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Email: gdz@sub.uni-goettingen.de

SECTION I.

OF THE DIFFERENCE OF MAN FROM OTHER ANIMALS.

1. *Difficulty of the subject.* He who means to write about the variety of mankind, and to describe the points in which the races of men differ from each other in bodily constitution, must first of all investigate those differences which separate man himself from the rest of the animals. The same thing occurs here which we often see happen in the study of natural history, and especially of zoology, that it is much easier to distinguish any species from its congeners at the first glance by a sort of divination of the senses, than to give an account of, or express in words those distinctive characters themselves. Thus we find it very easy to distinguish the rat from the domestic mouse, or the rabbit from the hare, but difficult to lay down the characteristic marks on which that diversity, which we all feel, depends. This difficulty of our present subject has been candidly and publicly confessed by the great authorities of the science; so much so that the immortal Linnæus, a man quite created for investigating the characteristics of the works of nature, and arranging them in systematic order, says, in the preface of his *Fauna Suecica*, "that it is a matter for the most arduous investigation to enunciate in what the peculiar and specific difference of man consists;" nay more, he confesses "that up to the present he has been unable to discover any character, by which man can be distinguished from the ape;" and in his *Systema Naturæ*, he gives it as his opinion, "that it is wonderful how little the most foolish ape differs from the wisest

man, so that we have still to seek for that measurer of nature, who is to define their boundaries;" finally, he did not attribute to man any generic or specific character, but, on the contrary, ranked the long-handed ape as his congener.

2. *Order of treatment.* Meanwhile I may be allowed to enumerate the points, in which, if I have any powers of observation, man differs from other animals, and I mean to treat the subject thus:

First, I shall enumerate those things which affect the external conformation of the human body.

Secondly, those which affect the internal conformation.

Thirdly, the functions of the animal economy.

Fourthly, the endowments of the mind.

Fifthly, I mean to add a few words about the disorders peculiar to man.

And sixthly, I shall reckon up those points, in which man is commonly, but *wrongly*, thought to differ from the brutes.

3. *External conformation.* Under this head I place some characters, which, although they are closely connected with the structure of the skeleton, yet are shown by the external habit of body, which depends upon it; and then the subsequent characters, especially if they are looked at collectively, seem to suffice for a definition of mankind:

- (A) The erect position;
- (B) The broad, flat pelvis;
- (C) The two hands;
- (D) The regular and close set rows of teeth.

To these heads all the other peculiarities which the human body exhibits, may be easily referred; and now let us examine them one by one,

4. *The erect position.* Here it is necessary for us to prove two points: first, whether the erect position is natural to man; secondly, whether it is peculiar to man (of which below, s. 10).

The former is evident *à priori*, as they say, from the very structure of the human body; and *à posteriori* from the unanimous concurrence of all the nations of all time that we are acquainted with. It is no more necessary to spend any time on this, than on the argument to the contrary, which some are in the habit of bringing from the instances of infants who have been brought up among wild beasts, and found to go on all-fours. Those who look carefully at the matter will easily see that no condition can be conceived more different to that which nature has designed for man, than that of those wretched children alluded to; for we might just as well take some monstrous birth as the normal idea of human conformation, as take advantage of those wild children to demonstrate the natural method of man's gait and life. Indeed, if we look a little more closely into these stories of wild children, it is more likely to turn out in the instances which are the most authentic, and placed beyond all doubt, as that of our famous Peter of Hameln¹ (Peter the wild boy, *Juvenis Hannoveranus* Linn.), of the girl of Champagne², the Pyrenæan wild man³, and of others, that these wretches used to walk upright; but in the stories of the others who are commonly said to go on all-fours, as the *Juvenis ovinus Hibernus* Linn., there are many things which make the story very doubtful, and of but indifferent credit⁴; so that the *Homo sapiens ferus* of Linnæus (*Syst. Nat.* ed. 12, Tom. I. p. 28) seems no more entitled to the epithet of four-footed than that of shaggy.

¹ Comp. particularly Voigt, *Magazin für Physik und Naturgesch.* T. iv. Part III. p. 91, and also Monboddo, *Antient Metaphysics*, Vol. III. Lond. 1784, pp. 57, 367. How much importance the Scotch philosopher attaches to Peter of Hameln is proved amongst other passages by the following: "this phenomenon is more extraordinary, I think, than the new planet, or than if we were to discover 30,000 more fixed stars, besides those lately discovered."

² (De la Condamine) *Histoire d'une jeune fille sauvage.* Paris, 1761, 12mo.

³ Comp. Leroy, *Sur l'exploitation de la nature dans les Pyrénées.* Lond. 1776, 4to, p. 8.

⁴ [Blumenbach's note here consists of extracts from the account of this *Juvenis Hibernus* by Tulp: but as that author is rare, I give instead the whole account at length. "The most acute sense of hearing would have been deceived by that genuine bleating which was heard by many others as well as myself to proceed from that Irish youth, who was brought up from infancy among sheep, and whom therefore it will be here worth while to describe exactly as he was. There was

5. *Man's structure proves that he was made upright by nature.* It is irksome and tedious to go a long way about to demonstrate a thing so manifest and evident of itself; but that pair of learned men, P. Moscati the Italian, and A. Schrage¹ the Belgian, who have patronized the opposite paradox, prevent my leaving it quite alone. Still it will be enough to touch on a few points out of many.

The length of his legs, in proportion to his trunk and his arms, show, at the first glance, that man was intended to be upright by nature. For, although I cannot agree with Daubenton, who thinks² that no animal besides man has such large hind feet, which are equal in length to the breadth of his trunk and head; for this is negatived by the examples of several mammals, as the *Simia lar* and the *Jerboa Capensis*; still it is plain to every one, that man is so made that he can in no wise go on all-fours; for even infants crawl by resting on their knees, although at that tender age the legs are smaller in the proportion we spoke of than in adults.

It is not however the length only, but the remarkable

brought to Amsterdam, and exposed to the eyes of all, a youth of sixteen years, who, being lost perhaps by his parents and brought up from his cradle amongst the wild sheep in Ireland, had acquired a sort of ovine nature. He was rapid in body, nimble of foot, of fierce countenance, firm flesh, scorched skin, rigid limbs, with retreating and depressed forehead, but convex and knotty occiput, rude, rash, ignorant of fear, and destitute of all softness. In other respects sound, and in good health. Being without human voice he bleated like a sheep, and being averse to the food and drink that we are accustomed to, he chewed grass only and hay, and that with the same choice as the most particular sheep. Turning in the same way every mouthful round, and taking account of each blade separately, he made his selection, and tasted now only this, and now only that, as they seemed more grateful, and more agreeable to his sense of smell and taste.

"He had lived on rough mountains and in desert places, himself equally fierce and untamed, delighting in caves and pathless and inaccessible dens. He was accustomed to spend all his time in the open air, and to put up equally with winter and summer. He kept as far as he could away from the lures of huntsmen, but at last fell into their nets, although he fled over uneven rocks, and precipitous cliffs, and threw himself most boldly into thorny brakes and sharp jungles, in which being at last entangled he fell into the power of the huntsman. His appearance was more that of a wild beast than a man; and though kept in restraint, and compelled to live among men, most unwillingly, and only after a long time did he put off his wild character.

"His throat was large and broad, his tongue as it were fastened to his palate." Tulp. *Obs. Med.* l. iv. c. 10, 5th ed. p. 296. Ludg. Bat. 1716, 12no. ED.]

¹ See *Verhandeling over de Longteering* in the journal called *Genees-Natuur-en-Huishoud-kundige Jaarboeken*, T. III. Part I. p. 32.

² *Mémoires de l'Acad. des Sciences de Paris*, 1764, p. 569.

strength of the legs compared with the more delicate arms, which clearly shows that the former are intended by nature for the sole purpose of supporting the body. This is particularly made manifest by a fact derived from osteogeny, namely, that in the new-born infant the tarsal bones, and especially the heel-bone, ossify much quicker, and become perfect much sooner than the carpal. This is a natural provision, because the little hands have no necessity for exercising any force in the first years of life, whereas the feet have to be ready to support the body, and provide for the erect gait towards the end of the first year. I say nothing of the powerful muscles of the calf of the leg, especially of the *gastrocnemii interni*, though these are made so strong and so prominent by nature to keep man upright, that, on that account, Aristotle, with the old anthropologists, thought that true calves should be ascribed to man alone.

The whole construction of the chest shows that man cannot in any way walk like the quadrupeds. For in the long-legged beasts the chest adheres to the sides as if squeezed forwards in a keel-like shape, and they have no collar-bone, so that the feet can more easily converge towards one another from each side, and in that way sustain the weight of the body more easily and more firmly. Besides, quadrupeds are provided either with a longer breast-bone, or with a larger number of ribs, descending nearer to the *cristæ ilei*, in order to sustain the viscera in the horizontal line of the trunk. But all these things are different in man, the biped. His chest is more flattened throughout, his shoulders are widely divaricated by the insertions of the shoulder-blades, his sternum is short, his abdomen more destitute of bony supports than is the case with those animals we were speaking of; and there are things of the same kind which cannot escape any one who compares with the human skeleton even a few of the quadrupeds, especially the long-legged ones. All these considerations show how ill adapted the human frame is to a quadrupedal walk, and that it cannot be anything else to him but unsteady, trembling, and very irksome and fatiguing.

6. *The broad and flat human pelvis.* What has been said gains particularly additional weight from the consideration of the human pelvis, whose clearly peculiar conformation again affords a diagnostic character by which man is made wonderfully to differ from the anthropomorphous apes, and most manifestly and most decidedly from all and singular the other mammals.

Although it may seem an affected paradox, yet the assertion, that a genuine pelvis is only to be found in the human skeleton might be defended. I mean that peculiar conjunction of the os innominatum with the sacrum and coccyx, which gives the appearance of a *pelvis*, or basin; for it is surprising how far the elongated ribs of the rest of the mammals differ from this basin-shaped formation. The termination of the ribs in the *Simia satyrus* and the elephant seem to come a little nearer the shape of the human pelvis than in other mammals whose skeletons I have examined. Still, in front the length is greater than the breadth, and behind they exhibit a very greatly elongated synchondrosis of the groin; and in both that resemblance to a basin which we spoke of is very much wanting, which is so conspicuous in man alone, in the expansion of the bones of the ilium over the linea innominata, and in the delicacy of the synchondrosis, and also in the curvature of the os sacrum from the promontory and in the direction of the vertebræ of the coccyx towards the front.

7. *The relation of the adjoining soft parts to the form of the human pelvis.* The hinder face of the pelvis gives the foundation to the glutæi muscles, of which the outermost or larger exceed in thickness all other muscles of the body, and being concealed by a remarkable stratum of fat from the buttocks. Their fleshy, useful, and semicircular amplitude, in which the podex is hidden, form, not only in the opinion of the classical authors of natural history, such as Aristotle¹ and Buffon²,

¹ *De partib. animalium*, IV. 10.

² *Hist. Nat. T. II. p. 544.* "Buttocks belong to the human species alone."

but also of the best physiologists, as Galen¹ and Haller², the principal character in which man especially differs from the apes, who are manifestly destitute of fundament.

Moreover, in consequence of that curvature of the os sacrum and the coccyx we mentioned, depends particularly the never-to-be-forgotten direction of the interior genital members of the female, and of the vagina also, the axis of which declines much more in front than in other female mammals from what is commonly called the axis of the pelvis. This makes, it is true, parturition more difficult, but, on the other hand, admirably guards against many other inconveniences, to which, especially during pregnancy, the woman, from her erect position, would be exposed.

It is in consequence of this same direction of the vagina, that in mankind the weaker sex is not, like the females of brutes, retromingent. And also because in animals (as far as we know at present) the opening of the urethra does not terminate as in woman, between the exact lips of the pudendum, but opens backwards into the vagina itself, as I have observed in these same anthropomorphous animals, the *Papio maimon* and the *Simia cynomolgus*, which I have anatomically dissected.

And, according to this same direction of the female vagina, that question must be settled which has been often discussed from the time of Lucretius, what position is most convenient to man for copulation?

“How best to prolongate the soft delight?”

For although man may perform this ceremony in more ways than one, and this variety of worship has been considered by the low Latinists as one of the things in which he differs

¹ *De usu partium*, xv. 8. Spigel, *De humani corporis fabrica*, p. 9, has cleverly elaborated the physico-theological theory of this prerogative. “Man alone of all animals can sit conveniently, since he has large and fleshy buttocks, which serve for a seat and cushion, when his stomach is full, in order that he may sit without annoyance, and easily apply his mind to reflection on divine subjects.”

² *De corp. hum. functionibus*, T. I. p. 57. “Nor are the apes distinguished from men by any mark easier than by this.”

from brutes, still physical causes sometimes interfere to induce him to copulate¹

“Like beasts or quadrupeds are used to do.”

Still the proportion of the virile member to the vagina seems better adapted for the usual mode of venery³.

8. *Remarks on the hymen, nymphæ, and clitoris.* In order to finish at one and the same time all those delicate matters which belong to the female part of mankind, I must here throw in something about the hymen, which little membrane, so far as I know, has hitherto been found in no other animal. Though I have examined the females of apes and papios with that view, I have never been able to find any vestige of it, or any remains changed into the *carunculae myrtiformes*; nor was I more successful with the female elephant which was led about Germany many years ago, whose genitals I particularly examined, because I had been told that Trendelburg, a famous physician of that day at Lubeck, had observed some kind of hymen in that beast. This little appendage to the female body is all the more remarkable, because I cannot imagine that any physical utility attaches to it. At the same time I am not much satisfied with the conjectures the physiologists offer as to the purpose of the hymen; and least of all with what Haller rather weakly suggests, “since it is found in mankind alone, it must be admitted that this sign of virginity was given for moral ends.”

¹ Comp. Carpi (Berengarius), *Commentaria super anatomia Mundini*, p. 13. “Man of all animals copulates by embraces and caresses in different positions, and is detestable for this, because he is more wicked and voluptuous and diabolical than rational.”

² Kæmpf. *Enchiridium Medicum*, p. 181.

³ When I was at London two years ago, I looked over the vast treasury of engravings preserved in the library of the King of Great Britain; and was particularly struck with and most carefully studied that famous volume of drawings relating both to human and comparative anatomy, etched by the great painter Leonardo da Vinci. Amongst them I observed particularly that remarkable and, in its way, unique representation of the copulation of a man with a woman, in which the trunk of each is so exposed to view, that the relation I hinted at, of the genital member when in a state of tension to the direction of the vagina, is made quite plain. I am indebted for a most accurate copy of this very clever print to the kindness of that most amiable man and excellent artist, John Chamberlaine, librarian of that Royal collection.

Linnæus seems to have been in doubt whether the females of other kinds besides women are endowed with the nymphæ and the clitoris. But I have proved myself that neither of those parts is peculiar to mankind. I have, following many other most competent witnesses, clearly observed the clitoris in many sorts of mammals of different orders, and frequently have found it very large as in the *Papio maimon* and the *Lemur tardigradus*; but most prodigious of all, about the size of a fish, in a specimen of the *Balcena boops* about fifty-two feet in length, which I carefully examined when it was thrown on the shore in Dec. 1791, near Sandfurt in Holland. As to the nymphæ, I have found them exactly like human ones in a *Lemur Mongoz*, which I kept alive myself for many years.

9. *Man a bimanous animal.* From what has been so far said about the erect stature of man follows that highest prerogative of his external conformation, namely, *the freest use of two most perfect hands.* By this conformation he so much excels the rest of the animals, as to have given rise to that old saying of Anaxagoras, which has been cooked up again in our time by Helvetius, "that he thought man was the wisest animal, because he was furnished with hands." This is rather too paradoxical: the assertion of Aristotle seems nearer the real truth, "that man alone has hands, which are real hands." For in the anthropomorphous apes themselves, the principal feature of the hands, I mean the thumb, is short in proportion, and almost nailless, and to use the expression of the famous Eustachius, quite ridiculous: so that it is true that no other hand, except the human hand, deserves the appellation of the organ of organs, with which the same Stagyrice glorifies it.

10. *Apes and the allied animals are quadrumanous.* Apes and the other animals, which are commonly called anthropomorphous, of the genera of *Papiones*, *Cercopithecæ* and *Lemures*, ought not in reality to be called either bipeds or quadrupeds, but *Quadrumana*. For their hind feet are furnished with a second genuine *thumb*, not with the great toe, which is given

to the biped, man, alone¹; indeed their feet deserve the name of hands more than their anterior extremities, since it is plain that they are adapted for purposes of prehension; and one kind of cercopithecus (*C. paniscus*) is endowed with a thumb, which is wanting in the anterior hands; but it has never been observed of any quadrumanous animal, that it is destitute of the thumb of the hind-hands.

Hence too it will be easy to settle the dispute which has been raised about the *Simia satyrus* and other anthropomorphous apes, namely, whether it is natural for them in their own woods to go as bipeds, or as quadrupeds. Neither one nor the other. For since the hands are not meant for walking upon, but for prehension, it is at once plain, that nature has designed these animals to spend their lives principally in trees. These they climb, on these they seek for their food, and so they want one pair of hands to support them, and the other pair to pluck fruits with, and other things of the kind; and for the same end nature has provided many of the cercopithecii, who are furnished with but imperfect hands, with a prehensile tail, in order that they may have a more secure hold upon trees.

It is scarcely necessary to point out that it is the result of art and discipline if any apes are ever seen to walk erect, and is plain from any drawings of the *Simia satyrus*², which have been taken carefully from the life, how inconvenient and unnatural that affected position of theirs is, in which they are made to lean with their fore-hands on a stick, their hind-hands meanwhile being collected in an unmeaning way into a fist³. Nor have I ever come across any example of an ape, or any other mammal except man, who can, like him, preserve an equilibrium

¹ That extraordinary lover of paradoxes, Robinet (T. v. *De la nature*, Tab. 9), exhibits the drawing of an embryo, which he gives out for that of the *Simia satyrus*: although it is plain at the first glance from the feet alone, which are furnished with a great toe, not a thumb, that it is a human foetus.

² See for example the monograph of Vosmaer.

³ Linnæus therefore was mistaken when he said, "that there were apes which walked with body erect on two feet like man, and who reminded one of the human species by the use they made of their feet and hands."

when standing erect on one leg at a time. Hence it is clear that the erect posture, as we find it to be naturally convenient to man, so also is it peculiar to him. Thus

"Mankind alone can lift the head on high
And stand with trunk erect."

11. *Properties of the human teeth.* The teeth of man are more regular than those of any other mammals. The lower incisors are more erect, which I reckon amongst the distinctive characters of the human body. The canines are neither too prominent, nor set too far back, but joined in the same line with their neighbours. The molars have singularly round obtuse crowns, by which they most clearly differ from the molar teeth of the *Simia satyrus* and the *S. longimana*, and all the other species of this genus whose skulls I have examined. Finally, the mandibles of man are distinguished by three characters: by their excessive *shortness*; the prominence of the chin, which corresponds with the erect incisors; but, above all, by the singular shape, direction, and junction of the condyles with the temporal bones, which certainly differ from the jaws of all other animals I am acquainted with, and which clearly prove that man is destined by nature for all kinds of food, or is an animal truly omnivorous.

12. *Other things which seem peculiar to the exterior of man, as his hairless body, &c.* I shall say nothing about some points of less importance which are frequently classed among the distinctive characters of man, such as the lobe of the ear, the swelling of the lips, especially the under one, and other things of that kind. But I must dispose in a few words of the glassy smoothness of the human body, and inquire how far it can be included among the diagnostic signs by which man differs from other mammals, who are in some way like him. Linnaeus indeed asserts, "that there are some regions where there are apes less hairy than man;" but I candidly confess that I have hitherto made fruitless inquiries as to whereabouts these apes may be. On the contrary, it is proved by the unanimous consent of all travellers who are worthy of credit, and by the specimens of those animals which have been seen frequently in

Europe, that those anthropomorphous apes which are usually included under the common Malay name of Orang-utan, and which are indigenous to Angola as well as to Borneo, and also the *S. longimana*, are naturally much more shaggy than man: insomuch that those which are not even adult, and have delicate health, still are more hairy than man. Though this position is beyond all doubt, yet it is the fact that men have been observed everywhere, and especially in some of the islands of the Pacific ocean, remarkable for their shaggy bodies; but accurate descriptions of them are still wanting.

The first mention of them occurs in the nautical expeditions of the famous Spangberg¹, who, on his return to Kamschatka from the coast of Japan, relates that he found a nation of this kind on the most southern of the Kurile islands² (lat. 43° 50'). Anomalous individuals of the same kind were observed, but only here and there, among the inhabitants of the islands of Tanna, Mallicollo, and New Caledonia, by J. R. Forster³. There is a report of a similar race in Sumatra⁴, which is said to inhabit the interior of the island, and is called *Orang-gugu*. As, however, man is in general conspicuous for his smooth and even skin, so, on the other hand, some particular parts of the human body seem to be more hairy than in brute animals, as the groin and the arm-pit, which characteristic has accordingly been ranked among those peculiar to man.

13. *Remarkable properties of the human body as to its internal fabric.* Having mentioned what was necessary about the absolute properties of the external human body, we are now brought to another point of the discussion, that is, his *internal fabric*; about which however our narrow limits compel us to follow Neoptolemus, and philosophize in a very few words. It will be necessary to divide this discussion into two heads; first,

¹ Müller's *Sammlung Russischer geschichte*, T. III. p. 174.

² Beyond doubt *Nadigda* island, about whose inhabitants, though only by hearsay, the companion of the great Cook, James King, received the same story. *Voyage to the Northern Hemisphere*, T. III. p. 377.

³ See his *Bemerkungen auf seiner reise um die Welt*. p. 218.

⁴ Marsden, the classical author on that island, tells us what he heard about them. *Hist. of Sumatra*, p. 35 n.

by investigating those things which man alone, or only a few other animals with him, has not got; secondly, those things which are peculiar to him.

14. *Internal parts which man is without.* Those parts which are found in mammals, and especially in the domestic ones, were once, when the opportunities of dissecting human corpses were rare or were entirely neglected with the taste for dissection, generally almost all attributed to man. Thus, for example, the *panniculus carnosus* or subcutaneous muscle, which was wrongly ascribed to him by Galen and his followers, and even by the restorer of human anatomy himself, I mean Vesalius, who was an acute critic of the mistakes of Galen, was properly denied to him by Nicolas of Steno, and ascribed to brute animals alone.

The *rete mirabile arteriosum*, which was also reckoned by Galen amongst the parts of the human body, was demonstrated to be wanting in man by Vesalius, following Berengarius of Carpi.

The *musculus oculi suspensorius s. bulbosus s. septimus*, with which the four-footed mammals are furnished, was first shown to be wanting in man according to the plan of nature by Fallopius. It has lately been found out that the human fetus has no allantoid membrane, which is common to almost every other mammal.

I say nothing of other parts which though found in but few genera of brute animals, nevertheless have been sometimes falsely attributed to man, as the so-called *pancreas aselli*, *ductus hepaticystici*, *corpus Highmorianum*, &c. or those which are bestowed on some orders of mammals alone, but are so manifestly denied to man, that no one would readily attribute them to him; among which I mean the *membrana nictitans* (which for the sake of the order of discussion I thought it better to mention here, although it rather belongs to the external parts) and the *ligamentum suspensorium colli*, and all other things of that kind. Man shares the *foramen incisivum* behind the upper primary teeth with the quadrupeds, but it is smaller in proportion and simple, whereas in most of the other mammals it is double, and in many of vast size.

15. *The intermaxillary bone.* An account of this remarkable bone is given separately for more reasons than one. The bones of the upper jaw which in man are contiguous to each other, and keep all and each of the upper teeth fixed in their place, in brutes are separated from one another by a singular third bone shaped like a wedge inserted between them. This bone is called by Haller the *os incisivum*, because the upper incisors (where there are any) are fitted in it. As however it is also found in those mammals who are destitute of such teeth, as cattle, the elephant, the two-horned African rhinoceros, or those which belong to the Edentata, as the anteaters and the Balanæ, I think it had better be called the *os intermaxillare*¹. In some this bone is one and indivisible, but in many bipartite, and in all distinguished by its own sutures from the neighbouring bones of the skull; one, the facial, generally extending in both directions along the nose to the extreme sockets of the incisors, the other, the palatine, running in a curved direction from those sockets to the foramina palatina.

When, therefore, Camper brings forward the want of this bone as one of the principal characters by which man differs from other mammals, a double question arises; First, Is man really without it? secondly, Are all the rest of the mammals provided with it? It was about two centuries and a half ago when this question first gave scope to a most bitter dispute between anatomists. Galen indeed has reckoned the sutures of what we have called the intermaxillary bone among the others of the skull, but Vesalius made use of this argument besides many others, to show that Galen had composed his osteological hand-book, which had so long been accepted as law, not from the skeleton of a man, but from that of an ape. It was thought after the vain attempts of Jac. Sylvius to vindicate² his Galen by the most wretched excuses, that this whole

¹ It is called by the famous zootomists Vitet and Vicq. d'Azyr *os maxillare inferius*; and by Blair, in his osteography of the elephant, *os palati*.

² He so twists about in endeavouring to save his divine Galen, that at last he drops down to this excuse, that although men of the present day have no intermaxillary bone, yet at the time of Galen they might have had one; and so this is

question was completely put an end to, when beyond all expectation even in our own time, Vicq d'Azyr has attempted to demonstrate an analogy between the human and animal constitution as far as the *os intermaxillare* goes, as if it were quite a new thing¹. The only vestige of similitude on which that analogy rests, namely, the semilunar fissure, which may be seen in the maxillary bones of the human fœtus, and of infants, in a transverse direction behind the sockets of the incisors, and which sometimes remains even in adults, has long been very well known². It was, however, well pointed out more than two hundred years ago according to natural truth by the sagacious Fallopius³, that the fissure in question was ill designated by the term suture. It is not necessary to mention that the facial side of the maxillary bones in the human skull is marked by no fissure, or even suture, of this kind, though it is conspicuously so in apes⁴.

As to the other question, whether man is the only mammal who is destitute of the intermaxillary bone, I must equally confess, that I have in vain sought for it in many skulls of the *Quadrumanæ*. The sutures which would indicate this bone are wanting in the skeleton of the dead female *Cercopithecus* which is preserved in the museum of the University, whose skull in other ways shows the remaining sutures well enough. Nor did I find them either in another skeleton of the same species, belonging to Billmann, the clever surgeon of Cassel, which however was old at the time of death and has many of the sutures obliterated, so that from this single specimen it would have been impossible to come to any conclusion.

no reason for attacking the prince of anatomists—"but there are some natural obstructions, which have taken possession of our bodies from intemperance in diet and venery, and from immoderate vice."

¹ *Mémoires de l'Acad. des Sciences de Paris*, 1780.

² See the figures of Vesalius and Coiter.

³ "I do not agree," says he, "with those who give out publicly that they have found out a *suture* under the palate attached in a transverse direction to either canine, which is plain in boys, but so obliterated in adults, that no vestige of it remains. For I consider this to be rather an indentation than a suture, since it does not separate one bone from another, nor show on the outside."

⁴ Eustachius, *Tab. Anat.* 46, fig. 2.

But I am acquainted with a third specimen of the same *Cercopithecus*, for the knowledge of which I am indebted to my friend Schacht, the worthy Professor of Harderovich, and in this too that bone is absent. So that it seems scarcely worth while to inquire about the presence or absence of this bone in any other specimens of this animal. In the ugly skeleton of that truly vast anthropomorphous ape from the island of Borneo, which I have examined carefully over and over again in the collection of Natural History belonging to the Prince of Orange at the Hague, I did not see the smallest vestige of those sutures; but that this ape was full grown is proved not only by the general condition of the skeleton, but also by the coalition of most of the sutures of the skull¹.

Such, however, is not the case with the skull of a younger anthropomorphous animal of the same kind, the remains of whose skeleton I dissected at London in the British Museum. An old label yet attached to it informs us that it belongs to the ape they call *orang-utan*, and was brought from the island of Sumatra, by the captain of the ship 'Aprice.' In this skull not a shadow of the sutures of the intermaxillary bone was to be found, although the remains of all the others are without exception still apparent. Neither did Tyson find them in his Angolese Satyr, nor does the figure in Daubenton of the skull of a similar animal, from the same locality, exhibit them. However then this may be, it is certain, what may also be held a character of man, that in the skulls of the apes I have been speaking of, the jaws are very prominent and projected forward as in the other mammals.

16. *Differences between some internal parts of man and those of other animals.* It must be seen at once that we can only speak here of a few of these differences, and those the most remarkable. To begin with the head, besides some things of less moment, man has, as it seems, the smallest crystalline lens

¹ I wonder Camper should be of the opposite opinion, for he says that this is the skeleton of an anthropomorphous ape not yet adult. *Naturgeschichte des Orang-utang*, p. 146.

(the cetacea excepted) in proportion, and it is less convex in the adult than in other animals; the large occipital foramen is placed more forward than in quadrupeds¹, and there are other things of the same kind. The mass of the brain is the largest of all, not indeed (according to the opinion which has prevailed from the time of Aristotle) in proportion to the whole body, but, according to the able observation of Sömmerring, when account is taken of the slenderness of the nerves which issue from it². For if the whole nervous system was divided from a physiological point of view into two parts, one, the nervous part properly so called, which embraces the nerves themselves and that portion both of the brain and the spinal marrow which lies close to their commencement; and the other, or sensorial part, which lies nearer the knot where the functions begin to coincide with the faculties of the mind, we should find that man has much the largest share of that nobler sensorial part.

That too is equally remarkable, the knowledge of which we also owe to the sagacity and acuteness of Sömmerring, that the *arenulæ* of the pineal gland so often already observed by others, are so constantly and perpetually found in human brains, from the fourteenth year of age upwards, that they also deserve to be reckoned amongst the peculiarities of man³. Once only, in the pineal gland of a stag, did he find similar arenulæ. And if they are ever really absent in the encephalon of an adult man, it certainly must be considered a very rare anomaly. One instance of this absence I owe to the famous physiologist of Padua, L. M. A. Caldani, who writes me word, that out of four human brains which he examined in 1786 with that object, there was only one, and that of an old man, in which no vestige of a pineal arenula was to be found.

The position of the heart is peculiar to man, and is said to be in the chest, because that entrail does not rest as in quadru-

¹ Daubenton, *Mémoires de l'Acad. des Sc. de Paris*, 1764.

² See his *Diss. de basi Encephali*. Götting. 1778. Ib. *Über die Körperliche Verschiedenheit des Negers vom Europæer*, and Ebel (J. G.), *Observationes neurolog. ex anatome comparata*, Frankf. ad Viad. 1788.

³ Sömmerring, *De capillis vel prope vel intra glandulam pinealem sitis*. Mogunt. 1785. A figure is given in *Diss. de decussatione nervorum opticorum*, ib. 1786.

ped upon the sternum, but in accordance with the erect position, on the diaphragm. Its base too is not as in them at right angles to the head, but to the vertebræ of the chest, like the tip of the left breast, and hence in them the heart lies right and left, whereas in man it rather has a front and back. Scarcely any other mammals beside man have the pericardium adhering to the diaphragm. The alimentary canal is just as perfect as it ought to be in an omnivorous animal. You might say man resembled the carnivores in the structure of the ventricle, and the shortness of the blind intestine; on the other hand, he is different from the herbivores in the length of the thin intestine, and its great diversity from the thick one; in the bulbous colon; in the absence of the sebaceous glands which secrete smell behind the anus. The *muliebria* too are different* in man besides what has been already mentioned, in the singular parenchyma of the womb; and the early fœtus is remarkable for the texture of the placenta, the length of the umbilical funnel and the singular umbilical vein. So far as I know, the hitherto enigmatical *vesicula umbilicalis* is peculiar to the young human embryo; and I have mentioned elsewhere¹, that it is common and natural to every human fœtus about the fourth month after conception, where I also have said something about the analogy it bears to the yolk-like bag of the chicken during incubation.

17. *Peculiarities of man, in respect of the functions of animal economy.* Here especial mention must be made of the peculiar tenderness and delicate softness of the human *tela mucosa*, or *cellulosa*, as it is commonly called. It is well known that there is a most remarkable difference in the different genera and species of animals as regards the substance of this tissue; that of eels being very tenacious, that of the herring being very tender: and so it was long since observed by our Zinn, a most eagle-eyed anatomist, that man, other things being equal, had beyond all other mammals the most delicate and subtle cellular substance.

¹ *Comment. Soc. Reg. Scient. Götting. T. IX. p. 116.*

I am either very much mistaken, or the softness of that envelope is to be counted amongst the chief prerogatives by which man excels the rest of the animals. For as this membrane is on the one side diffused over all parts of the body from the corium to its inmost marrow, and is interwoven like a chain with all and every part of the whole machine, and on the other is the seat of that most universal of all vital forces, contractility, next to which the dynamic power called after Stahl seems to come, I am thoroughly persuaded that to the flexible softness of this mucous membrane in man is owing his power of accustoming himself more than every other mammal to every climate, and being able to live in every region under the sun. As then nature has made man omnivorous in the matter of food as we have seen, so in respect of habitation it has intended him to dwell in every country and climate (*παντοδαπόν*): and so his body has been composed of a most delicate mucous composition, that he may adapt and accommodate himself more easily to the multifarious effects of different climates.

To this aptitude for accommodation admirably answers that other physiological property of man, namely, *his slow growth, long infancy and late puberty*. In no other mammal does the skull unite or the teeth appear so late; no other animal is so long learning to stand upon its feet, or in arriving at its full stature, or so late in coming to the exercise of the sexual functions. In another point of view no other animal, considering the moderate size of his body, has allotted him by nature so protracted a term of life¹. This incidental mention of his stature recalls to my mind that other singular property which, as far as I know, has been observed in no other animal, and which depends upon his erect position, namely, that his height

¹ It is scarcely possible to define the natural duration of human life, though we may consider it to be the more common and, as it were, ordinary goal of protracted old age. It is worthy of remark, what I have learnt from a careful comparison of many tables, that a considerable number in proportion of European old men attain the age of 84, whilst few survive it. Account therefore being taken of human longevity, and comparing it with the duration of the lives of other mammals, it is at once seen what a prerogative is bestowed upon man under that name, or at all events that his long infancy is compensated for with interest.

in the morning exceeds by somewhat more than a finger's breadth his height in the evening¹.

There are also some particulars to be mentioned about the sexual functions. Man has everywhere no particular time of year, as the brutes, in which he desires to copulate². To men alone is conceded the prerogative of nocturnal pollutions, which I am inclined to consider as natural excretions of the healthy man, to the intent that he may be thereby freed from the annoyance and stimulus of superfluous semen when it is suitable to him on account of his temperament or constitution. The menstrual flux, on the other hand, is not less peculiar to women, and is more universal and common to all, so that I think Pliny was right in calling woman the only menstruating animal. I am indeed aware that a flux of the same kind has been frequently attributed by authors to other female animals, especially those of the quadrumanous order; thus, for example, the *Simia Diana* is said to menstruate from the tip of its tail, &c. But for twenty years I have had opportunities of seeing female apes and papios, &c. in menageries, or in travelling caravans, and have made inquiries about this subject. I often found that one or other of them sometimes suffered from uterine hæmorrhages, but that they occurred at no regular period. Such was the assertion of the more honest keepers, who looked on it as a kind of diseased affection contrary to nature, and most of them candidly confessed, that they generally gave it out for a menstruous flux, in order to excite the astonishment of the mob. As to the fabulous stories of credulous antiquity about whole nations whose women are destitute of the menstruous flux, I shall briefly speak of them in another place.

18. *Faculties of the mind which are peculiar to man.* All with one voice declare that here is the highest and best pre-

¹ This was first observed in 1724 by an English clergyman, Wasse. *Philos. Trans.* T. XXXIII.

² Unless you like to believe Augustine Nipho, who in his singular book on love (which he dedicated to Joan of Aragon, famous for her extreme beauty), discusses the reasons which cause "women to be more lustful and amorous in summer, but men on the other hand in winter."

rogative of man, *the use of reason*. But when any one inquires more particularly what these words mean, we must needs wonder how many different reasons about the meaning of reason are entertained by the most reasonable philosophers. Some think it is altogether a quite unique and peculiar faculty of man, others but the elevated and very superior grade of a faculty, of which only slight vestiges are to be found in the soul of brutes. Some look upon it as the union of all and singular the highest faculties of man; others a particular direction of the faculties of the human mind, &c.

‘It is not ours to settle such disputes.’

I trust to resolve the question more briefly and safely, *à posteriori* as they say, by considering it as that prerogative of man which makes him lord and master of the rest of the animals¹. That he has this kind of dominion is obvious. It is also equally plain that the cause of this dominion does not reside in his bodily strength. It must therefore be referred exclusively to the gifts of the mind and their superiority. And these gifts in which man so far surpasses the rest of the animals, of whatever disposition and nature they may be, we will call *reason*. Nature, as we have seen, has made man so as to be omnivorous and an inhabitant of the whole world. But this unlimited liberty of diet and locality, according to the almost infinite variety of climate, soil and other circumstances, brings with it also multifarious wants which cannot be met or remedied in one way alone. His Creator has therefore fortified him with the power of reason and invention, in order that he may accommodate himself to those conditions. Hence, even from the most ancient times, by the wisest nations, this chief power of man, that is, the genius of invention, has been celebrated with divine honours. Thoth, for example, by the Egyptians, Hermes by the Greeks. Thus, to compress a good deal in a few words,

¹ “Whoever thou art who unjustly depreciate the lot of man, think what gifts our parent has bestowed upon us, what much more powerful animals we put under our yoke, what much fleetier animals we capture, and how there is nothing mortal which is not put under our stroke.”—Seneca.

man has made tools for himself, and so Franklin has acutely defined him as *a tool-making animal*; thus he has prepared for himself arms and weapons; thus he has found out ways of eliciting fire; and thus, in order that one man may use the advantages and assistance of another, he has invented *language*, which again must be considered as one of the things peculiar to man¹, since it is not like the sounds of animals, conventional, but, as the arbitrary variety of languages proves, has been invented and turned to use by him².

19. *Something about laughter and tears.* Besides that other manifestation of the mind I have just spoken of, I mean language, two others must be mentioned, about which there has hitherto been less doubt, whether, like speech, they are the property of man alone, since they have not been invented by, but are as it were congenital to him, and do not so much belong to the use of reason, as to the passions of the mind; I mean, *laughter*, the companion of cheerfulness, and *tears*,

‘The better part of all our senses.’

It is well known that many animals secrete tears, besides man. But it is a question whether they weep from sorrow. Competent witnesses assert it of some; as Steller³ of the *Phoca ursina*, and Pallas⁴ of camels. It seems however more doubtful whether brute animals display pleasure by laughter, although many instances are given in authors. Le Cat, for example, asserts that he had seen the *Satyrys Angolensis* both weeping and laughing⁵.

¹ The subtleties of the old and more recent schoolmen on the language of brutes are infinite. As a specimen it will be enough to cite Albertus called Magnus, who allows language to one anthropomorphous ape, I mean the pygmæus, besides man, yet not without a memorable restriction. “The pygmy speaks although it is an animal destitute of reason, *but cannot discourse*, nor make use of abstract terms, but its words are rather directed to the concrete things about which it speaks.”

² Hobbes long since perceived that man had himself invented language (about which the, in other respects, most accurate Sussmilch still doubts in our days); “the most noble and profitable invention of all other was that of speech, whereby men declare their thoughts one to another for mutual utility and conversation; without which there had been amongst men neither commonwealth, nor society, no more than amongst lions, bears and wolves.”—*Leviathan*, p. 12, ed. 1651.

³ *Nov. Comment. Acad. Scienti. Petropolit.* T. II. p. 353.

⁴ *Nachrichten über die Mongolischen Völkerschaften*, T. I. p. 177.

⁵ *Traité de l'Existence du fluide des nerfs*, p. 35.

20. *The most note-worthy diseases peculiar to man.* Although these pathological affections seem at first sight to have very little to do with the natural history of man, still I may be allowed to spend a few words in borrowing a summary of the principal diseases, which are also peculiar to man, especially as these phenomena, which are against nature and peculiar to him, depend on the temperament and constitution of his body, and his animal economy; and may with the same justice be noticed here, as the diseases of some animals peculiar to them are recounted in their natural history, as the *Lues bovilla*, the *Coryza maligna* of horses, or the voluntary madness which seems so frequent in dogs, &c. It will be understood that we shall only speak here of the most remarkable disorders, and that even those few, chosen out of many others, are not yet placed beyond all doubt, since the nosology of brutes, if we once leave aside our few domestic animals, is almost entirely uncultivated on account of its grave and partly insuperable difficulties. Still we may enumerate the following diseases as being with great probability some of those peculiar to mankind:—

Very nearly all the eruptive fevers; or at all events particularly among them,

Variola ¹ ,	Miliaria,
Morbilli,	Petechiæ,
Scarlatina,	Pestis.

Amongst the hæmorrhages;

Epistaxis (?),
Hæmorrhoides,
Menorrhagia.

Amongst the nervous affections;

Hypochondriasis,
Hysteria.

¹ Some years ago I was informed by letter by the famous doctor Jansen of Amsterdam, that an ape there had contracted a local ulcer from some eruptive contagion, but no fever of that kind.

Disorders of the mind, properly so called, as *Melancholia*, *Nostalgia*, &c. and perhaps *Satyriasis* and *Nymphomania*.

Cretinismus.

Of the cachectic disorders;

Rhachitis (?),

Scrofula (?),

Lues Venerea,

Pellagra,

Lepra and Elephantiasis.

Of the local disorders;

Amenorrhœa,

Cancer (?),

Clavus,

Hernia congenita (?).

The various sorts of *Prolapsus*, as that of the *vesica urinaria inversa*, of which we owe a very accurate notice to the sagacity of the famous Bonn¹.

Herpes (?),

Tinea capitis.

I am doubtful whether I ought to include here the intestinal worms of man and two species of the genus *pedicula*, observed in no other mammal, as far as I know, but him. I say nothing of those disorders which, though not peculiar to man, are far more frequent in him than in other animals; such as tooth-ache, miscarriage, abortions, difficult parturition, &c.

21. *Short list of those things, in which it is commonly, though wrongly thought, that man differs from the brutes.* Most of these points have been referred to above as opportunities occurred. Those which are left shall be briefly recounted. Such, for example, is the proximity of the eyes, whereas, in

¹ I think the reason why this remarkable defect in conformation has been so observed in human infants, but not, as far as I know, in the fetus of any other mammal, is to be sought for in the narrower proportionate synchondrosis of the pubis in man, that singular and, as it were, bipartite fissure, which also has been so accurately investigated by Bonn. See Roose, *Diss. de nativo vesicæ urinariæ inversæ prolapsu*. Götting. 1793, 4to, with engravings.

the apes, the eyes are much closer together than in man. The lashes in either eye-lid, which have been furnished not only to man, but to many other quadrumanous animals, and even to the elephant. The *Simia rostrata* has a more prominent nose than man¹. The ears are not immoveable in all men, nor are they moveable in all the rest of the mammals. For example, the *Myrmecophagæ* must be excepted. The organ of touch is common to most of the quadrumana with man; and so is the *uvula*. I am ashamed to mention some things which are too worthless, as eructation, which has been reckoned one of the prerogatives of man²; and that man cannot, like brutes, be fattened³, and other stuff of the same kind.

¹ Buffon, *Hist. des quadrupèdes. Suppl. T. VII. Tab. II. 12.*

² Æmilianus, *De ruminantibus*, p. 50. "As man alone walks upright, so he alone, out of so many animals, can eruct; for as the breath is light it seeks a higher region, and, by a sort of natural impetus, is carried to the top."

³ Lorry in *Hist. de la Société de Médecine*, a. 1779.