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The Beauty of Anatomy: Visual Displays and Surgical Education in Early-Nineteenth-Century London

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SUMMARY: The early-nineteenth-century artist, anatomist, and teacher Sir Charles Bell saw anatomy and art as closely related subjects. He taught anatomy to artists and surgeons, illustrated his own anatomical texts, and wrote a treatise on the use of anatomy in art. The author explores the connections among visual displays representing human anatomy, aesthetics, and pedagogical practices for Bell and a particular group of British surgeon–anatomists. Creating anatomical models and drawings was thought to discipline the surgeon’s hand, while the study of anatomy and comparative anatomy would discipline the artist’s eye. And for Bell, beauty made drawings into better pedagogical tools.

KEYWORDS: anatomy, visual displays, pedagogy, Charles Bell

Charles Bell the artist is never separated from the anatomist, nor the anatomist from the artist; and we may say that when he discovered the great law of distinct endowments in the nervous system, he was guided by that worship of symmetry of form which makes part of the theory of the beautiful as applied equally to the works of nature and of art.

—Amédée Pichot, *The Life and Labours of Sir Charles Bell*

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Sir Charles Bell begins his 1806 treatise for painters, *Essays on the Anatomy of Expression in Painting*, with an admission: “It is not an easy task to reconcile two subjects so far apart in the minds of most readers as anatomy and the fine arts; but if prejudices, early imbibed, be thrown off, it will be found that there is no science, taken in a comprehensive sense, more fruitful of instruction, or leading to more interesting subjects of inquiry, than the knowledge of the animal body.”¹ He, and to a lesser extent his contemporaries, saw the fine arts, particularly modeling/sculpture and painting, as teaching tools for anatomists and surgeons, helping them to discipline hand and eye. At a time when pedagogical practice was being debated, Bell’s work on visual displays and anatomy contributed to a pedagogical program that valued practical, formalized medical education, faced a dearth of bodies for dissection, and expanded the audience for that education to include surgeons, general practitioners, and apothecaries. When looking at the relationship between the fine arts and anatomy, Charles Bell can be seen as both a representative and an exceptional figure. Like many surgeon–anatomists, Bell relied heavily on illustrations in both his texts and his lectures. But while many of Bell’s contemporaries paid others to execute their artistic visions, Bell crafted his own illustrations, models, and specimens.

This article explores the roles that visual displays played in early-nineteenth-century anatomical and surgical instruction conducted both through texts and in London’s classrooms. It addresses questions raised by other historians about the style and aesthetic character of illustrations made by Bell and used by his colleagues. Bell considered both his natural philosophical systems of anatomy and his drawings to be beautiful and simple, ideals that were derived from the natural theology that provided the underpinning for Bell’s work. He considered beauty and simplicity to be essential qualities, making anatomical systems and drawings more accurate and more intelligible.

By exploring the importance of visual displays to anatomy, this work extends discussions of surgical education in London in the early nineteenth century, looking at the uses to which visual displays were put in the classroom. Images, art, and visual culture in science have been increasingly popular subjects of study among historians of science and medicine. Much of their work focuses on materiality, instruments, inscriptions, and

1. Charles Bell, *Essays on the Anatomy of Expression in Painting* (London: Longman, Hurst, Rees, and Orme, 1806), 7.

visual languages.² Similar attention has not been devoted to the relationship between scientific displays and pedagogical practice or theory;³ this article, therefore, provides an examination of the roles that the visual takes in science and medicine.

The Places and Spaces for Visual Display

During the early part of the nineteenth century, British medicine was transformed. The center of British medical education shifted from Edinburgh to London; research and education moved from small, private institutions to large, all-encompassing schools; methodologies changed as the practice of vivisection became more widely accepted; an explosion in the printing and availability of periodical literature reconfigured audiences, professional communities, and the nature of research; and the professional prestige of various medical professions shifted.⁴ The most significant of these changes were tied to the classroom—pedagogy drove, and was driven by, other medical reforms. Because the small schools of anatomy that provided the basis of a London medical education at the turn of the nineteenth century were run and staffed mostly by surgeons, surgeons found their own professional fate to be intimately bound up with that of the educational institutions and pedagogical practices at the center of new campaigns for reform.⁵

2. Alex Soojung-Kim Pang, “Visual Representation and Post-Constructivist History of Science,” *Hist. Stud. Phys. Biol. Sci.* 27 (1997): 139–70; Lorraine Daston and Peter Galison, *Objectivity* (Cambridge, Mass.: MIT Press, 2007); Martin Kemp, “‘The Mark of Truth’: Looking and Learning in Some Anatomical Illustrations from the Renaissance and the Eighteenth Century,” in *Medicine and the Five Senses*, ed. William Bynum and Roy Porter (Cambridge: Cambridge University Press, 1993), 85–121; Ludmilla Jordanova, “Gender, Generation and Science: William Hunter’s Obstetrical Atlas,” in *William Hunter and the Eighteenth Century Medical World*, ed. William Bynum and Roy Porter (Cambridge: Cambridge University Press, 1985), 385–412.

3. David Kaiser offers one exception, with his book *Drawing Theories Apart: The Dispersion of Feynman Diagrams in Postwar Physics* (Chicago: University of Chicago Press, 2005). Also on pedagogy, see Andrew Warwick, *Masters of Theory: Cambridge and the Rise of Mathematical Physics* (Chicago: University of Chicago Press, 2003); David Kaiser, *Pedagogy and the Practice of Science: Historical and Contemporary Perspectives*, Inside Technology (Cambridge, Mass.: MIT Press, 2005).

4. Roy Porter, “Medical Lecturing in Georgian London,” *Brit. J. Hist. Sci.* 28, no. 1 (1995): 91–99; Christopher Lawrence, *Medicine in the Making of Modern Britain, 1700–1920* (London: Routledge, 1994): chap. 2.

5. Susan Lawrence, “Entrepreneurs and Private Enterprise: The Development of Medical Lecturing in London, 1775–1820,” *Bull. Hist. Med.* 62 (1988): 171–92.

Charles Bell, one of a cohort of surgeons raised and trained in Edinburgh, moved to London for its comparatively open medical marketplace in 1804 and developed a career that survived the many changes in medical education and practice that took place between 1800 and 1840. Bell's interests in pedagogy and in professional advancement make him and his group of students and allies particularly valuable subjects for the study of the profound transition that took place in medical and life sciences in the early nineteenth century. Bell's priority dispute with some of his own students and countrymen, and with French vivisectionist François Magendie, over the discovery of the roots of motor and sensory nerves and their corresponding anatomical systems, makes Bell a figure of public significance whose work, politics, and reputation not only shaped but also help us to assess British medical culture at the time.⁶ Ludmilla Jordanova has suggested that by looking at Charles Bell, who was involved in many facets of the medical world, "it is possible to use an individual as a case study to facilitate our appreciation of early-nineteenth-century Britain"; and that focusing on an individual has "distinct advantages because it makes it easier to trace intricate ideological, professional, aesthetic, and political threads, to understand their inter-relationships, and to recognize their historically specific character."⁷ This sort of approach can be applied profitably to Bell, using his work to identify the complicated character of British medical pedagogy and its relationship to art.⁸

6. Several historians have written about Charles Bell, though usually in rather short articles focusing on only one element of his career. The longest of these, Paul F. Cranefield and Charles Bell, *The Way In and the Way Out: François Magendie, Charles Bell, and the Roots of the Spinal Nerves: With a Facsimile of Charles Bell's Annotated Copy of His Ideas of a New Anatomy of the Brain* (Mount Kisco, N.Y.: Futura, 1974), assesses Bell's claims to priority in his dispute with Magendie in a short article and provides documents relating to the debate itself. Irvine Loudon and Ludmilla Jordanova have written about elements of Bell's art in Irving Loudon, "Sir Charles Bell and the Anatomy of Expression," *Brit. Med. J.* 285 (1982): 1794–96; Ludmilla Jordanova, "The Representation of the Human Body: Art and Medicine in the Work of Charles Bell," in *Towards a Modern Art World*, ed. Brian Allen (New Haven, Conn.: Yale University Press, 1995): 79–94. Pauline Mazumdar has written about Bell in relation to the changing roles of anatomy, physiology, and surgery in Pauline Mazumdar, "Anatomy, Physiology and Surgery: Physiology Teaching in Early Nineteenth-Century London," *Can. Bull. Med. Hist.* 4, no. 2 (1987): 119–43. This article attempts to shed new light on Bell and his contemporaries by addressing Bell's multiple commitments together in a way that reveals the significance of his visual epistemology to pedagogical practices in his medical world.

7. Jordanova, "Representation of the Human Body" (n. 6), 79–80.

8. Because Charles Bell was surrounded by, and took part in, so many reforms in British medical structure and practice, historians often find him hard to place. Adrian Desmond calls Bell a vivisectionist Paleyan and a gentleman Whig moderate in Adrian J. Desmond, *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London* (Chicago:

Charles Bell was born in Edinburgh in 1774. His father was a clergyman and died when Bell was young. One of his older brothers, John, was a surgeon, anatomist, and artist, though with a very different style from Bell's. Bell was, however, very devoted to another of his three brothers, George, a well-connected Whig lawyer in Edinburgh.⁹ He maintained correspondence with George and sought his advice throughout his life.

Bell's education in Edinburgh comprehended the different forms of teaching that took place there: He was apprenticed to his brother John and took courses at the university. After his training was complete he helped John run a private school on Surgeon's Square; he also coauthored several medical textbooks with him. Bell wrote a great deal on subjects of interest to students, didactic texts on particular parts of the body or on medical maladies.

In 1804 Bell moved from Edinburgh to London, a part of the exodus of Scots to London during the late eighteenth and early nineteenth centuries, and in 1812 he took over the Great Windmill Street School, one of London's many private anatomy schools, from other Scots, including William Hunter.¹⁰ Bell's teaching career in London included the many sorts of institutional affiliations that were available to London medical teachers. Bell worked his way up the hierarchy at the Middlesex Hospital, appointed as a surgeon there in 1814 and eventually offering clinical lectures and shepherding students through the wards.¹¹ He lectured at the

University of Chicago Press, 1989), 190. Paul Cranefield and Richard French portray Bell as a staunch antivivisectionist in Cranefield and Bell, *The Way In and the Way Out* (n. 6); Richard D. French, *Antivivisection and Medical Science in Victorian Society* (Princeton, N.J.: Princeton University Press, 1975), 19. Pauline Mazumdar depicts him as a scientific progressive and one of the few anatomists interested in physiology in Mazumdar, "Anatomy, Physiology and Surgery" (n. 6). Such confusion exists, perhaps, because Bell has not been studied in any depth by historians of science, but it also exists because historians have given little attention to the supposedly backward British medicine of the early nineteenth century and have thus forced men like Bell and his contemporaries into categories meant to describe eighteenth-century medical practitioners, nineteenth-century political camps, or Victorian activists.

9. Gordon Gordon-Taylor and E. W. Walls, *Sir Charles Bell, His Life and Times* (Edinburgh: E. & S. Livingstone, 1958).

10. As Charles Singer and S. W. F. Holloway describe it, "[The Great Windmill Street School] had been opened in 1769 by the very distinguished Scot, William Hunter (1718–83). . . . Another Scot, William Cruikshank (1745–1800) . . . became his assistant in 1771. In 1783 Cruikshank was joined by Matthew Baillie (1761–1823), also a Scot, brother-in-law of John Hunter. . . . It was bought in 1812 by yet another eminent Scot, Charles Bell. . . ." Charles Singer and S. W. F. Holloway, "Early Medical Education in England in Relation to the Pre-History of London University," *Med. Hist.* 4 (1960): 1–17.

11. Susan C. Lawrence, *Charitable Knowledge: Hospital Pupils and Practitioners in Eighteenth-Century London* (Cambridge: Cambridge University Press, 1996).

College of Surgeons to large audiences for no pay and spent much of his time in London courting students, patrons, prestige, and fortune. He was among the first professors appointed at London University (founded in 1828) and also among the most famous.¹² And he was among the physicians and surgeons at the Middlesex Hospital who helped to establish the Middlesex Hospital School in 1835.¹³ Bell brings together the elements most significant to London's medical and pedagogical reform movements with a concern for the visual arts. As a "conservative reformer,"¹⁴ a moderate Whig who sought to modify medicine in a limited manner, he defended detailed human and comparative anatomy against vivisectionist physiology and morphology that were increasingly advocated by a new wave of continental-style medical teachers in London. His medical science was based in pedagogy, and his pedagogical practices depended upon visual displays that were constructed with a particular aesthetic and pedagogical, as well as natural theological, philosophy in mind.

Visual displays were very much a part of anatomical work in early-nineteenth-century Britain—anatomists used a variety of visual representations and technologies to teach their discipline and publicize their discoveries. There was nothing particularly novel about that—Leonardo da Vinci's anatomical drawings, along with those of Vesalius and William Hunter, were widely known to British anatomists, as were the wax models often used to teach anatomy, and some nineteenth-century anatomists knowingly invoked the work of their predecessors to claim a place within a notable tradition.¹⁵ In the early nineteenth century, drawings appeared in journals, books, and lecture halls. Museums containing preserved specimens and models were common. Lectures were sometimes given in the middle of museums so that the lecturer could illustrate his point.¹⁶ And,

12. Charles Bell, "Sir Charles Bell's Introductory Address on the Opening of London University," *London Med. Gazette* 2 (1828): 566–68.

13. Charles Bell, "Middlesex Hospital School: Opening Address," *Lancet* 1, no. 632 (1835): 89.

14. This phrase is one that I have chosen as a response to Adrian Desmond's "radical reformers." It describes a group with loosely shared social and political commitments. For more, see Carin Berkowitz Caruso, "Medical Science as Pedagogy in Early Nineteenth-Century Britain: Charles Bell and the Politics of London Medical Reform" (Ph.D. diss., Cornell University, 2010).

15. Bell writes about both Vesalius and Leonardo in an off-handed manner in his letters.

16. Jonathan Reinartz, who writes about the role of the museum in teaching medicine in Birmingham during the nineteenth century, goes so far as to suggest that this time period could be called the Age of Museum Medicine, saying, "For medical students, the museum was the site where theory first encountered practical learning, as ideas introduced in lectures were explained and illustrated with the help of preserved specimens." Jonathan Reinartz,

of course, actual bodies were displayed in dissection rooms, in which students would customarily watch a demonstrator perform a dissection. But medical men in the early nineteenth century were consciously formulating a pedagogical program that would systematize medicine. This endeavor to reform medicine prompted Charles Bell to articulate ideas about the relationship between visual displays and medical education and to try to extend the utility of visual displays in teaching a variety of audiences.

Bell's visual displays took a variety of forms. Most of the articles based on his clinical lectures and hospital cases, printed in the early volumes of the *London Medical Gazette* (1827–28), were illustrated.¹⁷ Bell's articles were among the few that contained illustrations in those early editions. It is unclear whether Bell himself had much to do with either the articles or the drawings or whether they were entirely re-creations by students attending Bell's classes—Bell is credited as the author, but there are notes suggesting that the articles were in fact written by students based on the notes they took.¹⁸ It is clear, however, whether it was Bell or his students who recorded them in the *Gazette*, that someone found them worth the expense and inconvenience of including. Bell's wife, Marion, wrote after his death, "By constant practice he became an attractive lecturer. . . . I have been told that his rapid and effective sketches on the black-board were a great aid."¹⁹ And Bell often wrote in his letters to his brother about making drawings for his class.²⁰

Bell's former student and demonstrator Herbert Mayo was one of the few others who had illustrated articles in the *London Medical Gazette*, and presumably he adopted the practice of including drawings in his lectures from his teacher and mentor. Bell's drawings in the *Gazette* are sometimes intricate and naturalistic sketches, common to other illustrated material, and at other times are schematic drawings (see Figures 1 and 2, both from Bell's 1828 lecture on the hip joint), which were abstracted and of a style seen infrequently in printed material on medical subjects.²¹ These schematic drawings may be a novelty of Bell's, but they might also reflect

"The Age of Museum Medicine: The Rise and Fall of the Medical Museum at Birmingham's School of Medicine," *Soc. Hist. Med.* 18, no. 3 (2005): 419–46, quotation on 420.

17. See, for example, Charles Bell, "On the Diseases and Accidents to Which the Hip-Joint Is Liable," *London Med. Gazette* 1, no. 6 (1828): 137–42; Charles Bell, "Observations on Haemorrhage," *London Med. Gazette* 1, no. 13 (1828): 361–65.

18. Berkowitz Caruso, "Medical Science as Pedagogy" (n. 14), 76–90.

19. Charles Bell, *Letters of Sir Charles Bell, K.H., F.R.S.C. & E. Selected from His Correspondence with His Brother George Joseph Bell* (London: J. Murray, 1870), 410.

20. For example, *ibid.*, 199 (April 1812).

21. I refer to them as Bell's drawings, even if they were reproductions by students.

the more common practice of drawing quick and rough sketches as Bell did on a blackboard in front of a class, a pedagogical practice that only rarely made its way into print (making the novelty the printed form rather than the drawings themselves). Sometimes they are inserted without any notice being taken of them within the text. At other times, the text will say something like “[t]he coagululum lies in this way,”²² with a drawing beneath it. The drawings are treated as straightforwardly and unproblematically readable, although they vary significantly in style and substance.



Figure 1. This is a rough schematic of a femur from the *London Medical Gazette* article “On the Diseases and Accidents to Which the Hip-Joint Is Liable” (n. 17), 137. It appears to have labels (the letter G, for example, at the bottom of the image), but those labels are not remarked upon. There is no comment upon the image within the text. The article describes causes of repeated dislocation, and the image appears to depict the angle of the femur and thigh to the body in the case of dislocation.

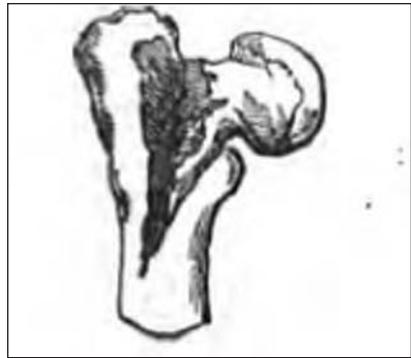


Figure 2. This drawing, which comes from the same article as Figure 1 (Bell, “Diseases and Accidents” [n. 17], 141), is very different in style. The drawing appears naturalistic, showing students how the neck of a fractured femur looks. One can infer that this is the subject matter being depicted only because of the way it is situated within the text: again, there is no label for the image and no mention of the image within the body of the text.

22. Bell, “Observations on Hemorrhage” (n. 17), 364.

Unlike the journal articles, much of Bell's work written for printing as books was built around beautiful and elaborate illustrations; text was of secondary importance. Bell used two different techniques for reproducing drawings in his texts: etching and engraving. Etching was the cheaper technique and was used frequently by Bell, who gained facility with it himself. When his brother mistook some drawings for engravings, Bell responded in an 1809 letter, "My bones engraved! Not a touch of them. Engraving could never do that; besides, they will not cost me one pound a-piece. Engraving would have been at the rate of six guineas; though a splendid book, it will be cheap and circulate wide. . . ." The expense of engraving was prohibitive for a text that was meant for students. Continuing the letter, Bell described his own competence at etching: "Land-seer, the engraver, I applied to for specimens of etching; but he said the manner, which was my own, had an excellent effect, and was free from affectation."²³ Authenticity and accuracy were Bell's ambitions; avoiding "affectation," which was difficult when crafting illustrations for technically complicated methods of reproduction, was an important part of achieving such truth in representations. Thus, Bell favored etchings, which were both cheap and easier to execute, for textbooks like his *Letters Concerning the Diseases of the Urethra* (1810) and his *Dissertation on Gun-Shot Wounds* (1814) that he hoped would sell widely.²⁴ In part, Bell's technical competence allowed him to make his teaching available to a broad audience and to build images into his pedagogy.

Engraving, which produced more refined illustrations, seems to have been reserved for Bell's grandest work. When writing about how to present his work on the nerves, his great passion, Bell remarked in August 1819 that he would unveil his system "by lectures in the first place; then by a little essay, explaining the outline of a new system, and finally, by magnificent engravings of the whole nervous system."²⁵ The work on the nerves, which Bell viewed as his most significant contribution, would *culminate* in set of engravings, the finest expression of his work. Like William Hunter's *The Anatomy of the Gravid Uterus* (1774), an elephant folio that included a set of very large plates that could be said to be a precursor to Bell's examples of medical artistry, many of Bell's books of engravings were meant to convince and impress colleagues and not just to teach students.²⁶

23. Bell, *Letters of Sir Charles Bell* (n. 19), 160 (June 10, 1809).

24. Charles Bell, *Letters Concerning the Diseases of the Urethra* (London: for John Murray, Bell and Bradfote, 1810); Charles Bell, *A Dissertation on Gun-Shot Wounds* (London: Longman, 1814).

25. Bell, *Letters of Sir Charles Bell* (n. 19), 265 (August 5, 1819).

26. William Hunter, *Anatomia Uteri Humani Gravidi Tabulis Illustrata* (Birmingham, UK: John Baskerville, 1774).

Both Bell's etchings and his engravings have a similar style and are clearly depictions of individual, rather than composite, corpses.²⁷ Bell wrote in one of his earliest texts, *The Anatomy of the Human Body*, co-authored with his brother John in 1801, "Of [any] twenty bodies not one will be found fit for drawing; but still I conceive that we are not to work out a drawing by piecing and adding from notes and preparations; we are to select carefully from a variety of bodies, that [one body] which gives largeness of parts, where the varieties of parts are well marked, and where there is the most natural distribution of vessels."²⁸ Bell's unwavering commitment to strict empiricism, expressed here, required that he copy from the individual in front of him, rather than creating some sort of anatomical illustration of the "ideal" or "normal."²⁹ When seeking a body to draw, he looked, as an anatomist would, for "normal" distribution of the parts, but also kept in mind the requirements of the artist, and looked for a body in which the anatomical parts he was drawing were "well-marked" and large. This empirical commitment was one that had been held by William Hunter and was probably shared by many of Bell's colleagues.³⁰ To those who would do otherwise or who objected to the peculiarity of individual bodies, Bell offered text as an antidote, saying, "[L]et us allow ourselves no license but copy accurately. By noting in the description any little deviation every necessary end is answered."³¹ Thus the text provided indications of what could be universalized, and the little individual details characteristic of his illustrations—depictions of facial

27. In this sense, Bell was contributing to a debate about fidelity to nature and artistry in the art world. Both Martin Kemp and Harry Mount have written about the debate rather extensively in Martin Kemp, "True to Their Natures: Sir Joshua Reynolds and Dr. William Hunter at the Royal Academy of Arts," *Notes Rec. Roy. Soc. London* 46 (1992): 77–88; Harry Mount, "Van Rymnsdyk and the Nature-Menders: An Early Victim of the Two Cultures Divide," *Brit. J. Eighteenth-Cent. Stud.* 29 (2006): 79–96. I will address Bell's place in the debate in greater detail in the section titled "Disciplining Hand and Eye" (p. 263). Bell, *Letters of Sir Charles Bell* (n. 19).

28. Charles Bell, *Engravings of the Arteries: Illustrating the Second Volume of the Anatomy of the Human Body*, ed. John Bell (London: Longman and Rees, 1801), 6.

29. Daston and Galison argue that anatomists of the seventeenth to nineteenth centuries crafted their anatomical illustrations from "ideal types." As notions of objectivity changed in the nineteenth century anatomists grew increasingly wary of these ideal types, seeing them as a way for subjectivity to enter their science. As a result, these men began to include depictions of a range of individual, particular bodies in their atlases. For more on this, see Daston and Galison, *Objectivity* (n. 2), 69–83; Lorraine Daston and Peter Galison, "The Image of Objectivity," *Representations* 40 (1992): 81–128.

30. According to Martin Kemp, "This warts-and-all style was particularly characteristic of British illustration." Martin Kemp and Marina Wallace, *Spectacular Bodies: The Art and Science of the Human Body from Leonardo to Now* (Berkeley: University of California Press, 2000), 50.

31. Bell, *Engravings of the Arteries* (n. 28), 15.

hair and expression or of ropes and nails holding the corpse in place—stood as markers of authenticity and signaled an important element of Bell’s philosophy of illustration.

Bell had already published two sets of engravings of the nerves when he wrote the letter to his brother, quoted above, about unveiling his work on the nervous system. He would later publish a final volume, “On the Nerves of the Face” (1829).³² Each of these works was built around detailed plates and limited textual explanations of those plates and the structures depicted therein. Both Bell’s engravings and his etchings in these works were elaborate and meant to be accurate and beautiful (exemplified in Figure 3). As will be discussed more in the section “Aesthetics and Intelligibility in Anatomy” (p. 269), they were supposed to impress and to make an argument for Bell; they assumed the most prominent place within the works.



Figure 3. “Nerves of the Neck,” plate ii from Charles Bell, *A Series of Engravings Explaining the Course of the Nerves* (1803). Reprinted with permission of the Wellcome Library, London. As is evident here, Bell included detailed information about the body being dissected, representing a cadaver faithfully. Such depictions of individual features were meant to enhance both the beauty and credibility of the drawings, as I discuss more in the section “Aesthetics and Intelligibility in Anatomy” (p. 269).

32. Charles Bell, “On the Nerves of the Face,” *Philos. Trans. Roy. Soc. London* 119 (1829): 317–29.

Bell's visual displays also assumed a central place in his classroom. He wrote to his brother about oil paintings of gunshot wounds for his museum (see Figure 7, p. 275)³³ and about making "gigantic drawings of the nervous system for [his] class."³⁴ In addition to drawings and paintings, Bell also used preserved specimens and models to teach students and to increase his fortunes, as anatomists like William Hunter had done before him. He amassed museum collections of normal specimens, pathological specimens, and curiosities in the space Hunter himself created at the Great Windmill Street School for a comprehensive museum of preserved specimens.³⁵ Bell evidently displayed his own collections at the Great Windmill Street School of Anatomy for both his students and the general public.³⁶ The extent to which Bell's museum was actually attended by a broader public is unclear, but it is clear that museums full of anatomical specimens were not uncommon and that by the early nineteenth century a segment of the British public had learned how to view such exhibits.³⁷

33. Bell, *Letters of Sir Charles Bell* (n. 19), 145 (April 22, 1809).

34. *Ibid.*, 265 (August 5, 1819).

35. According to Helen McCormack, under William Hunter "[t]he museum and library constituted the largest room of the house; at 51ft long and 27ft wide" and Bell maintained the grandeur of the museum, simply replacing its contents. Helen McCormack, "Housing the Collection: The Great Windmill Street Anatomy Theatre and Museum," in *My Highest Pleasures: William Hunter's Art Collection*, ed. Peter Black (Glasgow: University of Glasgow Press, 2007), 101–16, 110.

36. For a description of Bell's efforts in creating the Great Windmill Street School's Museum, see Bell, *Letters of Sir Charles Bell* (n. 19), 199 (May 3, 1812).

37. Samuel Alberti's work demonstrates that similar museums had different attendance policies: "William Hunter's collection, bequeathed to his alma mater, the University of Glasgow, was generally accessible only to medical students. . . . The Guy's Hospital Museum visitor book reads like a gazetteer and includes the Duke of Devonshire (twice), Lord Bowington, Mungo Park the African explorer, the Duke of Wellington, Lord Brougham, and on one notable occasion a Chinese 'minister' and his entourage. . . ." Samuel Alberti, "The Museum Affect: Visiting Collections of Anatomy and Natural History in Victorian Britain," in *Science in the Marketplace: Nineteenth-Century Sites and Experiences*, ed. Aileen Fyfe and Bernard Lightman (Chicago: University of Chicago Press, 2007), 371–403, quotation on 379. There is little mention of the public attending the museum in Bell's letters (though he certainly talks about student use of it), which suggests that his museum, while technically open to the public, probably served a specialized audience, much as Hunter's did. But while Bell's museum itself may not have attracted a wide viewing public, it is significant that museums of anatomical specimens were open to a public generally, for as Alberti also argues, museums "sought to replace the perceptual promiscuity of the cabinet of curiosities with a regulated gaze, presenting the museum as a site for remote, reasoned observation rather than gawking spectacle," 393. That regulated gaze of a public used to seeing specimens helped to make possible Bell's pedagogical practices, his use of abstracted drawings and specimens.

Classes were sometimes held amidst the specimens and sometimes specimens were brought in for the class.

Most specimens were jarred organs, removed from their bodily contexts and preserved in liquids or in dried form, requiring, as Simon Chaplin has argued, that students learn to “read” such preparations as “one element of a tripartite autoptic system that also involved observation of the dead cadaver and the live patient.”³⁸ Thus while Bell’s preserved specimens removed organs from systems, they, like many of Bell’s drawings, were presented within the context of disease histories. Bell’s catalogue entry for a preserved thoracic aorta with an aneurysm, for example, reads,

[T]he Patient lay long in the Middlesex Hospital being kept very low, and occasionally bled, his sufferings were by no means so acute, as we would imagine must necessarily result from such extensive disease. . . . Tumour has burst through to the back part, where it formed a very large Tumour during life, notwithstanding the distance of this posterior sac, from the Heart, the pulsation of the Tumour was at all Times very distinct: . . . he died exhausted from weakness.³⁹

This entry offers a description of the patient’s symptoms before death, of the situation of the diseased organ within the individual’s body upon dissection, and of how this case compared to others. The catalogue text offers *context* for the pathological specimen. Most museums would have had a similar sort of contextualizing catalogue, filled with the history of the specimen being displayed.⁴⁰

Although dissections were regarded as important for young practitioners, fewer bodies were available than instructors might have liked, and dissections were sometimes performed on exhumed, and therefore decaying, corpses. Preserved specimens and drawings, therefore, helped students to “see” disease. Although dissection was regarded as important for young practitioners (and was much more common than at any point

38. Simon Chaplin, “Nature Dissected, or Dissection Naturalized? The Case of John Hunter’s Museum,” *Museum Soc.* 6 (2008): 135–51, quotation on 140. Chaplin describes preserved specimens, or preservations, as distinct from collections held in cabinets of curiosity, defined by the work that went into their preparation as well as by their utility. Focusing on John Hunter’s anatomical collections, he argues that such “unnatural” objects, made by a great deal of craftsmanship, became “naturalized” as didactic tools in the eighteenth century, transforming messy bodies into abstracted and organized objects that were portable and stable in a way that fresh tissue was not.

39. Royal College of Surgeons, Edinburgh, Bell Collection BC.xii.2.M.57. GC 11006.

40. For one example, see the posthumously edited and published William Hunter, Alice Julia Marshall, and John H. Teacher, *Catalogue of the Anatomical Preparations of William Hunter in the Museum of the Anatomy Department* (Glasgow: University of Glasgow, 1970).



Figure 4. Wax and plaster cast of torso, Bell Collection, GC 1.43.04, The Royal College of Surgeons of Edinburgh. Reprinted with permission of the The Royal College of Surgeons of Edinburgh. According to Bell's catalogue, "From an adult male who survived the operation of herniotomy during several days but without alleviation of symptoms. On the morning of his death repeated copious evacuation *from* the bowels occurred. On post mortem examination though the intestines showed some peritonitis there was no great intestinal distension. Though successfully reduced by operation the strangulated loop of intestine was black and gangrenous."



Figure 5. Skeleton, Bell Collection, BC.1.3.M.24 GC 13690, The Royal College of Surgeons of Edinburgh. Reprinted with permission of The Royal College of Surgeons of Edinburgh. According to Bell's catalogue, this is "[a] very remarkable case of distortion by rickets. This woman died in childbirth."

previously) drawings and preserved specimens nonetheless afforded students time and proximity to the organ that dissections did not allow, and they encompassed a range of maladies that could not necessarily be found in a hospital at any given time.⁴¹ A footnote written by Bell's wife in Bell's posthumously collected letters says of Bell, "He had discovered a method of modelling morbid appearances in wax, retaining their colour in its original freshness, so as to perpetuate for the student much that was lost to them in the usual manner of preserving them."⁴² "Colour" and "freshness" were valued in Bell's models because they were things lost quickly in dissections, so the models, in this case, not only stood in for but even surpassed in utility dissections of pathological specimens. They became increasingly important as visual identification of pathological tissue became more significant in the practice of medicine and surgery.⁴³

For a variety of reasons then, museums were valued in early-nineteenth-century medical education, providing substitutes for corpses as the material of medicine and surgery.⁴⁴ Museum collections incorporated drawings, models, and specimens together. Bell described his museum at Windmill Street in an 1812 letter, saying, "It is a room admired for its proportions, of great size, with a handsome gallery running round; the class-room door opens from the gallery."⁴⁵ Bell's museum was literally connected to the classroom, signifying the close reliance on the museum in Bell's pedagogical practices.

Each of the forms of visual display described here—rough sketches and small drawings from journals; beautiful, intricate engravings from published treatises; large-scale oil paintings; and three-dimensional specimens and models—formed a part of Bell's pedagogical practice. Bell can be

41. Reinarz, "Age of Museum Medicine" (n. 16). See also Samuel Alberti's work on Victorian museums. Alberti, "Museum Affect" (n. 37), 393. The anatomy museum was a part of a system of visual displays, as Chaplin discusses in the passage quoted above, experienced alongside dissection and the observation of living patients.

42. Bell, *Letters of Sir Charles Bell* (n. 19), 73 (May 19, 1806).

43. A. W. Bates argues that museums were particularly important to anatomy teaching because "they allowed more prolonged and careful study than the dissecting room, and availability of specimens could be guaranteed." A. W. Bates, "'Indecent and Demoralising Representations': Public Anatomy Museums in Mid-Victorian England," *Med. Hist.* 52, no. 1 (2008): 1–22, quotation on 1. Jonathan Reinarz makes a similar argument in Reinarz, "Age of Museum Medicine" (n. 15), 423.

44. Susan Lawrence describes the value of museum-like collections of visual displays for a variety of medical practices. Susan Lawrence, "Educating the Senses: Students, Teachers and Medical Rhetoric in Eighteenth-Century London," in Bynum and Porter, *Medicine and the Five Senses* (n. 2), 154–78, 165.

45. Bell, *Letters of Sir Charles Bell* (n. 19), 200 (June 1, 1812).

understood as representative, typical, in his use of specimens, models, and illustrations in his classroom and in his production of grand, illustrated anatomical texts. While these displays were meant to serve as accurate representations of normal and pathological anatomy for the instruction of students, they did more than simply illustrate texts and lectures in a way that bodies might have done. Ludmilla Jordanova argues that “[t]here has been a tendency to see anatomically precise illustrations as serving a clear medical ‘need.’ . . . It is vital to be suspicious of such claims. Many illustrations have limited medical content, that is, they do not convey information otherwise unavailable . . . [and their] usefulness for medical practice could be limited or unclear.”⁴⁶ Both Jordanova and Kemp argue that medical illustrations were unnecessary to medical *practice*, but I argue that they were instead seen as essential to medical *pedagogy*. Visual displays, both drawings in texts and the variety of visual displays available in museums, were created as a part of training for medical, and particularly surgical, students, and those displays also served as aesthetic objects, incorporating a whole natural philosophical as well as pedagogical framework into their styles of composition.

Disciplining Hand and Eye

Bell sought to create an intersection between the fine arts and anatomical science in the classroom in part because he saw mechanical training, or disciplining of the body, as essential to both the visual arts and anatomy. He viewed the eye and the hand as similar organs and wrote in his Bridgewater Treatise *The Hand, Its Mechanism and Vital Endowments as Evincing Design* (1833), “[W]e have to show how much the sense of vision depends on the Hand, and how strict the analogy is between these two organs.”⁴⁷ The two organs, analogous in structure and function, required similar training, both attaining better functioning with age and practice: “[I]n truth, the motions of the eye are made perfect, like those of the hand, by slow degrees. In both organs there is a compound operation:—the

46. Deanna Petherbridge and Ludmilla Jordanova, *The Quick and the Dead: Artists and Anatomy* (Berkeley: University of California Press, 1997), 111. Martin Kemp makes a different argument, but one that, like Jordanova’s, has to do with the practice of medicine, in Kemp and Wallace, *Spectacular Bodies* (n. 30), 11: “Indeed, much of the detailed anatomy was of no use to the physician, or even the surgeon, because contemporary medical practice simply did not have the means to intervene with the levels of refinement that the representations delivered.”

47. Charles Bell, *The Hand, Its Mechanism and Vital Endowments as Evincing Design* (London: William Pickering, 1833), 329.

impression on the nerve of sense is accompanied with an effort of the will, to accommodate the muscular action to it."⁴⁸ Two decades earlier, Bell had devoted much of his *Essays on the Anatomy of Expression in Painting* (1806) to an assessment of the eye, just as his Bridgewater Treatise would be devoted to the workings of the hand. Both books were written for general audiences, and their basic assumptions—that the hand and eye are analogous and can be trained analogously—carry over to Bell's discussions about surgical training, training in art, and the relationship between anatomy and art.

In his textbook *Institutes of Surgery* (1838), Bell advocates the construction of visual displays to teach students the manual dexterity and hand–eye coordination they would need as surgeons.

It is essential that he [the student] should practise some mechanical exercise, that he may acquire an accordance between the eye and the hand. My brother put me to drawing, modeling, and etching, with this view; but perhaps the best exercise of all is the art of anatomical preparation,—a very different matter from that exercise of the scalpel with which students are generally satisfied.⁴⁹

The reason, Bell claimed, that anatomical preparation was superior to dissection for teaching anatomy was that “this art of anatomy . . . conveys the knowledge not only of structure but of pathology; for the hasty examinations of the physicians in the dead-house are comparatively of little value.”⁵⁰ As anatomical visual displays, the preserved specimens of the sort he housed in his museum were doubly rewarding to students because their preparation taught them the manual skills and discipline that they would need in both the dissecting room and the surgical theater, and because creating displays afforded students the time to study, and know by sight, various pathological tissues.

It is not surprising, given Bell's views on the relationships between the hand and the eye and between the fine arts and surgery, that he held a reciprocal view of the role of anatomy in training artists. In *Essays on the Anatomy of Expression in Painting*, Bell wrote, “The academies of Europe, instituted for the improvement of painting, stop short of the science of anatomy, which is so well suited to enlarge the mind, and to train the eye for observing the forms of nature”:⁵¹ as art trained the hands of surgeons, anatomy could train the eyes of artists. It was apparently a controversial

48. *Ibid.*, 336.

49. Charles Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*, 2 vols. (Edinburgh: Black, 1838), xx.

50. *Ibid.*, v–vi.

51. Bell, *Essays on the Anatomy of Expression in Painting* (n. 1), 7.

point—at the time, the Royal Academy of Arts taught anatomy by having students draw from other drawings and models rather than from cadavers.⁵² Objections were probably both practical (bodies were scarce and often required illegal procurement) and philosophical (some thought that artists who were to depict the living should learn to draw from the living or that artistic vision was better fostered by something other than detailed copying).⁵³ Bell's strong opinions regarding the training of artists in anatomy may have cost him a coveted appointment as the Royal Academy's professor of anatomy.⁵⁴

Bell confronted objections to the teaching of anatomy to painters explicitly. In *Essays on the Anatomy of Expression in Painting*, he wrote, "The study of anatomy has been objected to by some persons of pure taste, from the belief that it leads to the representation of the lineaments of death more than of life, or to monstrous exaggerations of the forms."⁵⁵ As a result of such views, the convention at the Royal Academy, much to Bell's chagrin and that of some of his subsequent students, was to teach anatomy through the study of casts of classical Roman sculpture and of models who posed for the classes. Bell's student Benjamin Robert Haydon established London's first private art school to promote Bell's approach,⁵⁶ emphasizing dissection for artists.⁵⁷ Haydon had learned from Bell the

52. In addition to objections to the unsavory interactions required to procure bodies for dissection, some within the Academy felt that British artists were displaying anatomy too prominently. According to Martin Kemp, "Knox, writing in 1852 in *Great Artists and Great Anatomists* . . . decried the worst excesses in which 'death-like dissected figures' were displayed 'on the canvas.' At its worst, over-exaggerated displays of musculature could become a tiresome mannerism." Kemp and Wallace, *Spectacular Bodies* (n. 30), 87.

53. Kemp, "True to Their Natures" (n. 27); Mount, "Van Rymnsdyk and the Nature-Menders" (n. 27).

54. Ludmilla Jordanova addresses this: "There is certainly evidence to suggest that the Academy in this period did 'police' the publicly expressed views of its members." Jordanova, "Representation of the Human Body" (n. 6), 88. Jordanova cites Sidney C. Hutchinson, *The History of the Royal Academy, 1769–1968* (London: Chapman and Hall, 1968). Bell lost elections for the professor of anatomy at the Royal Academy of Arts in 1808 and in 1825. William T. Whitley, *Art in England, 1821–1837* (Cambridge: Cambridge University Press, 1930).

55. Bell, *Essays on the Anatomy of Expression in Painting* (n. 1), 184.

56. Aris Sarafianos, "B. R. Haydon and Racial Science: The Politics of the Human Figure and the Art Profession in the Early Nineteenth Century," *Visual Cult. Britain* 7, no. 1 (2006): 79–106.

57. "Haydon's teaching was unique in its emphasis on dissection as an essential preparatory step in understanding antique sculpture. Most European academies of art in the late eighteenth century had a lecturer in anatomy just like the London Royal Academy, but the investigation and study of anatomy by art students was superficial and secondary." Frederick Cummings, "B.R. Haydon and His School," *J. Warburg and Courtauld Institutes* 26, no. 3/4 (1963): 367–80, quotation on 373.

importance of human anatomy and comparative anatomy and described his own students spending weeks “hanging over a putrid carcass.”⁵⁸ He adopted Bell’s pedagogical program by teaching detailed, practical anatomy to art students, in Bell’s classrooms themselves when possible or, when not possible, with the guidance of Bell’s textbooks on dissection.

While some have depicted Bell’s views on anatomy training as part of a straightforward desire for “realism,”⁵⁹ this obscures their real significance. Bell did require artists to draw from individual bodies, as mentioned earlier, and not from memory or from a sense of ideal or average types. But he also saw the visual discipline cultivated by anatomy as an important step toward developing a philosophy of art and of beauty. Bell addressed those who objected to dissection by artists when he wrote that, to the painter,

the study [of anatomy] is necessarily one of great importance; it does not teach him to use his pencil, but it teaches him to observe nature, to see forms in their minute varieties, which, but for the principles here elucidated, would pass unnoticed—to catch expressions so evanescent that they must escape him, did he not know their sources. It is this reducing of things to their principles which elevates his art into a connection with philosophy, and which gives it the character of a liberal art.⁶⁰

Anatomy, according to Bell, literally taught artists how to see, how to comprehend the “principles” of nature. By learning the principles of nature, its laws, artists would also learn to see the infinite varieties of form that demonstrated those principles; they would learn to see the details of a great system of nature. In this way Bell walked a line between the opposing positions advocated by William Hunter and by Joshua Reynolds at the Royal Academy.⁶¹ Reynolds wrote in his *Seven Discourses on Art* that

58. *Ibid.*, 370.

59. For example, J. Chikwe, “Art and Literature in the Anatomy of Charles Bell,” *J. Roy. Coll. Surg. Edinburgh* 39, no. 4 (1994): 201–7.

60. Bell, *Essays on the Anatomy of Expression in Painting* (n. 1), 184–85.

61. Mount describes the conflict as between a group who “held as its core tenet the belief that painters might best affirm the intellectual and social dignity of their art by depicting ideas of Nature as she should be, rather than simply copying what lay before them . . .” and those who advocated depicting nature in a highly detailed way that exactly replicated what they saw. Mount, “Van Rymdyk and the Nature-Menders” (n. 27), 84. Bell to some extent took from both sides in a debate that was most heated in the eighteenth century, arguing that artists should copy exactly in their training in order to understand the principles of nature, that anatomical illustrations should depict only actual bodies (even if one looked for the body with the most idealized structures in it), and that there was also a space for artists who understood the principles of nature to depict from the imagination so long as it was in accordance with nature’s principles.

the detailed copying of the sort often required by anatomists and natural philosophers was merely mechanical, and that if painters were simply to imitate their subjects in this way “[p]ainting must lose its rank, and be no longer considered a liberal art.”⁶² It is notable that Bell, who was surely aware of Reynolds’ *Discourse*, used the term “liberal art” as well, justifying the close and detailed study and replication of nature so that the painter could ultimately follow nature’s principles while at the same time showing artistry, doing more than just copying. It was this training of the mind for understanding the language of nature that rendered anatomy essential to those whose aim was not to do medical or anatomical drawings. Bell reinforced this point nicely elsewhere in his text: “Anatomy is not to be displayed [in paintings of living men], but its true use is to beget an accurate observation of nature in those slighter characteristics which escape a less learned eye.”⁶³ While the mind was being trained to understand the forms and organization of nature, the eye was learning to see.

Other branches of science were developing similar ideas about the role of sensory perception in pedagogy. Brian Dolan has written that in mineralogy, printed treatises were meant to be popular, commercially useful, and accurately illustrated in a way that would help to impose uniform classification. Anne Secord has demonstrated that images helped to recruit amateur botanists by offering aesthetic pleasure, which became the very reason why some experts wanted the role of the visual to be circumscribed, so that pleasure of the senses remained subservient to the use of the mind and of reason. According to both, the practice of drawing or the use of drawings to teach was meant to develop observational skills. Secord writes, “The aim was not to teach beginners how to look at pictures but, rather, how to use pictures to develop the observational skills necessary for looking at plants and other objects of nature.”⁶⁴ Bell’s ideas about using anatomy lessons with corpses to teach artists to see properly, and using anatomical drawings and objects to help surgeons learn, followed the same logic. Dolan writes similarly of the natural philosopher and artist James Sowerby that “the strong association Sowerby made between his artistic background and these philosophical societies was crucial for linking his skills in illustration with the concern for accurate observation emphasized in mineralogical training.”⁶⁵ Moreover, the

62. *The Idler*, October 20, 1759, as quoted in *ibid.*, 82.

63. Bell, *Essays on the Anatomy of Expression in Painting* (n. 1), 183.

64. Anne Secord, “Botany on a Plate: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge,” *Isis* 93 (2002): 28–57, quotation on 32.

65. Brian Dolan, “Pedagogy through Print: James Sowerby, John Mawe, and the Problem of Colour Illustration in Early Nineteenth-Century Natural History Illustration,” *Brit. J. Hist. Sci.* 31 (1998): 275–304, quotation on 283.

mineralogist for whom Sowerby did many of his illustrations, John Mawe, thought that minerals provided “an example of nature’s coherency and order,”⁶⁶ and that as a result individuals could be trained to see a classification scheme and apply it. The focus on objects and visual displays and the significance of observation for learning seem to resonate with the “object lessons” of Johann Heinrich Pestalozzi, a popular Swiss pedagogue who gave primacy to visual experiences, to objects themselves, over texts in teaching. Pestalozzi’s philosophy, which related mostly to primary education but had broad influence, was spread in Britain in part by Bell’s main benefactor, Lord Henry Brougham.⁶⁷ Practitioners of practical sciences like botany, mineralogy, anatomy, and medicine specifically focused on developing pedagogical programs for their respective disciplines, and all of these programs included the use of visual displays to train the eyes and mind to observe properly. Bell’s pedagogical program was meant for expert practitioners (or those training to be experts) rather than to attract amateur audiences, but the notion of visual displays being used to train sensory apparatuses and to create lasting thoughts in the mind seems to have been universal, regardless of the different intended beneficiaries.

Bell’s claims about the creation of specimens as surrogates for cadavers in the classroom, about the eye and hand as analogous organs requiring training and discipline to serve each other, and about teaching art to anatomists and anatomy to artists, all served an underlying philosophy of aesthetics and intelligibility. While Bell’s practices of visual display and his dependence on visual material as a teaching tool were largely common to his community and time, his philosophy was, to a great extent, particular to Bell. His contemporaries did not attempt to teach artists and to practice fine arts to the extent that Bell did and therefore did not write about the relationship between the two manual arts, so much dependent on one another in the classroom if not in professional practice. Bell’s ideas about disciplining the hand and eye and his aesthetic philosophy (addressed in the following section) bring together the many, seemingly disparate, concerns that stemmed from Bell’s participation in a number of

66. *Ibid.*, 280.

67. “By the 1820s, the greater stress—especially by educators of the working classes—on the importance of accurate observation and on bodily comportment, instead of on learning by rote, owed much to the perceived effectiveness of practices developed by the Swiss educationalists Johann Heinrich Pestalozzi and Philipp Emanuel von Fellenberg. Within Britain this method had gained leverage not only through Brougham’s promotion of the diffusion of knowledge, which aimed to enhance social harmony while maintaining the status quo by tailoring education to specific social classes, but also from the well-known educational efforts of the socialist manufacturer Robert Owen. . . .” Secord, “Botany on a Plate” (n. 64), 52.

the communities that helped to shape early-nineteenth-century medicine in London. In Bell's aesthetic philosophy we can see Bell's political commitments to conservative medical reform, with its reliance on pedagogy; to natural theology, whose fundamental tenets conditioned his belief in the intelligibility of nature; to the improvement of the fine arts through the study of anatomy and comparative anatomy; and to the Society for the Diffusion of Useful Knowledge and other popularizing efforts that sought to make natural knowledge widely accessible. It is to Bell's philosophy of aesthetics, in which all these varied pieces come together, that I now turn.

Aesthetics and Intelligibility in Anatomy

Bell spoke about images, both art and the human countenance, as being readable in the same way that written language was readable. It was anatomy, Bell believed, that provided that language.⁶⁸ Bell's strong belief in the ability of anatomy, and specifically facial expressions, to provide a grammar for visual language was fundamentally related to Bell's belief in natural theology. Bell himself made explicit the connection between natural theology—his belief in a world that a Creator designed to be intelligible—and anatomy's ability to teach the language of nature when he wrote, "Is not this variety of expression a proof of *design*, and that all our emotions are intended to have their appropriate outward characters?"⁶⁹

Bell's notion of a "readable" set of expressions is presented in *Essays on the Anatomy of Expression in Painting* as a part of a larger argument for a particular theory of beauty in art, one based on his natural theology. The face was selected by Bell as the most readable part of a nature that was meant to be puzzled out and understood, and it was also often thought the most beautiful subject of antique sculpture. But recognizing sublime beauty in classical sculptures of the face left Bell with a conundrum: how could something made by man, something that hardly replicated nature, be more beautiful than God's creation? Having recognized the unnaturalness of some of the most beautiful sculpted faces of antiquity, Bell asked, "How do we admit that to be beautiful which is not natural?"⁷⁰ The

68. Bell, *Essays on the Anatomy of Expression in Painting* (n. 1), 8. Physiognomy texts were common at time. Bell himself wrote about reading Lavater. Amédée Pichot, *The Life and Labours of Sir Charles Bell* (London: R. Bentley, 1860), 47. Bell's *Essays on the Anatomy of Expression in Painting* (n. 1) tapped into this existing literature and its audience.

69. Bell, *Essays on the Anatomy of Expression in Painting* (n. 1), 136.

70. Bell describes the unnatural beauty found in these classical sculptures: "In the statues of antiquity we see that the artists had a perfect knowledge of the human frame, and could

question took on particular importance in a world that was, for Bell, God's creation. The answer, of course, could be found in anatomy. Bell set up his own theory of beauty in contrast to that of various authorities who had programmatically tried to claim that a particular mathematical relationship of facial features defined the ideal human face.⁷¹ As he explained in *Essays*, "Now the difficulty of explaining why such deviations from real nature should inspire us with admiration, has forced inquirers into vague surmises and comparisons."⁷²

Instead of surmising that some mysterious relationship helped to define beauty, Bell argued that true beauty could be defined only using anatomical principles. A knowledge of comparative anatomy would allow artists to identify that which separated man from beast, that which was most human about the face, and then enhance elements that were particular to man to create beauty. Beauty, then, depended upon a comprehensive education in anatomy and a philosophy of nature, an ability to abstract its organizing principles:

[T]aking the philosophical view of the subject, a uniform plan is seen to pervade the animal kingdom. . . . If, according to this view, we examine the head, and follow the course of development of the brain, as the part which occupies the cranium, and then that of the organs of the senses, which together constitute the face, and include the apparatus of speech, we shall distinguish what is peculiar to man.⁷³

In this passage, Bell argues that through comparative anatomy, one can see common forms, but by tracing those forms up through the animal kingdom, one can also find elements in, for example, the head, that are unique to humans: the size of the brain, the apparatus of speech, and so on. In so doing, an artist could create a sort of supernatural beauty by magnifying those elements that were most human: the point was not to impose divine perfection onto the human form, but to separate human traits from those of beasts. Thus, "[w]e shall learn what forms of parts bear relation to those endowments by which [man] holds his acknowledged superiority; and . . . by magnifying, in works of art, what is peculiarly characteristic of man, we may ennoble his countenance, and, without being

represent it in all its natural beauty. But in many of these remains there is something beyond an exact copy of nature—something which, as we have seen, has been called *divine*." Ibid., 56.

71. Bell refers to John Hunter, Petrus Camper, Johann Friedrich Blumenbach, and Georges Cuvier, but addresses his comments mostly to Camper. Ibid., 25.

72. Ibid., 56.

73. Ibid., 57.

strictly natural, attain what is better.”⁷⁴ Artists could accentuate only these elements of human expressiveness, could create sublime beauty only by understanding both human anatomy and comparative anatomy.⁷⁵ In this way, the visual displays of anatomy texts, which were meant to be very particular, specific, and empirical, were different from the creative endeavors of the arts, which could generalize, abstract, and invent. Yet both were pervaded by a similar sense of beauty, a beauty defined by fidelity to the relationships and orders of nature and by simplicity and symmetry. Beauty was more than the ambition of artists to make pleasing pictures; it was also a part of Bell’s philosophy and of his fundamental belief in natural theology, a belief that would have resonated with an audience that read Paley’s *Natural Theology* and *The Bridgewater Treatises* and that was expected to find such arguments compelling.⁷⁶

Amédée Pichot, a French acquaintance of Bell’s who edited the periodical *Revue britannique*, wrote of Bell, “Charles Bell the artist is never separated from the anatomist, nor the anatomist from the artist; and we may say that when he discovered the great law of distinct endowments in the nervous system, he was guided by that worship of symmetry of form which makes part of the theory of the beautiful as applied equally to the works of nature and of art.”⁷⁷ Pichot’s characterization is apt. Symmetry, beauty, and artistry governed Bell’s work as an anatomist and natural philosopher in much the same way as they guided his work as an artist.

Simplicity was an important element of beauty, invoked in Bell’s descriptions of classical sculptures that he admired.⁷⁸ Pairing simplicity and beauty, Bell wrote fondly of his teacher, the painter David Allan, “David Allan was much thought of when a student in Rome, and from the

74. *Ibid.*, 56–57.

75. Bell describes this sublime beauty as “perfection” and says that it is reached through a study of anatomy in order to hone observation skills, coupled with individual genius. This perception combines truth and simplicity. “Hence it may well be said, that anatomy is the true basis of the arts of design and it will infallibly lead those to perfection who, favored with genius, can combine truth and simplicity with the higher graces and charms of art. It bestows on the painter a minuteness and readiness of observation which he can not otherwise attain.” *Ibid.*, 192.

76. Bell even edited and annotated one edition: William Paley, Henry Brougham, and Charles Bell, *Paley’s Natural Theology, with Illustrative Notes* (London: C. Knight, 1836).

77. Pichot, *Life and Labours of Sir Charles Bell* (n. 68), 101.

78. Bell compares the Elgin Marbles favorably to Michelangelo, praising the simplicity of their form. Bell, *Letters of Sir Charles Bell* (n. 19), 115 (November 19, 1807). His ideas about beauty permeate other art forms as well. Complimenting an opera singer, Bell describes “the dignity, the truth, and affecting simplicity of Grassini.” Bell, *Letters of Sir Charles Bell* (n. 19), 135 (December 1808).

beauty and simplicity of his ‘Origin of Painting’ (which was engraved), we may judge that he had taste and knowledge for a Painter of History.”⁷⁹ Bell used the word “simplicity” frequently, sometimes when describing his most elaborate work. He used it when describing images, as in the quote above, and he also thought that his theory of motor and sensory nerves contributed to anatomy in great part because it brought simplicity, or clarity, to that which had been vague and confused. What, then, did Bell mean by the term? Certainly his illustrations were “simple” when compared to the uncooperative messiness of a dissected body, representing with a clear focus the part of the body that Bell intended to depict, but Bell means something more than this. Simplicity involved elegance, which is why beauty and simplicity are so often paired in Bell’s writing. Bell used the term in a way that implied a sort of organizational efficiency—physiological systems should be simple because God would not have created a world with redundancies or unnecessary parts, so anatomy was simple in that it was only as complicated as it needed to be. Bell’s illustrations were simple in that they depicted, in a manner that would have been evident to those initiates familiar with human anatomy, the best, clearest examples Bell could find in nature of fundamental principles, elegant principles. While Bell took up the term “liberal art” in a way that seemed to answer and echo Joshua Reynolds, here he seems to echo fellow anatomist William Hunter, whose work has sometimes (though not exclusively) been depicted as “realist” compared to that of Reynolds. Hunter wrote of the study of anatomy by the artist, “It gives him a ready eye, correct judgment and distinct memory, and by dividing the larger portions of the body into their smaller constituent parts it brings out an arrangement and order in what would otherwise appear confusion.”⁸⁰ Thus simplicity was both a reflection of the details of the Creator’s Nature herself, and also evidence of understanding of the principles of Nature, without which details would lead to confusion.

Bell used “simple” to describe anatomical systems that could be understood through fundamental, intelligible principles, speaking of the complicated nervous system as “simple” because it functioned in a circulatory manner, with symmetrical anatomical parts delivering sensation to the brain and motive impulses to the extremities.⁸¹ Simplicity was an impor-

79. *Ibid.*, 14.

80. Martin Kemp, *Dr. William Hunter at the Royal Academy of Arts* (Glasgow: University of Glasgow Press, 1975), 43.

81. Bell is implicitly juxtaposing himself both to all of the anatomists who came before him and who layered sometimes-contradictory facts about the brain on top of one another and to François Magendie, who was accused by Bell of refusing to comprehend Bell’s system

tant marker of truth in Bell's idea of a designful world. In her recollections, Marion Bell wrote of her husband, "From his faith in 'Design,' he believed that in the works of Creation there is no confusion, and that all is arranged with simplicity if we could find it out."⁸² Bell himself included simplicity as chief among the virtues of his discovery of a system of motor and sensory nerves, writing to his brother in 1807, "I establish thus a kind of circulation, as it were. In this inquiry I describe many new connections. The whole opens up in a new and simple light; the nerves take a simple arrangement; the parts have appropriate nerves."⁸³ In other words, simplicity was associated with beauty and was an important signifier of correctness, both in philosophical theories describing the natural world and in images depicting it.

A reviewer of Bell's *Bridgewater Treatise* wrote in the *London Medical Gazette* (1833) about the talent Bell had for imparting "interest to the minds of his readers." This talent, he asserted, was derived from Bell's drawings and could "be traced to the diversified nature of the illustrations which the plan of his work has enabled him to present."⁸⁴ Bell's drawings helped to attract an audience and to make his subject interesting. But the beauty of Bell's drawings also helped him to teach. Analysts have wondered about the significance of aesthetic elements of Bell's anatomical illustrations (elaborate facial features and hair on a face with the skin of the neck peeled back beneath, a piece of cloth draped across a beautifully posed body that is flayed, the rope being gripped by an amputee with a pained face during surgery, etc.)⁸⁵ and some have claimed that they simply serve to allow readers to "virtually witness" Bell's work.⁸⁶ To Bell, however, beauty—derived from "simplicity," fidelity to nature, and the inclusion of the details that made a corpse human—also enhanced the pedagogical efficacy of his drawings; it was a part of Bell's pedagogical philosophy. Bell wrote, in his textbook, *Engravings of the Arteries: Illustrating the Second Volume of the Anatomy of the Human Body* (1801),

of nerves, preferring instead "accidental facts." See Berkowitz Caruso, "Medical Science as Pedagogy" (n. 14), chap. 1.

82. Bell, *Letters of Sir Charles Bell* (n. 19), 409.

83. *Ibid.*, 117–18 (December 5, 1807).

84. Anonymous, "Charles Bell's Bridgewater Treatise," *London Med. Gazette* 13 (1833): 253–58, quotation on 253.

85. See Figures 3, 6, and 7, and their captions.

86. The concept of "virtual witnessing," which has been applied to anatomical drawings by authors like Ludmilla Jordanova, can be found in chapter 2, "Seeing and Believing," in Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton, N.J.: Princeton University Press, 1985); Steven Shapin, "Pump and Circumstance: Robert Boyle's Literary Technology," *Soc. Stud. Sci.* 14, no. 4 (1984): 481–520.

By long attention to the subject I hope that I have been able to make these Plates simple, intelligible, and accurate. While the design of this book of Plates is to present to the student, at one glance, the general distribution of the vessels, and to fix them in his memory in a way which no description can accomplish, it will be found to give the most usual distribution of the branches; for I have been careful in the selection of my subjects.⁸⁷

This passage does a number of things. Bell informs us that his text was designed for students; that its plates were based on carefully selected subjects; and that Bell hoped that the plates were *simple, intelligible, and accurate* in order that they might “fix them in [the student’s] memory in a way which no description” could. They were meant to be simple and beautiful so that they would be memorable—so that they could be learned.



Figure 6. Plate IV, an engraving of the arteries of the head, from Bell’s *Engravings of the Arteries* (n. 28). Reprinted with permission of the Wellcome Library, London. Rather than being abstracted and presented separately as a part of a system, the arteries here are placed within the context of a face whose detail is incidental to the anatomical system being displayed. Yet the facial features and even the hair of the corpse are drawn with great detail and beauty that would be lacking were the skin entirely stripped back to reveal only the arteries themselves.

87. Bell, *Engravings of the Arteries* (n. 28), 15–16.



Figure 7. Charles Bell, watercolor of a wounded soldier, Waterloo, 1815 (inscribed “XIII, Waterloo . . .”; RAMC Muniment Collection 95/13, Wellcome Library, London. Reprinted with permission of the Wellcome Library, London. This 1815 watercolor of a wounded soldier, an amputee, at Waterloo is one of several paintings Bell made of wounded men after the battle (Bell had traveled there in order to treat the wounded). The paintings were used for Bell’s classes and in his museum. This painting is notable for the vividness and detail of the soldier’s face, the beautiful draping of his clothing, and the rope that the soldier grips with his remaining arm.

Both Martin Kemp and Susan Lawrence have mentioned passages in which William Hunter, a fellow Scottish anatomist, discussed images and memory. Kemp writes, “[William] Hunter’s lectures to the Royal Academy of Arts, no less than the preface to the *Gravid Uterus*, show that the highest pleasure to be evoked by a work of art arose when the effects were most truly equivalent to those of Nature herself. The more real the effects, the more the work ‘makes stronger impressions on the mind.’”⁸⁸ And Lawrence says, “[William] Hunter and [William] Hamilton both used the central image that being shown the ‘object’ made the ‘impression’ formed on the mind by direct observation somehow ‘deeper,’ hence longer

88. Kemp, “Mark of Truth” (n. 2), 117–18.

lasting.”⁸⁹ Both Kemp and Lawrence are talking about a basic philosophy of the mind and of learning. Bell would have been intimately familiar with Hunter’s works, as Hunter was the model of an anatomist and surgeon for Bell’s generation,⁹⁰ and Bell took over Hunter’s Great Windmill Street School. Bell seems to have incorporated and built upon Hunter’s philosophy. While Hunter’s drawings existed in elephant folios and presentation copies, Bell’s were made widely available to students through journals and inexpensive books—if images were a part of a pedagogical philosophy, they had to be available to students. If direct observation and a natural-seeming image helped a student to remember, then a beautiful image would make an even stronger impression, and impressions upon the mind, fixed memories, were construed as the essence of learning.

Conclusion

Visual displays were an important pedagogical tool for early-nineteenth-century anatomists, doctors, and surgeons. I have argued elsewhere that some reformers who hoped to improve medicine in London during the early nineteenth century focused on the classroom.⁹¹ They expanded the pool of students, requiring formal medical training to include general practitioners. As a result, anatomy teachers had to develop a pedagogical program that was practical while at the same time not reliant on a large and steady supply of bodies that would have been needed for training in dissection. Visual displays offered one solution. There was a variety of forms of visual display upon which teachers drew: etchings and engravings populated textbooks and journal articles, both of which were increasingly available to the average student. As the price of illustrated material and mass-produced texts decreased and the number of professional journals multiplied, illustrated texts served more regularly as the source of educational material for both the student physician or surgeon and the practicing doctor.⁹² Medical subjects were also taught using large paint-

89. Lawrence, “Educating the Senses” (n. 44), 170.

90. Bell wrote happily that he had been compared to the great master: “I must, however, give you the outline of a conversation with this same good man, Lynn . . . he says, . . . ‘I see you are calculated to be William Hunter amongst us.’” Bell, *Letters of Sir Charles Bell* (n. 19), 33 (January 8, 1805).

91. Berkowitz Caruso, “Medical Science as Pedagogy” (n. 14).

92. William Bynum and Janice Wilson, “Periodical Knowledge: Medical Journals and Their Editors in Nineteenth-Century Britain,” in *Medical Journals and Medical Knowledge: Historical Essays*, ed. William Bynum, Stephen Lock, and Roy Porter (London: Routledge, 1992), 29–48; Geoffrey Cantor, *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature*, Cambridge Studies in Nineteenth-Century Literature and Culture (Cambridge: Cambridge University Press, 2004).

ings and drawings in the classroom. In addition, collections of preserved specimens, sometimes gathered together for museums, provided a catalog of pathological tissues, offering a contextualized and comprehensive three-dimensional visual display of the body's organs and systems that often took the place of live dissections. More importantly for Bell, who was at the center of conservative reformers' efforts to develop medical education as a science based in the classroom rather than in experiment, vivisection, or the laboratory, the act of creating drawings and specimens helped surgeons and artists to train both their eyes and their hands for the craft to which they would apply themselves professionally.

But medical displays offered more than straightforward illustrations of medical subjects. Medical displays were beautiful. Such displays, for Bell, were aesthetic objects at the same time as they were didactic ones. And in their beauty, we find Bell's unique combination of communities—those of anatomist, artist, natural theologian, and pedagogical reformer—coming together. The aesthetic qualities of those displays depended upon notions of accuracy, simplicity, intelligibility, and beauty. They were meant to be beautiful so that they would be memorable and teachable. And, according to Bell's natural theology, that which had been created by God was intrinsically simple and therefore beautiful and comprehensible. Although artists created beauty by depicting that which was most human and most expressive in an amplified, fictionalized fashion, anatomists depicted beauty by including that which was human, was natural, in their illustrations: an individual's specific facial expression, hair, and nostrils, as well as the individual's particular arrangement of arteries.

Bell's aesthetic had a lasting influence on British art, even though the practice of anatomy was in decline in the Royal Academy. Bell's *Essays on the Anatomy of Expression in Painting* went through seven editions, and his students became prominent artists in Britain. Bell's most famous student, Benjamin Haydon, carried forward Bell's program, insisting on the importance of detailed human and comparative anatomy for artists and even using Bell's classroom and his textbook. Frederick Cummings, an art historian, writes of Haydon,

Haydon had dissected animals as a student under Sir Charles Bell, who had found the method of comparative anatomy useful in his researches on the nervous system. He [Bell] transmitted his scientific methodology to the artist. . . . Dissatisfied with the superficial anatomical education of his contemporaries, he [Haydon] had himself undertaken and insisted on transmitting to his students a scientific anatomical training through dissection.⁹³

93. Cummings, "B.R. Haydon and His School" (n. 57), 370.

Haydon and David Wilkie attended the anatomy lectures of Bell, and they carried forward his program of detailed anatomy for artists. In a similar way, Bell's art itself continued to be used by students of anatomy; and Bell's anatomy students, like Herbert Mayo, began to print small-sized, illustrated texts for students and to include illustrations in journal articles recounting their lectures.⁹⁴

Irvine Loudon says in a short article on Bell, "Charles Bell's works are memorable in a way that is rare indeed in anatomy. The best of them . . . show highly original powers of composition and are drawings of great beauty."⁹⁵ For Bell, that was exactly the point, and Loudon's argument can be extended when we realize that they had to be, that being memorable was not accidental. Anatomy and art were intimately related—they required the same bodily discipline of eye and hand, involved the same skill sets, but were most closely tied together in the classroom, where anatomy taught artists the language of nature and artistry made anatomy memorable, teachable.



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94. See, for example, Herbert Mayo, "Professor Mayo's Pathological Lectures, in Kings College, London," *London Med. Gazette* 15 (1835): 153–57, 155.

95. Loudon, "Sir Charles Bell" (n. 6), 1794.