CHAPTER IX

ARTIFICIAL CRANIAL DEFORMATION AMONGST THE AMERICAN INDIANS NORTH OF MEXICO

Among the many customs of the North American Indians which have attracted the attention of scientific observers, that of the artificial deformation of the head which is common amongst certain of the tribes is one of the most curious. Before considering the details of the practice as it obtains among the different divisions of the population, it may be as well to cast a cursory glance at the map of North America, and try to obtain some reasonably clear idea of the different linguistic stocks and their distribution. Four great families immediately arrest the attention. In the North-West, stretching towards the Arctic and the Eskimoan stock, and southwards as far as a line roughly drawn from east to west, from Hudson Bay to Vancouver Island, lies the domain of the great Athapaskan family, which region was formerly much more extensive than it is now. A southern division of the same family exists in Arizona, New Mexico, Colorado and part of Utah. South of the northern territory, but separated from the western sea by the Kitunahan and Salishan families, lies the home of the Algonquian family, which stretches away as far as Newfoundland and Nova Scotia. South again of the Algonquian stock is the territory of the Siouan family separated from the sea and the west by the Shoshonean stock (our fourth great family), and a number of minor stocks such as Shahaptian, the Shastan, &c. Eastwards lies the Iroquoian, and the remainder of the families are scattered over the continent, some like the Caddoan being in several distinct divisions, and others like the Muskogean being more concentrated.

Among the great linguistic stocks the practice of artificial head deformation is not in any way evenly distributed. Many of the tribes among the Athapaskan and stocks in California do not know the custom,¹ and it is probable that the

¹ Oettinger, 2, p. 622.
Algonquian, Shoshonean, and other stocks have no knowledge of the intentional varieties of deformation. Occipital deformation on the other hand due to the use of the cradle-board and probably accidental is found very uniformly distributed, especially in the south-west and its importance will be considered later. Artificial cranial deformation in America as in other parts of the world can be divided into various types according to the form of the distortion or to the apparatus employed. Taking the varieties of type, two, three or more can be distinguished. Hrdlička divides them into two great divisions, after pointing out that the deformation may be intentional or accidental, produced in life or posthumously. Of the intentional varieties he notes (a) the fronto-occipital form (Flat Head); and (b) the Aymara, macrocephalic or circumferential form. In the first of these the frontal and occipital bones are flattened causing a compensatory bulging of the parietals, and in the second, bandages or pads are employed which produce a variety of forms. Sullivan adopts the same classification, although he prefers the term "circular" to circumferential. Boas distinguishes three different types in the North-West Coast region alone, intermediate types also being present. In the first of his triple division the forehead alone is flattened and compensation takes place in a lateral direction, the parietals splaying outward. This form is found to a certain extent amongst the Chinook. The second form, practised by such tribes as the Cowichan (Salishan), takes the form of occipital flattening only, pressure being exercised upon the lambdoid region and just below it. From this form, an intermediate type such as that presented by the Catloltq (Comox: Coast Salish) passes to the third where compression is exercised both on the frontal and occipital bones as well as in a lateral direction, thus producing the upward elongation admired, for example, by the Koskimo (Wakashan).

Following the scheme of classification described in the introductory chapter to the present work, I shall depart from

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1 For the general physical characteristics of the Indians of the North Pacific coast, see Boas, 4.
2 Hrdlička, 8, pp. 147 ff.: cf. Rüdinger, 1, p. 54.
Plate XXXI.

Museum of the American Indian, Heye Foundation.

A Salish Woodcarving.
the above precedents and describe the deformations according to the apparatus employed in their production. Thus we have amongst the American Indians north of Mexico four main kinds of cranial distortion:—

1) Artificial cranial deformation produced by the cradle-board, which is probably accidental.

2) Deformation produced by the application of boards to the head, either singly, in pairs, or attached to cradles.

3) Deformation produced by the application of bandages.

4) Deformation produced by the application of pads.  

In the following pages I propose to select from among the tribes some of the more striking examples which illustrate the practice as seen in North America. We will begin with the region of the North-West Pacific Coast, including Vancouver Island and the neighbouring districts. This region, which constitutes one of the most important areas, has a damp, temperate climate, with a mountainous coast and great forest belts. Fish, especially salmon, form the staple diet, but berries and the produce of the chase inland are also extensively used. The chief mode of transport is by canoe, the frequent indentations in the coast and the land-locked stretches of water being especially favourable to this mode of travel.

Wissler, following other authorities, divides the culture into three groups: (a) the Northern, Tlingit, Haida and Tsimshian; (b) the Central, the Kwakiutl tribes and the Bella Coola; and (c) the Southern group, the Coast Salish, Nootka, Chinook, Kalapooian, Wailatpuan, Chimakuan and some Athapaskan groups.  

The Northern group is characterized mainly by such elements as skin clothing, carving of excellent technique, &c.; whilst in social organization there are two exogamic divisions with maternal descent, and a society of chiefs, nobles, commoners and slaves. The potlatch is found and initiation ceremonies are well developed. In the Central group there is a tendency towards paternal descent, whilst in the Southern division perhaps the most distinguishing feature is the use of the stone arrow-head in contrast to the north, where no chipped stone tools are found.  

The most important linguistic groups are in the north the Koluschan

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6 All these are found in British Columbia alone; see Boas, 1, p. 805.
7 Wissler, p. 227.
8 Wissler, pp. 227-228.
(Tlingit); further south the Chimmesyan (Tsimshian, Niska, &c.); the Wakashan, inhabiting various islands and embracing such tribes as the Koskimo, Makah, Nootka, &c.; and finally the Salishan group, comprising the Coast Salish, Cowlitz, Klallam, Shushwap and many others. Very generally speaking, the method of cranial deformation in this area can be divided into two groups. From about the Columbia River northward into British Columbia as far as Vancouver Island the practice of frontal and also fronto-occipital flattening was carried out so that the frontal bone retreated backwards from the eyes in a flat plane. Secondly, north of this area the skull was bandaged with a circular constriction so as to elongate the head upwards and backwards, thus producing the sugar-loaf, cone-shaped or cylindrical type.

We will now examine rather more closely a few of the instances of the custom as it has been observed by various travellers. Beginning with the southern area, let us take as our first example some tribes belonging to the Chinookan linguistic group, sandwiched in between two branches of the Salishan, the Kalapooian and the Shahaptian. This family comprises the tribes who at one time dwelt up the valley of the Columbia River as far as the Dalles and elsewhere. Unfortunately our information is scanty as to the social organization of the Chinook, the tribe which gave its name to the linguistic family. The village was the unit, and a chief was always present, who sometimes wielded extensive power in the neighbour villages. When Lewis and Clark visited the Chinook during the early years of the nineteenth century they noticed that both sexes had their heads "flattened in a most disgusting manner," and remarked that the custom diminished as one proceeded eastwards until, among the remoter tribes, it survived only among a few old women, a fact which should be remembered in connection with the statement that female children were always subjected to greater pressure than male. In the original journals of Lewis and Clark there are some curious drawings, which illustrate the striking impressions they received. In one case a child is depicted stretched out flat on its back upon a straight plank. Attached to one

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end of the board is another flat piece of wood which falls obliquely over the forehead of the infant and is tied down by thongs which are fastened to either side of the horizontal plank (cf. Pl. XXXIV, a). Biddle, in his history of Lewis and Clark's expedition, remarks that certain of the Columbia River Indians flatten the heads of their female infants only, whilst eastwards in the mountains boys also suffer the distortion. Again, Patrick Gass, who accompanied Lewis and Clark's party, records the fact that when first meeting these Indians they believed them to be a band of the so-called Flathead nation, as all their heads were compressed in the same form. Gass observed the method by which the deformation was produced, and he says that "this singular and deforming operation is performed in infancy in the following manner. A piece of board is placed against the back of the head, extending from the shoulders some distance above it; another shorter piece extends from the eyebrows to the top of the first, and they are then bound together with thongs or cords made of skins, so as to press back the forehead, make the head rise at the top, and force it out above the ears." Following Lewis and Clark, a number of other observers

Lewis & Clark, 2, vol. IV, p. 10.  
Gass, p. 156. The term "Flathead" was originally applied to a number of tribes of different linguistic stocks both in the south-east and north-west of the United States. The people now officially known as Flatheads, i.e., the Salish, never practised any form of intentional artificial cranial deformation, although it would appear that the people of certain bands, especially the southern bands of Wenatchi and Shusie, were accustomed to flatten the heads of their children to a slight extent, pads of skin being employed for this purpose (see Telt 2, p. 126, and compare also Smead, p. 53; Roman: Hodge, pt. I, p. 465 and Verrill, p. 334). In describing the Flatheads of the Yellowstone River, J. O. Pattie, whose account was originally published in 1833, records the observation of a singular method of deforming the head which appears to have been overlooked by modern authors. The men would have been, he says, exceedingly handsome, were it not for "the horrid deformity" of their heads, which were only a few inches in diameter in a transverse direction but monstrous in an upward direction, giving them the appearance of wearing a plumaged military cap. The plumage, however, was their matted hair which was dressed up to a point. This distortion was effected by binding two pieces of board on each side of the head of the new-born child, the boards being left in position until the child was three years old. See Pattie, p. 141. This method of binding boards on both sides of the head, instead of at the front and back, can indeed be paralleled in other parts of the world, but is undoubtedly a rare method of head deformation.
began to visit the tribes they had described. It may be of some interest if we glance over a selection of the narratives, arranged more or less chronologically, as thereby it may be possible to estimate any changes that occurred as the years passed. Gass published his journal in 1807, and several years later Prof. W. H. Keating, who was geologist to Major Stephen H. Long's second expedition, issued his account of the journey to the source of St. Peter's River. The custom, he says, is not general among all the Flatheads, a statement which probably implies that fewer cases were to be seen in an easterly direction. Ross Cox, who published his adventures on the Columbia River towards the middle of the nineteenth century, has given a graphic description of the custom of head deformation as it came under his direct observation. Writing of the Indians at the mouth of the Columbia River, he says that immediately after birth the child is placed in a kind of oblong cradle formed like a trough with moss under its body. The end on which the head rests is higher than the other part, and a padding is fixed on the forehead with a piece of cedar wood on the top of it, and secured by means of cord passing through small holes on each side of the cradle. The compression is continued for a year, and although little pain was apparently occasioned, Cox says that the appearance of the child was frightful. "Its little black eyes," he writes, "forced out by the tightness of the bandages, resembled those of a mouse choked in a trap." When released the head was perfectly flattened, the upper part seldom exceeding an inch in thickness (see Pl. XXXIV, b), and Cox also notes that all the slaves had normal undeformed heads."[8]

Townsend also describes a young child from whose head the deforming apparatus had just been removed. He says that without exception, it was the most frightful and disgusting object he had ever beheld. The entire frontal region of the skull was completely flattened, and the mass of hair which was forced back caused an enormous projection behind. The child's eyes protruded to a distance of half an inch and appeared both inflamed and discoloured, as did also the surrounding region. He continues that, as he gazed upon the deformity, he felt a kind of chill creep over him. The appearance was so "stark staring and absolutely queer" that horror

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A Dwarfish Cradle-board.

Museum of the American Indians, Hayd Foundation.
gave place to a smile, and when its mother tried to amuse it it looked "so irresistibly, so terribly ludicrous," that he and
his companions burst into a roar of laughter which made it
cry and appear much less lovable than before."

The feeling of disgust which Cox and Franchère express
was not, however, shared by Parker, who contributed a journal
of an exploring tour to the Rockies in 1835 to 1837. The
head deformation of the Chinook, he says, is not so great a
deformity as is generally supposed. From a point just above
the eyes to the crown of the head there is certainly a
depression, but this is not particularly noticeable in adult
persons. Pickering also, who wrote a section of the record
of the United States Exploring Expedition, is inclined to
agree with Parker. In an interesting account of the process
he says that he himself witnessed the remarkable treatment
to which the children of the Chinook submit. They are put
into wooden receptacles, whilst pads are tightly bandaged
over foreheads and eyes so that both movement and sight are
impossible. It is true that when they are released they
sometimes present a very remarkable appearance, but as
they grow up the skull tends to resume its normal shape,
so that the majority of adults scarcely exhibit, with the
exception of the unusual breadth of face, any marked
abnormality. On inquiry it appears that Pickering was
informed that the descendants of slaves obtained their freedom
at the end of three hundred years, and that they were able to
keep reckoning; and that further, although slaves were not
allowed to attempt to flatten their own skulls, they were very
careful to perform the operation on their children. From

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17 Townsend, pp. 176-177. Cf. Franchère, p. 324, who says that the
sight of these deformed heads, although an indispensable ornament to the
native (slaves only were exempt), shocks strangers exceedingly. Scouler,
p. 306, describes the cradle used and says that compression continues
until the child is able to walk. Its eyeballs project, the eyes being
directed upwards and, although no effect is seen in the intellect, apoplexy
is of frequent occurrence.

18 Parker, p. 134.

19 Pickering, pp. 24, 27, 28. Duflot de Mofras, however, in noting that
a deformed head was a mark of nobility, denied that slaves were allowed the
privilege, although from what he says it is possible that certain of their
children submitted to it. He records the fact that the compression lasted
some three years, and adds that those who underwent it were subject to
vol. VIII (1911).
what Pickering reports, it would appear that the children of slaves who had not completed the period of their servitude would not be deformed, but only those families whose children would be free. John Dunn, however, in his history of the Oregon territory, is of quite a different opinion. Writing of the tribes who live in the lower part of the valley of the Columbia River, he says that the singular custom of flattening the forehead exists amongst them, and also a compression of the whole head which gives them a hideous appearance. He describes the process as follows. Immediately after its birth the child is laid on a covering of moss placed inside an oblong wooden trough, the moss being bunched up higher at the head than at the feet. Padding is then placed on the child’s forehead with a piece of cedar bark on the top of it, and this is pressed down by cords attached to each side of the trough. The process is attended, it is said, by a good deal of pain, and certainly the appearance of the child is shocking. Its eyes seem to start from their sockets; its mouth is contorted and after a year’s pressure the desired effect—one of beauty and distinction—is attained. Amongst these peoples slaves are purchased from neighbouring tribes. They all have round heads, and every child of a slave must be allowed to grow up with a natural head unless it is adopted by a member of the ruling tribe. After death the deformed skull exhibits so remarkable an appearance that medical men of the period could scarcely believe that artificial constriction could produce such a form. Instead of padding and cedar bark being placed upon the forehead of the infant, as described by Dunn, McIntosh, who published a book on the American Indians in 1843, describes how masses of clay are used for the same

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39 J. Dunn, pp. 128-130: cf. Catlin, vol. II, pp. 110 ff.: Donaldson, Pl. XLII, &c. In the Musée d’Histoire Naturelle, Jardin des Plantes, Paris, are two beautiful examples of alleged Chinook child mummies, both loaded with necklaces. The heads are flattened to such an extent that they can only be described as discs, being about the thickness of a good-sized omelette (Gallery, Case 95). In the Museum of the Royal College of Surgeons such an infant’s skull may be seen (see Pl. XXXIV, b). It is the skull of a child from the Columbia River and probably died under pressure. The lower board has expanded the upper part of the occipital bone and pushed it unsymmetrically to the left side. The right parietal is also flattened. The orbital plates of the sphenoids and frontal have been pushed forwards, causing in life protrusion of the eyeballs, the lower portion of the orbits being much advanced beyond the upper.
purpose,\textsuperscript{21} and Lee, in discussing the same point, says how a woman described to an inquirer the process of putting a bag of sand upon the forehead, and, if too light, this was supplemented by an axe.\textsuperscript{22} The painful character of the operation is strongly emphasized by McIntosh, who says that under the pressure the noses of the children were accustomed to emit a whitish pus.

Alexander Ross, who for fifteen years was a resident in the lands of the Hudson Bay Company, and who described the adventures of some of the early settlers on the Columbia River, gives a similar account of the deforming process, and his statement that only certain favourite slaves were allowed the privilege of flattening the skulls of their children tends to clarify the divergent stories of Pickering and Duflot de Mofras. He describes the custom of deformation as fantastic. He says that immediately after birth the child, whatever the sex, has its head compressed by boards in order to flatten it. From the eyebrows the Chinook skull inclines backward towards the crown, and since the back of the head inclines forwards the general shape is that of a wedge. Thus there is a ridge from ear to ear, and the sharper the angle the greater the beauty and the more distinguished is this mark of free birth.\textsuperscript{23} Similarly, the American artist, Paul Kane, describes the practice of head deformation amongst the Chinook and the Cowlitz (Salishan). He states, like Ross, that it is a distinguishing mark of freedom and is carried out in the following manner. The children are strapped to boards covered with moss or the fibres from cedar bark. A pad is placed upon the forehead, a piece of smooth bark being placed on the top of this, the whole being bound down by a leathern band secured to either side of the plank. Under the back of the child’s neck a rude pillow of grass or cedar fibre is placed in order to support it. The process begins immediately after birth and is continued for some eight to twelve months,\textsuperscript{24} by which time a cuneiform shape has been produced. Kane did not appear

\textsuperscript{21} McIntosh, p. 189.
\textsuperscript{22} Lee, p. 202; cf. Crosby, p. 86, who says that hard cushions and flat stones are used.
\textsuperscript{23} Ross, p. 99.
\textsuperscript{24} Humbreville, p. 231, who says that deformation is produced “in a few months.”
to notice any suffering on the part of the child whilst pressure was being exercised; curiously enough, this was only noticed when the bandages were removed, when presumably the efforts of nature to correct the unnatural constriction caused a considerable diminution in the numbness produced by pressure.\textsuperscript{25}

Just as the Chinook deformed the heads of their children, so the Chehalis (a Cowichan tribe. Stsné’lis), had the same custom. Even as late as 1904, Hill-Tout describes how the Chehalis of the Harrison River practised head deformation. He reports that it was effected during the first months of life by means of a pad which, as in the case of the Chinook, was fastened across the frontal bone and secured to the cradleboard.\textsuperscript{26}

Seen in norma lateralis, the Chinook skull can scarcely be mistaken. The frontal bone slopes back sharply from just above the supra-orbital ridges, the flattened portion often extending as far as bregma. From this point the skull slopes backward till it falls abruptly at the occipital region, which in many cases is not flattened but rounded. Sometimes when two boards are used and the flattening involves both frontal and occipital bones, compensation takes place both laterally and in an upward direction, the skull becoming acrocephalic and the parietals being splayed out on either side.\textsuperscript{27} If two median sagittal diagrams of a Chinook and a Thompson Indian skull are superimposed, the exaggerated backward inclination of the Chinook is at once apparent.\textsuperscript{28} The basi-bregmatic height is decreased and lambda is pushed upward and backward, the bregma-lambda diameter being considerably shortened.

From the above notes a tolerably clear idea may be obtained as to the method and results of cranial deformation amongst the Chinook. Two forms may be distinguished. In the one, boards exercise a frontal-occipital compression, being tied together at the sides, and in this respect being very similar to a method found in Peru. In the other, frontal

\textsuperscript{25} Kane, p. 180, cf. J. Mix Stanley’s Chinook Burial Grounds, where he states that head deformation formed a distinctive feature as between freeman and slave.

\textsuperscript{26} Hill-Tout, 2, p. 322.

\textsuperscript{27} G. Retzius, 2, p. 98, who discusses an endocranial cast.

\textsuperscript{28} Oetteking, 2, Pl. II.
PLATE XXXIV.

After Catlin.

Chinook Mother and Child.

Royal College of Surgeons.

Deformed Chinook Skull
compression is effected by a board or a pad, or some hard lump of material being fastened on the forehead as the child lies in its cradle. As regards cradles, two main forms are used. In the one, the child is tied to a board with thongs, the deforming apparatus being secured to the sides of the board; whilst in the other, a kind of trough or dug-out canoe is employed, to the head of which a piece of wood is secured and bent obliquely over the child's forehead, acting as a kind of spring.

There is no doubt that among the tribes of the Columbia River the practice of artificial head deformation was of

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Mason, 1, p. 173: cf. Farabee, 2, pp. 184 ff., who states that these deforming boards attached to cradles are found both in the Gulf States east of the Mississippi as well as in the Columbia River region. Wilson, in 1863, thought that the occipital flattening amongst the tribes of the Columbia River might not be intentional, and his opinion raises an interesting problem (see D. Wilson 2, p. 26). There can be no doubt that when two boards were used the occiput was being intentionally flattened. But when the frontal bone is being flattened by a deforming apparatus, and through its pressure the occipital region is also flattened, when the surface on which it rests is hard, can we say that this posterior flattening is intentional? This point raises the whole question of the cradle-board (see Pl. XXXIII). The cradle-board of the American Indian, which is seen among the Algonquian and Iroquoian tribes, and also among others, has undoubtedly had a decided effect upon cranial form, although it is, I think, improbable that the resulting deformation was intentional. It is clear that this method of supporting children is by no means recent. In the sixteenth century the over credulous Thévet reports how the child was swaddled and laid "sur une planche ou ais de bois" (p. 417), and Hennepin reports the same thing in his account of La Salle's undertaking (p. 914). Similar contrivances are described by Sagard Théodat (vol. II, pp. 315-316), and the mysterious D. J. Hunter narrates how, when travelling, the mother places the board on her back, and when resting or at work suspends it from the branch of a tree (p. 263), a similar custom being prevalent in Northern Manchuria (see Williamson, vol. II, p. 220). Among the Navaho also, occipital cradle flattening is very pronounced, the heads becoming occasionally hyper-brachycephalic, with cephalic indices as high as 94.6; and similar conditions are found wherever the cradle-board is used, as among the Hopi, who otherwise practise no intentional cranial deformation (see Hodge, Part II, p. 43; Shufeldt; Sir W. Turner, 3, pp. 430-431). The same cause may account for the occipital flattening in the Chaco Cañon, New Mexico cranium (see Hoffman, p. 454), and it would appear that similar reasons can be found for the extreme forms of flattening found in some of the skulls of the Pueblo cliff-dwellers, of which Pl. XXXVI, showing a skull from Montana Valley, Montezuma County, Colorado, now in the British Museum (Natural History), nr. 3971, is a good example.
considerable social importance. The custom knit together the people who practised it, and those possessing the strangest heads were esteemed as the noblest amongst the population. As Hill-Tout says, a natural head was a sign of servitude. "The heads of the children born of wealthy and noble persons, and particularly those of chiefs, were severely and excessively deformed." As in Malekula the men with deformed heads were "Good Men," so on the Columbia River and elsewhere the most deformed were always to be found among the Best People."

Before finally leaving the Chinook method of flattening the forehead, we may as well glance at the same practice among the Songish, a Salishan tribe who now dwell to the west of Puget Sound and around Victoria in the south-east of Vancouver Island. Amongst these people, as soon as the child is born it is rubbed by its mother with the grease of the bear and the oil of the dog-fish. It is rubbed from the mouth towards the ears, so as to press the cheek bones somewhat upwards. The outer corner of the eyes are also pulled outwards; the calves pressed backwards and upwards; and the knees tied together to prevent the feet from turning inward. But above all, the forehead is important. This is pressed down and flattened, for if a child were neglected in this respect it would become the subject of jeers, and fingers would be pointed at it accompanied by the saying that no mother "had made it look nice." The cradle in which the child is laid is made of rushes. Five bundles are used, the outer one being made in the shape of a horseshoe and enclosing the four others, which are laid side by side in the space surrounded by the first. Two sticks, one at either end of the row of rushes, are thrust through them from side to side to keep them together. A number of thin loops, made of rope, are then attached to the outer rushes and the whole is covered with cedar bark. A roll of bark serves as a pillow, which is covered with a fringe of mountain goat’s wool. The cushion, which is to flatten the forehead of the child, is made of a

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"Hill-Tout, 3, p. 40.
"Cf. A. B. Lewis, "No one could hope for social recognition whose head was normal in shape" (p. 154); Delisle, 3, p. 306.
"Similarly, the Snoqualmi (Salishan) try to elongate the ears and nose of the new-born child (see Gunther, p. 253).
A Kwakiutl Skull.
number of flat pieces of cedar bark, fastened together and furnished beneath with a thick layer of the same bark. The cushion lies obliquely over the forehead of the child, and at both sides of the face rolls of cedar bark are placed and pressed against the head. A cord is tied over the cushion and securely fastened to certain of the loops on the edges of the outer horseshoe-shaped bundle, so that the cushion is drawn firmly down over the infant's head. It is left in position for a month, after which the child is transferred to a wooden cradle, in which it is fastened in the same way as the first.

The custom of artificial cranial deformation in this district appears to have been practised for some considerable time. Certain skeletal remains found in the middens of the Lower Fraser River can, it is supposed, be approximately dated by the presence of tree stumps projecting from them, and according to this it appears that some of the remains are at least one thousand years old. One skull found by Hill-Tout and described by Boas is recorded as showing traces of artificial deformation, and certain of the methods of burial are of some interest. A few of the mounds are provided with an outer rectangular boundary of stones set side by side in the form of a square, having each of its sides facing towards one of the cardinal points. Copper objects were found in these mounds, whilst other types show an advance, three squares being found, the body lying within the innermost.

The custom of cranial deformation exists also among the Makah (Wakashan), who belong to the Nootka branch. Head flattening is not universal among them, but when it is done the method is similar to that of the Songish. The child is laced up in its cradle, and when well secured a padding of bark is placed upon its forehead, over which stiffer pieces of bark are laid, and then the head is firmly lashed down by fastenings attached to the sides of the cradle. This position is maintained by the infant for about a year, and at the end of that time the frontal region of the child's head is much flattened and distorted.

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33 Fir is also sometimes employed (see W. C. Grant, p. 298).
35 Hill-Tout, 1, pp. 116 ff.; cf. H. I. Smith 1, p. 130, and Oetelking, 4, who comments on the bilateral deformation.
36 Swan, 2, pp. 3, 19, etc.
As the use of deforming apparatus begins to die out, massage and moulding take its place. We have an interesting example of this in the case of the Makah. Nowadays the basis of their deformation is massage. The head of the child is rubbed three times a day, and the body also has its full share of manipulation. Much pride is taken in the progress of the distortion. There is a saying which is often repeated when a child is placed before the mirror to see how the head is getting on. It runs:—

"How high, how high my forehead is getting. This is the first time I have looked in the glass." 57

To the east of the Makah dwell the Klallam (Salishan), who are related to the Songish and who also possess the practice of head flattening, although it is now dying out. 58 A Klallam Indian told Gibbs that Dokwebul ordered it so that they might be handsome, and at one time the custom extended from Milbank Sound in the north as far as the Coquille River in the south. 59

The Klallam cradle is usually a trough of cedar made by the father or grandfather of the child before or after its birth. Along each of the two sides four holes are drilled, whilst on each side of the top end are a couple of holes for the thongs which are to secure the head-deforming pad. The thongs securing the body are tied diagonally across the child, and one at the bottom is brought around the feet and secures them to the bottom end of the cradle. During the early years of its life, when the child is still helpless, it remains the greater part of the day upon the board, although the arms are sometimes freed. A certain amount of flattening is looked upon as a necessary sign of social distinction, although the flattening is not so extreme among the Klallam as among some of the other people of the North-West. Slaves are not permitted to exercise this privilege on their children, but if a man from the upper class should marry a female slave, then the mother or grandmother of the man would see that his children’s heads were flattened, but in spite of this outward sign, it would always be known that the children had slave blood. They make fun of people who have round heads, saying that the heads look like rocks. The process of deformation is carried

57 Densmore, pp. 565-566. 58 Bells, p. 656. 59 Gibbs, p. 211.
A Pueblo Cliff-dweller's Skull.
out somewhat as follows. After birth a pad of cedar wood is tied to the forehead of the child. It is usually about six inches long and from three and a half to four inches wide. A flat stone is folded inside it, and on the top is laid another similar pad without a stone. The whole is tied in position by horizontal thongs of buckskin, which pass through the holes in the sides of the cradle. It is also secured vertically by a thong which is fastened to some cross-lacing at its lower edge, and then is passed through the holes in the upper end of the cradle. This is done in order to prevent the child from being smothered by the pad slipping on to its face. The pad with the stone in it is usually only employed for about two weeks. Then the stone is taken out and the pad alone used for about a month longer. A few old women are credited with the knowledge as to how to apply it and as to the amount of pressure which should be employed. Finally, after the main pad is removed a strip of cedar bark is laid upon the forehead.\textsuperscript{49}

Again, the same practice is found among the Cowichan\textsuperscript{46} and the Klikitat (Shahaptian) Indians who live north of the Columbia River. Townsend has reported upon what he calls the “mashing in of the whole front of the skull” amongst these people. A chief told him that he had tried to abolish the practice but without success. It was considered a degradation to possess a normal round head, and non-deformed people were treated with indifference and disdain as unworthy of a place among them.\textsuperscript{42} The same custom, although to a more limited extent, prevailed among the early inhabitants of the Yakima Valley. Here skulls show an antero-posterior deformation, and accompanying it certain specimens exhibited a depression in the antero-parietal region.\textsuperscript{47} Similar practices have been noticed among the Suquamish (Salish) on the west side of Puget Sound. Among them a band of material was laid across the child’s forehead and secured there by thongs fastened to the bottom of the cradle; another pad was then tied across the top of the head, a little below the coronal suture, to prevent the pressure from forcing the head in that direction. The main effect was to cause the parietales to recede and the occiput to be flattened, whilst compensation took place laterally.\textsuperscript{48}

\textsuperscript{46} Gunther, pp. 235-237.
\textsuperscript{47} Townsend, p. 174.
\textsuperscript{48} Hill-Tout, 3, p. 39.
\textsuperscript{49} See Hill-Tout, 2, and Boss, 3, p. 647.
\textsuperscript{42} H. I. Smith, 2, p. 105.
We will now pass northward and view the custom as it obtained among people of the Central Group, as for example the Nootka (Wakashan), the Kwakiutl (Wakashan), and others. We will take the Nootka first, as they are representative of the class of tribes who at one time practised a severe form of artificial cranial deformation. These peoples extended from Cape Cook on the north to Port San Juan, and may be said to have as their centre Vancouver Island. When Lieutenant John Meares visited Vancouver Island at the end of the eighteenth century, and by his discoveries nearly precipitated war with Spain, he remarked with astonishment the condition of the heads of the Indians of Nootka Sound. They were compressed into a cylindrical or sugar-loaf form, the heads of the children being bound round with a kind of filet which came down almost over the eyes. In spite of this strange headdress the children did not, according to Meares, appear to suffer, although it was obvious that the bandages were very tight. In some cases people had their ears and noses pierced, and the lobes, weighted by ornaments, sometimes hung almost to their shoulders. The nasal septum also was occasionally perforated. There are strange tales told among the Nootka Indians. Long ago, it is said, a mysterious stranger came sailing up in a copper canoe with copper paddles and the shine of copper everywhere. He said that he was a Sky Being, and the natives are accustomed still to make images which are said to represent him. What he did to the Nootka is not told, nor whether he brought them this strange custom, so all we can do is to study the practice as we find it and try to obtain clues as to its origin from its use. José Espinosa y Tello, or whoever it was who told the story of the voyage of the schooners "Sutil" and "Mexicana" in 1792, also noticed the Nootka and their curious heads. He speaks of their skulls as shaped like pyramids, and states that it is doubtless caused by the method of treating their children. As soon as the infants are born and before they are placed in their oblong, box-like cradles, their heads are fashioned to shape by means of strong ligatures which reached down over their foreheads almost as far as their eyes. It does not appear, the writer avers, to cause any ill-effects, although he thinks it may to a

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44 Meares, pp. 249-253; 270.
small extent cause the brows to rise and alter the horizontal position of the eyes (cf. Pl. XXXII). 46

By intermixture with the tribes on the mainland the Nootka seem to have adopted at times the flattening deformation we have observed among the Chinook. 47 At all events, Scouler, while describing the deforming process among this people, says that immediately after birth the child is placed in a sort of box or cradle in which there is a small cushion to support the nape of the neck. The occipital region rests on the flat board which forms the back of the cradle, and a piece of plank attached to the top of the board by thong hinges falls obliquely over the forehead of the child. Both the cradle and the attachment are carried by the mother wherever she goes, and pressure continues till the child is able to walk. 48 Macdonald reports the same method in 1863. At the birth of a child it is placed, he states, in a wooden trough scooped out of a log (cf. Pl. XXXI). It is flat at the bottom and raised at the place where the nape of the infant's neck is destined to lie. A flat stone, 49 secured by twisted bark or some other contrivance, is laid on the forehead, and this is left in position until the child can walk. 50 Sproat has the same story to tell five years later, and he says that the Nootka are proud of their flattened foreheads, thinking that they give them health and strength. 51 As the years went by the custom seems to have begun to die out. John Jewitt, who spent two years as a prisoner among the Indians of Nootka Sound, does not appear to mention the custom, although he speaks of nose ornaments and labrets. 52 From the Nootka to the Kwakiutl is an easy stage. These people, who comprise the Kosimo, the Quatsino and many others, live on the northern part of Vancouver Island and also on the adjacent mainland. 53 Amongst this family only a certain number of the branches practise cranial distortion. 54 Mayne calls the method by which

46 See Relación del Viaje, &c., p. 124. For this expedition see Greenhow, pp. 122, 131, and Mozinho Suarez de Figueroa, p. 5, who gives a very similar account.
52 Jewitt, p. 114. 53 Shotridge, p. 72.
54 Boas, 2, p. 31. Even amongst the Nootka the custom does not appear to have been universal. See Bancroft, vol. I, p. 180.
they deform their heads very disgusting, the skull having a
squashed, elongated appearance which nearly made him sick.
In one case, which he describes, a woman had eighteen inches
of solid flesh and bone towering above her eyes before her head
began to slope backwards. J. K. Lord also made a number
of interesting observations concerning these people towards
1858, when he served on the Boundary Commission as
naturalist. The coffins, which he saw bound round and round
with the inner bark of the cedar and placed high up in the
pine trees, reminded him of Egyptian mummy cases, and
the deformed skulls filled him with astonishment. In one
case he noticed a freshly severed head dangling from a high
pole. "It looked in shape like a sugar-loaf," he writes,
"the apex of the skull terminating in a sharp point"
(see Pl. XXXV).  

On inquiry he learnt that it was the head of a chief who
had been captured and executed by some of the Indians of
Beaver Harbour, and subsequently he was able to secure the
skull and send it to the British Museum (Nr. E. 7., 62. 6. 22. 1)
where it now rests. Jacobsen graphically describes the pro-
cess of deformation. While speaking of the Koskimo, he says
that the heads of the children, and especially of the girls are
pressed so tightly by means of a peculiar kind of ligature, that
little by little the heads assume the shape of sugar-loaves.
The pressure is often so great that the noses of the children
who submit to it are constantly bleeding. Testimony as to
the strong pressure is confirmed by Boas, who points out that
in the south-east the pressure was not so extreme, but that
women were more markedly deformed than men, the sugar-
loaf form being essentially a feature of the more northerly
Kwakiutl. Those to the south have, it is said, been influenced
by the custom of deformation as it occurs in other tribes.

Some of the photographs taken from living representa-
tives of the Kwakiutl during the Jesup North Pacific Expedi-
tion and here reproduced are very striking. Thus Pl. XXXVII b

60 Boas, 5, p. 457: Hrdlička, 3
PLATE XXXVII.

A Kwakiutl Woman.

A Kwakiutl Woman.

Kwakiutl Types
and c which give a lateral view of the head of a Koskimo woman are excellent examples of the cuneiform type of head of which we have heard so much and the photograph taken from in front (Pl. XXXVII, a.) gives a good idea of the upward slope of the head from the eyes which so disgusted Mayne. A cast (x. 197) of a similarly shaped skull can be seen in the Royal Scottish Museum in Edinburgh.

Mr. George Hunt during his inquiries into the social and domestic life of the Kwakiutl obtained some detailed information on their practice of cranial deformation. He reports that after the child is born the midwife wipes it with soft, yellow, cedar bark, and when it is dry she takes a kelp bottle containing some oil of silver perch, opens it and pours a little of the oil into the palm of her right hand. With this she rubs the body, face and head of the child and does not cease her labours until the whole of the child is covered with the oil. Then she takes a medium sized piece of kelp, covers it with the same kind of oil and then puts it around the head of the child just above the ears. The strip is two finger-widths broad and is long enough to go four times round the head. After this is finished she takes the cradle and lays the child in it. A small cushion of cedar bark is put at either side of the infant's face to make it round and another thicker bundle is put on its forehead and this pad is called the "cedar bark head presser." Under the presser a little pad of wool is placed and the whole apparatus is fastened down to the forehead of the babe by means of hair which passes through holes made in the upper end of the cradle and is there secured. After about four days have elapsed the kelp bandage is removed and the head of the child again oiled. Oil is also put on the bandage which is replaced and tied tightly on to the forehead of the child, who is put back into its cradle. If the child is a girl, a good-looking mother of twin children is sought out, and she is requested to come to the house where the baby is being deformed in order that the bandage may be removed for the second time. This event occurs after eight days have passed. The child is then washed with urine and water, and after this operation is completed the face of the infant is pressed and moulded. The region above the eyebrows is first attended to, and after that come the sides of the nose and then the whole surface of the face. This process is important and is commonly called "putting the face of the child into shape."
Then the body and head of the child are again oiled and the bandages replaced. Every eight days the kelp band is taken off and then replaced after the head has been oiled. This is continued for four moons, and then it is stopped and the kelp band is laid carefully away in the box of cedar wood together with other of the child's belongings, which will only be taken out when the child has attained the age of ten months. In some tribes the bandage is kept on for twelve days, and when the child is a boy, then the bandage is kept on for ten days, and is only finally taken off after eight months.\footnote{G. Hunt in Boas, 6, pp. 657-671. For further information on Kwakiutl cradles see Newcombe, p. 39 and G. M. Dawson, pp. 14-15 of reprint from TRSC.}

From the above it will be observed that in certain sections of the Kwakiutl two kinds of head deformation can be distinguished. Not only is the head bound round with bandages as is the custom among the Mangbetu of Central Africa, the natives of South-West Malekula and of Vancouver Island, but also head pressure is used with a distinctive apparatus which recalls similar apparatus both in Indonesia and on the North West Coast. Evidently the kelp band exercises more influence than the "head presser." Kwakiutl heads are commonly cone-shaped, although the flat retreating foreheads are very apparent in a number of cases.\footnote{Dorsey has noticed the great number of Wurmian bones in Kwakiutl deformed skulls, especially around the coronal suture, and it is possible that the process of deformation has been a factor in the causation of these (see Dorsey, 2).}

It does not seem that the practice of head deformation among the North West Coast tribes affects their mental faculties. Gray is of the opinion that the tribes who flatten their skulls were inferior in intellect to those which remain normal, and indeed he ascribes certain vicious practices to the habit, but I do not think that there is sufficient evidence to sustain his thesis, which was revived by Posnansky many years later with reference to certain Peruvian peoples\footnote{See Gray, W. H., p. 147: Posnansky, 4.} and which, as we have already seen, was held by certain French medical men in cases of modern French deformation.

Although the early authorities were of the opinion that deforming the head had no noticeable effect upon the intellectual faculties of those practising it, the theory that the
alleged frequency of apoplexy may have had some connection with the cranial deformity was as we have seen, raised as early as 1829 by Seouler and repeated in 1860 by Domenech. I am not aware that there is any valid evidence for this idea, and I do not know if the frequency of apoplexy in other peoples addicted to the same practice has ever been recorded. At any rate, I do not remember seeing any reference to the subject in those authors whom I have taken the opportunity of consulting.

In the course of the above survey we have seen how the practice of the artificial deformation of the head is distributed on the North West Pacific Coast of America. From the Alsea (Yakonan) in the south who practised a fronto-occipital deformation to the Chimmesyana family in the north, various types and degrees of distortion are found, the one common factor apparently being that the deformation is a privilege not a punishment; a mark of nobility not of servility. In the diverse cultures of the North West Coast this fact stands out as one which must be remembered when any explanation is offered of this amazing custom. It is not, as we have seen, peculiar to this part of America; it falls into line with the same idea from the Caucasus to Asia and round the world.

Before leaving the west coast it may be found convenient if we glance at the custom further south as it occurs among certain of the tribes in California, and try to determine how far their practices resemble those of the more northerly region. Generally speaking the Indians of California are in many respects similar to those of the Pacific Coast to the north, being brachycephalic and short in stature, although further to the south they are inclined to be taller and more swarthly. The purer linguistic families of California are extremely diversified as to language, yet their culture does not appear to present any great number of striking variations. With the exception of basketry, the material arts are not developed, and totemism is unknown. Like the Australians, many of their religious ceremonies can be called complicated if we compare them with their material stage of culture, but borrowing has naturally occurred in the north where contact with the North West Pacific Coast has been established. The

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65 Farrand, 1, p. 240.
66 Cf. Kroeber, 1.
practice of artificial cranial deformation is not common among these tribes; indeed it only occurs but rarely. Hrdlička, in an examination of a mixed lot of fifty skulls from California only came across four slight cases of occipital cradle-board flattening, but it is possible that some of the older specimens of Modoc crania were not amongst them.67

The Modoc (Lutuanian) form a southerly division of that stock in south-west Oregon and California. This tribe, assisted by the Klamath, with whom there is some linguistic affinity, traded with the Chinook of the Columbia River, and there can be little doubt borrowing has had some influence on their culture. Two kinds of cradles are used: that of the sitting type where the child’s feet remain unimpeded and where there is no pressure on the occiput; and the board type which may or may not be ancient among the Modoc. As regards head deformation the methods are mixed, do not appear to have any definite meaning and are not, as far as I have been able to discover, associated with the idea of nobility. Circular bandages wound round the head to produce upward elongation are used to a certain extent, and Kroeber thinks that this form undoubtedly was derived from the north and east.68 Other methods are also found. Certain of the older inhabitants show indications of frontal flattening above the eyebrows and for some distance behind them. Occipital flattening can also be discerned, and in a few cases the antero-posterior flattening is so marked that a cuneiform skull is produced. Boards and strips of buck skin for binding the head are used but it is clear that the custom is fast dying out.69

Amongst the Modoc, as we have said attempts are made to elongate the head upwards, but the other branch of the Lutuanian family, the Klamath of south-west Oregon and especially the more northerly section regard the question from a different angle. The influence of the north seems here to have made itself felt, as these people are very careful to practise frontal deformation as they consider that an undeformed head is the mark of a slave. The distortion is effected usually by a bag of water-lily seeds tied over the child’s head and fastened securely thereon, the ends of the constricting bandage being fastened to the cradle-board.70

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67 Hrdlička, 5, p. 53.
68 Kroeber, 2, p. 326.
69 Barrett, pp. 257-258.
70 Hrdlička, 4, pp. 360 ff.
As we turn eastward intentional deformation fades away and the influence of the cradle-board alone becomes apparent. In the south-western states and northern Mexico among some tribes such as the Apache (Athapascan), Navaho (Athapascan), Mohave and Yuma (Yuman) and some of the Pueblo Indians, the cradle-board is in use and children are strapped so securely down that all movement is somewhat limited. Here infants remain for long periods of time, and are only removed for the purposes of washing. \(^7\)

Thus, among the Mohave and Navaho occipital flattening is common, especially so amongst the former where cases of hyperbrachycephaly are not at all unusual and are probably due to the posterior distortion. \(^8\) In the older graves ancient skulls appear occasionally to exhibit deformations which may have been due to conscious intention, but in many of them the distortion observed may possibly have been posthumous, except that it is probable that the cradle-board may have been the active factor in a few instances. In the newer stone graves in South Arizona this occipital flattening was alone apparent, the skulls themselves being brachycephalic. \(^9\)

This cradle-board flattening may have been that which Father James Gravier mentions when he says, in speaking of the Tunica (Tonikan) of the lower Mississippi, that “C'est dès le berceau que les mères ont le soin de mettre en presse la teste de leurs enfants pour la rendre plate.” \(^10\) This illustrates how cradle-board deformation was spread across the Continent, and it is only here and there that traces of the more complicated intentional forms are discovered. Thus in Missouri a case of this kind has been recorded. Here in 1919, near Lexington, a skull was discovered which had all the marks of that distortion which we associate with the circular constriction by bandages. Marks on the cranium itself strongly suggested the application of such a bandage passing over the frontal bone and under the occiput. Moderate frontal flattening was present, and a circular frontal depression together with a secondary broad post-coronal depression and also a flattening of the lower part of the occipital bone. In

\(^7\) Hrdlička, 6, pp. 79-84.  
\(^8\) Kate, 3, pp. 141-142; Hrdlička, 1, p. 349; Shufeldt: Sir W. Turner, 3.  
\(^9\) See Cushing, pp. 29-30.  
1923 another cranium, probably female, was found near Noel, which exhibited similar traces. The dates of these skulls are not certain, but Hrdlička thinks it is possible that they are prior to the historic Indians of Missouri.76 Again, among the skeletons found in the stone graves of Tennessee, many cases have been noted of occipital flattening, but the confusion of form rather suggests unequal cradle-board pressure rather than the effects of intention. Frontal flattening was rare; in one series of excavations two cases only showed traces.76 Moreover, many of the Tennessee crania investigated by R. G. Fuller showed that accidental occipital deformation does not appear to affect dolichocephalic skulls to any great extent and brachycephalic skulls least of all.77 In Illinois skulls have been found in the neighbourhood of Naples which exhibit fronto-occipital deformation, but the evidence does not appear to me sufficiently definite to determine the conscious or unconscious character of the distortion.78 Again, in Ohio, where deformed skulls are found both in the stone graves and mound building area, it is very difficult to say if the deformations observed are intentional. Flattened occiputs are common, and in the important Turner group of earthworks in Hamilton County, where some 36,000 pearls were discovered, very few cases of artificial deformation were observed. In one series five out of twenty-one crania exhibited slight occipital flattening, and in another series of thirteen, one showed medium occipital compression and three slight.79 At Madisonville, where occur the remains of a post-Columbian site, furnishing stone, copper and iron objects, pottery and beads, has been found a number of skulls, of which 26 per cent. of the 2 crania and 17 per cent. of the 2 crania were deformed by occipital flattening. Hooton, in a series of tables, has shown in a striking way the effect on the cranial indices of the degrees of deformation. Thus:—

76 See Hrdlička, 16, p. 270, who says that this type of deformation is only found elsewhere in America in Vancouver Island. Cf. Hrdlička, 15, p. 400, and G. Retzius, 1, who discusses an interesting example from Fort Essington, British Columbia.
76 Carr, pp. 363-365; Putnam, p. 391.
77 See Hooton, p. 89.
78 Henderson, p. 707.
CRANIAL DEFORMATION AMONGST THE AMERICAN INDIANS

CRANIAL INDICES OF UNDEFORMED CRANIA.

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WITH MEDIUM OR PRONOUNCED DEFORMATION.

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WITH SLIGHT DEFORMATION.

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<td>33</td>
<td>92.31</td>
<td>76.24</td>
<td>83.03</td>
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<tr>
<td>♀ Nr.</td>
<td>1*</td>
<td>1</td>
<td>18</td>
<td>20</td>
<td>88.62</td>
<td>70.39</td>
<td>84.25</td>
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* This cranium had slight flattening in the lambdoidal region which increased its length.

CRANIAL INDICES OF ALL CRANIA.

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<td>37</td>
<td>52</td>
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<td>29</td>
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<td>62</td>
<td>81</td>
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It will be seen from the above tables how the C.I. rises in proportion to the amount of deformation effected, showing that brachycephaly becomes more marked.

Although it seems clear that the cradle-board is not, generally at least, an intentional means of deforming the head, it would appear that some tribes do keep the child strapped to the board with the intention of influencing the bodily changes. Thus a Fox (Algonquian) Indian woman said that she followed the advice of keeping the child for long periods in the cradle, as otherwise it might grow up with a long head or be hump-backed or have bow legs. She added also that children were thus confined for nearly one year.  

Passing on to the more eastern States we find the same cradle-board occipital flattening in the Indian skulls from Minisink, three miles below Montague, Sussex County, New Jersey. In a burial ground thirty-four adult skeletons were discovered at ages ranging from 24 to 70 years. The majority of both sexes showed occipital flatness and some, it is said, exhibited indications of frontal compression. At Trenton, N.J., only two out of twenty-five crania showed slight occipital flattening, a fact which may suggest influence from Kentucky and Tennessee.

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60 Hooton, p. 86.  
61 Michelson, p. 319.  
62 Hrdlička, 11, p. 15.  
63 Hrdlička, 11, p. 16: Hrdlička, 2.
Before we examine the evidence from the Southern States it may be of interest if we turn northward and glance at what seems like an attempt at artificial deformation, although the effect upon the skull cannot be great, as I have never heard of any authority on the Eskimo maintaining that signs of artificial distortion were common, or even known, upon Eskimo crania. In the Ungava district it is reported that the Eskimo children are forced to wear very tight caps, which are not removed until the natural growth of the head bursts the material of which the cap is composed. I have not seen any attempts at confirming this report, and until further evidence is collected it will be more profitable for us to turn southward again to the Southern and Gulf States.

These States from Texas to Georgia were formerly peopled mainly by tribes of Muskogean stock, and although it would seem that in spite of great differences, the language of the important Natchez people belongs to this group. This tribe possessed many remarkable features. Their ancestors, it is said, were supposed to come from the direction of Mexico, and when the Spaniards arrived they found the people ruled by nobles who claimed sun descent. They possessed great skill in artistic work, made excellent pottery and built mounds upon which to erect their temples. Their religious ritual was highly organized and they had an elaborate system of sun worship. Society was organized on a dual basis, being divided into exogamous classes of nobles and commoners. From the earliest records the Natchez have been reported as deforming the heads of their children by flattening the frontal region. Similar methods are found along the Gulf States among such tribes as the Choctaw (Muskogean), the Waxhaw (Siouan), and the Catawba (Siouan). A vivid account of cranial deformation among the Waxhaw was published by Lawson in 1709. He says that these Indians lay the hinder part of their children's heads upon bags of sand such as engravers use to support their plates. They use a roll also which is placed

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84 J. M. Turner, p. 391: cf. D. King's account of how Eskimo skulls have become symmetrical (p. 48).
85 Cf. Parry, p. 168, &c.
86 See Morton, 1, p. 159, Pls. XX and XXI, and cf. Berthoud, pp. 4, 5. Meigs, 1, describes the Natchez skull as a flattened cone; see p. 62, nrs. 102, 1106: cf. Imbelloni, 5.
upon the child's forehead, the supporting surface for the infant being a flat board upon which it is tied. It is said that this method makes the limbs of the children straight as an arrow and is an orthopaedic invention of great value. As the child's head is flattened its eyes "stand a prodigious way asunder," and the hair hangs over the forehead in a manner, which to Lawson, seemed like the eaves of a house and appeared "very frightful." On inquiry the Indians stated that through the deformation their sight was much strengthened and they were able, thereby, better to discern game at a distance during the chase; an explanation which is reminiscent of the statement we have already heard given in Central America. 87 Lafitau also, in treating of certain of the tribes of Louisiana, describes how they flatten their foreheads, the tops of their heads terminating in points making their skulls look like bishops' mitres. Their method of deformation he describes as follows: A hole appears to have been bored in part of the cradle-board in which the child's head was laid. On the forehead a lump of clay was placed and tied down very tightly. Under the pressure the children suffered extremely during the early stages of the operation. Their faces turned black and whitish viscous fluid exudes from nose, eyes and ears. 88

Similarly, Butel-Dumont (1753), in speaking of certain tribes in Louisiana says that when children are born they take care to crush and flatten the upper part of the forehead with a board (planche) so that they might be able to bear loads better, an explanation which we have already heard in Central America. 89 The anonymous author of the Mémoire sur la Louisiane ou le Mississipi which was published in the middle of the eighteenth century describes the men and women of that region in rather a similar manner to Lafitau. Swanton, who quotes the book, considers it a reliable account of the material with which it deals. The people of the Mississippi, says the Memoir, have their heads pointed and almost in the shape of a mitre. They are not born like this; it is a charm which is bestowed upon them in early life. It is almost beyond belief what a mother does to the head of her child in order to force it to assume this shape. First she lays the child in a

87 Lawson, pp. 33-34.
cradle which is nothing more than a piece of board on which is spread a strip of hide. On one end of this board is a hole where the head is placed, and when in position this part is lower than the rest. The child is laid down naked upon this board and its head is pushed against the hole whilst under the forehead and under a part of the head masses of clay are applied which are forcibly pressed against the skull by means of two boards. The child cries and turns black, and when the mother presses on its forehead a white slimy fluid comes out of its nose and ears. Thus it sleeps every night until its head has taken on the desired shape, and it is only with the coming of the white man that the natives have begun to discontinue this custom.\(^{30}\)

The Choctaw (Muskogean) Indians are said actually to have taken their name from the Spanish cható on account of their flattened skulls. Adair, who suffered from the delusion as to the Jewish origin of the American Indians, says that these tribes flatten their heads with bags of sand on the forehead.\(^{31}\) Bartram also, who recorded his travels through Carolina, Georgia and East and West Florida in 1791, notes that among the Choctaw the child's head rests in a hole in its wooden cradle fashioned like a brick mould. On its forehead a bag of sand was placed in order to flatten it,\(^{32}\) Schoolcraft noting many years later that male infants only were subjected to it,\(^{33}\) and adding that some of the Creek tribes possess the same custom.\(^{34}\)

So also in the Mississippi mounds (Coahoma County), skulls have been discovered exhibiting both frontal and occipital compression, in this respect closely resembling other specimens found in the St. Francis River region of Arkansas. The average C.I. of the Coahoma series was 90.4, the maximum index being 97.5 and the minimum 84.8.\(^{35}\) At one time it was believed that artificial cranial deformation had not been

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\(^{31}\) Adair, p. 8. The custom seems to have died out early. See Cushman, p. 234.

\(^{32}\) Barton, p. 517: cf. Heriot, p. 348 and Volney, p. 411, who describes the Choctaw head as a truncated pyramid. H. C. Benson does not appear to notice the practice.


\(^{34}\) Ib., vol. II, p. 325.

\(^{35}\) Farabee, 1, in Peabody, p. 52.
practised in Florida. But there exists some evidence, and that as early as 1724, that a skull found by V. H. Riecke in "Hond-eyland" was artificially deformed. It was long and narrow, with flattened and retreating forehead and the top pointed or cuneiform whilst the occiput is described as protuberant. I think the Hond Eyland must be the island off the south-coast of Florida, but however that may be, another specimen thought by Kneeland to be either Choctaw or Natchez, was found eight miles above Apalachicola, in a kitchen midden to the west of Dog Island. Of late years, however, the evidence has been accumulating that in various parts of the peninsula fronto-occipital flattening was at one time practised. In a number of cases the frontal pressure had not been by any means extreme although it certainly existed. According to Hrdlička both the degree and frequency of the deformation differ as regards locality, seeming to diminish from north to south. The distortion is similar to examples found in Georgia, Alabama, Mississippi, Louisiana and Arkansas, and an example showing occipital compression is seen in Pl. XXXVIII. The centre of distribution seems to have been around the Alabama-Mississippi-Tennessee area, and as we have seen, similar types are known in Yucatan and the West Indies. In South America, as we shall have occasion to observe in a later place, the same practice is found mainly on the upper part of the western coast.

Before we sum up the provisional conclusions to which we have arrived after our survey of cranial deformation in North America, it may perhaps be of interest if we say a few words on the Aleutian Islands. The culture of the North West Coast must be considered to have at least some relation with the cultures of north-eastern Asia whether influences from other quarters are granted or not. We cannot enter here into a discussion of the culture of Aleutian Islands. Our attention must be strictly confined to the question of cranial deformation. Mr. Henry Balfour is of the opinion that some evidence exists as to the practice of head deformation amongst the people of these Islands. I have not, however, succeeded in convincing myself that this is correct. Martinet quotes Pinart as saying that in Alaska both elongated and laterally

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56 Winslow, p. 323. 57 Kneeland. 58 Hrdlička, 14, pp. 83 ff.
flattened skulls have been found, but I am not able to discover any reliable references to the Aleuts. Aleutian mummies have been described by such authors as Pinart and Macleod, but neither describes any deformations, although Pinart elsewhere, in mentioning the head of an Aleut, says that the head is large compared with the body and has a high and straight forehead. Baer, who has discussed a series of alleged Aleutian crania, does not appear to have reported any abnormality, but Holmberg states that among the people of Kadiak the occiputs showed flattening, but he does not say that this was due to artificial causes and I am unable to find any further references in such works as those by the early Russian traders and travellers who give a good deal of curious information about these people.

In Alaska, however, the presence of deformed skulls has been reported by D. S. Lamb, who read extracts from a paper by G. A. Otis, which was said to have been contributed by Otis to the National Academy of Sciences in Washington in 1870. I have not found this paper by Otis in the publications of the National Academy, neither have I found it elsewhere, and in a long obituary notice of Dr. Otis, which was published in 1881, there is no mention of any such article.

I take the liberty therefore of quoting from the extracts by Lamb, who may have seen the paper by Otis in manuscript. Otis was at one time the curator of the Army Medical Museum, and while there he states that since the acquisition of Alaska by the United States it has been discovered that cranial deformation through circular constriction was common in many of the Alaskan Islands, and six specimens of such deformed skulls have been received by him. A further selection of skulls are said to have been brought back to the

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99 Martinet, p. 584.
100 Pinart, 2.
101 Macleod, p. 143.
102 Pinart, 1, p. 161.
103 Baer, 1, pp. 263-267. Dall also, who examined 20 Aleut crania, notes no deformation (see Dall, 2, pp. 69-70), and in his account of some Aleut mummies, of which one was apparently a chief, he omits to mention any fact which would lead us to suppose that the skull was of abnormal shape (see Dall, 1). Cf. Quatrefages de Bréau and Hamy, pp. 425-426. On the other hand Montandon, in an account of four Aleutian crania, notes one as showing an Aymara (bandage) type of deformation (see Montandon, p. 96).
104 Holmberg, p. 360.
105 See W., J.J.
106 Lamb, p. 627.
Occipital Flattening in a Florida Skull.
Sandwich Islands by whalers returning from the Okhotsk Sea, but Otis apparently gave no details as to these finds, and I am not aware that full details have been published concerning them.

From the above survey of cranial deformation in North America it will be seen that there are large tracts of country inhabited by important families where the custom does not exist. It will be seen also how wide is the distribution of the cradle-board.

Amongst the Algonquian and many of the Athapascan peoples, including the great majority of the Plains Indians (Siouan), the custom is absent. If we glance at a map of North and Central America we shall see that the whole of the Mexican area and that of the Greater Antilles form a region where it must be remembered the custom was at one time widely distributed. Many of the Southern Indians have undoubtedly derived at least a part of their culture from Mexico, and it is, I think, reasonable to suppose that the influence of Central America will be found, as investigation proceeds, to be much more extensive than is at present supposed. The fact that the Natchez, whose culture shows decided Central American influence, were settled near the lower Mississippi, suggests that influence may have extended northward up that river, and we must remember that skulls with circular constriction have been found as far north as Lexington, and there is no reason to suppose that discoveries in this direction have ceased.

With regard to the North West Pacific Coast culture, the problem of the origin of head deformation amongst them still remains obscure. We have the two most important forms (boards and bandages) distributed amongst them, and as we have seen, similar practices can also be traced among the Modoc and the Klamath north of latitude 40. Until a great deal more is known as to the origin and early movements of many of these peoples, I do not think that any satisfactory hypothesis can be advanced, and it would certainly be out of place in these notes to discuss the theories which have hitherto been proposed. All we can say with some degree of probability is that, judging from the methods employed and from their associations with class distinction, it would seem that these customs have been borrowed from without rather than evolved within.