Why Mammals Are Called Mammals: Gender Politics in Eighteenth-Century Natural History

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IN 1758, IN THE TENTH EDITION OF HIS *Systema naturae*, Carolus Linnaeus introduced the term *Mammalia* into zoological taxonomy. For his revolutionary classification of the animal kingdom—hailed in the twentieth century as the starting point of modern zoological nomenclature—Linnaeus devised this word, meaning literally "of the breast," to distinguish the class of animals embracing humans, apes, ungulates, sloths, sea cows, elephants, bats, and all other organisms with hair, three ear bones, and a four-chambered heart.[1] In so doing, he made the female mammae the icon of that class.

When examining the evolution of Linnaean nomenclature, historians of science have tended to confine their study to developments within the scientific community. They trace the history of classification from Aristotle through Conrad Gesner and John Ray, culminating ultimately with the triumph of Linnaean systematics.[2] Linnaeus's nomenclature is taken more or less for granted as part of his foundational work in zoology. No one has grappled with the social origins or consequences of the term *Mammalia*. Certainly, no one has questioned the gender politics informing Linnaeus's choice of this term.

It is possible, however, to see the Linnaean coinage as a political act. The presence of milk-producing mammae is, after all, but one characteristic of mammals, as was commonly known to eighteenth-century European naturalists. Furthermore, the mammae are "functional" in only half of this group of animals

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[1] The 10th edition of Linnaeus's *Systema naturae* (1758) and Carl Clerck's *Aranei Svecici* (1757) together form the starting point of modern zoological nomenclature. See *International Code of Zoological Nomenclature*, W. D. L. Ride, ed. (London, 1985), 1: 3. The term *Mammalia* first appeared in a student dissertation, *Natura pelagi*, in 1757 but was not published until 1760. *Amoenitates academicae* (Erlangen, 1788), 5: 68–77.

[2] The literature on Linnaeus is voluminous. See British Museum, *A Catalogue of the Works of Linnaeus*, 2d edn. (London, 1933); Henri Daudin, *De Linné à Jussieu: Méthodes de la classification* (Paris, 1926); Ernst Mayr, *The Growth of Biological Thought: Diversity, Evolution, and Inheritance* (Cambridge, Mass., 1982); Heinz Goerke, *Linnaeus*, Denver Lindley, trans. (New York, 1973); and Gunnar Broberg, ed., *Linnaeus: Progress and Prospects in Linnaean Research* (Stockholm, 1980). Broberg's *Homo sapiens L.: Studier i Carl von Linnés naturuppfattning och människolära* (Stockholm, 1975), by contrast, considers broader contexts.

(the females) and, among those, for a relatively short period of time (during lactation) or not at all. Linnaeus could have derived a term from a number of equally unique, and perhaps more universal, characteristics of the class he designated mammals, choosing *Pilosa* (the hairy ones—although the significance given hair, and especially beards, was also saturated with gender),[3] for example, or *Aurecaviga* (the hollow-eared ones).

In what follows, I will explore how Linnaeus came to call mammals mammals and examine the cultural forces molding his vision of nature—a vision that, in turn, reinforced key political trends within eighteenth-century Europe. I consider first the emergence of the Linnaean term from natural history, retracing traditional history of science in order to understand naturalists' concerns as they devised categories for classification. What alternatives were available to Linnaeus as he thought about how to join humans to the animal kingdom, and how did other naturalists react? Traditional historians of science have stopped after describing struggles within scientific communities. But there is more to the story than that. To understand more fully the meaning of Linnaeus's term requires a foray into the cultural history of the breast. Even though Linnaeus's term may have been new to zoology, the female breast evoked deep, wide-ranging, and often contradictory currents of meaning.

Secondly, there were immediate and pressing political trends that prompted Linnaeus to focus scientific attention on the mammae. Linnaeus venerated the maternal breast at a time when doctors and politicians had begun to extol the virtues of mother's milk. (Linnaeus was a practicing physician and the father of seven children.) Eighteenth-century middle and upper-class women were being encouraged to give up their wet nurses; a Prussian law of 1794 went so far as to require that healthy women nurse their own babies. Linnaeus was involved in the struggle against wet nursing, a struggle that emerged alongside and in step with political realignments undermining women's public power and attaching a new value to women's domestic roles. Gender, indeed, lay at the heart of the eighteenth-century revolutions in views of nature—a matter of consequence in an age that looked to nature as the guiding light for social reform.

IT HAS BEEN SAID THAT GOD CREATED NATURE and Linnaeus gave it order.[4] Carolus Linnaeus, also known as Carl von Linné, "Knight of the Order of the Polar Star," was the central figure in developing European taxonomy and nomenclature.[5] His *Systema naturae* treated the three classical kingdoms of nature—animal, vegetable, and mineral—growing from a folio of only twelve pages in 1735 to a three-volume work of 2,400 pages in the twelfth and last edition revised by Linnaeus himself in

[3] Londa Schiebinger, *Nature's Body: Gender in the Making of Modern Science* (Boston, 1993), chap. 4.

[4] Albrecht von Haller rather mockingly called him "the second Adam." Gunnar Broberg, "Linnaeus and Genesis," in Broberg, *Linnaeus*, 34.

[5] Marie-Jean Caritat, Marquis de Condorcet, "Eloge de M. de Linné, *Histoire de l'Académie Royale des Sciences* (Paris, 1778), 66. Linnaeus was the first man of letters to be awarded this honor.

1766. In the epoch-making tenth edition, Linnaeus gave binomial names (generic and specific) to all the animals known to him, nearly 4,400 species.[6]

Linnaeus divided animals into six classes: *Mammalia*, *Aves*, *Amphibia*, *Pisces*, *Insecta*, and *Vermes*.[7] Although Linnaeus had based important aspects of plant taxonomy on sexual dimorphism, the class *Mammalia* was the only one of his major zoological divisions to focus on reproductive organs and the only term to highlight a characteristic associated primarily with the female. The names of his other classes came, in many cases, from Aristotle: *Aves* simply means bird; *Amphibia* emphasizes habitat; *Insecta* refers to the segmentation of the body. *Vermes* derives from the color (red-brown) of the common earthworm. Scientific nomenclature was a conservative enterprise in the eighteenth century; suitable terms tended to be conserved and new terms derived by modifying traditional ones. Linnaeus, however, broke with tradition by creating the term *Mammalia*.

In coining the term mammals, Linnaeus abandoned Aristotle's canonical term, *Quadrupedia*. For more than two thousand years, most of the animals we now designate as mammals (along with most reptiles and several amphibians) had been called quadrupeds. While Aristotle had never intended to develop a definitive taxonomy, his analytical distinctions set out in his *Historia animalium* laid the groundwork for European taxonomy. Using a number of diagnostics—mode of subsistence, locomotion, and reproduction—he arranged animals hierarchically along what would later be called the *scala naturae*. Aristotle began by dividing animals into two main groups according to the quality of their blood. "Blooded animals" had warm, red blood and superior qualities of "soul" (*psyche*)—sharp senses, great courage and intelligence; "bloodless animals" had a colorless liquid analogous to blood but with no essential heat. Quadrupeds, then, formed a major category within blooded animals and included all animals going on four feet. Aristotle further separated quadrupeds into two groups: viviparous and hairy with mammae (including many of the animals we now call mammals) and oviparous and scaly (what we now call reptiles and also some amphibians). Birds formed another group within the blooded animals; they were bipedal but not erect. Fish, the final group, were considered imperfect, lacking legs, arms, and wings, and living in water.[8]

Aristotelian categories and terminology remained fundamental to European natural history well into the early modern period. Conrad Gesner's influential *Historiae animalium* (1551) employed Aristotle's division of quadrupeds into viviparous and oviparous by treating each in separate volumes. Within each volume, animals were entered alphabetically. The Italian naturalist Ulisse Aldrovandi divided quadrupeds into those with single hooves (horses, for example) and those with cloven hooves (such as cattle, camels, or goats). Gesner and Aldrovandi

[6] W. T. Stearn, "The Background of Linnaeus's Contributions to the Nomenclature and Methods of Systematic Biology," *Systematic Zoology*, 8 (1959): 4–22; and E. G. Linsley and R. L. Usinger, "Linnaeus and the Development of the International Code of Zoological Nomenclature," *ibid.*, 39–46.

[7] Carl Linnaeus, *Systema naturae per regna tria naturae*, 10th edn. (Stockholm, 1758).

[8] Aristotle, *Historia animalium*, in *The Works of Aristotle*, D'arcy Thompson, trans. (Oxford, 1910), vol. 4; G. E. R. Lloyd, *Science, Folklore and Ideology: Studies in the Life Sciences in Ancient Greece* (Cambridge, 1983), 16; Aristotle, *Generation of Animals*, A. L. Peck, trans., rev. edn. (Cambridge, Mass., 1953), lxix; and Pierre Pellegrin, *Aristotle's Classification of Animals: Biology and the Conceptual Unity of the Aristotelian Corpus*, Anthony Preus, trans., rev. edn. (Berkeley, Calif., 1986).

continued the medieval practice of reciting all known information—zoological, historical, cultural, and mythical—about any particular animal. Aldrovandi in his discussion of the horse, for example, included the miracles attributed to the creature in various religions, along with poetic allusions, iconographic representations, and a list of coins bearing the equine image. Other taxonomic schema, such as Herman Frey's, followed Levitical categories dividing animals into clean (edible) and unclean (inedible).[9]

John Ray (1627–1705), the great English naturalist, presented the first serious challenge to Aristotelian classification. Aristotle's primary division of animals into blooded and bloodless, Ray noted, was not strictly accurate, since all organisms have a vital fluid. The division of animals into viviparous and oviparous was similarly flawed because all animals come from eggs. More specific to my theme, Ray was the first to question the appropriateness of the term quadruped. Whales, porpoises, and manatees, he pointed out, shared key features with quadrupeds (red blood, a heart with two ventricles, and lungs) but did not have four feet. In his "Table of Classification," Ray removed these animals from the fishes and grouped them with other viviparous quadrupeds. He also suggested that the term quadruped be dropped.[10]

Naturalists did not immediately act on Ray's suggestions. Linnaeus, in the first edition of his *Systema naturae* (1735), used the traditional term, *Quadrupedia*. He did, however, raise eyebrows and ire by including humankind (rather uncomfortably) among the quadrupeds. Indeed, it was the question of how to place humans in nature—which Thomas Huxley later called "the question of all questions"—more than anything else that led Linnaeus to abandon *Quadrupedia* and search for something more appropriate.[11] Linnaeus was not, of course, the first in modern times to recognize that humans are animals.[12] In 1555, Pierre Belon had pointed to the similarities in the skeletons of a human and a bird, and in 1699 Edward Tyson had dissected a chimpanzee—his *Homo sylvestris*—revealing the "great affinity" between animal and human anatomy.[13]

[9] Herman Frey, *Biblish Thierbuch* (1595). See Willy Ley, *Dawn of Zoology* (Englewood Cliffs, N.J., 1968), 160, 164.

[10] Despite these objections, the term figured prominently in the title of his book. In the text, Ray bowed to tradition, leaving the cetaceans among fishes. John Ray, *Synopsis methodica animalium quadrupedum et serpentini generis* (London, 1693), 55. See also Charles Raven, *John Ray, Naturalist: His Life and Works*, 2d edn. (Cambridge, 1950).

[11] Thomas Huxley, cited in Ernst Haeckel, *Das Menschen-Problem und die Herrentiere von Linné* (Frankfurt am Main, 1907), 8. Some historians have argued that it was the problem of how to classify the whale that led to Linnaeus's search for new terminology, others that it was the problem of where to place humans in nature; see, for example, William Gregory, "The Orders of Mammals," *Bulletin of the American Museum of Natural History* (February 1910): 28; Gunnar Broberg, "Homo sapiens: Linnaeus's Classification of Man," in *Linnaeus: The Man and His Work*, Tore Frängsmyr, ed. (Berkeley, Calif., 1983), 156–94.

[12] Aristotle had included humans among viviparous, hairy quadrupeds in his *Historia animalium*. In the course of the Middle Ages, however, scholastics removed humans from nature, emphasizing instead their proximity to angels. Aldrovandi, Gesner, and Ray expressed this by not including humankind in their zoological treatises at all. Rationality, in their eyes, blessed humans with immortal souls, raising them above brute creation. With the rise of comparative anatomy in the sixteenth century, the animal nature of humankind was less easily denied. Broberg, "Homo sapiens," 156–94.

[13] Pierre Belon, *L'histoire de la nature des oyseaux* (Paris, 1555), 40–41; Edward Tyson, *Orang-Outang, sive Homo sylvestris; or, The Anatomy of a Pygmie Compared with That of a Monkey, an Ape, and a Man* (London, 1699). See Maurice Daumas, *Histoire de la science* (Paris, 1957), 1352.

In setting humans among quadrupeds, Linnaeus called attention to their hairy bodies, four feet (two for locomotion and two for gripping, as he later explained),[14] and the viviparous and lactiferous nature of the females. On the basis of similarities in their teeth (namely, four incisors) he further included humans in his order *Anthropomorpha* (a term he borrowed from Ray) along with apes, monkeys, and sloths. *Anthropomorpha* was changed to *Primates* in the 1758 edition.[15]

Linnaeus's ranking of humans among quadrupeds outraged naturalists. They found repugnant his characterization of rational man as a hairy animal with four feet and four incisors. Georges-Louis Leclerc, the Comte de Buffon, born the same year as Linnaeus and his principal rival, made the obvious point that many of the creatures included among Linnaeus's *Quadrupedia* were not quadrupeds at all: humans have two hands and two feet; bats have two feet and no hands; apes have four hands and no feet; and manatees only two "hands."[16] Louis Daubenton, Buffon's assistant at the Jardin du Roi, denounced Linnaeus's entire system as "false" and "inaccurate."[17] Finally, many naturalists rejected as heretical the notion that humans were essentially animals. Holy Scripture, after all, clearly taught that man was created in God's image.[18]

Natural historians before Linnaeus had struggled long and hard with the problems of classification. John Ray, often credited with developing binomial nomenclature (although he did not employ it systematically), had used the term *Vivipara* to unite whales and other aquatic mammals with terrestrial quadrupeds. Within his subcategory *Terrestria*, he suggested the term *Pilosa* (hairy animals) as more comprehensive than *Quadrupedia* and thus more suitable for joining amphibious manatees with land-dwelling quadrupeds.[19] Peter Artedi, Linnaeus's close friend and colleague, had called attention to hair in his proposed *Trichozoologia*, or "science of the hirsute animal."[20] Linnaeus might well have chosen the more traditional adjective *Pilosa* for his new class of quadrupeds; in his system, hair had the same diagnostic value as mammae.[21] All mammals (including the whale) have hair, and it is still today considered a distinguishing characteristic of mammals.

But Linnaeus did not draw on tradition; he devised instead a new term,

[14] Carl Linnaeus, *Fauna Svecica: Sistens animalia Sveciae regni* (Stockholm, 1746), preface.

[15] See Londa Schiebinger, "The Gendered Ape: Early Representations of Primates in Europe," in *A Question of Identity: Women, Science, and Literature*, Marina Benjamin, ed. (New Brunswick, N.J., 1993).

[16] Georges-Louis Leclerc, Comte de Buffon, *Histoire naturelle, générale et particulière* (Paris, 1749–67), 14: 18.

[17] Cited by Jean Baptiste Bory de Saint-Vincent, *Dictionnaire classique d'histoire naturelle* (Paris, 1825), 8: 270.

[18] See Broberg, "Linnaeus's Classification of Man," 170–74.

[19] Ray, *Synopsis methodica*, "Animalium tabula generalis," 53. See also William Gregory, "Linnaeus as an Intermediary between Ancient and Modern Zoology," *Annals of the New York Academy of Sciences*, 18 (1908): 21–31, esp. 25. Ray's terms were used as adjectives, not nouns—an important distinction at a time when scholastics still distinguished between essence and accident. Theodor Gill, "The Story of a Word—Mammal," *Popular Science Monthly*, 61 (1902): 434–38.

[20] Broberg, "Linnaeus's Classification of Man," 175.

[21] I have derived this term from Linnaeus's use of *pilus* in his catalogue of mammalian traits (*Systema naturae*, 10th edn., 12). In the early nineteenth century, Lorenz Oken suggested that the class of mammals might better be called *Pilosa* for the uniqueness of their hair. Haeckel also argued for this term, stating that cutaneous glands—either sweat or sebaceous—gave rise to mammary glands, which suggested that in mammalian evolution hair preceded mammae (*Das Menschen-Problem*, 19).

Mammalia. In its defense, Linnaeus remarked that even if his critics did not believe that humans originally walked on all fours, surely every man born of woman must admit that he was nourished by his mother's milk.[22] Linnaeus thus called attention to the fact, commonly known since Aristotle, that hairy, viviparous females lactate. Linnaeus was also convinced of the diagnostic value of the teat. As early as 1732, in his *Tour of Lapland*, he had already announced, "If I knew how many teeth and of what peculiar form each animal has, as well as how many udders and where situated, I should perhaps be able to contrive a most natural methodical arrangement of quadrupeds."[23] In the first edition of his *Systema naturae*, he used the number and position of teats or udders to align orders within his class of *Anthropomorpha* (complicating factors being that females and males often have different numbers and that females of the same species may also vary in the number of their teats).[24] In 1758, Linnaeus announced the term *Mammalia* in the tenth edition of his *Systema naturae* with the words, "Mammalia, these and no other animals have mammae [mammata]." He seemed quite unconcerned that mammae were not a universal characteristic of the class he intended to distinguish. "All females," he wrote on the following page, "have lactiferous mammae of determinate number, as do males (except for the horse)."[25]

Mammalia resonated with the older term *animalia*, derived from *anima*, meaning the breath of life or vital spirit.[26] The new term also conformed to Linnaeus's own rules for zoological terms: it was pleasing to the ear, easy to say and to remember, and not more than twelve letters long.[27] For the rest of his life, Linnaeus fiddled with his system, moving animals from order to order, creating new categories and combinations to better capture nature's order. Yet he never rechristened mammals.

The term *Mammalia* gained almost immediate acceptance.[28] There were, however, detractors of note. Buffon scorned the entire project of taxonomy but especially Linnaean taxonomy and nomenclature. For Buffon, the task of the natural historian was to describe each animal precisely—its mode of reproduction, nourishment, customs, and habitat—not to divide nature's bounty into artificial groups with incomprehensible names of Greek or Latin origin. Buffon took particular offense at the prominence Linnaeus gave the breast: "A general character, such as the teat, taken to identify quadrupeds should at least belong to all quadrupeds." (Buffon, like Linnaeus, recognized that stallions, for example,

[22] Broberg, *Homo sapiens L.*, 176.

[23] Carl Linnaeus, *Lachesis Lapponica; or, A Tour in Lapland*, James E. Smith, trans. (London, 1811), 1: 191, slightly modified.

[24] Pig nipples, for example, vary from between eight and eighteen in number. Ernst Bresslau, *The Mammary Apparatus of the Mammalia in the Light of Ontogenesis and Phylogenesis* (London, 1920), 98.

[25] Linnaeus, *Systema naturae* (1758), 14, 16.

[26] Gill, "Story of a Word—Mammal," 435.

[27] Stearn, "Background of Linnaeus's Contributions to the Nomenclature," 8.

[28] Linnaeus's term *Primates* encountered more resistance. Notably, Johann Friedrich Blumenbach and Georges Cuvier insisted on separating humans and apes into distinct orders. Blumenbach coined the term *Inermis* (without weapons) for humans, and Cuvier coined the term *Bimanes* (two hands). Each of them called apes *Quadrumanes* (four hands). Johann Friedrich Blumenbach, *Handbuch der Naturgeschichte* (Göttingen, 1779), 57–59; Georges Cuvier, *Le règne animal distribué d'après son organisation* (Paris, 1817), vol. 1.

have no teats.)[29] Buffon also complained that Linnaeus's order *Anthropomorpha* lumped together things as different as humans, apes, and sloths. This "violence" was wreaked on the natural scheme of things, he lamented, all because there was "some small relationship between the number of nipples or teeth of these animals or some slight resemblance in the form of their horns."[30]

Other taxonomists, including Felix Vicq-d'Azyr and Thomas Pennant, continued to use the traditional term, *Quadrupedia*. Still others developed their own alternatives. The Frenchman Henri de Blainville in 1816 tried to rationalize zoological nomenclature, renaming mammals *Pilifera* (having hair), birds *Pennifera* (having feathers), and reptiles *Squammifera* (having scales).[31] In England, John Hunter proposed the term *Tetracoilia*, drawing attention to the four-chambered heart.[32]

These critics met with little success. *Mammalia* was adopted by the English as "mammals," although "mammifers" was also occasionally used, and, as one commentator has suggested, the science treating mammals was rather awkwardly rendered as mammalogy, meaning literally "a study of breasts" (and not of breast-bearing animals, which would be more properly mammology or mammalology).[33] The French devised *mammifères*, or the breast-bearers (not *mammaux*, nicely analogous to *animaux*). The Germans refocused matters slightly, creating *Säugetiere*, or "suckling animals," which appropriately drew attention away from the breast and highlighted the act of suckling. (No distinction was made between a mother giving suck and a newborn taking milk.) Linnaeus's term *Mammalia* was retained even after the Darwinian revolution and is today recognized by the International Code of Zoological Nomenclature.

THE WORD "MAMMA"—THE SINGULAR FORM OF "mammae," designating the milk-secreting organs of the female—probably derives from baby talk, being a reduplicated syllable often uttered by young children, who in many countries are taught to use it as their word for mother.[34] Linnaeus devised the term *Mammalia* from the Latin *mammae*, intending it to refer to the breast or teat itself as much as to its milk-producing aspects. These terms—breast and teat—are somewhat

[29] Buffon, *Histoire naturelle*, 1: 38–40. The author of the article "Mammifères" in the *Dictionnaire classique d'histoire naturelle* noted that in this period, it was commonly thought that male horses had no teats and consequently that mammae were not a universal characteristic of mammals (Paris, 1826), 10: 74. As John Lyon and Phillip Sloan have pointed out, Buffon may have been thinking of the stallion. Stallions have no teats and usually have inconspicuous rudimentary mammary glands, but even these are not always present. Lyon and Sloan, eds. and trans., *From Natural History to the History of Nature: Readings from Buffon and His Critics* (Notre Dame, Ind., 1981), 94 n. 8.

[30] Buffon, *Histoire naturelle*, 1: 38–40. See also Phillip Sloan, "The Buffon-Linnaeus Controversy," *Isis*, 67 (1976): 356–75; and James Larson, "Linné's French Critics," Broberg, *Linnaeus*, 67–79.

[31] Henri de Blainville, "Prodrome: D'une nouvelle distribution systématique du règne animal," *Journal de physique*, 83 (1816): 246. See also Toby Appel, "Henri de Blainville and the Animal Series: A Nineteenth-Century Chain of Being," *Journal of the History of Biology*, 13 (1980): 291–319, esp. 301.

[32] John Hunter, *Essays and Observations on Natural History, Anatomy, Physiology, Psychology, and Geology*, Richard Owen, ed. (London, 1861), 1: 25.

[33] Gill, "Story of a Word—Mammal," 436–37. See also *Dictionnaire pittoresque d'histoire naturelle*, 4 (1836), *s.v.* "Mammifères."

[34] Mamma meaning breast first appeared in English in 1579. Henry Skinner, *The Origin of Medical Terms* (Baltimore, Md., 1949), 223.

ambiguous. Teat sometimes refers to the nipple of a cow, sheep, or goat but also refers to the internal structures of the mammary gland. In humans (and some birds), breast refers to the chest area as well as to the milk-producing organ in the female. Today, it is the mammary gland with its milk-producing structures that defines the class *Mammalia*. Two groups fit uncomfortably in this taxon: males, with their dry and barren vestigial breasts, and monotremes (egg-laying mammals such as the duckbilled platypus, spiny echidna, and anteater), which have mammary glands but no nipples.[35]

The question of why males have breasts at all has long plagued naturalists. The eighteenth-century medical doctor Louis de Jaucourt addressed this issue as one of six basic questions about the breast in his article, "Mamelle," for Diderot and d'Alembert's *Encyclopédie*. Jaucourt, who also wrote a well-known entry on "Femme," noted that the particular cast of the human body and its parts answered to nature's need to conserve the species and that even though some parts, such as male breasts, may be superfluous, nature did not take them away. He was quick to argue that male breasts are not defective, that in many cases milk flows in great abundance from them. That males rarely produce milk was to be traced to the absence of menstrual blood—the source of milk. According to Jaucourt, with the onset of puberty, blood surges throughout the female body, causing young women's breasts to "inflate"; the passion of love also experienced at this age causes them to inflate even further. Men do not have menses, the author continued, and therefore their breasts—though anatomically similar to women's—never inflate.[36]

The fanciful notion that males are, indeed, capable of producing milk was popular among naturalists. Aristotle had considered it an omen of extraordinary good fortune when a male goat produced milk in such quantities that cheese could be made from it.[37] Eighteenth-century naturalists reported the secretion of a fatty milky substance—"witch's milk"—from the breasts of male as well as female newborns. Buffon related many examples of the male breast filling with milk at the onset of puberty. A boy of fifteen, for example, pressed from one of his breasts more than a spoonful of "true" milk.[38] John Hunter offered the example of a father who nursed his eight children. This man began nursing when his wife was unable to satisfy a set of twins. "To soothe the cries of the male child," Hunter wrote, "the father applied his left nipple to the infant's mouth, who drew milk from it in such quantity as to be nursed in perfectly good health." (The father also shared with his wife all other domestic duties.) Considering milk production within the bounds of normal male physiology, Hunter dutifully noted that the man "was not a hermaphrodite."[39]

[35] Blumenbach claimed that male hamsters and dormice do not have breasts but did not for this reason remove them from the class of mammals. *Handbuch der Naturgeschichte*, 46.

[36] *Encyclopédie, ou Dictionnaire raisonné des sciences, des artes et des métiers* (Paris, 1751–65), vol. 10, *s.v.* "Mamelle."

[37] Aristotle, *Historia animalium*, 522a.

[38] Buffon, *Histoire naturelle*, 2: 543.

[39] Hunter, *Essays and Observations on Natural History*, 238–39. Males nursing infants was a popular theme. In the nineteenth century, travelers made the remarkable claim that Brazilian men nurse all infants ("Mammifères," *Dictionnaire classique d'histoire naturelle*, 10: 105). Other travelers claimed that God had bestowed on the men of eastern Ethiopia "breasts of milk as amply supplied as those of the women." In Portugal, a man fifty years old was said to have suckled two orphans of a female relation.

Despite dramatic examples such as these, most naturalists recognized that the male breast was barren. Why, then, did males have breasts at all? Erasmus Darwin, Charles Darwin's grandfather, suggested that the vestigial male teat lent credence to Plato's theory that mammals had hermaphroditic origins and only later developed into distinct males and females.[40] Late into the nineteenth century, comparative anatomists continued to embrace the notion that some remote progenitor of the vertebrate kingdom had been androgynous.[41] Charles Darwin, following Clémence Royer, suggested that in an earlier age male mammals had aided females in nursing their offspring and that later, some pattern of events (such as smaller litters) rendered male assistance unnecessary. The disuse of the organ led to its becoming vestigial, and this was passed on to future generations.[42] Today, naturalists emphasize that many organs in the male and female, such as the clitoris and penis, and the labia majora and scrotal sac, are identical in the early embryos and only later—after the action of various hormones—develop along different paths.[43]

Along with males, monotremes might also be considered only honorary mammals. Female monotremes have functional mammary glands, but, unlike all other mammals they have no nipples. Milk is secreted through numerous pores onto the mother's belly, where her babies lap it up. The platypus, the first of these animals to reach Europe (from Australia), baffled early nineteenth-century taxonomists. Some naturalists suspected that it had been fabricated by foreign taxidermists, already notorious for their willingness to feed European curiosity by producing "mermaids" from the heads of monkeys sewn to the tails of fish. But the question of whether the platypus was a reptile, bird, mammal, or a completely new class of animal was not resolved even after George Shaw, working at the British Museum, determined that the skin he received in 1799 (eleven years after Linnaeus's death) was from a genuine animal. Because of its curious melange of characteristics, the German zoologist Johann Friedrich Blumenbach christened it *Ornithorhynchus paradoxus*.[44]

Shaw, having only a stuffed skin to work with, knew nothing of the platypus's internal structure and classified it as a quadruped (order *Bruta*) for its abundant "beaver-like" fur.[45] Zoologists imagined that this furry animal—like other mam-

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Joano dos Santos, "History of Eastern Ethiopia," in John Pinkerton, *A General Collection of the Best and Most Interesting Voyages and Travels in All Parts of the World* (London, 1808), vol. 16: 697. Centuries earlier, Aristotle had spoken of an androgynous race of people, their left breast being that of a man and their right breast that of a woman. Pliny the Elder, *Natural History*, H. Rackham, trans. (Cambridge, Mass., 1942), 7.ii, 14–17.

[40] Erasmus Darwin, *Zoonomia; or, The Laws of Organic Life* (London, 1796), 1: 512.

[41] G. Gegenbauer cited in Charles Darwin, *The Descent of Man and Selection in Relation to Sex* (1871; rpt. edn., London, 1913), 251 n. 29.

[42] Darwin, *Descent of Man*, 249–53. Darwin cited Royer's *Origine de l'homme et des sociétés* (Paris, 1870). On Royer, see Joy Harvey, " 'Strangers to Each Other': Male and Female Relations in the Life and Work of Clémence Royer," *Uneasy Careers and Intimate Lives: Women in Science, 1789–1979*, Pnina G. Abir-Am and Dorinda Outram, eds. (New Brunswick, N.J., 1987), 147–71.

[43] Stephen Jay Gould, "Freudian Slip," *Natural History* (February 1987): 14–19.

[44] My account of the platypus is taken from Harry Burrell's classic, *The Platypus* (Sydney, 1927), 1–45.

[45] Shaw's report is reprinted in Carl Linnaeus, *A General System of Nature*, William Turton, trans. (London, 1806), 1: 30–32.

mals—bore live young and suckled them. Everard Home, the English anatomist who dissected a female and a male that had come to him preserved in alcohol in 1802, found no uterus, no nipples, and no mammary glands. (The mammary glands of the non-nursing female are so small that they are easily overlooked.) From his investigation, Home suggested that the reproductive organs of the female platypus most closely resembled those of the ovoviviparous lizards, whose young are produced from eggs that hatch within the females' bodies.[46]

In the taxonomic wars that raged for more than thirty years over the classification of the platypus, the French zoologists Etienne Geoffroy Saint-Hilaire and Jean-Baptiste Lamarck faced off against the German Johann Meckel and his French colleague Blainville. Meckel and Blainville insisted that the platypus was a mammal, predicting viviparity and mammary glands. Geoffroy Saint-Hilaire adamantly refused to see it as a mammal, asserting (wrongly) that it lacked mammary glands and predicting (correctly) that it would be found to lay eggs. In 1803, Geoffroy Saint-Hilaire coined the term *Monotremata* ("one-holed"), emphasizing the reptilian structure of the platypus's reproductive tract. (Females and males have only one opening, the cloaca, for all excretory and reproductive functions; male mammals have two such openings, while females have three.) In 1822, Geoffroy Saint-Hilaire established *Monotremata* as a fifth class of vertebrates, ranked alongside mammals, birds, reptiles (including amphibians), and fishes.[47]

The debate continued even after Meckel discovered mammary glands in the platypus in 1824. Geoffroy Saint-Hilaire, still committed to seeing the platypus as something other than a mammal, refused to admit that the glands Meckel found produced milk, arguing instead that they were odoriferous glands similar to those found in shrews and used for attracting mates. (Milk production was not demonstrated until 1832.) After discovering the platypus's mammary glands, Meckel predicted that these animals would also prove to be viviparous, placing them squarely among the mammals. It was not until 1884, however, that it was confirmed that platypuses lay eggs like reptiles. Despite its nippleless mammae and ovoviviparity, the platypus is still today classed among mammals, where George Shaw placed it for its abundant hair in 1799. It is included within an egg-laying subclass of mammals (*Prototheria*) along with anteaters and is distinguished from both marsupial and placental mammals. Thus mammals can be mammals whether or not they have fully developed, functional mammae.

WERE THERE GOOD REASONS FOR LINNAEUS to name mammals mammals? This question implies a logic uncharacteristic of the naming process. Names of taxa collect over time, and unless there is a technical problem—as was the case with the term *Quadrupedia*—they pass unchanged from generation to generation. Naturalists also name plants and animals for other than empirical reasons. Plants or

[46] Home, cited in Burrell, *Platypus*, 22–23, 27.

[47] The German anatomist Friedrich Tiedemann left open the question of where to classify the platypus. Lamarck created a new class, *Prototheria*. (He would not consider them mammals because they had no mammary glands and were probably oviparous; they certainly were not birds, nor were they reptiles, since they possessed a four-chambered heart). Burrell, *Platypus*, 30.

animals that are pleasing are often named after a wife or colleague, while a particularly odious species might be given the name of a professional rival (for instance, *Siegesbeckia*, a small and unpleasant flowering weed that Linnaeus named after Johann Siegesbeck, a critic of his sexual system).[48]

Zoological nomenclature—like all language—is to some degree arbitrary; naturalists devise convenient terms to identify groups of animals. But nomenclature is also historical, growing out of specific contexts, conflicts, and circumstances. The historian can fairly ask why a certain term was coined. In coining the term *Mammalia*, Linnaeus intended to highlight an essential trait of that class of animals. Geoffroy Saint-Hilaire and Georges Cuvier, in their article "Mammalogie" for the *Magazin encyclopédique* of 1795, summed up the practice of eighteenth-century taxonomists, stating that primary organs determine classes, while secondary organs determine orders. In 1827, Cuvier continued to argue that the mammae distinguish the class bearing their name better than any other external characteristic.[49]

Is Cuvier's statement, in fact, true? Does the longevity of Linnaeus's term reflect the fact that he was simply right, that the mammae do represent a primary, universal, and unique characteristic of mammals (as would have been the parlance of the eighteenth century)? Yes and no. Paleontologists today identify the mammary gland as one of at least six uniquely mammalian characteristics.[50] Still, Linnaeus was perhaps overly exuberant in singling out the breast or teat itself—a sexually charged part of the female body—rather than its function. One could argue that the term *Lactantia* (the lactating ones, derived from Linnaeus's own description of female mammae) would have better captured the significance of the mammae; certainly, Linnaeus was wrong to think that the number and position of the teats themselves were significant. But *Lactantia* still refers exclusively to females. *Lactentia* or *Sugentia* (both meaning "the sucking ones") would have better universalized the term, since male as well as female young suckle at their mothers' breasts.

The fact remains that the mammae were only one among several traits that could have been highlighted. Even by eighteenth-century criteria, there was not one characteristic alone that could determine class assignment. As Buffon recognized, species—defined for sexually reproducing organisms as members of a group of individuals that can produce fertile offspring—is the only taxon that exists in nature.[51] This does not mean that higher units—genera, families, orders,

[48] Ronald King in Robert Thornton, *The Temple of Flora* (1799; rpt. edn., Boston, 1981), 9. Linnaeus sometimes named new genera after friends and colleagues, intending to suggest a spiritual likeness between the individual and the plant or animal in question; Benjamin Jackson, *Linnaeus* (London, 1923), 278. Linnaeus also ranked his colleagues as "Officers in Flora's Army" according to his evaluation of their scientific merit. His list was headed by "General Linnaeus"; the lowliest rank was assigned to Siegesbeck. Goerke, *Linnaeus*, 108.

[49] Cuvier, *Le règne animal*, 1: 76.

[50] The other characteristics are: a jaw articulation formed by the squamosal and the dentary; a chain of three bones, malleus, incus, and stapes connecting the tympanic membrane to the inner ear; the presence of hair or fur; the left aortic arch in the systemic arch; and cheek teeth with divided roots. D. M. Kermack and K. A. Kermack, *The Evolution of Mammalian Characters* (London, 1984), vii; see also T. S. Kemp, *Mammal-like Reptiles and the Origin of Mammals* (London, 1982).

[51] Scott Atran, *Cognitive Foundations of Natural History: Towards an Anthropology of Science* (Cambridge, 1990), 316 nn. 23–24.

classes, and on up—are arbitrary; these must be consistent with evolutionary genealogy.[52] Yet, as we have seen, Linnaeus could have chosen from equally valid terms such as *Pilosa*, *Aurecaviga*, *Lactentia*, or *Sugentia*. Because Linnaeus had choices, I suggest that his focus on the breast responded to broader cultural and political trends.

LONG BEFORE LINNAEUS, the female breast had been a powerful icon in Western cultures, representing both the sublime and bestial in human nature.[53] The grotesque, withered breasts on witches and devils represented temptations of wanton lust, sins of the flesh, and humanity fallen from paradise. The firm spherical breasts of Aphrodite, the Greek ideal, represented an otherworldly beauty and virginity. During the French Revolution, the bared female breast—embodied in the strident Marianne—became a resilient symbol of freedom.[54] From the multi-breasted Diana of Ephesus to the fecund-bosomed Nature, the breast symbolized generation, regeneration, and renewal.

Linnaeus created his term *Mammalia* in response to the question of humans' place in nature. In his quest to find an appropriate term for (what we would call) a taxon uniting humans and beasts, Linnaeus made the breast—and specifically the fully developed female breast—the icon of the highest class of animals. It might be argued that, by privileging a uniquely female characteristic in this way, Linnaeus broke with longstanding traditions that saw the male as the measure of all things. In the Aristotelian tradition, the female had been seen as a misbegotten male, a monster or error of nature. By honoring the mammae as sign and symbol of the highest class of animals, Linnaeus assigned a new value to the female, especially women's unique role in reproduction.

It is important to note, however, that in the same volume in which Linnaeus introduced the term *Mammalia*, he also introduced the name *Homo sapiens*. This term, "man of wisdom," was used to distinguish humans from other primates (apes, lemurs, and bats, for example). In the language of taxonomy, *sapiens* is what is known as a "trivial" name. (Linnaeus at one point pondered the choice of the

[52] Stephen Jay Gould, "A Quahog Is a Quahog," in Gould, *The Panda's Thumb: More Reflections in Natural History* (New York, 1980), 204–07.

[53] The cultural significance of the breast and mother's milk is a vast and as yet insufficiently studied topic; here I want to touch on only those aspects relevant to Linnaeus's work. Marina Warner's *Alone of All Her Sex: The Myth and the Cult of the Virgin Mary* (New York, 1976) and her *Monuments and Maidens: The Allegory of the Female Form* (London, 1985) along with Caroline Bynum's *Jesus as Mother: Studies in the Spirituality of the High Middle Ages* (Berkeley, Calif., 1982) are extremely helpful, although they focus primarily on the Middle Ages. Heinz Kirchhoff's article "Die künstlerische Darstellung der weiblichen Brust als Attribut der Weiblichkeit und Fruchtbarkeit als auch der Spende der Lebenskraft und der Weisheit," *Geburtshilfe und Frauenheilkunde*, 50 (1990): 234–43, is very rich but is written, like Erich Neumann's *Grosse Mutter: Der Archetyp des grossen Weiblichen* (Zurich, 1956), from a rather wooden Jungian perspective without attention to historical context. Helpful materials are also found in Anne Hollander, *Seeing through Clothes* (New York, 1978); and Françoise Borin, "Arrêt sur image," *Histoire des femmes en Occident: XVI^e–XVIII^e*, Natalie Zemon Davis and Arlette Farge, eds. (Paris, 1991), 213–19. A good cultural history of the breast and mother's milk is much needed.

[54] See Lynn Hunt, *Politics, Culture, and Class in the French Revolution* (Berkeley, Calif., 1984), esp. pt. 1; also Warner, *Monuments and Maidens*, chaps. 12–13.

name *Homo diurnus*, designed to contrast with *Homo nocturnus*.)[55] From a historical point of view, however, the choice of the term *sapiens* is highly significant. "Man" had traditionally been distinguished from animals by his reason; the medieval apposition, *animal rationale*, proclaimed his uniqueness.[56] Thus, within Linnaean terminology, a female characteristic (the lactating mamma) ties humans to brutes, while a traditionally male characteristic (reason) marks our separateness.

The notion that woman—lacking male perfections of mind and body—resides nearer the beast is an ancient one. Among all the organs of a woman's body, her reproductive organs were considered most animal-like. For Plato, the uterus was an animal with its own sense of smell, wandering within the female body and leaving disease and destruction in its path.[57] Galen and even Vesalius (for a time) reported that the uterus had horns. The milk production of the female breast had already been taken to link humans with animals. Aristotle, in his *Historia animalium*, had recognized that all internally viviparous animals—women, sheep, horses, cows, and whales, for example—nurse their young. Beyond noting how breast size relates to milk production and noting the number and position of teats in various animals, Aristotle was not much interested in the breast itself. His interest lay more in the utility and variety of milk from different animals—which among these made the tastiest cheese and which kinds of grasses promoted milk production.[58]

In Judaic traditions, too, the discomfort women felt during menstruation and childbirth were considered curses, rendering them unclean, undesirable, and beastlike. The disgust associated with menstruation also sullied lactation; Aristotle's theory that lactation was related to menstruation remained current in the West until well into the eighteenth century. For Aristotle, milk was concocted blood, which in males was secreted as semen. In nonpregnant females, this blood was secreted as menstrual fluid, in pregnant women, as a vital fluid nourishing their embryos, and in postpartum women, as milk for newborns.[59]

Myths and legends also portrayed suckling as a point of close connection between humans and beasts, suggesting the interchangeability of human and animal breasts in this respect. A nanny goat, Amaltheia, was said to have nursed

[55] Broberg has shown that Linnaeus first used the term *sapiens* in 1753 to denote a species of monkey referred to as *Simia sapiens*—a species said to play a mean game of backgammon ("Homo sapiens," 176). Linnaeus wrote of "trivial names" in reference to botany: "I have put trivial names in the margin so that without more ado we can represent one plant by one name; these I have taken, it is true, without special choice, leaving this for another day. However, I would warn some solemnly all sensible botanists not to propose a trivial name without adequate specific distinction, lest the science fall back into its early crude state." Cited in John Heller, *Studies in Linnaean Method and Nomenclature* (Frankfurt, 1983), 278.

[56] Linnaeus saw reason as the principle characteristic distinguishing humans from other animals. In the preface to his *Fauna Svecica* (1746), he called reason "the most noble thing of all" that places humans above all others. See also H. W. Janson, *Apes and Ape Lore in the Middle Ages and the Renaissance* (London, 1952), 74–75.

[57] Plato, *Timaeus*, 91c. Plato seemed uncertain whether woman should be classed with brute beasts or rational beings. Ian Maclean, *The Renaissance Notion of Woman: A Study in the Fortunes of Scholasticism and Medical Science in European Intellectual Life* (Cambridge, 1980), 31.

[58] Aristotle, *Historia animalium*, 500a, 521b, 582a. Throughout the Middle Ages, there was little interest in mammae as a marker of sexual difference. See Joan Cadden, *The Meanings of Sexual Difference in the Middle Ages: Medicine, Natural Philosophy, and Culture* (Cambridge, 1992).

[59] Aristotle, *Generation of Animals*, 776a–777a. Aristotle saw milk production as natural and good; he argued against Empedocles, who saw milk as a whitish pus emanating from putrefied blood.

the young Zeus.[60] A she-wolf served as the legendary nurse to Romulus and Remus, the founders of Rome. From the Middle Ages to the seventeenth and eighteenth centuries, bears and wolves were reported to have suckled abandoned children (Figure 1). Children were thought to imbibe certain characteristics of the animals that nursed them—the "wild Peter" found in northern Germany in 1724 grew thick hair all over his body as a result of his nurturance at the breast of a bear. Linnaeus believed that ancient heroes, put to the breast of the lioness, absorbed her great courage along with her milk.[61]

In rarer instances, humans were reported even to have suckled animals. Veronica Giuliani, beatified by Pius II (1405–1464), took a real lamb to bed with her and suckled it at her breast in memory of the lamb of God.[62] European voyagers reported that native South Americans kept their breasts active by letting animals of all kinds feed from them. In Siam, women were said to have suckled apes.[63] The practice of animals suckling at human breasts was also reported in Europe. William Godwin recorded that as Mary Wollstonecraft lay dying after childbirth, the doctor forbade the child the breast and "procurred puppies to draw off the milk."[64]

Linnaeus thus followed well-established Western conceptions when he suggested that women belong to nature in ways that men do not.[65] As Carolyn Merchant has shown, nature itself has been conceived as female in most Western intellectual traditions.[66] The identification of woman with the fecund and nurturing qualities of nature was highlighted in the influential eighteenth-century artists and engravers Hubert François Gravelot and Charles Cochin's personification of Nature as a virgin, her breasts dripping with milk (Figure 2).[67]

It is significant that Linnaeus used the mammiferous Diana of the Ephesians, an ancient symbol of animal and human fertility, as the frontispiece to his *Fauna Svecica*, where he first defended his inclusion of humans among the quadrupeds (Figure 3).[68] Linnaeus's Diana, half captive in the fecund earth, emerges to

[60] Warner, *Alone of All Her Sex*, 194.

[61] Carl Linnaeus, "Nutrix noverca," respondent F. Lindberg (1752), *Amoenitates academicae* (Erlangen, 1787), 3: 262–63. Goats and other animals were used to suckle syphilitic children in foundling hospitals in the eighteenth century or when there was a shortage of human nurses. Valerie Fildes, *Wet Nursing: A History from Antiquity to the Present* (Oxford, 1988), 147.

[62] Mervyn Levy, *The Moons of Paradise: Some Reflections on the Appearance of the Female Breast in Art* (London, 1962), 55.

[63] Hermann Ploss, Max Bartels, and Paul Bartels, *Woman: An Historical, Gynaecological and Anthropological Compendium*, Eric John Dingwall, ed. (German edn., 1885; St. Louis, Mo., 1936), 3: 211.

[64] William Godwin, *Memoirs of the Author of a Vindication of the Rights of Woman* (London, 1798), 183.

[65] Petrus Camper did not explain why he used a female figure to illustrate the art of transforming "a quadruped into the human figure." *The Works of the Late Professor Camper: On the Connexion between the Science of Anatomy and the Arts of Drawing, Painting, Statuary, &c.*, T. Cogan, trans. (London, 1794), plate 7, fig. 13.

[66] Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (San Francisco, 1980).

[67] Charles Cochin and Hubert François Gravelot, *Iconologie par figures; ou, Traité complet des allégories, emblèmes &c* (1791; rpt. edn., Geneva, 1972), *s.v.* "Nature." Erasmus Darwin also portrayed "Nature" as multi-breasted in *The Temple of Nature* (London, 1803), frontispiece.

[68] Linnaeus, *Fauna Svecica*, frontispiece. Otto Gertz has suggested that Linnaeus provided the engraver with the initial design for this frontispiece. "Artemis och Hinden: Frontispisplanschen i Linnés *Fauna Svecica*," *Svenska Linné-Sällskapets Årsskrift*, 31 (1948): 20.

FIGURE 1: A bear suckling a child, from Bernard Connor, *The History of Poland* (London, 1697), 1: 342. By permission of the Houghton Library, Harvard University.

FIGURE 2: Nature portrayed as a young virgin. Though a virgin, her breasts are shown dripping with mother's milk (the virgin mother is a persistent theme in Christianity, where the ideal female is both chaste and fecund). Nature's nudity expresses the simplicity of her essence. The lion and stag are symbols of chastity. The multi-breasted Diana of the Ephesians in the background represents the ancients' image of nature, "the Mother of all Being." From Charles Cochin and Hubert François Gravelot, *Iconologie par figures; ou, Traité complet des allégories, emblèmes &c* (1791; rpt. edn., Geneva, 1972), *s.v.* "Nature." Courtesy of the Pennsylvania State University Libraries.

display her womb—the center of life—and her nourishing breasts.[69] In this classic image, her curiously immobilized trunk is covered with symbols of both fertility (bees, acorns, bulls, crabs) and chastity (stags, lions, roses). Her pendulous breasts, heavy with milk, represent the life force of nature, mother and nurse of all living things.[70]

For Linnaeus to suggest, then, that humans shared with animals the capacity to suckle their young was nothing new. This uniquely female feature had long been considered less than human. But it had also been considered more than human. In the Christian world, milk had been seen as providing sustenance—for both body and spirit. Throughout the Middle Ages, the faithful cherished vials of the Virgin's milk as a healing balm, a symbol of mercy, an eternal mystery. As Marina Warner has pointed out, the Virgin Mary endured none of the bodily pleasures and pains associated with childbearing (menstruation, sexual intercourse, pregnancy, or labor) except for suckling. The tender Madonna suckled the infant Jesus both as his historical mother and as the metaphysical image of the nourishing Mother Church.[71] During the twelfth century, maternal imagery—especially suckling and nurturing—extended also to church fathers. Abbots and prelates were encouraged to "mother" the souls in their charge, to expose their breasts and let their bosoms expand with the milk of consolation.[72] Even the full breasts of God the Father were said to be milked by the Holy Spirit into the cup of the Son of God.[73]

In subcurrents of religious thought, mother's milk was thought to impart knowledge. Philosophia-Sapientia, the personification of wisdom, suckled philosophers at her breasts moist with the milk of knowledge and moral virtue (Figure 4). Augustine of Hippo, too, imagined himself drinking from the breasts of Sapientia.[74] Centuries later, men of science still sought the secrets of (female)

[69] Neumann, *Die Grosse Mutter*, 128.

[70] In the original statues of Diana *multimammia*, her visible body parts—head, neck, hands, and feet—were made from dark stone. Her breasts, by contrast, were made from lighter stone. Robert Fleischer, *Artemis von Ephesos und verwandte Kultstatuen aus Anatolien und Syrien* (Leiden, 1973); and George Elderkin, "Diana of the Ephesians," *Art in America*, 25 (1937): 54–63. Linnaeus's epithet "Nosce te ipsum" (know thyself) appended to *Homo* in the first edition of his *Systema naturae* was also taken from the Temple of Diana. By the late eighteenth century, nature was often portrayed as a tender mother, patiently nursing her children (see Daniel Chodowiecki's "Genius of Art"). Hermann Thiersch, *Artemis Ephesia: Eine archäologische Untersuchung* (Berlin, 1935-), 121, plate 70. Jane Sharp, the English midwife, noted that polymastia (more than two breasts) sometimes occurred in women. *The Midwives Book; or, The Whole Art of Midwifery Discovered: Directing Childbearing Women How to Behave Themselves* (London, 1671), 336.

[71] Warner, *Alone of All Her Sex*, 192, 200; *Monuments and Maidens*, 283. Whether the Virgin menstruated was much discussed in the Middle Ages; many theologians, committed to a new emphasis on Incarnation, argued that she did. Cadden, *Meanings of Sexual Difference in the Middle Ages*, 174–75.

[72] Bynum, *Jesus as Mother*, 115. See also Erwin Panofsky, ed., *Abbot Suger on the Abbey Church of St.-Denis and Its Art Treasures* (Princeton, N.J., 1946), 30–31.

[73] Warner, *Alone of All Her Sex*, 194.

[74] The pictorial representation of *sapientia lactans* dates to the early fifteenth century. The seal of Cambridge University portrays the naked *Alma Mater Cantabrigia* with milk streaming from her breasts. W. S. Heckscher, "Spiritualia sub metaphoris corporalium," *University of Toronto Quarterly*, 16 (1946–47): 212 n. 9. See also Peter Dronke, "Bernard Silvestris, Natura, and Personification," *Journal of the Warburg and Courtauld Institutes*, 43 (1980): 16–31, esp. 28–29; Klaus Lange, "Geistliche Speise," *Zeitschrift für deutsches Altertum*, 95 (1966): 81–122; and Lieselotte Möller, "Nährmutter Weisheit," *Deutsche Vierteljahrsschrift*, 24 (1950): 347–59.

FIGURE 3: Frontispiece to Linnaeus's *Fauna Svecica* (1746), featuring a many-breasted Diana. Linnaeus's Diana is relatively modest with only four breasts; earlier depictions often featured twenty-eight or more breasts, sometimes encircling her entire upper body. Diana's breasts, spouting water, also became a favorite motif for fountains (those at Villa d'Este, Tivoli, for example). By permission of the Staatsbibliothek zu Berlin, Preussischer Kulturbesitz (Sign.: Lv 11 575).

FIGURE 4: Sapientia (the personification of wisdom) suckling two philosophers. From a fifteenth-century German manuscript, reproduced in Lieselotte Möller, "Nährmutter Weisheit," *Deutsche Vierteljahrsschrift*, 24 (1950), fig. 2, facing 351.

nature within her bosom, though with a rather different purpose. Goethe waxed poetic on the point: "Infinite Nature, where are thy breasts, those well-springs of all life on which hang heaven and earth, toward which my withered breast strains?"[75] For Goethe, at least, the scientist's new desire was not to suckle at the breast of nature but to imitate its nourishing power.

Mother's milk was valued for its medicinal as well as its spiritual virtues. As a cure for deafness, Sicilians drank the milk of a woman who had borne a first son. Mother's milk was used as an abortifacient in sixteenth-century Germany. In Alsace, it served as a remedy for consumption. It was also used for treating earaches, fevers, and sores.[76] Linnaeus recommended it to adults as a laxative. Mother's milk was considered regenerative: legend held that the sixteenth-century priest Bartolomé de Las Casas, defender of Native Americans against the horrors of Spanish conquest, was nursed back to life by a native woman.[77]

In a certain sense, Linnaeus's focus on the milk-bearing breast was at odds with trends that found beauty (though not necessarily salvation) in the virginal breast. In both Greek and Christian traditions, the ideal breast was an unused one—small, firm, and spherical; the process of milk swelling the breast was thought to deform it. Mythical female figures—the goddesses Artemis and Aphrodite, the martial Amazons (who supposedly burned away one breast so that their bows would lie flat against their chests), and the nursing mother of Christ—were all virgins.[78] Of all the female Virtues, only Charity possessed a non-virginal body: infants drank maternal bounty, love, and humility from her breasts.[79]

The classic aesthetic ideal of the firm, unused breast was realized in the bodies of many upper-class medieval and early modern European women who avoided the burden of suckling their own children.[80] François Clouet's painting of Henri II's mistress, Diane de Poitiers, naked in her bath, contrasts the smallness of her classic, rosy bosom to the swollen breasts of the wet nurse suckling a child in the

[75] Johann Wolfgang Goethe, *Faust: Eine Tragödie* (1808–32; rpt. edn., Munich, 1962), 19. In a book dedicated to Goethe, Alexander von Humboldt featured a frontispiece showing the spirit of poetry unveiling "the mystery of nature." Nature is personified as the multimammae Diana. See Alexander von Humboldt, *Reise von Alexander von Humboldt und Aimé Bonpland* (Tübingen, 1807). I thank David Hull for calling this to my attention. In the Middle Ages, it was commonly thought that fundamental causes could be discovered "in the most secret recesses of Natura's Breasts" (Dronke, "Bernard Silvestris," 25). The nineteenth-century statue "Nature Unveiling before Science" featured in the foyer of the Paris medical faculty bares only the breasts and the face. See Merchant, *Death of Nature*, fig. 17; also Ludmilla J. Jordanova, *Sexual Visions: Images of Gender in Science and Medicine between the Eighteenth and Twentieth Centuries* (Madison, Wis., 1989), chap. 5.

[76] Ploss and Bartels, *Woman*, 3: 233–34.

[77] Kirchhoff, "Die künstlerische Darstellung der weiblichen Brust," 240.

[78] Grotesque art of the late Middle Ages depicted breasts being cut off as a form of torture. Saints Agnes and Barbara were said to have suffered this fate. Margaret Miles, *Carnal Knowing: Female Nakedness and Religious Meaning in the Christian West* (Boston, 1989), 156.

[79] Warner, *Monuments and Maidens*, 281. In eighteenth-century France, Charity appeared in propaganda to encourage maternal nursing. T. G. H. Drake, "The Wet Nurse in France in the Eighteenth Century," *Bulletin of the History of Medicine*, 8 (1940): 944.

[80] The paintings of Peter Paul Rubens featured voluptuous breasts. In the seventeenth century all across Europe, breasts were shown to be larger and rounder than in the sixteenth century. Anne Hollander has traced changing ideals of the breast, showing that the bared breast, in the fourteenth century a symbol of maternal self-sacrifice and in the fifteenth century a symbol of Amazonian heroism, became in the seventeenth and eighteenth centuries a sexual ornament and expression of pure eroticism (*Seeing through Clothes*, chap. 3). See also Bernard Mandeville, *The Virgin Unmask'd; or, Female Dialogues betwixt an Elderly Maiden Lady, and Her Niece . . .* (London, 1709).

background. (Nurses' nipples were said to "grow black" with overuse and old age.)[81] Wealthy women in Europe bore children but most often did not nurse them. For this task, women were employed who were considered closer to nature: peasants and, in overseas colonies, native women and women of African descent ("often but one remove above a brute," in the words of one observer).[82] Even when, late in the eighteenth century, fashionable women did for a while nurse their infants, the shape and size of the breast was at issue. Moderately sized, nicely oval breasts with small but protuberant nipples were thought to produce better milk than large, pendulous breasts.[83]

Ideals of the breast, however, changed over time. After roughly the 1750s, the maternal breast vied for a while with the virginal for cultural preeminence. Literary critic Barbara Gelphi has traced the way in which the maternal breast was eroticized in late eighteenth-century medical literature. Male physicians, including Erasmus Darwin, described in rapturous prose the sensuous pleasures experienced by nursing infants. Darwin went so far as to attribute to the curvaceous breast filled with milk the origins of the human idea of beauty—an idea impressed on the senses of the infant. Medical eroticization of the maternal breast paralleled changing fashions in women's clothing, which by the end of the century was designed to expose the full shape of the breast and nipple. Gelphi argues that this new fashion was as much cultivated by women as imposed on them. While, for legislators, the breast came to guarantee women's disenfranchisement (see below), women, adopting Jean-Jacques Rousseau's vocabulary of the new domesticity, flaunted their breasts to celebrate their new-found power to nurture the future sons of the state (a power, Gelphi emphasizes, that was restricted to the confines of the home).[84]

Colonial relations also affected perceptions of the breast. Late nineteenth-century anthropologists classified breasts by beauty in the same way that they measured skulls for intelligence (Figure 5). The ideal breast—for all races—was once again young and virginal. Europeans preferred the compact "hemispherical" type, found, it was said, only among whites and Asians. The much-maligned breasts of African (especially Hottentot) women were dismissed as flabby and pendulous, similar to the udders of goats.[85] When women of African descent were portrayed sympathetically, they were typically shown having firm, spherical

[81] Sharp, *Midwives Book*, 360.

[82] Pinkerton, *General Collection of the Best and Most Interesting Voyages*, 11: 194.

[83] Mary Lindemann, "Love for Hire: The Regulation of the Wet-Nursing Business in Eighteenth-Century Hamburg," *Journal of Family History*, 6 (1981): 382. Midwives, such as Jane Sharp, were concerned that overly large breasts might become cancerous. Sharp, *Midwives Book*, 337. Sharp's concern was with milk production, not the beauty of the breast.

[84] Barbara Gelphi, *Shelley's Goddess: Maternity, Language, Subjectivity* (New York, 1992), 43–60. See also Jean Block, "Women and Reform of the Nation," *French Women and the Age of Enlightenment*, Samia I. Spencer, ed. (Bloomington, Ind., 1984), 3–18.

[85] Ploss and Bartels, *Woman*, 1: 398–99. Witches were also portrayed with heavy, pendulous breasts during the European witch craze (Miles, *Carnal Knowing*, 136–38). These types of associations led early modern Europeans to doubt that the elaborate breasts adorning the Diana of the Ephesians were the breasts of a woman. Their pendulous fullness suggested rather the udders of beasts. Furthermore, they had no nipples, a curiosity leading one twentieth-century art historian to conjecture that Diana's overfull mammae were not breasts at all but indeed bull scrota—the bull also being an ancient symbol of fertility (Kirchhoff, "Die künstlerische Darstellung der weiblichen Brust," 236).

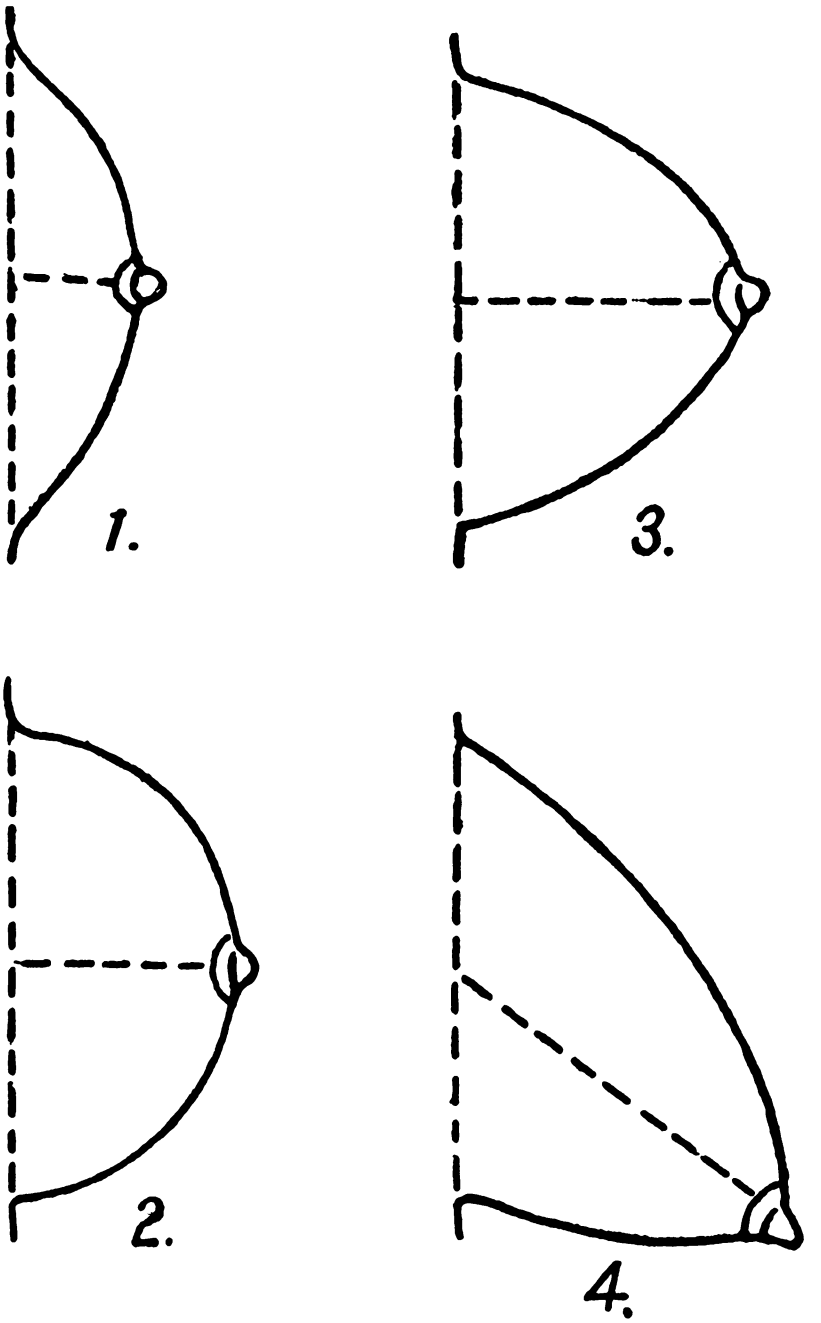

FIGURE 5: Breast shapes among humans from Hermann Ploss, Max Bartels, and Paul Bartels, *Woman: An Historical, Gynaecological and Anthropological Compendium*, Eric John Dingwall, ed. (German edn., 1885; St. Louis, Mo., 1936), 1: 399. The first is described as "bowl-shaped," the second is "hemispherical" (characteristic of whites and Asians and identified by the authors as beautiful), the third "conical," and the fourth (found primarily in blacks) "elongated," as in "the udder of the goat," with nipples pointed downward.

breasts, as in John Stedman's illustration of his fifteen-year-old mulatto mistress and later his wife, Joanna.[86] For Charles White, the Manchester physician and notorious racist, the hallmark of European superiority was found on the bosom of European women:

> In what quarter of the globe shall we find the blush that overspreads the soft features of the beautiful women of Europe, that emblem of modesty, of delicate feelings, and of sense? . . . Where, except on the bosom of the European woman, two such plump and snowy white hemispheres, tipt with vermillion?[87]

Thus Linnaeus's fixation on the female mammae, though new to the zoological tradition, emerged from deep cultural roots. It is hard to say how aware the Protestant Linnaeus was of the extent to which he was drawing from these broader images and cultural practices (many of them Catholic) that we can recognize today in his work. As a university-educated man, he was well versed in both the classics and Scripture, and his use of the multi-breasted Diana in the frontispiece to his *Fauna Svecica* reveals at least some familiarity with these traditions, which may help to explain, at least in part, the easy acceptance of his innovation both within science and the broader culture.

EUROPEANS' FASCINATION WITH THE FEMALE BREAST provided a receptive climate for Linnaeus's new term. But more immediate political concerns compelled him to focus scientific attention on the mammae. His scientific vision arose alongside important political trends in the eighteenth century—the restructuring of both child care and women's lives as mothers, wives, and citizens. The stress he placed on the naturalness of a mother giving suck to her young reinforced the social movements undermining the public power of women and attaching a new value to mothering. Despite the Enlightenment credo that all "men" were by nature equal, middle-class women were not to become fully enfranchised citizens or professionals in the state but newly empowered mothers within the home.

Most directly, Linnaeus joined the campaign to abolish the ancient custom of wet nursing.[88] The eighteenth century was the heyday of wet nursing. More Europeans than ever before—including not just aristocrats and wealthy merchants but farmers and artisans—sent their children to the countryside to be nursed. By the 1780s, Paris and Lyons were sending up to 90 percent of their children to wet nurses.[89] Although wet nursing had provided a solution to the

[86] John Gabriel Stedman, *Narrative of a Five Years Expedition against the Revolted Negroes of Surinam*, Richard Price and Sally Price, eds. (1796; rpt. edn., Baltimore, Md., 1988), 89.

[87] Charles White, *An Account of the Regular Gradation in Man and in Different Animals and Vegetables* (London, 1796), 134. Cited also in William Stanton, *The Leopard's Spots: Scientific Attitudes toward Race in America, 1815–59* (Chicago, 1960), 17.

[88] Maternal breast-feeding had long been urged on mothers, especially in Protestant countries (see Sharp, *Midwives Book*, 353, 361–62). Dissatisfaction with wet nursing began in the 1680s; the height of the campaign, however, came in the eighteenth century. Valerie A. Fildes, *Breasts, Bottles, and Babies: A History of Infant Feeding* (Edinburgh, 1986); and Randolph Trumbach, *The Rise of the Egalitarian Family: Aristocratic Kinship and Domestic Relations in Eighteenth-Century England* (New York, 1978). Dry nursing, in which infants were fed various mixtures of bread and water, was also advocated but led to even higher infant mortality.

[89] George D. Sussman, *Selling Mothers' Milk: The Wet-Nursing Business in France, 1715–1914*

problem of child rearing for middle and upper-class mothers and fathers, it also resulted in high infant mortality.[90] Fears began to grow that Europe's population was declining at a time when governments were looking for increased labor power to bolster military and economic expansion. The concern to increase population was so great in Denmark, for example, that a law was passed in 1707 authorizing young women to bear as many children as possible even if they were bastards.[91] Joseph Raulin, physician to Louis XV of France, judged children to be "the wealth of nations, the glory of kingdoms, and the nerve and good fortune of empires."[92] The physiocrat Marquis de Mirabeau traced depopulation to the neglect of mothers for their children, alongside other factors such as the concentration of property in few hands, luxury, and the decadence of agriculture.

The preservation of family and maternal duties became important matters of state.[93] For state ministers, the simplest way to increase birth rates was to reduce infant mortality by improving training of obstetricians, midwives, and—most important—mothers. A central element in this campaign was a series of health and conduct manuals written for women by medical doctors.

In this context, Linnaeus—himself a practicing physician—prepared a dissertation against the evils of wet nursing in 1752 just a few years before coining the term *Mammalia* and while watching his own children suckle. (His wife bore seven children between 1741 and 1757.) His work titled "Step Nurse" (translated into French as "La nourrice marâtre, ou Dissertation sur les suites funestes du nourrissage mercénaire") sounded the themes of the Enlightenment attack on wet nursing.[94] First and foremost, wet nursing violated the laws of nature. Nature—herself "a tender and provident mother"—had set the course for female reproduction; digression from her laws endangered both mother and child. Linnaeus recognized (as did other physicians and some midwives) that a newborn nursed by another woman was deprived of the mother's first milk, colostrum, crucial for purging the child of meconium. He also warned that, because most nurses came

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(Urbana, Ill., 1982), 20–22; see also Nancy Senior, "Aspects of Infant Feeding in Eighteenth-Century France," *Eighteenth-Century Studies*, 16 (1983): 367; Mary Sheriff, "Fragonard's Erotic Mothers and the Politics of Reproduction," *Eroticism and the Body Politic*, Lynn Hunt, ed. (Baltimore, Md., 1991), 14–40.

[90] Figures collected by Maxime de Sarthe-Lenoir, Lieutenant Général de Police for Paris, in the 1770s, cited in Senior, "Aspects of Infant Feeding," 367–68. See George Sussman, "Parisian Infants and Norman Wet-Nurses in the Early Nineteenth Century," *Journal of Interdisciplinary History*, 7 (1977): 637. James Lehning has shown that the numbers of deaths among nurses' children were also quite high; "Family Life and Wetnursing in a French Village," *Journal of Interdisciplinary History*, 12 (1982): 651.

[91] Reported in Henry Home, Lord Kames, *Sketches of the History of Man* (Dublin, 1775), 1: 169.

[92] Joseph Raulin, *De la conservation des enfans* (Paris, 1768), vol. 1, "épitre au roi."

[93] See, for example, Raulin, *De la conservation des enfans*; J. E. Gilibert, "Dissertation sur la dépopulation, causée par les vices, les préjugés et les erreurs des nourrices mercénaires," preface, *Les chef-d'oeuvres de Monsieur de Sauvages* (Lyons, 1770), vol. 2; Johann Frank, *System einer vollständingen medicinischen Polizey* (Mannheim, 1779), vol. 1. In an attempt to curb abuses and decrease infant mortality, wet nursing in France was regulated by law in 1715. Sussman, *Selling Mothers' Milk*, 38.

[94] Linnaeus, "Nutrix noverca." Translated by Gilibert as "La nourrice marâtre, ou Dissertation sur les suites funestes du nourrissage mercénaire," *Les chef-d'oeuvres de Monsieur de Sauvages*, 2: 215–44. See also William Cadogan, *An Essay upon Nursing, and the Management of Children* (London, 1748); and Jean-Jacques Rousseau, *Emile; ou, De l'éducation* (1762), in *Oeuvres complètes*, Bernard Gagnebin and Marcel Raymond, eds. (Paris, 1959–69), 4: 254–64.

from the poorest classes, they ate fatty foods, drank too much alcohol, were riddled with pox and venereal disease—all of which produced unhealthy, if not lethal, milk. He also emphasized that "forcing the milk back" might prove harmful to the mother. Uterine contractions after birth forced the voluminous humors associated with pregnancy to flow toward the breasts; if these humors did not emerge as milk, the woman might fall ill. For Linnaeus, the laws of nature dictated the road to health for both mother and child.

In this 1752 pamphlet, Linnaeus also foreshadowed his subsequent nomenclature by contrasting the barbarity of women who deprived their children of mother's milk with the gentle care of great beasts—the whale, the fearsome lioness, and fierce tigress—who willingly offer their young the teat.[95] The idea that women should follow the example of beasts was a common feature of the anti–wet-nursing literature flooding Europe at this time.[96] Appealing to natural law and order, the French midwife Marie Anel le Robours pleaded with women to follow the "animal instinct" that prompts a mother to care for her young immediately after birth. Anel le Robours admonished mothers to disregard husbands who sought to rid the house of troublesome infants and to cultivate instead the "superior attachment that lower animals have for their young." She also advised women to disregard the advice of midwives who failed to recognize the value of colostrum. (It was customary for midwives to advise women to wait twenty-eight hours after childbirth before nursing.) Infants, just like other small animals, Anel le Robours explained, will search for the breast immediately after birth.[97]

These and other critiques of baby farming went a long way toward countering the ignorance and abuses surrounding wet nursing. Babies in this period had a much better chance of surviving when nursed by their mothers.[98] Abuses were numerous, especially in France, where nurses desperate for the pay often took in more nurslings than they could nourish adequately.[99] The anonymous author of *The Ladies Dispensatory* no doubt exaggerated when she charged that sending a child out to a wet nurse was little better than exposing it to die in the street. At the same time, many of the attacks on wet nursing also reiterated age-old myths and

[95] Linnaeus, "Nutrix noverca," 258.

[96] This argument dates at least to the seventeenth century; see Senior, "Aspects of Infant Feeding," 378–79. On the theme of women suckling their young like beasts, see also Cadogan, *Essay upon Nursing*, 7; Raulin, *De la conservation des enfans*, 1: xxv–xxviii; Jacques Ballexserd, *Dissertation sur cette question: Quelles sont les causes principales de la mort d'un aussi grand nombre d'enfans* (Geneva, 1775), 64; Charles Whitlaw, *New Medical Discoveries, with a Defence of the Linnaean Doctrine* (London, 1829), 1: 233; and *Der Patriot*, January 27, 1724, cited in Lindemann, "Love for Hire," 381. The anonymous "Sophia" also used a similar argument to try to convince men to let their wives breast-feed. *Woman Not Inferior to Man* (London, 1739), cited in Vivien Jones, ed., *Women in the Eighteenth Century: Constructions of Femininity* (New York, 1990), 225.

[97] Marie-Angélique Anel le Robours, *Avis aux mères qui veulent nourrir leurs enfans*, 3d edn. (Paris, 1775), esp. ix, 53, 92–93. See also Gilibert, "Dissertation sur la dépopulation," 255–56, 264. European women were also encouraged to follow the example of "primitive mothers" (Africans and Native Americans), for whom milk was said to form "the natural bond that unites mother and child." Cited in D. G. Charlton, *New Images of the Natural in France: A Study in European Cultural History, 1750–1800* (Cambridge, 1984), 156.

[98] Cited in Jones, *Women in the Eighteenth Century*, 85.

[99] Abuses relating to financial concerns were greater in France than in England. Fiona Newall, "Wet Nursing and Child Care in Aldenham, Hertfordshire, 1595–1726," in *Women as Mothers in Pre-Industrial England*, Valerie Fildes, ed. (London, 1990), 129.

superstitions. Linnaeus, for example, cautioned that the character of the (upper-class) child could easily be corrupted by the milk of (lower-class) wet nurses. Using examples drawn from Erasmus, he blamed the bitter, wicked milk of nurses for Nero's addiction to alcohol and for Caligula's tyranny.[100]

While authors of these pamphlets showed genuine concern for the well-being of mothers and children of their own classes, they seldom considered the evils of baby farming for the "lower classes of mankind" (as one influential voice in the anti-wet nursing campaign called them).[101] Children of wet nurses themselves were often neglected or even "disposed of" (for a small fee, no questions asked).[102]

The attempt to abolish wet nursing was tied to another aspect of the restructuring of reproduction in the eighteenth century: the takeover by male physicians of traditional female domains. The story of the demise of midwives and rise of male gynecologists and obstetricians is well known.[103] The endeavor by university-trained physicians to professionalize women's health care (and in so doing to drive traditional female practitioners from the field) extended also to the management of newborns. The English physician William Cadogan, perhaps the most emphatic on this point, encouraged fathers—who often considered breast-feeding something low and degrading—to have their children nursed under their "own eye." Nursing, in his view, should not be one of "the mysteries of the *Bona Dea*, from which men are excluded." Supervision of the care of children had been "too long fatally left to the management of women, who cannot suppose to have proper knowledge to fit them for such a task, notwithstanding they look upon it to be their own province." The "grandmothers" should be moved aside, along with their herbs, roots, and other traditional practices.[104] The Jamaican judge Edward Long encouraged white ladies in the colonies to give up the barbarous and corrupting custom of handing their children over to "negro or mulatto wet nurses." Mothers of European descent were encouraged to take up the agreeable task of nursing their own infants, "so consonant to the laws of nature."[105]

For the enlightened savant, the laws of nature dictated more than the rules for reproductive regimes: they also dictated social order. Medical authority, the legal system, and popular literature worked together to create new interest in maternal breast-feeding. As prescribed in Rousseau's influential novel *Emile*, breast-feeding became fashionable among French upper-class women for a short period in the late eighteenth century.[106] In France and Germany, leading medical doctors

[100] Linnaeus, "Nutrix noverca," 265.

[101] Cadogan, *Essay upon Nursing*, 7.

[102] Fildes, *Wet Nursing*, 193. A few medical men noted the high mortality rates among wet nurses' own children (Linnaeus, "Nutrix noverca," 264). In some cases, it was claimed that wet nursing was responsible for depopulating entire villages (Lindemann, "Love for Hire," 380). By and large, however, concern was focused on the physical and moral well-being of middle and upper-class children.

[103] See Jean Donnison, *Midwives and Medical Men: A History of Inter-professional Rivalries and Women's Rights* (New York, 1977); Ornella Moscucci, *The Science of Woman: Gynaecology and Gender in England, 1800–1920* (Cambridge, 1990), 42–57.

[104] Cadogan, *Essay upon Nursing*, 3, 24.

[105] Edward Long, *The History of Jamaica* (London, 1774), 2: 276.

[106] Rousseau, *Emile, 254–64.*

advocated laws that would force healthy women to nurse their own infants.[107] The French National Convention decreed in 1793 that only mothers who nursed their own children would be eligible for state aid (women in poor health were exempted). Similar laws were put into effect in Prussia in 1794, just a few years after Frederick the Great installed a modern version of Diana of the Ephesians in his Potsdam garden.[108]

Authors of anti–wet-nursing literature—including Linnaeus, Cadogan, Rousseau, and Anel le Robours—were highly moralistic about returning women to their rightful place as loving and caring mothers. This, despite the fact that Rousseau placed his own five children in foundling homes, not even bothering to record their sexes or dates of birth.[109] Women's attempts to contravene the laws of nature were seen as a matter of vanity. Cadogan prevailed on every woman to give up "a little of the beauty of her breast" to feed her young. Linnaeus charged that women only pretended to be unable to breast-feed and ridiculed their many "excuses": that they did not have enough milk, or could not be deprived of fluids precious to their own health, or were overloaded with domestic affairs. But the real reason, according to Linnaeus, was that they did not want to deprive their husbands of the pleasures of marriage—sexual access was a characteristic, he noted, of all quadrupeds. (It was thought that nursing mothers should refrain from sexual intercourse.) Rousseau, not so generous to women's motives on this point, charged that a wet nurse freed the upper-class mother to return to the gay entertainments of the city, not necessarily her husband's bed.[110]

Returning to nature and its laws was seen as the surest way to end corruption and regenerate the state, morally as well as economically. Rousseau, the era's self-appointed spokesman for nature, saw the refusal of mothers to nurse as the source of national depravity. "Everything follows successively from this first depravity. The whole moral order degenerates; naturalness is extinguished in all hearts." The bond between mother and child created through maternal nursing was idealized as the basis of civil society, fostering love of sons for mothers, returning husbands to wives. The infant was imagined to imbibe with breast milk the mother's noble character, her love and virtue. "Let mothers deign to nurse their children," Rousseau preached, "morals will reform themselves, nature's sentiments will be awakened in every heart, the state will be repeopled."[111] For the enlightened of Europe, the breast symbolized the synthesis of nature and society, the bond between the private and public worlds.[112]

It is remarkable that in the heady days of the French Revolution, when

[107] Mary Jacobus, "Incorruptible Milk: Breast-feeding and the French Revolution," in *Rebel Daughters: Women and the French Revolution*, Sara Melzer and Leslie Rabine, eds. (New York, 1992), 62.

[108] Lindemann, "Love for Hire," 391.

[109] *Allgemeines Landrecht* (1794), pt. 2, title 2, art. 67, in Susan Groag Bell and Karen M. Offen, eds., *Women, the Family and Freedom: The Debate in Documents*, vol. 1., *1750–1880* (Stanford, Calif., 1983), 39. See also Doris Alder, "Im 'Wahren Paradies der Weiber': Naturrecht und rechtliche Wirklichkeit der Frauen im Preussischen Landrecht," in *Sklavin oder Bürgerin: Französische Revolution und neue Weiblichkeit, 1760–1830*, Viktoria Schmidt-Linsenhoff, ed. (Frankfurt, 1989), 206–22.

[110] William Kessen, "Rousseau's Children," *Daedalus*, 107 (1978): 155. Ironically, too, Emile was brought up by a wet nurse in the country. Senior, "Aspects of Infant Feeding," 385.

[111] Rousseau, *Emile*, 255.

[112] Rousseau, *Emile*, 258.

revolutionaries marched behind the martial and bare-breasted Liberty,[113] the maternal breast became nature's sign that women belonged only in the home. Delegates to the French National Convention used the breast as a natural sign that women should be barred from citizenship and the wielding of public power. In this case, "the breasted ones" were to be confined to the home. In denying women political power, Pierre-Gaspard Chaumette, an official of the Paris Commune, asked indignantly: "Since when is it permitted to abandon one's sex? Since when is it decent for women to forsake the pious care of their households and the cribs of their children, coming instead to public places, to hear speeches in the galleries and senate? Is it to men that nature confided domestic cares? Has she given us breasts to feed our children?"[114]

This message was embodied in the "Festival of Unity and Indivisibility" of 1793, celebrating the first anniversary of the Republic. Jacques-Louis David's carefully orchestrated festival featured a "Fountain of Regeneration" built on the ruins of the Bastille, the symbol of absolutism (Figure 6). As described in the popular press, eighty-six (male) deputies to the National Convention drank joyfully from the spouting breasts of "Nature" personified as Isis, the Egyptian goddess of fertility. While the male deputies publicly drank the maternal "milk" of national renewal from the breasts of the colossal Isis, exemplary republican mothers quietly reenacted the scene, giving their virtuous milk to future citizens of the state.

The year 1793 marked the fateful repression of women's demands for active citizenship and also, as Lynn Hunt has shown, a turning point in republican images of women. When publicly represented, women were no longer cast as the strident Marianne, the symbol of Liberty, but increasingly in motherly roles. Festivals featured parades of pregnant women; women in ceremonies, such as the Festival of the Supreme Being of 1794, were all wives and mothers, many pressing nurslings to their breasts.[115]

LINNAEUS'S TERM *MAMMALIA* HELPED LEGITIMIZE the sexual division of labor in European society by emphasizing how natural it was for females—both human and nonhuman—to suckle and rear their own offspring. Linnaean systematics had sought to render nature universally comprehensible, yet the categories he devised infused nature with middle-class European notions of gender. Linnaeus saw the females of all species as tender mothers, a vision he (wittingly or unwittingly) projected onto Europeans' understandings of nature. This was not the only instance in which Linnaeus suffused nature with parochial notions of gender. In his botanical taxonomy—for which he was hailed the father of modern botany—Linnaeus established (hetero)sexuality as the key to classification. In so

[113] Ludmilla Jordanova, "Naturalizing the Family: Literature and the Bio-Medical Sciences in the Late Eighteenth Century," in Jordanova, ed., *Languages of Nature* (New Brunswick, N.J., 1986), 97; Warner, *Monuments and Maidens*, 282.

[114] See Hunt, *Politics, Culture, and Class in the French Revolution*, chaps. 2, 3.

[115] Cited in Darline Gay Levy, Harriet Bransom Applewhite, and Mary Durham Johnson, eds., *Women in Revolutionary Paris, 1789–1795* (Urbana, Ill., 1979), 219. See also Dorinda Outram, *The Body and the French Revolution: Sex, Class and Political Culture* (New Haven, Conn., 1989).

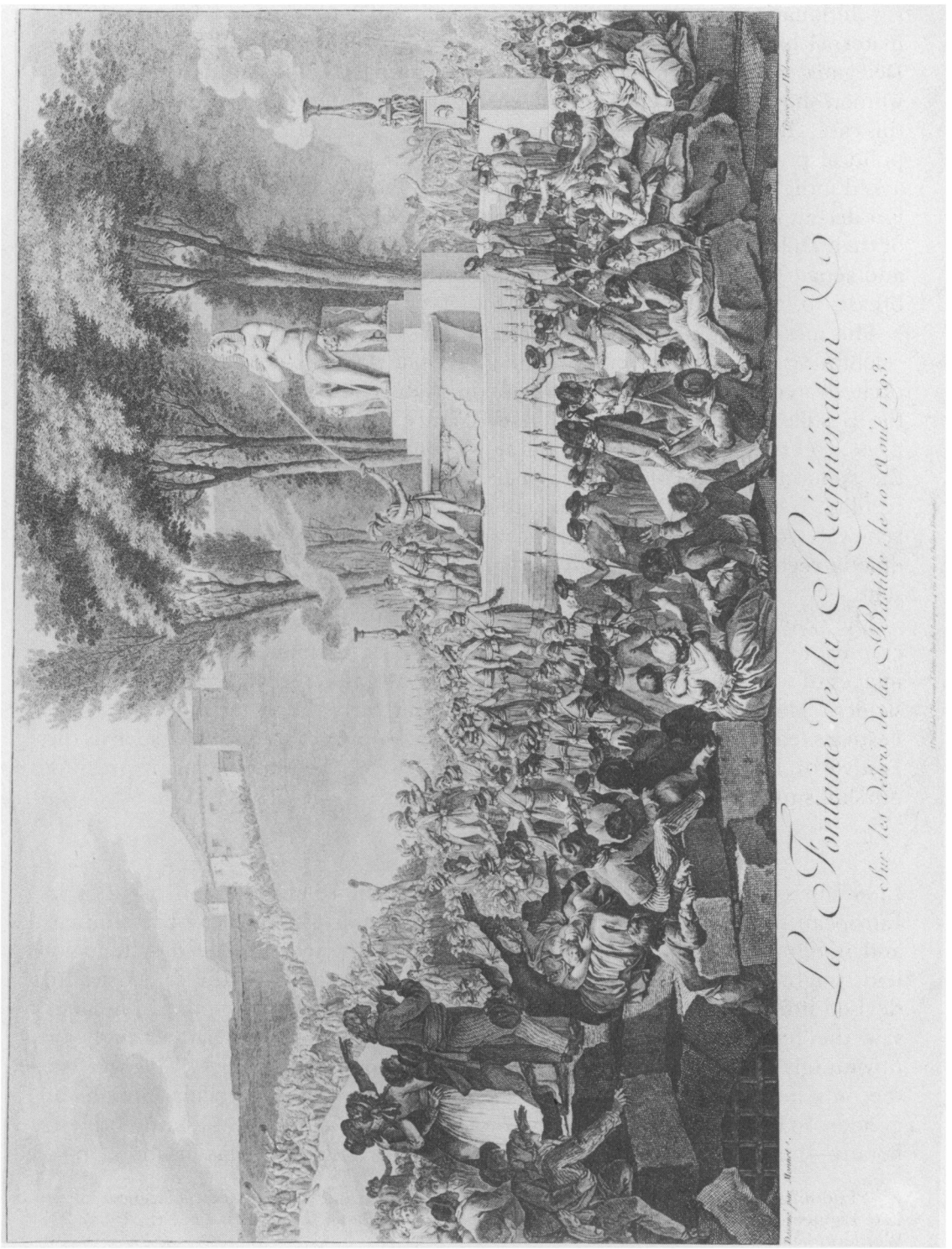

FIGURE 6: The "Fountain of Regeneration" by Jacques-Louis David, the famous eighteenth-century French painter. From Charles Monnet, *Les principales journées de la révolution* (Paris, 1838). Spencer Collection, The New York Public Library, Astor, Lenox, and Tilden Foundations.

doing, as I have shown elsewhere, he gave male parts priority over female parts in determining the status of an organism in the plant kingdom, imposing traditional notions of gender hierarchy onto science.[116]

In naming mammals, there is no evidence that Linnaeus intentionally chose a gender-charged term; he may have done so naïvely. But he did not do so arbitrarily. The fact that scientists might be innocent of the implications of their work does not make them any less mediators or marketeers of political ideas. Historians have to appreciate the contingency of scientific knowledge and especially what is foregone in the choice of one particular course over another. This is why the political historian of science asks: Why do we know this and not that? Who gains from knowledge of this and not that?[117]

The story of the origins of the term *Mammalia* provides yet another example of how science is not value neutral but emerges from complex cultural matrices.[118] The term Linnaeus coined in 1758 solved the problem of how to classify the whale with its terrestrial congeners and did away with Aristotle's outmoded term quadruped. But, more than that, it provided a solution to the place of humankind within nature and ultimately of womankind within European culture.

[116] Lynn Hunt, *The Family Romance of the French Revolution* (Berkeley, Calif., 1992), 151–91, esp. 153–55. See also Carol Duncan, "Happy Mothers and Other New Ideas in Eighteenth-Century French Art," in *Feminism and Art History: Questioning the Litany*, Norma Broude and Mary Garrand, eds. (New York, 1982), 200–19. It is important to point out that notions of republican motherhood and sexual complementarity—important doctrines of female sexuality developed in this period—became prescriptive and increasingly descriptive of the lives of middle-class women, not the lives of peasant women, domestic servants, female apprentices, or artisans. Nor in the nineteenth century would these ideals apply to the lives of working-class women, although middle-class domesticity was often held up to women of all classes as an ideal to emulate. See Brigit Hill, *Women, Work, and Sexual Politics in Eighteenth-Century England* (Oxford, 1989).

[117] Londa Schiebinger, "The Private Life of Plants: Sexual Politics in Carl Linnaeus and Erasmus Darwin," in *Science and Sensibility: Gender and Scientific Enquiry 1780–1945*, Marina Benjamin, ed. (Oxford, 1991), 121–43.

[118] See Sandra Harding and Jean F. O'Barr, eds., *Sex and Scientific Inquiry* (Chicago, 1987); Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (New York, 1989); Londa Schiebinger, *The Mind Has No Sex? Women in the Origins of Modern Science* (Cambridge, Mass., 1989); and Helen E. Longino, *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry* (Princeton, N.J., 1990); Robert N. Proctor, *Value-Free Science? Purity and Power in Modern Knowledge* (Cambridge, Mass., 1991); Evelyn Fox Keller, *Secrets of Life, Secrets of Death: Essays on Language, Gender and Science* (New York, 1992).