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ANNOTATED BIBLIOGRAPHY OF REPORTS OF DISSECTIONS OF GREAT APES: 1699-1871

1699

Citation: Tyson, E. 1699. *Orang-outang sive Homo sylvestris: Or the anatomy of a pygmie compared with that of a monkey, an ape, and a man*. London: Thomas Bennet and Daniel Brown.

Summary: Tyson's monograph is an impressively detailed and superbly illustrated report of the results of his and William Cowper's dissection of an infant common chimpanzee.

Provenance: Individual reported to have been brought from Angola to Bristol on a merchant ship early in 1698. It was alive when it was transferred to London, where it died, probably in April of the same year.

Claimed study taxon/taxa: *Orang-Outang, sive Homo Sylvestris* or "Pygmie."

Probable study taxon/taxa: Several lines of evidence are consistent with the dissected cadaver being an infant common chimpanzee, *Pan troglodytes*. First, Tyson reports that the 'pygmie' was brought from "*Angola* in *Africa*" (p. 2). Second, its skeleton, which is preserved in the Natural History Museum in London, is consistent with it being a common chimpanzee. The illustrations in Tyson's monograph are also consistent with it being a common chimpanzee.

Novel data: Yes.

Significance: This was the first comprehensive description in the anglophone literature of the morphology of any of the extant non-human great apes.

Description: The comparative anatomist Edward Tyson reports in considerable detail the results of his and William Cowper's dissection of what is almost certainly an infant common chimpanzee. The first 58 text-pages are devoted to careful descriptions of the external appearance (Figure 2) and the viscera of the pygmie. The subsequent section is devoted to its skeleton (26 text-pages) and muscles (seven text-pages). For each system or region Tyson identifies any differences between the dissected animal, monkeys (i.e., Barbary apes) and modern humans. Next come two lists (pp. 92-95). The first enumerates the 48 ways Tyson's "Pygmie" "more resembled a Man" (p. 92), and the second the 34 ways it "resembled more the Ape and Monkey-kind" (p. 94). In a brief summary on p. 91 Tyson suggests that "our *Pygmie*, more resembled the humankind than *Apes* and *Monkeys* do" and "our *Pygmie* is no *Man*, nor yet the *Common ape*; but a sort of *Animal* between both." The final section (pp. 95-108) consists of legends for the exquisite copper-plates illustrating the dissections prepared by M. Vandergucht: his name appears on the frontispiece of the second, 1751, edition, but not the first. Bound in with Tyson's anatomical description are three 'Philological Essays' concerning the ways that the

Ancients interpreted ‘Pygmies,’ ‘Cynocephali’ and ‘Satyrs and Sphinges.’ He concluded that none of them were *Men.*

1803

Citation: Camper, P. 1803. *Oeuvres de Pierre Camper, qui ont pour objet l’histoire naturelle, la physiologie et l’anatomie comparee*. Paris: Chez H. J. Jansen.

Summary: Camper reports on dissections—his own and others—of orang-utan cadavers sourced from the Dutch East Indies.

Provenance: Judging from his account, all of these animals came from the Dutch East Indies.

Claimed study taxon/taxa: Orang-Outang

Probable study taxon/taxa: *Pongo pygmaeus*

Novel data: Yes.

Significance: One of the earliest reports of orang-utan morphology.

Description: The text refers to information about several animals made available by colleagues at different times, as well as the results of his own dissections. From the location, or affiliations, of these colleagues, all of the observations appear to be about specimens belonging to *Pongo.* The first individual is an animal described by Relian, a surgeon in Batavia (the erstwhile capital of the Dutch East Indies, now Jakarta in Indonesia) that was brought to Camper’s attention by M. Allamand (presumably before 1770). The second was described in 1770 by M. Hoffmann, a physician in Batavia: Camper suggests (p. 82) that he dissected the larynx of this individual. A further animal was provided by M. Hope “directeur de la Compagnie des Indes orientales hollandaise” in 1771. Camper provides linear dimensions of the head, trunk and limbs of the Hoffmann and Hope animals in a table (pp. 48-9). The fourth individual was described in 1772 by M. Vosmaer, “directeur du cabinet d’histoire naturelle du stadthouder”; Vosmaer apparently dissected the viscera of that individual. The next was made available, also in 1772, by M. Van der Meulen, a “capitaine de la bourgeoise” based in Amsterdam. The sixth animal, an immature male, came from the “menagerie du Petit-Loo”. It was made available by M. Van Hoey and was dissected by Camper on August 31st, 1777 (p. 51). In the second chapter Camper focuses on the detailed comparative anatomy of the cartilages and soft-tissues of the larynx, comparing the orang-utan he dissected in 1777, plus his dissections of the Hoffman and Hope individuals, with the morphology seen in other primates, including modern humans. Camper describes the distinctive laryngeal pouches of the orang-utan in his 1777 dissection (p. 85). The third chapter (pp. 93-101) focuses on the intestines, the fourth (pp. 102-107) on the female sex organs, the fifth (pp. 108-112) on the male sex organs; these observations are based on Camper’s dissection of the Van Hoey individual. The next chapters focus on the skeleton. The sixth (pp. 113-120) provides linear measurements (pp. 114-115) taken from the Vosmaer individual, the seventh (pp. 121-127) focuses on the cranial axial skeleton, the eighth (pp. 128-131) on the pelvis, sacrum

and coccyx, the ninth (pp. 132-136) on the femur, and the tenth (pp. 137-146) on the hand with some references to the foot. Camper provides legends (pp. 180-196) for illustrations. These are, respectively, based on the Hoffmann individual (Planche I, Figs. 1-4, and Planche II, Figs. 1-2), an individual "j'ai disseque a Amsterdam, en 1757" (p. 185) (Planche II, Figs. 3-7), the Van Hoey individual (Planche II, Fig. 8), the Hope individual (Planche II, Fig. 9), and "du premier Orang" (Planche II, Fig. 10). It is not clear which individuals are illustrated in Planche III, except for Fig. 4 which is based on the Hope individual, and Figs. 6-8 which is based on the Van Hoey individual.

1821

Citation: Traill, T. S. 1821. Observations on the anatomy of the orang outang. *Memoirs of the Wernerian Natural History Society* 2: 1-49.

Summary: Traill reports the dissection by himself and Dr. Vose of what is most likely a young female common chimpanzee.

Provenance: According to Traill's report the animal he dissected belonged to Mr. Bullock who obtained it from Captain Payne who procured it "in the Isle of Princes in the Gulf of Guinea" (p. 3). It came by ship to Cork, and thence to Liverpool where it died.

Claimed study taxon/taxa: *Simia satyrus.*

Probable study taxon/taxa: Given its provenance the dissected cadaver was most likely a young female common chimpanzee, *Pan troglodytes*.

Novel data: Yes.

Significance: Apart from being one of early reports of the dissection of a common chimpanzee, it emphasizes many of the significant cranial and postcranial differences between common chimpanzees and modern humans (e.g., a more posteriorly-located foramen magnum, no independent flexor pollicis longus and a slender posterior calcaneal tubercle). It may also include the first description of knuckle-walking.

Description: Traill suggests that "under the name of Orang Outang" … "naturalists appear to have confounded two distinct animals, The Indian or Brown Orang, and the African or black species" (p. 1). The paper reports the dissection of a young female ape Traill refers to as "Simia Satyrus" (p. 29). It belonged to Mr. Bullock who obtained it from Captain Payne, who reported that when the creature was alive "it never placed the palm of the hands of its fore extremities to the ground, but, closing its fists, rested on the knuckles" (p. 4). The report of the dissection conducted by Traill and "by friend Dr Vose" (p. 2), includes comparisons with a previously dissected "rib-nosed baboon" or Simia Maimon. With respect to the animal as a whole Traill reports that the arms "descend below the knees, by the whole length of the phalanges of the fingers" and "the foot is more properly a hand appended to a tarsus" (p. 9). The report describes the bones (pp. 10-20), joints and ligaments (pp. 21-22), muscles (pp. 22-33), "brain and principal

nerves" (pp. 33-37), "heart, lungs and principal blood vessels" (pp. 37-38), sense organs (pp. 38-39), "organs of voice" (pp. 39-43), "chylopoëtic viscera" (pp. 43-46), "urinary organs" (p. 46) and finally the organs of generation (pp. 47-49). Among the many specific observations are that, compared to the human, "the foramen magnum of the occipital bone, is situated considerably farther back" (p. 11), "the os calcis is narrower; the projection forming the heel is less broad" (p. 19), "there is a striking similarity"…"in the number and position of the small muscle about the palate, tongue, pharynx and larynx" (p. 23), there is "no opponens pollicis" and "the flexor pollicis longus seems rather a part of the flexor profundus than a separate muscle" (p. 27), "the muscles of the inferior extremity differ more from the human subject than any other part" (p. 27), and within the lower limb "one of the principal peculiarities" is a muscle "at the top of the thigh" they call "scandens" or "Musculus scansorius" that draws "the thigh up toward the body" (p. 29). The brain weighed 11 ounces, and although "the body was not weighed before dissection" Traill conjectures that the brain "is from 1/30th to 1/40th part of the whole body. This proportion approaches that of man, in whom it varies from 1/22 to 1/31" (p. 35). Finally, the "length of the whole intestines, = 24 (feet) and 4 (inches) is "upwards of nine times the length of the body of the animal;––a proportion fully greater than what we find in man" (p. 45).

1824-5

Citation: Jeffries, J. 1824-1825. Some account of the dissection of a Simia satyrus, ourang-utang, or wild man of the woods. *Webster & Treadwell's Boston Journal of Philosophy and the Arts* 2: 570-580.

Summary: Report by a physician of an immature male orang-utan *sensu stricto* from Borneo. that died one day after reaching Boston.

Provenance: The animal was sent from Borneo to Java, and thence by the ship *Octavia*, commanded by Captain Blanchard, to Boston.

Claimed study taxon/taxa: *Simia satyrus.*

Probable taxon/taxa: *Pongo pygmaeus*.

Novel data: Yes.

Significance: After Camper, one of the first systematic dissections of an orang-utan that included useful information about its morphology.

Description: Jeffries provides a commendably detailed account of the external appearance (pp. 571-2), soft tissues (pp. 573-5), brain (pp. 575) and the skeleton (pp. 575-8) of an orang-utan. He noted the animal was immature, commenting that the first molars were the only permanent molars erupted (p. 576), and the brain weighed nine and three-quarter ounces. Jeffries' description of the skeleton included linear measurements of the cranium, limb bones and the limbs. He observed that "the whole foot except the os calcis much more resembles a hand than a human foot" (p. 578). Jeffries explains that the heat in June in Boston "prevented that patient and

slow dissection which alone could enable me to give a correct and full description of his internal structure." (p. 571).

1825

Citation: Cuvier, M. F. 1825. *Des dents des mammifères, considérées comme caractères zoologiques.* Paris: F. G. Levrault.

Summary: Illustrated descriptions of the immature and adult dentition of the orang-utan.

Provenance: Their morphology and source are consistent with both individuals coming from Borneo.

Claimed study taxon/taxa: Orang-Outang and Pongo.

Probable study taxon/taxa: *Pongo pygmaeus*

Novel data: Yes.

Significance: One of the earliest descriptions and illustration of the dentition of the orang-utan.

Description: On pp. 8-10 (N°. II) Cuvier describes and illustrates (N°. 2) the dentition of an immature individual; the only permanent tooth crown is the first molar. The wrinkled enamel is consistent with the animal being an orang-utan. On pp. 10-12 (N°. III) Cuvier describes and illustrates (N°. 3) the dentition of a mature individual. The individual, which is described as coming from the "cabinet d'anatomie du Museum d'histoire naturelle," is described as a "grand singe de Borneo".

1827

Citation: Tiedemann, F. 1827. Das hirn des orang-outangs mit dem des menschen verglichen. *Zeitschrift fur Physiologie* 2: 17-28.

Summary: Describes a brain of an orang-utan made available to him.

Provenance: The brain was obtained from an animal sourced from Java and sent to Leiden.

Claimed study taxon/taxa: Orang-Outang.

Probable taxon/taxa: *Pongo* sp.

Novel data: No.

Significance: One of the first comparative reviews of the brain of *Pongo*.

Description: General discussion of the brain of great apes. Review of the differences between the brains of apes and humans (pp. 27-28) includes information about their relative weights.

1830

Citation: Owen, R. 1830. On the anatomy of the *orang utan* (*Simia Satyrus*, L). *Proceedings of the Committee of Science Correspondence of the Zoological Society of London* 1: 4-5, 9-10, 28-29, 67-72.

Summary: Owen compares the results of dissecting a young male orang-utan with his own observations of other orang-utans and Tyson's, and his own observations of chimpanzee morphology.

Provenance: The first of the four reports begins with this description "The subject principally referred to was a young male, probably about four years of age, which had recently been presented to the Society by Mr. Swinton of Calcutta; it reached England in a very debilitated state, and dies on the third day after its arrival in Bruton-street." (*ibid*, p. 4). Because Owen makes explicit comparisons with the *Chimpanzee* we must assume that this report refers to a young male orang-utan.

Claimed study taxon/taxa: *Simia satyrus.*

Probable taxon/taxa: *Pongo* sp.

Novel data: Yes.

Significance: Although the report focuses on the results of Owen's dissection of a young male orang-utan, Owen's narrative makes it clear that he had previously dissected other orang-utans and at least one common chimpanzee, and he had access to numerous orang-utan crania, both mature and immature.

Description: This report is in four parts. The first focuses on Owen's description of the soft-tissue anatomy of the orang-utan, with an emphasis on the stomach, other parts of the digestive system, the brain and the larynx. Owen's statement with reference to Tyson's monograph, that he had "confirmed many of the descriptions given in that work." (p. 5) suggests that prior to his dissection of the orang-utan Owen had already dissected a chimpanzee (see below) and had access to information other than that provided by Tyson. The second part as "devoted to the osteology of the animal, which is minutely described and contrasted with that of the *Chimpanzee.*" (p. 9). Owen suggests that "With the skeleton of the *Pongo* (*Pongo Wurmbii*, Desm.) the resemblance is in many particulars almost complete," and "the extensive examination which (he) has made of the entire skeletons of both the *Pongo* and the *Orang*, and of numerous *crania* of the latter at various ages, has led him to adopt the opinion of those who maintain that these constitute really but one species, of which the *Orang* is the young, and the *Pongo* the adult." (p. 9). But it is not clear whether Owen is relying on reports of *Pongo Wurmbii*, or on his

own observations, nor is it clear where he was able to make observations about "numerous *crania*" of "various ages" belonging to the *Orang*. In the third part, which focuses on the "Myology of the *Simia Satyrus*, L.," Owen "confined himself to the notice of such muscles that are peculiar to that animal, and have not any analogues in the human frame ; of those which, if analogous, deviate remarkably in their proportions and attachments ; and lastly, of such as have been considered as of doubtful existence in the *Orang*." (p. 28). This suggests that Owen either had existing first-hand knowledge of the myology of the *Orang*, or he had access to observations on the myology of the *Orang* made by others. The following statement made later in the report "In the Chimpanzee which Mr. Owen dissected, .." (p. 29) makes it clear that Owen had previously dissected a chimpanzee, although there is no published report of that dissection. Owen identifies the muscles present in the orang-utan and not in modern humans (pp. 28-29). Two examples of these observations are that "the anterior fleshy portion" of *digastricus* "is altogether wanting in the *Orang Utan*" and that "Neither in the *Orang Utan* nor in the *Chimpanzee* is there any true *ligamentum nuchae*." (p. 29). The fourth part focuses on the "myology of the lower extremities." (p. 67), but Owen also makes observations about the ligaments. Among the many detailed observations are that the *glutæus medius* is "relatively longer than in man" and is "four times as thick" as the *glutæus magnus*, and he suggests that the *invertor femoris* "first discovered by Dr. Traill in the *Chimpanzee*" has the same "origin, form and insertion" in "the *Orang Utan*." (p. 68). There is no mention in the four reports of the muscles of the upper limb, and apparently there is no "missing" section because these are the page numbers given in Rupke's (1994) authoritative biography of Owen.

1835

Citation: Owen, R. 1835. On the osteology of the chimpanzee and orang utan. *The Transactions of the Zoological Society of London* 1, no. 4: 343-379.

Summary: Owen provides a comparative analysis of chimpanzees and orang-utans that is both descriptive and quantitative.

Provenance: The exact place of origin of the two skeletons he focuses on is ambiguous.

Claimed study taxon/taxa: *Simia Troglodytes* and *Simia Satyrus.*

Probable study taxon/taxa: *Pan troglodytes* and *Pongo* sp.

Novel data: Yes.

Significance: One of the first publications to provide a comparative metrical analysis of the skeletons of chimpanzees and orang-utans, and a list of the ways chimpanzees and orang-utans differ from each other, and from modern humans.

Description: Owen, who refers to "the *Orangs*, or great tailless *Apes* of Africa and Asia," bemoans the lack of adult skeletons in natural history museums. This study focuses on the osteology of two adult skeletons, one a *Chimpanzee* = *Simia Troglodytes* and the other an *Orang*

Utan = Simia Satyrus. He compares his own findings with those of Tyson (1699), Camper (1803), Blumenbach (1790-1811), Cuvier (1829) and Lawrence (1819). Owen's observations about the chimpanzee were made on the skeleton of an adult chimpanzee from Sierra Leone in the collection of "R.B. Walker Esq., Surgeon, of Curzon Street" (p. 345). The 'Orang Utan' he compared it with is the skeleton of the young male orang-utan whose myology he described in Owen (1830) (see above). It is apparent from the text that Owen had access to "eight *crania* of the *Simia Satyrus*" (footnote on p. 357) (i.e., orang-utan *sensu stricto*). He describes the detailed osteology of the adult chimpanzee (pp. 344-354), the "young chimpanzee" (pp. 354-355), and the Orang Utan (pp. 355-368). Owen summarizes his comparisons in the form of three lists (pp. 368-370). In the first he lists the 23 variables in which the "*Chimpanzee* differs osteologically from the *Orang*"; he suggests that in 16 of these the chimpanzee is closer to the human condition. He lists three variables in which the orang is closer to the human condition, and the 21 ways in which both chimpanzees and orangs differ from modern humans. In addition to a few measurements in the text (p. 358 and 364), he provides a comprehensive metrical comparison in a table of "Admeasurements" (pp. 374-5). There are 103 linear measurements listed; 41 cranial, 5 dental and 57 postcranial. In addition to the measurements taken on the chimpanzee and orang-utan referred to above, he also provides measurements taken from an adult, but not fully grown, orang-utan skeleton in the Museum of the Royal College of Surgeons. He also includes observations on an adult orang-utan cranium "in the possession of Mr. Cross, of the Surry Zoological Gardens" (p. 377). Owen also provides the contemporary synonymy of the chimpanzee and the orang-utan *sensu stricto* (p. 373). The plates include some very fine drawings of the chimpanzees and orang-utan, including the teeth of the adult chimpanzee (Plate LI) and orang-utan (Plate LIII) that show linear enamel hypoplasia.

1836

Citation: Tiedemann, F. 1836. XIII. On the brain of the negro, compared with that of the European and the orang-utang. *Philosophical Transactions of the Royal Society of London* 126: 497-527.

Summary: An early comparative study of brain volume in modern humans and the African apes.

Provenance: The modern human crania are divided geographically.

Claimed study taxon/taxa: Modern humans, one "Asian Orang-Outang" and one "African Orang-Outang, or Chimpanzee."

Probable study taxon/taxa: *Pongo* sp. and *Pan troglodytes.*

Novel data: Yes.

Significance: He provides more details of the ape brains in his earlier paper, but this is one of the earliest studies that compares their size with the brain sizes of modern humans.

Description: Tiedemann compares volume of the endocranial cavity among Negroes, Europeans, the Asiatic Orang-Outang, and the "African Orang-Outang, or Chimpanzee" (p. 519). Tiedemann lists the European cadavers in the sample (35 males and 17 females) in a table (p. 501). They range in maturity from a "new-born child" to a "Man eighty-two years old." For each he provides brain weights, for many he provides body weights, and for a few he provides body height. He also provides the ratio between the brain and the body weight. He provides information about the dimensions of the spinal cord of a "Negro" and a "European" (p. 513) and the dimensions of the cerebellum and cerebrum of brains of "Negroes" and a "Europeans" (pp. 514-515). The crania from private, hospital and museum collections are listed in tables (pp. 505-510). They are sub-divided into "*Ae*thiopian Race" (38 males and 3 females), "European Nations" (77 males), "Asiatic Nations" (24 males), "African Nations" (4 males), "Mongolian Race" (18 males and 2 females), "American Race" (24 males and 3 females), and "Malayan Race" (38 males and 5 females). He also lists 12 females (p. 508), all of which come from collections or museums in Europe, but their geographic origin is not clear, For all of these crania he provides the collection or museum they come from and their endocranial volume in ounces. He explains that the volume of the endocranial cavity was obtained by weighing the empty cranium, filling it with millet-seed, and then re-weighing the filled cranium (p. 504). He asks two questions. First, "Is there any important difference between the structure of the brain of the Negro and that of the European?" And second, "Has the brain of the Negro more resemblance to that of the Orang-Outang than the brain of the European?" (p. 498). He concludes that "The brain of a Negro is upon the whole quite as large as that of the European and other human races", and "The Negro brain does not resemble that of the Orang-Outang more than the European brain" (p. 519). He illustrates superior and inferior views of the brains of an "Asian Orang-Outang" (Plate XXXV Figs. 1 & 2) and an "African Orang-Outang, or Chimpanzee" (Plate XXXV Figs. 3 & 4). Both were from the Hunterian Museum of the Royal College of Surgeons in London.

1837

Citation: Cuvier, G. 1837. *Du crane en général, et de ses proportions avec la face. Leçons d'anatomie comparée (2nd edition).* Paris: Crochard.

Summary: Gives the comparative context for cranial variation in mammals, including information about a juvenile and adult "orang-outang" and a juvenile chimpanzee. The comparative sample includes three modern humans, and three gibbons, two adult and one juvenile.

Provenance: None provided for the juvenile and adult orang-outang" and the juvenile chimpanzee.

Claimed study taxon/taxa: Orang-outang and chimpanzee.

Probable study taxon/taxa: *Pongo* sp. and *Pan troglodytes*.

Novel data: Yes.

Significance: An early comparison of the morphology of the cranium.

Description: Reports on the condition in the juvenile and adult "orang-outang," and the juvenile chimpanzee for the facial angle (pp. 163-167), the orbit and the nasal opening (pp. 247-248), the endocranial morphology (pp. 288), the pattern of articulation of the bones contributing to the cranial vault (pp. 315-316), the form and connections of the maxilla, (pp. 383-384), and the cranial foramina (pp. 460-461).

1840

Citation: Knox, R. 1840. Inquiry into the present state of our knowledge respecting the orang-outang & chimpanzee. *The Lancet* 34, no. 873: 289-296.

Summary: Knox reviews recent literature concerning the anatomy of the orangutan and the chimpanzee.

Provenance: Unknown.

Claimed study taxon/taxa: Orangutan and chimpanzee.

Probable study taxon/taxa: *Pongo* sp. and *Pan troglodytes*.

Novel data: No.

Significance: More of a critique of what was "contemporary" science in the 1840s than an actual scientific analysis.

Description: Knox reviews recent literature concerning the anatomy of the orangutan and the chimpanzee. He comments about the measurements of the adult orangutan made by M. De Blainville along with De Blainville's observations on the skeleton. Knox also compares De Blainville's work to that of Richard Owen, and concludes that neither anatomist can truly interpret the function of the skeleton without dissecting the soft tissues.

1841

Citation: Vrolik, W. 1841. *Recherches d'anatomie comparée sur le chimpansé. Amsterdam:* Johannes Müller.

Summary: Comprehensive comparative presentation of the results of dissecting a young female chimpanzee.

Provenance: None

Claimed study taxon/taxa: Chimpanzee.

Probable study taxon/taxa: *Pan troglodytes.*

Novel data: Yes.

Significance: Detailed description of chimpanzee anatomy.

Description: After reviewing previous research on the morphology of the orang-utan and chimpanzee, Vrolik presents the results of his own dissection of a young female chimpanzee. The monograph is divided into six chapters. Apart from the second chapter (pp. 17-24), which is a detailed description of the myology of the chimpanzee, the other chapters provide comprehensive comparisons of Vrolik's observations with previously published observations by others on modern humans, chimpanzee, orang-utan, siamang etc. The first chapter (pp. 3-16) deals with the skeleton, the third chapter (pp. 25-38) deals with the muscles, the fourth chapter (pp. 39-41) with the nervous system, the fifth chapter (pp. 42-43) with the vascular system, and the sixth chapter (pp. 44-47) deals with the viscera. Th rest of the monograph is devoted to seven exquisite drawings (Pl. I-VII) prepared by J.M. Kierdorff. They illustrate, respectively, the skeleton (Pl I), the muscles of the neck (Pl II), the muscles of the anterior abdominal wall and the femoral vessels exposed in the femoral triangle (Pl III), the flexor muscles of the upper limb (Pl IV), the extensor muscles of the forearm and hand (Pl V), and the muscles on the posterior aspect of the thigh and calf (Pl VII). All of the above illustrations are of the chimpanzee. Plate VI is a mix of four drawings of the chimpanzee (the aortic arch, the flexor muscles of the lower limb, an anterior view of the larynx, and the liver), and two drawings of the orang-utan (a posterior view of the carpus, and the medial surface of the right cerebral hemisphere, midbrain and hind brain).

1847

Citation: Savage T. S., and Wyman J. 1847. Notice of the external characters and habits of *Troglodytes gorilla,* a new species of orang from the Gaboo River, by Thomas S. Savage; osteology of the same, by Jeffries Wyman. *Boston Journal of Natural History* 5: 417-442.

Summary: First formal description of the 'external character and habits of the gorilla, together with a description of the skeleton, and a comparison of the skeleton with that of the chimpanzee.

Provenance: The location of the animals Savage describes is quite specific— see the title above.

Claimed study taxon/taxa: *T. gorilla.*

Probable study taxon/taxa: *Gorilla* sp.

Novel data: Yes.

Significance: The first physical description of the gorilla, but more importantly the first description of how the cranial and postcranial skeleton of *Troglodytes gorilla* differ from the "Chimpanzée" the "only Orang hitherto discovered in Africa" (p. 246 and pp. 426-436).

Description: Savage describes an animal known by the local people as Engéena, which differs from the Chimpanzée (aka Encheeco). He describes it as being "much larger" than the Chimpanzée, with shoulders twice the breadth of the latter, the forearm "much" shorter than the arm, and "thumbs larger than the fingers" (p. 246). Savage observed that it supports itself on its "fingers, and palms of the hands" (p. 246) and not on its knuckles *contra* the Chimpanzée. With respect to the skeleton, Wyman describes the "four skulls, two males and two females, one of each in perfect condition, and all of them adult; a male and female pelvis, the long bones of the upper and lower extremities, and a few vertebrae and ribs." (p. 426). The features of this collection were compared with six adult chimpanzee crania. Across the skeleton Wyman draws attention to 13 differences between *T. gorilla* and the chimpanzee, and seven differences between *T. gorilla* and the orang-utan.

1853

Citation: Owen, R. 1853. Osteological contributions to the natural history of the chimpanzees (*Troglodytes*) and orangs (*Pithecus*). No. IV. Description of the cranium of an adult male gorilla from the River Danger, West Coast of Africa, indicative of a variety of the great chimpanzee (*Troglodytes Gorilla*), with remarks on the capacity of the cranium and other characters shown by sections of the skull, in the orangs (*Pithecus*), chimpanzees (*Troglodytes*), and in different varieties of the human race. *Transactions of the Zoological Society of London* 4, no. 3: 75-88.

Summary: Owen compares a hitherto undescribed gorilla cranium with crania of orang-utans, chimpanzees and modern humans.

Provenance: None provided, other than the skull belongs to the Philosophical Institution of Bristol (p. 77).

Claimed study taxon/taxa: *Troglodytes Gorilla*

Probable study taxon/taxa: *Gorilla*.

Novel data: Yes.

Significance: A detailed comparative analysis of a gorilla cranium.

Description: In the first part of the paper (pp. 75-77) he describes the cranium of an adult gorilla. In the second part, he compares it with the cranium of "an adult male Orang (*Simia satyrus*) in the Museum of the Zoological Society" (p. 77). He also makes comparisons with, and provides data for, specimens of Troglodytes niger and modern human crania (see table on p. 85). In tables on p. 86 he supplements comparative data from Wyman with his own observations. The

plates are exquisite drawings of the gorilla cranium, plus bisected skulls of *Pithecus Satyrus* and modern humans.

1854

Citation: Gratiolet, P. 1854. *Mémoire sur les plis cérébraux de l'homme et des primates*. Paris: Libraire Arthus Bertrand.

Summary: Comparative study of the external morphology of the cerebral cortex of the chimpanzee, gorilla, and the orang-utan.

Provenance: Uses data from other studies.

Claimed study taxon/taxa: Orang-Outang, Troglodytes Chimpanze, Troglodytes Gorilla.

Probable study taxon/taxa: *Pongo* sp., *Pan troglodytes*, *Gorilla* sp.,

Novel data: No.

Significance: Early comparative study of the pattern of convolutions.

Description: Louis Pierre Gratiolet, a student of Henri de Blainville who subsequently became De Blainville's assistant at the Muséum d'Histoire Naturelle, was one of the first researchers to study the comparative anatomy of cerebral convolutions. He compares the convolutions on the human brain to those of a range of primates, including brains of adult and fetal gibbons, orang-utan *sensu stricto*, chimpanzee—as described by Tyson, Tiedemann, Van-der-Kolk and Wrolick, and gorilla—as described by Duvernoy. Gratiolet describes the lateral and medial surface morphology of the cerebral cortex of the orang-utan (pp. 47-49), the chimpanzee (pp. 49-52), and the gorilla (pp. 52-53). He compares them to each other, and to the brains of modern humans, in the next section.

1855

Citation: Duvernoy, G. L. 1855. Caracteres anatomiques des Grands Singes Pseudo-anthropomorphes. *Archives du Muséum National D'histoire Naturelle (Paris)* 8: 1-248.

Summary: Compares the skeleton of what appears to have been an adult male gorilla brought back to France from Gabon by M. Franquet, with an adult female gorilla described by de Blainville, orang-utan *sensu stricto* skeletons from Sumatra and Borneo described by Wurmb, the chimpanzee described by Owen, and a gibbon.

Provenance: Adult male gorilla (Tschego) brought back to France from Gabon by M. Franquet

Claimed study taxon/taxa: Tschego, Orang de Sumatra, Orang de Borneo, Chimpanze.

Probable study taxon/taxa: *Gorilla* sp., compared with *Pan troglodytes*, *Pongo pygmaeus*, *Pongo abelli.*

Novel data: Yes.

Significance: One of the few comparative studies that includes both species of orang-utan.

Description: Duvernoy helped George Cuvier prepare *Leçons d'anatomie comparée*. This publication focuses on describing the skeleton of what appears to have been an adult male gorilla (Tschego) brought back to France from Gabon by M. Franquet, the Chief Medical Officer in Gabon (aka Gaboon). Compares it with an adult female gorilla described by de Blainville, orang-utan *sensu stricto* skeletons from Sumatra and Borneo described by Wurmb, the chimpanzee described by Owen, and a gibbon. He also considers differences in the deciduous and permanent dentitions of a chimpanzee, orang-utan and a gibbon. Provides information about vertebral number (p. 45), and measurements of the cranium (p. 8 and p. 46) and limb bones (p. 45 and p. 47). Concludes by asking three questions: Are chimpanzees distinct from Franquet's gorilla? Is the genus *Gorilla* distinct from the genus *Troglodyte*? In what order should we place the four genera in the *Pseudo-anthropomorphes*?

Citation: Wyman, J. 1855. Prof. Jeffries Wyman gave an account of the dissection of a black chimpanzee, (Troglodytes niger) one of the collection presented by Dr. J. V. C. Smith. The dissection was made particularly with reference to a comparison of the muscular system of Troglodytes with that of man. *Proceedings of the Boston Society of Natural History* 5: 274-276.

Summary: Summarizes the differences between the muscles of a chimpanzee dissected by Wyman, and those of modern humans.

Provenance: None other than the identity of the donor.

Claimed study taxon/taxa: Black Chimpanzee, (Troglodytes niger).

Probable study taxon/taxa: *Pan troglodytes.*

Novel data: Yes.

Significance: The short report of a chimpanzee dissection draws attention to several important differences between chimpanzees and modern humans.

Description: Among the differences between modern humans and the chimpanzee dissected by Wyman, he focuses on are that the origin of the deltoid on the scapula was more extensive, the pectoralis minor was inserted into the greater tuberosity, the supinator longus and wrist flexors are more powerful, whereas the extensor pollicis longus is less well-developed. One muscle, the Trachelo-clavicular, was only found in the chimpanzee, whereas another muscle, the flexor pollicis longus, was not found in the chimpanzee.

1856

Citation: Owen, R. 1856. Osteological contributions to the natural history of the chimpanzees (*Troglodytes*) and orangs (*Pithecus*). No. V. Comparison of the lower jaw and vertebral column of the *Troglodytes Gorilla, Troglodytes niger, Pithecus Satyrus,* and different varieties of the human race. *Transaction of the Zoological Society of London* 4, no. 4: 89-116.

Summary: A detailed comparative analysis of a gorilla lower jaw, hyoid and vertebral column.

Provenance: None provided, other than the skeleton belongs to the Philosophical Institution of Bristol (p. 77).

Claimed study taxon/taxa: Troglodytes Gorilla.

Probable study taxon/taxa: Gorilla.

Novel data: Yes.

Significance: A detailed comparative analysis of a gorilla mandible, hyoid and vertebral column.

Description: In the first part of the paper (pp. 89-93) he describes the mandible and hyoid of an adult gorilla, and compares them with the mandible and hyoid of modern humans, orang-utans and chimpanzees. The majority of the paper (pp. 93-115) is devoted to a description and comparative analysis of the vertebral column. The exquisite plates are drawings of the parts of the vertebral column that illustrate the condition in the gorilla and compare it with the same regions in modern humans, orang-utans and chimpanzees. (BW)

1861

Citation: Marshall, J. 1861. On the brain of a young chimpanzee. *The Natural History Review* July: 296-316.

Summary: Observations based on a dissection of the brain of a young male chimpanzee.

Provenance: None provided.

Claimed study taxon/taxa: Chimpanzee.

Probable study taxon/taxa: *Pan troglodytes*.

Novel data: Yes.

Significance: Provides data about the body and brain of the same individual.

Description: The first part consists of observations made during the dissection of the brain of a young male chimpanzee. Measurements of the body, including the lengths of the forearm, hands, toes, feet, and fingers were also noted. Details of the brain includes its weight and general dimensions, and observations about the brain regions and the nerves. The second part compares Marshall's findings to those of Gratiolet, van der Kolk, Tiedemann, Tyson and Vrolik. Data tables on pp. 304-305 include measurements and ratios of dimensions between different brain regions in modern humans and the chimpanzee. The only figure illustrates a dissection of the hippocampal region of the chimpanzee (p. 313).

Citation: Rolleston, G. 1861. On the affinities of the brain of the orang utang. *Natural History Review: A Quarterly Journal of Biological Science* 1, no. 2: 201-217.

Summary: Comparative analysis based on Rolleston's dissection of a young male orang-utan, which focused on the brain.

Provenance: None provided.

Claimed study taxon/taxa: Orang-utan (*Simia Morio*),

Probable study taxon/taxa: *Pongo* sp.

Novel data: Yes.

Significance: Provides novel information about the external and internal structure of the brain of an orang-utan.

Description: Rolleston reports the dissection of a young—the first and second molars were erupted and it weighed 16 pounds and twelve ounces—male orang-utan (*Simia Morio*), which focused on the brain. The first section describes the differences that can be seen with the naked eye between the brain of modern humans and the orang-utan. The second section draws attention to differences in the brains of the orang-utan and the chimpanzee. The third section focuses on the differences in the pattern of cerebral convolutions, with references to Gratiolet (1854). The fourth section is dedicated to differences in the internal structure of the brain. There are comparisons involving references to similarities and differences between the lemur and chimpanzee brain, but the emphasis is on differences in brain structure between orangutan and modern humans. Measurements in tables on pp. 207-209 compare the overall size, and the size of the components, of the brains of orang-utans, chimpanzees and modern humans. The four illustrations are based on photographs after the brain of the orang-utan had been "hardened in spirit for as much as two months" (p. 216).

Citation: Church, W. S. 1861. On the myology of the orang utang (*Simia morio*). *Natural History Review: A Quarterly Journal of Biological Science* 1, no. 4: 510-516.

Summary: Compares his observations on the muscles of the "Anterior Extremity" with those he made on his own dissections of a "Magot" (aka Barbary macaque, or *Macaca sylvanus*) and *Cebus*, and with reports of other dissected great apes and with the condition in modern humans.

Provenance: None provided.

Claimed study taxon/taxa: Orang Utang

Probable study taxon/taxa: *Pongo* sp.

Novel data: Yes.

Significance: An early comparative study of upper limb myology among the great apes.

Description: Dissected a "young" Orang-Utan with "feebly developed" (p. 511) muscles. He compares his observations of the orang-utan with his own dissection of a "Magot" (aka Barbary macaque, or *Macaca sylvanus*) and *Cebus*, and with reports of other dissected great apes (i.e., Duvernoy (gorilla), Vrolik (chimpanzee), Cuvier, Hallett, Jourdan and Owen) and with modern human myology. In this paper Church restricts his observations to the muscles of the "Anterior Extremity." He is careful to consider each muscle, and how it differs among his comparative sample. The presentation of the results of the muscles of the anterior extremity continues in the first part (pp. 82-85) of Church (1862).

1862

Citation: Church, W. S. 1862. On the myology of the orang utang. *Natural History Review: A Quarterly Journal of Biological Science* 2, no. 5: 82-94.

Summary: Continuation of Church (1861) in which he concludes his observations of the anterior extremity, describes the muscles of the lower extremity, and concludes with a summary of the differences among modern humans and the great apes.

Provenance: None provided.

Claimed study taxon/taxa: Orang Utang

Probable study taxon/taxa: *Pongo* sp.

Novel data: Yes.

Significance: An early comparative study of upper and lower limb myology among the great apes.

Description: Continuation of his presentation of the results of his dissection of a young "Orang-Utan." He compares his observations of the orang-utan with his own dissection of a "Magot" (aka Barbary macaque, or *Macaca sylvanus*) and *Cebus*, and with reports of other dissected great apes (i.e., Duvernoy (gorilla), Vrolik (chimpanzee), Cuvier, Hallett, Jourdan and Owen) and with modern human myology. In the first part of this paper (pp. 82-85) Church concludes his observations about the muscles of the "Anterior Extremity." In the second part (pp. 85-93) he tackles the muscles of the "Lower Extremity." On pp. 93-94 he summarizes the differences between his orang-utan and modern humans.

1863

Citation: Wilder, B. G. 1863. Contributions to the comparative myology of the chimpanzee. *Boston Journal of Natural History* 7: 325-384.

Summary: Careful discussion of the comparative morphology of many of the muscles of the limbs.

Provenance: Not provided.

Claimed study taxon/taxa: *Troglodytes niger.*

Probable study taxon/taxa: *Pan troglodytes.*

Novel data: Yes.

Significance: Provides meticulous comparisons of limb muscles among a wide range of primates.

Description: Dissected the left side of an alcohol-preserved young male chimpanzee (*Troglodytes niger*) provided by Jeffries Wyman; the right side of the same animal was dissected by Joseph Moore, but the results were unpublished. Wilder compared his findings with the results of his own dissections of six other primates (Macacus, Cynocephalus, and Ateles), as well as the published observations of Duvernoy (gorilla), Owen (orang-utan), Traill (chimpanzee), Tyson (chimpanzee), Vrolik (chimpanzee), and Wyman (gorilla). Focuses on individual muscles in the upper and lower limb, particularly on their presence/absence and how they vary within and among primates. Wilder provides a table (p. 379) that compares the locations of the insertions of the tendons of flexor longus digitorum and flexor longus pollicis, and the presence of lumbricals in modern humans and *Troglodytes niger.*

1864

Citation: Huxley, Thomas. 1864. Professor Huxley's hunterian lectures on "the structure and classification of the mammalia," delivered at the Royal College of Surgeons. Lectures X-XVIII.

Delivered between February 23rd and March 12th. Published in *Medical Times and Gazette* between April 9th and June 4th, pp. 398-646.

Summary: Compares the gross morphology of the chimpanzee, gorilla and orang-utan and modern humans.

Provenance: Not provided.

Claimed study taxon/taxa: Chimpanzee, gorilla and orang-utan.

Probable study taxon/taxa: *Pan troglodytes*, *Gorilla* sp., *Pongo* sp.

Novel data: Yes.

Significance: Detailed consideration of the muscular differences among chimpanzees, gorillas, orang-utans and modern humans.

Description: These lectures focus on the similarities and differences between the gross morphology of the chimpanzee, gorilla and orang-utan and modern humans. Huxley focuses on skeletal and dental anatomy, myology, with additional comments about the central nervous system, the secondary sex organs, and the palate. The longest section is devoted to the chimpanzee (Lectures X-XIV), the section on the gorilla (Lectures XIV-XVI) is shorter, and the section on the orang-utan (Lectures XVI-XVIII) is the shortest. Most of Huxley's comments are passed on previous publications (e.g., Church, Cuvier, Duvernoy, Marshall, Owen, Rolleston, Sandifort, Wilder, Tyson, etc.) but he reports the results of a recent chimpanzee dissection by Flower and himself, and his own dissection of the hand and foot of a gorilla. Huxley provides careful reviews of the presence/absence of muscles, and on differences in their attachments, both between each ape and modern humans, as well as noting differences among the chimpanzee, gorilla and orang-utan. For example, in Lecture XI he lists muscles chimpanzees have, but modern humans do not (e.g., levator claviculae, dorsoepitrochlear, scansorius, abductor ossis metacarpi quinti) and in Lecture XII he discusses muscles that have different attachments in chimpanzees and modern humans (e.g., pectoralis minor, flexor pollicis longus and gluteus maximus). In Lecture XIV he stresses that there is variation within chimpanzees, and that some muscles well-developed in chimpanzees are occasionally seen in modern humans. In Lecture XV Huxley does the same for the gorilla, and in Lecture XVII for the orang-utan. In Lecture XV, he also notes that the scapula in the gorilla is more like that of modern humans than is the chimpanzee scapula.

1865

Citation: Crisp, E. 1865. On the os penis of the chimpanzee (*Troglodytes niger*) and of the orang (*Simia satyrus*). *Proceedings of the Zoological Society of London* 33, no. 1: 48-49.

Summary: Reports that both the chimpanzee and the orang-utan have an os penis.

Provenance: None provided.

Claimed study taxon/taxa: Orang and Chimpanzee.

Probable study taxon/taxa: *Pongo* sp. and *Pan troglodytes.*

Novel data: Yes.

Significance: The first description of os penis bones in the chimpanzee and the orang-utan.

Description: Discovered an os penis in "a young Orang" and in "two Chimpanzees" in his possession (p. 49). He examined "all the male anthropoid apes in spirits at the College of Surgeons" and found an os penis in each one, a "very young Chimpanzee" with only four incisors, and in "two Orangs, about two years of age" (p. 49). He also "believes" the bone is present in the Gorilla, but he does not record examining a gorilla. He illustrates the penis-bones of "a young Orang" and "a young Chimpanzee" (p. 48).

Citation: Mivart, S. G. 1865. Contributions towards a more complete knowledge of the axial skeleton in the primates. *Proceedings of the Zoological Society of London* 33, no. 1: 545-592.

Summary: One of the first studies to focus on the axial skeleton.

Provenance: N/A

Claimed study taxon/taxa: Troglodytes and Simia.

Probable study taxon/taxa: *Pan troglodytes*, *Gorilla* sp. and *Pongo* sp.

Novel data: No.

Significance: Reviews the number and the morphology of the vertebrae, plus observations about the sternum.

Description: Detailed review of the number and the morphology of the vertebrae within the cervical, dorsal (aka thoracic), lumbar and sacral regions of the vertebral column. More wide-ranging than just the great apes. Lists the numbers of dorsal, or rib-bearing, vertebrae (p. 555). Summarizes the features only seen in modern humans, features shared by modern humans (aka Hominidae) and the chimpanzee, gorilla and orang-utan (aka Simiinae) (p. 580), features shared by chimpanzees, gorillas and orang-utans, and features shared by chimpanzees and gorillas (aka Troglodytes) (p. 581).

1866

Citation: Humphry, G. M. 1866. On some points in the anatomy of the chimpanzee. *Journal of Anatomy and Physiology* 1, no. 2: 254-268.

Summary: Anatomical data from of one male and one female chimpanzee on various aspects of both hard and soft anatomy, specifically as it relates to young specimens.

Provenance: Specimens from Zoological Gardens, Regent's Park; Figures plausibly depict chimpanzee foot; specifically makes comparisons with both gorillas and humans

Claimed study taxon: Chimpanzee

Probable study taxon/taxa: *Pan troglodytes*

Novel data: Yes.

Significance: A mix of information about the hard and soft-tissues.

Description: Dissection of one male and one female chimpanzee, both of which were young exhibiting "not ankylosed" epiphyses. The female was 25.5 inches long and weighed 8 lbs. 2.5 oz. and the male was 36 inches long (no weight given). Emphasis is placed on the structure of the hip joint, knee and foot with further descriptions of the prostate, larynx, tongue, arteries, and a brief description of upper limb morphology. Descriptions of structures given refer chiefly to the male individual that was skinned prior to dissection by Humphry with descriptions of the joints, larynx, tongue, and bladder exclusively of the male. There a total of nine figures including both chimpanzee and human feet, distal femora, and chimpanzee bladder and prostate. Includes an interesting aside on man as the "only recipient of the 'aura divina'" on p. 263.

1871

Citation: Champneys, F. 1871. On the muscles and nerves of a chimpanzee (*Troglodytes niger*) and a *Cynocephalus anubis*. *Journal of Anatomy and Physiology* 6, no. 1: 176-211.

Summary: Comprehensive description of the myology of a chimpanzee and baboon, plus comparisons with human anatomy. Extensive footnotes on the finding of other anatomists in specimens from the same claimed species provide further comparison.

Provenance: Specimen provided by Rolleston, a known comparative anatomist.

Claimed study taxon/taxa: *Troglodytes niger*

Probable study taxon/taxa: *Pan troglodytes*

Novel data: Yes.

Significance: Comprehensive description of the myology of a chimpanzee and baboon, plus comparisons with human anatomy.

Description: Comparison of the muscles and nerves of a female chimpanzee (skinned, of unmentioned age) and *Cynocephalus anubis* (unskinned and "young" age). Most attention is given to the muscles, with detailed descriptions of both upper and limbs as well as neck/torso. For many muscles, the author has simply noted the condition is the same as in humans and left it at that. The analysis of nerves is less detailed both in actual description and in footnotes. The author notes that due to the chimp being skinned most cutaneous nerves were highly damaged, if present at all. No figures. Extensive footnotes on the findings of previous researchers takes nearly half of the page space.

Citation: Macalister, A. 1871. On some points in the myology of the chimpanzees and others of the primates. *Annals and Magazine of Natural History Series 4* 7, no. 41: 341-351.

Summary: Description of the myology is based on a dissection carried out by Macalister and Haughton.

Provenance: Female chimpanzee purchased from Dublin Zoological Gardens by Rev. Dr. Haughton.

Claimed study taxon/taxa: Chimpanzee

Probable study taxon/taxa: *Pan troglodytes*

Novel data: Yes.

Significance: Presents primarily anatomical data that adds to previous work or contradicts previous work. Macalister makes a point of not including data that simply agree with that of: Vrolik (1841), Wyman (1855), Wilder (1862), Huxley (1864), and Humphrey (1867).

Description:
This paper regards the dissection and subsequent comparative myology of a young female chimpanzee purchased from the Dublin Zoological Gardens by Rev. Dr. Haughton, who performed the dissection along with Macalister. Macalister notes that the female chimpanzee was in very poor health with, "extensive necrosis of the lower jaw," and some muscular atrophy in other parts of the body. The authors focus on new findings and anatomical features that disagree with previous reports of chimpanzee anatomy. Descriptions of musculature from the head, neck, torso, forelimbs, and hindlimbs are all included. Each muscle is compared to other primates, including other apes, both New and Old World monkeys, and modern humans. Macalister emphases in his conclusion that the facial muscles are decidedly modern human-like, whereas the neck, upper limb, and back muscles were all decidedly anthropoid, and that the hindlimbs were decidedly pithecoid. Includes an illustration of the brachial plexus.