Visual Representations of Disease: The Philosophical Transactions and William Cheselden's Osteographia

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Visual Representations of Disease: The *Philosophical Transactions* and William Cheselden's *Osteographia*

Nico Bertoloni Meli

ABSTRACT In this essay, Nico Bertoloni Meli analyses visual representations of diseased states appearing in the *Philosophical Transactions*, leading up to and culminating with the 1733 treatise by William Cheselden, *Osteographia*. Overall, surgeons tended to focus on the specific characters of lesions and privileged their visual appearance over elaborate humoral or chemical theories; therefore they play an important role in this essay. The rise of visual representations of diseased states went hand in hand with the rise of surgeons, whose numbers as Fellows of the Royal Society increased after 1700. **KEYWORDS:** William Cowper; Edward Tyson; James Douglas; Paul Buissière; illustrations of human pathology

> Elizabeth Treves, 23. or 24. years of age, fair of complexion, brown-hair'd, of an healthy constitution, low of stature, of honest repute, but of mean and poor parentage, near this Town [Plymouth], was on Friday July 3d, 1669 in good health, and went well to bed, where she took as good rest and sleep, as ever before, but in the morning, when she awaken'd, and attempted to turn herself in her bed, was not able, finding her Breasts so swell'd, that she was affrighted to an astonishment. Then endeavoring to sit up, the weight of her Breasts fastned her to her bed; where she hath layn ever since, yet without all pain and weakness either in her Breasts, or in any other part.

SO BEGINS THE ACCOUNT of the Kafkaesque awakening of Elizabeth Travers, one of the first illustrated pathological reports in the *Philosophical Transactions*. The account was addressed by William Durston, physician at Plymouth, to the president of

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the Royal Society, William Brouncker.[1] Plates representing diseased states often show a diseased body part from a cadaver; by contrast, here we see the patient alive, staring at readers with her enlarged breasts on view, almost like a saint displaying the wounds of her martyrdom (fig. 1). I have in mind Saint Roch showing the bubo of the plague in his groin, for example, or one of the patron saints of lepers.[2]

While there is a long and distinguished tradition of scholarship devoted to anatomy, or the visualization of the healthy body, we are still largely in the dark with regard to the visualization of disease in a medical context; thus, we know more from the perspective of art history or religious history than from medical history.[3] In this essay—which is part of a larger project extending to the first half of the nineteenth century—I focus on the medical dimension. Among the questions I wish to address are: which medical practitioners showed diseased states and why? Which organs and diseases did they show? Which artists were involved in this process and what was their background?

Of course, the notion of disease is problematic and could be ambiguous: Where is the line separating anatomical malformations from diseases? Are monsters and congenital malformations diseased states?[4] Commenting on a case of what today we would call a horseshoe kidney, anatomist Edward Tyson questioned whether the peculiar conformation was "of much inconvenience to the Patient" (fig. 2).[5] What did contemporaries make and what are we to make of the hermaphroditic lobster that graced

1. William Durston, "An Extract of a Letter Concerning a Very Sudden and Excessive Swelling of a Womans Breasts," *Philosophical Transactions* (hereafter *PT*) 4 (1669): 1047–50 at 1047–48; there are variations in the spelling of "Durston" and "Travers." The original letter was sent from Plymouth on July 19 and was read at the Royal Society on July 22. I am grateful to Matthew Hunter for having kindly shared with me his transcriptions of the original documents. The only earlier illustrated case was reported from France and involved a double matrix with an extrauterine pregnancy: *PT* 4 (1669): 969–70. See Matthew C. Hunter, *Wicked Intelligence* (Chicago, 2013), 16–19.

2. Christine M. Boeckl, *Images of Leprosy* (Kirksville, Mo., 2011); Boeckl, *Images of Plague and Pestilence* (Kirksville, Mo., 2000).

3. Ludwig Choulant, *History and Bibliography of Anatomical Illustration*, trans. and ed. Frank Mortimer (Leipzig, 1852; repr. Chicago, 1920); Martin Kemp, "Style and Non-Style in Anatomical Illustration: From Renaissance Humanism to Henry Gray," *Journal of Anatomy* 216 (2010): 192–208; Sachiko Kusukawa, *Picturing the Book of Nature* (Chicago, 2012); a useful bibliography in pathology is Edgar Goldschmid, *Entwicklung und Bibliographie der pathologisch-anatomischen Abbildung* (Leipzig, 1925); Georges Canguilhelm, *On the Normal and the Pathological,* introd. Michel Foucault (Dordrecht, 1978).

4. Alan W. Bates, *Emblematic Monsters: Unnatural Conceptions and Deformed Births in Early Modern Europe* (Amsterdam, 2005).

5. Edward Tyson, "Anatomical Observations," *PT* 12 (1678–79): 1035–39 at 1038. A case of horseshoe kidney had already been represented in Caspar Bauhin, *Theatrum anatomicum* (Frankfurt am Main, 1605), 1312–13. Nancy G. Siraisi, *Medicine and the Italian Universities, 1250–1600* (Leiden, 2001), 320, points out that in sixteenth-century Padua, Giovanni Battista da Monte had argued along similar lines. An early discussion and plate of a horseshoe kidney appears in Leonardo Botallo, *De catarrho commentarius: Addita est in fine monstrosorum renum figura, nuper in cadavere repertorum* (Paris, 1564). See John A. Benjamin and Dorothy M. Schullian, "Observations on Fused Kidneys with Horseshoe Configuration: The Contribution of Leonardo Botallo (1564)," *Journal of the History of Medicine and Allied Sciences* 5 (1950): 315–26.

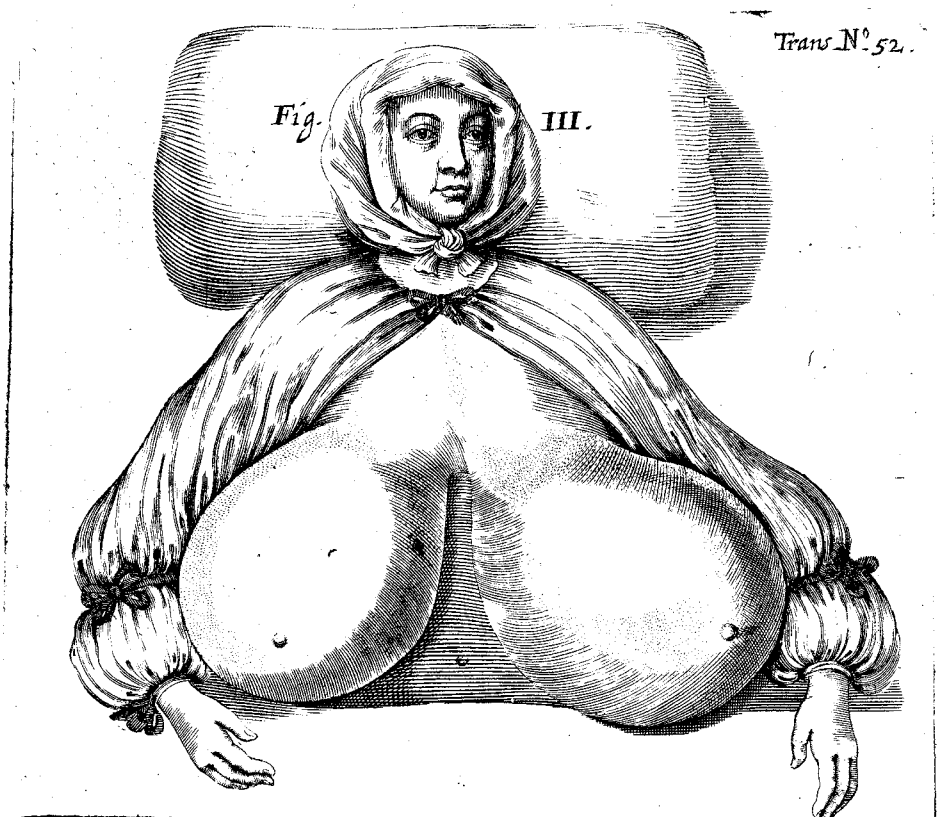

FIGURE 1. Elizabeth Travers and her enlarged breasts, *PT* 4 (1669). © The Royal Society.

the pages of the *Philosophical Transactions* for 1730? And what about the case reported by Abraham Vater of an exceptionally long "plica polonica" (fig. 3), a condition considered pathological until the early nineteenth century but demoted later in the century to the byproduct of a lack of cleanliness?[6]

An especially intriguing state is the degeneration of bone articulation leading to ankylosis, or the fusion of two distinct bones: this condition would normally be classed as a disease, though, as William Cheselden pointed out, in cases when the articulation is in a poor state, ankylosis could sometimes be seen as the remedy.[7]

My essay covers a long half-century from the early years of the *Philosophical Transactions* to the seminal work by William Cheselden, *Osteographia* (1733), to my knowledge the first treatise to include an extensive and relatively systematic section on diseased states—notably bone diseases. As we are going to see, there are significant

6. "An Account of the Hermaphroditic Lobster Presented to the Royal Society . . . Examined and Dissected . . . by F[rancis] Nicholls," *PT* 36 (1730): 290–94; Abraham Vater, "Casus rarissimus plicae polonicae enormis," *PT* 37 (1731): 50–51.

7. William Cheselden, *Osteographia, or the Anatomy of the Bones* (London, 1733), chap. 7.

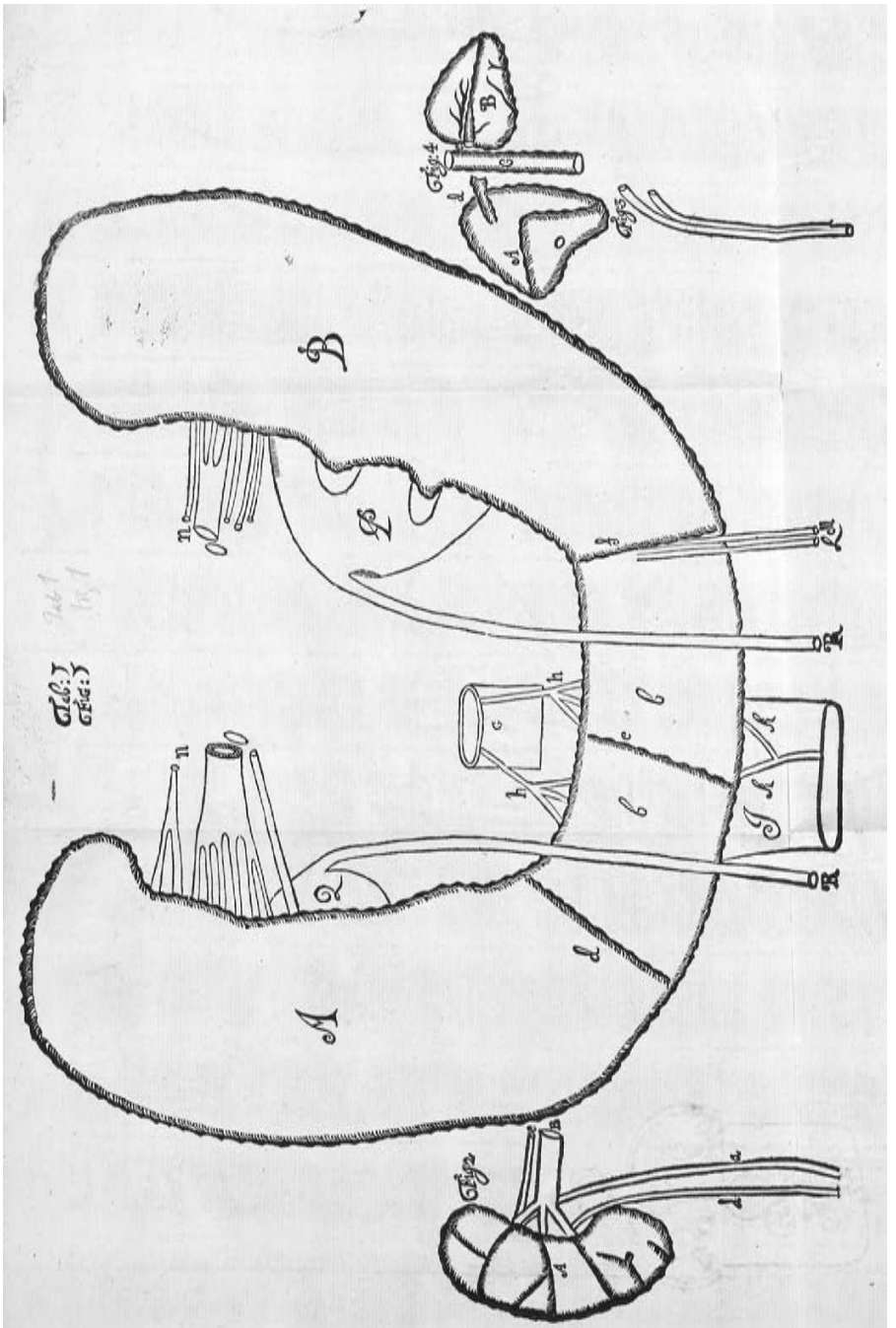

FIGURE 2. Edward Tyson, horseshoe kidney, *PT* 12 (1678–79). © The Royal Society.

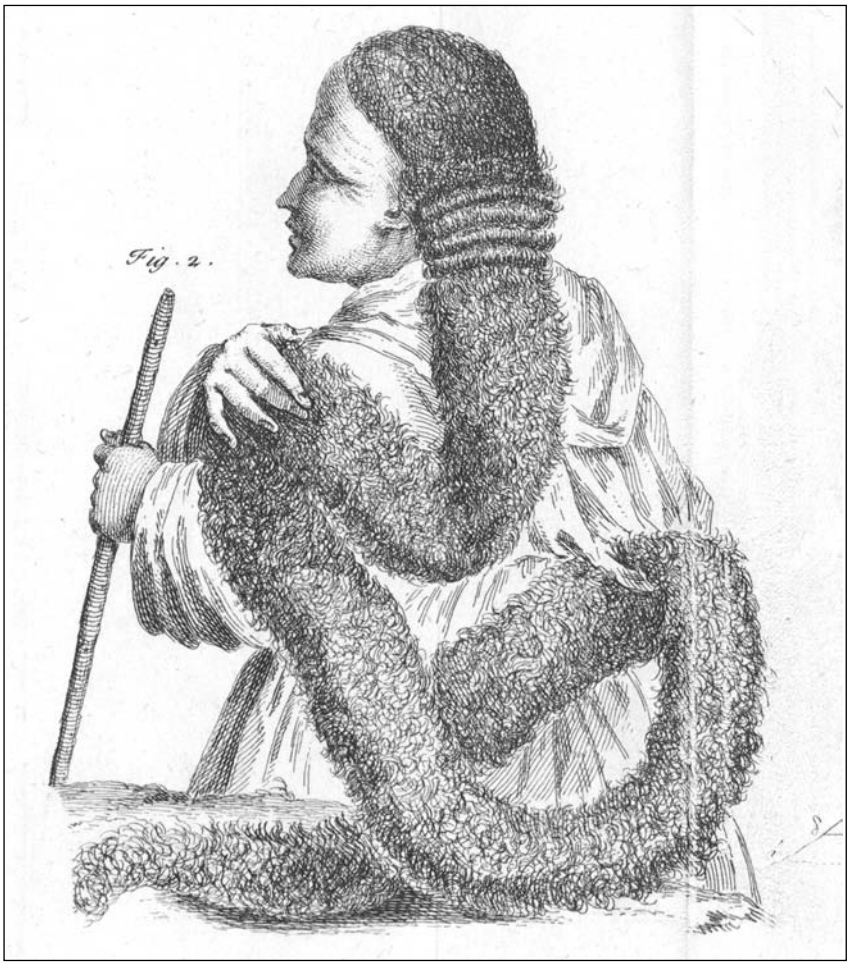

FIGURE 3. Long "plica polonica," *PT* 37 (1731). © The Royal Society.

connections between Cheselden's treatise and earlier works published in the *Philosophical Transactions*.

Before embarking on my excursus, I owe you an account of what happened to Elizabeth Travers; unfortunately she soon died, on October 21, 1669, and Dr. Durston proceeded to dissect her left breast, which was the biggest, with the help of a surgeon; besides the huge size and weight of sixty-four pounds, he found nothing strange. Alas, her aunt became so attached to Travers's body that she prevented its further dissection; Dr. Durston, however, suspected that he would have found nothing of significance.[8] In any event, he included an image not so much to offer a visualization of the complaint but—it would seem—to certify the size and authenticity of such an extraordinary case.

8. Durston, "Extract," 1047–50, 1068–69, 1077.

Representing Diseased Body Parts

Illustrating diseased organs and body parts in this period involved several challenges, which need to be briefly analyzed. The first concerns the availability of the specimens; we know that bodies were not routinely available for dissection in early modern times. Pathology is quite different from anatomy in that a relatively small number of bodies sufficed to prepare many illustrations for an anatomical treatise; by contrast, the number of bodies necessary to prepare illustrations for a comprehensive treatise of the main diseases of all the organs of the body far exceeded what would have been available to medical men. While Andreas Vesalius could produce *De humani corporis fabrica* (Basel, 1543) at age twenty-eight, he certainly could not have produced anything comparable in pathology, which would have required a systematic effort over several decades involving an extensive number of cases and one or more artists always at hand. Relying on the large Paris hospitals, which hosted several thousand patients at any one time, Jean Cruveilhier was the first to produce a comprehensive pathology treatise based on fresh specimens illustrated in color, *Anatomie pathologique* (Paris, 1829–42), a task that took fourteen years.

Other extensive works, admittedly less ambitious, had appeared before then, relying not on fresh but on preserved specimens, which eased the task because all the specimens could be brought together and one did not need the services of an artist for fourteen years. But color and to some extent texture were lost in the preservation process—which usually involved injections or immersion in spirit of wine. These preservation techniques were being developed at the end of the seventeenth century: Royal Society Fellows William Croone and Robert Boyle focused on preservation in spirit of wine, whereas Dutch anatomists Jan Swammerdam and Frederik Ruysch were especially proficient with injections.[9] Besides obliterating color and affecting texture, preservation in spirit of wine was problematic in that the specimens were kept in sealed jars and had either to be drawn that way, or extracted and then resealed in the jars. However, injections too were problematic in that they highlighted the vascular structure and potentially led to extravasations and the compression of other tissues. Moreover, time was required to put together a meaningful collection. It is not surprising that Ruysch, who had assembled the most famous anatomical museum of his time, also produced one of the richest early collections of images including anatomy, pathology, and natural history. [10]

Early modern images of disease had appeared in different venues: broadsides and other ephemeral publications, essays in the medical and scientific journals of the

9. Martin Lister, "Some Observations about Damps," *PT* 10 (1675): 391–95 at 395; Harold J. Cook, "Time's Bodies: Crafting the Preparation and Preservation of Naturalia," *Merchants and Marvels: Commerce, Science, and Art in Early Modern Europe*, ed. Pamela H. Smith and Paula Findlen (New York, 2002), 223–47; *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven, Conn., 2007), 268–88; Luuc Kooijmans, *Death Defied: The Anatomy Lessons of Frederik Ruysch* (Leiden, 2010), 85.

10. Gijsbert M. van de Roemer, "From Vanitas to Veneration: The Embellishments in the Anatomical Cabinet of Frederik Ruysch," *Journal of the History of Collections* 22 (2010): 169–86; Kooijmans, *Death Defied*, 269–93; Domenico Bertoloni Meli, *Mechanism, Experiment, Disease: Marcello Malpighi and Seventeenth-Century Anatomy* (Baltimore, 2011), sect. 10.5.

time, such as the *Philosophical Transactions*, or collections of *Observationes medicae* or *medico-chirurgicae*.[11] Usually these earlier publications contained a limited number of illustrations—at times not more than one—and this made it easier for both anatomists and artists to accomplish their task.

Producing pathology images for publication, then, was expensive, required careful planning and coordination, and in the case of fresh specimens would have required the artist to be in the morgue or available at rather short notice, since the specimens decayed rapidly. Hence one may well ask: what was represented and why? From what we have learned so far, it may not come as a surprise that easily preserved bladder, kidney, and gallbladder stones were especially popular subjects: though relatively common, stony concretions were generally seen as preternatural occurrences generating constant fascination, especially those of a large size and unusual shape. Despite their easy preservation, bones were less frequently represented in the seventeenth century, possibly because they were perceived as more mundane.[12] The difficulty of securing diseased parts and artists to portray them, and the focus on what was perceived as extraordinary or preternatural, provide some justification for the relative scarcity of systematic or even extensive treatises with pathological illustrations, at least in comparison with anatomical ones. However, other developments tended to enable their production, such as changing notions of disease, the professional background and affiliation of medical men, and the rising status of surgeons, who were increasingly publishing in the *Philosophical Transactions* and being elected Fellows of the Royal Society.

For example, the role of surgery in documenting disease has been understudied. We have an imposing body of illustrated works from the time of Hans von Gersdorff, *Feldtbüch der Wundartzney* (Strassburg, 1517), to Berengario da Carpi, *Tractatus de fractura calue sive cranei* (Bologna, 1518), from the many publications by the royal surgeon Ambroise Paré to Georg Bartisch, *Ophthalmodouleia, das ist, Augendienst* (Dresden, 1583), and from the extensive *Opera* of Guilhelmus Fabricius from Hilden or Hildanus (Frankfurt, 1646) to Johannes Scultetus, *Armamentarium chirurgicum* (Ulm, 1655). Overall, the subjects of the illustrations were mainly surgical instruments and procedures or practices rather than diseased body parts as such, although at times the

11. Gianna Pomata, "A Word of the Empirics: The Ancient Concept of Observation and its Recovery in Early Modern Medicine," *Annals of Science* 68 (2011): 1–25; Pomata, "Observation Rising: Birth of an Epistemic Genre, ca. 1500–1650" in *Histories of Scientific Observation*, ed. Lorraine Daston and Elizabeth Lunbeck (Chicago, 2011), 45–80; Pomata, "Sharing Cases: The *Observationes* in Early Modern Medicine," *Early Science and Medicine* 15 (2010): 193–236.

12. Dutch physician Gerardus Blasius classed polyps, stones, and ossifications as preternatural occurrences in *Observationes medicae rariores* (Amsterdam, 1677), 73–95. On bones, see "An Extract of a letter from Bernard Connor, M.D., to Sir Charles Walgrave, Published in French at Paris: Giving an Account of an Extraordinary Humane Sceleton, Whose Vertebrae of the Back, the Ribs, and Several Bones Down to the Os Sacrum, Were All Firmly United into One Solid Bone, without Joynting or Cartilage," *PT* 19 (1695–97): 21–27; and Peter Hardisway, "Ingens materiae purulentae copia cariem & separationem totius ossis mali, &c. inducens, & per triennium ex ore pueri defluens," *PT* 35 (1727–28): 374–76. On the notion of the preternatural, see Lorraine Daston and Katharine Park, *Wonders and the Order of Nature, 1150–1750* (New York, 1998).

two cannot be radically separated. As we are going to see, the surgical tradition proved crucial to the emergence of pathological illustrations.[13]

So how are we to understand the images of diseased bodies that were printed? This is a complex question that would be best answered from a broad perspective; even restricting one's attention to journals, it would be desirable to include not only the *Philosophical Transactions* but also other periodicals such as the Nuremberg *Miscellanea curiosa* or Thomas Bartholin's *Acta medica et philosophica hafniensia*. From a partial and preliminary survey of these sources, my sense is that early images are best understood not in the context of pathology sensu stricto, but more in the context of interest in extraordinary occurrences in natural history, in comparative anatomy, and occasionally in ordinary anatomy, too, insofar as diseased body parts help clarify the structure of healthy parts. By this I mean that in these early representations of diseased parts, there was no attempt to provide a comprehensive visual account of morbid states; the emphasis was not on the diseases one would find routinely, but rather on exceptional and extraordinary cases. Similar patterns often occurred in comparative anatomy and natural history, when new exotic animals were dissected and their anatomy was compared to European specimens. As we are going to see, some anatomists, such as Edward Tyson, William Cowper, and James Douglas, authored essays on both comparative anatomy and pathology.[14]

John Browne and Edward Tyson: Disease, Anatomy, and Natural History

An especially interesting case occurred in 1685 at St. Thomas's Hospital in London. A hydropical soldier, aged twenty-five, was in such poor state that he repeatedly requested paracentesis, or the draining of fluid from his body. According to John Browne, the hospital surgeon who performed the operation and who wrote the report, the soldier caught the disease by drinking too much water and catching cold during the night while on duty. The soldier—whose name was not given—was so swollen that he could barely lie in bed and so weak generally that the procedure looked hazardous: yet, since inaction would have led to certain death, Browne decided to perform the operation. He removed three pints of brinish liquor, and as much more after a few days, but then the patient died. The operation, as Browne is eager to report, was performed correctly, as testified by the physicians and surgeons who witnessed it, and brought temporary relief to the patient, despite the fact that it could not avert his fate.[15]

13. For a useful survey on surgery, see Daniel de Moulin, *A History of Surgery with Emphasis on the Netherlands* (Dordrecht, 1988); Owsei Temkin, "The Role of Surgery in the Rise of Modern Medical Thought," *Bulletin for the History of Medicine* 25 (1951): 248–59.

14. Daston and Park, *Marvels*, chap. 9, argue that there was a change of attitude toward marvels in the eighteenth century.

15. John Brown[e], "A Remarkable Account of a *Liver*, Appearing *Glandulous* to the Eye," *PT* 15 (1685): 1266–68. On Browne, see the entry by Ian Lyle in the *Oxford Dictionary of National Biography* (hereafter *ODNB*), s.v. "Browne, John (1642–1702/3?)," last modified 2004, http://www.oxforddnb.com/view/article/3681. On the role of the patients' social status, see Jerome Bylebyl, "The Manifest and the Hidden in the Renaissance Clinic," in *Medicine and the Five Senses*, ed. William F. Bynum and Roy Porter (Cambridge, 1993), 40–60.

Browne was responsible for the postmortem as well, which was witnessed by physicians William Dawkins, Edward Tyson, and William Briggs—the author of a celebrated treatise on ophthalmology in collaboration with Isaac Newton—and others, including the distinguished engraver and crayon artist William Faithorne, who drew the specimen. The presence at the postmortem of the renowned artist, who knew Robert Hooke and Samuel Pepys, and painted portraits of several Fellows of the Royal Society—*ante mortem*—including physician Edmund King and naturalist John Ray, testifies to Faithorne's wide-ranging interests and the close ties between the investigation of nature and visual representation at the Royal Society.[16]

Upon opening the body, Browne removed twenty-four quarts of water and found a large inflammation of the peritoneum. The most intriguing feature, however, was the liver, which was slightly smaller than usual and consisted entirely of glands or nodules filled with a yellowish fluid; the parenchyma of the liver in between the glands was of the usual reddish color (fig. 4).

In the nineteenth century Browne's glandulous liver was seen as the first illustration of liver cirrhosis—a name coined by René Laennec—due to alcohol abuse; as physician Joseph Frank Payne put it in the *British Medical Journal* for 1888: "A private in the Guards is hardly likely to have acquired dropsy by drinking water, and there can, I think, be little doubt that the so-called 'glandular structures' were the ordinary soft bile stained masses, separated by fibrous tissue, which we find in cirrhosis of the liver."[17] Another illustration of a cirrhotic liver was provided around 1800 by Matthew Baillie, who established a correlation with alcohol abuse. In 1685, however, Browne did not disregard causes and the case history, since he pointed out the cold nights and guard's excessive drinking of water, in line with contemporary views.[18]

In Browne's opinion, the pathological structure he had uncovered greatly supported Malpighi's views of the glandular structure of the liver, put forward in *De hepate* in 1666. Indeed, I suspect that the impetus to publish the essay and include a plate stemmed more from anatomical concerns—to confirm recent views on the structure of the liver—than pathological interests per se. In *De hepate* Malpighi had claimed that the liver consists of glands filtering bile from blood; he examined a large

16. On Faithorn[e], see Meghan C. Doherty, "Creating Standards of Accuracy: Faithorne's *The Art of Graveing* and the Royal Society," in *Science in Print: Essays on the History of Science and the Culture of Print*, ed. Rima D. Apple, Gregory J. Downey, and Stephen L. Vaughn (Madison, Wisc., 2012), 15–36. Faithorne's son Henry was also the nephew of and apprentice to John Martyn and typographer for the Royal Society who published John Ray, *Historia piscium* (London, 1686); see Charles A. Rivington, "Early Printers to the Royal Society 1663–1708," *Notes and Records of the Royal Society* 39 (1984): 1–27 at 18. On William Faithorne, see the entry by Antony Griffiths in the *ODNB*, s.v. "Faithorne, William [*known as* William Faithorne the elder] (*c.*1620–1691)," last modified January 2008, http://www.oxforddnb.com/view/article/9102. The plate was engraved by "Mr. Burgesses."

17. Jacalyn Duffin, *To See with a Better Eye: A Life of R. T. H. Laennec* (Princeton, N.J., 1998), 70; Joseph Frank Payne, "An Address on the Morbid Anatomy and Pathology of Chronic Alcoholism," *British Medical Journal* (December 8, 1888): 1275–77 at 1276.

18. Matthew Baillie, *A Series of Engravings, Accompanied with Explanations, Which Are Intended to Illustrate the Morbid Anatomy of Some of the Most Important Parts of the Human Body,* 10 fascicles (London, 1799–1803), fascicle 5, plate 2, 101–2.

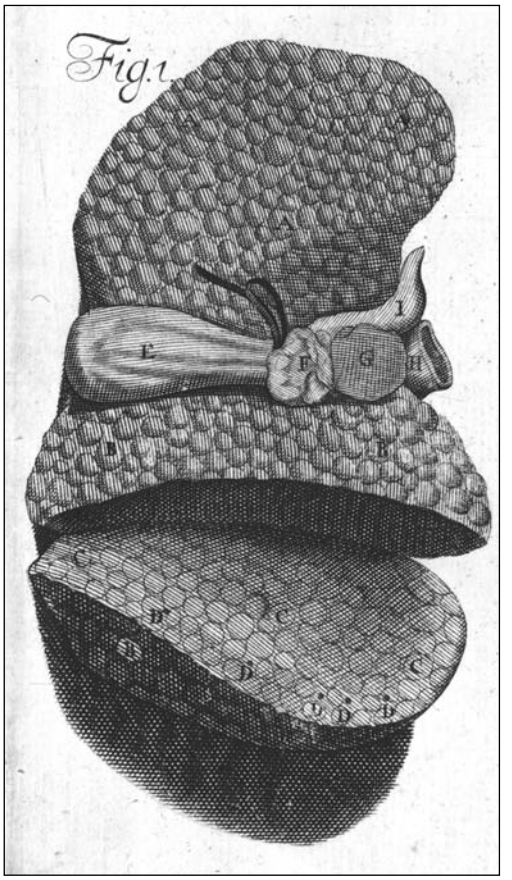

FIGURE 4. John Browne, glandular liver, *PT* 15 (1685). © The Royal Society.

number of animals to get evidence for his views. Malpighi defended the thesis that several organs have a glandular structure by means of pathological evidence of the type Browne mentioned, which I have called the "microscope of disease." According to this view, disease enlarges and thus makes visible body parts that are present also in the healthy organism. Thus Browne's essay agreed with Malpighi in terms of both results and methods of inquiry. It is especially interesting that Malpighi seemingly relied on a pathological state strikingly similar to the one reported by Browne; based on the presence of abundant fluid in the abdomen and a smaller yellow liver with a "glandular" structure resembling a bunch of grapes, medical historian Luigi Belloni identified liver cirrhosis as the disease in the case studied by Malpighi, providing crucial evidence for Malpighi's claim. Thus, seemingly analogous pathological formations independently observed at Bologna and London led to analogous conclusions about the normal structure of the liver.[19]

19. For the notion of the "microscope of disease," see Domenico Bertoloni Meli, "Blood, Monsters, Necessity in Malpighi's *De polypo cordis*," *Medical History* 45 (2001): 511–22; Henry Sampson,

We have seen that among those witnessing Browne's dissection was Edward Tyson (1651–1708), a physician and a distinguished anatomist with interests in comparative and pathological anatomy, the same who had published the essay on the unusual kidney (see fig. 2). Tyson published a number of works in the *Philosophical Transactions*, Thomas Bartholin's *Acta . . . hafniensia*, and elsewhere, on topics such as the anatomy of the opossum and the chimpanzee; he also had a collection of preparations, including pathological ones. In 1691 he published an essay in which he claimed that the watery cysts the size of a pigeon egg that he had found during a dissection of a gazelle or antelope from Aleppo were a species of imperfect animal that he called "hydatides," an insect or worm sui generis bred in animal bodies; the figure he included was due to Richard Waller, secretary of the Society, who was present at the dissections. Tyson argued that they have a neck (fig. 5), which he observed with the microscope, and which he conjectured was instrumental in absorbing nourishment or moisture. Then Tyson moved from hydatids found in exotic animals from the "Orient" to those found in humans, such as those he had found in a patient ten years before, or those often found in ovaries, thus tying his comparative and pathological interests, despite the fact that the different types of hydatids had different structures.[20]

The cases discussed by Browne on the liver and by Tyson on hydatids instantiate the connections between the study and visualization of diseased states, normal anatomy, and natural history.

William Cowper, Paul Buissière, and James Douglas: Surgical Perspectives

It was Tyson who proposed William Cowper (1667–1710) for membership in the Royal Society, which elected him in 1699 as one of its first surgeons. Cowper is best known as the author of *The Anatomy of Humane Bodies* (Oxford, 1698), a treatise largely based on the pulls of the plates—that is, the early and at times rough impressions—for the Dutch 1690 edition of Govert Bidloo, *Anatomia humani corporis* (Amsterdam, 1685); the numerous and impressive engravings relied on drawings by the renowned artist Gerard de Lairesse.[21]

"Anatomical Observations in the Body of a Woman about 50 Years Old, who Died Hydropical in her Left Testicle, Decemb, 30 1677," *PT* 12 (1677): 1000–1002 at 1001. Marcello Malpighi, *Opere scelte*, ed. and trans. Luigi Belloni (Turin, 1967), 415, contains the postmortem report of Father Bolognetti, who had died on August 6, 1666, and which was referred to in *De hepate*; Bertoloni Meli, *Mechanism*, 118.

20. Edward Tyson, "Lumbricus hydropicus," *PT* 16 (1691): 506–10. On Tyson, see the entry by Anita Guerrini in *ODNB*, last modified January 2008, http://www.oxforddnb.com/view/article/27961; Sachiko Kusukawa, "Picturing Knowledge in the Early Royal Society: The Examples of Richard Waller and Henry Hunt," *Notes and Records of the Royal Society* 65 (2011): 273–94.

21. This edition originated an extensive and well-known controversy about plagiarism between Cowper and Bidloo. On surgeons and the Royal Society, see G. C. R. Morris, "On the Identity of Jaques du Moulin, F.R.S. 1667," *Notes and Records of the Royal Society* 45 (1991): 1–10 at 2. See also Michael Hunter, *The Royal Society and Its Fellows, 1660–1700: The Morphology of an Early Scientific Institution*, 2nd ed. (Oxford, 1994); Craig Ashley Hanson, "Anatomy, Newtonian Physiology and Learned Culture: The *Myotomia reformata* and its Context within Georgian Scholarship," in *Anatomy and the Organization of Knowledge, 1500–1850*, ed. Matthew Landers and Brian Muñoz (London, 2012), 157–70.

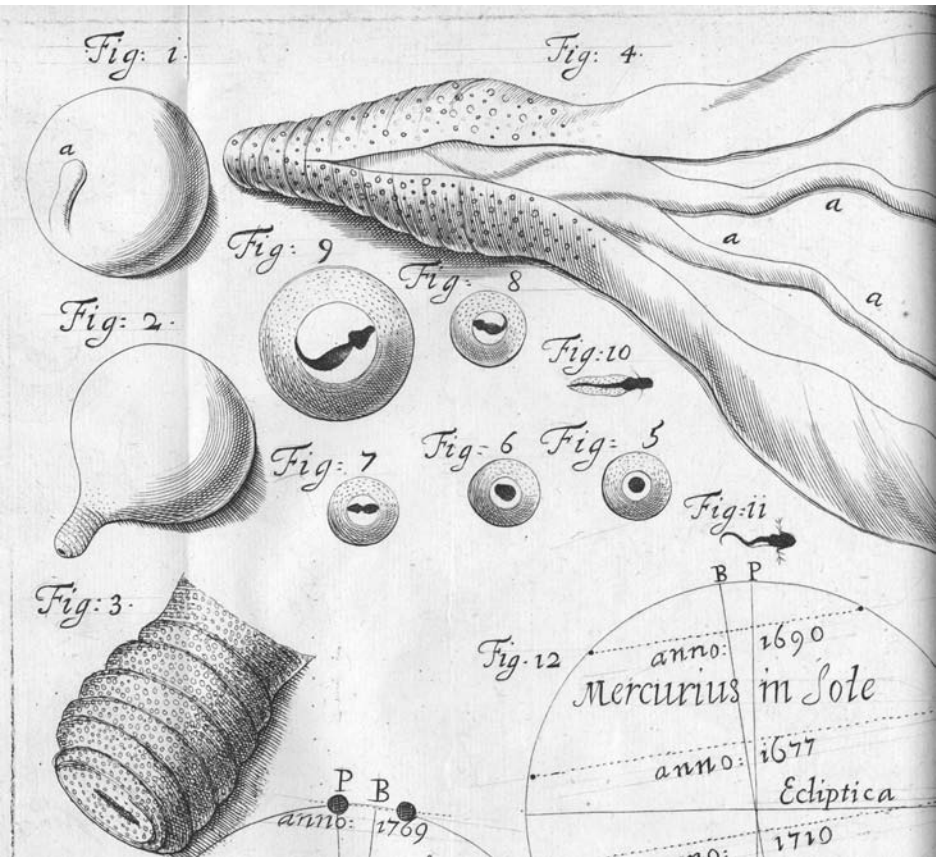

FIGURE 5. Edward Tyson, "Hydatides" (Fig: 4), *PT* 16 (1691). © The Royal Society.

Cowper also authored several illustrated pieces on pathological cases for the *Transactions*, the first one on a diseased kidney (fig. 6). That account is quite rich and I shall discuss it briefly. Its format is that of a letter; Cowper states that he was invited to write it, presumably by the editor of the *Transactions*, Richard Waller, to whom he had spoken of the case. Cowper's effort "to recollect the best account I could," suggests that he had not kept a record of the case, and indeed he admitted that he had not committed other cases to writing either. He also states that, despite the opposition by some, he found dissecting diseased bodies valuable to prognosis and diagnosis; in all probability he had in mind Thomas Sydenham and his followers, who questioned the usefulness of anatomy to the art of healing. Cowper highlighted not the extraordinary nature of the case, but rather the usefulness of correlating symptoms to postmortem results.[22]

22. William Cowper, "An Account of a Very Large Diseased Kidney," *PT* 19 (1696): 301–9 at 301; Thomas Sydenham, *Anatomie, 1668*, in *Dr Thomas Sydenham (1624–1689): His Life and Original Writings*, ed. Kenneth Dewhurst (Berkeley, Calif., 1966), 85–93; on Cowper, see the entry by Monique Kornell in *ODNB*, s.v. "Cowper [Cooper], William (1666/7–1710)," last modified January 2008, http://www.oxforddnb.com/view/article/6510.

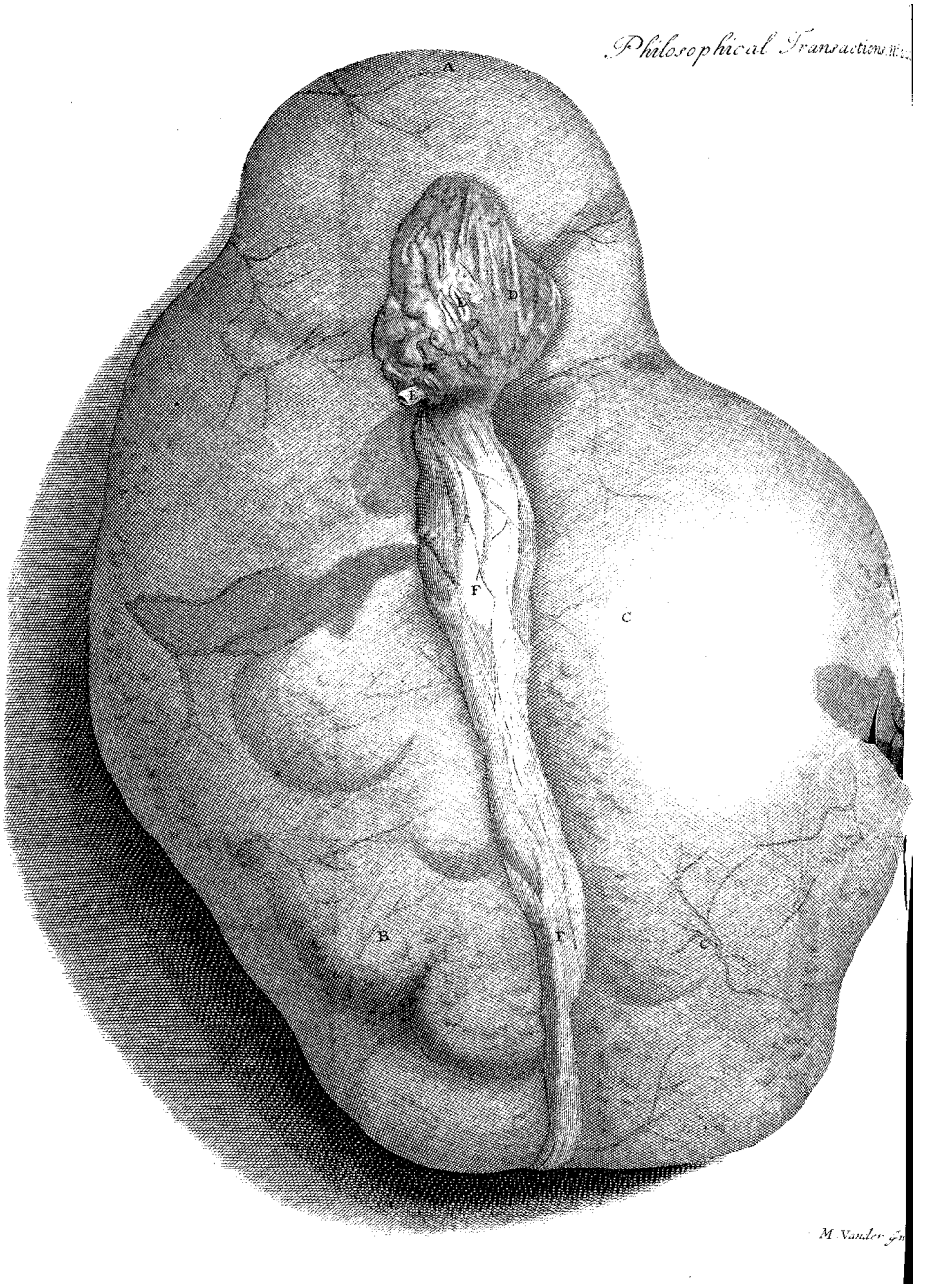

FIGURE 6. William Cowper, "Very Large Diseased Kidney," *PT* 19 (1696). © The Royal Society.

The case begins with symptoms observed about eight years before the patient's death; Cowper states that he was called to dissect the body one day after death but provides no indication as to when or by whom the drawing was made. Since Cowper first reported the case orally to Waller and only later committed it to paper, the origin of the drawing is all the more intriguing: did he have it before conferring with Waller, perhaps as part of a pathological portfolio? The engraving was signed by the Antwerp émigré Michael Vandergucht, who produced several anatomical and pathological works for Cowper.[23]

This was not Cowper's only contribution to *Philosophical Transactions* relevant to pathology. Polypous formations of various natures were relatively popular subjects of study in the seventeenth century; usually they were expelled by live patients from the respiratory airways or found after death in the blood vessels around the heart. Cowper's essay belongs to the latter category and shows a coral-shaped structure found in the pulmonary vein of a one-year old child (fig. 7); Cowper argued that the formation illustrated the structure of the pulmonary vein and included two images of one such vein prepared with wax injections and preserved in Tyson's anatomical collection, highlighting once again their close collaboration. This plate too was engraved by Michael Vandergucht.[24]

In the same year as Cowper another surgeon was elected a Fellow; Huguenot refugee Paul Buissière (deceased 1739) was a prominent London surgeon, anatomist, and anatomy lecturer who was proposed for membership by Hans Sloane. Buissière authored several essays based on postmortems for the *Philosophical Transactions*. He is especially interesting from our perspective in that he explicitly advocated a surgeon's perspective and, indirectly, visualization, as playing a key role in understanding diseased states; much like Cowper's, his comments provide a view contrary to Sydenham's. In one case he argued that the substance a boy of five coughed up about ten or twelve days before he died of consumption was a mucilaginous humor that had formed an incrustation inside the air vessels and not a blood vessel from the lungs, as some had claimed; relying on a postmortem examination he could show that another similar incrustation was present, and that both the air and blood vessels in the lungs were intact. The essay opened with a defense of the usefulness of postmortems to both physicians and surgeons and included an engraving (fig. 8) of the more recent incrustation.[25]

23. On Michael Vandergucht and his son Gerard, see the entry by Timothy Clayton in *ODNB*, s.v. "Vandergucht, Gerard," last modified 2004, http://www.oxforddnb.com/view/article/28072.

24. William Cowper, "An Account of a Polypus Taken out of the Vena Pulmonalis, and of the Structure of That Vessel," *PT* 22 (1700–1): 797–98 at 798. According to Giovanni Battista Morgagni, *De sedibus et causis morborum per anatomen indagatis* (Venice, 1761), translated by Benjamin Alexander as *The Seats and Causes of Diseases Investigated by Anatomy*, 3 vols. (London, 1769), 1:742, the first to provide a delineation of heart polyps was Caspar Bauhin; indeed, the second edition of *Theatrum anatomicum* (Basel, 1621) contains an appendix in which plate 9 shows polyps found in the right and left ventricles.

25. Paul Buissière, "A Letter Concerning a Substance Cough'd up Resembling the Vessels of the Lungs," *PT* 22 (1700–1701): 545–46; on Buissière, see the entry by Gordon Goodwin and revised by Michael Bevan in *ODNB*, last modified January 2008, http://www.oxforddnb.com/view/article/3891.

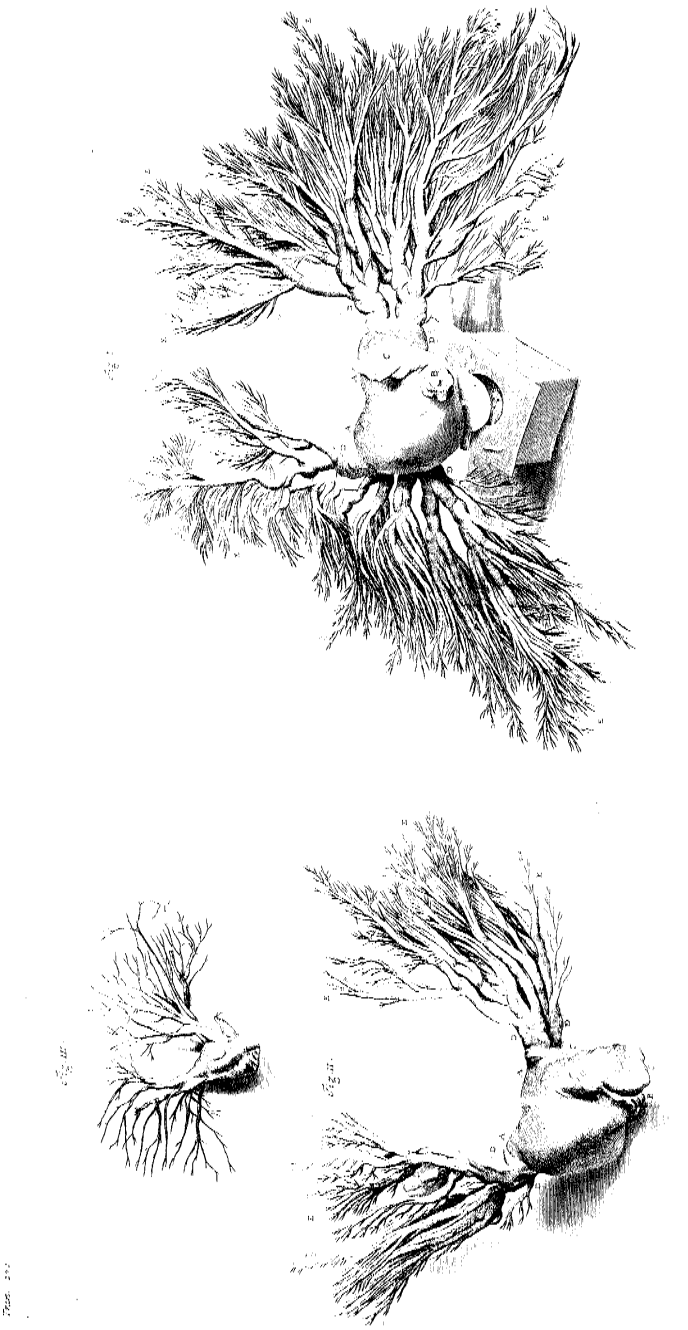

FIGURE 7. William Cowper, "Polypus" (the child's polyp is Fig. III; Fig. I and Fig. II show the Tyson preparation), *PT* 22 (1701). © The Royal Society.

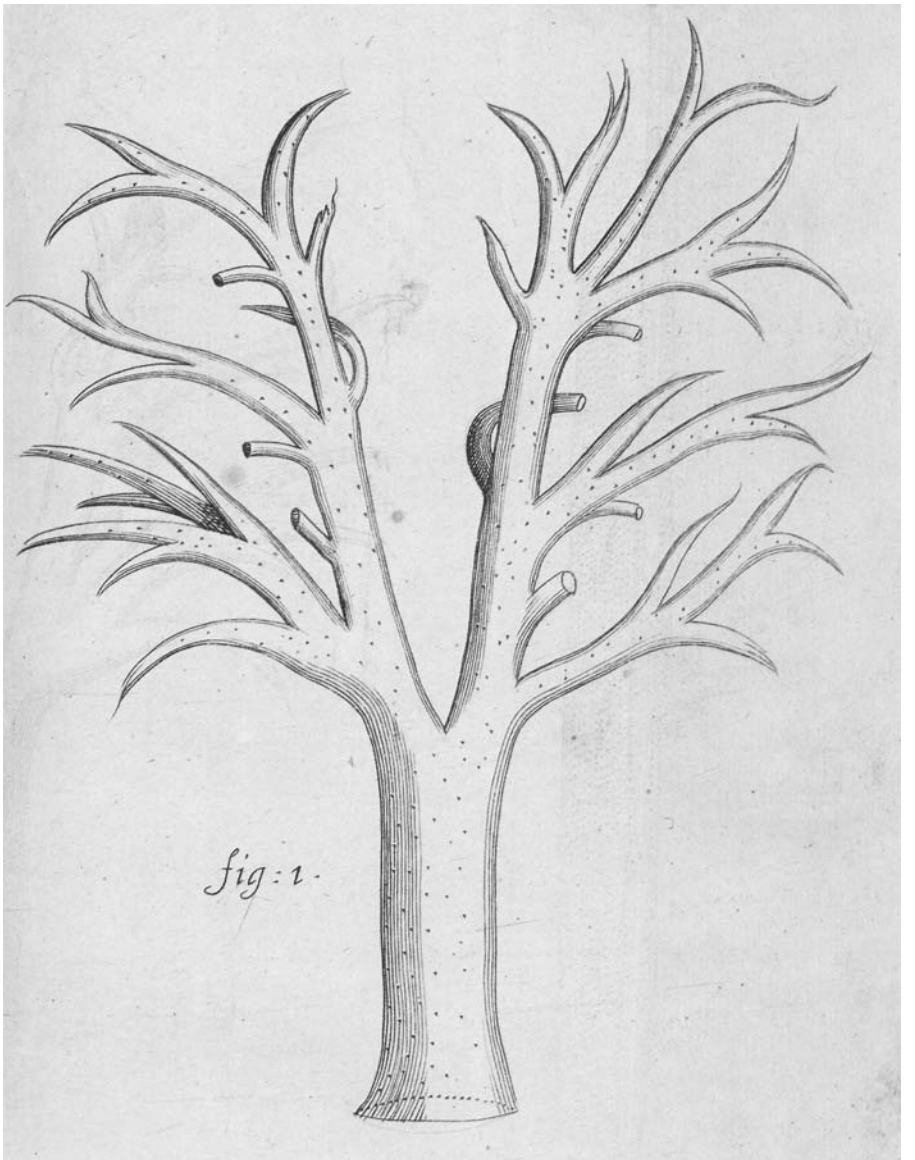

FIGURE 8. Paul Buissière, polyp expelled from lungs, *PT* 22 (1700–1701). © The Royal Society.

In another essay in which Buissière found a peculiar conformation, in the form of a triple bladder (fig. 9), as the cause of difficult urination, he argued that there was a link between professional affiliations and intellectual horizons, and defended a surgical as opposed to a medical perspective:[26]

26. Paul Buissière, "A Letter to the Publisher Concerning a Triple Bladder," *PT* 22 (1700–1701): 752–55 at 752. See Bertoloni Meli, *Mechanism*, chap. 12.

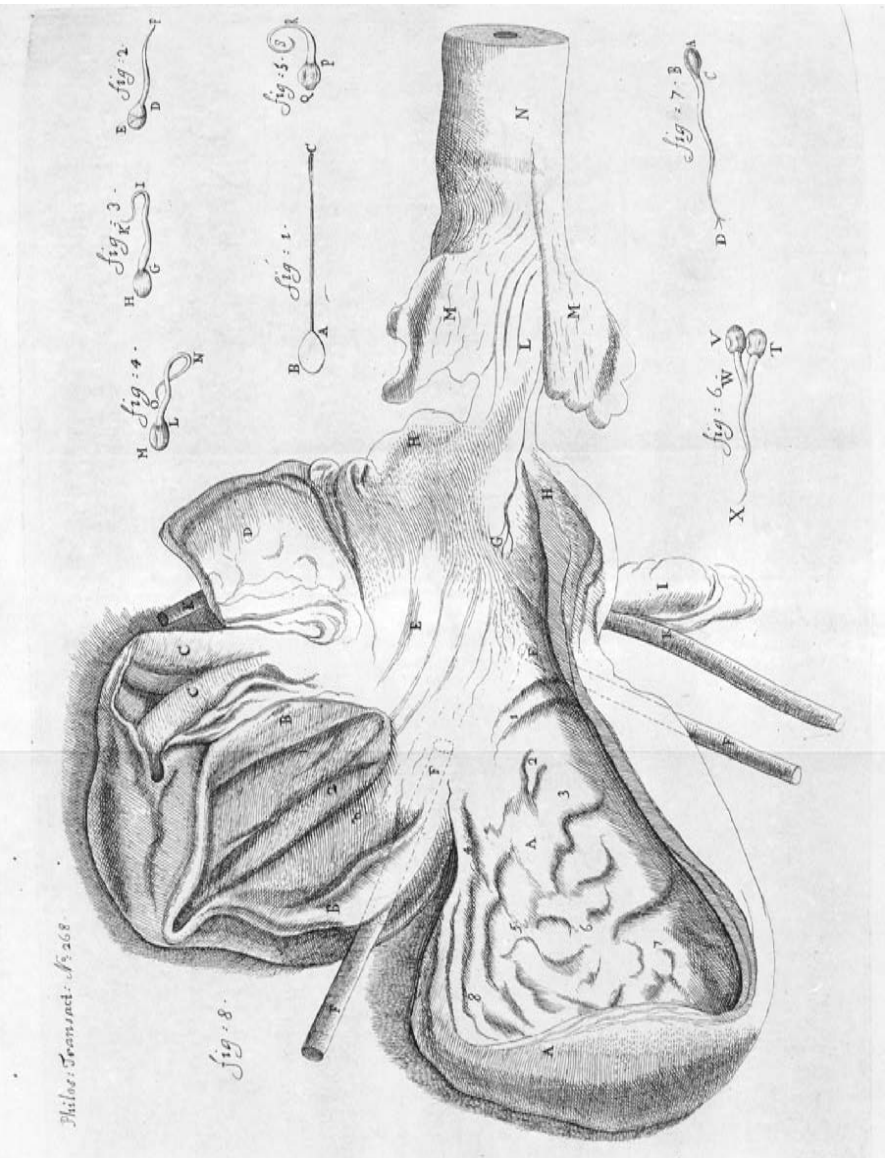

FIGURE 9. Paul Buissière, case of triple bladder (fig: 8), *PT* 22 (1700–1701). © The Royal Society.

> [I]f Physicians were a little more careful to search, or cause to be searched in the bodies of them that dye of extraordinary distempers, they would find sometimes, that which they attribute to the alteration of the blood or humour, dependeth merely on an extraordinary conformation of parts.

This crucial passage identifies a cognitive hiatus between surgeons and physicians, one worth elaborating. Anatomy constituted a common ground between them, and of course at times physicians did perform postmortems. But whether they relied on the traditional doctrine of the humors, or on the more recent views on acid–alkali imbalance advocated by the Leiden professor Frans de le Boë, by and large they held entrenched theoretical views on the causes of disease and on therapies, and privileged acting on the blood through diet. From a therapeutic standpoint, the specific manifestations of disease were therefore not especially significant. For Malpighi, for example—one of the most prominent anatomists and physicians of the time and one whose work was especially well received at the Royal Society—most diseases were due to an excess of acid or erosive particles in the blood that damaged the glands and the filtration process for which they were responsible, engendering further imbalances in the blood composition. Given this position, the specific visual features of the lesion would not help a great deal. In fact, Malpighi often used postmortems and diseased states to find the seat of the disease or to confirm his views on the glandular structure of many organs rather than to study disease as such, as we have seen above.[27] By contrast, surgeons acted on local lesions through local means, relying on what one may call "double localism," a perspective from which the specific visual features of the lesions were crucial.

A third practitioner who was especially active in pathological illustrations was the physician, anatomist, and man-midwife James Douglas (1675–1742). After studying at Edinburgh and Utrecht, Douglas gained his medical degree at Rheims in 1699; his midwifery specialization was especially close to surgical practice. In 1712 and 1716 Douglas also lectured on osteology and muscles to the Company of Barber-Surgeons, testifying to his closeness to surgical perspectives. Douglas worked on comparative anatomy as well, his interests ranging across mammals, birds, reptiles, amphibians, fish, and invertebrates. Thus his activities and expertise spanned many medical and anatomical domains. Douglas contributed several relevant essays to the *Philosophical Transactions*. In 1706, for example, he published an account of a woman who had died the third day after delivery, from a hydropical ovary; no doubt his role as man-midwife provided him with relevant cases. The essay was accompanied by the case history and a striking illustration: Douglas states that he even brought home the specimen in order to study it at leisure. Fig: II shows the kidneys, uterus, and the enormous left ovary (fig. 10); Fig: III shows the vagina and uterus. Douglas was a friend of William Cheselden, who called him "an indefatigable anatomist" in the acknowledgments to his *Anatomy of the Humane Body* (London, 1713); some of the drawings were due to Douglas, and in all probability the drawing of the diseased ovary was his, too.[28]

27. See Bertoloni Meli, *Mechanism*, 20–22 and chap. 12.

28. James Douglas, "An Account of a Hydrops Ovarii, with a New and Exact Figure of the Glandulae Renales, and of the Uterus in a Puerpera," *PT* 25 (1706): 2317–27 at 2320; the renal glands mentioned in the title are marked *a* and *d* in Fig: II. The original drawing can be found among the Royal Society papers, MS 131/109. I am grateful to Sachiko Kusukawa for this reference. On Cheselden, see Zachary Cope, *William Cheselden, 1688–1752* (Edinburgh, 1953), 6–8. On midwifery, see Adrian Wilson, *The Making of Man-Midwifery: Childbirth in England, 1660–1770* (Cambridge, Mass., 1995).

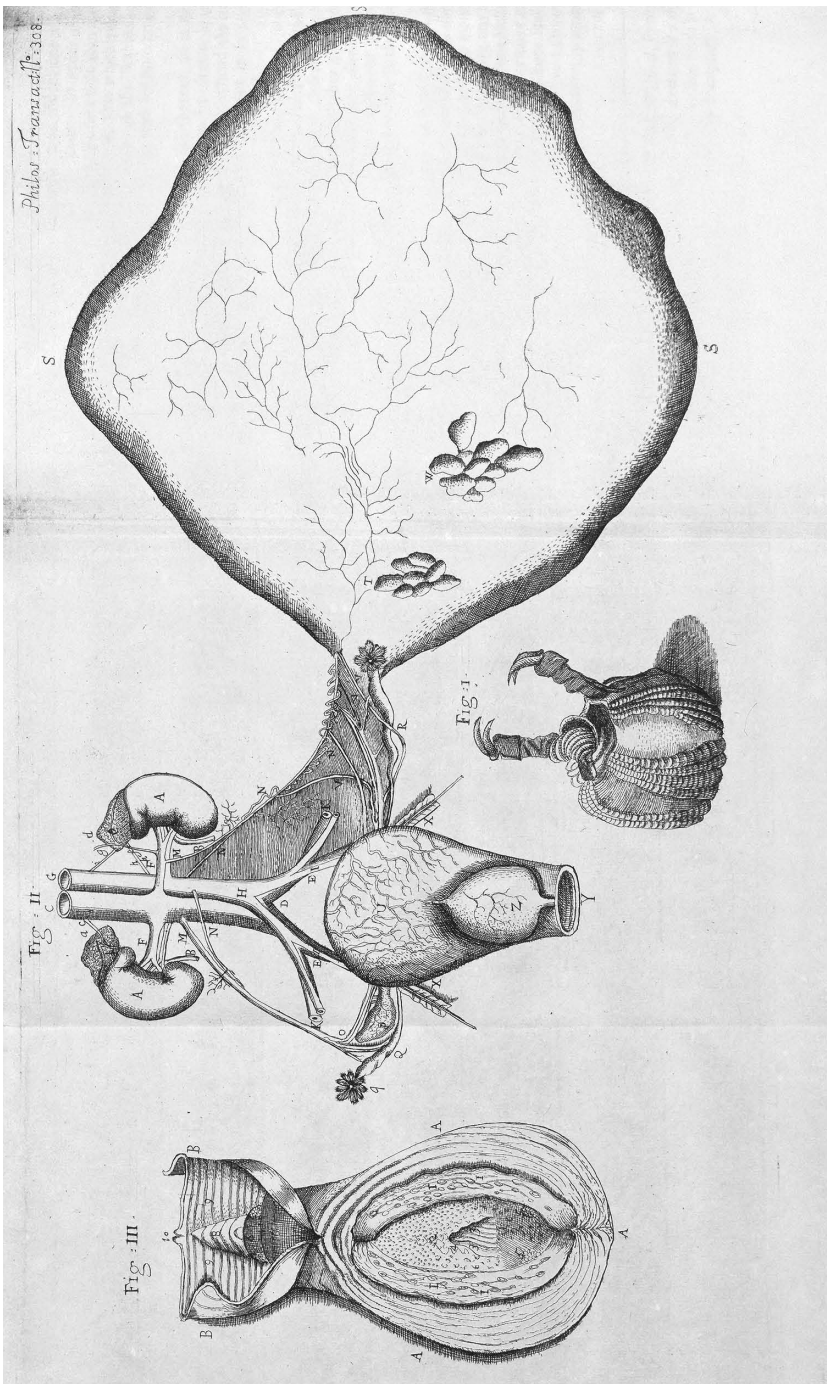

FIGURE 10. James Douglas, "Hydrops ovarii," *PT* 25 (1706). © The Royal Society.

William Cheselden and Bone Pathology

William Cheselden (1688–1752) occupies an especially significant role in the emergence of pathological illustrations; for this reason I am going to provide a more extensive biographical sketch and analysis of his work.

Cheselden moved from his native Leicestershire to London about 1703, when he commenced a seven-year apprenticeship with James Ferne, surgeon to St. Thomas's Hospital. Cheselden studied and also lodged with William Cowper, whom we have just met; their relationship was to prove significant on many levels. After passing the final examination of the Company of Barber-Surgeons, Cheselden started offering a course on anatomy and animal economy, including surgical indications, which was later given at St. Thomas's Hospital. In 1711, following the example of his mentor Cowper, he was elected a Fellow of the Royal Society, to whose *Transactions* he made several contributions.[29] In 1713 he published an illustrated student manual, *The Anatomy of the Humane Body*, which went through thirteen London editions throughout the century, and several foreign ones as well. From the fourth edition (1730) onward, the work included an appendix on lithotomy with clinical results of his methods for extracting bladder stones, this being his specialty; further, although his work was on anatomy, Cheselden included a pathological plate that we will discuss shortly. In 1718 Cheselden was first appointed assistant surgeon and soon thereafter principal surgeon at St. Thomas's Hospital. He was also appointed surgeon for the stone at the Westminster Infirmary and St. George's Hospital. In 1720 he started taking art classes at the academy established by Louis Chéron and John Vanderbank, thus gaining skills in drawing and painting. Among Cheselden's most famous operations was that performed in 1728 on a young boy of thirteen born blind, who gained sight, contributing to a celebrated philosophical debate on vision and the senses; no other example could better capture the rising status of surgery in philosophical debate. Cheselden was one of the most successful and influential London surgeons in the first half of the century.[30]

In 1733 he published *Osteographia, or the Anatomy of the Bones*, an impressive, lavishly illustrated folio volume that will be the focus of our attention. Dedicated to Queen Caroline, wife of George II, *Osteographia* was an ambitious and expensive work, seeking to portray all the bones of the human body life-size in fifty-six plates; moreover, each plate was printed twice, with lettering for clarity's sake, and without for aesthetic reasons. *Osteographia* was unusual among the great anatomical treatises since Vesalius's *Fabrica* in including an entire chapter on diseased body parts with extensive illustrations in sixteen plates; these too were printed twice, suggesting that Cheselden attributed an aesthetic role to them as well. Later anatomies, such as Bernhard Siegfried Albinus, *Tabulae sceleti et musculorum corporis humani* (Leiden, 1747), focused on the healthy as opposed to the diseased body, while diseased states and pathology were generally discussed and illustrated in separate works; thus *Osteographia*'s format did not prove popular. Cheselden also included a number of smaller

29. Cope, *Cheselden,* 2, 66. On Cheselden, see the entry by John Kirkup in *ODNB*, last modified October 2006, http://www.oxforddnb.com/view/article/5226.

30. Cope, *Cheselden*, 67–68, 76–79.

plates of animal skeletons, used as decorations at the beginning and end of each chapter, in the tradition of comparative anatomy; this tradition, as we have seen, was often tied to anatomy and pathology. In some instances the plates with animal skeletons were the first representations of some animal species to be printed. Although surgeon John Douglas, James's brother, lampooned *Osteographia* as being pompous and useless, Cheselden's treatise was a striking work and an especially original one for the inclusion of animal and pathological cases. One may see the inclusion of plates on bone pathology both as an expression of the rising status of surgeons and as a visual guide for medical men.[31]

Cheselden had originally envisaged three books with a comprehensive treatment of all of human anatomy, of which *Osteographia* would have been the first, but lack of interest by subscribers and the public led him to scrap the other two.[32] Since he stated that he was planning to have them also adorned with comparative anatomy plates, one may wonder whether he would have included illustrations of pathological cases in them as well. He did include a pathology plate—not involving bones—in later editions of *The Anatomy of the Human Body*, so one may surmise that that was indeed his intention (fig. 11). Interestingly, that plate was used as a visual reference for the identification of an unusual tumor, thus testifying to the medical use of such pathological images. Further evidence of the usage of *Osteographia* comes from an essay by the French surgeon François Houstet, whose "Mémoire sur l'exostoses des os cylindriques, dans lequel on établit une nouvelle espèce d'exostose" relies on a plate in Cheselden's work to establish a new type of exostosis, or bone tumor.[33]

Cheselden had a rather entrepreneurial attitude toward *Osteographia*: he stated that the book would cost four guineas to subscribers and six after it was printed, specifying that the plates would be destroyed after all the copies had been printed (three hundred for the English version and one hundred for possible Latin or French translations). The frontispiece, showing Galen observing a skeleton of a criminal on a roadside, highlights the ancient pedigree of the study of human osteology and, indirectly, the special status of bones, due to their easy preservation, as well as of surgeons who dealt with them.[34]

31. Ibid., 32, 66–71, 89; John Douglas, *Animadversions on a Late Pompous Book Intituled Osteographia, or the Anatomy of the Bones, by William Cheselden* (London, 1735). James Douglas remained on friendly terms with Cheselden; Allister Neher, "The Truth about Our Bones: William Cheselden's *Osteographia*," *Medical History* 54 (2010): 517–28.

32. According to Monique Kornell, Cheselden managed to sell fewer than one hundred copies by 1740; see "Accuracy and Elegance in Cheselden's *Osteographia* (1733)," *The Public Domain Review*, accessed on May 6, 2013, http://publicdomainreview.org/2011/08/22/accuracy-and-elegance-in-cheseldens-osteographia-1733/.

33. Louis Odier, "Mémoire sur la discrétion médicale pour la Société de Médecine et de Chirurgie du Juillet 2, 1803," in *Les honoraires médicaux: et autres mémoires d'éthique médicale*, ed. Philip Rieder and Micheline Louis-Courvoisier (Paris, 2011), 151–52; I am grateful to Philip Rieder for this reference. See Cheselden, *The Anatomy of the Human Body* (London, 1740), plate 28. Houstet's essay was published in the *Mémoires de l'académie royale de chirurgie* 3 (1757): 130–44 of the quarto edition at 131, 133.

34. Cheselden, *Osteographia*, chap. 8.

Cheselden employed two artists, both in the roles of draftsmen and engravers, Gerard Vandergucht and Jacob Schijnvoet, referred to as Shinevoet in the text. In general, the former was responsible for the large plates of human bones, the latter for the smaller ones of animal skeletons. Vandergucht was a leading London engraver who successfully combined line engraving directly on the plate with etching; his father, Michael Vandergucht, was the same who had engraved a number of anatomical plates for Cheselden's mentor Cowper, including, among other works, additional illustrations for his 1698 *Anatomy*. Since Cheselden had lodged with Cowper, as we saw above, it seems likely that he became acquainted with the Vanderguchts at that time; in addition, like Cheselden, Gerard had been a student of the Huguenot artist Louis Chéron. These multiple connections provide a helpful context for Cheselden's inclusion of pathological plates: Cowper had published several articles in the *Philosophical Transactions* with illustrations of diseased specimens engraved by Michael Vandergucht as well as works on comparative anatomy, for example on the opossum. Moreover, it is plausible that among the more than one hundred anatomical specimens left at Cowper's death, some would have been relevant to pathology.[35] Thus Cheselden continued and expanded Cowper's work on pathology and comparative anatomy with Gerard Vandergucht, the son of Cowper's engraver.

Little is known about Schijnvoet: Cheselden reports that he had come from the Netherlands following some misfortune and while in London had engraved interior views of cathedrals that were published under other artists' names. He died soon after having completed his work for Cheselden, who praises his plates but presents them as inferior to Vandergucht's. Both artists had a background in architectural drawing and engraving, and indeed perspectival concerns were prominent in the *Osteographia*, as suggested by the methods used to produce its illustrations. Initially, in order to achieve accurate delineations, they carefully measured all the bones, a procedure that proved cumbersome and time-consuming, especially for rendering irregular lines, perspective, and proportion. Subsequently, as shown on the famous title page of *Osteographia*, they relied on the camera obscura, though Cheselden intervened directly to perfect the drawings and especially the engravings, arguing that such interventions were indispensable in anatomy; his art training at the school of Chéron and Vanderbank, coupled with his anatomical expertise, no doubt proved useful here. Besides providing help with irregular lines, the camera obscura enabled artists to adjust size with great accuracy and speed, thus allowing Cheselden to represent ideal male and female skeletons with the proportions of the Apollo Belvedere and the Venus de Milo, for example. Size and proportions were key concerns to him.[36]

Cheselden also claimed credit for the technique of engraving bones, which involved a combination of single—often heavy—lines engraved directly on the plate

35. Cowper, "Kidney"; Cowper, "Polypus"; Cowper, "Of Ossifications or Petrifactions in the Coats of Arteries, Particularly in the Valves of the Great Artery," *PT* 24 (1705): 1949–77; Cowper, "Of Hydatides Inclosed with a Stony Crust in the Kidney of a Sheep," *PT* 25 (1706): 2304–5. Plates from the first two were signed by Vandergucht.

36. Cheselden, "To the Reader," in *Osteographia*; Lorraine Daston and Peter Galison, *Objectivity* (New York, 2007), 77–79.

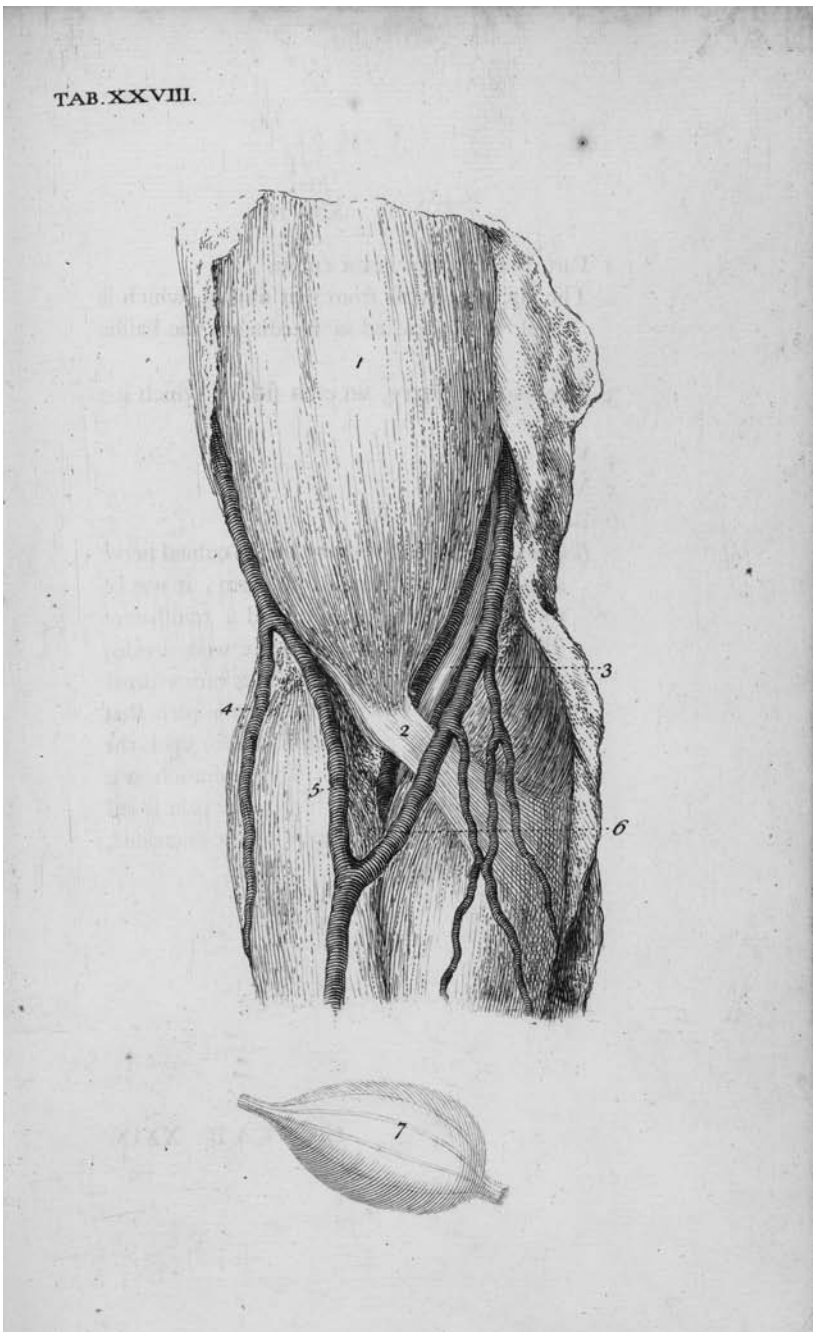

FIGURE 11. William Cheselden, unusual tumor (numbered 7), *Anatomy of the Human Body* (London, 1740), 256, plate 28. Huntington Library, 490892.

with softer single lines produced by etching: line engraving was employed in order to render the smoothness of the contours of bones, while the other parts, often involving varied textures, were all etched. In the address to the reader, Cheselden singled out the rendering of the acetabulum of the os innominatum in comparison to the heads and sockets of the other bones as the chief exemplar of this mixed technique. As we have seen, Vandergucht was a leading figure in London in the new French fashion of combining line engraving with etching and had adopted it before.[37] We encounter here an example of a correlation between technique of representation and visual—in this case more specifically textural—features of a body part, associating smooth portions of bones with line engraving and rough or corroded portions with etching (see figs. 13 and 14, below). The quality of his illustrations was far superior to what we have encountered so far.

Whereas healthy bones often represent ideal types, like skeletons of classical statues, the diseased bones are highly specific; in a case of ankylosis, for example, Cheselden included also an image of the metal fragment that in his opinion had caused it. An especially striking image is that of a set of bones of an officer who had suffered gunshot wounds (fig. 12).

Although Cheselden's *Osteographia* included a chapter specifically devoted to diseases of bones, consisting of fifteen folio plates with several figures each, other portions of his work too contained unusual material. For example, one plate shows an instance of variability of the sternum, with one specimen displaying four bones and the other five; another plate shows a bone found in a human heart; on yet other plates we find fragments of the skull of a girl who was cured at St. Thomas's Hospital, and of the upper and lower jaws of a man who had lost all his teeth.[38]

Cheselden does not provide a detailed account of how he selected the bones to be illustrated. In the introduction to the chapter on bone diseases he states that he did not aim to provide a comprehensive account and highlights two criteria for choosing which specimens to image: those that would enable fellow surgeons better to identify their cases and provide a cure, and those that gave examples of "extraordinary" diseases. Extraordinary did not mean unique: commenting on an example showing a diseased os innominatum, Cheselden states: "This is not the only case of this kind that I have seen," thus giving an indication of the frequency of the condition.[39] Although Cheselden did not seek completeness and, like others before him, often selected extraordinary cases, his work was different from previous attempts: by focusing on one body part and assembling a rather large number of cases with an extensive iconographic apparatus—more than a quarter of the plates that depict human bodies in his work illustrate disease—Cheselden moved significantly beyond reports of single cases

37. Cheselden, "To the Reader," in *Osteographia*; Clayton, *The English Print, 1688–1802* (New Haven, Conn., 1998), 58–59. On Schijnvoet (1686–1733), see William Le Fanu, "Anatomical Drawings by Jacobus Schijnvoet," *Oud Holland* 75 (1960): 54–58. See also Martin Kemp, "'The Mark of Truth': Looking and Learning in Some Anatomical Illustrations in the Renaissance and Eighteenth Century," in *Medicine and the Five Senses*, 85–121 at 107–8.

38. Cheselden, *Osteographia*, plate 17 includes other variants; plate 1, figure 5; plate 6, figures 2–5.

39. Ibid., figure 1, plate 46.

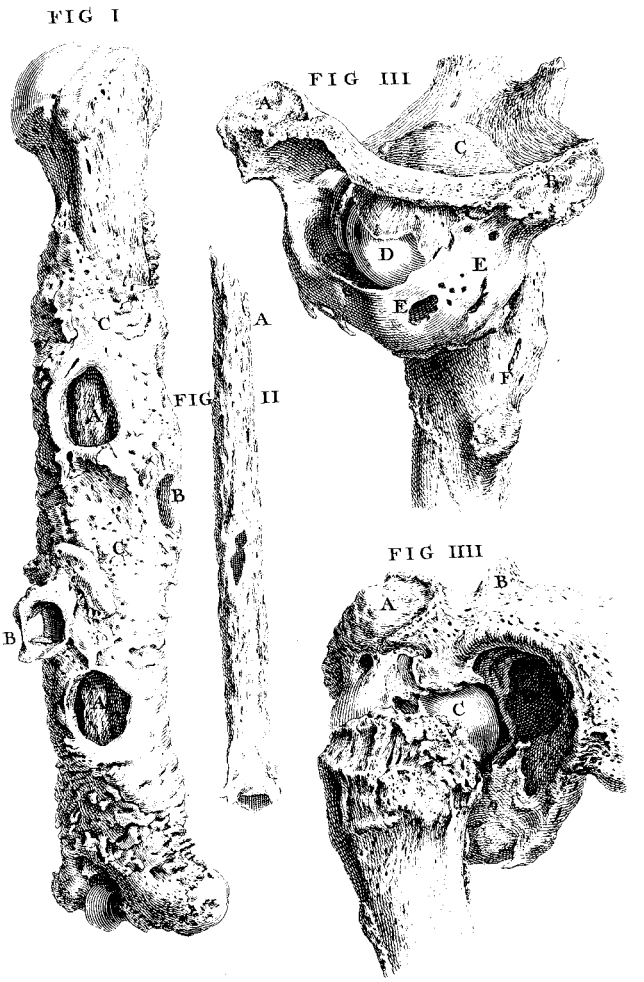

FIGURE 12. William Cheselden, gunshot wound, *Osteographia* (1733), plate 55, (FIG III and FIG IIII are two views of the same bone). Huntington Library, 406136.

such as those provided by Cowper in the pages of the *Philosophical Transactions*, for example, or more or less random collections such as those published by Thomas Bartholin or Nicolaes Tulp in the previous century.[40] The very size of his sample of pathological bones sets his work apart: in presenting an individual case, the emphasis is often on its uniqueness, whereas the very act of presenting a collection shifts the attention to other issues, such as comparisons and range. The emphasis on cures is also significant: as a surgeon, Cheselden would have focused on location of the disease to study its precise features and to devise a cure. The localism of physicians, by contrast, would often have limited them to the study of the disease, whereas therapies—involving diet, for example—would have targeted the whole body, as Buissière told us.

The plates designated to represent diseased states start with skulls of a woman and man who had died of syphilis, as it were an introduction to disease by Eve and Adam. Cheselden presents his work in a traditional fashion, starting from the skull and proceeding down to the thorax and legs, even separating the bones belonging to the same individual; other bones of the syphilitic woman whose skull appeared in the very first figure on the first pathological plate appear several plates later.[41] Cheselden shows femur, humerus, tibia, and fibula, respectively; the rendering of textures is especially effective in the contrast between the smooth parts, rendered with heavy line engravings on the surfaces marked E in "Fig I" and "Fig II" of plate 48, and the carious parts, clearly identifiable in all four bones (figs. 13 and 14). In this respect, diseased bones made special demands on the artists.

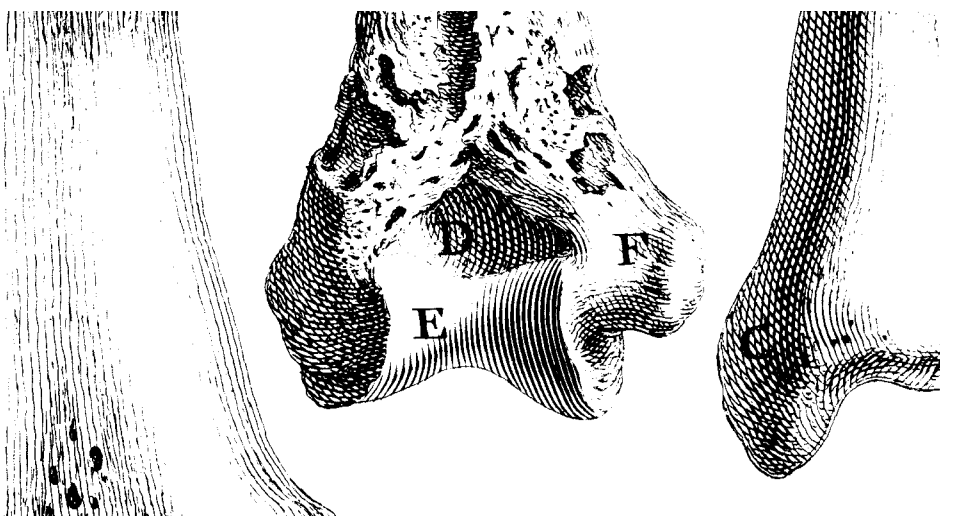

FIGURE 13. Detail of William Cheselden, diseased bones of a syphilitic woman, *Osteographia* (1733), plate 48 (see fig. 14 for entire image). Huntington Library, 406136.

40. Nicolaes Tulp, *Observationes medicae*, 2nd ed. (Amsterdam, 1652; first ed. 1641); Thomas Bartholin, *Historiarum anatomicarum rariorum centuriae*, 3 vols. (Copenhagen, 1654–61).

41. Cheselden, *Osteographia*, plate 41, figure 1; plate 48.

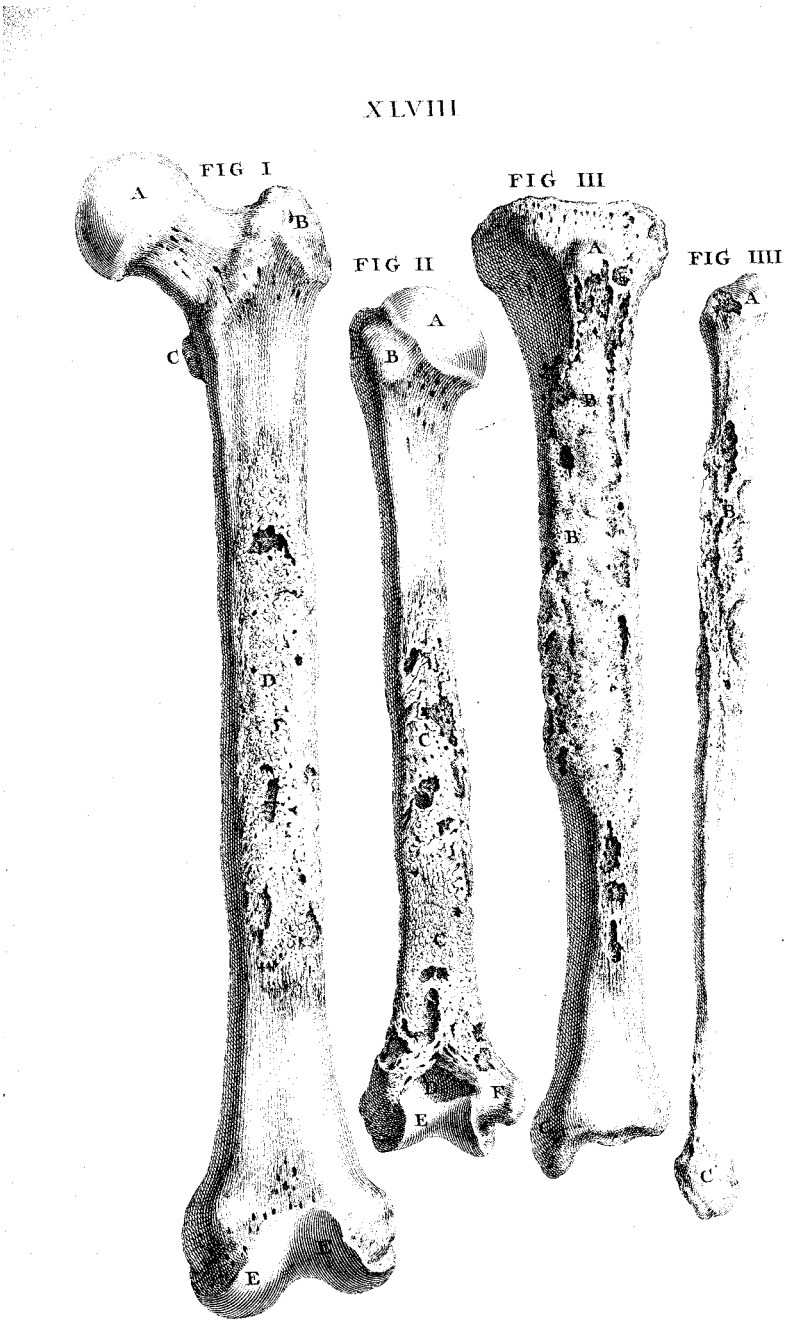

FIGURE 14. William Cheselden, diseased bones of a syphilitic woman, *Osteographia* (1733), plate 48. Huntington Library, 406136.

Cheselden must have relied on a personal collection of diseased bones, but he also acknowledged several colleagues, largely fellow surgeons from London hospitals, for having provided him with many specimens. For example, two skulls of men who had died of the venereal disease were provided by Mr. Palmer, late surgeon to the Lock Hospital; another figure showing the jaw of a woman with a large exostosis, or bone growth, was based on a specimen communicated by Dr. Hoddy; specimens for four figures were provided by Mr. Ferne—Cheselden's early mentor—and the late Mr. Paul, both surgeons to St. Thomas's Hospital.[42] Possibly Cheselden inherited the specimens of deceased colleagues. Although by giving the provenance of the bones, Cheselden was in principle enabling contemporaries to check the originals for accuracy, one could argue that in the decades since Durston's account of Elizabeth Travers, the emphasis had shifted from a concern for establishing the credibility of extraordinary cases. Cheselden, it seems, provided the provenance of his specimens not so much to certify the authenticity of his cases, since it seems implausible to question that, but to document their origin and acknowledge his colleagues; the permanence of bones and their usefulness to surgical practice led to a shift from witnessing to provenance.

Most plates are accompanied only by a description of the diseased bones; occasionally, however, Cheselden outlined a case history. In one example, he describes the case of a young woman of thirteen who had a portion of the humerus removed by surgeon Goodrich from Ipswich, and who healed so well as to be able to carry a pail of water thereafter.[43] Visual representation of texture was crucial to Cheselden's intended aim, since he argued that diseases of hard bones could be more easily cured by exfoliation, whereas spongy bones were often incurable. Even in the case of bones, there can be a striking disconnect between the pain felt and the visible lesions: cases of "white swelling" can be so painful that the surgeon may be forced to amputate, yet all one can find is that the ends of the bone are slightly larger and softer. Cheselden did include a plate illustrating such a baffling case.[44] Despite the expense involved, occasionally one finds a diseased bone shown from multiple sides, offering a perspectival view potentially crucial to surgeons (see fig. 12).[45]

About the same time, Cheselden's friend James Douglas composed a comprehensive treatise on osteology, allegedly even more thorough than *Osteographia*, including a pathology section, but although it was virtually complete at his death in 1742, it was never published.[46] Nonetheless, his manuscript testifies to the growing interest in osteology and specifically bone pathology in mid-eighteenth-century London.

42. Ibid., plate 42, figures 1–2; plate 49.

43. Ibid., plate 49, figure 4.

44. Ibid., chap. 7 and plate 49, figure 3. On white swelling, see Francis Condie, *A Practical Treatise on the Diseases of Children* (Philadelphia, 1844), 567–68. White swelling may refer to a tubercular lesion of the bones.

45. Cheselden, *Osteographia*, plate 44; plate 53, figures 1–2; plate 55, figures 3–4.

46. On James Douglas, see the entry by Helen Brock in *ODNB*, s.v. "'Douglas, James (*bap.* 1675, *d.* 1742)," last modified 2004, http://www.oxforddnb.com/view/article/7899.

Concluding Reflections

Despite the limited geographical scope of my study, we can attempt some tentative conclusions. The history of visual representations of diseased states followed a different path from that of healthy parts: comprehensive or even only extensive illustrated treatises were produced much later than in anatomy. Early works, throughout the seventeenth century, consisted of a range of publications with occasional illustrations, usually in a limited number; these early works are best seen in relation not so much to nonillustrated studies on human pathology but especially to the surgical and natural history—including comparative anatomy—traditions.

The Royal Society occupies an especially significant position in this area for a variety of reasons: the interest in comparative anatomy and unusual animals on the parts of anatomists like Edward Tyson went hand in hand with an interest in the unusual that characterizes pathology; the rise in status of surgery and surgeons in Britain, culminating with membership in the Royal Society for William Cowper, Paul Buissière, and many others after them provided a professional and institutional background for the rise of pathological illustrations; lastly, for all its occasional lackluster issues, the *Philosophical Transactions* offered a major forum for communication at a European level. Cheselden's apprenticeship with Cowper played a significant role and provided a rich context for his work at several levels.

Cheselden's work stands out as a major contribution to pathological illustrations. Reflections on the rising status of surgeons apply to him as well and provide a fertile context for analyzing the emergence of a new medical genre, the illustrated pathological treatise. Although diseased bones were not especially prominent in seventeenth-century literature, they became an obvious choice in the eighteenth because of their easy preservation: Cheselden put them at the same time on the plate and on the map of pathology. The specific format of *Osteographia*, combining anatomy, natural history, and pathology, was not successful. However, many works used Cheselden's plates as pathological and artistic exemplars, at times adopting similar techniques for representing the smooth surfaces of bone ends and the textured portions corroded by disease. I have in mind in particular Cornelis Trioen, *Observationes medico-chirurgicae* (Leiden, 1743); Andreas Bonn, *Tabulae ossium morbosorum* (Amsterdam, 1785–88); Johann Peter Weidmann, *De necrosi ossium* (Frankfurt, 1693); and Eduard Sandifort, *Museum anatomicum* (Leiden, 1793). All these extensively illustrated works were either entirely devoted to bone pathology or included several osteological plates; thus in this regard one may well claim that *Osteographia* ushered in an eighteenth-century golden age in the pathological illustration of bones, one that created a visual catalogue including scores of plates, mostly in folio, moving from the extraordinary individual cases of the early Royal Society to more extensive and systematic accounts.[47]

47. On the issue of the visual representation of diseased states, see Nico Bertoloni Meli, "The Rise of Pathological Illustrations: Baillie, Bleuland, and Their Collections," forthcoming in *Bulletin of the History of Medicine.*

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