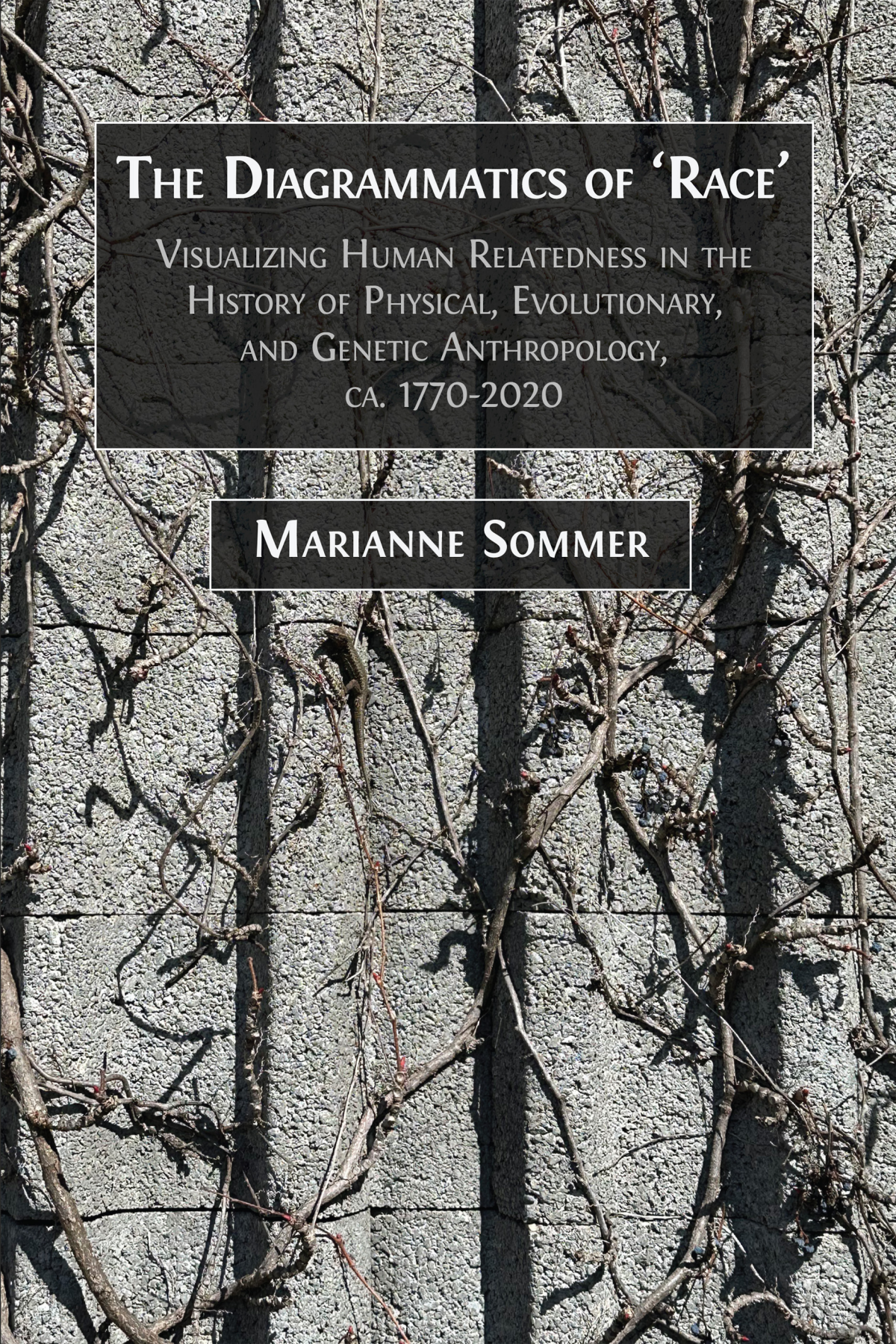

The Diagrammatics of 'Race'

Visualizing Human Relatedness in the History of Physical, Evolutionary, and Genetic Anthropology, ca. 1770-2020

Marianne Sommer

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1. Esthetics, Diagrammatics, and Metrics: The Beginnings of Physical Anthropology

Prichard's *Researches into the Physical History of Man*, first published in 1813, was a founding text. He was internationally recognized as the father of modern ethnology or anthropology. As we will see, his encompassing contribution could not be disregarded even by his adversaries (Stocking 1973, ix–xii). Although Prichard called his approach physical history, it rested on classical literature (of historical geographers), later travel writing (by James Cook, Joseph Banks, Johann Forster, Mungo Park, Alexander von Humboldt, etc.), oriental studies, antiquarian and Christian chronological treatises, alongside natural history (Carl von Linné, Georges-Louis Leclerc, Comte de Buffon, George Cuvier, Étienne Geoffroy Saint-Hilaire). Among these influences was William Jones, who had suggested the affinity of the European languages to ancient Sanskrit and their common but lost origin, and who had retraced the history of humanity philologically to a single family in Persia in "A Discourse on the Origin and Families of Nations" (1999 [1807] [1792]). Indeed, the comparative-historical approach to languages was the most important pillar of Prichard's work, followed by studies of religions, political institutions, manners and customs (Stocking 1973, xxxiv–xliii; also Augstein 1997).

However, the beginnings of another anthropology were already taking form, one that aimed at determining human history and kinship on the basis of physical characteristics that were interpreted as durable. The way in which Prichard engaged with this literature is insightful. He at times even seems to have ridiculed what the Dutch physician Camper "fancied" (Prichard 1813, 48). Prichard understood Camper to establish

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a scale of animals and human types according to their beauty and intelligence on the basis of the so-called 'facial angle'. While Prichard in the 558 pages of text in *Researches* could do without illustrations (though he included vocabulary tables and genealogical/chronological lists), Camper's dissertation of 1768, which was posthumously published in 1792 (and translated into German by Samuel Thomas von Soemmerring), was built around diagrams of skulls from his rather modest collection, which, besides crania from his and neighboring countries, contained only eight such from Africa and Asia (Camper 1792, xiv on the collection).

Camper's first two diagrams have since been reproduced frequently, often out of context and adapted in ways so as to enhance their racist appearance (Coghill and Hayes 2024). These showed a row of skulls framed and traversed by lines above a series of corresponding heads (1792, TAB. I and TAB. II [copper plates, n.p.]). They were representations of his method. Camper had aligned a European with his more 'exotic' human skulls and an ape skull for comparison. The inspection of the proportions of the skulls thus arranged made him conclude that the differences between them were captured by a line from the forehead (supraorbital ridge) to the upper lip (incisors). In order to transfer the diagrammatic method into a diagram for measurement and demonstration, Camper invented a construction through which horizontal, vertical, and diagonal strings could be strung. This should allow him to produce geometrical drawings that preserved the skulls' proportions and to arrive at points of comparison and to draw lines (on the technique, see Karliczek and Jank 2010, 71–75). In the drawings, he arranged the skulls along a horizontal line through the base of the nose and the auditory tract, which, together with the first line described above, provided said facial angle. In the resulting first diagram, there is a series of skulls and heads of increasing facial angles from a monkey on the left to a juvenile orangutan and the Angolan child whom he had publicly dissected in Amsterdam in 1758. While the Angolan skull stood in for Black Africans, the fourth skull and head of a "Kalmyk" (Camper 1792, 16) represented all of Asia.[1]

1 The Kalmyk skull was taken to represent all of Asia from Siberia to New Zealand, as well as America; the European stood for Europe, Turkey, Arabia, and Persia; and the Angolan for sub-Saharan Africa. At the same time, Camper recognized that all nations showed a range in facial angle.

The first skull and head on the left of Camper's second diagram referred to a European individual with a facial angle of 80°. Everything above that Camper relegated to the realm of art and everything below 70° he regarded as resembling the apes. Now Camper made explicit use of the experimental nature of diagrams. He changed the European skull's line from forehead to upper lip, step by step, so as to increase the facial angel, or to move from reality into art. When doing so, the head became gradually shorter; in the last figure of the series, in which the facial angle reached its maximum of 100°, the eyes were in the middle of the face. If one were to move above 100°, however, the head would become malformed. Camper explained that the ancient Greeks did go up to the maximum of 100° in their art, as the last figure showed, while the Romans only used 95° as in the second last figure. If one carried out the experiment in the other direction beyond the first diagram, Camper suggested, the Angolan skull would become ape and monkey and then dog and bird. Camper did so in drawing without reproducing the resulting diagram (1792, 16–24). Thus, in playing with the facial angle, Camper made it look as though the Angolan skull would approach the ape, while he at least stated that the similarity disappeared as soon as one considered other regions of the body or the head. At the same time, Camper thought that, due to the correlation of parts, the experimentation with the facial angle enabled one to diagrammatically morph one human type into another. This is demonstrated in Figure I.1 for the transformation of a Black African into a European or vice versa (28–29).

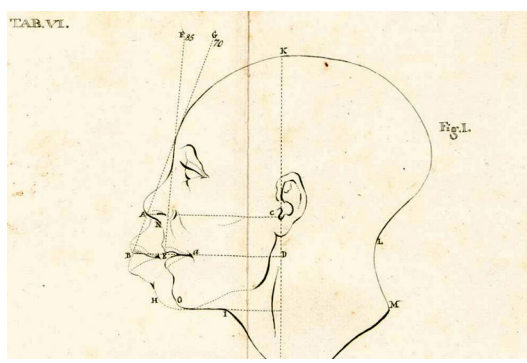

Fig. I.1 The diagrammatic morphing of human varieties. Petrus Camper, *Über den natürlichen Unterschied der Gesichtszüge in Menschen: verschiedener Gegenden und verschiedenen Alters* […] (Berlin: Voss, 1792), Plate 6, copper plate, appendix. Public domain.

Camper drew, painted, and sculpted human faces as a hobby and noticed that in European art, Black Africans rather looked like Europeans. He was also not satisfied with the existing methods to capture the physically beautiful. In a distinctly diagrammatic way, he wanted to show how beauty resided in relations between parts and that these could be expressed in measures. In doing so, he was drawing on an artistic tradition. In fact, Camper had encountered something similar to his facial angle in Albrecht Dürer's work (Camper 1792, 20). Already Dürer had made extensive use of diagrams to capture different head shapes, their proportions and transformations. Even while it was not his aim to arrive at distinctions between different peoples, he had applied such lines to one Black head as part of the great human variability. Unlike Camper, Dürer had derived his lines from the face, not the skull, and he had not provided measures for the angle between the facial line and the horizontal lines he chose (see Figure I.2; Dürer 1528; Meijer 1999, 102–104).

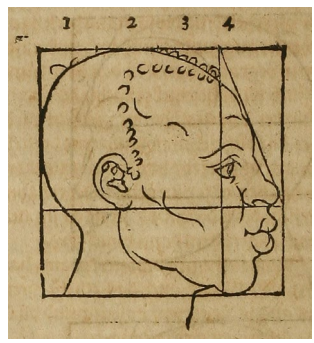

Fig. I.2 Dürer's diagrammatics of the head. Albrecht Dürer, *Hierinn sind begriffen vier Bücher von menschlicher Proportion* [...] (Nuremberg: Hieronymus Andreae Formschneider, 1528), n.p. Public domain.

Beyond art, the correlation of parts would become a central concept in comparative anatomy, and Camper situated his treatise in natural history. He wanted to contribute to the 'natural history of man', and that is how he was understood: the facial angle, the first angular measurement for the comparative analysis of human skulls, became a mainstay of physical anthropology (e.g., Meijer 1999; Visser 1990). Camper, though making esthetic judgments about different human forms, used the power of diagrams to experiment with proportions to

demonstrate that the human varieties were exactly that: variations on a single type according to the law of the correlation of parts. This was in support of his belief that all humans were descended from a single pair, Adam and Eve – humans were of one family and bound together by genealogy.

With his scale of perfection through animal and human forms, Camper was part of a longer tradition (even if Camper did not belief in the *scala naturae* as the natural order).[2] However, it was one of his contemporaries who devised another diagrammatic and metric mode of arrangement: the French naturalist Louis Jean-Marie Daubenton, Buffon's assistant, with whom Camper was acquainted. Daubenton (1764) published diagrams of animal and human skulls in which were inserted the lines he used to distinguish between them. In humans, what he defined as the plane of the occipital foramen approached most closely to the horizontal (resulting in the lowest occipital-orbital angle) due to their upright body posture. As in Camper's case, this angle connected the human form with animals in a scale (ape, monkey, dog, and horse). However, Daubenton did not subdivide humans into different 'nations' (Meijer 1999, 110–14). Neither did Johann Gottfried Herder, with regard to the facial angle, but he did partake in the diagrammatic experimentation of molding forms into each other.

In *Ideen zur Philosophie der Geschichte der Menschheit* (1785, 189–218), Herder claimed that his way of comparing human and ape heads resulted from his own study of skulls. Even though he had found the reference to Daubenton's treatise in Blumenbach's writings, he had not read the piece. However, Herder drew on Camper's facial angle and wished that the latter's treatise and diagrams were widely received. Herder thought he had discovered the reason for Camper's findings: if, instead of the ear, one took the last cervical vertebra as the starting point to draw lines to the very back of the skull, to its apex, to the front of the forehead, and the chinbone, it became clear that the form of the head depended on the habitus of the entire organism, on whether it walked

2 The first to have tried to develop *lineae cephalometricae* [cephalometric lines] to distinguish between different animals and humans was Adriaan van den Spiegel in the context of the interest in distinct head forms (*figurae capitis*). One of his lines – the *linea faciei* [facial line] – was drawn from chin to forehead (Spiegel 1632, 21–22; Pierer and Choulant 1816, 520–30; Marinus 1846).

upright. Most importantly, Herder used a diagram in words when mentally transforming one form into the other through the correlation of parts – something Camper had accomplished in drawing: if the center of gravity of the head was changed, the jaws moved forward, the nose flattened, the eyes approached each other, and the front receded as the skull lost its curvature, increasingly resembling that of an ape. If the mental experiment was carried out in the other direction, one transformed an animal form into a human form with its most beautiful and capable head. Within the human form, the angle defined by the degree of protrusion of the lower face and retreat of the forehead marked the difference between mal- and well-formed heads, up to the Greek face that was tilted forward in an esthetically pleasing way. Herder was positive that there would be a science concerned with the correlation of the interior parts that surpasses the superficial approach of physiognomy (1785, 189–218).

By the early nineteenth century, the facial angle had become the stuff of textbooks on natural history. The German comparative anatomist Lorenz Oken used it to support a *scala naturae* as the order of the mammals. In an amalgamation of Camper's and Daubenton's approaches, he proposed also measuring the position of the plane of the occipital hole along with the facial angle (indicating the position of the head on the neck) (1813, 659–60). At the same time, the facial angle had been taken up in Camper's second consideration too, namely, to differentiate between the 'nations' of humankind, while other naturalists had devised further methods for this purpose. The comparative anatomist of the hour, George Cuvier (1800, 3–15), for example, engaged with the facial angle in different 'races' and developed a method for the relative measurement of skull and face – a ratio that, according to him, decreased from Europeans to Asians to Black Africans (and was meant to express relative mental and sensual faculties).[3]

To the contrary, for Prichard (1813, 46–55), it was moot to base the comparison between individuals – which in the case of Camper

3 In his dissertation, Wolter Hendrik Crull (1810) engaged with the existing craniological methods. He treated Camper's, Blumenbach's, and Cuvier's systems, among others, and he also applied Daubenton to the human varieties (for another early overview see Pierer and Choulant 1816, 520–30).

stood for entire human groups – on one measurement.[4] He took issue with other attempts at physical anthropology like Cuvier's and von Soemmerring's, too.[5] But there was one scholar who had pioneered the study of skulls and whom Prichard held in much higher regard – so much so that he dedicated his 1813 *Researches* to him – the Göttingen physician Blumenbach, who was also a friend. Himself referring to Camper (among others), Blumenbach issued his six instalments of *Decas* (*altera/tertia/quarta/quinta/sexta*) *collectionis suae carniorum diversarum gentium illustrata* (1790, 1793, 1795, 1800, 1808, 1820), in which a series of ten skulls each was represented on copper plates and described. In his most famous work, *De generis humani varietate nativa* (1775), to the contrary, there were no illustrations of skulls until the third edition of 1795.[6]

Blumenbach (1798, 2) was proud that his skull collection was more extensive and varied than that of his friend Camper, and in this third edition, he distinguished five human varieties on its basis, which he called 'Caucasian', 'Mongolian', 'Ethiopian', 'American' and 'Malayan'. However, the terms 'Caucasian' and 'Mongolian' were not coined by Blumenbach but by Christoph Meiners, the German race theorist and Blumenbach's antagonist at Göttingen due to his polygenist and proslavery advocacy (Quine 2019; Michael 2020a, 90–94). In his own treatise, Blumenbach emphasized that the human varieties showed great variation within themselves and merged into each other through imperceptible gradations; no characteristic had been found that was exclusive to one group. This meant that classification was arbitrary, although Blumenbach did hold that his own was truer to nature than others. He discussed possible causes, including the *Bildungstrieb* [formative drive], climate, way of life, 'bastardization', illnesses and/

4 Prichard did not do justice to the complexity of Camper's analyses. The widespread misinterpretation of Camper's views by anthropologists led to the facial angle being used to establish 'racial hierarchies of intelligence' (Blanckaert 1987).

5 Von Soemmerring had knowledge of Camper's work prior to publication and referred to it in his treatise on the physical differences between 'the African and European races'. He also suggested that Camper's work was mostly only known from an abstract (Soemmerring 1785, 5).

6 I have mainly worked with the German translation of the third edition of 1798, comparing key passages with the Latin (1795) and French (1804) versions of the same edition.

or accidents, of differences in hair color and structure, skin color, face and skull shape, Camper's facial angle, peculiarities in teeth, ears, sexual organs, feet and hands as well as differences in stature. Overall, like Camper and Prichard, Blumenbach wanted to defend the unity of humankind: it constituted one species and was of common origin (Blumenbach 1798, 91–202).

Blumenbach, too, was interested in the relations of parts, especially with respect to the skull, but he accused Camper of not having used his points and lines consistently in his drawings, and he thought that Camper's facial angle did not work as a criterion to distinguish varieties, for more than one reason. There were very different skulls from different 'nations' that may have the same facial angle, while similar skulls may differ in this angle. The profile alone was not very informative. Blumenbach therefore proposed another approach. It seemed nearly impossible to capture all proportions with one line, but this was best achieved with the *Scheitelnorm* [vertex norm], also referred to as *norma verticalis* [vertical norm]. One had to arrange the skulls without lower jaws on their cheekbones (*Jochbein*) along a line on the table and look at them from behind, as illustrated in his diagram that has since become famous and that shows three skulls from different continents from above and behind as well as the line of their orientation (see Figure I.3). This allowed for the simultaneous observation of all important characteristics.

The oval 'Caucasian' skull that Blumenbach put in the middle, which for him possessed most beauty and symmetry, was from a female Georgian (who was captured in the Turkish war by the Russians and died in Moscow, where she was dissected). In comparison, Blumenbach described the 'Ethiopian' skull to its left that was from a female from Guinea (the 'concubine' of a Dutch man who died in Amsterdam, where she was dissected) as having something akin to a beak,[7] and the 'Mongolian' skull to the right, which had belonged to an Evenki person (a 'Reindeer Tungus', who had ostensibly killed himself and was brought home by an army surgeon), looked to him as if it had been flattened and thus protruded on both sides (Blumenbach 1798, 143–61, 203–224, 289–91). The observation that the two 'extreme' varieties seemed to

7 "rostrum" (Blumenbach 1795, 205): 'beak', 'nuzzle', 'snout'.

be 'elongated' and, respectively, 'flattened' versions of the 'Caucasian' skull, combined with the diagram of the skulls adjusted along a visible line, again suggest a diagrammatic approach to skulls in which one variety is molded into the other through correlated changes in parts. Indeed, in this molding, Blumenbach (1798, 204) took the 'Caucasian variety' to be the original: it had developed into the two 'extremes' on both sides, into the 'Ethiopian' and the 'Mongolian'.

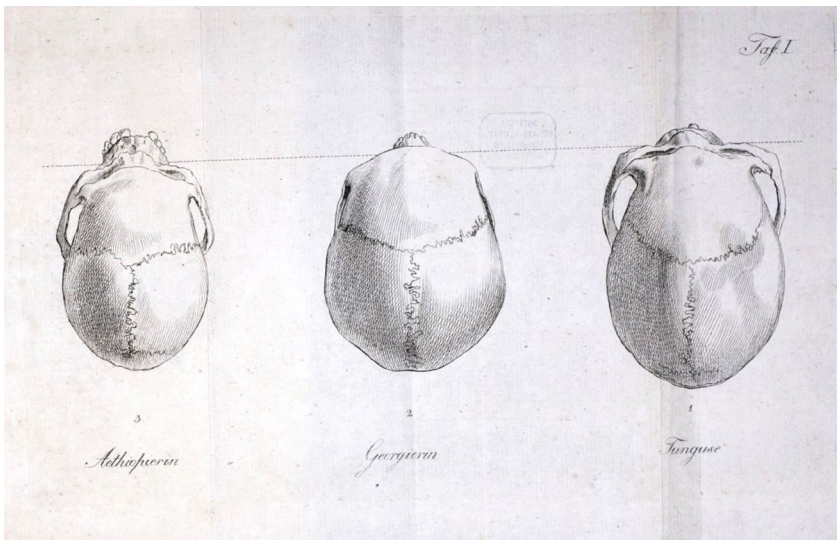

Fig. I.3 Blumenbach's diagrammatic approach. Johann Friedrich Blumenbach, *Über die natürlichen Verschiedenheiten im Menschengeschlechte*, 3rd ed. (Leipzig: Breitkopf und Härtel, 1798), Plate 1, copper plate, appendix. Public domain.

In his second fold-out plate, Blumenbach introduced two new forms on each side of the 'Caucasian', the 'American' (a skull from the Caribbean, acquired by Joseph Banks) on the side of the 'Mongolian' and the 'Malay' (a skull from Tahiti, also acquired by Joseph Banks) on the side of the 'Ethiopian'. But Blumenbach did not think that the 'Caucasian' degenerated, as he called it, first into the 'American' and the 'Malay', and then these forms developed into the 'Mongolian' and the 'Ethiopian' respectively, as this order might suggest. Rather, while he seems to have thought that the 'Malay' had developed from the 'Caucasian', the 'American' was of 'Mongolian' origin (Blumenbach 1798, note to Plate I and II, n.p.). In other words, the arrangement of the skulls does not indicate actual lines of transformation of one form into another; it does

not suggest a tree with two shoots branching out from the Caucasian, as has been proposed by Gould (1996 [1981], 401–412, with an image of the 'tree' on 409; see also Junker 2019, who himself proposed another tree structure as underlying Blumenbach's diagram: Fig. 6.4, 109). Blumenbach's visual order is not tree-structured. It is nonhierarchical. It follows anatomical affinity, mostly concerning the breadth of the skull, rather than descent. This is why the 'American' is between the 'Caucasian' and 'Mongolian' instead of to the left of both of them. In other words, for Blumenbach, degeneration was reversible. In adapting to American climates, in diverging from the 'Mongolian', the 'American type' in fact returned somewhat to the 'Caucasian' anatomy.

What a diagrammatic reading of the line of skulls in order of anatomical affinity was meant to convey was not actual genealogy; rather, like Camper's morphing experiments, it was intended to demonstrate that human variation was gradual. It suggested to the eye the possibility of transforming the primordial type into varieties under observation of the relations of parts and, at least to a degree, vice versa. As elaborated in the introduction of this part from the perspective of Peircean diagrammatology, diagrams were not only chosen as the tool of representation because they are inherently about the relation of parts, they were also explored for their potential for experimentation, either by making them dynamic, as in the case of Camper, or by provoking the experiment in the beholder's mind, as in the case of Blumenbach. In the end, like Camper's, Blumenbach's diagrammatics aimed to demonstrate the single origin and unity of humankind, but, unlike Camper's, it was not metric – Blumenbach's approach did not necessarily involve instruments and measurements.[8]

8 Scholars have interpreted Blumenbach's writings on the human varieties rather differently, from being egalitarian and progressive to white supremacist and racist. The latter judgments might well have something to do with the changes the English translations introduced into his texts, as John S. Michael (2017) has aptly argued. Thomas Bendyshe presented Blumenbach's *De generis humani varietate nativa* in his English translation (1865) as constructing five 'races' as distinct, separate, and unequal units. Already in 1787, Blumenbach had concluded in "Observations on the Bodily Conformations and Mental Capacities of [Black Africans]" (English translation 1799) that Black Africans were not inferior to the rest of humanity. He collected books by Black writers, he opposed his colleague Meiners' racism, Friedrich Tiedemann described him as defender of the intellectual power of Black people, and he was drawn on by abolitionists (Michael 2017; also, Douglas 2008; Richards 2018). Additionally, Blumenbach described

Prichard quoted Blumenbach's work in the original Latin and even included a translation of the latter's conclusion with regard to the five skull forms in his *Researches*. At the same time, Prichard observed that the skull bones were strongly shaped in development by the muscular system and that the differences in head shape could not be specific because of the individuality of this system. Prichard declared that none of the peculiarities described were constant and confined to one 'race'. Skull shapes that were considered typical of Black Africans and 'Mongolians' appeared also among Europeans, and even more so the other way around. Though this was acknowledged by Blumenbach, Prichard took issue with what he understood as the other researcher's insistence on the constancy of his descriptions (Prichard 1813, 56–65; for an encompassing treatment of Prichard and his work, see Augstein 1996). In the next chapter I turn to the physical anthropology of the Philadelphia physician Morton, who drew on all of the above: Prichard's ethnological and chronological knowledge, Camper's esthetic and metric as well as Camper's and Blumenbach's diagrammatic approach. However, Morton's work was of different theoretical and political intent and impact. The anthropologists so far treated were monogenists – they believed in a single origin of humankind, a humankind that constituted one species –, and their monogenism was associated with an antislavery position. To the contrary, we will see that Morton's work was taken on by polygenists and advocates for slavery. Morton wanted to have his very own impact on anthropology, ethnology, or ethnography, as he called it (Sommer 2023a, 5–10).

members of all varieties as esthetically pleasing (Michael 2020a, 80–84). However, Blumenbach was not free from the eurocentrism of his time and, in a letter, did compare a Black African skull to that of a monkey (Blumenbach to Camper, 9 September 1784, in Gysel 1983, 138).