

# Head Shape Configuration Over The Centuries

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It is common practice in plastic and maxillofacial surgery to analyze the morphology of the face according to various measurements of the craniofacial skeleton, used as guidelines to correct deformities or disproportions. Today, one could not conceive orthodontic treatments or jaw surgery without the use of cephalometry.

Before being used in medical practice, skull and facial analysis have a long history related to philosophy and art. Used initially to determine the beauty and the character related to particular facial features of a person, the analysis of the craniofacial skeleton progressively became a method for anatomists and physical anthropologists to describe human diversity.

## PHYSIOGNOMONY

The analysis of human facial features in relation to beauty, intelligence, and diseases has been a subject of debate since antiquity, sometimes in the quest for ideal facial proportions leading to canons of beauty, the most famous being the Greek sculptor's Polycleitus (c.450 BC.) One century later, Aristotle (384–322 BC) described in his *Physiognomica* the art of reading one's character from one's bodily features. He compared male and female bodies and faces to those of various animals: males look like brave lions because of their larger mouth, squarer face, large eyebrows, whereas women are more like shy panthers. Since these early writings considering the face as a reflection of the qualities of the soul of its owner, numerous treatises have attempted to define and measure the various features of the human face, giving rise to the famous *Gold Numbers* or the *Divine Proportions* published in 1509 by Fra Luca Pacioli.

These studies had 2 applications that were sometimes combined: an initiation for painters or sculptors and recognition of an individual's character and personality. Painters like Villard de Honnecourt (13th century) (Fig. 1), Pietro della Francesca (1412–1492) (Fig. 2), Leon Battista Alberti (*De la pintura*, 1435), Leonardo da Vinci, a good friend of Fra Luca Pacioli (Fig. 3), Albrecht Dürer (*Vier Bücher von menschlicher Porportion*, 1528) (Fig. 4), Pierre-Paul Rubens (*Théorie de la figure humaine*) (Fig. 5) have superimposed drawings of human faces with geometrical figures: circles, squares, rectangles, and triangles, adding sometimes a mensuration of the different parts. Following the physiognomic trend initiated by Aristotle, other philosophers and artists like Jean d'Indagine (*Chiromantia*, 1522), Giambattista Della Porta (*De humana physiognomia*, 1586), and Charles Le Brun (*Traité de géométrie physiognomonique*, 1671) (Fig. 6) have emphasized the links between animal and human features with their corresponding characters.

During the 18th Century, the Swiss clergymen Jean-Gaspard Lavater (1741–1801) devoted a great part of his life and most of his writings to what he called *The Physiognomy or the art to know the human beings according to their facial features*. Like della Porta, he draws similitudes between the face of individuals and animals, establishing a gradation starting from the most perfect profile, represented by the classical Greek statues, to the ugliest frog-like faces (Fig. 7). His objective was to create a true science of facial interpretation wherein beauty and ugliness are in exact relationship with moral beauty and depravity of men and women. As a man of faith, however, he refuted all links between animals and humans. Although criticized during his life for practicing a pseudoscience, he was also very admired by known philosophers and writers. Goethe, who was 8 years younger, was particularly interested by this possibility to create a practical psychology and offered him several portraits with commentaries of his own. He also wrote the chapter on skulls in one of Lavater's books. The friendship between the 2 men did not last because of their opposed religious beliefs.

## THE SCHOOL OF ANGLES

Since the middle of the 17th century, scientists, anatomists, and physicians also became interested in measuring the body and the craniofacial structures, one of the first being the German Johann Sigismund Elsholtz, who proposed a system whose purpose was to correlate bodily proportions and diseases. He invented a special ruler the *Anthropometron* for his calibrations. *Anthropometria, sive de mutua membrorum corporis humani proportione et naevorum harmonia libellus* was published in 1663. During the 18th century, the physician Louis Jean-Marie Daubenton (1716–1800), a collaborator of the French naturalist Buffon, studied the point of junction between the vertebral column and the cranium, which he called the *occipital foramen*, and noticed that it varies between the animal species, being more anterior or posterior, according to the tilting of the head and its relationship with bipedia or quadripedia.

The real starting point of what has been called the "school of angles," precursor of our modern cephalometry should be attributed to the Dutch surgeon and anatomist Petrus Camper, following his lectures on this subject in 1770 to the Amsterdam Drawing Academy. According to his new portraiture technique, an angle is formed

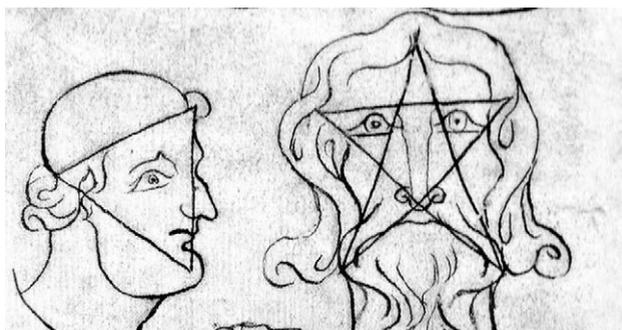


FIGURE 1. Villard de Honnecourt: *Head triangles*.

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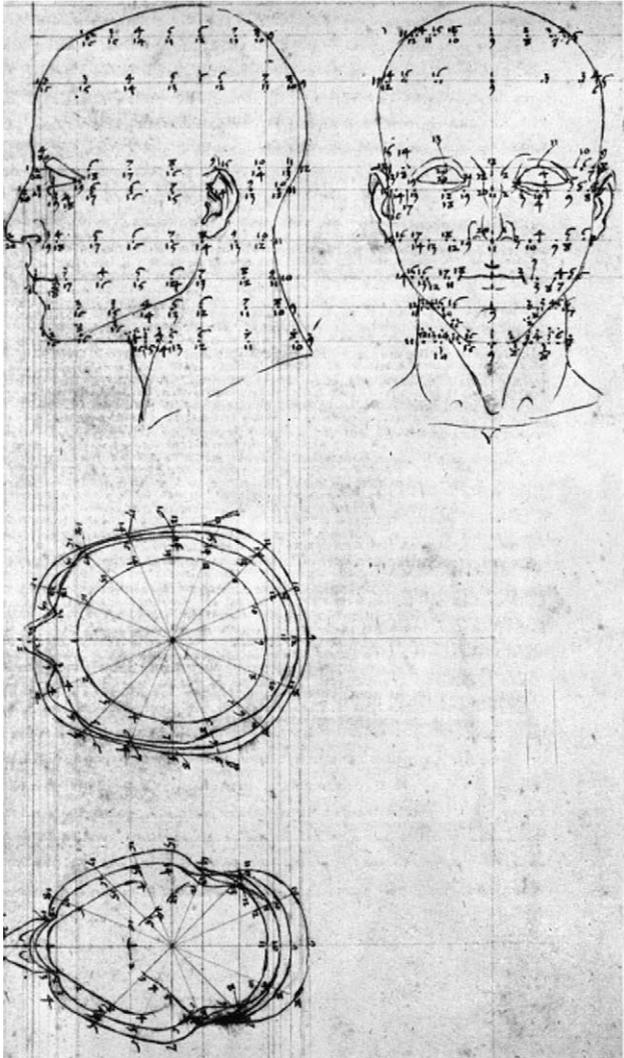


FIGURE 2. Pietro della Francesca: *Head measurements.*



FIGURE 3. Leonardo Da Vinci: *Grotesque heads.*

by 2 lines, from the advancing part of the maxilla to the most prominent part of the forehead (Fig. 8). Camper claimed that antique Greco-Roman statues presented an angle of 100 degree to 95degree, Europeans of 80 degree, Orientals of 70 degree, Black people of 70 degree, and the Orangutan of 42 to 58 degree. Without judgment on the intelligence of their owners, Camper claimed that, out of all human races, Africans were the most removed from the classical sense of ideal beauty.

“My main purpose is to consider the beauty of the parts of the human body, particularly the head. Nobody can deny that the heads of Apollo of the Belvedere, of the Venus of Medici and of the Laocoon are beautiful and would prefer them to our most beautiful individuals.”

“The facial angle allows not only to establish a distinction between skulls of various animal species, but also to trace a gradual line that results, in our view, from the reconciliation of the human varieties.”

Since this first description by Camper, numerous scientists and physicians have referred themselves to this and other angles, to

classify mankind according to the shape of their skull and facial structures with obvious prejudice. For example, Julien-Joseph Virey, a French physician, naturalist, and anthropologist, wrote in 1801 a book called *Histoire naturelle du genre humain ou recherche sur ses principes fondamentaux physiques et moraux*. Based on the facial angle, he distinguishes the different human types according to their craniofacial shape.

“The Celtic races have noble and proud figures, which can be measured by the facial angle. The more acute the angle, the face lengthens in a muzzle and shows an ignoble figure close to the beast; when the angle straightens, it takes a look of magnitude, nobility, and sublimity. Ugliness indicates all the physical and moral dissoluteness.”

### THE NORMA VERTICALIS

In 1795, Johann Friedrich Blumenbach, a German Professor of Medicine, often considered as the father of physical anthropology, came up with a new classification scheme. In his book, *On the Natural Variety of Mankind*, he divided humanity into 5 varieties.

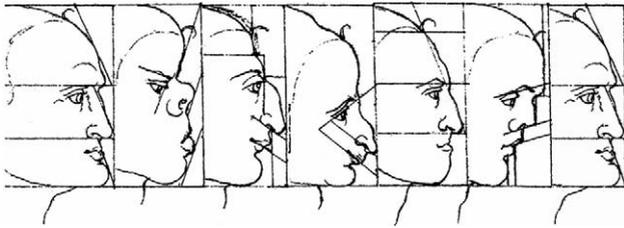


FIGURE 4. Albrecht Dürer: *Human proportions*.

He associated each with a particular geographic area—Negro (Africa), Mongolian (Asia), Malay (Southeast Asia), American Indian (America), and white (Europe). Blumenbach introduced the word *Caucasian* to describe the variety of mankind—the Georgian—that had originated on the southern slopes of Mount Caucasus. This was for him the most beautiful race. The other races represented degeneration from the original type, up to the further apart, the heads of Mongols and Negroes.

In his book *Decas Collectionis Sivaе Craniorum Diversarum Gentium*, he illustrated 40 skulls from various origins. By the end of his life, Blumenbach owned the greatest contemporary collection of human skulls (what he terms his “Golgotha”): 245 whole skulls and fragments and 2 mummies. Unlike Camper, Blumenbach measured skulls along several lines. Placing scores of skulls of individuals from around the world in a line and measuring the height of the foreheads, the size and angle of the maxillaries, the angle of the teeth, the eye sockets, the nasal bones, and also Camper’s facial

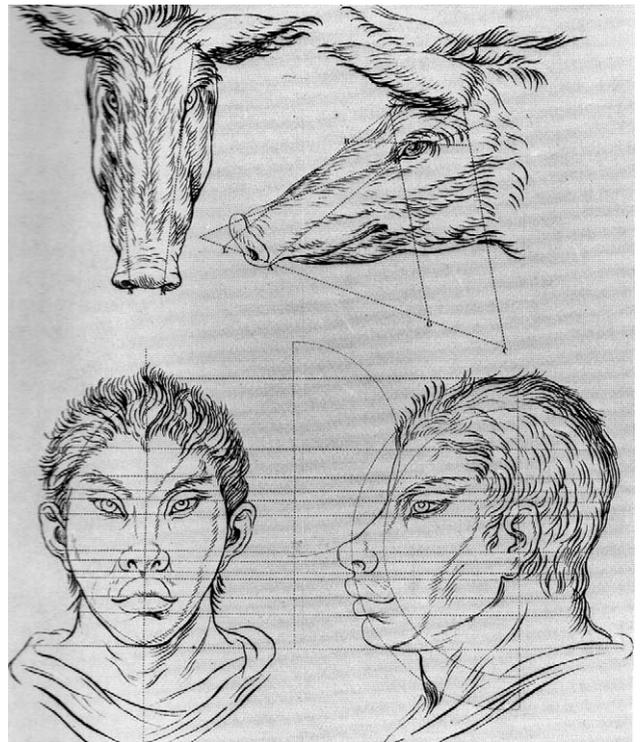


FIGURE 6. Charles Le Brun: *Geometric physiognomy*.

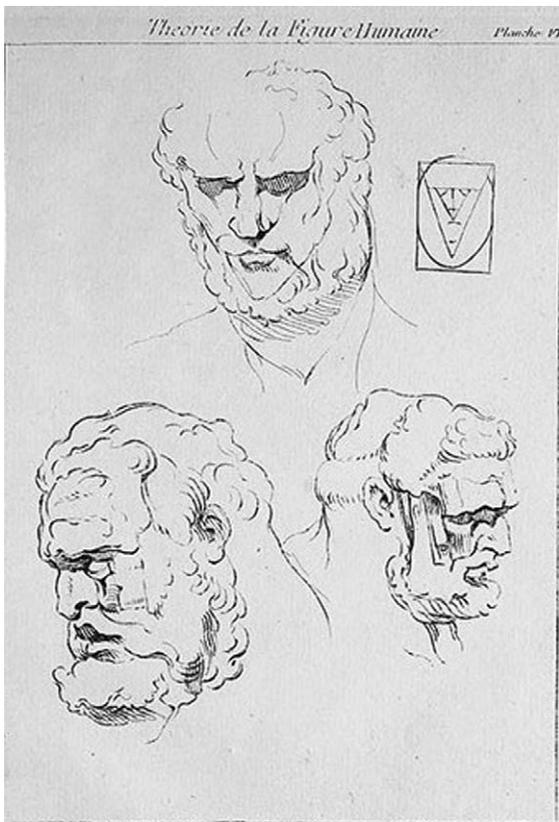


FIGURE 5. Pierre-Paul Rubens: *Theory of the human face*.

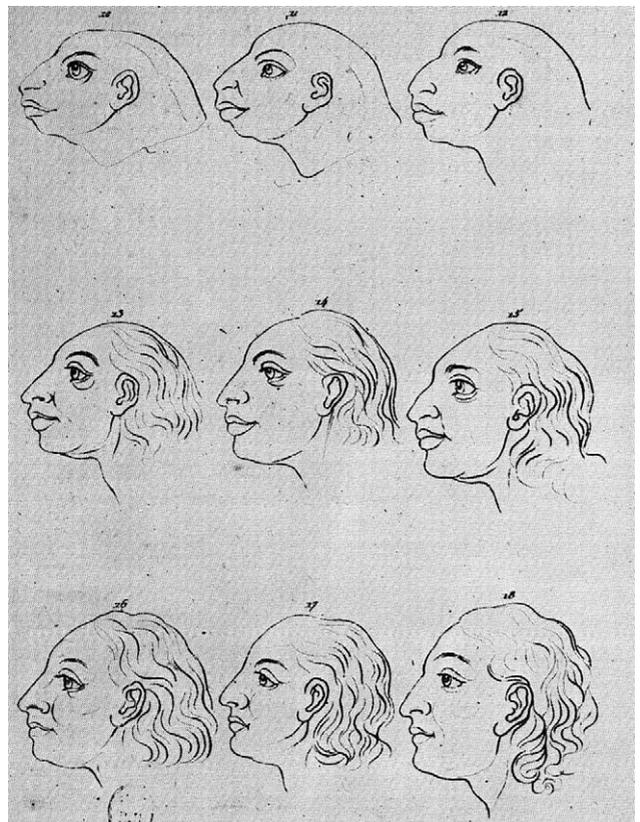


FIGURE 7. Johann-Gaspar Lavater: *From frogs to beautiful men*.

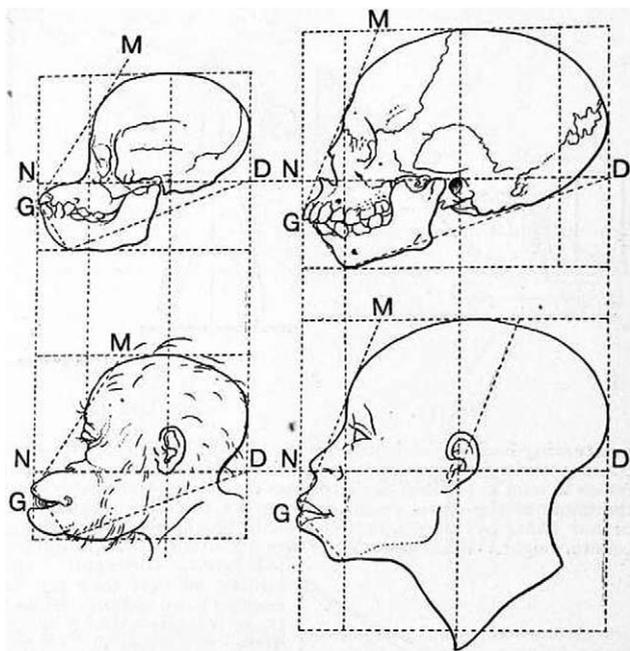


FIGURE 8. Petrus Camper: *The facial angles*.

angle in profile, Blumenbach produced what he called the *norma verticalis*, that is the view of the skulls from above (Fig. 9). A line is drawn at the maxillary level, allowing comparing the protrusion of the face in relation to the forehead in different skulls.

### PHRENOLOGY AND CRANIOSCOPY

The relationship between the osseous cranium and its content, the brain, led a few anatomists to deduce that a small cranial capacity signifies automatically a small brain and small intelligence. Franz Joseph Gall (1758–1828), a renowned Viennese physician and anatomist, has gone further in building a new theory according to which, intellectual, moral, and emotional faculties are located in the brain at particular sites. The exterior aspect of the cranium will therefore reflect the development of this or that capacity. He believed that the bumps and uneven geography of the human skull were caused by pressure exerted underneath from the brain. The brain was divided into sections that corresponded to certain behaviors and traits that he called fundamental faculties. There were 27 fundamental faculties, among them were: recollection of people, mechanical ability, talent for poetry, love of property, and even a murder instinct. Based on the surface of a person's skull, Gall could make assumptions about the person's fundamental faculties and therefore their character (Fig. 10). Although mocked by many of his contemporaries, Gall's methods, that he called cranioscopy, had an enormous success particularly among writers and teachers trying to find out the positive or the negative bumps of their pupils.

### THE CEPHALIC INDEX

Another type of skull measurement was determined by Anders Retzius, a Swedish professor of anatomy, initially to classify ancient human remains found in Europe. He classed skulls in 3 main categories: “dolichocephalic” (from the Greek *dolikhos*, long and thin), “brachycephalic” (short and broad), and “mesocephalic” (intermediate length and width). The cephalic or cranial index is the ratio of the maximum breadth to the maximum length of the skull, multiplied by 100. In his book *Om Formen af Nordboernes Cranier*

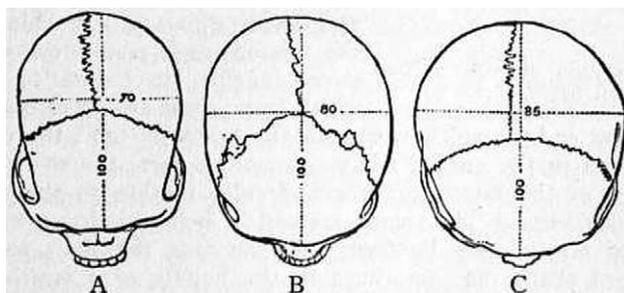


FIGURE 9. Johann Friedrich Blumenbach: *Norma verticalis*.

(1843), Retzius supposed that it was possible to establish the mental and moral capacities of a man, thanks to these measurements. For him, the dolichocephalic people that are the Nordic Whites were superior to the brachycephalic Blacks. Today, the cephalic index remains an important parameter for ultrasound biometry of the fetal head.

### FACIAL FORMS

Sir Charles Bell (1774–1842), best known for having described the so-called Bell palsy, has written several essays on the anatomy and philosophy of facial forms and expressions where he criticized Lavater, Camper, and Blumenbach, proposing a new method of analyzing the facial features for expressing beauty, underlying the importance of the relationship between the forms of the skull and the face as expressed by the various functions, such as the organs of mastication, speech, and expression.

“By this more accurate method of measuring the skull having been brought to observe distinctions not only in the cranium and bones of the face, but also in the face itself, and in the cranium independently of the face, I wished in the next place to consider more at large the varieties in the form of the face,

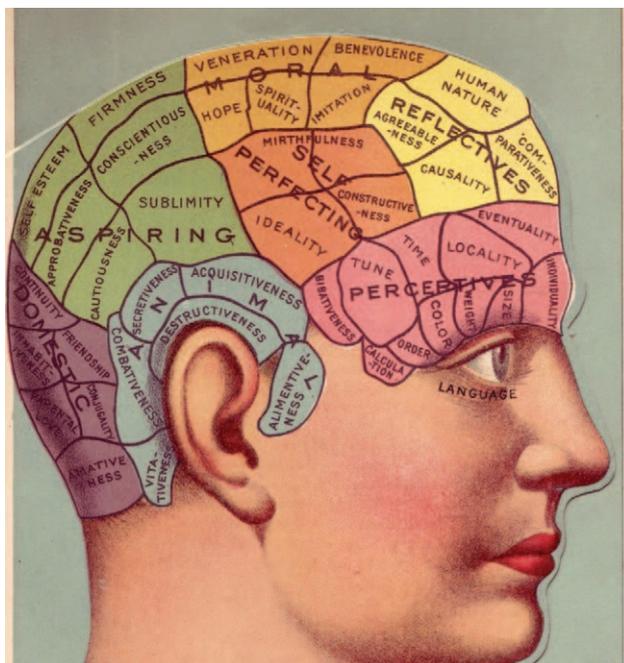


FIGURE 10. Franz Joseph Gall: *Phrenology*.

and the reason of the secret influence of certain forms on our judgment of beauty. From the examination of the heads both of men and brutes, and of the skulls of a variety of animals, I think there is reason to say, that the external character both of man and brutes consists more in the relative proportions of the parts of the face to each other, than has been admitted.”

Initially, cephalometric analyses were mainly concerned with the concept of beauty and ugliness comparing the facial features of mankind and animals. These measurements and angles served as tools of education for painters and sculptors, and also often for writers to describe the character of their heroes. Since the 19th century, doctors became more and more interested in these methods of craniofacial recognition to acknowledge the indices of mental disease, depravation, and crime of an individual. We shall see a few of these incredible theories and misjudgments by some notorious scientists on the bases of head shapes.

### EARLY PHYSICAL ANTHROPOLOGY

The 19th century can be considered as the golden age of physical anthropology. Most of the scientists who became interested in this field were initially trained in medicine and surgery and all of them claimed that their writings were based on pure scientific analysis. They developed a real fascination for anthropometry and craniometry in particular, using tools like angles, indices, and craniometry developed previously, to analyze the various individuals and races, and classify them on scales of beauty and intelligence.

Pierre Paul Broca (1824–1880), known for his research on the localization of speech (the area of Broca) and the lateralization of brain functions, became acquainted with anthropology very early and this domain remained his lifetime interest. In 1859, he founded the Anthropological Society of France and advanced the science of cranial anthropometry by developing many new types of craniometers (Fig. 11) and numerical indices of measurements used to distinguish and classify human groups. As most people of his time, he considered the Negroes as mostly immature.

“The obliquity and protrusion of the face, called prognathism, dark skin, wooden hair, and intellectual and social inferiority are often associated, as a more or less white skin, smooth hair, and orthognathic face is the most ordinary sign of the most elevated folks in the human series”.

A friend of Broca, Carl Vogt (1817–1895), sometimes called the “German Darwin,” was a polyvalent scientist, physician, zoologist, geologist, and anthropologist. He was also very active in politics as a left-wing representative. In 1852, he was named professor in Germany and Switzerland. His courses to the students have been summarized in his *Lectures on Man* (1864), where he compared the African to the White race and described them as “two extreme human types.” The differences between them, he claimed, are greater than those between 2 species of apes and this proved that African born are a separate species from Whites.

“The trunk is smaller in proportion to the extremities, specially to the arm, which in the Negro reaches below the middle of the femur. Most Negroes can, without stooping, reach with the finger end the region above the knee caps. The neck is short, the cervical muscles are very powerful, but the shoulders are narrow and less strong than in the white. There is certain resemblance in the form of the neck to that of the gorilla.”

In England, James Hunt (1833–1869) founded in 1863 the Anthropological Society of London becoming its first president.

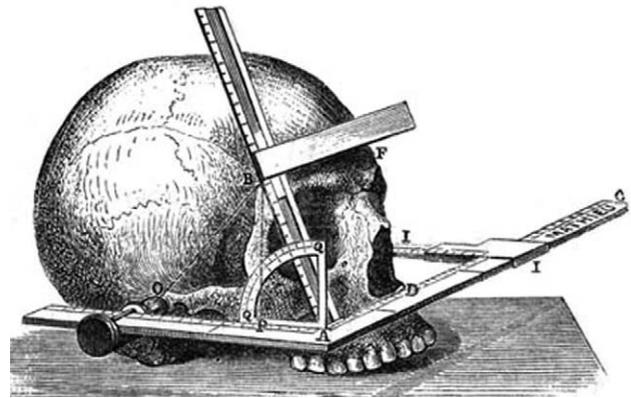


FIGURE 11. Broca's craniometer.

He also published and edited the *Anthropological Review*. The society undertook the translation of several valuable books on anthropological subjects, Hunt himself editing Carl Vogt's *Lectures on Man*. His article entitled *On the Negro's Place in Nature*, first read at the British Association meeting at Newcastle, attracted much criticism; it defended the subjection and slavery of the Africans, and supported the belief in the plurality of human species. For Hunt, the brain of the Negro had been proved to be smaller than the brain of the European, Mogul, Malay, American Indian, and Eskimo. According to Hunt, the facial angle of the Negro was generally between 70 and 75 degree, and sometimes as low as 65 degree and the frontal sutures closed much earlier than in the European. The same as Vogt, Hunt surmised that the brain of both the Negro and the ape when in an infant state resembled that of the European, but this ceased to be the case when older; at puberty, all development in the brain of the African ceased, and the form of the skull became more ape-like with the years. Hunt affirmed that this entirely matched with the psychological fact that all increase of intelligence after the age of puberty was impossible for the Negro.

Samuel George Morton (1799–1851), who was also originally a physician, is considered, together with Louis Agassiz, as the founder of the “American School” of physical anthropology. He claimed that the difference between humans was one of species rather than variety. His theory held that each race had been created separately and each was given specific, irrevocable characteristics. From his measurements of his large skull collection, he concluded in his *Crania Americana* (1839) that the whites had the biggest brains, averaging 87 cubic inches, Indians were in the middle, with an average of 82 cubic inches, and Negroes had the smallest brains with an average of 78 cubic inches.<sup>1</sup> Morton believed that the skulls of each race were so different that a wise creator from the beginning had created each race and placed it in separate homelands to dwell. He also believed that cranial capacity determined intellectual ability, and used his craniometrical evidence in conjunction with his analysis of anthropological literature then available to argue in favor of a racial hierarchy, which put whites on the top rung and Africans on the bottom. His skull measurements (by volume) then came to serve as “evidence” for racial stereotypes.

<sup>1</sup> Morton's skulls measurements have been questioned by the famous evolutionary biologist SJ Gould in his book, *The mismeasure of man*. This polemic has been further pursued in 2011 in an article by JE Lewis et al.: *The Mismeasure of Science: Stephen Jay Gould versus Samuel George Morton on Skulls and Bias*.

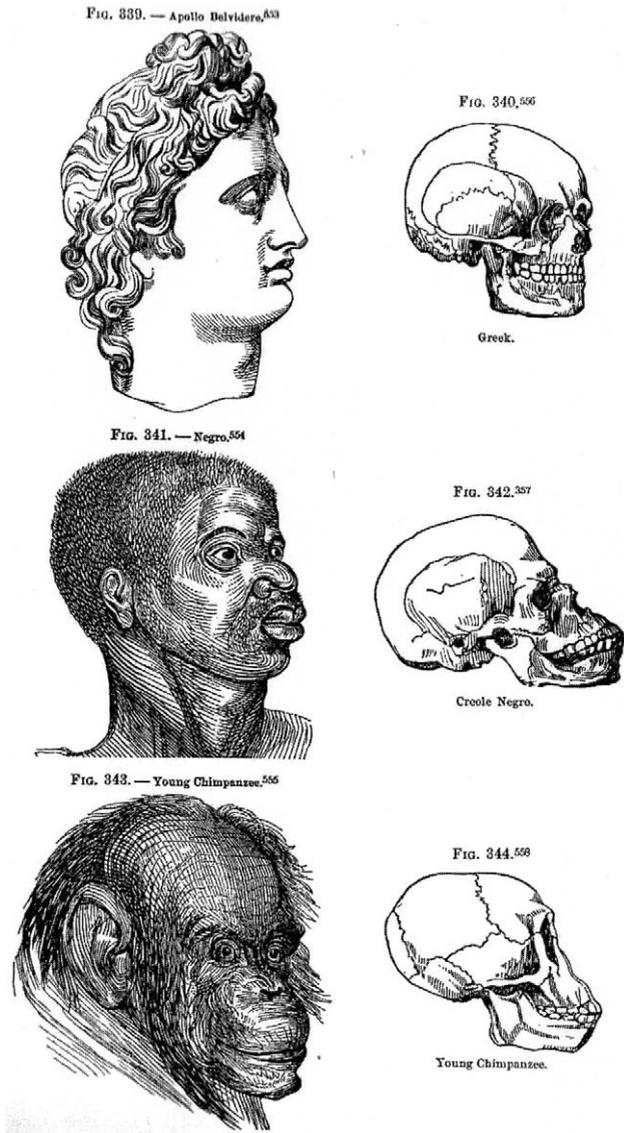


FIGURE 12. Nott and Gliddon: *Types of Mankind*.

Morton's followers, particularly Josiah Nott and George Gliddon in their monumental tribute to Morton's *Types of Mankind* (1854), carried his ideas further and backed up his findings, which supported the notion of polygenism—the premise that the different races were separately created by God. Like the French anthropologists, their theories were based on the analysis of skulls (angles, indices, and volumes) of various origins (Fig. 12), assuming *a posteriori* the character and intelligence of their former owner. This book became one of the leading examples of the supposedly scientific theory of craniology, especially as applied to racial groups.

### CRIMINAL ANTHROPOMETRY

The link between physiognomy, phrenology, craniometry, intelligence, and so-called human races led an Italian physician and criminologist, Cesare Lombroso (1835–1909), to the development of a theory of anthropological criminology. In thousands of post-mortem examinations and anthropometric studies of criminals and insanes compared to “normal individuals,” Lombroso became

convinced that the “born criminal” could be anatomically identified by such items as a sloping forehead, ears of unusual size, asymmetry of the face and cranium, prognathism, and other “physical stigmata” (Fig. 13). Specific criminals, such as thieves, rapists, and murderers, could be distinguished by specific characteristics, such as the size and capacity of their skull, which Lombroso thought are much smaller than the normal individuals’). His book *L'uomo delinquente* (1876) and his numerous articles and conferences had an enormous influence among the lawmakers and criminologists of the 19th Century.

### THE COMPOSITE PORTRAITURE

Among the numerous attempts to apprehend the common facial features of a group of individuals, distinguishing a race, or a typical figure of criminal or sick individuals, Francis Galton (1822–1911), the cousin of Charles Darwin, invented what he called the “Composite portraits.” Galton's process involved the photographic superimposition of  $\geq 2$  faces by multiple exposures (Fig. 14). On the basis of these facial images (and fingerprint patterns, that he described), Galton devoted much of his late life to exploring variation in human populations and its implications (Fig. 15). In addition to being a statistician, explorer, geographer, and protogeneticist, he became a pioneer in *eugenics*, defining this term as: “questions bearing on what is termed in Greek, *eugenes*, namely, good in stock, hereditarily endowed with noble qualities.” Galton's eugenics was thus the science of improving stock, equally applicable to men, brutes, and plants, through selective breeding to produce preferred traits.

### CRANIOMETRY AND MENTAL DISEASES

During the 19th Century, in the same way that many anthropologists construed different races as a degeneration of the white pinnacle, mentally deficient patients were frequently portrayed as the products of a process of atavistic degeneration from mental and physical norm. As described by Lombroso, the perpetrators of crime, the receptacles of disease, and the propagators of mental and physical weaknesses can be recognized by their physical features, mainly their craniofacial appearance and mensuration.

In 1862, John Langdon Down (1828–1896), a British physician to the Asylum for Idiots at Earlswood, acquired the conviction that he could divide the residents of his Asylum in groups by simple reference to their physical status. His findings, published in his *Observations on an Ethnic Classification of Idiots*, were based on measurements of the diameters of the head and of the palate and identification of specific facial features from photographs, which he took himself. Using Blumenbach's classification of the races (Mongolians, Aztecs, whites, Malayans, and Ethiopians), Down set about to assign all the Asylum residents to one or other of Blumenbach's racial groups. He concluded that “The great Mongolian family has numerous representatives and it is to this division I wish, in this paper, to call special attention. A very large number of congenital idiots are typical Mongols.”

### THE HERITAGE

Looking at these controversial observations and theories from our actual knowledge, one cannot but be astounded by the lack of scientific rigor often displayed by these outstanding naturalists, physicians, and anthropologists during several decades and even centuries. Often referring to each other and before measuring the inside and the outside of skulls, most of them had acquired the conviction, whether polygenists or monogenists, that there were different separate races in the world with not only different faces and crania, but also different moral and intellectual aptitudes. The purpose of the scientists was therefore to try to find typical



1. Trococéphale vio!ateur, de Ravenne.



2. Voleur milanais, condamné 13 fois.

FIGURE 13. Lombroso: The rapist and the thief.

measurements, angles and stigmata, to provide statistical coincidences between physical appearance and mental aptitudes of individuals or groups of people. As the mind is located in the brain, it seemed natural to them that attention should be directed to its envelope—that is the craniofacial skeleton. Some of the most outstanding physicians and scientists, often known for their brilliant discoveries and inventions in other fields, have supported these theories. The consequence, as expressed by Galton and his followers, was that, through selective breeding, sterilization, and euthanasia, the human species could control and even direct its own evolution. During the early 20th century, eugenics was widely accepted in the European and US academic community.

Modern cephalometry used in surgery and orthodontics has nowadays surpassed this confusion between beauty, intelligence, and race, but it is wise to remember that this indispensable technical

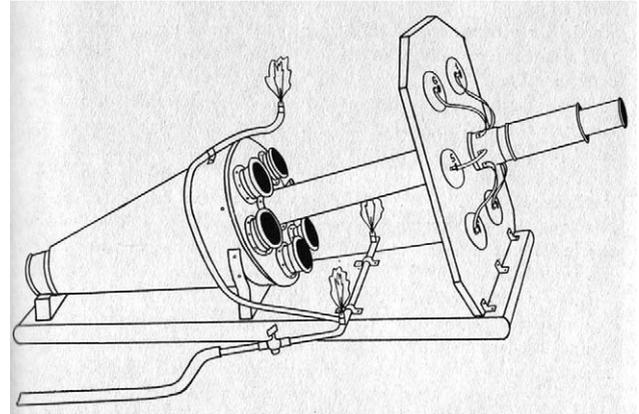


FIGURE 14. Galton's superposed photographic system.

tool of analysis of the facial skeleton has also set the ground for acts of human discrimination.

### HEAD REMODELING

The Coneheads was a recurring sketch on *Saturday Night Live* about a family of aliens with bald conical heads (Fig. 16). It originated in 1977 and was later made into a movie. Dan Aykroyd, its creator, said he developed the idea for the Coneheads at the sight of the Moai, the mysterious and ancient stone statues of Easter Island, which have similarly conical heads. In fact, the idea of modifying



FIGURE 15. Galton composite portraits.

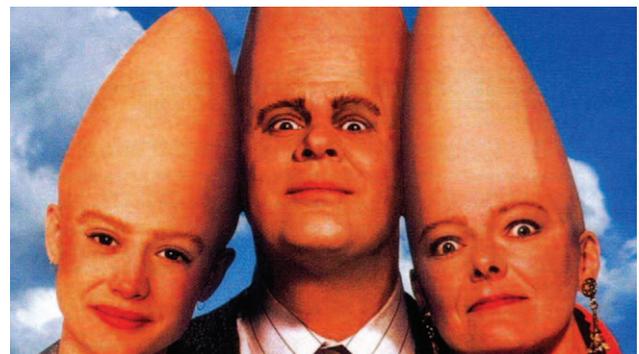


FIGURE 16. The Coneheads.

the shape of the head is very old and has been particularly developed in some populations for various reasons. Nowadays, modeling or remodeling an infant skull or parts of the face like an ear or a nostril without surgical intervention is not an uncommon therapeutic tool for a few specific deformations.

At birth, the shape of a newborn's skull is highly variable because of its inherent plasticity, intrauterine constraint, and the tortuous journey through the birth canal. Variations from the typical oval shape that usually results from the vaginal delivery process will generally return to normal in a relatively short period of time. Breech babies typically have a craniofacial shape resulting from their position in utero. They have characteristically a long, narrow head, with a prominent occipital shelf, redundant skin over the neck, overlapping lambdoidal sutures. After birth, restrictive or constrictive forces applied to a baby's head can result in more or less severe distortions. In children with positional head deformity (posterior plagiocephaly), the occiput is flattened with corresponding facial asymmetry. Positional head deformity produces more facial asymmetry than synostotic plagiocephaly because of the forehead protruding on the side of the flattening. With early detection and intervention, most positional head deformities can be treated conservatively with physical therapy or a head orthosis ("helmet"). The skull undergoes 85% of its postnatal growth within the first year of life. The helmet alleviates the pressure on the flattened area of the occiput and allows the skull to grow faster in the desired directions.

Some facial anomalies may also benefit from an early remodeling. Corrections of infant ear deformities by various molding methods are used to shape the antihelix, the triangular fossa, the helical rim, and the overly prominent conchal-mastoid angle, with a good success rate when begun in the first week of the infant's life. A few malformations associated with facial clefts may also benefit from external- or internal-like devices to push back the premaxilla to alleviate the tension in very wide clefts or to remold the deformed nostrils. The recent methods of distraction osteogenesis of the maxillaries or the correction of scaphocephaly by spring expansion of the sagittal suture are other examples of progressive facial and skull remodeling. Of course, the most common facial corrections produced by conservative therapy are related to the orthodontic treatments that may sometimes enhance dramatic changes to the lower third of the face.

As said before, the idea and the custom to modify the shape of the babies' head and to enhance its beauty dates back to prehistoric times and seems to have been practiced on all continents. Early examples of intentional human cranial deformation predate written history and date back to 45,000 BC in Neanderthal skulls from the Shanidar Cave in Iraq. The earliest known traditions to bind their children's heads were the ancient Egyptians of the third millennium BC. King Tutankhamen and Queen Nefertiti (Fig. 17) had typically an elongated head. The earliest written record of cranial deformation dates to 400 BC in Hippocrates' description of the Macrocephales. According to Hippocrates, the Macrocephales is a population, probably located around the Black Sea, who attached an idea of nobility in elongating their heads using bandages. He thought it could become hereditary: "As soon as a child is born, while his body is still supple and his head conserves its softness, it is molded with the hands and forced to elongate with bandages and suitable apparatus, that loosens its spherical form and makes it grow in length. Thanks to this custom, with time, this change of shape identifies so well with Nature that this art (molding the infant skull) became unnecessary."

The geographer and historian Strabo (63 BC–24 AD) mentioned that a white population called the Sigynni had the custom to elongate the heads of their children in such a way that "their foreheads were so prominent as to shadow their chin."

During the Italian quattrocento, it was the practice in the House of Este in the 1400s to place restrictive ties known as "bandeau" at birth on the heads of the royal newborns. A portrait of a princess who underwent this process hangs in the Louvre Museum (Fig. 18).



FIGURE 17. Queen Nefertiti.

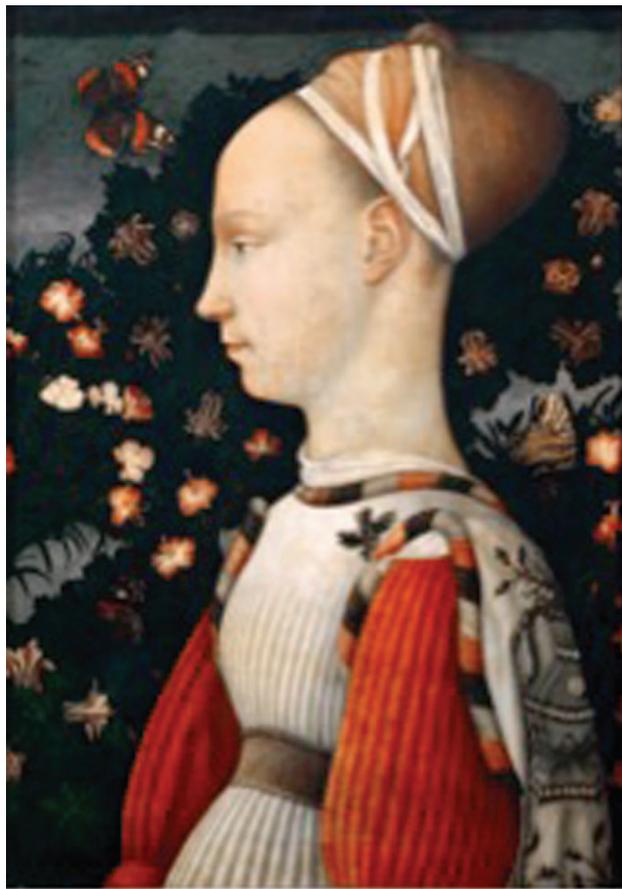


FIGURE 18. Princess Gabriella d'Este.

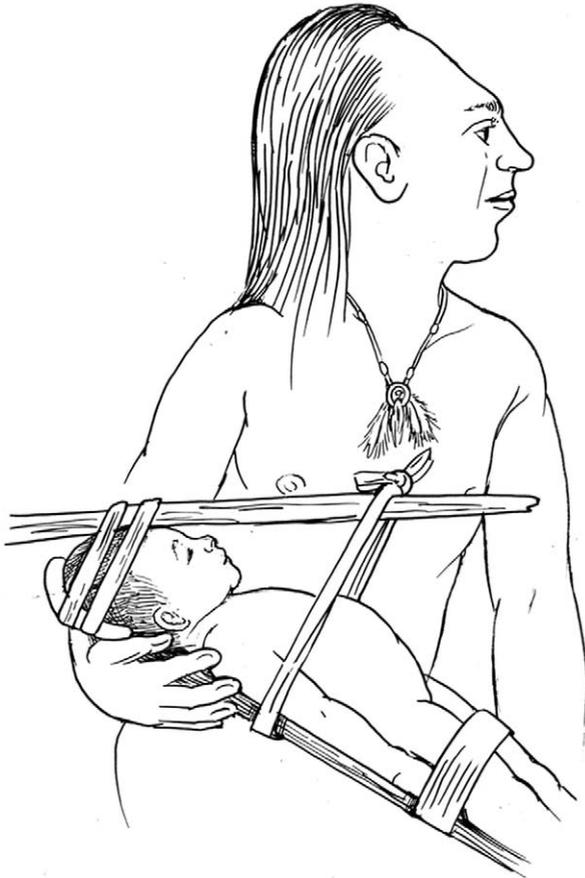


FIGURE 19. Chinook device for head shaping.

**MEDICAL ORTHOMORPHOSIS**

Since the 17th Century, doctors became interested in the making of beautiful children, giving advice to the parents as to how to handle their offspring.

In 1656, Claude Quillet, a French physician and cleric, wrote a long poem entitled *Callipedy* (from the Greek καλλός –beautiful/ παιδι-child) or *the art to have beautiful children*. He gave advice as to how to raise them from birth with emphasis on nutrition and education, but did not give specific advice about the physical beauty. A century later, another French doctor, Nicolas Andry de Bois-Regard wrote a book that is often considered the founding treatise of conservative orthopedic surgery, entitled *Orthopaedia or the art of correcting and preventing deformities in children*, orthopedics meaning the art of rectifying the children. It is a sort of homage to the grace and beauty of children; he wrote for example: “one must not neglect the body and let it become deformed, this would be against the intention of the Creator; this is the basic principle of orthopedics” and further “this book is aimed exclusively at fathers and mothers and all people bringing up children who must try to prevent and correct any deformed part of the child’s body.”

The purpose of Andry is to describe the organs in their “natural perfection” and teach how to maintain this state of perfection. He then proceeds in depicting deformities of the body and the face and how to rectify them. Although most corrections are aimed at the limbs and the spine, several deal with facial aesthetics. “When I speak about the ears, I do not mean to teach how to correct deafness, but how to behave to produce or conserve an ear, the external

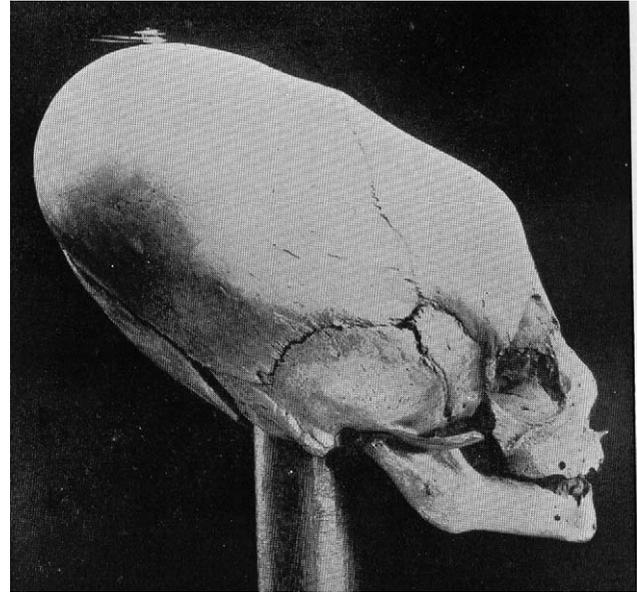


FIGURE 20. Chinook skull.

perfection that it should have, like being nicely flattened.” For him, a beautiful face can vary according to the standard of the cultural environment. The apparent flaws of a body should never be considered as real flaws. “French people, for example, despise pug-noses and small eyes that are praised by the Chinese.” He then proceeds in describing maneuvers to correct ears and noses. For well-flattened ears, one should use a tight bonnet from an early age and never let an earlobe escape from it. As for the flat and snub nose, considered a great deformity for the French people, it can be corrected by often bringing the 2 alae together with the fingers and to do it again and again every day. For the pug-nose, it is even more difficult: one should pass and re-pass with the fingers on the dorsum of the child’s nose, at every hour of the day, for several months. For the crooked nose, similar methods are advised. Most interesting is the chapter entitled *deformities of the head, in relation*

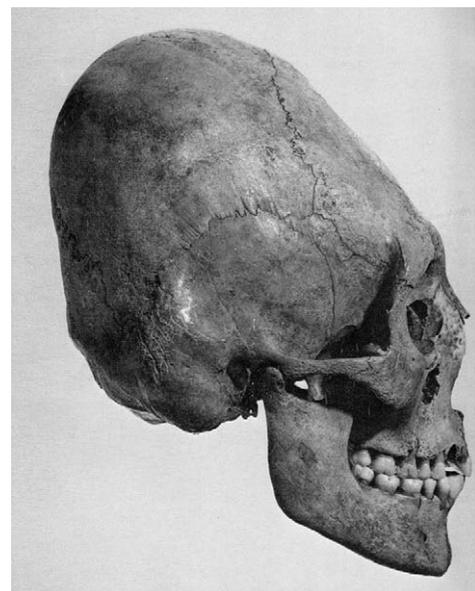


FIGURE 21. Hun skull.

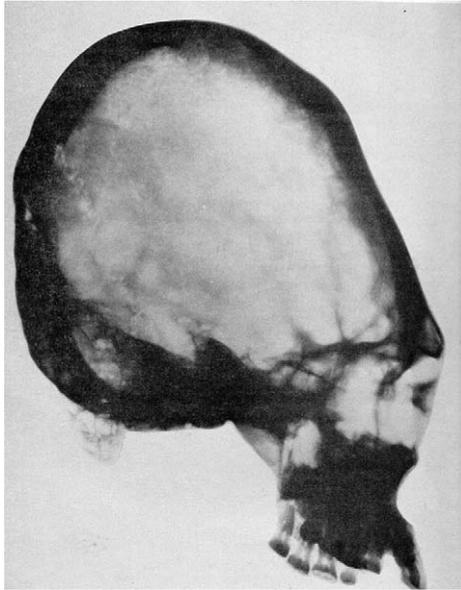


FIGURE 22. Hun skull X-Ray.

to the cranium: "The head, to be well made in relation to the cranium, should be a little round, with a small forward and backward projection, and slightly flat on the sides. This is the natural figure; however, this figure might often be corrupted by the way children are handled. One should be careful with the bonnets and the bandages that we bind to the head. If these bonnets or bandages apply too much pressure on the sides, the head might elongate and look like these folks, which have been called *Macrocephales*, from the Greek word meaning long heads. If one tightens too much not only on the sides, but also in the front and in the back, it will elevate like a peak and look like the head of this known historical *Therside* whose head was a pyramid."<sup>2</sup>

Since the beginning of the 19th century, doctors and anthropologists have been studying these intentional cranial deformations. In 1805, the Lewis and Clark expedition encountered the Chinook tribe at the mouth of the Columbia River. Infants of the tribal leaders were noted to have their heads constrained by wooden sticks and rope (Fig. 19). These devices were placed soon after birth and kept in place for months or years to create a permanent cranial deformity that was interpreted as a mark of distinction (Fig. 20).

The most comprehensive historical and physiological reports have been published by J. Ambialet in 1893: *La déformation artificielle de la tête dans la région toulousaine* and by EJ Dingwall in 1931: *Artificial cranial deformation, a contribution to the study of ethnic mutilations*. The study of Ambialet is mostly concerned with the deformed heads found in the area of Toulouse in France, which could have been a tradition transmitted by the Huns who had settled in the country (Figs. 21 and 22). He describes various headbands and skullcaps, which were commonly used to tighten the heads of the babies, and gives images of deformed skulls that he was able to examine. Dingwall's study not only refers to traditions in many parts of the world, but also describes the methods used to modify the skull shape and the possible reasons that the parents had to adopt this type of practice. For this author, there are 6 types of intentional cranial deformation:

<sup>2</sup> Homer describes a Thersite soldier as the ugliest man to come to Troy, with a pointed head and a thin patch of fuzz growing on it. (*An ancestor of the Conehead!*)



FIGURE 23. Maya head shaping.

The molding the head of the infant (Torres Straights). The molding is performed either by the mother, midwife or relative, and is often accompanied by a preparatory greasing of the child's head. At the same time, the nose, ears and limbs are often massaged or molded.

The application of boards to the head: Pieces of wood are secured to various parts of the infant's head to flatten those parts against which they are fixed. The boards and pads are fastened together by laces or strings and tightening is effected by tightening or by a process of twisting. The basic idea is the intention of flattening certain portion of the skull (Fig. 23).

The application of bandages to the head (New Hebrides and Central Africa): In many parts of the world, the head of the child is immediately after birth bound tightly with yards of material, thus forming a kind of tight, cone-shaped cap. This fitting is applied to the head for considerable periods of time, the result being that by way of compensation, it becomes cone-like or cylindrical (Figs. 24 and 25).

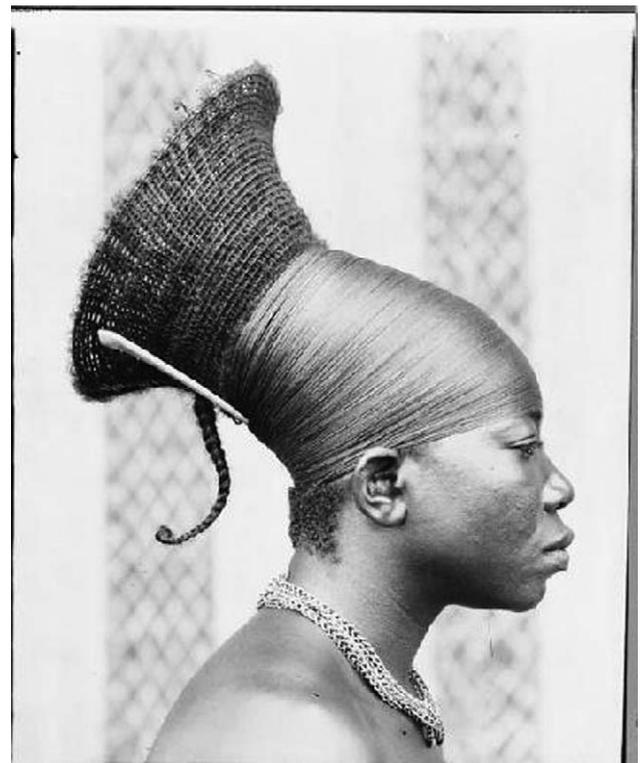


FIGURE 24. Mangbetu woman.



Femme mangbetu et son enfant, ancien Congo belge.

FIGURE 25. Mangbetu child.

The application of pads to the head: A pad usually made of material stuffed with some hard packing or with sand or clay is often a supplement of a board. They are seldom used alone and secured over the child's forehead by means of bandages or linen strips (Fig. 26).

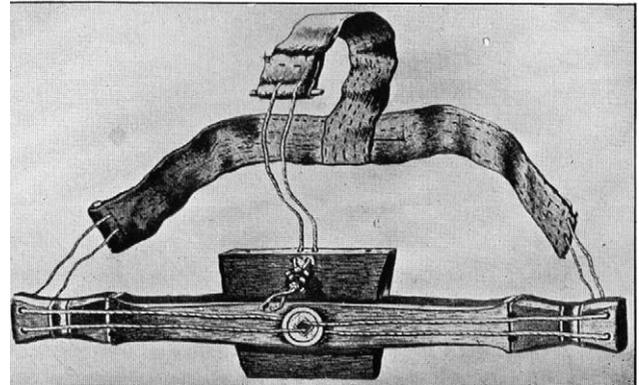


FIGURE 26. Malanau apparatus for head deformation.

The application of stones to the head (Polynesia). It consists broadly of putting heavy stones round the head of the child as it lies in its cradle. Three stones are usually employed, 1 for the top of the head and 1 for either side.

Cradles. Certain attachments to the cradles are used to the express purpose of deforming the head of the child (Borneo, Celebes). The cradles of the North American Indians were used for both, cradle and transport, one result of the latter being that the child was lashed tightly to the supporting board.

The rationale for these interventions was not only to make beautiful children. It was sometimes to create class and tribal distinction. Similar practices were felt to enhance intellectual and sexual abilities and to provide intimidation in battle through the imitation of beasts. Artificial cranial deformations are not always intentional. The use of tight bandages and bonnets served to keep the babies' heads warm. The application of a pad above the forehead was to protect the brain at the level of the opened fontanel before the closure of the skull bones. Maintaining the head in a stable position in a travelling cradle is another explanation.

It is interesting to note that if nowadays we have ceased to reshape the head of our children except in cases of cranial or facial deformity, many young women adopt a hairstyle that simulates an elongation of their skull. The conehead figures might still become fashionable!