crania grooved by ligatures have been found.

M. Virey (Art. "Enfant," Dic. des. Sci. Méd.) asserts that caps drawn tight by ribbons will "force the head into a sugar-loaf shape, and produce idiocy" in infants.

La Bret. (Compt. Rend. Soc. de Biologie. Paris, 1852, IV, *et seq.*) Sur la déformation artificielle du crâne en Amérique. The author gives a résumé of the opinions of well-known writers on the production of cranial deformity by artificial means in North and South America.

Guéniot (Bull. Soc. de Chir. de Paris, 1870, 2d Ser. x, 382 *et seq.*), "Obliquité par propulsion unilatérale," describes a case of flattening of the occipito-parietal region on one side, accompanied by corresponding projection of the other, due to constant position of the head on a hard surface during infancy.

Dr. J. Thurnam (On Synostosis of the Cranial Bones. London, 1865), describes a brachycephalous skull from the Round Barrows, with a broad, shallow depression passing behind the coronal suture, and over the occiput in the line of the transverse spine. This was evidently the effect of some kind of head-dress; probably, one such as MM. Foville and Lunier has described as now in use in France.

L. A. Gossei (Essai sur les déformations artificielles du crâne. Paris, 1855. Ackermann. Neues Magazin von Baldringer, Bd. 2, p. 5), says, "Hunc morem in Germania satis usitatum esse et Laurenberg; etiam Hamburgensis capita neonatorum vinculis artificiose compressisse." Schade, J. De Singulari cranii ejusdum deformitate. Gryphia, 1858, 11."

*Idem.* Lunier (Essai sur les déformations artificielles du crâne. Gosse. Paris, 1865), refers to this custom as prevailing in the Franco-Gallic Provinces, and adds, "Itague hand difficile intellectu videtur, forsitan etiam hujus cranii deformitatem ea causa affectam esse." 11.

*Idem.* Andry (Gosse's essay) reports the same in Flanders. Shadel recognizes the intra-uterine causes, and for the most part occupies himself with distortion due to affections of the sutures, following Hyrtl, Stahl, and Virchow.

Case of what Guéniot calls Obliquité par propulsion unilatérale, "reported by M. Mocquet. (Bull. Soc. Anat. de Paris, 1875, 1. 56.) Cause stated to be in all such cases,

or most, prolonged pressure over occipito-parietal region from hard pillow, and position and weight of head.

Bourke, Capt. John G. (*Snake-Dance of the Moquis, New York, 1884*), describes "cradles of flat boards, with a semi-circular screen for the head. These differ among the Moquis in no essential from the ordinary cradle-board of the North American Indians. When the child is placed on it it is wrapped up tightly in blankets, with its arms pinioned tightly to its sides" (pp. 240, 241).

Vambéry, A. (*Sketches of Central Asia. London, 1868*). Swaddling clothes are here in general use, and the *kindik kesen*, or cutter of the same, is a person of much consequence, because the act of cutting these out is accompanied by many ceremonial observances. Vambéry seems to indicate, however, that the child is not swathed for any length of time.

Harris, Maj. W. C. (*Highlands of Ethiopia. London, 1844*). The beaux of the Dankalis and Somalis, at Tajura, "employ in lieu of a pillow a small wooden bolster, shaped like a crutch-handle, which receives the neck \* \* \* and preserves the periwig from derangement" (I, p. 58).

D'Albertis, L. M. (*New Guinea*). "Great varieties of type, in color, physiognomy, and in the shape of the skull," are found on Pangian Island. Here it is observed that parietal compression protrudes the supra-orbital arches (I, p. 29). The same statements may, he says, be made of the natives at Orangerie Bay (I, p. 97). Along the whole line, from Sorong to Dorey, the nose varied in form from flat to aquiline (I, p. 210). In his plate of the mummified head got from Darnley Island, Torres Straits, the type is macrocephalous.

Blake, Dr. Carter (*Appendix Unexplored Syria, Burton & Drake. London, 1872*), describes a female skull from the Dayr Mâr Mûsâ el Habashi showing artificial "compression of the parietal bones," probably caused by use of the "suckling-board."

Davis. (*Collection of Voyages and Travels, etc. London, 1745*). "In Morria, a small, low island, lying in the river of the Amazons," children are thus carried. "They take a piece of the rind of a tree, and with one end thereof they fasten the child's head, and about the arm-pits and shoulders with the other, and so hang it on their backs like a tinker's budget" (II, p. 487).

Dawkins, W. Boyd. (*Cave Hunting. London, 1874*). Refers to Professor Busk's notes on the crania of Perthi-Chwaren, in which a skull with "a well-marked depression across the middle of the occipital bone" is described. This depression had the appearance of being "caused by the constriction of a bandage." Except this deformation the skull was "well-formed and symmetrical," not having any of the contours of the tête annulaire, due, according to MM. Foville and Gosse, to occipital compression (p. 170).

Professor Busk states, in his ethnological notes (*Cave Hunting*), that the Berber contingent of the Moorish invaders of Europe in the eighth, ninth, and tenth centuries "used to elongate the skull posteriorly and flatten the head" (pp. 170, 171).

In the same work Professor Dawkins suggests that the flattened occiput of the brachycephalous invaders of neolithic Britain "may have been caused by the use of an unyielding cradle-board in infancy" (p. 193). Evidently the flattened vertex of the Sclaigneaux cave was not natural (p. 219).