2 Cranial Varieties in the Human and Orangutan Species

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Why did European scientists suddenly collect and measure human skulls? The initiator of craniology, Petrus Camper, MD (1722–89), became infamous for two of his engravings that seemingly suggested that protruding jaws (prognathism) indicated an "objective" racial hierarchy in nature. Once these profiles were isolated from the rest of Camper's work, the original context about organic interconnectiveness, human head shapes' plasticity and their mutual reciprocity, was forgotten. Georges Louis Leclerc, Count de Buffon's (1707–1788) provocative *Histoire naturelle* had inspired Camper to aim for more than just a compilation of anatomical facts. By reintroducing Aristotle's principle of correlation, Buffon vitalized the life sciences, although he never applied this concept to human heads (Reill 2005, 43–7; Hoquet 2007, 149–54). Rather, he repeated slaves' jokes seriously that their "alien" features were contrived artificially. The Dutch anatomist refuted this assertion: racial characteristics were a matter of geometry. Unfamiliar traits were merely protrusions or reductions of a head's sustained volume which reduced or enlarged the remaining components. Camper's dynamic sketches demonstrated how immense variation resulted from only slight alterations materially modifying entire physiognomies. While his striking cranial sequence influenced an embryonic science of morphology (Goethe), it also became the "central visual icon of all subsequent racism" (Schiebinger 1993, 149–50). This chapter's objective is to restore the genesis and intentions of Camper's "facial angle" theory, based on his manuscripts, drawings, diaries, and letters in Dutch archives.

VARIETIES OF THE HUMAN SPECIES

Modern life sciences (biology) therefore began with the first three volumes of the encyclopedic *Histoire naturelle* in 1749. The prevalent Cartesian mechanical philososophy was wholly inadequate for the life sciences and in the "Discourse on the Manner to Study and Treat Natural History," referred to as the "First Discourse," Buffon explained how to break new ground (Buffon 1749, 1: 1–64; Lyon 1976, 133–81). In the second volume

he replaced the concurrent preformation theory with epigenesis and his third volume presented a "Natural History of Humankind" (Buffon 1749, 3: 305–531). The general goal was to explain the interconnected whole of animate nature in as few principles as possible *à la Newton*.

René Descartes (1596–1650) had deduced science from a few principles formulated *a priori*. Buffon wanted to undo this obsession with absolutes and instead of comparing nature with his ideas, the naturalist should instead compare nature with herself. Science was not about certitude but rather about probability derived from the same occurrences, frequent repetition, and immense variety (biodiversity) (Buffon 1749, 1: 54–5). Carl Linnaeus (1708–78), Buffon's nemesis, was the first since Aristotle to incorporate humanity into the animal kingdom and he classified humans with apes, monkeys, lemurs, and bats based on teeth and mammae. A preponderance of each one of the four bodily humors distinguished Linnaeus's four human varieties (Linnaeus 1758, 1: 21). Prioritizing relationships over categorizations, Buffon reversed the Swede's procedure: "Things, in themselves, have no existence for us; nor does giving them a name call them into existence. But they begin to exist for us when we become acquainted with their relations to each other and their properties" (Buffon 1749, 1: 25). Living nature could be explained as a self-contained system, and even do without God (Buffon 1749, 1: 65–126). Buffon collected vigorously for the French king's *cabinet* (museum), supposedly the *Histoire naturelle*'s subject matter. The epistemological procedure, according to John Locke (1632–1704), was to then gaze at length at the productions from different climates next to each other until the objects combined in the mind (Buffon 1749, 1: 5–6, 44–5).

Pure empiricism, or petty details, was reserved to comparative anatomists like Buffon's collaborator, Louis-Jean-Marie Daubenton, MD (1716–1800). Buffon stipulated that the powers of observation had to be cultivated simultaneously with the powers of imagination. Mediation between an active investigating force and the object to be investigated would discover what united the antinomies, understood through analogies (Buffon 1749, 1: 30, 51, 55, 62). The similar tendencies found among dissimilar beings would clarify regular development from free creation and it was the combination of determinism and freedom that distinguished life from the inanimate. Following his discussion of human development with a long, unillustrated essay entitled *On the Varieties of the Human Species*, Buffon became the first to study humankind as a species: "Everything which we have hitherto advanced . . . related to humanity as an individual. The history of the human species requires a separate treatment, of which the principal facts can only be derived from the varieties that are found among the inhabitants of different climates" (Buffon 1749, 1: 371; Curran 2011, 11–2, 221–2). Because all peoples could interbreed, there was but a single human species. Thus the agents of change had to be climate, nutrition, and customs, and ancient climatic theory was compatible with scripture, in that a once unitary people had been forced into a worldwide diaspora. Distinctive appearances

and lifestyles developed according to the conditions of peoples' places of settlement and the habitat's harshness or mildness appeared in their very physiques: the most extreme characteristics occurred at the antipodes (the Frigid and Tropical Zones), while the optimal ones in the epicenter (the Temperate Zone).

Buffon's essay was no ethnological inventory but a rhetorical demonstration of environmentalism. Before the social construction of race, climatic explanations of color and disposition, grounded in humoralism, were the dominant account for human variation. Mary Floyd-Wilson has described regionally framed humoralism as "geohumoralism" (Floyd-Wilson 2003, 1–2, 12). The climatic theory first appeared in the Hippocratic Corpus of the fifth century BC. Claudius Galen, the second-century Greek physician in Roman service, refined the external factors that affected the body's humorial equilibrium (health): the medical regimen of the "six non-naturals" (*sex res non naturales*). This hygiene or preventive medicine—distinct from physiology (*res secundum naturam*) and pathology (*res contra naturam*)—consisted of air, sleeping and waking, food and drink, motion and rest, excretion and retention, and the passions or emotions. Buffon's oratory aim, that the environment caused human diversification, was loosely organized around this sixfold commonplace.

Describing the stunted Lapps (Sámi) in sexual terms, Buffon emphasized the fifth non-natural, that of retention and excretion. He linked the nomadic Tatars of the Central Asian steppes with the fourth non-natural, motion and rest. The sedentary Asians, effeminate and fatalistic, were matched with the second non-natural, sleeping and waking. The European nations were the "true and beautiful," in the Platonic meaning of a prototype, thanks to the best food and drink, the third non-natural (Buffon 1749, 3: 528). In this context, Buffon explicitly cited humors: "The color of the flesh comes from that of the blood and the other humors of the body, on which the food must necessarily influence their qualities" (Buffon 1749, 3: 483). The various skin tones of the scorched and lethargic nations derived from the varied heat of Africa's air, the first non-natural. The American natives, whom Buffon regarded as the feeblest variety with little sexual ardor on an immature continent, were associated with the last non-natural, the state of mind. Locke had characterized American Indians as infantile for having few ideas (overestimating Europeans' linguistic mastery). Not only had the Temperate Zone moved from the Mediterranean to Catholic France but Buffon also revised classical climatology by adapting epigenesis from antiquity.

The first human being served as the archetype for all humans but had not been perpetuated unchanged. Nor was variation "simply individual and random, but determinate in direct response to factors related to geography and climate," having a microcausal influence by way of the food or through the operation of *moral* (habits or social) causes (Sloan 1973, 303). Emphasizing human surmountability over the environment, Buffon

downplayed the geophysical determinants of classical climate theory. He reported a rather ingenious explanation for African features from French travel narratives:

> The Negro women almost always carry their infants on their backs while they work. To this custom some travelers ascribe the large bellies and flat noses common among Negroes. In her raising and stooping with jerks, the mother is apt to strike the child's nose against her back. In order to avoid the blow, the child keeps his head back by pushing the belly forward. (Buffon 1749, 3: 458–9)

For Camper, such stories defied logic (i.e., the logic of mathematics). The "jerk against the Mother's back can . . . perhaps flatten the cartilaginous nose a bit, but could not enlarge the nostrils sideways and symmetrically" (Camper 1791, 54). Otherwise he supported Buffon's environmentalist account for humankind's diversification (Camper 1791, 17, 53). In an anonymous publication, however, Camper was blunter. The artifice theory, that human intervention created racial characteristics, "was all too clearly demonstrated to be untrue by Mister P. Camper . . . in spite of what has been narrated by . . . Buffon . . ." (Camper 1783, 374).

For some time, Camper did not oppose the artifice argument in public. Since antiquity it was known that head shapes could be molded by applying pressure to the neonate's soft skull. Deliberate cranial deformation occurred on every continent except Australia. Camper did not deny that artifice had "never been productive of changes" but that it was untenable as the general source for diversity (Camper 1791, 22). In 1756, he received proof against the idea that Africans "made the sides of their nose spread" by means of some compress (Camper 1791, 54). All the features in a six-month-old fetus "were so strongly marked, that every person could immediately distinguish the Negro child, although the color of the skin was not [yet] changed into black" (Camper 1791, 23). Characteristics manifesting before birth had to be attributed to natural forces alone: "The Moors do not push the nose in, as has been said, for it is already flat in the womb: it seems to depend on the region: similarly the nose seems smaller and flatter because both jaws project further than in other people" (Camper 1763, 374). Camper learned firsthand in Amsterdam that black babies were "born white or rather reddish, like ours, and that they become brown a few days later and then black" (Camper 1772, 389; Meijer, 1999, 189).

Some European women had a deformed pelvis caused by common rickets, malnutrition or high heels. Camper procured pelvic bones from Africa, Asia, and America to examine the reasons for their women's alleged easier birthing. One of the first to compare non-European pelves, he found their dimensions to be more spacious. He set the optimum of a pelvic angle he devised to 100 degrees for the European woman and 125 degrees for the African (Camper 1801, 342–3; Schiebinger 1993, 156–7). Camper also

compared crania from these continents. For example, he observed that the upper jaw was broadest in the Kalmyk (a Tatar people), whereas Dutch mouths often proved too narrow for the teeth nature intended. "In Asia, in Africa they have room because the jaws fill out much wider and exceed there once more as a general rule" (Camper 1783, 131–2). Thanks to vitamin D, unbeknownst to Camper, healthier pelvic and mandibular shapes did not constrict births or overlap teeth.

STUMBLING UPON THE "FACIAL LINE"

The skull was indeed a traditional starting point in human anatomy. It consisted of two compounds: the cranium and the mobile *mandible* (lower jaw). To ascertain the inherent forces that molded their shapes, Camper sawed mammalian crania in half at their longest axis. He saw that "the cranial cavity for the brain was indeed generally regular, but . . . the placing of the upper and lower jaw constituted the natural difference of the amazing variety" (Camper 1791, vi–vii). The manifest cause for diversification proved to be the *maxilla* (upper jaw) contained in the cranium. The demonstrative line that had such "great utility in the determination of the particular faces," Camper named the *linea facialis* (Camper 1791, 35). This pertinent "facial line" was traced in profile from the front of the incisor teeth to the prominent part of the forehead. As his horizon, Camper drew a line from the nose base to the middle of the ear hole (the future "Camper's plane" in dentistry). The angle produced from the facial line, intersecting with the horizontal line, provided a specific numerical degree. Because the cipher became the emphasis, this cranial measure was posthumously called the "facial angle" rather than facial line. A change in its slant reshaped heads. Although nature appeared inexhaustible in her variations of form, the varieties were manifestations of a plan that was not visible but traceable. According to Buffon, regulative patterns were controlled by the formative principles hidden within organized matter (Buffon 1749, 1: 57). This *moule intérieure*, a blueprint that accounted for the continuity of form, was a hidden organizer that could never be seen directly, but was attested to by external modifications (Buffon 1749, 2: 35). Buffon called the higher degree of understanding "by which we are able to embrace at one and the same time many different objects" a *grande vue* (Buffon 1749, 1: 5). Camper's facial angle theory was such an encapsulation: "the diversity of countenances is made by varying the proportions and the facial line's inclination" (Camper 1791, 108).

Camper portrayed the heads of a tailed monkey, orangutan, African, Asian, European, and the casts of male Roman and Greek statues in profile. The same ape, Angolan, Kalmyk, European and Apollo were depicted full face, followed by a series of diverse ages in profile and full face. For easy comparison of the profiles, Camper drew fleshy parts for

the crania and artificial skulls for the statues. Facial angles more acute than 70 degrees represented mammalian snouts; they protruded increasingly to the flattest of bird beaks. Skeletal changes accompany advancing age making every individual undergo variable facial angles. The toothless baby's facial line measured at 95 degrees, the one-year-old to 100 degrees, but the adult in his prime regressed to 80 degrees, while the toothless old person's sank as low as 78 degrees. Among adults, degrees higher than 80 degrees were "formed by the rules of art alone" (Camper 1791, 38). A hypothetical form, with a right angle, was interpolated between the European and the Roman statue to reduce the 15 degree gap. Roman artists had limited themselves to 95 degrees whereas the Greeks favored 100 degrees (Camper 1791, 39).

What compelled Camper to add a mythical figure immortalized as masculine beauty? The Amsterdam Drawing Academy owned a cast of the Pythian Apollo (Ploos van Amstel 1770, 392), but Camper's choice of Apollo, rather than the Venus de Medici, may have been due to Johann Joachim Winckelmann (1717–1768). As an art student, Camper had practiced making copies of ancient busts, the Belvedere Torso, and the like. Noticing how "the Ancients seem to have paid great attention to the facial line for the Characteristics of the Negro," Camper believed that his discovery substantiated what had already been known to them (Camper 1791, 37). Greek statues' heads were based on a skull's pliable consistence being elongated until their forehead and nose formed close to a continuous line in profile. The 100 degree facial line elevated the crown, shrank the back of their heads, widened the space between their eyes, and determined their tiny mouths to have small lips. Nature though had no obtuse facial angles. "The Antique beauty therefore is not in nature; but to use Winckelmann's term, it is an ideal" (Camper 1791, 91). Camper replaced Winckelmann's abstract premises for ideal beauty with a physical truth: "that which this clever Man terms *ideal* is in fact founded upon the rules of optics" (Camper 1791, iv). Camper's two dissertations had been on vision (PhD) and on the eye (MD). The artificial dimensions of classical figures compensated for perspectival distortions in the spectator's line of sight and it was the purge from optical impurity that perfected classical statues (Camper 1791, 74–5; Grindle 1997).

Although Camper has been accredited with being "the first scientific attempt to associate the typology of an archetypal European skull with that of canonical antique sculptures" (Bindman 2002, 203), the correlation predated him. Andreas Vesalius (1514–64) employed the Belvedere Torso in *On the Fabric of the Human Body* woodcuts to suggest that the anatomist was not implicated in the body's violation (Vesalius 1543, book 5). Seeking to displace Galenic authority with direct autopsies, this Flemish anatomist tried to make human dissections more palatable by presenting a classical image in an alien yet still recognizable fashion (Kornell 1996, 65; Harcourt 1987, 29, 52).

HUMAN ANATOMY'S SIMIAN SOURCES

Camper anticipated shock to his cranial line-up: "why indeed the comparison with the Forest-man (*het Bosch-mensch*)" (Camper 1772, 381)? *Orang* meant "man" and *outang* "forest" or "bush" in the Malay language. Nicolaas Tulp, MD (1593–1674) had called the ape from Dutch-occupied Angola that arrived alive in Holland *orangutan* (Tulpius 1641, 274). Thereafter, the Malay became a generic for the known great apes, with utter confusion between the chimpanzee and the orangutan (the gorilla became known in Europe only in the mid-nineteenth century). The anthropoid ape was one of Europe's most discussed yet least known animals. The animal resembling humanity the most was a pivotal point about what defined humankind for a secular "science of man" (*Menschkunde*).

Suggestions of genetic relations between humans and apes were anathema to Camper, for whom humanity had a special destiny in nature, a religious belief he supported with physical truths. By Dutch standards, Camper was an "orthodox non-believer" (atheist), but compared to the *philosophes*, he was a "non-orthodox believer" (physico-theologian) (Janssens and Kuijjer 1997, 76). In 1758, Camper dissected an Angolan boy in public to refute "that the Negroes and the Blacks had originated from white people's intercourse with large Apes or Orang Utans" (Camper 1772, 381). He compared the eleven-year-old's anatomy with the ape autopsy Edward Tyson (1650–1708) had published in 1699. The first to dissect an anthropoid ape, this London doctor proposed that it occupied a place in the *scala naturae* between humans and beasts (Tyson 1699, iii). But Camper found nothing in the recent-expired Angolan "more in common with this animal [chimp] than with a white person; on the contrary, everything was the same" (Camper 1772, 381). In his publications, he either juxtaposed or superimposed the African and Asian ape to demarcate the facial line difference of 12 degrees (Camper 1782, 74).

Camper dissected monkeys to understand "the most precious and valuable works of the immortal Galen," the greatest authority on human anatomy (Camper 1779, 140–1). By 1770, he had verified all of Galen's monkey sources except for a larynx with two pouches. Vesalius had made the revolutionary conclusion that Galenic anatomy was based on animal dissections only and Camper had the means to trace this data. The more reliable accounts about apes came from Dutch physicians, *Verenigde Oostindische Compagnie* (VOC) employees or cabinet directors. Jacob de Bondt (1592–1631), a Dutch doctor in Indonesia, had publicized that orangutans supposedly walked on two legs and recited the myth of Borneo's interior natives that orangutans could speak but refused from fear of enslavement (Bontius 1658, 84–5; Martínez-Contreras 2009, 335n2). Camper's mother, Sara Geertruida Ketting (1689–1748) was born in Surat, India of Dutch parents and baptized in Batavia (present-day Djakarta), Java. There she met and married Florent Camper (1675–1748), a Reformed Church minister in

Batavia from 1702 to 1712. He saw a small live orang that he later kept preserved in Leiden (Valentijn 1724–1726, 3: 242).

Petrus Camper, who travel inside Europe, observed a living orangutan infant, captured in Banjarmasin (Dutch Borneo's capital), in the Stadhouder's menagerie near the Hague (Meijer 2004, 62–78) and several other specimens, including his father's pickled one, of which he cut into five. In 1770 Camper became the first European to dissect the East Indian orangutan. These orangutan infants came from Johann Paul Hoffmann, a Batavia physician, John Hope (1737–1784), a VOC director, Arnout Vosmaer (1720–1799), director of the Stadholder's zoo and cabinet, Dr. Cornelis van Hoeij (1717–1803), a senator in The Hague, Willem van de Meulen, a wealthy Amsterdam merchant, and Professor Jean Nicolas Sebastian Allamand (1713–1787) of the University of Leiden museum (Camper 1782, 12, 19, 26–30). Anatomically, orangutans did not have a bipedal structure. The speech organs of all five of Camper's dissections matched the Greek anatomist's textual description. The orangutan's paired lateral sacs proved that the ape was but a mute quadruped. Camper's 1782 monograph, *Essay on the Natural History of the Orang Utan and Other Simian Species*, definitively dehumanized the ape.

The Malay name, Camper insisted, should be reserved exclusively for the real orangutan. Buffon had divided *Orangutans* into two varieties. He knew the *pongo*, the large "orangutan," only from travelers' accounts, but he, in addition to Dr. Tyson and Dr. Tulp, had himself witnessed in Paris a two-year-old *jocko*, the small "orangutan," walk upright in 1740 (Buffon 1766, 14: 52–5). In concluding that only the lack of thought prevented the ape from speaking, Buffon had resorted to Cartesian dualism. Camper tried to convince the French to update their information in a forthcoming *Histoire naturelle* supplement, but the minor rectifications that appeared after Buffon's death did not credit him directly (Meijer 2009, 100–1; Buffon 1789, *supplement* 7: 1–29). The genuine orangutans were reddish, derived from Borneo, had heads set into their shoulders, with long, lean arms and legs, and no nails on their great toes, whereas the muscular black apes of Buffon, Tulp, and Tyson all came from Angola in Africa.

OCULAR INTEGRITY

When Camper visited Paris for the second time in 1777, the small stuffed *jocko* (chimp) in the *Cabinet du roi* shocked him. (Buffon [Daubenton] 1766, 14: 130; Martínez-Contreras 2009, 332–3). Buffon's artist had enhanced the infant into an elegantly erect adult with a walking stick (Buffon [Daubenton] 1766, 14: 82). Camper criticized the inventiveness of artists and taxidermists. Vosmaer and Allamand had mounted their respective orangutans standing up straight. Camper was equally astonished that Daubenton, upon receiving the skulls of two Chinese and one Tatar, was

unable to "recognize any pronounced characteristic which distinguishes them from men of our nation" (Buffon [Daubenton] 1766, 14: 377). He attributed this to the Frenchman's inability to draw. The difference in cheekbones between the Kalmyk and European was "not easily discerned by someone not accustomed to [clay] modeling" (Camper 1791, 20). His plastic arts experience had Camper notice "a striking difference not only in the protrusion of the maxilla but also in the breadth of the face and in the squareness of the mandible" Camper 1791, vii). Even though the Kalmyk and Angolan shared the angular measure of 70 degrees, they were complete contrasts in full face. The Angolan had the narrowest skull, the Kalmyk the broadest, and the European was somewhere in between. The Kalmyk's wide jaws forced their cheekbones to project, hid their ears, gave them the flattest faces of all peoples, and caused their distinct eyes. Their eyes stood the closest together, whereas European eyes were the widest apart and the African's intermediate. With approaching eyes, Kalmyk sockets slanted and stretched the eye muscles.

Camper measured skulls through a threaded drawing window (Karliczek and Marlen Jank 2010, 57, 74–5). Concern for accuracy by mid-century had less to do with quantification than with making qualitative observations more exact, a goal achievable only through mechanical methods. Binocular vision gave a slight broadening of objects. In contrast to vanishing-point perspective, the architectonic method (orthographic projection) produced representations of true size and mutual relationships. To avoid perspective-induced foreshortening, the draftsman's single eye had to move in a plane parallel to the object guided by the drawing device. The optical axis remained at right angles to the object. This divested the observer's influence from the representation of the actual substance and the specific relations of component parts could be read exactly. Camper replaced the distortions of the subjective perspective with the objectivity customary in architecture. Some art historians consider Camper's explanation of optical optimum for "ideal beauty" to be rather simplistic but it was consistent with his support for the architectonic method. The focus merely shifted from one end of the line of sight to the other. The artist's manipulations were made for the object's sake in topographical anatomy but for the spectator's sake in canonical statuary. Visual representation served contrasting purposes. The object needed to be scrupulously depicted in science whereas in art there was license to optimally please the beholder's eye.

In 1774, Camper finished the facial angle illustrations. From his dozen overseas skulls, only two foreign human skulls were engraved to keep labor and costs to a minimum. Camper had dissected a young Angolan on November 14, 1758, an elderly Angolan on April 16, 1766, a young black male on April 17, 1768, and a mulatto on November 9, 1768. The very first was used to represent Africa's *Kaffers* (Bantu), *Hottentots* (Khoikhoi), and Malagasy. The only image of a Kalmyk skull at the time Camper acquired his was the one Jan Wandelaar (1690–1759) had engraved for the 1743 Leiden dissertation of

Johann Benjamin von Fischer (1720–59/60) (Fischer 1743; Vermeulen 2008). In 1774, Camper met the Kalmyk valet who accompanied Denis Diderot (1713–84) and Athanasius Bala to The Hague (Diderot 1875–1877, 17: 447; Wilson 1972, 644, 646, 863n84). Needing the teeth and mandible that his specimen lacked, Camper asked Bala to send him a Kalmyk head "freshly cut and well preserved in all its parts," but the Greek in Russian service turned down the gory request (Dongen 1972, 44). Camper supplied his incomplete skull with an old Angolan's mandible. The Kalmyk symbolized Asia from Siberia to New Zealand, including the Americas, whose natives descended from Tatar migrants (Camper 1791, 15). Camper easily selected a European skull in his prime to stand for all of Europe, Turkey, Persia, and the largest part of Arabia, as far as Hindustan. The recently discovered South Seas islands were too insufficiently known to be included, although at Oxford he sketched a Polynesian skull (Camper 1785).

These three human skulls constituted material evidence about the most globally dispersed inhabitants. Such provenances were necessary because "changes are so gradual that distinctions can only be perceived by comparisons from great distances" (Camper, 1791, 14). Measured in ratios and angles, the most prominent part in Africans proved to be the maxilla, in Asians the cheekbones, and in Europeans the nose. The components of these three-dimensional objects related geometrically. Because there were direct correlations with the other features in each skull, national physiognomies—despite the considerable diversity of appearances—were just osseous alternatives to a contained volume.

USING BUFFON TO CORRECT BUFFON

Buffon had stipulated that the major feature distinguishing living from inanimate forms was *conjonction* or conjunction: no single element could be removed from the whole without changing the *rapports* or relations between the remaining parts (Buffon 1749, 2: 37). In this way, he changed the concept of cause and effect. Each constituent part of an organized body was both cause and effect of the other parts. Camper's application of this idea to human heads resulted in the facial angle theory. The upper jaw's projection governed the head's shape because weight shifted around the "line of gravity." This third line, after the facial and horizontal lines, was a vertical line through the ear hole. The head's forepart was heavier than the back in the Kalmyk but the reverse in the African. Adult Europeans' evenly distributed head weight gave them a "haughty look" (Camper 1791, 47). This line of gravity, placed forwards in infancy, varied with age, gender, pregnancy, or crippling (Camper 1781, 275–309).

In 1770, Camper lectured "On the Characteristics of the Difference between Ages and those between the Various Nations" and "On the Beauty of Antique Faces and on a new Method of Drawing" at the Amsterdam

Drawing Academy. By altering the facial line, he morphed the European with an 80 degree facial angle either into an edentate elder of 78 degrees or into an African of 70 degrees. The superimposition of the African on the European demonstrated that the African nose was not so much squashed as it was embedded in a forward-jutting upper jaw. Noses that stretched over a wide maxilla necessarily flattened the nostrils. The upper jaw's projection enlarged the distance the lips had to cover, consequently thickening them. European faces correlated inversely from the Africans'. An 80 degree facial angle made the jaws retreat and forced long, thin noses to project further than the upper lip, creating a distinct nasal-bone and placing the nose's bottom parallel to the ground. Sketching such metamorphoses (*gedaanteverandering*) on blackboards demonstrated that "we no more pull our children's noses out than Africans push their children's noses in" (Camper 1791, 58). Camper used Buffon's concept of conjunction to refute the idea that customs produced racial features. Buffon had paraphrased the beautification practices that Jean-Baptiste du Tertre (1610–1687) described from secondhand sources in his *L'Histoire générale des Antilles habitées par les Français* (du Tertre 1667, 2: 508):

> Father Du Tertre explicitly states that if almost all the Negroes are flat-nosed, it is due to the fathers and mothers crushing their children's noses, that they squeeze their lips to make them thicker. Those who receive neither of these operations have facial features as beautiful, the nose as elevated, and the lips as thin as Europeans. (Buffon 1749, 3: 459)

This Camper pronounced to be complete "bunk" (Camper 1768, 17). His private notes to Buffon's essay on the varieties of the human species have been preserved in a 1768 manuscript in Leiden. "All of this is invented" (Camper 1768, 19), he noted after Buffon's summary "that features depend greatly on the customs which different peoples practice in flattening noses, stretching eyelids, lengthening ears, thickening lips, flattening faces, etc." (Buffon 1749, 3: 480). Camper scribbled: "we have given clear indication that the flat nose sustains the very projecting jawbone" (Camper 1768, 16). Racial characteristics were neither incidental nor fabricated but interrelated consequences. When he drew two artificially formed skulls in English collections, Camper was able to verify by their superimposition that the volume lost in the forehead's flattening was compensated by the cranium's elongation.

Attributing racial features to art alone implied that they were too ugly to be natural. The assumption that European features were the "normal" or natural ones, whereas others' were not, was for Camper an aesthetic bias. Notions of "incorrect" traits arose from an irrational discomfort, due to lack of habit. "Modern psychology," by which he meant Locke's philosophy, taught that all ideas were records of sensations and a matter of experience (Camper 1769, 263). The eyes love the familiar or what society has

taught them. Blacks' characteristics became a "problem" only in the early modern period. For centuries, Africans were associated with wisdom and genial melancholy. West Africans were first seen in terms of the familiar Moors, Ethiopians, or Egyptians, but with the Atlantic slave trade's acceleration, Europeans segregated sub-Saharan Africa and denied the continent her place in classical history. The geohumoral logic of inversion fixed the pale northerner and the black southerner in an interdependent relationship. The growing economic power of Protestant Europeans, who had a decentered position in the classical tripartite scheme, demanded a new paradigm. George Best (†1584) displaced geohumoralism with a unique exegesis of Genesis 9: 18–27 (Best 1578), and dislodged Africans from the realm of natural "science" by attributing black skin to the "curse of Ham" (Floyd-Wilson 2003, 6–11). In his "Oration on the Origin and Color of Blacks," Camper dismissed the biblical curse that justified color-based slavery:

> What kind of an image have the poor [native] Americans conceived of white people, after being treated by them in such an undeserved, such a cruel and barbaric manner? Will they not believe that the God of heaven and earth changed those brutes, as a permanent sign of his righteous wrath, into white people? (Camper 1772, 383)

This lecture was one of the "earliest and most uncompromising treatises against color discrimination" (Bindman 2002, 204). Prioritizing whiteness was narcissism, Camper noted, for those who gave precedence to whites were always white themselves. The denaturalization of black people was promoting white people as humanity's only representation. By debunking the artifice thesis, Camper conferred natural causes to the protrusion of maxilla, cheekbones, or noses. Yet even "internal molds" implied a malleable consistence. No part of the cranium could attain maximum development without proportional reduction in its other parts. Camper united the many into one by measuring the integral processes beneath deceptive surfaces in comparison.

The alternative view of nature that Buffon introduced mid-century focused on organic similarity, degrees of relation, and forms functioning in the economy of the whole. Camper presented this organic nature by symbolic means, facts which had a sensuous basis but were not readily perceptible. Reducing the head's three-dimensional form to a simple profile line allowed him to translate solids into a bi-planar representation. Removed from their context, Camper was charged with racism because the facial angle profiles were assumed to be hierarchical profiles of rank in a static chain of being. Restoring Camper's metamorphoses emphasizes his intended vision that physiognomic varieties are kneaded like clay. Features are mutually related and the mere retraction or protrusion of the upper jaw has consequential designs. In sum, the facial line was the morphological key to the multitudes of head shapes.

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