Medical Science as Pedagogy in Early Nineteenth-century Britain: Charles Bell and the Politics of London Medical Reform

by Carin Berkowitz Caruso

MEDICAL SCIENCE AS PEDAGOGY IN EARLY NINETEENTH-CENTURY BRITAIN: CHARLES BELL AND THE POLITICS OF LONDON MEDICAL REFORM

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In the early nineteenth century, Charles Bell and François Magendie became embroiled in a priority dispute over the discovery of the roots of motor and sensory nerves. I use this priority dispute to open an examination of pedagogy and medical reform, looking at the importance of visual displays in both the classroom and in print, the development of different audiences with the expansion of medical and scientific journals, the significance of experiment and practice in medical education, and the role of national and professional politics that were involved in practically every issue in the medical community.

During the period in which the discovery was actively contested, 1823-1842, British medical audiences and communities were reconfigured by the simultaneous development of a new university and new hospital schools in London and by the birth of medical periodicals. Many medical periodicals declared their positions openly, representing particular political and professional factions. While other historians have documented the work of radical reformers, my dissertation focuses on another group of reformers, one that claimed to be preserving and enhancing what was "characteristically British." These "conservative reformers" sought to improve medical education in Britain by creating more practical training for surgeons, physicians, and general practitioners. They proposed offering joint training in medicine and surgery, connecting lectures on fundamental subjects like anatomy to

cases in London's hospitals, and emphasizing the importance of ward-walking and clinical lectures in the hospital. Although these conservative reformers gave pedagogy pride of place, print culture grew increasingly important for organizing medical communities. The many medical journals founded in the 1820s relied for the bulk of their published material on classroom lectures and notes taken by students, while at the same time rendering such classrooms irrelevant by publishing the material of lectures themselves (sometimes against the wishes of the lecturer). Thus, even with the birth of medical journals, the classroom remained the center of British medical innovation and of attempts to reform and systematize it. It is to the classroom that we should look for the birth of British medical science.

BIOGRAPHICAL SKETCH

Carin Berkowitz Caruso graduated with honors from Johns Hopkins University, where she majored in English and minored in the history of science, medicine, and technology, with a Bachelor of Arts degree in 2001. She received her Master of Arts from the Science and Technology Studies Department at Cornell in 2005 and her PhD there in 2010. Carin is currently the Associate Director of the Beckman Center at the Chemical Heritage Foundation.

For Theo

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and comfort through the last decade. He made this accomplishment possible and for that I am deeply grateful.

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1. Introduction

"Reform is the wish of many—revolution is the desire of the demagogue alone."
(Editor of the London Medical Gazette, 1831)[1]

During the early part of the nineteenth century, British medicine was transformed drastically. 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. 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 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.

Charles Bell, one of a cohort of surgeons raised and trained in Edinburgh, moved to London for its comparatively open medical marketplace, and developed a career in London that survived the many changes in medical education and practice that took place between 1800 and 1840. Bell's interests in pedagogy, in physiology as a discipline, and in professional advancement make him and his group of students and allies particularly interesting subjects in the study of the profound transition that took

[1] Editor, "Criminal Information against the Rioters—New Bye-Laws of the College of Surgeons," *London Medical Gazette* 8 (1831), p.279.

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. 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."[2] I adopt this sort of approach, using Bell to identify the complicated political, professional, personal, and intellectual character of British medical pedagogy.

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,[3] while Paul Cranefield and Richard French portray Bell as a staunch antivivisectionist,[4] and Pauline Mazumdar depicts him as a scientific progressive and one of the few anatomists interested in physiology.[5] Such confusion exists, perhaps, because Bell has

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[2] 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, CT: Yale University Press, 1995), 79-80.

[3] Adrian J. Desmond, *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London* (Chicago: University of Chicago Press, 1989), 190.

[4] 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: Futura Publishing Company, 1974); Richard D. French, *Antivivisection and Medical Science in Victorian Society* (Princeton: Princeton University Press, 1975), 19.

[5] Pauline Mazumdar, "Anatomy, Physiology and Surgery: Physiology Teaching in Early Nineteenth-Century London," *Canadian Bulletin of Medical History* 4, no. 2 (1987), p.119-43.

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. Instead, this dissertation depicts a medical community whose practitioners juggled varied allegiances to schools and teachers, professional institutions, and to the regions within which they were born. While nationalism played a role, political parties were often less important than professional politics.

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 Bell does not seem to have been particularly close to him. Bell was, however, very devoted to another of his three brothers, George, a well-connected Whig lawyer in Edinburgh.[6] Charles Bell maintained correspondence with George and sought his advice throughout his life, and that correspondence constitutes a valuable resource for this dissertation.

Bell's education took place in Edinburgh and comprehended all 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 his brother John run a private school on Surgeon's Square. He also co-authored several medical textbooks with his brother. Bell wrote a great deal on subjects of interest to students, didactic texts on particular parts of the body, including titles like, *Letters Concerning the Diseases of the Urethra* (1810),[7] *A Dissertation on Gun-Shot Wounds* (1814),[8]

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[6] Gordon Gordon-Taylor and E. W. Walls, *Sir Charles Bell, His Life and Times* (Edinburgh: E. & S. Livingstone, 1958).
[7] Charles Bell, *Letters Concerning the Diseases of the Urethra* (London: Longman, 1810).
[8] Charles Bell, *A Dissertation on Gun-Shot Wounds* (London: Longman, 1814).

"Observations on Fractures of the Patella" (1827),[9] "Observations on Haemorrhage by Charles Bell, Taken from his Clinical Lectures" (1828),[10] and *Institutes of Surgery* (1838).[11] In 1804 Bell moved from Edinburgh to London, a part of the exodus of Scots to London during the period following the Scottish Enlightenment, and in 1812 took over the Great Windmill Street School, one of London's many private anatomy schools, from other Scots and passed it on to Scots as well.[12] Bell's teaching career in London included the many sorts of institutional affiliations that were available to London 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. He lectured at the 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. And he was among the physicians and surgeons at the Middlesex Hospital who helped to establish the Middlesex Hospital School in 1835. In 1836 Bell returned to his former home, becoming a faculty member at the University of Edinburgh. Bell is both an ordinary representative of British medical education—a man who followed the trends in an attempt to earn a living and further his career and who served a representative variety of institutions—and an extraordinary one: he became known for a discovery and

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[9] Charles Bell, "Observations on Fractures of the Patella," *London Medical Gazette* 1, no. 2 (1827), p.28-31.

[10] Charles Bell, "Observations on Haemorrhage by Charles Bell, Taken from His Clinical Lectures," *London Medical Gazette* 1, no. 13 (1828), p.361-5.

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

[12] 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," *Medical History* 4 (1960), p.1-17.

therefore earned enough prominence that he could try to shape the institutions to which he belonged thereafter, and he left letters that were preserved. As the central character in this story, he brings together the elements most significant to London's medical and pedagogical reform movements.

There are a few terms that need to be defined before proceeding. First, the words *medicine* and *medical men* are used loosely in this dissertation except where otherwise indicated. While doctors, surgeons, and apothecaries to some extent operated under different constraints and with different levels of remuneration and social standing, most practitioners of all three trades were general practitioners, practicing both surgery and medicine. The terms *physiology/physiologist* and *science/scientist* are used imprecisely as well. Physiology in Britain at this time was a loosely-defined life science that was closely related to anatomy and that attempted to understand the normal functions of a living body. Bell hated the term physiology, but I use it to describe the work that was being done by him and others to understand the nervous system. Some of the actors in that dispute had more precise definitions of physiology or were trying to make a discipline out of it. "Science" is a word sometimes used too casually for early periods in the history of science. The definition of science as a broad term for systematic attempts made through particular kinds of methods and sensory experience to understand nature emerges at the end of the period at which I am looking. Many historians of science associate the emergence of the term "scientist" with the founding of the British Association for the Advancement of Science in 1831. But the period between 1800 and 1831, which predates the establishment of science as an institution, is a hard one to place—natural philosophy does not seem any more accurate than science as a description of attempts to understand nature during the period. I talk about the *life sciences* and *medical*

sciences to mean explorations of the nature of living creatures during this period. Such terms are not meant to suggest anything about methods, disciplines, or power.

I use the word *science* differently and with more precision when I talk about Bell and his contemporaries trying to make a *science* of medicine, and in that case I mean that they were attempting to make the study of medicine methodical, a knowledge-based discipline rather than an art. The making of that discipline, that *system* or *science* of medicine, involved sometimes uncomfortable union of the Galenic, theory-based, Latin medical training of the universities, and the artisanal training of apprenticeships. It was hesitantly becoming "an amalgam of natural philosophy and instrumentality…" as Peter Dear argues is characteristic of modern science.[13] Medical science of the sort taught and promoted by Charles Bell was a product of natural philosophy (for example, when Bell describes his anatomical systems as correct because they were elegant and beautiful, he was certainly practicing natural philosophy) combined with practical experience, a sort of technical or instrumental practice. Bell insisted that there be theory in a science of medicine, that one know the principles of anatomy, for example, before practicing surgery. Bell wrote to his brother in 1805, in one instance, about work he was developing on the anatomy of expressions, saying: "the book wanted theory, and it will now have it; it was insulated remarks. We shall be able to combine it into a system, and then it will admit being talked of."[14] A set of separate facts or remarks, to Bell, was less valuable or noteworthy than facts brought together into a system. Science was part natural philosophy, and natural philosophy was about *systems*. This passage is just one example of the sort of *system* at work in Bell's natural philosophy and helps us to

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[13] Peter Dear, *The Intelligibility of Nature: How Science Makes Sense of the World* (Chicago: University of Chicago Press, 2006).
[14] Charles Bell, *Letters of Sir Charles Bell, K. H., F. R. S. L. & E. Selected from His Correspondence with His Brother George Joseph Bell* (London: J. Murray, 1870), 53 (5 July, 1805).

understand better why a *system* of education (in this case, *system* meaning a particular course of training), also frequently discussed by Bell, became a necessity. Both kinds of systems became themes in discussions of early nineteenth-century reforms in medical education, which was meant to be both organized and methodical, a disciplined study, and natural philosophical (and anti-French) in ways that the word "system" implied.

The complement to the invocation of systems of natural philosophical reasoning in British medical reformers' construction of medicine as a science was the use of the terms *practice* and *practical.* A group that I call "conservative reformers," a term that I will define below, often referred to British medicine as practical in a way that French and radical medicine was not. "Practical" was a flexible term. It could be used to distinguish the medicine of "conservative reformers" from that of the Oxbridge conservatives, whose theoretical science did not involve any hands-on training. Medical science could also be practical in the sense that it was related directly to therapeutic effectiveness. The *London Medical Gazette* became known as *The London Medical Gazette: or the Journal of Practical Medicine* and *The Medico-Chirurgical Review* was also subtitled the *Journal of Practical Medicine.* Both of those titles reflect journals whose focus was on medical sciences related to clinical practice and not on what we would today term "basic sciences." Conservative reformers would have considered the materialist, experimental life sciences of radical reformers unrelated to the practice of medicine, and therefore not practical. Though ideas of medical science as a set of elegant theories about the functioning of the body, and as a practical, therapeutically focused science lived in uneasy tension, they were merged most easily in the classroom and in systems of training, where they coexisted as a means for getting medical students to observe the world around them properly

(through natural philosophy or comprehending the system of nature) and as a forum for the actual observation itself (practice).

Finally, *conservative*, unlike the other terms described above, has a very precise meaning within this dissertation. I coin the term *conservative reformers* to serve as a parallel and counterpart to the radical reformers who imported materialism into their medical sciences and who populate Adrian Desmond's *The Politics of Evolution*.[15] Conservative reformers, in this case, are traditional reformers. They could as easily be called moderates. I do not intend the term to have political connotations, as most of the actors whom I call conservative reformers were liberal Whigs.

Charles Bell, whose priority dispute with François Magendie[16] provided an occasion for rallying conservative reformers, was an exemplary and visible member of this group. "Conservative reformers" are distinguished them from both the old guard (who were a rare breed, mostly found in the elite universities of Oxford and Cambridge) and the radicals. Bell promoted reform while at the same time advancing a model of medical science that avoided vivisection and was based in traditional British surgical education in anatomy. Adrian Desmond has managed to define Bell's politics for other historians, calling him a conservative member of the establishment with an "old-school mentality," and a gentleman Whig, not least because he lectured at the bastion of conservatism, the Royal College of Surgeons, and was later knighted.[17] But Bell is far more difficult to pigeonhole than that, as were many of his colleagues. He and his cohort of reformers intended to improve British medicine by *conserving,* even amplifying, what they saw as truly British about medical education in London, while at the same time updating it and making it more efficient. Theirs was a genuine

[15] Desmond, *The Politics of Evolution*.
[16] See Chapter 2 of this dissertation.
[17] Desmond, *The Politics of Evolution*, 94.

reform movement (in the age of reform, in London, there were few who did not propose some sort of reform) though not as unified as that of the radical reformers, but the conservative reformers proposed amendments to British medicine that would *conserve* what they considered to be traditionally British values and styles of practice in British medicine. The conservative reformers' definition of what constituted traditionally British medical science was of their own devising, and, along with the anti-French rhetoric surrounding it, helped to reify the notion of national differences—of nations themselves—, and of British exceptionalism.[18] Such rhetoric constitutes the sort of practice that Eric Hobsbawm describes when he says "it is clear that plenty of political institutions, ideological movements and groups—not least in nationalism—were so unprecedented that even historic continuity had to be invented…."[19] While Hobsbawm is more interested in symbols and acts, the invention of medical tradition, a supposed tradition of ideas, seems to fit his argument that nations are socially engineered through the creation of traditions that are meant to establish social cohesion. Conservative reform, and the invention of a unifying tradition, were products of socially and politically fraught times, and served as protection against the threat of political revolution, both in medicine and in politics. Thus medical politics served not as a microcosm of State politics but as one of its constituent parts. Looking at early nineteenth-century British medicine, surgery, anatomy, and physiology demonstrates the significance of pedagogy to understanding the histories of science

[18] The creation of British nationalism has been the subject of several recent histories. See, for example, Linda Colley, *Britons: Forging the Nation, 1707-1837* (New Haven: Yale University Press, 1992); Colin Kidd, *British Identities before Nationalism: Ethnicity and Nationhood in the Atlantic World, 1600-1800* (Cambridge [England]; New York: Cambridge University Press, 1999); Eric J. Evans, *The Forging of the Modern State: Early Industrial Britain, 1783-1870*, Foundations of Modern Britain (London; New York: Longman, 1983).

[19] E. J. Hobsbawm and T. O. Ranger, *The Invention of Tradition* (Cambridge; New York: Cambridge University Press, 1983), 7.

and medicine, but it also helps to demonstrate the significance of local, medical politics to national politics.

This discussion of medical pedagogy has been broken down into five chapters. Chapter two, "Defining a Discovery: Changes in British Medical Culture and the Priority Dispute over the Discovery of the Roots of Motor and Sensory Nerves," details Bell's priority dispute over the discovery of separate roots of motor and sensory nerves, which lasted from 1811 until his death in 1842. I have divided the chapter into sections on Bell's initial description of his work on the nerves in his 1811 pamphlet "Idea of a New Anatomy of the Brain"; on Bell's responses to Magendie's attempts to lay claim to "his" discovery; and on Bell's responses and those of his students to Herbert Mayo's attempts to claim the discovery. By looking at the history of the priority dispute, it is possible to evaluate changes occurring in British medicine and medical education and provide background on the professional groups and educational institutions in British medicine. The ways in which Bell defined his own discovery changed over time, reflecting trends in British medical science; and the comparison between Bell's responses to Magendie and his responses to Mayo offers a nice opportunity to talk about waning British nationalism in science. One can see, in Bell's changing approach to the dispute, that one cohort of British surgeons tried, at the beginning of the nineteenth century, to create a particularly British physiology in opposition to what they saw as French physiology, but that the popularity of such an approach declined when the Napoleonic Wars ended and British medical men started crossing the channel again to pursue their educations in cadaver-rich Paris.

The third chapter explores the ways in which the contents of a classroom were delivered to a wider, anonymous reading public in the early nineteenth century through published periodicals. Periodicals changed the ways in which teachers perceived their audiences, and in fact brought together communities and audiences

that were entirely new. "Printing, Publishing, and Remaking Audiences" begins with the priority dispute between Bell and Magendie, the dispute in which Magendie accused Bell of failing to publicize his discovery sufficiently by notpublishing it in a journal. It is an argument that could be made in the 1820s, but that would have been harder to make just a decade earlier when Bell was first working on the nerves. Medical periodicals created a new, professional audience for medical science. They also helped to unify groups of practitioners with similar concerns (radical reformers, conservative reformers, anti-vivisectionists) across different locales and professional sects. Each of the widely circulated medical journals in the early nineteenth century had a clear editorial voice. These journals began to supplant schools as the organizing force behind British medical politics. Medical men also composed a significant part of the movement to educate a broader British public through vehicles like the Society for the Diffusion of Useful Knowledge, the Bridgewater Treatises, and other popular texts.

Chapter four, "Rhetoric, Reform, and Revolution: Making 'British Medicine' in Early Nineteenth-Century London," addresses in detail the impact of anti-French rhetoric in the conservative reform movement in Britain, a rhetoric that is visible in Bell's priority dispute with Magendie and that was widely available and used by Bell's contemporaries during the Age of Reform (1780-1850). During the first three decades of the nineteenth century, many proposals were circulated regarding reform in medical education. These proposals became numerous and their proponents very vocal by the 1820s, in great part due to the dialogue and audience generated by medical periodicals. While historians have often recognized the radicals of the reform movement, the movement itself was broad, and a group that I call conservative reformers was large and effective in its attempts to implement modest, gradual change. Conservative reformers focused on improving medical education in London by emphasizing

therapeutics and practice, by continuing what they represented as British traditions of philosophical anatomy and deductive physiology, and by promoting competition among decentralized educational institutions. They based their medicine in the classroom, and they used rhetorical distinctions between revolution and reform to advocate for reform in a conservative, restrained, British fashion.

While the fourth chapter deals with the rhetoric of reform, the fifth chapter, "Systematizing Medicine through Institutional Change, 1825-40: London University and London's Comprehensive Hospital Schools," talks about actual institutional changes that were enacted by conservative reformers. In 1827, London University was founded in an attempt to educate London's middle-class professionals and tradesmen. It was London's first university medical school. It was meant to emphasize therapeutics and practical courses like anatomy. Over time, instead, it became a home to radical reformers who taught French-style morphology, vivisection, and materialism. To counter London University, London's hospitals began to implement their own comprehensive medical curricula centered on clinical practice, anatomy, and therapeutics.

Finally, by looking at "The Aesthetics of Anatomy: Visual Displays and Surgical Education in Early Nineteenth-Century London" the dissertation enters the classroom, looking at pedagogical practices themselves by examining the roles of visual displays. Charles Bell, artist, anatomist, and teacher, saw anatomy and art as closely related subjects. Bodies for dissection were scarce, so drawings, models, and preserved specimens provided important teaching tools. The pieces produced by Bell and some of his contemporaries, however, contain more than straightforward representations to be used in a classroom: they are designed to be aesthetically pleasing objects unto themselves. This chapter explores the connections between 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. Surgery, sculpting, and drawing were arts, all of which required that the practitioner develop related physical skills. In addition, Bell seems to have believed that because the world was created by God, it was necessarily beautiful, simple, and 'readable.' He therefore valued simplicity in his natural philosophical systems of anatomy, thinking that that which is true is simple; and he imparted beauty to his drawings, thinking them better teaching tools and more accurate reflections of the human body because they were aesthetically pleasing.

Taken together these chapters provide an exploration of nineteenth-century medical pedagogy, one that has several different implications for the histories of science and medicine. First, this dissertation suggests some of the pitfalls of anachronism in the history of science. Bell's priority dispute and the history of pre-Darwinian life sciences and medicine in Britain have often been written about, or, more commonly, been written off, as insignificant, by those using current categories and assumptions. Such historians have written in a way that obscures interesting developments taking place in Britain at the time and in a way that creates false continuities between modern day medical science and that of other historical times and places (for example, continental life sciences and medicine in the early nineteenth century). The dissertation also demonstrates the importance of multi-faceted, sometimes contradictory, local and professional politics in determining the actions and allegiances of medical and scientific men of the period. Bell and his contemporaries aligned themselves with patrons who could support publishing endeavors, hospitals or private anatomy schools that could offer employment, wealthy patients, and other men who came from the same region of Britain, as well as those who shared their politics,

medical or otherwise. By attending only to big historical trends, to national politics, we obscure the local, situated politics that motivated many of the historical actors involved in this story. It becomes clear, when looking closely, that both radical and conservative reformers often acted for reasons that had little to do with large-scale politics. While this dissertation insists on the importance of local politics, it also demonstrates that medicine was one arena in which the nation was being made. Nationalism and the invention of "Britishness" or a British national style was very much a part of medical reform debates. And while it coexisted with political rhetoric of a similar nature, medical men were not merely copying an extant model. In the age of reform, conservative reformers invented what they considered to be a British medical tradition that helped define who the British were as a people—pragmatic, humane, and free. Perhaps most importantly, this dissertation argues that the classroom is a significant site of scientific and medical development and innovation, that it was at the center of all else in British medicine at the beginning of the nineteenth century. Combining systems of natural philosophy with practical experience, the classroom can be seen as the site at which medicine and science were first and most profitably united.

2. Defining a Discovery: Changes in British Medical Culture and the Priority Dispute over the Discovery of the Roots of Motor and Sensory Nerves

In 1811, Charles Bell, as a surgeon-anatomist trying to make his living in the crowded London medical marketplace, had a little book on the nerves and brain printed for distribution to his friends and other natural philosophers and medical men.[1] The book contained what Bell considered to be a great discovery on the workings of the nerves and brain:

> [C]onsidering that the spinal nerves have a double root, and being of opinion that the properties of the nerves are derived from their connexions with the parts of the brain, I thought that I had an opportunity of putting my opinion to the test of experiments, and of proving, at the same time, that nerves of different endowments were in the same chord [sic], and held together by the same sheath.[2]

The experiments that Bell mentions so casually were both technically difficult and hard for Bell to stomach, according to his own accounts in personal correspondence. In the text, however, they are presented as unremarkable. Bell did not apologize for them or emphasize the difficulty of the surgery required to conduct them. Bell's emphasis was clearly on the logic of the different system of the nerves he had constructed and not on its experimental proof.[3] It is also evident from the list of its recipients—scientists, doctors, and wealthy or powerful men who might provide

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[1] Charles Bell, *Idea of a New Anatomy of the Brain: A Facsimile of the Privately Printed Edition of 1811, with a Bio-Bibliographical Introduction* (London: Dawsons of Pall Mall, 1966).
[2] Ibid., 21.
[3] In a letter to his brother written in 1807, Bell says "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; and the whole accords with the phenomena of the pathology, and is supported by interesting views once in wisdom; not pieced together like the work of human ingenuity." Bell, *Letters of Sir Charles Bell*, 117-18 (5 December, 1807). He later writes that Magendie experiments "in hope to catch at some of the accidental facts of a system which, it is evident, the experimenters did not fully comprehend." Charles Bell, *An Exposition of the Natural System of the Nerves of the Human Body* (London: Spottiswode, 1825), 3-4.

patronage—that Bell intended this pamphlet for a small professional or else highly educated audience.[4] Since there were no medical journals being published in London at the time, Bell publicized his work by distributing this printed text to as many important people as he could afford (he was not a wealthy man), and lecturing about it in his anatomy classes. He sent the paper to one hundred recipients, while his classes reached a wider, although local, group.

By 1823, when the Frenchman François Magendie claimed a very similar discovery for himself, the medical world had changed a great deal. Journals were beginning to proliferate, and Magendie, who contested Bell's claims to discovery on the very basis of their inadequate publication, presented his own work in a journal he had himself founded.[5] Vivisection, which became a part of the debate between Bell and Magendie, had become a familiar and much reviled practice in Britain and was the subject of legislation there in 1825.[6] When speaking before the House of Commons that year to promote his anticruelty legislation, MP Richard Martin adduced the callousness of vivisectionists, using Magendie as his prime example:

> There was a Frenchman by the name of Magendie, whom he considered a disgrace to Society. In the course of the last year this man, at one of his anatomical theatres, exhibited a series of experiments so atrocious as almost to shock belief. This M. Magendie got a lady's greyhound. First of all he nailed its front, and then its hind, paws with the bluntest spikes that he could find, giving as reason that the poor beast, in its agony, might tear away from the spikes if they were at all sharp or cutting. He then doubled up its long ears,

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[4] The recipients of his text included Thomas Young, William Wollaston, Sir Humphry Davy, Sir Astley Cooper, Matthew Baillie, Herbert Mayo, Joseph Banks, and Peter Mark Roget. All were well known and capable natural philosophers or medical men with wide social circles. For a complete list of those to whom we know that the text was circulated, see the edition reprinted in the *Journal of Anatomy and Physiology*, with an introduction by Alexander Shaw: Charles Bell, "Idea of a New Anatomy of the Brain, with Letters &C.," *Journal of Anatomy and Physiology* 3, no. 1 (1868), p.147-82.

[5] François Magendie, "Expériences sur les fonctions des racines des nerfs rachidiens," *Journal de Physiologie Expérimentale et Pathologie* 2 (1822), p.276-9; François Magendie, "Expériences sur les fonctions des racines des nerfs qui naissent de la moëlle epinière," *Journal de Physiologie Expérimentale et de Pathologie* 2 (1822), p.366-71.

[6] T.C. Hansard, "Hansard's Parliamentary Reports," (London: 1825), 657.

> and nailed them down with similar spikes. (Cries of `Shame!') He then made a gash down the middle of the face, and proceeded to dissect all the nerves on one side of it.... After he had finished these operations, this surgical butcher then turned to the spectators, and said: `I have now finished my operations on one side of this dog's head, and I shall reserve the other side till to-morrow. If the servant takes care of him for the night, I am of the opinion that I shall be able to continue my operations upon him to-morrow with as much satisfaction to us all as I have done to-day; but if not, ALTHOUGH HE MAY HAVE LOST THE VIVACITY HE HAS SHOWN TO-DAY, I shall have the opportunity of cutting him up alive, and showing you the motion of the heart.[7]

The story is probably fictitious,[8] but it clearly served its inflammatory purpose. After telling it, Martin made a point of emphasizing that John Abernethy and Everard Home, two well-known *British* Surgeon-Anatomists, had along with other medical men written statements condemning such cruelty. Vivisection became an element of the Bell-Magendie priority dispute that resonated with the professional and nationalistic politics of the British medical community of the period.[9]

Vivisection became a significant element of what turned into, in part, a nationalistic priority dispute, but it was never a straightforward part, and it exemplifies the strategic positioning, defining, and redefining that occurred over the life of the dispute. When convenient, Bell was an antivivisectionist, and those who agreed with that cause backed him as an example of how unnecessary vivisection was to medicine. But Bell's assistant, Andrew Shaw, who, in 1839, was writing when vivisection was considered scientifically legitimate even if popularly objectionable, described the process whereby Bell confirmed his theory through an experiment on a living animal, saying that he "cut extensively through the skin; then he must carry his knife through several successive layers of thick and tendinous muscles: after that, he has to apply his saw to a chain of irregularly formed bones; and having divided these bones, he must

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[7] Ibid.
[8] J. M. D. Olmsted, *François Magendie, Pioneer in Experimental Physiology and Scientific Medicine in Nineteenth Century France* (New York: Schuman's, 1944), 141.
[9] French, *Antivivisection and Medical Science*, 18-21.

introduce his levers and bone scissors into the interior of the vertebral canal, to tear and break up the fragments, and disclose parts contained within."[10] Shaw's argument for Bell relied on the idea that Bell practiced vivisection and found it inadequate to decide this particular scientific question. Both Bell and Shaw and, of course, their rivals, relied on arguments that suited them, reflecting and participating in both national and professional politics.

The story of the discovery reveals much about the way in which the British medical community of the early nineteenth century was structured and the way in which it was changing. Credit for *a* discovery regarding the roots of the nerves was claimed by many and those would-be discoverers presented overlapping, but not identical, definitions of their discovery and an agreement over what was actually discovered (though not who discovered it) emerged out of conflict, negotiation, and revision. The process whereby the definitions of, and credit for, the discovery were crafted is the subject of this chapter. Because the discovery was contested, first by the Frenchman François Magendie and later by Bell's own student and countryman Herbert Mayo, it offers an opportunity to evaluate the ways in which British medical practitioners and physiologists defined themselves over time in relation to the French and in relation to each other. Allegiances to fellow countrymen and to particular medical factions helped to create a complicated set of shifting priorities that developed through, and were revealed by, responses to Bell's work within the fragmented British medical community.

Though Bell received much acclaim from his contemporaries for his work on the nerves and eventually was knighted for his discovery,[11] his work was also criticized by many and changed shape often. It was continuously being defined and

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[10] Alexander Shaw, *Narrative of the Discoveries of Sir Charles Bell in the Nervous System* (London: Longman, 1839), 45.
[11] Bell, *Letters of Sir Charles Bell*, 323 (12 October 12 1831).

redefined by Bell, his student-advocates, his defenders, and his detractors. Historians have most often accepted the definition of the discovery that has allowed them to pronounce one physiologist victor over all the others, ignoring the competing definitions.[12] But the complicated disputes surrounding the substance of the discovery of the roots of motor and sensory spinal nerves, never really acknowledged by the historical actors themselves, give one an opportunity to glimpse the ways in which professional communities were structured and the ways in which their members used various forms of print and other tools of communication to build alliances and assert supremacy.[13] Examining this controversy and taking Bell and his anatomical physiology seriously complicates a story that has been oversimplified or ignored by other historians—it makes the history of the life sciences a more interesting one, as it had many possible outcomes.

I. The Origins of the Controversy

Charles Bell began his career in Edinburgh, the city in which he was born. He studied surgery and received his degree from the University of Edinburgh and was apprenticed to his brother, John Bell, the surgeon and anatomist. Barred from practice at the Edinburgh Infirmary and from a teaching position at the University for political reasons (he and his brother were not well-liked by the reigning surgeon in Edinburgh, Alexander Munro secundus), Bell moved to London in 1804 to establish his career.[14] In London's free medical marketplace, Bell began offering anatomy classes to artists and surgical and medical students, first in his own home and later at the Great

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[12] See, for example, Cranefield and Bell, *The Way in and the Way Out*; Gordon-Taylor and Walls, *Sir Charles Bell, His Life and Times*; Olmsted, *François Magendie, Pioneer in Experimental Physiology*.
[13] For more on scientific priority disputes, see Augustine Brannigan, *The Social Basis of Scientific Discoveries* (Cambridge [Eng.] ; New York: Cambridge University Press, 1981).
[14] Gordon-Taylor and Walls, *Sir Charles Bell, His Life and Times*, 13-31; L. S. Jacyna, *Philosophic Whigs: Medicine, Science, and Citizenship in Edinburgh, 1789-1848* (London; New York: Routledge, 1994), 78-112.

Windmill Street School of Anatomy, which had belonged to John and William Hunter. Bell's classes for artists relied, much as his physiology did, on the idea that in order for artists to represent living bodies, they needed to dissect and to know the anatomical structures of dead ones.[15] Bell's pedagogy provided the foundation on which his physiological practice was built and upon which his reputation was made. His classes, popular and well-attended,[16] relied on the sort of dissection and induction that Bell himself claimed to use in his research. And systems in anatomy, in which function was deduced from form and organs performed together to accomplish tasks as a system,[17] made nice pedagogical tools for Bell, serving him in the classroom as well as in his work.[18] Bell writes of his early surgical training, "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. Besides, it is this art of anatomy which 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."[19] Constructing anatomical specimens and organizing them into systems forced students to examine anatomy more closely and thoroughly. Bell relied on his classes to disseminate his ideas, to help create a name for himself, and to gain a network of patients and they played a critical role in Bell's discovery. Bell's anatomical

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[15] Charles Bell, *Essays on the Anatomy of Expression in Painting* (London: Longman, Hurst, Rees, and Orme, 1806); Bell, *Letters of Sir Charles Bell*.
[16] Mazumdar, "Anatomy, Physiology and Surgery," 128.
[17] Bell's ideas of a system were much like those of Richard Owen, when he wrote in 1837 about John Hunter, one of Bell's idolized predecessors, "In contemplating the gradational and connected series of the organs of animals which the now venerable Blumenbach must have witnessed for the first time in the museum of Hunter, that learned and accomplished physiologist was doubtless led vividly to appreciate the cumulative force with which comparative anatomy urges the onward progress of physiological science when all its scattered facts are concentrated into one orderly system." Richard Owen, "Preface," in *The Works of John Hunter*, ed. James Palmer (London: Longman, Rees, Orme, Brown, Green, and Longman, 1837).
[18] For an analysis of how Bell's style of natural philosophy served him in the classroom, written by one of Bell's contemporaries, see Anonymous Reviewer, "Analyses and Notices of Books: Charles Bell's Bridgewater Treatise," *London Medical Gazette* 13, no. 1 (1833), p.253-8.
[19] Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*, xx.

demonstrators and house pupils also helped him conduct the experiments on which he was working, to prepare anatomical specimens, and to draw the structures that they saw, as was common at the time.

When Charles Bell began his work on the brain and nerves, he conceived of this work as his path to legitimacy and fame. He wrote to his brother about the work, saying that it placed him in the same category of British discoverers as the eminent William Harvey.[20] The topic of the nerves was considered by Bell's contemporaries at the turn of the nineteenth century to be one of the most promising and least developed, as is clear from contemporary medical treatises. The brain and nerves were also subjects that were particularly central to the work of men schooled in Edinburgh.[21] And when Bell started to investigate the brain anatomically, he did so with the purpose of making a discovery, a discovery that would earn him patients and students. On May 21, 1807 he wrote to his brother "I am casting about for a subject to make something new of. I have been thinking about the brain—of mind—of madness."[22] And later, on November 31st, Bell wrote, "My surgical books and lectures you will soon see eclipsed by my character as an anatomist and physiologist. I really think this new view of the Anatomy of the Brain will strike more than the discovery of lymphatics being absorbents."[23] He had only three students and little income at the time, and surely this emphasis on fame and discovery was, in part, an attempt to secure financial stability.

As is evident from the title "Anatomy of the Brain," Bell did not begin his work with the anatomy of the nerves as his subject. He began his work on the nerves

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[20] See, for example, Bell, *Letters of Sir Charles Bell*, 118 (December 5, 1807), 176 (May 25, 10), 265 (August 5, 19)
[21] Christopher Lawrence, "Unpublished Thesis: Medicine as Culture: Edinburgh and the Scottish Enlightenment" (University of London, 1984).
[22] Bell, *Letters of Sir Charles Bell*, p. 96 (May 21, 1807).
[23] Ibid., p. 117 (November 31, 1807).

in an attempt to understand the functions of the brain.[24] According to Bell, previous anatomists had assumed that the brain acted as a sensorium, that the whole thing together interpreted sensations, and in making such an assumption, they did not break the brain down into anatomically and physiologically distinct sections. In such a view, nerves were each fitted to receive a particular impression from their environment and differed only in degrees of sensibility, and individual nerves carried both impressions to the brain and the force of the will from it.[25] Bell attempted to map out the functions of the brain by mapping out its anatomy, adopting both methodologies and objectives well known among British anatomists. Like phrenologists in Edinburgh[26] and those who worked on natural theology,[27] Bell believed in the fundamental principle that form was revealing of function. He saw the body as "a system great beyond our imperfect comprehension, formed as it should seem at once in wisdom; not pieced together like the work of human ingenuity," and thus as an intelligible system and one whose workings could be revealed by investigating the body's structures.[28] He saw his own work, therefore, as being a form of detailed anatomy that replaced vague notions about the functions of organs as a whole with descriptions of specific processes carried out by specific anatomical systems among those organs. By

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[24] Bell, *Idea of a New Anatomy of the Brain*.
[25] See, for example, Ibid; Sir Charles Bell, "Clinical Lecture on Diseases of the Nerves," *London Medical Gazette* 13, no. 1 (1833-1834), p.699.
[26] For more on Gall's influence on nineteenth century work on the nerves and brain, see Stephen Shapin, "Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh," *Annals of Science* 32, no. 3 (1975), p.219-43; Edwin Clarke and L. S. Jacyna, *Nineteenth-Century Origins of Neuroscientific Concepts* (Berkeley: University of California Press, 1987), introduction for more on phrenology in nineteenth-century-Britain.
[27] The quintessential nineteenth century work on natural theology was, of course, William Paley, *Natural Theology* (London,: Printed for R. Faulder by Wilks and Taylor, 1802). Bell even edited a version of it in 1835. He also wrote one of the Bridgewater Treatises, a series of works attesting to the "Power, Wisdom, and Goodness of God, as manifested in the Creation," Charles Bell, *The Hand, Its Mechanism and Vital Endowments as Evincing Design* (London: William Pickering, 1833). For an analysis of natural theology by historians, see Aileen Fyfe, "Publishing and the Classics: Paley's Natural Theology and the Nineteenth-Century Scientific Canon," *Studies in History and Philosophy of Science* 33 (2002), p.729-51; L.S. Jacyna, "Immanence or Transcendence: Theories of Life and Organization in Britain 1790-1835," *Isis* 74 (1983), p.311-29.
[28] Bell, *Idea of a New Anatomy of the Brain*, 7.

mapping out structures he was able to deduce functions. Bell's work on the brain and nerves exemplifies this philosophy: having found it difficult to work on the brain directly, Bell traced the brain outward through the nerves, asserting that the cerebrum and cerebellum were "different in function as in form" and that the bundled nerves that he traced from the brain into the body were "distinct in office as they are in origin from the brain."[29] In other words, by looking at the anatomy of the nerves specifically, Bell thought he could map out their functions as well as those of the parts of the brain itself.

In 1810 Charles Bell described his progress on the discovery he set out to make, detailing experiments on the spinal nerves in a letter to his brother, saying:

> It occurred to me that there were four grand divisions of the brain, so were there four grand divisions of the spinal marrow; first, a lateral division, then a division into the back and fore-part. Next it occurred to me that all the spinal nerves had within the sheath of the spinal marrow two roots—one from the back part, another from before. Whenever this occurred to me I thought that I had obtained a method of inquiry into the function of the parts of the brain.
>
> Experiment 1. I opened the spine and pricked and injured the *posterior* filaments of the nerves—no motion of the muscles followed. I then touched the *anterior* division—immediately the parts were convulsed.
>
> Experiment 2. I now destroyed the posterior part of *the spinal marrow* by the point of a needle—no convulsive movement followed. I injured the anterior part and the animal was convulsed.[30]

This letter seems to describe in narrative fashion the development of an idea from anatomy and then the simple test of that idea through vivisection. This idea and experiment formed the basis of Bell's claim to discovery and is the essence of his short 1811 text, "An Idea of a New Anatomy of the Brain."

Between 1804, when Bell moved to London, and 1811, when he circulated

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[29] Ibid., 5-6.
[30] Bell, *Letters of Sir Charles Bell*, 171.

copies of a treatise on the nerves, Bell struggled to make a living in London. He taught, he saw occasional patients, he introduced himself to more established men in the field, but his income was supplemented with money from his brother George. In 1811, Bell had his text, "An Idea of a New Anatomy of the Brain," printed and distributed among a small circle of influential men. This pamphlet was not obviously meant to establish Bell's discovery—it was given to those who would be most able to critique it for Bell and to those who might circulate news of its author to others and enhance Bell's reputation and class sizes. Thomas Young, William Wollaston, Sir Humphry Davy, Sir Astley Cooper, Matthew Baillie, Herbert Mayo, Joseph Banks, and Peter Mark Roget, all well known and capable natural philosophers or medical men with wide social circles, received copies.[31] Bell did not have the money to make the pamphlet into more than a sketch or to put it into wide circulation and did not yet have a benefactor to do it for him. Instead, he planned to incorporate its contents into his teaching.

Bell intended from the start to lecture on (rather than print) his discovery in order to publicize it, revealing his particular sense of the "public" as a socially interconnected professional group rather than an anonymous reading public. In an 1807 letter to his brother, Bell wrote, "[m]y new Anatomy of the Brain is a thing that occupies my head almost entirely... My object is not to publish it, but to lecture it to my friends, to lecture it to Sir Joseph Banks' coterie of old women, to make the town ring with it, as it is really the only new thing that has appeared in anatomy since the days of Hunter."[32] It was through his teaching that Bell gained some of his fiercest allies and advocates for his discovery.

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[31] For a list of those to whom we know that the text was circulated, see the edition reprinted in the *Journal of Anatomy and Physiology*, with an introduction by Alexander Shaw. Bell, "Idea of a New Anatomy of the Brain, with Letters &C.." *Journal of Anatomy and Physiology* 3, no. 1 (1868), p.147-82.

[32] Bell, *Letters of Sir Charles Bell*, 118 (5 December 1807).

Beginning with Bell's 1811 self-published treatise on the brain and nerves, we get a sense of how he conceived of his discovery before it was contested. Bell opened the text by saying that anatomists did not understand the brain and nerves, that notions about the nervous system were vague and based in analogy rather than precise description.[33] His friends and colleagues, he said, misunderstood him and his aims in investigating the brain, assuming that Bell was looking for the seat of the soul, often thought to be in the brain.[34] Such an ambition, Bell claimed, would have been presumptuous and foolish. Instead, his purpose was to investigate the brain as anatomists and physiologists would have any other organ: through detailed anatomical dissections. Setting up his own work against those of distinguished predecessors, Bell wrote,

> In opposition to these opinions, I have to offer reasons for believing, that the cerebrum and cerebellum are different in function as in form; that the parts of the cerebrum have different functions; and that the nerves which we trace in the body are not single nerves possessing various powers, but bundles of nerves, whose filaments are united for the convenience of distribution but which are distinct in office as they are in origin, from the brain.[35]

His work had the added virtue of simplicity, an advantage that Bell would rely upon in defense of his contribution throughout his lifetime.

In the introduction to his "Idea of a New Anatomy," Bell asserted that before him, the more one knew about previous work on the anatomy of the brain, the more confused one became. A hodgepodge of previously established facts and theories, many of which contradicted each other, made the brain like a maze. In great part because of his faith in Natural Theology, such confusion was unacceptable to Bell,

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[33] Bell, "Idea of a New Anatomy of the Brain, with Letters &C.," 154.
[34] Ibid.: 153.
[35] Bell, *Idea of a New Anatomy of the Brain*, 4-6.

who placed a high premium on the elegance of systems of anatomical parts working together and who described the nerves as such a system in his text. He wrote to his brother, "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."[36] Here again Bell used Harvey's discovery of circulation as a prototype. In addition to hoping that his own work would be as monumental as that of his British predecessor, Bell appreciated the elegance of Harvey's anatomical system. And, in fact, the notion of circulation, in which one type of anatomical part carried something vital from the center to the periphery, and a parallel and similar part carried things back to the center, seemed to apply to the nerves.

Bell went on to detail his findings on the brain, the cerebellum, and the double roots of the spinal nerves. He began the body of the text by describing the anatomy of the brain itself, noting the ways in which the cerebrum and cerebellum were clearly anatomically distinct—in form, in color, and in vascular structure—and remained distinct in various species of the animal kingdom. Bell found that the cerebrum, home of sensory perception and thought, varied in size proportional to the sophistication of the species and its nervous system. He then matter-of-factly described an experiment he performed on a living donkey to confirm the functions of the parts of the brain, saying, "On laying bare the roots of the spinal nerves, I found that I could cut across the posterior fasciculus of nerves, which took its origin from the posterior portion of the spinal marrow without convulsing the muscles of the back; but that in touching the anterior fasciculus with the point of the knife, the muscles of the back were immediately convulsed."[37] It is on the basis of this experiment that Bell claimed to have concluded that every nerve with a double function must have a double root, a

[36] Bell, *Letters of Sir Charles Bell*, 117-18 (5 December, 1807).
[37] Bell, *Idea of a New Anatomy of the Brain*, 15.

connection with both the cerebrum and the cerebellum. In his "Idea of a New Anatomy," Bell called these double functions "sensible" and "insensible," and later, "nerves of sense" and "nerves of motion." The cerebrum, he claimed, united the body with the world, containing the nerves bearing sensory impressions from the outside world and the nerves that carry the force of will to the body, while the cerebellum handled the nerves responsible for basic functions of the body. Bell ended the piece by summarizing the functions of the nerves, saying, "[t]hrough the nerves of sense, the sensorium receives impressions, but the will is expressed through the medium of the nerves of motion."[38] The book is short and laid out in a sketchy fashion, but it is clear that Bell thought the work was significant. An understanding of the brain and of the nerves had implications beyond physiology and medicine as well. Investigations of the brain and nerves could appear to lead to materialism or sacrilege, and they could also have political and social overtones, as was the case with phrenology.[39] Here by talking about the will, Bell is using a term that he surely knew (for his letters suggest that he read philosophers like Locke) had a philosophical history: the exercise of free will was an important component of debates about materialism, about religion, and about democracy in eighteenth and early nineteenth-century Britain.[40]

Bell's method of pursuing his ideas about the brain and nerves became a central part of later priority disputes and is worth examining in more detail, as it is also representative of a British style of physiology that was increasingly the subject of debate. As I have described above, Bell surmised that each root's properties related to the part of the brain with which it connected and that nerves with different functions were bundled together into a single cord as they made their way out into the body. In

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[38] Ibid., 20.
[39] Shapin, "Phrenological Knowledge and the Social Structure of Early Nineteenth-Century Edinburgh."
[40] James A. Harris, *Of Liberty and Necessity: The Free Will Debate in Eighteenth-Century British Philosophy*, Oxford Philosophical Monographs (Oxford: Oxford University Press, 2005).

order to put such ideas to the test, Bell developed two experiments, described only briefly in "Idea of a New Anatomy" in the fashion depicted above—one in which he opened the spine and "pricked and injured the posterior filaments of the nerves…then touched the anterior division" and one in which he "destroyed the posterior part of the spinal marrow by the point of a needle… [and] injured the anterior part."[41] The experiments were technically difficult—Bell found it hard to injure one filament without also injuring the other and getting the spine open without damaging its contents required delicacy and dexterity—but Bell was able to achieve results. He described the injury and destruction of the posterior root as not causing movement, while that of the anterior root caused the animal to shake violently.

It is important that Bell says of these experiments that they were not conclusive, but merely provided encouragement that his system was correct.[42] Bell's style of physiology required that anatomical and philosophical reasoning precede, and to some extent supersede, vivisection experiments. While he became more explicit about these methodological priorities later in his career, Bell established them from the outset, writing within "Idea of a New Anatomy," "[i]f I be correct in this view of the subject, then the experiments which have been made upon the brain tend to confirm the conclusions which I should be inclined to draw from strict anatomy."[43] Experiment, then, was used by Bell to support conclusions already deduced from anatomy, much in the same way that he used pathology as a form of natural experimentation. Bell wrote to his brother that "[t]he whole opens up in a new and simple light; the nerves take a simple arrangement; the parts have appropriate nerves; and the whole accords with the phenomena of the pathology."[44] Pathology, usually

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[41] Bell, *Letters of Sir Charles Bell*, 170 (12 March, 1810).
[42] Bell wrote, "[t]o this end I made experiments which, though they were not conclusive, encouraged me in the view I had taken." Bell, *Idea of a New Anatomy of the Brain*, 21-22.
[43] Ibid., 33.
[44] Bell, *Letters of Sir Charles Bell*, 118 (5 December, 1807).

considered one portion of the Institutes of Medicine and not a part of the disciplines of anatomy or surgery,[45] was adopted by Bell in his physiological reasoning as a way of confirming hypotheses based on anatomy—disfigurement and disease caused anatomical changes corresponding to symptoms that revealed the normal functions of those same parts of the anatomy. His supporters eventually asserted that he was methodologically innovative in this respect, while his detractors claimed he was unscientific. Bell's methodology, tied to his pedagogical program, was as much a part of the priority dispute and competition for scientific credit as were the facts of the discovery itself. It also became a rhetorically useful tool, allowing him to mold himself as opposite to the Frenchman with whom he competed.

Despite his requests for comments on his 'little manuscript,' Bell received very little attention for the work at the time that he circulated it and was disappointed by the lack of feedback.[46] In the ten years following its printing, Bell continued to work and lecture on the brain and nerves, but did not publish anything on them per se (although he did give a paper before the Royal Society, in July 1821, entitled "On the Nerves," which summarized his work to date and discussed the functions of the fifth and seventh nerves). Publication became an increasingly important measure of good science as the circulation of scientific periodicals expanded dramatically in the 1820s.[47] Thus, when others took up the subject of the nerves a decade after the circulation of Bell's little pamphlet, Bell found his priority disputed and his methods and conclusions under attack.

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[45] Stephen Jacyna, "Theory of Medicine, Science of Life: The Place of Physiology Teaching in the Edinburgh Medical Curriculum, 1790-1870," in *The History of Medical Education in Britain*, ed. Vivian Nutton and Roy Porter (Amsterdam: Rodopi BV Editions, 1995).
[46] Bell, *Letters of Sir Charles Bell*, 275 (10 June, 1822).
[47] For more on changes in print culture, see Thomas Broman, "J. C. Reil and the 'Journalization' of Physiology," in *The Literary Structure of Scientific Argument: Historical Studies*, ed. Peter Dear (Philadelphia: University of Pennsylvania Press, 1991); James A. Secord, *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000).

II. The Controversy: Challenges from Abroad

Perhaps the strongest threat to Bell's priority came from abroad, from the French physiologist François Magendie. Historians and physiologists have tried to sort out the dispute and to issue credit for the discovery in a variety of ways. L.S. Jacyna and Edwin Clarke pronounced Magendie the victor in a passage that is representative of, though perhaps more decisive than, the opinions of many twentieth century historians and scientists seeking to base priority on "correctness" of facts and methodology,[48] saying,

> It is now widely accepted that although Bell made the first experimental observations on spinal root properties, his claims for full priority cannot be allowed, for two reasons. First, his pioneer, but sole, investigation was incomplete and the results he obtained did not warrant the conclusions deduced, which in any case were mainly erroneous. Second, and of much more sinister significance, is the damning evidence against Bell that, in an attempt to establish his leadership, he dishonestly appropriated Magendie's correct opinions and in light of them deceitfully emended his earlier publications before reprinting them in order to support his case.[49]

Others have been more even-handed, giving Bell credit for an idea and for an initial theory, while assigning Magendie credit for completing what Bell started.[50] And still others have credited Bell entirely, accusing Magendie of having stolen his

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[48] See Cranefield and Bell, *The Way in and the Way Out*; C.B. Jorgensen, "Aspects of the History of the Nerves: Bell's Theory, the Bell-Magendie Law and Controversy, and Two Forgotten Works by P.W. Lund and D.F. Eschricht," *Journal of the History of Neuroscience* 12, no. 3 (2003), p.229-49; Olmsted, *François Magendie, Pioneer in Experimental Physiology*.

[49] Clarke and Jacyna, *Nineteenth-Century Origins of Neuroscientific Concepts*, 111.

[50] For other accounts of the priority dispute, see Pierre Flourens, "1858 Memoir of Magendie, Translated by C.A. Alexander," *Annual Report of the Smithsonian Institution* (1866), p.100; John E. Lesch, *Science and Medicine in France: The Emergence of Experimental Physiology, 1790-1855* (Cambridge: Harvard University Press, 1984); Mazumdar, "Anatomy, Physiology and Surgery."; Gillian Rice, "The Bell-Magendie-Walker Controversy," *Medical History* 31, no. 2 (1987), p.190-200.

idea directly.[51] The predominant view among historians, though, is that Bell only made initial inquiries into the roots of motor and sensory nerves and that Magendie deserves the credit for having proved their functions.

Magendie published his first account of motor and sensory nerves in 1822. In September of 1821, John Shaw, who was Bell's nephew and assistant and who had learned a little bit of French, traveled to Paris in order to convey Bell's work to French anatomists. He explained Bell's system to Magendie and, when asked, provided a demonstration on a horse. Shaw had previously only performed the demonstration on an ass and seems to have been confused by what he saw when he cut away the skin on the horse's face: the demonstration did not go as planned and the nerves that Shaw cut failed to cause the expected paralysis of the lip.[52] Still, Magendie found the demonstration intriguing and asked Shaw for a copy of his new laboratory manual and an account of Bell's paper delivered before the Royal Society, both of which he received.

In June, 1822, Magendie published an article in the journal he founded, *Journal de physiologie expérimentale et de pathologie*, entitled, "Experiments on the Functions of the Roots of the Spinal Nerves."[53] In the article he stated that he had long wanted to try an experiment on spinal nerves but that he had had difficulty opening the spinal cord without killing, or at least seriously injuring, the animal until someone had brought him a litter of eight puppies. The puppies' spinal cords were more malleable, and he had been able to open the vertebral canal without destroying its contents, allowing him to cut first the posterior and then the anterior roots

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[51] For an account of this encounter that favor Magendie, see Cranefield and Bell, *The Way in and the Way Out*; Olmsted, *François Magendie, Pioneer in Experimental Physiology*. And for accounts that favor Bell, see Alexander Shaw, *An Account of Discoveries of Sir Charles Bell in the Nervous System* (London: J. Murray, 1860). and Amédée Pichot, *The Life and Labours of Sir Charles Bell* (London: R. Bentley, 1860).
[52] Gordon-Taylor and Walls, *Sir Charles Bell, His Life and Times*.
[53] Magendie, "Expériences sur les fonctions des racines des nerfs rachidiens," 366-71.

separately and then to sever both together. From these experiments, the first of which produced an animal whose limbs convulsed but were devoid of sensation, the second of which produced flaccid but sensitive limbs, and the third of which produced limbs with neither sensation nor motion, Magendie deduced that "the posterior roots seem to be particularly destined for sensibility, while the anterior roots seem to be especially connected with movement."[54]

After Magendie's article was published, Shaw, who had received a copy of the *Journal de Physiologie Expérimentale et Pathologie* from Magendie, wrote to Magendie, saying that Bell had performed the same experiment thirteen years earlier[55] and, shortly thereafter, sent Magendie a copy of Bell's "little book," "Idea of a New Anatomy."[56] The priority dispute was taking shape.

Magendie's first attempt to settle it appeared immediately in an article that recounted the events to date:

> One sees by this citation of a work which I could not know of, since it had not been made available to the public, that Mr. Bell, led by his ingenious ideas on the nervous system, had been very near to discovering the functions of the spinal roots; nevertheless, the fact that the anterior roots are designed for movement, while the posterior roots belong more particularly to feeling, appears to have escaped him: it is, therefore, to having established this fact in a positive manner that I must limit my claims.[57]

The passage is notable for the fact that Magendie seized on Bell's lack of publication (Bell having declared that he would teach, and only later publish on, the roots of motor and sensory nerves) as well as factual errors from the outset as the basis of his claims

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[54] Translated by Olmsted in his work, Olmsted, *François Magendie, Pioneer in Experimental Physiology*, 102.
[55] Shaw and Bell referred to the "Idea of a New Anatomy" as having been published in 1809, although evidence suggests that it was not actually printed until 1811 Ibid.
[56] A narrative account of these events can be found in Magendie, "Expériences sur les fonctions des racines des nerfs qui naissent de la moëlle epinière."
[57] Ibid.

for credit. His argument, unlike Bell's, remained essentially stable throughout the dispute. The changing grounds on which Bell asserted his priority give a picture of the changes in British medicine more generally.

Bell's responses to Magendie were presented in his own later monographs on the nerves and came initially in the form of criticisms of Magendie's methodology. He incorporated one of his earliest public reactions to Magendie's work into his *An Exposition of the Natural System of the Nerves* (1825),[58] a volume that detailed Bell's work on the nerves that had been presented before the Royal Society. In it, he wrote:

> In France, where an attempt has been made to deprive me of the originality of these discoveries, experiments without number and without mercy have been made on living animals; not under the direction of anatomical knowledge, or the guidance of just induction, but conducted with cruelty and indifference, in hope to catch at some of the accidental facts of a system which, it is evident, the experimenters did not fully comprehend.[59]

This passage gets to the heart of Bell's critique of Magendie: Magendie's emphasis on "accidental facts" and his vicious pursuit of those facts through uninformed vivisection, were deeply flawed. Such claims would have garnered the support of a significant portion of the British medical community of the time, a community that tolerated occasional vivisection but considered it to have limited value as compared to dissection (which was controversial in Britain, considered necessary by medical professionals, and thought not cruel by that community).[60] That the first British anti-cruelty legislation, Martin's Act, was passed in 1822 with the support and testimony of British medical professionals and mentioned Magendie directly demonstrates the popularity of the anti-vivisectionist cause in Britain at the time that Bell and Magendie

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[58] Bell, *An Exposition of the Natural System*.
[59] Ibid., 3-4.
[60] Desmond, *The Politics of Evolution*; French, *Antivivisection and Medical Science*; Nicolaas A. Rupke, *Vivisection in Historical Perspective* (London; New York: Croom Helm, 1987).

were beginning their dispute.[61] The act, which forbade any person to "wantonly and cruelly beat, abuse, or ill-treat any Horse, Mare, Gelding, Mule, Ass, Ox, Cow, Heifer, Steer, Sheep, or other Cattle,"[62] had little to do with medical research, as it applied only to those who harmed animals belonging to other people (their property) and did not apply to smaller domesticated animals (or to bulls or cocks, who fought for sport), but it did draw attention to vivisection, as arguments made before parliament in the bill's favor involved testimony about animal experimentation.[63]

Bell emphasized anatomical systems to create a sense of common purpose and heritage with his contemporaries. Bell often compared the systematic nature of William Harvey, saying to his brother in a letter in 1819, "[b]elieve me, this is quite an extraordinary business. I think the observations I have been able to make furnish the materials of a grand system which is to revolutionise all we know of this part of anatomy—more than the discovery of the circulation of the blood."[64] It is a telling and ambitious claim, one that makes clear that for Bell, his discovery was more than simply another fact. By invoking talk of systems in the context of Harvey's discovery, Bell positioned himself within a particular British legacy, alluding to what was recognized as probably the most significant British discovery in anatomy and medicine, attempting to draw together the support of his fellow countrymen for his claims against a foreigner.[65] The French were widely thought of as being against

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[61] Hansard's Parliamentary Reports from 1825 states that "there was a Frenchman by the name of Magendie, whom he [Mr. Martin] considered a disgrace to Society... Mr. Martin added that he held in his hands the written declarations of Mr. Abernethy, of Sir Everard Home (and of other distinguished medical men), all uniting in condemnation of such excessive and protracted cruelty as had been practised by this Frenchman." See, Hansard, "Hansard's Parliamentary Reports."

[62] Quoted in Shevawn Lynam, *Humanity Dick : A Biography of Richard Martin, M. P., 1754-1834* (London: Hamilton, 1975).

[63] The list of animals protected was amended to include dogs, chickens and roosters, bears, and bulls in 1835.

[64] Bell, *Letters of Sir Charles Bell*, 265 (5 August, 1819).

[65] Bell also considered himself heir to the traditions of the Hunters, whose Great Windmill Street School he took over. Bell wrote to his brother "My object is… to make the town ring with it, as the only new thing that has appeared in anatomy since the days of Hunter." Ibid., 118 (5 December, 1807).

systems in the Britain,[66] and although men like Bell thought their work every bit as empirical as French work, they set their work up in opposition to the French by insisting that facts without systems explaining the relationships of anatomical parts, without an underlying philosophy, were meaningless. Thus Harvey became the progenitor of British anatomy. The British anatomists took up Romanticism late, and in a very eclectic fashion that some even find puzzling, but the consistency in the philosophies of the anti-materialist, anti-French, British anatomists, resided in the importance ascribed to unity and underlying purpose, or function, in anatomical structures—to systems.[67]

Bell's cause, like that of the anti-vivisectionists, took on nationalistic tones, such that Bell even wrote, in an 1823 letter to his brother, "[y]ou may send for the 'Medical Journal'—the last number of the yellow book—if you please, where you will find some strictures in my favour and against the French. They, you know, have accused me of taking from them!"[68] He spoke of the French and of Magendie almost interchangeably during the early years of the dispute, partly because Bell trusted that his fellow Britons would share his opinions about the French and their style of medical science. It is, perhaps, not surprising that a man who grew up during the Napoleonic Wars and treated wounded soldiers from the Battle of Waterloo would assume that fellow British doctors would rally around him if his territory was being threatened by the French. But because the flow of British medical students studying in Paris, which had slowed to a trickle during the Napoleonic Wars, increased significantly once the

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[66] John Harley Warner, *Against the Spirit of System: The French Impulse in Nineteenth-Century American Medicine* (Princeton, N.J.: Princeton University Press, 1998).
[67] Philip Rehbock, "Transcendental Anatomy," in *Romanticism and the Sciences*, ed. Andrew Cunningham and Nicholas Jardine (Cambridge: Cambridge University Press, 1990).
[68] Bell, *Letters of Sir Charles Bell*, 281 (8 December, 1823).

wars ended,[69] Bell found the medical community around him—its methods and its sympathies—shifting.

Bell continued to insist that Magendie had stolen his idea and that Magendie had then pursued it in a way that was improper methodologically, but his attacks became more specific and more detailed, no longer taking for granted that other British anatomists were opposed to vivisection or to the French. Just a few years after the unequivocal passage above about experiments "without number and without mercy," Bell claimed, in an 1828 lecture before the College of Surgeons,

> before M. Magendie made these experiments… that my experiments upon the fifth nerve, and the seventh, were repeated before him; that the rationale of these experiments was explained to him; that he had a little work put into his hands, in which these experiments upon the roots of the spinal nerves were described… yet I am constrained, in this place, to say that he may not have understood these experiments upon the seventh, or on the fifth… that he may even, in short, have employed his fingers, those 'pickers and stealers,' as Shakespeare calls them, without the control of his head—without intention or ideas of any kind—with a perfect purity that belongs to entire ignorance.[70]

This passage reflects the same vitriol as before, but this time Bell equated Magendie's experiments with his own. He did so because he could no longer assume that his audience disavowed the methods of the French; that is, at that point he assumed that they did not want to hear him rail against vivisection on moral grounds.

Just a year later, in a letter to the editor of the *London Medical Gazette*, Bell seems to confirm that experimental physiology was taking hold in Britain, writing, "How often shall I have to make an apology for not believing in the opinions of

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[69] Thomas Neville Bonner, *Becoming a Physician: Medical Education in Britain, France, Germany, and the United States, 1750-1945* (New York: Oxford University Press, 1995); Michael Sappol, *A Traffic of Dead Bodies: Anatomy and Embodied Social Identity in Nineteenth-Century America* (Princeton, N.J.: Princeton University Press, 2002).

[70] Charles Bell, "Lectures on the Nervous System Delivered at the College of Surgeons," *London Medical Gazette* 1, no. 21 (1828), p.620.

experimenters?"[71] He went on to argue that he tried precisely the same experiments that Magendie did "with every assistance possible…. My experiments on this subject entirely failed…. When, therefore, twelve years afterwards, I addressed the Royal Society, I put all these experiments aside, and founded my reasoning upon that which was not only correct but was easily ascertained to be so."[72] Magendie's work, Bell said, was subject to mistakes—the procedures Magendie followed could not possibly have allowed him to distinguish between sensory and motor nerves.[73] Here, Bell is refining and combining his earlier arguments—Magendie stole his experiments, but those experiments don't work, so Magendie must also have stolen his results. With a subtle shift in rhetoric, Bell made himself the original thinker but also the expert on a methodology that he had earlier condemned but one that had become increasingly popular among his colleagues.

Bell's argument changed several more times within his lifetime. In the next revision of the argument, in 1834, he praised Johannes Müller for deciding the controversy experimentally, saying: "[h]e has repeated the experiments with the utmost care, insulating the distinct roots, and observing the effects when they are variously irritated. He has shewn that by experimenting upon frogs, the conclusions which I had announced are confirmed in a manner which admits of no question or doubt; and that one root—the anterior—is for motion alone, and the posterior for sensation alone."[74] Bell's acceptance of experiments as conclusive in a debate in

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[71] Charles Bell, "Letter to the Editor on the Nervous System," *London Medical Gazette* 1, no. 21 (1829), p.691-2.
[72] Ibid.
[73] For another version, see Bell, "Clinical Lecture on Diseases of the Nerves," 699. (1833) Bell writes: "When M. Magendie performed the experiments upon the spinal nerves, I saw that he went a great deal too far—farther than he was entitled to go by his premises. I saw that he was stating what he could not state from experiments, because his experiments were the same as mine. I had made out part of the subject—viz. that which related to the functions of the posterior roots—by inference, and then confirmed the whole by the decisive experiments upon the fifth pair. He pretended to make the thing clear by experiments upon those nerves which I had puzzled at in vain, in order to make clear by the very same experiments."
[74] Ibid.

which he had rejected experimentation as improper and unsuccessful from the outset could be seen as merely convenient—Bell favored experimenters when they helped his cause—and surely there is some of that self-interest at work here, but Bell was also responding to a general shift in the way that the British medical community viewed experimentation on living animals, though it is not clear whether he himself changed his view of experimentation. In 1834, one British surgeon testified before a parliamentary committee on medical education that "[t]he proper course of physiology is that taught by experiment,"[75] while at the same time, British scientists were launching a "science in decline" argument,[76] claiming that all the good scientific work was being done in Germany and France where the State provided resources and where there was not the same public scrutiny of vivisection.[77] In order to maintain the support of his colleagues, Bell needed to incorporate some of the new epistemology, one in which animal experimentation and the pursuit of what Bell earlier called "accidental facts" provided the foundation of physiological knowledge, into his defense of his own priority.

The final twist in the argument between Bell and Magendie came in the form of an admission of error on Bell's part. In his 1834 clinical lecture on diseases, published in the *London Medical Gazette*, Bell stated:

> My experiments proved the portio dura to be the nerve of motion to all the muscles of the side of the face, with the exception of the muscles of the jaws;… with regard to the lips, I was led into a mistake in my first experiments, which Magendie corrected. I thought that the lips, besides obtaining the power of motion principally from the branches of the portio dura, were also, to a certain degree, under the control of branches prolonged from the motor root of the fifth pair: and this I conceived was for the purpose of associating the lips and the cheeks in the combined actions of mastication. I

[75] House of Commons, Select Committee, Report 2:216
[76] Charles Babbage, *Reflections on the Decline of Science in England* (London: B. Fellowes, 1830).
[77] French, *Antivivisection and Medical Science*; Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity*, 1st American ed. (New York: W. W. Norton, 1998), 335.

> was in error as to the particular branch which is so prolonged to the cheeks—an error into which I should not have fallen, had I examined with more care, before my first experiments, the anatomy of the roots of the fifth pair, as it is given in several of the best German authors…"[78]

Here, again, Bell was posing as an experimentalist and allying himself with German anatomy. But this was a unique admission of a mistake by Bell—one that did not minimize Magendie's work. Still, it ends with Bell's insistence on the importance of anatomy *before* experimentation, demonstrating that although Bell might have recognized a place for experimentation within physiology, he was still committed to the primacy of what he called "higher anatomy,"[79] which he thought superior to a strictly experimental physiology, even though programs like his were going out of fashion with his contemporaries.

This fairly extensive recounting of Bell's changing defense of his priority in the dispute with Magendie suggests the changes that Bell perceived in the British medical community—his audience and potential allies in the dispute. The British medical and surgical communities, fragmented by the multitude of hospitals and small schools like Bell's, were sometimes brought together by disputes like Bell's that resonated with broader political concerns. Bell responded aggressively and directly to François Magendie, initially drawing on nationalistic and anti-French sentiment, hoping to unite other British medical men in his cause. But over the course of Bell's teaching career, in the first four decades of the nineteenth century, it became clear that

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[78] Bell, "Clinical Lecture on Diseases of the Nerves," 699.

[79] "Higher anatomy" seems, for Bell, to have been a sort of anatomically based physiology—a physiology in which form followed function and in which there was a central and unified plan of nature. Philip Rehbock characterizes higher anatomy as being synonymous with philosophical anatomy and transcendental anatomy, forms of Romanticism, Rehbock argues, that made their way to Britain in the form of eclectic and sometimes even contradictory philosophies, from Germany. Rehbock talks about Owen as the prototypical transcendental anatomist, saying that he would have been "'The British Geoffroy' had it not been for the fact that he had already become known as 'the British Cuvier.' His approach was an eclectic one, employing transcendentalism and teleology as the situation warranted." Rehbock, "Transcendental Anatomy," 153.

simple nationalism would not win allies for Bell and that he would have to change his approach in order to bring together a broader swath of the British medical men. Although the community was brought together by larger and broader medical schools and new medical journals that circulated widely, the community itself became, perhaps, more clearly divided into camps defined not by national or nationalistic politics, but by local and professional divisions, educational backgrounds, and varied positions on reforms that were being instituted. With such a fragmenting audience, Bell was fighting a losing battle. Bell and his students carried forth the dispute with Magendie with vigor, but the dispute really piqued the attention of a British medical community that was becoming divided along generational and political lines when Bell's former student, Herbert Mayo, claimed the discovery for himself and also allied himself methodologically with Magendie.

III. The Controversy: Challenges from within Great Britain

Bell's response to Magendie's priority can be contrasted directly with his response to his own countryman and student, Herbert Mayo. As was mentioned previously, during the early part of the nineteenth century, the British medical community was becoming publicly factionalized. These factions developed partly through the growth of periodicals with highly political slants, but they also grew through discussions over licensing and educational reform. Forms of licensing and the educational preparation for the medical professions seemed outdated to those within the community attempting reform, but the Royal Colleges of Physicians and Surgeons were both powerful and corrupt.[80] It is, therefore, not terribly surprising that the

[80] For more on the hierarchical system of medical professions and on the requirements for licentiates and fellows of the Colleges, see Susan Lawrence, "Private Enterprise and Public Interests: Medical Education and the Apothecaries' Act, 1780-1825," in *British Medicine in an Age of Reform*, ed. Roger French and Andrew Wear (London and New York: Routledge, 1991); Roger French and Andrew Wear, *British Medicine in an Age of Reform*, The Wellcome Institute Series in the History of Medicine

greatest reforms were instituted through the licensing requirements of new and less powerful Worshipful Society of Apothecaries. The Apothecaries Act of 1815 required that apothecaries possess a license from the Society of Apothecaries in order to practice. Formal qualifications for a license were: courses in anatomy, botany, chemistry, materia medica, and physic, six months hospital experience, and apprenticeship. Reform was prompted by general practitioners in provinces hoping to protect their business from druggists and charlatans and it prompted much discussion among the medical professions about what kind of an education *should* be required to practice one of the branches of medicine.

Different medical professions were in conflict with each other, but conflict was also evident within each profession. Both surgeons and physicians had organizations that were structured to empower an elite group that was old, stagnant, and out of touch with regular practitioners. Both groups also had reformers. These factions were represented by journals that clearly declared their political positions.[81] Bell's priority dispute with British contemporaries can be understood as both evidence of and a product of these professional politics.

While Bell's British contemporaries took different sides in his debate with Magendie, in Bell's view the most brutal betrayal by one of his own countrymen came from his own student, Herbert Mayo. Mayo studied with Bell from 1812-1815, first at the Great Windmill Street School of Anatomy and later in the wards of the Middlesex hospital.[82] Bell's and Mayo's careers remained closely intertwined, as often happened

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(London; New York: Routledge, 1991); Bernice Hamilton, "The Medical Professions in the 18th Century," *Economic History Review* 4, no. 2 (1951), p.141-69; Roy Porter, *Disease, Medicine, and Society in England, 1550-1860*, Studies in Economic and Social History (Houndmills, Basingstoke, Hampshire: Macmillan Education, 1987); Christopher Lawrence, *Medicine in the Making of Modern Britain, 1700-1920*, Historical Connections (London ; New York: Routledge, 1994).

[81] For more on the politics of medical journals during this period, see Desmond, *The Politics of Evolution*.

[82] Gordon-Taylor and Walls, *Sir Charles Bell, His Life and Times*; Charles Herbert Mayo, *A Genealogical Account of the Mayo and Elton Families of the Counties of Wilts and Hereford* (London: C. Wittingham, 1882).

with ambitious pupils and their teachers in early nineteenth-century London. Mayo became a house surgeon alongside Bell at the Middlesex Hospital in 1818 and in 1826 he and another of Bell's students, Caesar Hawkins, bought The Great Windmill Street School of Anatomy from Bell. When the Middlesex Hospital School was founded in 1835 as a rival to London University, Sir Charles Bell and Herbert Mayo were both on the surgical faculty, and Dr. Francis Hawkins, brother of Bell's student Caesar Hawkins, and Dr. James Wilson, from whom Bell had originally bought the Great Windmill Street School, were both on the faculty of physicians.[83] As is clear, both from such a web of connected careers and from letters by medical men of the time describing the significance of knowing established members of the medical community,[84] teachers found their students, relatives, and friends positions and helped them to gain a foothold in a competitive medical marketplace.

Like Bell, Mayo worked on the nerves, and he clearly took from Bell many of Bell's approaches. Both worked on the ass, and experiments they performed are similar. Furthermore, both were known for their skilful drawings, and in fact they are notable as the only two authors to illustrate their articles in the opening issues of the *London Medical Gazette*.[85] But Mayo differed from Bell in his assignment of functions to the fifth and seventh cranial nerves and disputed Bell's theory of respiratory nerves. Their disagreement remained civil at first—in the first edition of Mayo's *Outlines of Human Physiology*, published in 1827, Mayo credits Bell with developing the experiments from which he and François Magendie worked, saying,

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[83] For more on the founding of the Middlesex Hospital School and on the overlap in Bell's and Mayo's careers, see Gordon-Taylor and Walls, *Sir Charles Bell, His Life and Times*, 146-49; William James Erasmus Wilson, *The History of the Middlesex Hospital During the First Century of Its Existence* (Oxford: Oxford University, 1843), 165-69.
[84] Bell's letters to his brother serve as only one example.
[85] See, for example, Bell, "Observations on Fractures of the Patella."; Charles Bell, "Observations on the Diseases and Accidents to Which the Hip Joint Is Liable," *London Medical Gazette* 1, no. 6 (1828), p.137-42; Herbert Mayo, "Dilated Oesophogas," *London Medical Gazette* 3 (1828), p.123-5.

"But when thus sharing the claim to these discoveries between M. Magendie and myself, I should in justice state that the experiments in each case were but improvements on those which Mr. Bell had previously performed."[86] But the dispute quickly turned vicious, as is evident in Mayo's omission of the above passage crediting Bell in later editions of the book. The conflict, which I will explore in greater detail below, surely escalated at least in part because Mayo not only claimed correct assignment of facial nerves for himself, but also because he declared that Magendie's claims to priority were valid.[87]

The dispute between student and teacher is also revealing of changes in the professional nature of British medicine. Herbert Mayo was a part of an ambitious group of medical practitioners—his father, Dr. John Mayo, was a physician who became a governor at the Middlesex Hospital, and his older brother Thomas was a physician as well, having graduated from Oxford. Thomas Mayo inherited his father's practice, was elected a fellow of Oriel College, and served as president of the College of Physicians, leaving Herbert with much to live up to.[88] Herbert Mayo's family provided him with a thorough education (he studied at Leiden, where he took an MD, as well as at the Middlesex Hospital and with Bell at the Windmill Street School) and also with many valuable connections. But Herbert Mayo was regarded by his contemporaries as being particularly eager for advancement. When King's College Medical School was opened in 1831, for example, Mayo was elected to the Chair of Anatomy and Physiology on the basis of his reputation as a well-educated, skilled practitioner. When, in 1836, however, "the same chair was vacated at University College by the resignation of Dr. Jones Quain, Mr. Mayo proffered himself as one of the candidates but was unsuccessful with the additional annoyance of having excited

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[86] Herbert Mayo, *Outlines of Human Physiology* (London: Burgess and Hill, 1827).
[87] Herbert Mayo, "On Bellingeri's Claims as a Physiologist," *London Medical Gazette* (1834), p.271.
[88] Mayo, *A Genealogical Account of the Mayo and Elton Families*.

feelings of distrust in the breasts of the Council of King's College."[89] This sort of move, accepting one teaching post and then trying secretly to get a better one when it opened up, was thought to be overly aggressive and ungentlemanly. The editors of the London Medical Gazette advised Mayo at the time, "We shall be plain with Mr. Mayo: This over-vaulting ambition of his is both pitiful and ridiculous: in our opinion, instead of scampering about, as he seems so strongly disposed to do, he should confine himself to his chair of surgery, and be thankful that he has got it."[90] His obituary in the *Lancet* in 1852, even declared him "somewhat conceited."[91] With his foreign education, his connection to physicians (rather than surgeons), and his family's social standing, Mayo's conflict with Bell took on the added dimension of professional politics, encompassing the tensions between a group of older and perhaps more politically conservative surgeon-anatomists educated in Britain and a group of young medical scientist-surgeons who had been educated abroad and were baldly and perhaps rudely ambitious.

IV. Bell, Mayo, and the Nerves of the Face

In Bell's dispute with Magendie, facial nerves gave Bell's method of physiological inquiry particular trouble. His limited experiments did not always yield the expected results, as was the case when John Shaw demonstrated Bell's work on the facial nerves in front of Magendie. The facial nerves became the center of Bell's dispute with Mayo as well. At around the same time that Magendie began publishing on the nerves (1822), Herbert Mayo, who had been Bell's demonstrator at the Great Windmill Street School and thus was intimately familiar with Bell's work, published

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[89] Correspondent, "Medical Intelligence," *Provincial Medical and Surgical Journal* 19 (1852), p.464-5: 465.
[90] Editor, "The Medical Session, School Arrangement," *London Medical Gazette* 18 (1836), p.741-2: 742.
[91] Anonymous, "Obituary," *Lancet*, no. 2 (1852), p.313.

his *Anatomical and Physiological Commentaries* in which he directly disputed much of Bell's work on the facial nerves. The facial nerves were complex and intertwined, with many ganglia, so unlike the spinal nerves, dissecting the facial nerves was not a straightforward process. They also provided much of the pathology (like what we now know as Bell's Palsy) that Bell used to deduce the function of anatomical structures: if he cut one nerve to relieve pain or tension in a particular portion of the face, or if someone had an injury that resulted in the paralysis of particular facial muscles, Bell could use that to confirm his physiological theories. Mayo, who did a good deal of work on the facial nerves, might have found their complicated structures good for making the case for the necessity of vivisection.

In 1821, Bell published an article entitled "On the Nerves; Giving an Account of Some Experiments on Their Structure and Functions, Which Lead to a New Arrangement of the System" in the *Philosophical Transactions of the Royal Society of London* in which he divided nerves into a symmetrical system of nerves and superadded or irregular nerves. He focused particularly on the trigeminus, or fifth pair of cranial nerves (Figure 1, below), and the facial, or seventh pair of cranial nerves, declaring that the fifth pair belonged to the symmetrical system, while the portio dura of the seventh pair (which was divided at the time into the portio dura and the portio mollis[92]) belonged to the superadded, or respiratory, nerves. The fifth pair was important to Bell essentially because it resembled the spinal nerves—Bell called the fifth pair "the spinal nerves of the head"—and conversely, the scheme of spinal nerves was important because it explained the complicated fifth pair of cranial nerves. According to Bell's scheme, the fifth pair had sensory branches that, like the ganglion-filled sensory nerves of the spinal cord, emerged from a ganglion, while also having a small motor root that bypassed the ganglion. He traced the origin of this discovery to

[92] Mazumdar, "Anatomy, Physiology and Surgery," 141.

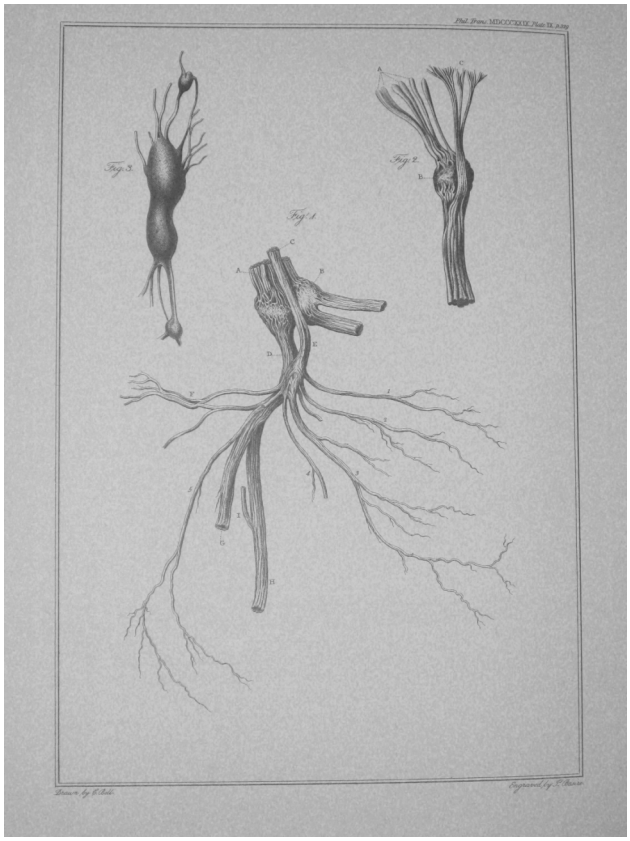

Figure 1. In this drawing, by Bell, the large nerve in the middle of the page here is the fifth nerve, dissected out. It shows both the ganglion and the motor root passing in front of the ganglion. The smaller nerve above and to the right of the fifth nerve is the ganglion of a spinal nerve, placed in the drawing to show its similarity to the ganglion of the fifth nerve. The nerve to the left of the fifth nerve is the ganglion of a sympathetic nerve and is meant to show the difference between ganglia of sympathetic nervous system and those of the symmetrical system (of which the fifth nerve and the spinal nerves were a part).[93]

[93] Charles Bell, "On the Nerves of the Face," *Philosophical Transactions of the Royal Society of London* 119 (1829), p.317-29: Plate ix.

Figure 2. In this image, also drawn by Bell, A, which is right under the ear, is the Portio dura at its origin, with its principal branches cut. B, which is pinned down in front of the face, is the trunk of the Portio dura, the 7th nerve, while C, pinned immediately next to it, is the 3rd branch of the 5th nerve, which joins the Portio dura, showing how complex and interwoven the nerves of the face are.[94]

[94] Ibid.: Plate viii.

the process of teaching and demonstrating in front of his students.[95] The idea of a symmetrical system of nerves and a superadded system of nerves helped Bell to explain both the similar paths of two nerves that appeared to have motor functions (which would be a redundancy not plausible to someone who favored the elegance of a designful Creator) and the pathology of partial paralysis of the face—nerves from the symmetrical system would produce paralysis of voluntary motion whereas those of the superadded system would paralyze respiratory (and therefore involuntary) functions.[96] He often told his audiences that such paralysis was as good as an experiment, demonstrating on a living patient how chewing motions could remain undisturbed, due to an uninjured 5th nerve, while at the same time the patient could not laugh or control his facial expression. Thus, according to Bell, the portio dura was the respiratory nerve of the face and "all those motions of the nostril, lips, or face generally, which accord with the motions of the chest in respiration, depend solely on this nerve," as did the muscles of expression, which Bell believed to be related.[97] Without a functioning portio dura, the parts of the face could not coordinate with the lungs or produce expression (which Bell considered to be mostly involuntary). Herbert Mayo rejected Bell's system of respiratory nerves as well as his assignment of functions to the fifth and seventh cranial nerves. When cutting the fifth cranial nerve, Mayo noted no loss of muscle tone, but on cutting the facial or seventh cranial nerve "the lips immediately fell away from the teeth, and hung flaccid, and the nostrils lost

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[95] Shaw, *Narrative of the Discoveries of Sir Charles Bell.*
[96] Charles Bell, "On the Nerves; Giving an Account of Some Experiments on Their Structure and Functions, Which Lead to a New Arrangement of the System " *Philosophical Transactions of the Royal Society of London* 111 (1821), p.398-424.
[97] Charles Bell, *The Nervous System of the Human Body: Embracing the Papers Delivered to the Royal Society on the Subject of the Nerves* (London: Longman, Rees, Orme, Brown, and Green, 1830), 43.

all movement."[98] Thus where Bell had declared the fifth nerve a motor nerve because when he cut it the ass appeared unable to eat, Mayo concluded that it was a sensory nerve and that the animal did not eat with its lips because it could not feel the food, but that when the food was placed on its tongue, it could still devour its oats. Similarly, Mayo found that Bell's experiments on the seventh nerve did not go far enough: when cutting *both* sides of the seventh pair of cranial nerves, Mayo found that not only respiratory, but all motor functions ceased, leading Mayo to declare the seventh pair a general motor nerve. Caesar Hawkins, Bell's student and co-proprietor with Mayo of the Great Windmill Street School, summed things up in his 1849 Hunterian Oration to the College of Surgeons: "Here, too, Sir Charles Bell's humanity stood in his way for he only divided the portio dura on one side of the face, the division of which by Mayo on both sides left no doubt that no power of motion was derived from the fifth to the muscles of the face, and it was soon acknowledged by everyone that the seventh was their sole motor nerve."[99]

By 1829, the debate had gotten fierce enough that Mayo and Alexander Shaw, Charles Bell's nephew, engaged in a heated exchange in the *London Medical Gazette*, a more conservative medical periodical edited predominantly by surgeons.[100] Mayo wrote disparagingly of Shaw, saying that his letter to the *Gazette* "has produced a very painful impression upon my mind. It is painful to witness the adoption, at the very outset of life, of a course so misguided."[101] Mayo then went on to describe Bell's theory of the respiratory nerves and quoted Magendie concurring with Bell, implying

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[98] Herbert Mayo and Johann Christian Reil, *Anatomical and Physiological Commentaries*, 2 vols. (London: Printed for Thomas and George Underwood, 1822), 107-20.
[99] Caesar Henry Hawkins, *The Hunterian Oration, Presidential Addresses, and Pathological and Surgical Writings* 2vols. (London: W.J. & S. Golbourn, 1874), 28.
[100] For more on the politics of the various medical journals in the first half of the nineteenth century, see Desmond, *The Politics of Evolution*, 13-16.
[101] Herbert Mayo, "On the Uses of the Facial Branches of the 5th and 7th Nerves," *London Medical Gazette* 3 (1829), p.831-3: 831.

that Magendie also believed in a system of "superadded" nerves. This allowed Mayo to set himself up as the true discoverer of the functions of the fifth and seventh nerves. He declared that this notion of "respiratory nerves" had always given him difficulty but that he felt it unnecessary to discuss the system further, as the theory was "falling into disrepute" and he wanted the reputation not of being the one to debunk another discovery but of being the one to determine the proper functions of the portio dura and of the facial branches.[102]

Charles Bell did not answer these accusations himself, but Alexander Shaw did so at great length, presumably in part on Bell's behalf. He began by attacking Mayo's "air of condescension," saying:

> I believe I am not altogether destitute of that ancient virtue which enforces respect and deference to the aged; but let me ask what was the example afforded me by Mr. Mayo himself when he was a young man, commencing his professional career—eight years ago? What was his conduct towards Mr. Bell, his senior by many years—his teacher, and in whose house he had resided? It is entertaining to hear Mr. Mayo, of all men, assuming the tone he does—he who commenced by opposing in the most reckless manner all that Mr. Bell had done on the subject of the nerves, and who afterwards claimed as his own the most essential and prominent parts of his preceptor's discoveries. He was protected from Mr. Bell's animadversions merely because he was a very young man, and had been his house pupil.[103]

According to Shaw, Mayo had failed to show the deference expected from a student toward his teacher; he had bad scientific manners. In addition, Shaw asserted that Mayo had omitted discussion of both Bell's work and John Shaw's work on the nerves in Mayo's *Commentaries* and that if he had had true evidence regarding their falseness he would have demonstrated that he had repeated previous experiments and found

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[102] Ibid.
[103] Alexander Shaw, "Letter to the Editor, Mr. Shaw in Reply to Mr. Mayo," *London Medical Gazette* 4 (1829), p.12-4: 13.

them lacking. Finally, Shaw demanded that Mayo, who had said that if priority were to be allocated to Bell or to Magendie, he preferred Magendie, give some reason for his choice.[104]

Although Shaw wrote extensively in response to Mayo, Bell clearly felt that it was inappropriate for him to respond to Mayo in a direct way. Shaw acted as Bell's representative in this controversy much as Clarke did for Newton and Huxley would do later for Darwin.[105] But by the end of the exchange Bell felt it necessary to distance himself from the whole mess, allowing the editors of the *London Medical Gazette* to write: "We are authorized, by Mr. Bell, to contradict the insinuation that he is the concealed opponent in the controversy between Mr. Mayo… and Mr. Shaw. He has neither written nor dictated any thing on the subject in dispute."[106]

Bell never did directly address Mayo's betrayal either in published work or in surviving private letters. His career and Mayo's followed very similar trajectories, and they often worked at the same institution, which might have made civility a necessity. As mentioned earlier, Mayo was a pupil of Bell's at the Great Windmill Street School from 1812-1815; worked at the Middlesex Hospital with him from 1818 until Bell resigned in 1836, first as a house surgeon and from 1827 on as an elected surgeon; and was a co-founder of the Middlesex Hospital Medical School with Bell in 1835. But Bell's initial reluctance to attack Mayo directly might also have had to do with Bell's hope of uniting British anatomists and medical practitioners behind his own anatomical physiology and against French physiology. Bell, who had written in his 1830 edition of *The Nervous System of the Human Body* (which was written at

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[104] Ibid.
[105] Steven Shapin, "Of Gods and Kings: Natural Philosophy and Politics in the Leibniz-Clarke Disputes," *Isis* 72, no. 2 (1981), p.187-215. Peter J. Bowler, *Charles Darwin: The Man and His Influence*, Cambridge Science Biographies Series (Cambridge; New York: Cambridge University Press, 1996), 148-9.
[106] Editor, "Controversy Concerning the Nervous System," *London Medical Gazette* 4 (1829), p.60: 60.

approximately the same time that he was engaging in his dispute with Mayo) about his difficulty in keeping his "pupils to the examples of our own great countrymen,"[107] felt strongly that British medical science and pedagogy were best served by following in the traditions of their great predecessors and disavowing continental physiology. The *London Medical Gazette* reviewer of that text concurred, saying, "The nationality which displays itself in this just appeal, cannot, we repeat, be too much admired and encouraged. It is, in truth, full time for all rational thinkers to be heartily tired of that rage which is so prevalent in favour of foreign opinions."[108] Attacking one's own student and countrymen, especially when that student was himself recognized as a good physiologist, is perhaps not the best way to recruit fellow anatomists and physiologists to your cause. Some might argue that Bell did not respond to Mayo because he felt that responding to the younger and less experienced man was beneath him, but Bell was very outspoken about Magendie's claims to discovery and Magendie was also younger and less experienced, so it seems unlikely that Mayo's youth was the only reason Bell did not engage him. It is possible, therefore, to think that Bell, who was always building alliances and trying to promote his anatomical physiology as a particularly British endeavor, did not want to attract attention for attacking another British physiologist, especially not one that he had trained himself.

Mayo, on the other hand, continued to write on the nerves and to dispute Bell's findings. In 1834 he wrote in a letter to the editor of the *Medical Quarterly Review* that "Magendie, by ingeniously using very young animals in his experiments, succeeded in obtaining a positive result, and in realizing the discovery, which is honestly his," describing the discovery of the difference in function between spinal nerves with and without ganglia. And in case it was not enough to credit Magendie,

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[107] Bell, *Nervous System of the Human Body*, 188.
[108] Anonymous Reviewer, "Review of Bell's the Nervous System of the Human Body," *London Medical Gazette* 7 (1831), p.434-7: 435.

Mayo discredited Bell, saying, "Sir Charles Bell's various publications, in which he claims or assumes credit for discoveries to which he is not entitled, the following words of Seneca would form an excellent motto: 'Ista pro ingenio finguntur, non ex scientiae vi."[109]

In 1839, after Bell had returned to Edinburgh and had grown increasingly distant from the London medical scene, Alexander Shaw published *Narrative of the Discoveries of Sir Charles Bell in the Nervous System*,[110] an extensive defense of Bell's priority. In it, Shaw focuses almost entirely on attacking Mayo, reserving only one of six chapters for Magendie. Much of his case against Mayo has to do with establishing the dates on which various players were working on aspects of the discovery, the extent to which Mayo's work was done under the supervision or at the instigation of Charles Bell, and Mayo's personal conduct toward his mentor, but he also approaches the dispute in a more theoretical manner, discussing vivisection at length and redefining, yet again, the substance of Charles Bell's innovation.

Shaw's explanation of why vivisection was a method inappropriate to physiological research on the nerves demonstrates both similarities to Bell's views on the matter and clear differences. It is apparent that Shaw was arguing against a majority of physiologists in Britain, most of whom were vivisectionists or were at least accepting of vivisection by this time (which was not the case during the peak of Bell's career), and Shaw argues the point, therefore, on technical and not ethical grounds. He describes in rather excruciating detail the process whereby experiments on the nerves would be conducted, with the physiologist cutting through skin, muscles, and bones, and introducing bone scissors into the vertebral canal "to tear and break up the fragments, and disclose parts contained within," saying:

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[109] "These things are contrived by cleverness, not by the power of knowledge." Herbert Mayo, "To the Editor of the Medical Quarterly Review," *The Medical Quarterly Review* 2 (1834), p.450-1: 451.
[110] Shaw, *Narrative of the Discoveries of Sir Charles Bell*.

> Now, can it be supposed that, after suffering from the tortures of such a proceeding, there is any animal, however submissive to the infliction of pain or high in its courage that could endure the further and concluding parts of the experiment with such a degree of patience as to admit of correct observations being made in regard to the amount of sensibility appertaining to either of the roots? When the membrane investing the spinal marrow has been slit up and the roots displayed, can it be supposed that the animal is in such a condition as to enable us to judge satisfactorily whether its struggles and cries result from the severity of the wound inflicted, or depend on the fresh injuries that we commit on the roots of its nerves?[111]

In other words, Shaw made the claim that there was no way that the nerve roots would be left exposed and the animal unaltered, and said that although one could demonstrate which roots were responsible for motion through vivisection, it would be impossible to show which were responsible for sensation. He did not suggest that vivisection was always unacceptable, simply that it was not effective in studying the nerves. Shaw explained that it was for this reason that Bell was not able to assign the property of sensation to either root experimentally, even though he did mention that the anterior root alone was capable of exciting the muscles to contract. In order to determine which was the root of sensation, Bell had to return to anatomy and to the argument, based in Natural Theology, that the human body is an elegant and purposeful system without unnecessary redundancies. According to this argument, circulation of nervous impulses, much like the circulation of the blood, would make logical sense, and such a system would require that the posterior root be for sensation, so that one root carried the will of the brain out to the body while the parallel root returned sensory perceptions to the brain.

After declaring vivisection inappropriate for investigations of the nerves, thereby undermining the methods of Bell's detractors, Shaw went on to make the case

[111] Ibid., 45.

that Bell's discovery was fundamentally methodological: that the sheer act of focusing on the roots of the nerves was Bell's innovation and that it was far more significant than whatever Magendie or Mayo did afterward. He wrote,

> Here, then, is the simple explanation of the principle on which all these new discoveries have been based. It consists, I repeat, in supposing that, to investigate the functions of the nervous system successfully, we must devote our attention, not to the trunks, as was formerly done, but to the roots of the nerves. Accordingly, whoever was the first to suggest and follow out that new method of prosecuting the subject, must be declared the true originator of the recent improvements in this department of physiology. It is by the test of who did the most to establish this law, that we must decide to whom we are indebted for these discoveries.[112]

By shifting from a defense of Bell on the basis of his results to a defense based on approach, Shaw could redefine the terms of the debate, denying Mayo and Magendie priority by definition and making their work appear derivative. In a sense, this defense allowed for the support of experimentalists and vivisectionists, for as Shaw pointed out, without the focus on the roots, there could be no revealing experiments on the nerves. Shaw's account also placed vivisection early in the narrative of Bell's work—Bell discovered the function of one root by vivisection and then resorted to philosophical principles to assign a function to the other root—rather than presenting it as a simple means of confirming a scheme already worked out. Shaw's defense of Bell was written for an audience of medical scientists different from that for which Bell's own work had been written. Where Bell assumed his early audience was made up largely of anti-French and antivivisectionist surgeon-anatomists, Shaw was writing to convince physiologists educated in the style of continental medical scientists. We can even see the use of the word physiology as a sort of short-hand for some of these generational differences. For Bell, physiology was just a sort of anatomy with

[112]Ibid., 7.

function and movement added, but for Mayo, Shaw, and the next generation of medical men, physiology was one of the new experimental medical sciences.

Bell regarded anatomy as the true basis of physiology and used the word physiology with caution. In his 1830 letter written to his students upon his resignation from the London University, Bell wrote, "To those who know how little I value physiology, in the common acceptation of the term, it will be a proof of my desire to see the experiment of the new school fairly tried, that I submitted to be called professor of a science (if a science it be) on which an inceptor candidate for medical degrees would read lectures more readily than I could."[113] He had a clear distaste for the discipline of physiology that was associated with vivisection and the French and a new style of medical scientist who failed to develop a proper grounding in anatomy. Bell continued his letter to his students by saying, "You are aware that the subjects on which I lectured were the higher departments of anatomy–that I reasoned on a demonstration in which my knowledge of anatomy and my experience of disease came into use as laying the just principles in the practice of your profession."[114] To Bell, anatomy and pathology were the true foundations of medical science.

Mayo and Magendie, who were of a new generation of medical practitioners and scientists, however, located themselves within a new discipline of physiology, which they considered a science in its own right, with its own experimental methods that would help them to understand the living body.[115] They called themselves physiologists to distinguish themselves from older anatomists like Bell. Herbert Mayo

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[113] Charles Bell, "Mr. Bell's Letter to His Pupils of the London University, on Taking Leave of Them," *London Medical Gazette* 7 (1830), p.308-11.
[114] Shaw, *Narrative of the Discoveries of Sir Charles Bell*, 7.
[115] See Andrew Cunningham, "The Pen and the Sword: Recovering the Disciplinary Identity of Physiology and Anatomy before 1800. I, Old Physiology - the Pen," *Studies in History and Philosophy of Biological and Biomedical Sciences* 33C, no. 4 (2002), p.631-65. Andrew Cunningham, "The Pen and the Sword: Recovering the Disciplinary Identity of Physiology and Anatomy before 1800: Ii, Old Anatomy - the Sword," *Studies in History and Philosophy of Biological and Biomedical Sciences* 34C, no. 1 (2003), p.51-76.

called his two most famous works *Anatomical and Physiological Commentaries* and *Outlines of Human Physiology,* while François Magendie called the journal that he founded the *Journal de Physiologie Expérimentale et Pathologie.* Even Alexander Shaw, Bell's strongest advocate, was a part of the new generation of practitioners and used the term physiology without reservation, even applying it to Bell's work in the quotation cited above: "Accordingly, whoever was the first to suggest and follow out that new method of prosecuting the subject, must be declared the true originator of the recent improvements in this department of physiology."[116] Bell's work on the nerves and the priority dispute that followed took place against the backdrop of a medical community in transition and a medical science in the making. The changes in Bell's claims to discovery help to demonstrate the changes in the audience to which he was appealing.

V. From Anatomists to Physiologists

When Bell first moved to London, surgeon-anatomists ran small schools of anatomy in their homes and taught students in hospitals that provided clinical experience for practically-minded students. Natural Theology was in vogue. Exchanges between British and French medical practitioners were limited by the Napoleonic Wars[117] and it was safe to assume that British practitioners would reject the vivisection that was being adopted as a method for understanding the body in France. In this environment, Bell began to work on the nerves, imagining both a specialist and non-specialist audience for "his discovery," which he would present to

[116] Shaw, *Narrative of the Discoveries of Sir Charles Bell*, 7.
[117] John Harley Warner, "The Idea of Science in English Medicine: The 'Decline of Science' and the Rhetoric of Reform, 1815-1845," in *British Medicine in an Age of Reform*, ed. Roger French and Andrew Wear (New York: Routledge, 1991), 138.

the scientific community through lectures at his Windmill Street School of Anatomy, thereby drawing a larger number of students who would help generate income.

By the time that Bell left London to return to Edinburgh in 1836, physiology had supplanted anatomy as the fundamental medical science. Physiology was not tied to (or tied down by) clinical experience or application in the way that anatomy and pathology were, and it did not rely on cadavers or on shared philosophical assumptions about a creator or design. What had seemed ethically problematic at the beginning of the nineteenth century was now accepted as a routine part of medical education (even if its acceptance in non-medical society was just starting to be seriously questioned).[118]

In order for Bell to defend his discovery, he had to reposition his claims to accord with the trends in British medical science. Bell's rhetorical use of anti-vivisection waned over the first third of the nineteenth century along with his emphasis on natural theology as the fundamental basis of his discovery. When Bell arrived in London, he was a part of a cohort of great surgeons and medical doctors, and of great teachers, that had made their way to the capital of practical medical education to teach in the numerous charitable hospitals and small schools of anatomy that London offered. This group, largely from Scotland, regularly dined together, worked together, and traveled in the same non-medical intellectual circles. By the time Bell left the city, the small schools had been driven out in part because large universities and hospitals had supplanted them.[119] The medical community had now clearly splintered into "scientists" and "practitioners," both of which were separate from other emerging disciplines in the sciences (Bell's idea about spreading his

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[118] Rupke, *Vivisection in Historical Perspective*, 92-102; French, *Antivivisection and Medical Science*, 15-35.
[119] Mazumdar, "Anatomy, Physiology and Surgery."; Roy Porter, "Medical Lecturing in Georgian London," *British Journal for the History of Science* 28, no. 1 (1995), p.91-9.

discovery by lecturing on it to Banks' coterie of women would have seemed entirely untenable by the 1840s).[120] The most ambitious medical scientists would have conducted and taught physiology in the style of the French or Germans, as an experimental laboratory science and not as a fundamentally practical or clinically-based science.

In this environment the politics that had determined earlier professional alliances—nationalism, party politics, birthplace, and the identity of one's teachers and relatives—were to some extent replaced by alliances built on place in the medical reform movement and other sorts of professional politics. Journals, which were overtly aligned with professional causes and with men of particular medical sects and backgrounds, demonstrated professional rank and politics visibly. In such a landscape, Bell attempted to fashion a nationalistic science of anatomy integrated with relevant pathology, that is, pathology that revealed the normal functions of anatomical structures[121] (and therefore the institutes of medicine),[122] to form what he called higher anatomy. His "higher anatomy" was a science that used experiment but did not rely on it, and he propagated that science in the classroom and through the close, small social circles and networks of patronage that ruled in the early part of the nineteenth century. While his discovery of a system of the nerves was recognized both within Britain and abroad, its underpinnings—a philosophical anatomy based in natural theology, demonstrative anatomical preservations and drawings that were revealing of the systems of the living body, and a science based in pedagogy—were not similarly

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[120] For a parallel story, see Iwan Rhys Morus, *Frankenstein's Children : Electricity, Exhibition, and Experiment in Early-Nineteenth-Century London* (Princeton, N.J.: Princeton University Press, 1998). Electrical science attracted overlapping but distinct communities of spectacle-seekers, technicians, and scientists like Michael Faraday at the Royal Institution.

[121] Bell's palsy is named after Charles Bell, who used patients' partial paralysis and his experiences cutting facial nerves to alleviate their pain to help illuminate the normal motor and sensory functions of facial nerves. Bell, *Nervous System of the Human Body*.

[122] Jacyna, "Theory of Medicine, Science of Life."

recognized. Bell's struggle to assert his priority occurred alongside a parallel and intertwined struggle to establish the sort of medical and surgical education upon which Bell built his own reputation. That world of private medical schools was quickly changing, in part through the advent of medical journals and the audiences they helped to create.

3. **Printing, Publishing, and Remaking Audiences**

When Charles Bell printed his little book *A New Idea of the Anatomy of the Brain* in 1811 and circulated it among his friends, publicizing was not the same thing as publishing. Bell planned to publicize his work, what he considered his discovery, in three main ways: by circulating a privately-printed pamphlet to one hundred important medical men, natural philosophers, and potential benefactors; by lecturing on it to a wider audience of students who would be drawn to his classroom to hear about his great discovery; and finally, when the new system of brain and nerves and all of Bell's ideas about it had been thoroughly developed—perhaps a lifelong project—by publishing a grand book of engravings, a showpiece to leave for posterity, to secure his status as a great discoverer.[1] In 1811 this was more or less the set of available options for publicizing one's work. There were many ways to establish priority or circulate one's ideas without printing them (the classroom, society meetings, informal gatherings that helped to constitute professional communities), but options for printing were few and costly.

Though certainly periodicals circulating to a general audience were available by the beginning of the nineteenth century, the majority of British medical periodicals, in particular the weeklies that developed wide audiences, were not born until the 1820s.[2] When medical periodicals did begin to circulate, however, they did so widely, with several competing periodicals becoming available within just a few years of each other. The majority of these medical journals were published in London.

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[1] See Chapter 2 of this dissertation.

[2] Roderick Macleod's *London Medical and Physical Journal* and James Johnson's *Medico-Chirurgical Review* were quarterlies that were both in existence before the 1820s, but the bulk of periodicals, and certainly the weeklies, were not founded until later. 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), Introduction.

William Bynum and Janice Wilson write, "Crudely speaking, during the century, London had 10 per cent of the population and 15 per cent of the doctors. Up to 50 per cent of the profession spent part of their training in the metropolis, almost 75 per cent of the medical journals were published there...."[3] The proliferation of journals was so rapid and altered the nature of publicizing scientific work so totally that, as described in Chapter 1, François Magendie could make the claim that Bell's work was not sufficiently public to allow him to claim priority for the discovery. Although medical periodicals started being printed later than other kinds of journals, they were a part of a general trend in publishing: the number of periodicals in Britain tripled in the first three decades of the nineteenth century.[4] By 1830 pedagogical practices had come to include periodicals—teachers recommended that students read particular periodicals,[5] and many assumed that their lectures would appear later in print.

It is very clear, based on the ways he chose to publicize his discovery, whom Bell imagined to be his audience and what level of expertise he thought they had. Though he did envision publishing a grand series of engravings in book form, he had a clear knowledge of who his audience was in 1811, and maintained that control over the next decade, since he did not, in fact, publish on the nerves until he delivered a lecture at the Royal Society in 1821.[6] In the intervening years Bell would have *known* his audience personally, as members of his classes or as professional colleagues. His audience was also a type of community, formed through direct interactions. The London medical societies, most of which were founded between 1750 and 1820,

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[3] Ibid., 34.

[4] Geoffrey Cantor writes of the increase in periodical literature: "The greatest proportionate increases [in the number of periodicals] occurred… in the late 1810s/early 1820s and in the early 1830s… the number of titles trebled in the first three decades of the new century, and the types of periodical also rapidly increased." Geoffrey Cantor, *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature*, Cambridge Studies in Nineteenth-Century Literature and Culture (Cambridge; New York: Cambridge University Press, 2004), 8.

[5] Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*, Preface.

[6] Bell, "On the Nerves."

offered the main opportunity to develop communities.[7] By 1830, medical audiences and communities had been redefined by the birth of journals; these journals brought people into contact in new ways, creating communities of people who had not met, opening up the audience for medical education, and in some ways bringing the contents of classroom practice itself to a wide reading public. Pedagogical practices came to encompass publishing, revealing assumptions that knowledge could be effectively conveyed through text.

As new audiences were brought together by the periodical press, arguments about what constituted a "public" or an appropriate audience for any given periodical became increasingly important. They were important in general publications aimed at "improving" the lower classes and in professional periodicals. In the specialized world of medical periodicals, "private" and "public" were terms initially employed when talking about publishing rights to lectures that were "private" versus those that were "public," and thus the significance of their definitions was economic. Over time, the terms instead began to signify expert and non-expert audiences. Private audiences were controlled, limited, expert. Public audiences were unknown audiences, non-expert audiences, and potentially dangerous audiences. Although radicals and men who devoted themselves entirely to publishing, like Thomas Wakley, are exceptions to this rule, most medical men whose work was published seem to have published some form of scientific or medical (rather than political or literary) text, and it is on this majority that my chapter focuses. Medical men contributed to publications meant for both private and public audiences, helping to create private, expert, medical knowledge and the sort of depoliticized, safe science meant for broad reading publics. There has been a host of texts devoted to print culture, to the constitution of a public,

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[7] Susan C. Lawrence, *Charitable Knowledge: Hospital Pupils and Practitioners in Eighteenth-Century London* (Cambridge ; New York: Cambridge University Press, 1996), 261.

and to the technology of printing.[8] My argument concerns the ways in which these sorts of issues affected, and were affected by, medical men. I will begin by looking at the role of medical men in crafting popular scientific texts like the *Library of Useful Knowledge* and Bell's Bridgewater treatise that would bring "safe science" or depoliticized science to the working class. I will then move to a discussion of the specialized, deeply political medical journals aimed at a professional, expert audience, while simultaneously attempting to achieve a wide enough circulation to survive.

I. The Society for the Diffusion of Useful Knowledge—Science for the Public

Medical men in general, and Charles Bell in particular, were heavily involved in several different kinds of efforts to educate the non-medical public about the natural world. Bell and the physician Peter Mark Roget were founding members of the Society for the Diffusion of Useful Knowledge (SDUK) in 1826, an organization that was largely the brainchild of Whig member of parliament Lord Henry Brougham,[9] and Bell also co-edited an edition of Paley's *Natural Theology* in 1835.[10] If medical journals were highly politicized and sought a specialized, expert audience, the SDUK, through its own publications and the texts that it recommended for pedagogical

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[8] Probably the most famous text dealing with "print culture" is Elizabeth L. Eisenstein, *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early Modern Europe* (Cambridge; New York: Cambridge University Press, 1979). More recent works on print culture and science in the nineteenth century include: Marina Frasca-Spada and Nicholas Jardine, *Books and the Sciences in History* (Cambridge; New York: Cambridge University Press, 2000); Kevin Gilmartin, *Print Politics : The Press and Radical Opposition in Early Nineteenth-Century England*, Cambridge Studies in Romanticism (New York: Cambridge University Press, 1996); Secord, *Victorian Sensation*; Jonathan Topham, "Scientific Publishing and the Reading of Science in Nineteenth-Century Britain: A Historiographical Survey and Guide to Sources," *Studies in the History and Philosophy of Science* 31 (2000), p.559-612; Adrian Johns, *The Nature of the Book : Print and Knowledge in the Making* (Chicago, Ill.: University of Chicago Press, 1998).

[9] Jonathan Topham, "Science and Popular Education in the 1830s: The Role of the 'Bridgewater Treatises'," *The British Journal for the History of Science* 25, no. 4 (1992), p.397-430: 399.

[10] William Paley, Henry Brougham, and Charles Bell, *Paley's Natural Theology, with Illustrative Notes* (London,: C. Knight, 1836).

purposes for a general public, tried to depoliticize the science that they thought so important for a general audience.

Brougham, in addition to being a member of Parliament, was one of the founders of the *Edinburgh Review* in 1802, as well as the motive force behind London University and one of Charles Bell's patrons. He founded the SDUK to promote "the composition, publication, and distribution of cheap and useful works."[11] SDUK publications included *The Library of Useful Knowledge* (1827-46), *The Library of Entertaining Knowledge* (1829-38), *The British Almanac* (1828-46), and *The Penny Magazine* (1832-45). They also recommended books for the libraries of Mechanics' Institutes to acquire. Many of the works that Brougham considered useful were scientific in nature, and covered a virtually encyclopedic set of subjects. These works were often written by medical men who sought to supplement their incomes, and "even more than works by geologists and astronomers, treatises by medical men were often based on lectures; some served both as student text and as reflective works for a general audience."[12] Medical men were able to parlay their teaching experience into additional income by finding other subject areas on which to publish.

The SDUK's publications, and in fact its very mission of bringing scientific knowledge to a wide reading public of the middle and lower-middle classes, were made available by new printing technologies. An edition of the SDUK's *Library of Useful Knowledge* appeared every two weeks, filled with double columns of small type.[13] Such an abundance of text was made possible by technical developments in the machinery of printing, by the steam printing machine, introduced in 1814 and

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[11] From Henry Brougham, *Practical Observations Upon the Education of the People, Addressed to the Working Classes and Their Employers* (London: Longman, Hurst, Rees, Orme, Brown, and Green, 1825); Rebecca Kinraide, "The Society for the Diffusion of Useful Knowledge and the Democratization of Learning in Early Nineteenth-Century Britain" (University of Wisconsin-Madison, 2006), 16.
[12] Secord, *Victorian Sensation*, 61.
[13] Ibid., 48-9.

widely used by 1830. Jim Secord writes, "Steam made publication possible on a massive scale and became especially important for the printing of newspapers…. The new technologies were ideal for entrepreneurs with large-scale financial backing, who could produce 'cheap, amusing and instructive' publications for a penny or three halfpennies at a time."[14] Henry Brougham himself described the importance of such new technology in the SDUK's *Penny Magazine*, saying:

> In ten days one machine produces 160,000 copies from two sets of plates. If the printing machine had not been invented it would have taken a single press, producing a thousand perfect copies each day, one hundred and sixty days, or more than five calendar months, to complete the same number. We see, therefore, that up to this point there are many conditions for the production of a Penny Magazine which could not exist except in a high state of civilization, where there were large accumulations of knowledge.[15]

The printing press itself became the exemplar of the ways in which technology could be used to spread technical and scientific knowledge. The SDUK's publications were fairly effective at selling copies and spreading their "useful knowledge." In 1832, the first issue of the SDUK's *The Penny Magazine* sold 50,000 copies within five days. After woodcuts were introduced six months later, sales had climbed to 200,000 copies per week (see Figure 3).[16]

It is clear from a casual glance at an advertisement for the *Library of Useful Knowledge* in an issue of the *Dublin Literary Gazette* from 1830 that the SDUK's definition of "useful knowledge" for a broad public involved a great deal of science

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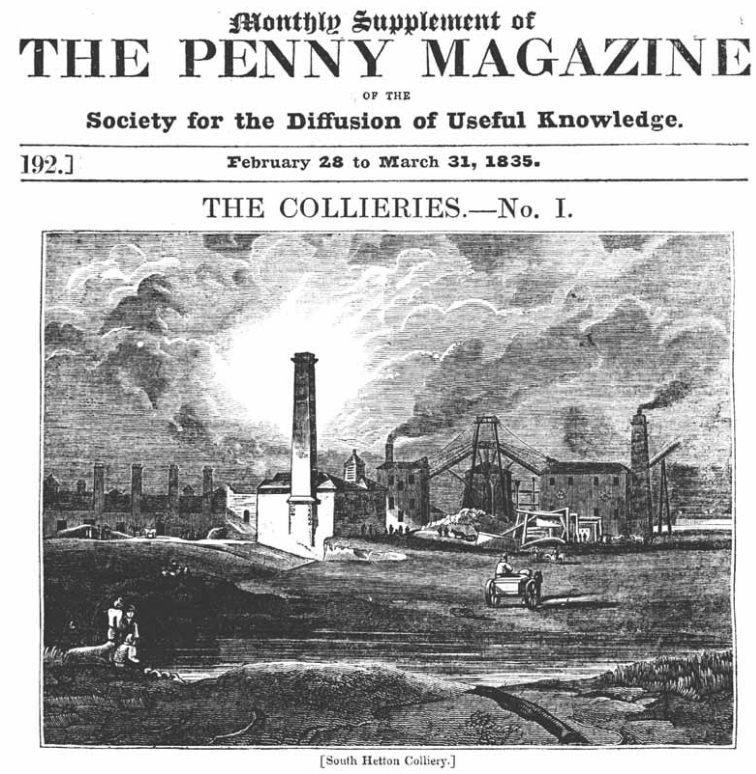
[14] Ibid., 32.
[15] Editor, "The Commercial History of a Penny Magazine " *The Penny Magazine* 2, no. 3 (1833), p.465-72: 471.
[16] Kinraide, "The Society for the Diffusion of Useful Knowledge and the Democratization of Learning in Early Nineteenth-Century Britain", 117.



Monthly Supplement of
THE PENNY MAGAZINE
OF THE
Society for the Diffusion of Useful Knowledge.

192.] February 28 to March 31, 1835.

THE COLLIERIES.—No. I.

[South Hetton Colliery.]

Figure 3. "The Collieries--No. 1." *The Penny Magazine* 1835, no. 192 (1835): 121-28. A woodcut of the sort that typically illustrated *The Penny Magazine*, here depicting the South Hetton Colliery.

and technology. According to the advertisement, subjects included:

> Natural Philosophy, Vol I. consisting of the Preliminary Treatise, Mechanics, Hydrostatics, Hydraulics, Pneumatics, Heat, Optics, and Polarization of Light. A Volume containing the History of Greece; and a Volume of Geometry… Besides these, the following Treatises have appeared, many of which are complete: an account of Lord Bacon's Novum Organum; an account of Sir Isaac Newton's Optics; Optical Instruments, Electricity, Galvanism, Chemistry, Vegetable Physiology, Animal Physiology; Thermometer and Pyrometer; Arithmetic and Algebra; Navigation; Mathematical and Physical Geography, and the Art of Brewing.[17]

The subjects addressed by the *Library of Useful Knowledge*, in fact, resemble the curriculum from Lord Henry Brougham's other pedagogical project, London University. According to Henry Brougham's 1827 *Objects, Advantages and Pleasures of Science,* science was an important part of a working-class education because it enabled the working class to become disciplined in their labors, to improve their own condition in life by making discoveries to benefit themselves and mankind, to enjoy the abstract pleasures of learning, and to understand the wisdom and goodness of the creator.[18]

In spreading scientific, often fairly technical, knowledge to a wide reading public, the Society for the Diffusion of Useful Knowledge was careful to avoid politics and religion in their publications. The Society encompassed a wide variety of Whigs, from Benthamites to Broughamites, and risked alienating those at odds with the Anglican Church if they espoused any particular form of religion within their texts.[19] Perhaps more important for maintaining their audience, however, the Society avoided any explicit mention of party politics. Although the SDUK avoided party

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[17] "Works Just Published," *The Dublin LIterary Gazette* 23 (1830), p.400.
[18] Topham, "Science and Popular Education in the 1830s: The Role of the 'Bridgewater Treatises'," 405.
[19] Ibid.

politics, in part to avoid the stamp tax that was associated with political weeklies and that would have made it impossible to sell periodicals cheaply,[20] they did attempt to counter radical politics with their safe, rational, dispassionate science. It is no coincidence that *The Penny Magazine* was founded in the early 1830s,[21] at a time when, according to Kinraide, "Radical periodicals filled their pages with warnings against the [Whig-sponsored] Reform Bill[22] and the turncoat Whigs…."[23] Brougham's introduction to the *Library of Useful Knowledge* claimed that science "elevates the faculties above low pursuits, purifies and refines the passions, and helps our reason to assuage their violence."[24] *The Penny Magazine, The Library of Useful Knowledge*, and other SDUK publications offered an alternative to such radical periodicals and cheap broadsides, one that was meant to engage the intellect with safe science that was bound to result in moral improvement, according to its proponents.

It is clear that while scientific publications like medical journals were intended for an expert, and therefore narrow, readership (as I will describe in further detail later in the chapter), there were many scientific publications, particularly those produced by the SDUK, that *were* intended for a wide reading public. Although medical men were involved in both endeavors, the medical journals took a very different form from publications by the SDUK. Both were highly technical, but the medical journals were

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[20] According to Rebecca Kinraide, "The final topic that the SDUK claimed to avoid was politics… The term 'politics' was used by the SDUK to refer to issues directly relating to political parties or to electoral or legislative happenings, such as bills under discussion in Parliament.… From a practical standpoint, 'politics' referred to anything that could make a publication liable for the stamp tax. The tax required any publication appearing more often than every 26 days, carrying news of recent events or of a political nature, and costing under six pence (before tax) to pay four pence per issue for the stamp. This fee would make it impossible for the SDUK to sell any publication for six pence (or especially one penny in the case of *The Penny Magazine*). Kinraide, "The Society for the Diffusion of Useful Knowledge and the Democratization of Learning in Early Nineteenth-Century Britain", 93.
[21] Topham, "Science and Popular Education in the 1830s: The Role of the 'Bridgewater Treatises'," 404.
[22] See Chapter 4
[23] Kinraide, "The Society for the Diffusion of Useful Knowledge and the Democratization of Learning in Early Nineteenth-Century Britain", 123.
[24] Henry Brougham, *A Discourse of the Objects, Advantages, and Pleasures of Science* (London: Baldwin, Cradock, and Joy, 1827), 2.

openly political, while SDUK publications avoided politics carefully. Notions of private and public, which were constructed by Bell and his contemporaries in relation to notions of expertise (private audiences for medical publications were expert audiences, while public ones were non-expert), are important to understanding early attempts made by medical men to spread science through print. There is evidence, even from supporters of the SDUK, however, that non-expert audiences were not as receptive to highly technical, depoliticized knowledge as men like Brougham hoped. Though all the technical mechanisms were in place for cheap, widely available periodicals to bring safe science to the masses, the SDUK's ambition to educate the lower classes about science and technology, to bring them depoliticized knowledge, seems to have been successful to a limited extent only, even according to its proponents.

Despite his interest in pedagogy and his involvement in the SDUK, Bell had doubts about some of the SDUK's activities, some of which are revealed in his letters. He seems to have believed the contents of SDUK publications redundant, as he wrote to his brother in 1831 that "the encyclopaedists are all writing the same stuff. And here are eight men more to wear the subject to the bone—all the same work."[25] He also thought it unlikely that SDUK works were reaching their intended audience and seems to have wanted to disassociate himself from that audience:

> That indefatigable fellow [Brougham] is to write the article 'Hydraulics' for the Library of the Society, which you call 'a new society for mechanics;' but I beg you to understand that I do not consider it in that light at all. It is more intended for the rich than the hammermen. Brougham has also written the introductory discourse, and all the correspondence goes through him."[26]

[25] Bell, *Letters of Sir Charles Bell*, 320 (September 3, 1831).
[26] Ibid., 295 (January 19, 1827).

The last sentence is significant because it makes it clear why Bell involved himself, even when he thought that the work was unnecessary and the intended audience was the wrong one: Brougham was a powerful politician and patron whose influence Bell courted. But Bell clearly had some concerns about the appropriateness of a broad, working-class audience, even for apolitical science.

There is other evidence as well that the SDUK was not overwhelmingly successful in its efforts. James Secord has suggested that the treatises were often too technical for their readership, saying, "A few of the titles sold well, but Brougham's utopian hopes were not borne out;"[27] and Rebecca Kinraide has made a similar point.[28] The founding of *The Library of Entertaining Knowledge* in 1829 is, in itself, evidence that *The Library of Useful Knowledge* was not reaching all of the audience that the SDUK desired. *The Library of Entertaining Knowledge* included topics like *An Account of the Manners and Customs of Modern Egyptians, Vegetable Substances Used for the Food of Man, The Menageries: Quadrupeds,* and *British Costume*.[29] It provided superficial overviews of miscellaneous, and often less scientific, topics. This in itself seems to be reasonably good evidence that depoliticized, technical treatises were not widely appealing, that the public for whom they were supposed to be good was in the market for something else—and also good reason why journals like *The Lancet*, in order to sell more copies, even to an expert audience, employed a clear political perspective and sensational stories.

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[27] Secord, *Victorian Sensation*, 48-49.
[28] Kinraide, "The Society for the Diffusion of Useful Knowledge and the Democratization of Learning in Early Nineteenth-Century Britain", 109.
[29] Edward William Lane, *An Account of the Manners and Customs of the Modern Egyptians*, The Library of Entertaining Knowledge (London: Charles Knight and Co., 1837); *Vegetable Substances Used for the Food of Man*, The Library of Entertaining Knowledge (London: Charles Knight, 1832); *The Menageries: Quadrupeds, Decribed and Drawn from Living Subjects*, Library of Entertaining Knowledge (London: Charles Knight, 1830); J. R. Planché, *History of British Costume*, The Library of Entertaining Knowledge (London: Charles Knight, 1834).

II. Potential Pitfalls of Publics: Professional Expertise, Popular Audiences, and Bell's Bridgewater Treatise

If the SDUK tried to provide safe scientific knowledge in periodical form, the Bridgewater Treatises that it recommended to libraries and readers undertook a similar mission, hoping to gain a readership with safe science and a less technical science than was found in some of the SDUK's productions. The Bridgewater Treatises, which were unrelated to the SDUK, but which were recommended by the Society for a time, were established by the Earl of Bridgewater to address "the Power, Wisdom, and Goodness of God, as manifested in the Creation," contained works on geology, astronomy, chemistry, and on animal and human physiology, among other subjects.[30] Jonathan Topham has argued, however, that they were used more as pedagogical tools for teaching science than they were for teaching theology, that they "were valued for their safe science, rather than the strictly demonstrative functions of their natural theology."[31] The Bridgewater Treatises offered systematic and thorough studies of scientific topics. The argument from design was thought to be easily understood and broadly applicable, and therefore it underpinned attempts to teach anatomy and physiology to a "popular" audience. Unlike periodicals, they were not terribly cheap, and thus were not as widely accessible as periodicals were to a working-class public, but they were frequently owned by Mechanics' Institutes and were clearly non-specialist.

Bell took particular pains to maintain his position as an authority when writing for a non-expert audience. It is clear that by the time that Bell became involved in writing his Bridgewater Treatise and in illustrating Brougham's edition of Paley's *Natural Theology*, the notion of "public" as being non-expert had congealed in a way

[30] Jonathan Topham, "Beyond the 'Common Context': The Production and Reading of the Bridgewater Treatises," *Isis* 89 (1998), p.233-62.
[31] Topham, "Science and Popular Education in the 1830s: The Role of the 'Bridgewater Treatises'," 404.

that made a broad public potentially threatening to an author like Bell, who was always, even late in his career, looking to solidify his position within scientific and medical communities.

Bell saw his Bridgewater Treatise, *The Hand, Its Mechanism and Vital Endowments as Evincing Design*, as an exploration of ordinary human anatomy. It was, Bell thought, not particularly glamorous or sensational. Echoing *The London Medical Gazette*'s derisive rhetoric about the kinds of material that attracted popular audiences, Bell wrote, "A vulgar admiration is excited by seeing the spider-monkey pick up a straw, or a piece of wood, with its tail.… To excite attention, the motions of the human frame must either be performed in a strange and unexpected mode, that will raise the wonder of the ignorant and vulgar; or we must rouse ourselves, by an effort of the cultivated mind, to observe things and actions, of which the sense has been lost by long familiarity."[32] His ambivalence toward a popular audience that found vulgar curiosities appealing is clear. He was not seeking the sort of audience that gravitated toward *The Library of Entertaining Knowledge* rather than *The Library of Useful Knowledge.* Bell proposed to excite an "effort of the cultivated mind" instead of such easy and vulgar attractions with his exploration of the commonplace. Rather than relying on a sensational subject matter (a form of science that Bell seemed to think did not help to produce a "cultivated mind," which was the main reason to bring science to a popular audience at all), Bell instead relied on the ordinary hand as symbolic of divine perfection and human progress,[33] along with illustrations throughout the text, to attract a general reader.

Bell addressed his concerns about writing such a popular and religious treatise by declaring himself unbiased and his interest in the subject matter authentic rather

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[32] Bell, *The Hand, Its Mechanism and Vital Endowments as Evincing Design*, 10.
[33] Ibid., 273-4.

than forced by the request to write on the subject. "When one has to maintain an argument, he will be listened to more willingly if he is known to be unbiassed [sic], and to express his natural sentiments. The reflections contained in these pages have not been suggested by the occasion of the Bridgewater Treatises, but arose, long ago, in a course of study directed to other objects."[34] He also writes directly in the Preface of the potential risks of writing such a popular work:

> The author cannot conceal from himself the disadvantages to which he is exposed in coming before the public, not only with a work in some measure extra-professional, but with associates distinguished by classical elegance of style, as well as by science. He must entreat the reader to remember that he was, early and long, devoted to the study of anatomy*;* and with a feeling (right or wrong) that it surpassed all others in interest and usefulness.[35]

It is, in one sense, a humble passage asking the reader to excuse the author for anything he might find lacking in style. But in another sense it is a proclamation of expertise and professional authority. One should excuse a lack of style, Bell is saying, because he has devoted his life to the study of anatomy. It is interesting that he uses the word "extra-professional," clearly calling anatomy a profession and distinguishing this particular publication and its audience as outside the profession. Such demarcations were made necessary by the development of separate professionalizing communities and broad reading publics, both of which were constituted as communities by publications that catered to them.

Bell was particularly concerned by Lord Brougham's request that he illustrate Paley's *Natural Theology,* fearing that his reputation could be compromised. He wrote to his brother in 1835: "It has always occurred to me that Paley's works are unfit to build upon—that their simplicity and almost childishness have been the

[34] Ibid., v.
[35] Ibid., vii.

sources of the popularity of that book, and that my illustrations would be liable to such criticism as is applicable to an artist who rears cumbrous heavy columns on a light ornamental frieze."[36] Such popular works had the potential to be lucrative, particularly when requested by a patron like Lord Brougham, but Bell feared that they weren't serious enough and that they could diminish his professional reputation. He wrote in that same letter that Lord Brougham's "fault has been attempting too much, and his weakness in doing things the most opposite in their nature at the same time."[37]

Publicly, Bell flattered Brougham, his benefactor, but he did so in a way that also attempted to buoy his own professional reputation, which was tied up with Brougham's. He wrote that his own conclusions in *The Hand* "were not the peculiar or accidental suggestions of professional feeling, nor of solitary study, which is so apt to lead to enthusiasm"; and that his proof that his own work was not a product of "enthusiasm" was that he had been asked by Brougham to illustrate *Natural Theology*, indicating "that the powerful and masculine mind of Lord Brougham was directed to the same objects [natural theology]; that he, who in early life was distinguished for his successful prosecution of science, and who has never forgotten her interests amidst the most arduous and active duties of his high station, encouraged and partook of these sentiments."[38] The gendered nature of the language could be dissected profitably by another, I am sure, but what Bell was trying to make clear was that his interest in natural theology was no fleeting enthusiasm, no passion of the sort that motivated a casual observer, but instead was a serious endeavor, a long-standing, professional engagement.

Charles Bell, a founding member of the SDUK, author of a Bridgewater Treatise, and illustrator of an edition of *Natural Theology*, is often thought of as a

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[36] Bell, *Letters of Sir Charles Bell*, 339 (March 29, 1835).
[37] Ibid.
[38] Bell, *The Hand, Its Mechanism and Vital Endowments as Evincing Design*, vi.

popularizer of science, but as with all of his pursuits, his work in popular literature was complicated. He clearly was somewhat ambivalent about the SDUK's attempts to reach a broad audience and about his own involvement in Brougham's other attempts to bring science to the public. Secord has written, "New notions of authorship accompanied the new genres. Original work in science depended on the credibility of the authors in a way that fiction and poetry did not."[39] Secord is saying that the perceived expertise of the author, rather than the value of what was written, helped to determine the fate of scientific work. It seems that Bell believed that his involvement in popularization could threaten his credibility as an expert in the scientific and medical communities. One's position as an expert, as a purveyor of private knowledge, Bell feared, could be compromised by becoming too involved in attempts to appeal to a public audience.

III. Early Forays into Medical Journalism—the Politics of Readers

Specialized, expert audiences were being developed through the building of medical journals at the same time that the SDUK was courting a general audience. By 1830, a medical student in London looking for guidance or for the contents of London's medical lectures could turn to a variety of periodical sources. Taken together, the amount of information to which such students had access is almost overwhelming. The two primary medical journals in London, *The Lancet* (f. 1823) and *The Medical Gazette* (f. 1827), were both weekly journals. Weeklies were the most likely journals to be politicized, as they were published frequently enough to include relevant and timely political commentary and had space for things like letters.[40] Both *The Lancet* and the *London Medical Gazette* produced almost 2,000

[39] Secord, *Victorian Sensation*, 43.
[40] "Frequent publication gave time and space for leaders, correspondence and political comment. It created the potential for the medical journal to be an instrument of reform in ways that quarterlies or

pages per year. As previously mentioned, both journals had clear political positions. In addition, medical men could turn to *The London Medical and Surgical Journal* (f. 1828), which espoused radical politics and was published as a monthly until 1832 and then became a weekly; *The Medical-Chirurgical Review* (f. 1820), an expensive, moderate quarterly; and, of course, the non-specialist journals like the *Edinburgh Review,* in which matters of general interest were published.[41] Medical men could choose which journals to read and also, if they used the journals as a means of free publishing and publicizing of their work, could choose where to publish. In doing so, they were choosing a set of politics. Contemporaries recognized the political nature of journals. The editors of the *London Medical and Surgical Journal* wrote about the politics of major medical journals with some disdain in 1834:

> It is generally the policy of a journal to set itself up as the advocate of this or that party; and, by a devoted attachment to its interests, by respecting—or lauding ill prejudices, by denying or palliating its defects, and, above all, by heaping opprobrium upon the antagonist faction, to earn an interested support. Of the nature of this exaggerated advocacy in state politics, the public is so well aware, that none but the most violent adopt the opinions, or credit the unauthorised statements of a newspaper on either side…[42]

The politics of a medical journal often got wrapped up in its strategies to appeal to a wider audience, strategies to save the journal from being strictly technical. Thus the journals both broadened their appeal to those outside the medical community and restricted it to those with particular political leanings simultaneously. The March, 1828, account of a surgery to remove a bladder stone, a lithotrity, by Bransby Cooper,

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even monthlies could never have aspired to." Bynum and Wilson, "Periodical Knowledge: Medical Journals and Their Editors in Nineteenth-Century Britain," 38.

[41] Desmond, *The Politics of Evolution*, 15-16.

[42] Editor, "Medical Journalism--Notice of Parliamentary Inquiry," *The London Medical and Surgical Journal* 5 (1834), p.55-7: 55.

serves as a nice example of this. *The Lancet*, whose editor, Thomas Wakley, thought Bransby Cooper—nephew of the famous surgeon Astley Cooper, who had attained a hospital position, arguably, on the basis of his family name—embodied all that was wrong with London medical politics, chose to depict this botched surgery in an unusually entertaining fashion.[43] Though the surgery was described in the normally serious set of columns entitled "Hospital Reports," this particular report was written as a theatrical drama. At the beginning of the article, the stage is set, the play is declared a tragedy, and the characters are introduced: "The performance of this tragedy was nearly as follows. Act 1. The patient (a labouring man from the county of Sussex, thick set, ruddy and healthy in appearance, and 53 years of age) was placed on the operating table, at a few minutes past one o'clock, on Tuesday the 18th. The only one of the surgical staff present, besides the operator, was Mr. Callaway."[44] The patient, the audience learns, was tied down, the surgery begun. It is clear from the outset that it is a tragedy with comic elements—the surgery is bad from the outset, but Bransby Cooper's lines are also meant to amuse. When he cannot manage his instruments, cannot find and remove the stone, he asks for his famous uncle's tools and declares, "'I really can't conceive the difficulty—Hush! Hush! Don't you hear the stone?'—'Dodd (turning to the Demonstrator), have you a long finger? Give me another instrument—Now I have it! Good God! I can hear the stone when I pass the sound from the opening but the forceps won't touch it—O dear! O dear!.... Every now and then there was a cry of, Hush! Which was succeeded only by the horrible squash, squash of the forceps in the perineum.'"[45] The "play" ends with the surgeon "flourishing" the forceps above his head and speaking to the students present while the

[43] Ruth Richardson, *Death, Dissection, and the Destitute*, 2nd ed. (Chicago: University of Chicago Press, 2001), 46.
[44] Editor, "The Operation of Lithotomy by Mr Bransby Cooper Which Lasted Nearly One Hour!," *The Lancet* 1828, vol. 1 (1828), p.959-60: 959.
[45] Ibid.

patient lies on the table. The article then moves into a relatively technical discussion of the postmortem examination (the patient, its author says, died 29 hours after the surgery) explaining indications that Bransby Cooper had been incorrect in his assessment of the situation: the perineum was not deep, as Cooper had thought; the wound was a mess and seemed to penetrate organs; etc.

The form of the piece makes it accessible and entertaining—a satire for surgeons that was also appealing to a broader audience. It also makes the politics of the journal impossible to ignore. The drama is unsparing in its depiction of Bransby Cooper, making him appear the bumbling idiot and including the line about his uncle's tools in order to remind the reader that he may be incompetent, but he is protected by privilege. But connected to the drama, which might have wide appeal to a particular, politically-defined audience even beyond the medical community, is the technical analysis of the case, saving it from being merely the stuff of political broadsides.[46] At the end of the play, it resumes the standard form of a hospital report, clearly written for a medical audience interested in the findings after death.

In response to *The Lancet*, *The London Medical Gazette* chose to reprint some of the drama itself, perhaps because it was effective at recruiting an audience and perhaps also to inflame those who would be opposed to *The Lancet*'s politics. It also printed an article titled "Cooper v. Wakley," recounting Wakley's trial for libel at great length.[47] Wakley was sued by Bransby Cooper, who accused Wakley of libel and asked for £2000 in damages. The account of the trial is actually one of the longest pieces printed in *The London Medical Gazette* during its first decade. It spans 33 pages, with letters from medical men regarding the trial occupying another six pages.

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[46] Wakley wrote a much longer account, including drawings of the bound patient and other inflammatory material: Thomas Wakley, *A Report of the Trial of Cooper V. Wakley for an Alleged Libel* (London: The Lancet, 1829).
[47] Editor, "Cooper V. Wakley," *The London Medical Gazette* Dec. 1828-May, 1829 (1828), p.65-98.

The editor of *The London Medical Gazette* writes, "The sufferings of the person who was undergoing a painful and difficult surgical operation were made the subject of a dramatic treat for the entertainment of the readers of *The Lancet*. He began his account with making some silly jokes and allusions to what he is pleased to call 'uncle's knife,' which are certainly below observation."[48] Ultimately the trial was decided in favor of the plaintiff, Bransby Cooper, at the expense of Thomas Wakley (though Wakley's supporters considered it a draw, as Cooper was only awarded £100), and therefore it occasioned an opportunity for *The London Medical Gazette* to deride *The Lancet* and its politics. But of course *The Lancet* was not alone (though it may have been most extreme and most effective) in creating entertainment for its readers: that was an important element of selling journals, even medical journals, and the oppositional politics that in one way constrained the potential audience for a journal simultaneously provided the drama and entertainment that animated the journals and therefore sought to expand audiences as well.

When Charles Bell first arrived in London, he attempted to make a place for himself professionally by asking for letters of introduction to prominent members of the community from well-placed friends back home and by attending dinners and other social functions.[49] It was how one got a foothold in the community and found students and open hospital positions. In bringing together audiences defined by the professional, medical politics in new and different ways that small face-to-face gatherings would not have allowed, these journals altered the social landscape of medicine, creating new kinds of communities. Those communities often crossed the formerly all-important boundaries of professional rank, education, and family

[48] Ibid.: 83.
[49] See Bell, *Letters of Sir Charles Bell*, 23.

background, bringing together, at least through the printed page, individuals who might not have met in person, and helping to align their interests.

IV. Reproducing the Classroom and Clinic in Print

One way that the medical journals filled their 2,000 pages per year was to print the contents of lectures given around town. Sometimes they printed those contents with the permission of the author, who would even edit the lectures, which were written up by students or others in attendance at the lectures. But in other cases, journals, particularly *The Lancet*, would print lectures without the permission of the lecturers. Thomas Wakley famously feuded with John Abernethy as well as with Astley Cooper about the publication of lectures that Abernethy and Cooper did not want printed.[50] The lectures would become the central feature in each issue of the journal, with a series of lectures extending across multiple issues of the journal. They would be featured alongside advice to students, clinical reports from the hospitals, reports from provincial or foreign medical societies, opinion pieces by the editor or by letter-writers (sometimes including letters written disputing the contents of the lectures being published), and professional happenings (lawsuits, deaths, new teaching positions).

On this issue, as on most others, *The Lancet* and *The London Medical Gazette,* and the authors who contributed to each, espoused different positions. John Abernethy summed up the argument against such publication in his *Lectures on the Theory and Practice of Surgery*, writing:

> If a person educate himself with a view to become a teacher in any department of science, he endeavours to collect, by reading, all the scattered knowledge that has been obtained; to acquire by his own observations and experiments

[50] Samuel Squire Sprigge, *The Life and Times of Thomas Wakley* (London: Longman, Green and Co., 1897), 84-88, 99.

> additional information; and to arrange and display the whole of his subject in a perspicuous and impressive manner. Should certain portions of his lectures seem worthy of general attention, he progressively publishes them; and some of the most instructive books in our profession, as they were the result of long-continued meditation and enquiry, have been thus produced. But who would labour in this manner, under the persuasion that the fruits of his exertions might be surreptitiously taken from him? If this be permitted, it must put a stop to such efforts, and materially impede the progress of science.[51]

Abernethy went on to malign the character of Wakley, calling him a person "so devoid of all good feeling and all sense of shame as to avow and defend conduct so unprincipled."[52] The issue came up again in a trial entirely unrelated to the publishing of medical lectures. In the lawsuit Bransby Cooper v. Thomas Wakley, mentioned above, Cooper used Wakley's publication of other men's lectures to demonstrate that Wakley was of a bad and untrustworthy character, motivated by profit: "for the purpose of committing plunder on the property of others, to assist himself… he should do that which would render it unnecessary for the pupils to attend the lectures, because all the advantages derivable from their attendance might be gained by reading the reports of them in *The Lancet*?"[53] The profiting from the work of another, the use of unfinished or unpolished work, the disincentive to pursue scientific advances in order to publish them, and the potential effect of rendering the classroom unnecessary, all made the publication of lectures without the permission of the lecturer objectionable to those who accused Wakley of damaging the medical community.

Wakley, on the other hand, argued that he was a "friend of a FREE MEDICAL PRESS," that he was publishing lectures to benefit medical practitioners generally and general practitioners in particular, to allow them to stay abreast of the best and most current medicine and surgery being taught in London. He also argued that the lectures

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[51] John Abernethy, *Lectures on the Theory and Practice of Surgery* (London: Longman, Rees, Orme, Brown, and Green, 1830), iii.
[52] Ibid., iv.
[53] Editor, "Cooper V. Wakley," 79.

that he published were public anyway. Wakley defended himself at length in an 1830 column entitled "Address to the Readers of *The Lancet*," writing:

> One of the accusations most constantly directed against us was, that we had published without consent—in fact, had stolen and published for our own profit, the lectures of several medical teachers. For five years we treated the accusation with silent contempt; and having thus shown our feeble opponents, that it was not in their power to lessen the influence, or decrease the sale of this work… [we chose] to make the profession acquainted with the circumstances under which the whole of the lectures had appeared.[54]

The column reminded readers that there was a distinction between a public teacher and a private one, saying that *The Lancet* recognized the lectures of private lecturers as private property and thus had never printed such lectures without the consent of the lecturers. *The Lancet* determined a lecture to be public when it was delivered within a public hospital (lecturers had always charged for attendance at their lectures in hospitals as well as in private buildings, but the site of the lecture being in some way public defined the nature of the lecture for Wakley) and applied this principle in the dispute with Abernethy, where it was upheld in court. Wakley then listed the names of lecturers who had consented to have their lectures published for the sake of "public utility" and in some cases had even assisted the journal by editing the articles.[55] It quickly became clear that any lecture delivered in a public venue was likely to be printed somewhere and it therefore made sense, at least to some, to cooperate and oversee the publication of one's work.

Another practice that was begun by *The Lancet,* objected to by some on the grounds that it violated notions of public and private, and that eventually became ubiquitous, was the publication of hospital reports. If the reprinting of classroom

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[54] Thomas Wakley, "Reply to the Slanderers," *The Lancet* 1830, no. 1830, vol. 1 (1830), p.1-5: 4.
[55] Ibid.

lectures offended some, reproducing clinical experience through print was even more controversial. *The Lancet* began reporting on cases in London's charitable hospitals in November of 1823, and by November 16th of that year they had reported on the first case that ended in a fatality.[56] Cases were narrated as serials, sometimes suspensefully stretching across several issues. Wakley saw his role in printing hospital cases as serving two ends: they could serve to educate practitioners as to the nature of contemporary practice in London, but they could also highlight corruption and incompetence in London's hospitals. In an 1899 biography of Wakley, Samuel Sprigge wrote that hospital surgeons "might conceal things awkward to themselves or their hospitals, in which case it would be *his* [Wakley's] duty to reveal them."[57] It did not take long for a variety of objections to surface.

The hospitals realized almost immediately that Wakley's reporting would not serve them well, as Wakley was inclined to highlight the worst elements of hospital practice. Several hospitals quickly barred him, or anyone they discovered who reported to him, from their grounds.[58] *The Medico-Chirurgical Review*, one of the few competing medical journals in 1823, a quarterly edited by James Johnson, wrote of Wakley's practice: "No man can command success in surgical operations; and if a surgeon fails from want of dexterity he suffers mortification enough, heaven knows! in the operating-room, without being put to the cruel and demoniacal torture of seeing the failure blazoned forth to the public!"[59] Wakley mocked Johnson's characterization of the fragile surgeons, but *The Lancet*'s Hospital Reports continued to be the subject

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[56] Sprigge, *The Life and Times of Thomas Wakley*, 105.
[57] Ibid., 106.
[58] Editor, "Hospital Reporting," *London Medical Gazette* 1828, vol. 2 (1828), p.120-1: 120-21.
[59] Sprigge, *The Life and Times of Thomas Wakley*, 112-13. "'This latter,' said Wakley, 'is so monstrous a proposition that, prepared as we were for the imbecilities of the Hole-and-corner champions, we were somewhat staggered at the impudent absurdity with which it is advanced. Not a scintilla of compassion does the Hole-and-corner advocate suffer to escape him for the victim of the surgeon's want of dexterity; all his sympathy is reserved for the ignorant operator.'"

of criticism, for both style and substance, throughout the decade.

The London Medical Gazette, which published its own column of hospital reports, wrote a multi-part commentary on *The Lancet*'s use of hospital reporting. The article was particularly critical of the unserious style of *The Lancet*'s column: "The purpose of such reports has no characteristic of honesty about it: its object is not to communicate information—because the simplest statements would answer that purpose—but to *attract*; and where one reader attends to a dry record of facts, ten we know will be gained by *embellishings*—especially when these involve the character and conduct of eminent individuals. *Misrepresentation is the main-wheel of the machinery.*"[60] In addition to the criticism of *The Lancet* for not being properly serious, for being written for the entertainment of audiences rather than for the education of practitioners, *The London Medical Gazette* accused *The Lancet* of improperly making the private public:

> We deny that the treatment of disease is a thing that falls under the cognizance of the public judgment, or ought to be brought under their notice. That surely cannot be deemed a public matter which the public cannot understand: and of medical and surgical matters the public are singularly and pre-eminently ignorant, and of course are singularly and preeminently liable to be deluded…. That, again, is not public which is not practised with open doors. That, again, is not public which is accessible only upon payment of fees:—what is *so* attainable, is strictly a private concern.[61]

The London Medical Gazette, in other words, argued that hospital reports should not be written in a style that might appeal to the public because the knowledge contained therein was only accessible to experts and not to the public. The argument about what was private and what was public had crucially to do with control over audience. William Bynum describes the increasing specialization of scientific journals in the

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[60] Editor, "Hospital Reporting," *London Medical Gazette* 1828, vol. 1 (1828), p.697-701: 697.
[61] Ibid.: 698.

nineteenth century, saying that it was defined by two trends: a move toward editorial boards by journals and the increasing significance of professional gains rather than financial ones for the editor.[62] He also describes an increasing reliance on footnotes and disallowance of the anonymity that was so common in early medical periodicals as markers of the professionalization of journals.[63] Such trends toward creating an expert, and therefore controlled, or private, audience, made the titillating reporting done by *The Lancet* threatening. According to the *Gazette,* hospital reports had the potential to be sensational and could be presented in an entertaining or scandalous manner, so they had to be carefully crafted in such a way that they would only be read by their appropriate audience—the specialized audience of medical experts who could understand and learn from them. *The London Medical Gazette* also argued that hospitals were not public spaces, that they were not institutions with open doors, and that the lectures the hospitals hosted were also private because students paid to attend them.[64] This argument mirrors the argument made about the reprinting of other medical and surgical lectures. "Private" and "public" were terms very much up for debate in the newly burgeoning periodical press, but even in conservative medical journals like *The London Medical Gazette*, the trend was toward printing lectures, both classroom and clinical. Even early issues of *The London Medical Gazette* were filled with lectures, much like *The Lancet.* It just attempted to obtain permission from lecturers and maintained better relationships with them.

These articles changed medical education. They made it possible to survey the contents of a course without actually paying to attend it, but they also made it possible for a teacher to build a reputation through print rather than through word of mouth, as

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[62] Bynum and Wilson, "Periodical Knowledge: Medical Journals and Their Editors in Nineteenth-Century Britain," 43.
[63] Ibid., 56.
[64] Editor, "Cooper V. Wakley," 83.

students could select instructors based on their publication record. Journals brought the most recent medical developments and lectures of London to practitioners in the provinces, who had previously been disconnected. It is clear that some lecturers actively courted publication in these journals as a way to publicize their courses and their work,[65] while others saw the journals as threatening classroom attendance or, more commonly, sales of later publications in book form. Charles Bell, despite having been criticized by Magendie for not having publicized his discovery sufficiently, was always looking for benefactors to pay for his publications early in his London career, and seems to have embraced medical journals by the mid 1820s, as he was a regular contributor to *The London Medical Gazette*. Wakley suggested that lectures would be useful to licensed practitioners who wanted to stay up-to-date,[66] and perhaps that is how they were used, as they seem to have fallen into an easy coexistence with classroom lectures, rather than supplanting them. Of course such printings did not allow for the inclusion of the visual displays that constituted so much of classroom experience, but they did attempt faithfully to reproduce the words of the lecturers.

In some ways, therefore, the classroom, at least the public classroom and the classroom of the consenting private lecturer, was opened up, its audience expanded to include even some provincial practitioners. Most often lectures were printed in the journal whose politics accorded with those of the lecturer. If a lecturer sought to have his lecture printed, he would need to choose a journal to which he would give access and permission and, with it, a set of medical politics and an audience. On the one hand, the journals expanded the audience for medical lecturing, bringing together doctors, surgeons, and apothecaries in a forum that united medical professions in a way unlike any that had existed previously, they also splintered the medical

[65] Wakley, "Reply to the Slanderers," 4-5.
[66] Ibid.

community in new ways, ways that were explicitly based on politics and not on medical sect, place of birth, or social connections.

While medical journals were reconstituting medical audiences, reprinting lectures, and defining for themselves the nature of public and private, there were other organizations making similar attempts to spread knowledge, define readers for science, and modify notions of public.

IV. Conclusion

The wide availability of printed literature, particularly periodicals, in the early nineteenth century altered the landscape of British medicine, creating new publics and new pedagogical spaces. Politicized medical periodicals created new medical communities. Previously communities had been formed by local societies or organizations or had been composed of individuals who were born in the same geographical region and thus had letters of introduction from friends or relatives in common. Medical communities did not often transgress professional boundaries: apothecaries associated with other apothecaries, not with medical doctors or surgeons. Medical periodicals brought together professional communities across geographic regions and professional affiliations, bringing together instead communities of practitioners with similar professional agendas. These periodicals also helped to create notions of expertise and professionalism—expertise and professionalism that had to be maintained while achieving the sometimes contradictory aim of developing a wide readership.

These periodicals altered the definition and significance of 'public' and 'private' as they pertained to medical teaching and medical audiences. Journals filled their pages with accounts of classroom lectures and hospital cases, reproducing the classroom in print. In doing so, they threatened the standard systems of remuneration

in medicine: medical men taught in order to supplement their incomes and published their lectures, usually, at the end of a career. Journals and teachers, therefore, disputed the nature of the spaces in which lectures were held, arguing over whether they were public or private and whether the journals were entitled to print what went on in those spaces. Relatively quickly, however, "public" and "private" came to be terms that described audiences and expertise—the stakes of periodical publication for individual authors/lecturers had to do with maintaining the right stance as experts.

Public audiences were broad and non-expert. Only particular kinds of knowledge were thought suitable for such readers. Professional (and therefore controlled, private) audiences could be exposed to science that was political in nature or that had an element of sensationalism to it. It was thought, however, that the public required science that had been stripped of its sensationalism and its politics. Working-class audiences who had access to newly inexpensive political weeklies were threatening to those who feared that the passions of the working class might lead to revolution. Groups like the Society for the Diffusion of Useful Knowledge used their own periodicals like *The Library of Useful Knowledge* as well as conservative scientific texts such as the Bridgewater Treatises to advance safe, depoliticized, rational knowledge of nature as an antidote to the frightening passions of an angry working class. Such texts were often written by medical men, who had experience lecturing and who needed the additional income, but those medical men had to cultivate public audiences without acquiescing to the public's demands for sensational knowledge so as to preserve their own positions as medical experts. Men like Bell were deeply concerned about achieving such a balance.

The ways in which "publics" were defined by medical men writing in different contexts tells us a great deal about expertise, pedagogy, and reform during this period. As public audiences for scientific knowledge grew through widely available and

cheaply produced print, new expert communities were also developed, and particular kinds of texts were developed for those communities. Medical pedagogy was altered by the ability of lecturers to "speak to" audiences that they did not know, and the early forays into publishing by medical men reflect their attempts to figure out how best to do so while maintaining both their incomes and their expertise.

4. **Rhetoric, Reform, and Revolution: Making "British Medicine" in Early Nineteenth-Century London**

An October, 1829, editorial entitled "Hints to Pupils" in the *London Medical Gazette* begins,

> The most cursory glance at the advertisements on our wrapper during the last month, must convince the student of at least one important fact—that there are plenty ready to *teach*, whatever he may be able to *learn*; and although there be some whose vocation in this way begins and ends with the advertisement, yet it is undeniable that no capital in Europe presents an equal number of efficient, and even of eminent teachers [emphasis in original].[1]

And yet most historians do not see Britain as the center of the nineteenth-century medical world. For them it is late nineteenth-century developments like the application of medical experimentation, the use of anaesthetics, and the introduction of laboratory medicine, all of which were imported to Britain from the Continent, that signaled the development of scientific medicine in Britain. I will argue instead that early nineteenth-century Londoners saw themselves as advancing the practical science of medicine through education. Pedagogy became the center of British medical improvement and the site at which medicine and science were first integrated. London reformers developed particular ways of defining British medicine and its strengths and argued for reform in ways that complemented those definitions.

A variety of medical reform movements existed in the early nineteenth century alongside reform movements of other sorts, including those that were political in nature.[2] Many medical reformers tapped into a rhetoric of reform that was available

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[1] Editor, "Hints to Pupils," *London Medical Gazette* 5 (1829), p.15-8: 15.
[2] The Reform Act of 1832, the first great reform act and one that expanded the franchise, was debated and passed while many of the medical reforms described in this chapter were being enacted.

from the political sphere, and some players in political reform movements also had influence on medical reforms, but the medical reform movement had its own issues and politics that diverged from national politics as well, and to some extent the politics of the medical reform movement not only drew from, but also helped to make, national politics. Those medical reformers who emphasized practical skills and systematic education, and who might therefore be portrayed as more conservative when compared with their experimentalist brethren, had more immediate success in shaping what constituted medical science and medical education in Britain, and they will be the focus of this chapter. It will evaluate the rhetoric of medical reform, examining reform through the eyes of its proponents.

I will begin by briefly defining again the groups that I call radical and conservative reformers. Adrian Desmond's "radical reformers" in *The Politics of Evolution* were medical men who imported Continental life sciences such as morphology and philosophies like materialism. Desmond's work has defined those reformers for other historians since its publication.[3] Their counterparts, the group that I call "conservative reformers" because they employed a rhetoric of tradition in their calls for reform, are recognized only as conservatives or as members of the establishment by Desmond and subsequent historians. Conservative reformers saw some room for improvement in the British medical world, but argued for incremental changes, particularly in educational requirements and licensing laws, and small modifications and the improvement of a system already in place, rather than revolutionary overhaul of medical institutions. While true conservatives (non-reformers) did exist—often at places like Oxford and Cambridge—true conservatives who saw no need to implement any changes were hard to come by in London, and thus were a group invoked by reformers to make a point rather than a group that offered

[3] Desmond, *The Politics of Evolution*.

significant opposition. As I show in sections II and III on the defining of traditional British medicine and its strengths and on conservative reformers' proposals for circumscribed reform, respectively, these men created an idea of the British medicine that they hoped to conserve, defining it in opposition to French medicine. What they define as British medical traditions are, to some extent at least, their own creations—Harvey, invoked by Bell, as was described in Chapter Two, as British medical hero, was also a vivisectionist, for example, so there was no long British history of humane practitioners.[4] Still, despite their reliance on British tradition, these conservative reformers had real ambitions for moderate reform, ambitions that were often realized. Tensions between the groups of reformers came to a head in the discourse surrounding the proposal for the London College of Medicine, a new licensing corporation, that took place in 1831. In subsequent chapters I will address institutional changes, and visual displays and classroom practices in a London medical education, but here I focus on the rhetoric and the ambitions of reformers.

I. Various Calls for Reform

During the first three decades of the nineteenth century, many proposals were circulated regarding reform in medical education. These proposals became numerous and their proponents very vocal by the 1820s, aided by the dialogue and audience generated by medical periodicals.[5] While historians have often recognized the radicals of the reform movement, the movement itself was broad and comprised many groups.

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[4] Anita Guerrini, "The Ethics of Animal Experimentation in Seventeenth-Century England," *Journal of the History of Ideas* 50 (1989), p.391-407.

[5] See Charles Newman, *The Evolution of Medical Education in the Nineteenth Century* (London, New York: Oxford University Press, 1957); Irvine Loudon, "Medical Practitioners 1750-1850 and the Period of Medical Reform in Britain," in *Medicine in Society*, ed. Andrew Wear (Cambridge: Cambridge University Press, 1992).

In this section I offer a rough sketch of the contours of the groups of radical and conservative reformers and some of their basic principles.

Ia. London's Radical Reformers

For some, the sense that the British medical sciences were falling behind those of their continental rivals provided the impetus for change.[6] Here I will address only briefly and generally the makeup and reformist positions of this group. Those who wanted to overhaul the British medical system and who talked about importing Continental (often Parisian) styles of medical education have been described by Adrian Desmond,[7] as well as by medical scientists of the late nineteenth century who talked about the heroic struggle to bring science to Britain a generation earlier.[8] Radicals like Thomas Wakley, founder of *The Lancet*, proposed that British medical education and research be refashioned after the French model, in which medical sciences like experimental physiology, pathology, and morphology were being developed in centralized institutions at which faculty received salaries. This movement was born in the aftermath of the Napoleonic Wars. As tensions between Britain and France cooled, more and more students sought to complement their medical education at home with study in Paris.[9] Some returned convinced of British medical superiority, but others were impressed by the experimental physiology of François Magendie, the surgical accomplishments of Baron Guillaume Dupuytren, and the new stethoscope and auscultation methods of René Laennec, as well as the

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[6] According to John Harley Warner, "While the theme of decline in professional rhetoric emerged out of the upheaval of English medical culture, its persistent point of reference was medical ferment on the other side of the Channel." Warner, "The Idea of Science in English Medicine," 137.
[7] Desmond, *The Politics of Evolution*, Chapters 2-4.
[8] See, for example, Thomas Henry Huxley, *Science and Culture, and Other Essays* (New York: D. Appleton and company, 1882).
[9] See Warner, "The Idea of Science in English Medicine," 138; Russell Maulitz, "Channel Crossing: The Lure of French Pathology for English Medical Students, 1816-1836," *Bulletin of the History of Medicine* 55 (1981), p.475-96.

superior financial circumstances of those teaching medicine in Paris.[10] In one 1832 editorial review in the *London Medical and Surgical Journal*, written by a Londoner who admired the French, for example, French medical science stood as an ideal to strive for and a bit of a reproach to the British medical scientists and the populace they served:

> The steady and rapid progress of the medical sciences during the present century, has been in a great measure owing to the minute and systematized researches of the French school of pathologists. Much of their superiority over ourselves may be fairly ascribed to the wisdom of their hospital regulations, which enforce the universal inspection of the dead, and to the entire emancipation from prejudice on this subject of the popular mind.[11]

This sort of critique, suggesting that the British were not doing enough to advance medical science, was common in radical circles.[12] *The Lancet* included reports from

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[10] For more on French medicine in the early nineteenth century, see Erwin Ackerknecht, *Medicine at the Paris Hospital, 1794-1848* (Baltimore: Johns Hopkins University Press, 1967); W. F. Bynum, *Science and the Practice of Medicine in the Nineteenth Century* (Cambridge: Cambridge University Press, 1994), Chapters 2 and 4; L. W. B. Brockliss and Colin Jones, *The Medical World of Early Modern France* (Oxford: Oxford University Press, 1997). For two studies of the development of French medicine in the 18th Century, both of which, like this study, find that there was much going on in a period seen as being stagnant, see L.W.B. Brockliss, "Before the Clinic: French Medical Teaching in the Eighteenth Century," in *Constructing Paris Medicine*, ed. Caroline Hannaway and Ann La Berge (Amsterdam: Rodopi, 1998); Toby Gelfand, *Professionalizing Modern Medicine: Paris Surgeons and Medical Science and Institutions in the 18th Century* (Westport, Conn.: Greenwood Press, 1980).

[11] London Medical and Surgical Journal, 1832, (109-110) vol 1

[12] Ian Burney offers a succinct summary of the elements that British medical men admired in French medicine. It is noteworthy that the list begins with a structural difference that was thought to enable other, scientific accomplishments. The French had "…increased medical control of large, publicly financed hospitals which drew together vast number of (poor) patients, and which enabled their systematic arrangement into 'cases' according to the class of disease suffered; second the elaboration of diagnostic and (secondarily) therapeutic intervention aimed at uncovering commonalities between ostensibly different symptom complexes, using (often instrumentally assisted) physical diagnosis which elicited information that could be used for comparative purposes, and which could be embodied in statistical representations of 'cases'; third, a shift in the unit of anatomical analysis (under the rubric of 'general anatomy') from a large number of discrete and discontinuous organs to a more limited set of interconnecting elemental tissues; fourth, diagnosis oriented towards the localization of disease as a distinct, tangible entity, the presence of which was signaled by a lesion on a specific (internal) bodily structure; and, finally, routinized autopsy to confirm the suspected correlation of disease symptom and bodily lesion." Ian Burney, "Medicine in the Age of Reform," in *Rethinking the Age of Reform: Britain 1780-1850*, ed. Arthur Burns and Joanna Innes (Cambridge, UK: Cambridge University Press, 2003), 167.

the French hospitals Hotel Dieu and Hôpital de la Pitie regularly in its reports of hospital cases, which was not the case in the moderate medical journal *The London Medical Gazette*.

For those who advocated emulating the French, or just overhauling the British system, *The Lancet* was the primary vehicle for advancing their position. In *The Lancet*, Wakley and others wrote scathing critiques and mocking reviews of members of the establishment and more conservative surgeons and medical practitioners, referring to those who ran the Society of Apothecaries as "whacks" and the Royal College of Surgeons "Voracious Bats."[13] One letter-writer, complaining of nepotism in the Royal College, wrote to the editor of *The Lancet* in 1829, "Constituted as the College [the Royal College of Surgeons] is, Sir, how can we expect better things? Take, for instance the manner in which vacancies are filled in the council; and let me ask, whether that member who has most influence with his colleagues will not take care to introduce his immediate friend or relation, without any regard to his talent or qualifications as a professional legislator."[14] Such complaints were among *The Lancet's* standard fare—radicals sought extensive reform of a system and group of leaders that they saw as hopelessly corrupt and profit-driven.[15] In addition, *The Lancet* advocated reforms to the anatomy laws and for the advancement of the general practitioner. In doing so, they argued for the destruction of professional divisions, as can be seen in this 1829 letter.

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[13] See Mary Bostetter, "The Journalism of Thomas Wakley," in *Innovators and Preachers: The Role of the Editor in Victorian England*, ed. Joel H. Wiener (Westport, CT: Greenwood, 1985); Warner, "The Idea of Science in English Medicine," 142; Keir Waddington, *Medical Education at St. Bartholomew's Hospital, 1123-1995* (Woodbridge, Suffolk ; Rochester, N.Y.: Boydell Press, 2003), 142.

[14] "Argus", "Letter to the Editor: Medical and Surgical Reform," *Lancet* 1828-29, no. 2 (1828), p.397: 397.

[15] The Royal College of Surgeons had been known for its corruption and financial mishaps since the eighteenth century. See Hamilton, "Medical Professions in the 18th Century."

> The profession of medicine in the metropolis is far too much subdivided and portioned out into different departments; and it is to this cause that we must attribute the paucity of those who possess that comprehensive knowledge of its various and complex branches, which, though difficult to attain, is, in itself, the best reward of its cultivators, and is the only means of raising them to that rank in society which ought to be the ambition, alike of the surgeon and physician.[16]

Many of the journal's contributors were general practitioners, those who practiced midwifery, surgery, medicine, and pharmacy, and who could therefore find no license to legally support their practice (a practice upon which most of the population relied for health care). Apothecaries could not be licensed if they dispensed both advice and drugs, surgeons were not allowed to practice midwifery, and licensed medical doctors and surgeons were not allowed to practice each other's trade.[17] In practice, a number of these general practitioners did hold a license as apothecaries or surgeons, but their all-encompassing work remained largely unrecognized officially.

Radical reformers also complained about the cost of a medical education in London, focusing particularly on the practical, hospital-based education of which conservative reformers were most proud. In a fairly typical passage from *The Lancet*, one editor carped,

> Chemistry is taught him demonstratively; botany is learned by him in the midst of those objects with which it is intended to make him acquainted; anatomy is subjected to his senses in every possible shape and form; each, in short, of the other sciences is taught him in daily courses of three, four, five, and six months, and often at an expense which he can afford; but that science which all the others are but subsidiary, is not taught him at all. While an elaborate course of instruction in any of the sciences is given for *four guineas,* the inspection of the patients in a hospital, without a word of instruction, costs him nearly *thirty!*[18]

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[16] "Juvenis", "Apothecaries," *Lancet* 1828-29, no. 2 (1828), p.429: 429.
[17] Loudon, "Medical Practitioners 1750-1850 and the Period of Medical Reform in Britain."
[18] Thomas Wakley, "Editorial," *The Lancet* 1 (1829), p.42.

Hospital instruction was one of the best sources of income for teachers of medical subjects, and those teachers therefore charged students high prices for access to the hospital and that crucial experience of seeing a large sampling of diseases. Students who paid those prices often felt that their access was inadequate. Some complained that they were not allowed to read through the notes on each patient (rules at charity hospitals differed and some prohibited students from seeing the notes on patients as an attempt to preserve patient privacy), while others felt that clinical lectures were not truly clinical in that they did not make enough use of the patients themselves.[19]

Wakley and his followers, some of whom were private school teachers in London or prominent advocates for general practitioners, held meetings at the Crown and Anchor in 1831 to establish something that Wakley called the London College of Medicine.[20] It was one of their more ambitious attempts to reform London Medicine and embodies the radical platform well. Their idea was to do away with the Royal Colleges of Physicians and Surgeons and the Society of Apothecaries and to establish in their place a democratic institution unifying the three professions of medicine. This London College of Medicine would remedy much of what Wakley saw as wrong with British medicine. Its officers would be elected annually. It would certify practitioners cheaply. Though the radicals did not, ultimately, succeed in instituting the College, it is worth addressing the conflict surrounding it in greater detail, as the debate displays the rhetorical strategies of both the radicals and conservatives well. I will come back to it in section IV of this chapter.

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[19] Bonner quotes one student who wrote to *The Lancet* in 1826 "The medical lectures […] were 'written compositions read over to the students.' To be of value, he said such lectures had to be made 'as *clinical* as possible.' Another student complained as late as 1842 that although he had been in London for six weeks, he had not heard a single clinical lecture." Bonner, *Becoming a Physician*, 133.
[20] Desmond, *The Politics of Evolution*, 104.

First, however, reformers outside of the radical circles, who have not received much attention from other historians, warrant further attention. Those who were members of the Royal Colleges, who were themselves educated under the old system of private schools and who were often the targets of Wakley's condemnation, sometimes sought a less drastic overhaul while still seeking to reform the system.

Ib. Conservative Reformers:

Conservative reformers, who primarily used the *London Medical Gazette* as a vehicle for their views, sought to reform elements of British medicine—often licensing requirements or structures of the College of Surgeons or College of Medicine—while keeping the essence of what they saw as London (British) medicine. A number of London's most prominent surgeon-teachers, many of whom held appointments at the Royal College of Surgeons and teaching posts at London's hospitals, can be labeled conservative reformers, among them Sir Benjamin Brodie and Sir Astley Cooper. These two were a part of Bell's community or the community to which he aspired. They were both known as successful teachers and had distinguished themselves within the medical community.[21] Both had, in some way, become members of the establishment, and yet each had some ambitions to reform medicine in London, as is evident in articles published in the *London Medical Gazette*.

Benjamin Brodie advocated operating less, particularly doing fewer amputations, and treating surgical cases medically. He also conducted vivisection

[21] Both received royal titles for the assistance they provided the King, both served as President of the Royal College of Surgeons (making them more a part of the establishment than Charles Bell was), and Brodie eventually served as the President of the Royal Society, the first surgeon to fill that post. William Le Fanu, "Sir Benjamin Brodie," *Notes and Records of the Royal Society of London* 19, no. 1 (1964), p.42-52; Bransby Blake Cooper, *The Life of Sir Astley Cooper, Bart., Interspersed with Sketches from His Note-Books of Distinguished Contemporary Characters* (London,: J.W. Parker, 1843), Volume II, Chapters X and XVIII.

experiments.[22] Brodie had served as a demonstrator at the Great Windmill Street School of Anatomy under James Wilson, from whom Bell bought the school. He was elected to the Council of Royal College of Surgeons in 1829, despite having "signed a memorial to the Council in 1826, suggesting the need to reform its constitution."[23] In 1840 he helped to pass a reform to make the Council elective from all of the Fellows. These sorts of reforms were typical of conservative reformers, who saw the need to improve and modify existing institutions but not to do away with them. Both Brodie and Astley Cooper were outspoken advocates for reform to the anatomy laws.[24]

Cooper, like Brodie, was clearly a member of the establishment. The *Lancet*, calling attention to nepotism in the London hospitals, published an article stating that Cooper had five relatives working in key positions in London's hospitals and that their combined income from students was £3,000.[25] But as with all of the conservative reformers, Cooper cannot be neatly categorized. He maintained friendships with known London radicals like Henry Cline and John Thelwall and was, according to Iwan Rhys Morus, "himself notorious during the 1790s for his republican sympathies."[26] Cooper, who went to Paris to see the revolution firsthand, later wrote: "A revolution may sometimes be a good thing for posterity, but never for the existing generation for the change is always too sudden and violent."[27] Brodie and Cooper,

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[22] Benjamin Brodie, *Pathological and Surgical Observations on Diseases of the Joints.* (London: Longman, Hurst, Rees, Orme, and Brown, 1818).
[23] Fanu, "Sir Benjamin Brodie," 48.
[24] When asked about the effects of using dissection as a punishment for murderers, Brodie replied, "I think on the whole the effect is injurious… it would be better, as far as anatomy is concerned, that it were abolished." Cooper responded, "The law enforcing the dissection of murderers is the greatest stigma on anatomy which it receives, and is extremely injurious to science." Editor, "Anatomy," *London Medical Gazette* 2 (1828), p.471-7: 473-74.
[25] Richardson, *Death, Dissection, and the Destitute*, 42.
[26] Iwan Rhys Morus, "Radicals, Romantics and Electrical Showmen: Placing Galvanism at the End of the English Enlightenment " *Notes and Records of the Royal Society* 63 (2009), p.263-75: 268. See also Alan Richardson, *British Romanticism and the Science of the Mind*, Cambridge Studies in Romanticism (Cambridge: Cambridge University Press, 2001), 117.
[27] Cooper, *The Life of Sir Astley Cooper, Bart., Interspersed with Sketches from His Note-Books of Distinguished Contemporary Characters*, 225.

who had previously attended the King together, worked to obtain a royal sanction for the London Medical and Chirurgical Society in 1834, a recognition that had initially been opposed by the Royal College of Physicians. The Medical and Chirurgical Society brought together individuals from all branches of medicine in the service of the improvement of that science, though it had no ambitions to grant licenses or to otherwise alter the power structure of London's medical world.[28]

Bell, Brodie, and Cooper are only prominent examples of the group that made up London's conservative reformers. The conservative reformers did not have a very vocal leader like Thomas Wakley, and the *London Medical Gazette* was the product of many voices who found themselves united in their response to Wakley. Ian Burney writes that it was "Founded in 1827 as an antidote to Wakley's attacks on establishment medicine, [and] served as the mouthpiece for members of a medical elite anxious to reform in order to preserve."[29] The group was not entirely a unified one, but they did have some shared concerns and shared background, as the brief biographies above suggest. Membership in the Royal College of Surgeons, London's hospital schools, and London's private anatomy schools meant that they traveled in the same circles, and publication in the *London Medical Gazette* allowed them to develop an audience and a following. I will detail the conservative platform for pedagogical reform in the third section of this chapter. That platform played an important role in defining British medicine and in shaping medical education.

II. Conservative Reformers: Defining British Medical Tradition, Opposing the French

[28] Penelope Hunting, *History of the Royal Society of Medicine* (London: Royal Society of Medicine, 2001), Chapter 3.
[29] Burney, "Medicine in the Age of Reform," 165.

Conservative reformers embraced what they considered to be a "British" style of medicine and science, while simultaneously contrasting it with "French" or "Continental" medicine. In doing so, they defined a British medicine that they described as traditional. These men emphasized moderation in reform, holding out the spectre of the French revolution as a reminder of the perils of reform gone too far and of embracing anything French. One conservative reformer, quoted in the epigraph to the Introduction to this dissertation, voiced sentiments present in many similar articles in the *London Medical Gazette*, writing of those who might want drastic reform: "Reform is the wish of many--revolution is the desire of the demagogue alone."[30]

These conservative reformers claimed to oppose using continental medical sciences as the basis of new institutional curricula or requirements for practice not simply because they did not practice such sciences themselves, but because they believed that it was necessary for the British to establish their own system, one that was particularly suited to their countrymen.[31] The rhetoric surrounding such calls for a particularly British kind of reform echoes that of conservative political reformers, who agitated for parliamentary reform between 1780 and 1830.[32] These political reformers argued for British exceptionalism in politics and thought that reform could prevent revolutionary upheaval like that found on the Continent.[33] According to

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[30] Editor, "Criminal Information against the Rioters—New Bye-Laws of the College of Surgeons," 279.
[31] The utility and drawbacks of looking at the history of science through the lens of 'national styles' have already been revealed: Gerald Geison and Frederic Holmes, eds., *Research Schools: Historical Reappraisals*, Osiris (Chicago: University of Chicago Press, 1993), 30-49; Jonathan Harwood, *Styles of Scientific Thought: The German Genetics Community, 1900-1933*, Science and Its Conceptual Foundations (Chicago: University of Chicago Press, 1993). Though the rhetoric of the conservative reformers looks as though it would fit some such arguments, I am not interested in engaging in an analysis of whether there really were national styles of medical science. There were, of course, differences in the kinds of educational institutions used in different countries that helped to shape their medical sciences, but I am not interested in making a "national styles" sort of argument. Instead, I am interested in looking at why the conservative reformers employed a rhetoric that emphasized national differences, real or perceived.
[32] Arthur Burns and Joanna Innes, *Rethinking the Age of Reform: Britain 1780-1850* (Cambridge, UK: Cambridge University Press, 2003), Introduction.
[33] It is particularly reminiscent of writings of Edmund Burke and those who followed, adopting his stances on revolution, reform, and British exceptionalism. According to Joanna Innes, "Burke's

Joanna Innes and Arthur Burns, many sought "some middle way between reaction and revolution. Within that middle way, there might be scope for reform. The argument that reform *did* represent a middle way—that, properly conceived, it was a preservative *against* revolution, not a precipitant of it—had been made by Edmund Burke as early as 1790."[34]

Medical reform rhetoric tapped into notions both of British exceptionalism and of reform as antidote to revolution present within this broader rhetoric of reform. An 1828 editorial in the *London Medical Gazette* captures such resonances, saying "We have in a former paper expressed something like an opinion, that if medical education in England is not absolutely the best in the world, it is perhaps the best for us: in saying so, we are fully sensible that many improvements might be suggested, but then those improvements and alterations must all be made in the spirit of the English system, (if we may so term it,) and according to the feelings and principles still cherished in this country."[35] Another editorial, written in 1832, suggested that proponents of the French system "forget the very latitude in which they live—they overlook the existence of a whole system intrinsically dissimilar—they allow nothing for national peculiarities—or, with a complete ignorance of human nature, they would attempt to drown them."[36] But while we may see reflections of Burkean arguments in

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understanding of 'reform' had always been a relatively narrow one; most notably, he had never endorsed the cause of Parliamentary reform. He had primarily been concerned with the curbing of royal influence, and, latterly, with the extirpation of corruption, greed, and ambition in the East India Company... 'reform' denoted pragmatic, limited improvement: the correction, by minor adjustment, of faults that stood clearly revealed…['reform'] represented the chief *alternative* to revolution." Ibid., 88. Also see Burney, "Medicine in the Age of Reform." Burke's stance shows just how piecemeal British reform philosophies could be—most Whigs endorsed Parliamentary reform, but clearly Burke did not. That even Burke could be called a reformer shows that most platforms during the Age of Reform involved at least some reformist rhetoric—almost no one was arguing for things to remain exactly as they were. For an example of Burkeian rhetoric, see, Editor, "Reform--College of Physicians," *London Medical Gazette* 11 (1832-33), p.485.

[34] Arthur Burns and Joanna Innes, *Rethinking the Age of Reform : Britain 1780-1850* (Cambridge, UK ; New York: Cambridge University Press, 2003), 14-15.

[35] Editor, "Medical Education," *London Medical Gazette* 1, no. 11 (1828), p.314-7: 314.

[36] Editor, "Medical Reform- Education," *London Medical Gazette* 11 (1832), p.89-92: 90.

those of the conservative medical reformers, medical politics was also local, based on professional affiliations, and the arguments took on the particularities of the social world of medicine. For most of these men it was not that medicine was used as an example to support party or national politics. Anti-French rhetoric was employed in the service of specifically medical arguments, arguments that British, and particularly London, medicine was worth preserving and improving. Such rhetoric helped to construct a British nationalism and ideas about British tradition through medical debates.[37]

So what made a system "British" and what made this British system superior to these opponents of French Science? Institutionally, Londoners claimed that it was competition. They prided themselves on the many private schools run by the best practitioners. By 1800, almost half of provincial practitioners had been educated in London (and, of course, an even larger percentage of London's practitioners would have been).[38] With approximately fifty courses and twenty schools or hospitals, students were supposed to be able to find the best teachers and those who provided the newest theories and practices. In an 1830 editorial in the *London Medical Gazette*, one Londoner wrote, "While we here enjoy all the facilities of instruction and mutual co-operation that zeal and competition can supply—with all that freedom and independence so characteristic of the nation—the French faculty are entirely under the controul of government; in fact, under the surveillance of the police."[39] Similarly, Charles Bell stated in his introductory lecture at the opening of London University in

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[37] Nationalism has been the subject of several recent books on Britain, but most of them see nationalism being constructed in the political or social sphere. Conservative reform arguments suggest that the idea of the nation was simultaneously being built through debates over medical reform. For more on the creation of British nationalism, see Colley, *Britons: Forging the Nation, 1707-1837*; Kidd, *British Identities before Nationalism: Ethnicity and Nationhood in the Atlantic World, 1600-1800*; Evans, *The Forging of the Modern State: Early Industrial Britain, 1783-1870*; Hobsbawm and Ranger, *The Invention of Tradition*.

[38] Porter, "Medical Lecturing in Georgian London," 96.

[39] Editor, "Present State of the London and Paris Schools of Medicine," *London Medical Gazette* 7 (1830), p.21-5: 24.

1828 that he hoped that the establishment of the London University did nothing to discourage teachers at the private schools.[40]

That emphasis on competition extended beyond London to other cities in Britain. Even cities with established university medical schools like Edinburgh had a variety of private schools offering courses in medicine. Students would create their own curriculum by attending a mixture of university courses and courses at any number of private institutions.[41] When the faculty members at the University of Edinburgh were not good teachers, as was the case with Alexander Monro Tertius,[42] the private schools of Surgeon's Square did a better business than the University itself. Adam Smith, the father of *laissez-faire* economics, taught at Edinburgh in the mid- to late-eighteenth century. Smith's ideas about market forces, which permeated the culture of the University of Edinburgh, helped to sustain a system in which even the University faculty did not receive a salary and were paid by the individual students who took their courses (although degree requirements forced students to show evidence of having attended some of the basic courses, thereby guaranteeing some faculty an income).[43]

As in Edinburgh, medical and surgical lecturers in London derived their income from individual students and therefore needed to be popular in order to make a living. Londoners extolled the virtues of this competitive environment, declaring it a way of ensuring a superior education in which the best teachers taught subjects that

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[40] Charles Bell, "London University--Mr. Bell's Introductory Lecture," *London Medical Gazette* 5 (1830), p.18-21: 18.
[41] Lisa Rosner, *Medical Education in the Age of Improvement: Edinburgh Students and Apprentices 1760-1826* (Edinburgh: Edinburgh University Press, 1991), Chapter 3; Christopher Lawrence, "The Shaping of Things to Come: Scottish Medical Education 1700–1939 " *Medical Education* 40, no. 3 (2006), p.212-8.
[42] Bynum, *Science and the Practice of Medicine*, 4.
[43] According to Rosner, "Writing to Professor William Cullen in 1774, [Adam] Smith attributed the 'present acknowledged superiority' of the Edinburgh medical faculty to the fact that they received no salaries and had no national monopoly over degrees, and had to rely on the 'diligence and success in their profession' to attract students." Rosner, *Medical Education in the Age of Improvement*, 4.

students cared about most. Teachers often saved their discoveries for the classroom in order to attract more students by offering access to the latest developments in medical science. Such was the case with Bell's discovery of separate roots of motor and sensory nerves, which was taught long before it was published.[44] In those cases, the classroom itself became the seat of British medical "science." In an 1809 letter to his brother, Bell drew a distinction between medical men who earned their income through practice and those who earned it in the classroom, saying, "My means of being known are through my books and pupils: I retain my consequence by preferring science to practice […]. Those with whom I stand contrasted are making perhaps 9000 pounds a year. What does that imply? The pursuit of science, perhaps? Pooh! Pooh!"[45]

It is less clear what was particularly British about the *content* of medical education, as that tended to vary somewhat regionally and was the subject of much debate between professional factions. Historians like Christopher Lawrence have written on the differences between Scottish and English medicine,[46] but it is hard to draw clear distinctions between the two when an overwhelming number of the early faculty at London University, and many of the private teachers in London more generally, were Scotsmen who had been educated at Edinburgh, and when students tended to pursue their educations in both locales.[47]

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[44] For example, Roy Porter writes, "Such courses had many attractions. Some embodied discoveries unavailable elsewhere. William Hunter's auditors heard of his researches on aneurysm, the placental circulation, the lymphatic system and the gravid uterus, nowhere available in print." Porter, "Medical Lecturing in Georgian London," 94.
[45] Bell, *Letters of Sir Charles Bell*, 159 (November 9, 1809).
[46] Lawrence, "The Shaping of Things to Come: Scottish Medical Education 1700–1939 ".
[47] For more on students' tendencies to pursue their education in both London and Edinburgh, see Ibid.: 214; Rosner, *Medical Education in the Age of Improvement*. For more on Scottish teachers in London, see Singer and Holloway, "Early Medical Education in England in Relation to the Pre-History of London University."; N. B. Harte, *The University of London, 1836-1986 : An Illustrated History* (London ; Atlantic Highlands, NJ: Athlone Press, 1986).

One thing that conservative reformers considered important and worth preserving in British medical education was the tradition of joint education in surgery and medicine. Surgery at Edinburgh was different in that it was included in the University whereas, according to Lisa Rosner, "[e]lsewhere in Europe, surgeons were excluded from the universities, and developed separate educational institutions to train their students and apprentices."[48] And there was no university at all in London; but surgery was taught in the same sorts of schools as medicine. Bell spoke like a conservative reformer when he counseled his students in 1835 to know medicine and surgery and to base their practice upon a knowledge of anatomy, saying, "Your long list of certificates you must have; but I conjure you to act as if anatomy, and such uses of anatomy as you see in hospital practice, were the business of your life in London, and not to be satisfied with learning to answer such questions as may be put to you at any board."[49] Some of this generalism can be attributed to the fact that most medical practitioners, whether certified in London's classrooms as surgeons or apothecaries, would, to a great extent, serve as general practitioners, dabbling in both surgery and medicine as their patients required.

We can make some additional generalizations about British medicine or at least British medical ideals that are substantiated by the comparisons between British and foreign medicine drawn in British medical journals. When comparing themselves to the French, British surgeons and physicians tended to emphasize their abilities as practitioners and the corresponding strength of the practical education their students received in hospitals. In 1831, one conservative reformer wrote in the *London Medical Gazette,*

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[48] Rosner, *Medical Education in the Age of Improvement*, 86-87.
[49] Charles Bell, "Clinical Lecture on Diseases of the Spine, Delivered, Nov. 3, at the Middlesex Hospital School," *London Medical Gazette* 17 (1835), p.231-4: 231.

> Upon the rational empiricism of medicine as founded on the study of disease in the great book of nature, has the practice of it in this country been able to bear triumphantly the comparison with its condition in France; there, science studied in the abstract, and theories ingeniously devised, give evidence of the speculative character of that school, whilst the smaller proportion of deaths in England prove as incontestably the efficiency and superiority of the practical character of our own.[50]

The classification of diseases, it was said, not the healing of patients, was the principal concern of the busy French doctors. British doctors and surgeons, in contrast, spent much of their education walking the wards of hospitals or sometimes in apprenticeship, and the emphasis in such systems was on therapeutics. According to Adolph Muehry, a British physician and surgeon, "The French physician […] thinks more of the disease than the patient."[51] And one student studying in France wrote home describing the French by saying, "Indeed, they seem to think that the perfection of medicine consists not so much in keeping patients alive as in foretelling with precision the appearances which will be found after death."[52] That reputation was coupled with the association of French medicine with experiments that were often depicted as either establishing facts already known through experience,[53] or cruel and irrelevant to any kind of medical practice. One medical student, James Macauley, wrote: "In 1837 I attended, along with Edward Forbes and others known to you, the class of Magendie; at least we went to some of his lectures. The whole scene was revolting; not the cruelty only, but the 'tiger-monkey' spirit visible in the demoralized

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[50] Editor, "London University--Apprenticeships," *London Medical Gazette* 8 (1831), p.336: 336.
[51] Bonner, *Becoming a Physician*, 139.
[52] "Voyageur", "Letter to the Editor: Parisian Medicine," *London Medical Gazette* 1 (1828), p.695-7: 695.
[53] As was the case with William Sharpey's testimony about Magendie's experiments before the Royal Commission on Vivisections: "In the first place, they were painful (in those days there were no anaesthetics), and sometimes they were severe; and then THEY WERE WITHOUT SUFFICIENT OBJECT. For example, Magendie made incisions into the skin of rabbits and other creatures TO SHOW THAT THE SKIN IS SENSITIVE! Surely all the world knows the skin is sensitive; no experiment is wanted to prove that." Great Britain Royal Commission on Vivisection, *Report of the Royal Commission on the Practice of Subjecting Live Animals to Experiments for Scientific Purposes* (London: George Edward Eyre and William Spottiswoode, 1876), 22, Question 444.

students. We left in disgust, and felt thankful such scenes would not be tolerated in England by public opinion."[54] The experiments conducted were depicted as both cruel and revolting *and* as demoralizing to students.

By contrast, one 1833 review of Bell's newly published Bridgewater Treatise, *The Hand, its Mechanism and Vital Endowments as Evincing Design,* said of Bell, "although in some works we see him designated by the supposed proud title of 'experimentalist,' his experiments have been few, and only confirmatory of deductions previously drawn from studying the course of nerves…," adding with approval that his limited experimentation was "as strictly under Bacon's definition of induction, or 'experience,' as the most multiplied course of experiments… although the adherents of the opposite opinion urge that… we should 'torture nature,' to make her disclose her secrets."[55] But this reviewer did not simply say that induction from dissections was the best scientific practice or that vivisection was unethical. He asserted that Bell's method of deducing function from structure was *pedagogically* effective, saying,

> The practice of combining the demonstration of the structure of the body with arguments of a physiological kind derived from it, so as to exhibit the uses of the parts in the economy, at the same time that the structure is shewn, constitutes the great art of making a lecture attractive. It not only serves to impress the minute points of demonstration firmly on the mind of the student, and to produce a continued exercise of the judgment as well as of the memory, but it is of the highest benefit, on account of the solidity which it gives to the views of the lecturer.[56]

In other words, by connecting structure and function in a methodical and systematic way in both his lectures and his texts, Bell was able to teach his audience.

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[54] Thomas Babington Macaulay, "Thoughts on the Advancement of Academical Education in England," *The Edinburgh Review* 44 (1826), p.315: 21.
[55] Anonymous, "Charles Bell's Bridgewater Treatise," *London Medical Gazette* 13 (1833), p.253-8: 254.
[56] Ibid.

The emphasis on the practical character of British medicine even extended to the anatomy schools, where the instructors intended their anatomy courses to be practical. Though dissections were conducted here, as elsewhere, by an assistant, or demonstrator, one advertisement for Bell's Great Windmill Street School of Anatomy proclaims that "Mr. Bell will continue to visit students during their operations to point out the application of Anatomy to practice."[57] Bell's advertisement claims that his dissection course is practical in the sense that the anatomy taught therein is always related by the instructor to clinical practice.

London also provided other kinds of collections that furthered a practical medical education. It had the most ample supplies of corpses for dissection in Britain[58] and contained extensive collections of preserved anatomical specimens and models. The Hunters, Matthew Baillie, Joshua Brookes, and Charles Bell all developed private museums of specimens and "Pupils of the top midwifery lecturer, William Smellie, could practice delivery techniques on his life-size wax, leather and wooden dolls."[59] Observing such collections of specimens or collections of diseased individuals in a hospital, or practicing on models, was a crucial part of the London educational program.

Conservative medical reformers defined British medicine in opposition to French, or continental, medicine and to the radicals who advocated French medicine in Britain. They defined its strengths broadly, incorporating a variety of practitioners who shared a rough understanding of what constituted British medicine. The fundamental features of British medicine, according to these men, who were usually surgeons, were various: the competitive and open nature of British medical courses;

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[57] This advertisement was taken from Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*.
[58] Richardson, *Death, Dissection, and the Destitute*, Chapter 2.
[59] Porter, "Medical Lecturing in Georgian London," 95.

the integration of some medical and surgical training in order to prepare students for general practice; the practical and therapeutic character of a British education; and the absence of unnecessary or unnecessarily cruel vivisection experiments. Benjamin Brodie's 1838 "Introductory Discourse" contains a passage that highlights nicely the ways in which this rhetoric defining British medicine as different from, and superior to, continental medicine functioned. Brodie wrote, "It is one advantage arising from the peculiar constitution of the London medical schools, that, with few exceptions, the instructions which you here receive, have, in a greater or less degree, a tendency to practice. The ambition of the teacher of Anatomy is not limited to success in his present vocation. He looks forward to the time when his profession as a Physician or Surgeon will elevate him to fame and fortune."[60] In this passage Brodie combines those things that conservative reformers thought made a London education great: its emphasis on practice and the competitiveness of its teachers (though Brodie is here talking about teachers' ambitions to achieve fame and fortune as practitioners). Brodie continues:

> I have no doubt that the praises which are bestowed on some of the continental anatomists are well founded: that there are universities in which the Anatomical professors, devoting their whole time, and industry, and intellect, to this one pursuit, explain the mysteries of minute anatomy at greater length, and with more precision, than the teachers here: but, nevertheless, I assert, that ours is the better method with a view to the education of those who wish to become, not mere philosophers, but skilful and useful practitioners.[61]

As conservative reformers so often did, Brodie rounded out his discussion of the strengths of a London education with a favorable comparison to the French. This sort

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[60] Benjamin Brodie, "Introductory Discourse on the Studies Required for the Medical Profession," in *The Works of Sir Benjamin Collins Brodie*, ed. Charles Hawkins (London: Longman, Green, Longman, Roberts, and Green, 1838), 467.
[61] Ibid.

of nationalistic rhetoric and juxtaposition of the British and French styles of medical education was a resource for conservative reformers in disputes with their more radical countrymen over the substance of reform.

III. Criticizing British Medicine, Circumscribing Reform

While conservative reformers extolled the virtues of a British medical education, they also recognized a need to improve elements of that education. Their proposals for reform often came in the form of institutional change. Sir Charles Bell testified twice about unjust promotions within hospitals before the 1834 Select Committee of the House of Commons, which was appointed at the instigation of Thomas Wakley "to inquire into and consider of the laws, Regulations and Usages regarding the EDUCATION and PRACTICE of the various Branches of the MEDICAL PROFESSION, in the United Kingdom." He was called to give this testimony because of a pamphlet that he had written in November of 1824, entitled, "A Letter to the Governors of the Middlesex Hospital, from the Junior Surgeon." This pamphlet reveals a strong critic of the hierarchy in British medicine, but also Bell's deeper concern for the structure of British medical education.[62] Bell summarized his position in the following passage:

> I advocate this principle, that the situation of Physician or Surgeon to an hospital, should be a reward for professional merit. It is unhappily conceived, on the other hand, that young Physicians should be introduced to hospitals—that they may there learn their profession, and be prepared for private practice;

[62] Richard Hunt and Ida Macalpine, "A Privately Printed Pamphlet by Sir Charles Bell on the Principles Involved in Appointments to the London Hospitals," *Annals of the Royal College of Surgeons of England* 30 (1962), p.257-65: 261. They write of the pamphlet on p 258, "As Bell has not so far been credited with an active interest in reforms of the medical profession, we tried to find a copy of his pamphlet in the London libraries to study it, but were unsuccessful […] at last we found it listed in W.B. Taylor's *Catalogue of the Library of the Society of Apothecaries*, 1913, listed anonymously under Middlesex Hospital as number 4 of 13 pamphlets." Copies of this Catalogue had been auctioned off and they were able to get hold of one through correspondence with a collector, so their article remains the only real source of this letter by Bell.

> and that whenever their private patients promise them a livelihood, they should leave the hospital to the next candidate for the notice of the town […]. It is the prevalence of this notion in the College of Physicians, which unites so many of that body to introduce their junior fellows into the great hospitals […]. In this scheme of forming physicians, there is no provision for the improvement of science or for the records of practice; neither stimulation nor reward is held out […]. In the course of a few months a young gentleman is a Student, a Member of the College, Physician to an Hospital, and Teacher of Medicine. It would be well if he were to proceed at this rate; but a few private patients withdraw him from his public duties, and he is influenced by that notion which prevails so extensively in London, that to be otherwise employed than moving about in a chariot, is to declare his incapacity.[63]

Bell was objecting specifically to the promotion of a new fellow of the College of Physicians over a more experienced physician at the Middlesex Hospital, but he was also objecting to the idea that a lucrative private practice was considered the physician's end goal. Teaching and medical science suffered as a result of such goals because men of experience never stayed on to promote the development of new knowledge. These objections, and Bell's testimony, were themselves reformist, and while not radical, they were hardly those of the establishment.

These sorts of critiques—of unjust promotions, impenetrable hierarchies, and unworthy elites—were widely shared and were present across the British educational system. In 1800, Thomas Beddoes, a physician and reformer, according to Roy Porter, "complained of its 'system of hereditary professorships' which showed 'every reputed disadvantage of hereditary monarchy, and not one of its advantages,'"[64] while in 1840, an editorial from the *Medical Times* of London was still talking about weeding out "the absurd system of HEREDITARY PROFESSORSHIPS."[65] In Edinburgh, where the city council appointed professors to the university and those professorships were often handed down to kin or to students,[66] Alexander Monro

[63] Ibid.
[64] Quoted in Porter, "Medical Lecturing in Georgian London," 93.
[65] Editor, "Professional Sketches," *Medical Times* 3, no. 57 (1840), p.37: 37.
[66] Rosner, *Medical Education in the Age of Improvement*, 47; Jacyna, *Philosophic Whigs*, 57.

Primus, Secundus, and Tertius (father, son, and grandson) succeeded each other in the chair of Anatomy and Surgery, together occupying the chair for 126 years continuously. Alexander Monro Tertius was known for his mediocrity. Charles Darwin, for example, wrote home about him, saying, "I dislike him & his lectures so much that I cannot speak with decency about them. He is so dirty in person & actions."[67]

Those who voiced such complaints, but who advocated that education be reformed in a particularly British way, sought to improve upon a system that was already in place. They were, in many cases, staunchly opposed to refashioning the institutions of British medical education along the lines of those in Paris or elsewhere in Europe. In London, Fellows of the Royal College of Surgeons tended to control the appointment of hospital surgeons, who gained lucrative teaching opportunities with their charitable hospital posts, as students would pay to follow them through the hospitals or to have access to their hospital patients. As Susan Lawrence describes: "Fellows brought the shadow of the College's conservatism and respect for classical learnedness… [in] contrast to the Licentiates' enthusiasms for newfangled ideas, methods, and medical power that already undermined the traditional elite's claims for authority over medical knowledge."[68] By the beginning of the nineteenth century, however, the composition of the College was beginning to change, as the number of licentiates (those licensed to practice surgery, the general membership of the College) increased while the number of fellows, the College leaders, remained small. With this change in composition, the power disparity between the fellows and the licentiates was increasingly the source of complaint and unrest. In 1826, Benjamin Brodie had been a part of an appeal to the legislature by young fellows of the Royal College of Surgeons

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[67] Quoted in Adrian J. Desmond and James R. Moore, *Darwin*, Warner Books ed. (New York: Warner Books, 1991), 69.
[68] Lawrence, *Charitable Knowledge*, 67.

to amend the constitution of the Royal College to recognize the certificates of those who had learned the art of surgery in the provinces, thereby opening up the Royal College to a wider number of licentiates.[69] Thomas Wakley was among those who signed the petition. And "at the end of 1840 the Council accepted his [Brodie's] plan, to form a superior class of specially qualified Fellows among the Members of the College, and to make the Council elective from the whole body of these Fellows."[70] These sorts of reforms helped to make the Royal College of Surgeons more meritocratic without altering its basic structure.

The professional hierarchy, and promotions within it, were only two complaints of men like Bell and Brodie, who hoped to draw on the strengths of what they considered traditional British medicine, with its strengths in practical training and its competitive educational system meant to promote good teaching, while creating a more just system that required a well-funded, thorough, systematic, and practical education of its students. In doing so, they were fighting both members of the establishment who wanted to keep the power structure the same and radicals who wanted to implement a revolution like that which had taken place in French medicine, creating a state-funded, centralized system of experimental medicine that leveled the hierarchies within and between medical professions.[71] In addition to suggesting institutional changes, those who wanted to preserve the strengths of British medicine talked about optimizing, streamlining, or codifying what was already there, most often talking about reforming licensing requirements.

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[69] Editor, "College of Surgeons," *The Examiner* 944 (1826), p.163. This would have reduced the income of the members of the Royal College's Council, most of whom were teachers in the London hospitals and benefited from provincial students who had to redo educational requirements in London because their school and hospital certificates were not recognized.
[70] Fanu, "Sir Benjamin Brodie," 48.
[71] Warner, "The Idea of Science in English Medicine."

One of the primary complaints of reformers was that, despite the tendency of British surgeons to take courses on both surgery and medicine, the licensing systems and formalized educational systems did not actually fit patterns of practice: surgeons, medical doctors, and apothecaries were treated as distinct groups and tested in subjects with little overlap, while in practice, most who treated patients functioned as general practitioners, diagnosing, dispensing medicines, and performing operations when necessary. Their licensing tests did little to prepare them for this sort of varied practice.[72] According to one author in the *London Medical Gazette* in 1831,

> …nine-tenths of the practice of medicine, strictly so-called, devolves upon those who have taken no degree in medicine, and who have barely contrived, in the course of one or two years, devoted to the study of all the branches of medical science, 'to pay some little attention to medicine;' and should a young man, starting as a general practitioner, find himself well acquainted with it, while he has cause for self-congratulation that he has not to acquire it 'during the first half dozen years of practice, and at the expense many lives,' he will, I think, have to thank himself more than the legal requirements of corporate bodies.[73]

Conservative reformers, such as the author of the article just quoted, suggested altering licensing requirements to make them broader or offering a system of licenses and certificates, so that one could get a surgical license with a certificate in medicine or vice versa. They did not, however, go so far as the radical reformers did[74] and suggest a whole new body for the dispensing of licenses in which all forms of medicine were unified and a single license was offered.

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[72] In a passage addressing the inappropriate institutional distinctions, the London Medical Gazette declared, "As to students, it is in the last degree harassing and perplexing to them to have two entirely distinct, and in some degree rival bodies, claiming their allegiance—the Society of Apothecaries possessing a legal authority, the College of Surgeons a conventional sway over them; and each having its separate curriculum, with all its appendages of registrations and certificates, together with numerous other 'appliances and means to boot.'" Editor, "The New Code of Medical Education, and Its Consequences," *London Medical Gazette* 16 (1835), p.198-202: 200.
[73] Editor, "On Medical Education," *London Medical Gazette* 8 (1831), p.654-6: 655.
[74] See section IV of this chapter.

A shortage of bodies for student dissections was a difficulty frequently bemoaned in medical journals as well.[75] The *London Medical Gazette* and *The Lancet*, usually at odds with each other, could even agree on the need to remedy such a deficiency in British medical education: the opinions of Astley Cooper and Benjamin Brodie regarding the use of dissection for punishment appeared alongside a quote from Thomas Wakley in the *London Medical Gazette*[76]). In an 1829 letter to the editor of the *London Medical Gazette*, one medical man wrote:

> Medical science is indispensable to the welfare of mankind. To its diffusion and extension anatomy is essential. This cannot be cultivated adequately by any means, save by the actual dissection of human bodies […]. Under the existing laws of England, a supply of them cannot be legally obtained; while these laws, with glaring inconsistency, enjoin a knowledge of anatomy as indispensable to every medical practitioner, and visit the want of it with severe penalties.[77]

While finding enough bodies for dissection was difficult in the first couple of decades of the nineteenth century, with grave-robbers providing both bodies and stigma for the anatomists, the push to reform the practices of British anatomists culminated in the Burke and Hare scandal of 1828. William Burke and William Hare murdered 17 people and sold their corpses to anatomists, primarily Robert Knox of the Edinburgh Medical College, for dissection. The scandal, which horrified a public already wary of anatomists, provided an impetus for lawmakers to revise rules regarding the acquisition of bodies for dissection through the Anatomy Act of 1832. One *Lancet* editorial stated, "It required no extraordinary sagacity to foresee, that the worst consequences must inevitably result from the system of traffic between

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[75] See Richardson, *Death, Dissection, and the Destitute*, particularly chapters 2 and 3; Warner, "The Idea of Science in English Medicine."
[76] Editor, "Anatomy." See footnote 34 for the passages by Brodie and Cooper.
[77] Anonymous, "Letter to the Editor," *London Medical Gazette* 4 (1829), p.333: 333.

resurrectionists and anatomists, which the executive government has so long suffered to exist. Government is already in a great degree, responsible for the crime which it has fostered by its negligence."[78] Such an editorial reflects well the frustration that medical men expressed regarding laws governing corpses for dissection. Dissection was considered a necessary part of medical education, but bodies were always in short supply, especially in a medical culture that was increasingly emphasizing practice as a part of schooling. These circumstances forced anatomy teachers to deal with criminals who found illegal sources of bodies and helped to keep surgery a profession without any true, untarnished gentlemen.[79]

Finally, some surgeon-reformers felt that surgery was still taught as a series of heroic operations, ignoring the non-surgical management of diseases that fell within the surgeon's domain, management that often constituted the greatest part of surgical practice. In 1822, the London editor of the *Medical Intelligencer* wrote unhappily that "Surgery is taught without reference to medicine […although students] are taught dead anatomy to a certain point, [teachers] give little or no demonstrative information on morbid anatomy."[80] His complaint, in other words, was that surgeons learned normal anatomy but not anatomical pathology and that they were taught operations but not how to treat disease or injury without operating. Such a complaint reflected the concerns of surgeons who had broad practices or who practiced as general practitioners and did not just perform operations; it fitted well into a world of surgeons who did not see disease as local.[81] Benjamin Brodie, who was an advocate of operating less frequently, wrote in his 1838 "Introductory Discourse on the Studies

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[78] Thomas Wakley, "Editorial," *The Lancet* 1 (1828-29), p.818-21: 818.
[79] Richardson, *Death, Dissection, and the Destitute*.
[80]Editor, "Editorial," *Medical Intelligencer: or Monthly Compendium of Medical Knowledge* 3 (1822), p.ix.
[81] For more on the tendency of London surgeons to see disease as constitutional rather than local and anatomical during this time period, see Mazumdar, "Anatomy, Physiology and Surgery."

Required for the Medical Profession," "When I tell you that we are to trust to Nature, I do not mean to say that we are to confide in her implicitly, but that our rule should be not to disturb her operations without an adequate reason for so doing."[82] Later in the same text he talked about disease as producing symptoms that could be alleviated only by treatment of the disease systemically, as the disease could reside in a location altogether separate from the body part producing symptoms. These sorts of proposed reforms involved gradual and moderate change.

Conservative proposals for reform were carefully crafted to improve British medicine without restructuring it or undermining its foundations. These reformers sought to revise the existing Colleges of Surgeons and Physicians and Society of Apothecaries in order to make them more democratic and just, but they did not seek to replace the institutions. They worked to codify a set of courses necessary for the practice of medicine and to broaden that set so that surgeons, apothecaries, and medical doctors would be equipped for the sort of general practice that they were likely to engage in once licensed. Both conservative and radical reformers worked to make more bodies available for dissection, agreed by all to be the foundation of a proper medical education. And surgeon-reformers attempted to teach restraint rather than heroic surgery, which, when coupled with medical knowledge that they were attempting to introduce into the licensing requirements, would cut down on the number of surgeries. Such proposals would accentuate those elements of a British medical education most valued by conservative reformers' virtues: if competition was meant to produce the best education, then making the governing bodies of medicine more democratic could only improve them; if a British medical education was the best in the world because it was practical, then creating a system that reflected the realities of general practice and increasing access to bodies for practicing dissection could only

[82] Brodie, "Introductory Discourse on the Studies Required for the Medical Profession," 476.

make it more practical, amplifying its superiority. In 1831, these reform ambitions, along with the nationalist conservative reform rhetoric, were showcased in a dispute with radicals. It is to that dispute, a dispute over the formation of what Wakley called the London College of Medicine, that I now turn.

IV. London College of Medicine: the Rhetoric of Revolution and Reform

On May 7, 1831, Thomas Wakley and a number of his radical reformers held the first public meeting at the Crown and Anchor in London to set out the framework for what they called the London College of Medicine.[83] The London College of Medicine was meant to serve as a rival to the Royal College of Physicians, the Royal College of Surgeons, and the Society of Apothecaries and to serve as a licensing and professional body for all medical practitioners: physicians, surgeons, apothecaries, and general practitioners. The London College of Medicine provides an interesting site of analysis because it highlights the significance of rhetoric, personalities, and professional affiliations and politics: those very things that separated radical from conservative reformers, even though many of them published similar opinions about the College itself, couched in very different tones, in their opposing journals.

The proposed structure of the London College of Medicine addressed many of the concerns that were a part of radical reformers' platform. The policies set out in the first meeting of the college decreed that any man who was legally qualified to practice any branch of medicine in England, Ireland, or Scotland, or could produce a diploma from any British university or medical college at the time of the College's founding would be deemed to be an eligible candidate for a diploma (license to practice) without examination. All those who received the diploma of the London College

[83] Thomas Wakley, "London College of Medicine: May 7, 1831," *The Lancet* 1830-31, vol. 2 (1831), p.177-83.

would be considered Fellows within the institution and "Doctors" outside of it. The College would be governed by a senate elected by the general membership. The senate would examine future candidates for diplomas, those examinations would be conducted in public, and candidates would not to be required to produce any certificates of coursework whatsoever. The exam for the diploma would be conducted over two days: the first day would address the "facts of anatomy and materia medica," and the second day would address the "theoretical principles of physiology, pathology, semiology, surgery, and the practical application of these principles to medicine, surgery, and midwifery." The cost of the diploma would be between 3 and 5 guineas and Fellows would be at liberty to practice all branches of medicine or to specialize. There would also be an eleemosynary fund established for widows.[84] This proposal contained a number of drastic changes to the system of medical education, licensing, and governance in Britain.

The London College of Medicine would have united doctors, surgeons, and apothecaries in one body, leveling the entrenched hierarchy of the London medical scene. It also would have recognized training in provincial schools and hospitals as equal to that occurring in London, which was not the case with the Royal Colleges. It would have been led by a popularly elected senate, would have reduced the cost of a diploma, and would have disrupted the power of hospital surgeons by not requiring certificates of attendance at a hospital. Wakley emphasized several times that its policies had been founded upon principles taken from the best examples of medical societies in Britain and *around the world* (the international scope also reflecting the position of radical reformers).[85] As Wakley himself put it:

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[84] Ibid.

[85] For example, he wrote: "We have carefully examined the machinery of medical Colleges and Universities in this country and throughout the world" in establishing the London College of Medicine.

> Here the power rests with the whole body of the Fellows. No man is to receive the diploma without enjoying full equality in collegiate rights and privileges.... The funds of the College will be secure against plunder. Merit will be protected and rewarded. Students will be examined in public, and be thus shielded from the petulance of ignorant bigots, and from the malignant, secret intrigues of rival teachers… distinctions which have so long disgraced the profession will be entirely abolished, and the public will have the infinite satisfaction of knowing that every possessor of the diploma of this College has proved that he is well qualified to practise in every branch of medical science.[86]

Responses to this proposal, which was crafted around the radical reformers' agenda, were substantively surprisingly similar across the two different reform communities, but were cast very differently. Radicals applauded the new College of Medicine and pledged their commitment to it, particularly praising certain elements of the proposed College. One such medical man wrote a letter to *The Lancet* praising the College's plan "to admit to its fellowships those who shall be found competent, no matter *where*, *how,* or *when*, their information has been obtained. This is in direct opposition to the illiberal spirit of the College of Physicians, which has a regard to the *where* and the *when* medical knowledge has been attained, and also has an especial regard to the admission fee…."[87] Wakley, who also proclaimed the virtues of the new London College of Medicine by contrasting it with the Royal Colleges, wrote about the importance of recognizing those who practiced across branches of medicine: "College of Physicians so far disclaims the practice of surgery, and even of midwifery, that the *Fellows* who engage in such '*subordinate*' branches are marked out for punishment and degradation. The 'by-laws' of the Junto in Lincoln's Inn Fields—that

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Anonymous, "London College of Medicine, Second Public Meeting of the Supporters of This Institution," *The Lancet* 1830-31, vol. 2 (1831), p.212-22: 217.
[86] Wakley, "London College of Medicine: May 7, 1831," 181.
[87] Wanfield, "The Eleemosynary Fund," *The Lancet* 1830-31, vol. 2 (1831), p.688-9: 689.

abominable compound of imbecility, conceit, and apostacy,--exclude from every office in the College… every *surgeon* who may *disgrace* himself by practicing in obstetric medicine….”[88] Among radicals, those virtues—the openness and impartiality of admissions and election to the College Senate and the recognition of the practical necessity for a medical man to practice all branches of medicine—were almost universally recognized and praised in the articles and letters printed in *The Lancet.* Those policies were thought to rectify the most egregious failings of the system already in place. But those same letter-writers who praised the institution also expressed reservations.

A number of readers of *The Lancet* wrote letters expressing concern about the extreme nature of the leveling of medical professions that the London College of Medicine would bring, about the proposal to admit initially all who had legally practiced any branch of medicine prior to the College’s founding, and about the wisdom of removing requirements for hospital attendance, at the same time that they avowed support for the institution and for Wakley.[89] One anonymous letter-writer, sounding very moderate indeed, wrote,

> Living, as we do, in the age of medical reform, it would be well for us to recollect, that it is less difficult to be convinced of the necessity of reform, than to define the nature of that change which would beneficially and permanently influence the whole medical community. Salutary reform does not, in my opinion, consist in removing every impediment for the purpose of establishing perfect equality; nor is the leveling system carried to a fearful extent, at all

[88] Thomas Wakley, "London College of Medicine: August 13, 1831," *The Lancet* 1830-31, vol. 2 (1831), p.627-30: 627.

[89] “Will young men, freed from the restraints imposed by the ‘ticket system,’ as it has been called, and left to their own pleasure and discretion in the attendance upon, and acquisition of means of improvement, obtain the same information, acquire as much practical knowledge as under the present system?” "Omega", "Letter to the Editor: London College of Medicine," *The Lancet* 1830, vol. 2 (1831), p.345-6: 345.

compatible with the best interests of the profession.[90]

Another added, "…there surely ought to be some distinction made between a strictly professional man, and one who is half doctor, half tradesman; *you* may pass decrees declaring their equality; but will society, for whom artificial distinctions are made, recognize and act upon your laws?"[91] These men, though they assumed relatively moderate stances with respect to the new College, were both clearly radical reformers. Both of these men wrote in to *The Lancet,* a journal whose political position was clearly laid out and whose readership, if we are to believe its other letters to be representative, shared its politics, and both authors declared at the outset of their letters that they supported the London College of Medicine and that their letters were meant to assist its leaders. Taken as a group, these letters suggest that radicals were concerned about keeping out quacks and about overzealous leveling of professional divisions, but that they were particularly enthusiastic about the proposal to merge surgery and medicine (if not necessarily the drug-selling apothecary) to create a single diploma and about the increased openness and inclusiveness, the democratic nature, of the new institution.

Conservative reformers writing both in and to the *London Medical Gazette,* not surprisingly, opposed the founding of the London College of Medicine. But they also recognized the need for some of its reforms and shared some of the concerns about it with radicals. One concerned medical man wrote to the *Gazette*, echoing the fears of his radical counterparts, "If those are to be admitted who were in practice previous to the year 1815…the College would have hosts of middle-aged chemists and druggists,

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[90] L., "London College of Medicine: Objections to the Universal Title of 'Doctor'," *The Lancet* 1830-31, vol. 2 (1831), p.687-8: 687.
[91] Anonymous, "Letter to the Editor: London College of Medicine," *The Lancet* 1830-31, vol. 2 (1831), p.256: 256.

oilmen and grocers, presenting themselves as candidates for the diploma, stating that they were in practice previous to the passing of the Apothecaries' act: and who could deny it?'[92] This writer is alluding to the relatively unregulated state of apothecaries before the Act of 1815 that imposed strict licensing requirements on those who wanted to dispense medical advice. His concern is typical of those who feared that their professional standing would be harmed by quacks who practiced under the name "doctor," a common concern generally among medical men. Another author wrote, "it is stated that candidates will not be required to produce any certificates whatsoever—an examination being considered quite sufficient: even a certificate of hospital practice is not required—I am sure it is not necessary to occupy the pages of your journal with arguments proving the complete absurdity of this…."[93] These statements are remarkable for their similarity to those made by radicals writing to *The Lancet* who expressed concern about keeping the caliber of professional medicine high.

Those who criticized the London College of Medicine on some grounds also recognized the need for increased participation of the membership in the Royal Colleges. Such conservative reformers wrote things like, "No man, who is not very blind or very uncandid, will deny that the present constitution of the College of Surgeons is essentially unpopular… at variance with the spirit of liberalism which marks the times."[94] Another surgeon asked of the Council of the Royal College of Surgeons, "Why should the Council remain insensible to the advantages which would arise from a freer intercourse, in their official capacity, between them and the Commonalty, which, without trenching upon their privileges, would increase the

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[92] Anonymous, "Letter to the Editor: Collegium Wakleyanum," *London Medical Gazette* 8 (1831), p.271-2: 272.
[93] Ibid.
[94] Editor, "College of Surgeons," *London Medical Gazette* 7 (1831), p.787-91: 789.

importance, the utility, and the character of the College?"[95] And one author captured particularly well the sentiments of many who wrote to the *London Medical Gazette*:

> there are very few reflecting men in the medical profession who do not believe that the system of medical education, and of medical polity generally, in this country, is in want of some improvement. Now, sir, the proposed '*College of Medicine'* is not likely to effect any amelioration or reform in medical polity; first, because many of its proposed measures are objectionable, or even Utopian; and, secondly, because the 'College of Medicine' will not be joined by the most respectable and influential members of the profession, for reasons which need not here be stated; But, sir, if 'an Association for the Improvement of Medical Education and Polity, and for promoting harmony in the profession,' were formed, for the purpose of petitioning the constituted authorities, or even the legislature itself, for better laws and regulations than now exist, I am certain the said association would soon be joined by a powerful phalanx of rank and talent in medical science. Such an association, sir, would not work against existing institutions, but assist them in procuring wise legislative enactments, by collecting the voice of the profession into a focus.[96]

The consensus seems to have been that, although Wakley's new College went too far, although it jeopardized medical education and risked letting quacks practice legally, reform was necessary, even reform along the lines of the principles that Wakley and his cohort espoused. These conservative reformers felt that it was sufficient to reform the old institutions. But while substantively these groups of reformers seemed to agree on a number of points, the rhetoric surrounding the London College of Medicine was revealing of other kinds of divisions, divisions suggested in the passage above, when the author writes: "the 'College of Medicine' will not be joined by the most respectable and influential members of the profession." The dispute over the College of Medicine was grounded in professional politics and in political rhetoric.

Both *The Lancet* and the *London Medical Gazette* took part in creating conflict

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[95] "One of the Multitude", "College of Surgeons," *London Medical Gazette* 7 (1831), p.818-20: 820.
[96] Joseph Henry Green, "Distinction without Separation," *London Medical Gazette* 8 (1831), p.213-7: 217.

around the proposed institution, first by insulting the character of the leader or leaders on the opposing side. Wakley wrote of the Royal College of Surgeons that it was full of "Impudent, empty-headed pretenders! Puffed up with over-weening vanity by the slavish obsequiousness of lace-bedecked menials and sycophantic, expecting toad-eaters…"[97] and routinely called those who ran the Society of Apothecaries "Old Ladies" and "Hags." The editors of the *London Medical Gazette*, in turn, wrote, "Mr. Wakley, in the course of a speech which, to our sad experience, lasted a full hour by the clock, exhibited rare powers of facetiousness and waggery…. and proved to be so *dry* in the course of delivery, that the speaker was obliged to drink about a couple of quarts of water! to make himself fluent."[98] These sorts of insults and mockery were common in the clearly partisan medical journals, journals which were read almost exclusively by those who agreed with their politics. But the strategic rhetoric went beyond cheap insults.

The politics of the London College of Medicine were, in large part, the politics of revolution versus reform. One reader of the *London Medical Gazette* set it up that way directly, saying, "I am a decided friend to reform, but not revolution,"[99] explaining, "In reference to this institution I would say that it admits of, and indeed requires, very considerable reform; but because it requires reformation, is no reason that it should be annihilated."[100] The distinction between revolution and reform carried the sorts of political implications discussed earlier in this chapter: to be a revolutionary in early nineteenth-century Britain was a risky position. The editor of the *London Medical Gazette* made such a point explicitly, saying of the Royal College of Surgeons:

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[97] Thomas Wakley, "Plottings of the College Council," *The Lancet* 1830-31, vol. 2 (1831), p.81-3: 82.
[98] Editor, "Wakley's Entertainment at the Crown and Anchor," *London Medical Gazette* 7 (1831), p.792-3: 792.
[99] Anonymous, "Letter to the Editor: Collegium Wakleyanum," 272.
[100] Ibid.: 271.

> There are many who may be called *reformers*—that is, who would prefer having a voice in the election of the Council, and who would be glad to establish a right of property in the building, such as should enable them to assemble there to discuss professional matters. Of such persons a great majority of the members consist. But of *radicals*— that is, of those who would support the riots got up by Wakley as a fillip to the sale of his papers—there is not one in fifty, and those few are persons of no note, influence, or name.[101]

Professionally, the politics of reform were safe; there were many who advocated reform. But to court revolution was to ally oneself with Wakley's cohort and to oppose the established leadership of the medical profession. Proponents of the new College of Medicine accepted this rhetoric of revolution. Wakley called the London College of Medicine "a complete renovation of the medical profession in England—an entire remodeling of the statutes relating to medicine"[102] and said that the medical profession would regret having toiled for many years "under the iron rods of incompetent rulers" when they could have "thrown off the yoke of their debasement."[103] In so doing, he made the stakes of joining his cause clear—supporters of the new College would be making a political move.

By the end of 1831, the London College of Medicine had simply faded away.[104] This happened in part because even its supporters had reservations about its extreme positions; in part because Wakley, its main promoter, embraced a rhetoric of revolution in a time when reform was the safer, and indeed more British, alternative to revolution; and in part because of an incident at the Royal College of Surgeons that happened just before the initial meeting at the Crown and Anchor to set up the new

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[101] Editor, "College of Surgeons," 790.
[102] Thomas Wakley, "London College of Medicine: June 18, 1831," *The Lancet* 1830-31, vol. 2 (1831), p.379-80: 379.
[103] Thomas Wakley, "The London College of Medicine," *The Lancet* 1830-31, vol. 2 (1831), p.243-50: 244.
[104] "Philomeides", "Letter to the Editor: Grand Convocation of the Collegium Wakleyanum," *London Medical Gazette* 8 (1831), p.208-9: 208.

College. Events at the Royal College of Surgeons inflected the debate about the London College of Medicine and helped to support depictions of Wakley and his followers as riotous revolutionaries, dangerous to the professional man's career, if nothing else.

On March 8, 1831, Wakley and a number of his followers, most of whom remain unnamed in accounts of the event, assembled at the Royal College of Surgeons and entered the building prior to the Council having arrived and opened it. They were there to demonstrate sympathy for naval surgeons, who had received a circular indicating that they were not to attend the King's levées. Wakley thought it a particularly opportune moment to protest, as the Hunterian Oration was to be given that day and, in protesting, he and his followers effectively asserted their right to determine the business of the day at the Royal College of Surgeons. Once in the College theater, Wakley, along with two other practitioners, Mr. Garland and Mr. King, proposed resolutions vindicating the rights of naval surgeons, resolutions that were passed by the membership assembled there. The Council entered, insisted that the Hunterian Oration be given, and, after the oration, voted 15-3 against the resolutions supporting the naval surgeons. Wakley was incensed. He invited his supporters to assemble at the Royal College of Surgeons on the day of the next Hunterian Oration in order to protest. The Council of the College, in response, announced that the doors to the building would be locked until the time of the Oration. A crowd of Wakley's followers assembled early nonetheless, entered the College building, and created enough of a commotion that the Oration could not continue, and the Council had Wakley forcibly removed from the building.[105]

[105] For accounts of the incident, see Editor, "Outrage at the College of Surgeons," *London Medical Gazette* 7 (1831), p.760-4: 760-61; Wakley, "Plottings of the College Council."; Sprigge, *The Life and Times of Thomas Wakley*, 212-17.

To moderates, this incident signaled that Wakley and his crowd brought chaos and even violence. It allowed the *London Medical Gazette* and those conservative reformers guarding against revolution to paint Wakley as a dangerous revolutionary and lent credence to fears of "revolution" in the medical world. It also made it politically untenable for those who wished to maintain an already secured standing in the medical world to support Wakley's cause—in a small and highly politicized, competitive London medical world such a move would be disastrous for the career of a man who relied on the establishment. The *London Medical Gazette* wrote of it:

> On the disturbance—we might, without exaggeration, say riot—at the College of Surgeons, which it is this week our painful duty to record, we shall make but little comment. The simple narrative of events speaks for itself, and tells a story of disgrace which will be read with shame and mortification by all who have the respectability of their profession at heart—by all who prefer order to confusion, and decency to outrage—by all professional men who think too highly of themselves and of their calling to behold, without pain, the theatre of the College of Surgeons converted into a scene of the most disgraceful tumult; where demagogues assume the character of English surgeons, and setting at naught all the observances we are accustomed to respect, convert the lecture-room, hitherto devoted to the purposes of science, into an arena for the display of the wildest passions.[106]

Talk of uncontrollable, indecent passions, of riot and tumult, and of demagoguery, would be echoed in the rhetoric surrounding the London College of Medicine. Talk of revolution, after all, was easily connected to criticism of the King's treatment of his naval surgeons, criticism labeled "an outrage upon all decency and taste, [bordering] too close on treason to be altogether prudent…."[107] The events were neatly linked, articles about them set side by side, language used to describe the "riot" and the

[106] Editor, "Outrage at the College of Surgeons," 760-61.
[107] Ibid.: 763.

College constructed as parallels.[108] The rhetoric and politics of reform and revolution, and the actions of Wakley himself, actions that resulted in a public disturbance and police action, helped to shape responses to the London College of Medicine, creating the appearance of sharp opposition within the medical community.

V. Conclusion

Between 1810 and 1830, a variety of reformers became increasingly critical of British medical education. Their proposals for reform found an audience, and they found communities in the blossoming medical periodicals. Radical reformers, who felt that the British were falling behind their continental rivals scientifically, generally proposed a remodeling of British medicine by minimizing the distinctions between practitioners, electing those who examined candidates for diplomas, doing away with required hospital attendance, and incorporating burgeoning medical sciences like experimental physiology, morphology, and pathology. These reformers have been accounted for in the historical literature. Conservative reformers, who wanted to refashion or improve medical education in London, wanted to do so in ways they considered particularly British—by emphasizing therapeutics and practice, by continuing what they represented as British traditions of philosophical anatomy and deductive physiology, and by promoting competition among decentralized educational institutions. These conservative reformers should not be mistaken for conservative members of the establishment. They argued in favor of overhauling anatomy laws to provide more legitimate sources of bodies for anatomy classes; they proposed reforms

[108] See, for example, the following letters and articles clustered together in which the style of writing and rhetoric regarding the College and the incident at the Royal College of Surgeons are very similar and seem to suggest that the two might be related sorts of revolutionary endeavors: "Bdelucleon", "Letter to the Editor: College of Surgeons," *London Medical Gazette* 8 (1831), p.269-71: 269-71; Anonymous, "Letter to the Editor: Collegium Wakleyanum," 271-2; Editor, "College of Surgeons," 787-91; Editor, "Wakley's Entertainment at the Crown and Anchor," 792-3.

to the government of the Royal Colleges to make those institutions more responsive to the needs of their members; and they sought to make medical education more practical by integrating surgical and medical education and by perfecting the hospital training that Londoners considered their greatest strength. They based their medicine in the classroom and in practical attainments. They found grounds to carry out their dispute with the radicals in the proposed London College of Medicine, using distinctions between revolution and reform to draw distinctions between the two groups and to advocate the cause for reform in a moderate, restrained, British fashion.

The rhetoric of reform described in this chapter was also very much a part of institutional reforms that took place in London's teaching hospitals and in the erection of a new university in London in the late 1820s. In those institutions, the subject of the next chapter, reformers debated again whether British medical education should be fundamentally practical or whether it should be developed in such a way as to compete with programs in France. The institutions that took shape ultimately attempted to incorporate both kinds of reform, but demonstrated that medical science in Britain would be, first and foremost, a science based in practical pedagogy and not in a laboratory.

5. **Systematizing Medicine through Institutional Change, 1825-40: London University and London's Comprehensive Hospital Schools**

During the first half of the nineteenth century, the epicenter of British medical education shifted from Edinburgh to London. Simultaneously, research and education in the British capital moved from small schools offering a few courses in private homes to large hospital schools and universities offering a full medical curriculum.[1] By the 1830s and 1840s, research practices in the life sciences changed as vivisection became more widely accepted and the argument from design began to lose advocates.[2] These changes in research style and epistemology were tied to the classroom—periodicals reveal a medical community obsessed with restructuring education in order to reform medical science and therapeutics.[3]

In this chapter I will argue that conservative reformers developed what they considered a science of medicine by reforming pedagogical institutions, ultimately establishing hospital schools as their prototype of a thorough London medical education. Hospital schools were practical in nature and promoted a systematic grounding in therapeutic practice. London University, which was founded to teach practical medicine as an alternative to the theoretical, Latin-based education at Oxford and Cambridge, became a seat of radical, French-style medical sciences within a few years of its opening in 1828. Charles Bell, on the medical faculty, and other like-minded reformers outside of it, felt that the ambitions of the founding members of the University had not been realized and could not be realized in that institution—they,

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[1] Waddington, *Medical Education at St. Bartholomew's Hospital, 1123-1995*, 71.
[2] For more on vivisection in Britain, see: French, *Antivivisection and Medical Science*, Chapter 1, "Animal Experiment and Humanitarian Sentiment before 1870"; Rupke, *Vivisection in Historical Perspective*, Chapter 4, "Marshall Hall (1790-857): Vivisection and the Development of Experimental Physiology".
[3] W.H. McMenemey, "Education and the Medical Reform Movement," in *The Evolution of Medical Education in Britain*, ed. F.N.L. Poynter (Baltimore: The Williams and Wilkins Company, 1966), 135.

along with others[4] in the London medical community, worked to develop a different sort of institution, the hospital school, into the site of comprehensive, practical medical education of the sort that could rival London University. Though they can be seen as opposite models based on competing philosophies, both institutions only partially represented the styles of medical education that they purported to represent—institutional politics were almost always complicated and messy. Both also helped to create a new union between science and medicine, a union forged in the classroom.

The conservative reformers involved in the development of comprehensive hospital schools were a loosely affiliated group, defined primarily by their opposition to the more radical reformers who sought to level British medical hierarchies and to import materialist, experimental Continental life sciences. They were otherwise diverse in background, interests, and to some extent, politics. They tended to hold positions in London's hospitals, to publish in the *London Medical Gazette,* and to move in similar circles, sharing commitments to anatomy and to emphasizing clinical practice.[5] By focusing on these conservative reformers, one can see the complexity of London medical scene and its institutions, the importance of local politics, and the real and significant reforms and developments taking place at the sites of practical education: the hospital schools.

As I argue in the previous chapter, conservative reformers attempted to improve medical education and practice in ways that they described as being particularly British—by emphasizing therapeutics and practice, by expanding British traditions of philosophical anatomy and deductive physiology, and by promoting competition among decentralized educational institutions. The rhetoric of such reformers was explicitly anti-French and these reformers generally argued that reform

[4] For more on what I mean by conservative reformers, see the previous chapter of this dissertation on rhetoric and reform.
[5] See Chapter 4 of this dissertation for more on the constitution of the group.

should be moderate in order to avoid the violent sort of revolution that had taken place in France. These reform ambitions and development of a notion of "traditional British medicine," very much shaped the sorts of institutional change that took place during the 1820s and 30s and can be seen in the responses to the development of London University as a continental-style medical institution.

In examining reforms enacted in medicine and surgery in London at the beginning of the nineteenth century it becomes obvious that, as Roy Porter so nicely puts it, Georgian Britain "was not the wasteland sometimes supposed, but to appreciate this we must look not to the universities but rather to the intellectual arena of London."[6] Porter goes on to say that those who still find a wasteland do so because they are looking whiggishly backward, searching for twentieth-century medicine in the nineteenth, or because they are reading the early nineteenth century through the lens of Victorian reformers' rhetoric. Instead, British medical science was an observational science developed through connections between anatomy, pathology, and hospital care and advanced by teachers who practiced all three.

Institutional changes in London's system of medical education took shape during the 1820s and 30s. There was an atmosphere of reform in general in London at the time, as political reform took shape in the Reform Act of 1832, after several years of debate, uncertainty, and agitation.[7] London had, by then, become the seat of British surgical and medical education, in part because students from all over, including Edinburgh, had long come to London to walk the wards of the great hospitals for practical experience, and in part because the great school of surgical education in Edinburgh had gone into decline.[8]

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[6]Porter, "Medical Lecturing in Georgian London," 99.
[7] Burns and Innes, *Rethinking the Age of Reform: Britain 1780-1850*.
[8] Rosner, *Medical Education in the Age of Improvement*, 48-49.

During this period, two new types of institution were developed in London: universities, like London University,[9] that focused on professional education, and full-fledged hospital schools, like the Middlesex Hospital School and St. Bartholomew's Hospital School, that offered practical medical education. These two types of institution were products of similar sorts of concerns for broad, systematic, and practical medical education in the British capital, but they served slightly different (though not necessarily incompatible) goals. London University, within a few years of its opening in 1828, saw itself as adopting the best pieces of French and German professional education,[10] creating a universally respected scientific and clinical medical education. The hospital schools were meant to offer what the British thought of as their own particular strength—clinical experience through the observation of patients at the bedside, and lectures that connected basic sciences like anatomy to cases in the hospital wards. As one medical editor put it in an 1829 article directed at students, "It has long been the custom in London to connect medical schools with the great hospitals, by which the student has the advantage of confirming or correcting, at the bedside of the patient, the impressions he has received in the lecture-room. It was this arrangement which gave to London its great celebrity as a practical school of medicine and surgery."[11] To such conservative-reformer proponents of the hospital schools, British traditions and British strengths dictated that medical education be built around London's hospitals.

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[9] Although King's College was established only shortly after London University (it was founded in 1829) it did not aim to offer a new model of educational institution in the way that London University did. Its aim, in fact, was largely, to counter the influence of the avowedly secular and reformist London University. In 1836 the two institutions were brought together as a part of the University of London. Joseph Meisel, "A Magnificent Fungus on the Political Tree: The Growth of University Representation in the United Kingdom, 1832-1950," *History of the Universities* XXIII, no. 1 (2008), p.109-84: 117.
[10] Lawrence, *Medicine in the Making of Modern Britain*, 27.
[11] Editor, "Hints to Pupils," 15.

I. The Birth of London University: Practical Training for Britain's Professional Classes, 1826-1828

London University was founded with reformers' pedagogical concerns in mind. The debates surrounding its birth and the changes it underwent in its early years help to capture the transformation from a model of medical science that was intended to be particularly British, to one that emulated continental rivals and was considered to be universal. London University was clearly meant to alter the landscape of British medical education. Before its opening in 1828 London had no university medical school. Previously, medical education in London was conducted in disparate and varied institutions. It was ad-hoc, meant to suit an individual's needs. There were two primary components of London medical education: the private schools of anatomy, which also offered medical courses other than anatomy, depending on the lecturer's skills,[12] and the hospitals, which offered the opportunity for students to "walk the wards" and to attend clinical lectures.[13] London University was meant to combine the best from each source. All agreed that London University should offer an alternative to the classical learning of Cambridge and Oxford, but reformers debated just *how* medical education should be refashioned at the new institution.[14]

London University was founded in 1826 and opened for classes in 1828. It was largely the work of Edinburgh lawyer, Whig, and reformer Lord Henry Brougham, whose interest in education is exemplified by his involvement in the Society for the Diffusion of Useful Knowledge, the London Whig association intended

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[12] Susan Lawrence, "Entrepreneurs and Private Enterprise: The Development of Medical Lecturing in London, 1775-1820," *Bulletin of the History of Medicine* 62 (1988), p.171-92.
[13] Students would often pay to be allowed to walk through a hospital as someone's pupil, gaining access to sick patients and sometimes to the clinical notes of the doctors and surgeons. Susan Lawrence has written extensively on both the private schools of anatomy and on ward-walking and hospital education in Ibid; Lawrence, *Charitable Knowledge*.
[14] Bonner, *Becoming a Physician*, 172-73; Desmond, *The Politics of Evolution*, 31-32, 92-94.

to provide scientific and practical knowledge to the middle and working classes.[15] Brougham was also a staunch supporter of the Reform Act of 1832 and believed that reform, coupled with education in the sciences, would help to improve the lot of the middle classes and the overall welfare of society. When it opened, London University, widely known as "the godless institution of Gower Street,"[16] had no religious requirements. According to its widely-distributed prospectus, the University was meant "to bring the means of a complete scientific and literary education home to the doors of the inhabitants of the metropolis, so that they may be enabled to educate their sons at a very moderate expense and under their own immediate and constant superintendance."[17] This would distinguish London University from its ancient competitors, for, as the prospectus declared, "It is known that a young man cannot be maintained and instructed at Oxford or Cambridge under 200£ or 250£ a year while the expenses of many very far exceed this sum; and the vacations last about five months in the year. The whole expense of education at the London University will not exceed 25£ or 30£ a year…."[18] This moderately-priced education was meant, above all, to be practical in nature.

London University was intended to serve merchants and members of the professions of medicine and law and to conduct courses in English, without the emphasis on Latin and Greek found at Oxford and Cambridge. In doing so, it would utilize the "local advantages in the metropolis, for connecting the theoretical with the practical parts of these branches of knowledge, which cannot be equally enjoyed in

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[15] Geoffrey Cantor, "Henry Brougham and the Scottish Methodological Tradition," *Studies in History and Philosophy of Science* 2, no. 1 (1971), p.69-89.
[16] Harte, *The University of London, 1836-1986 : An Illustrated History*, 14.
[17] Edmund Burke, "The London University," *Annual Register* 67 (1826), p.82.
[18] Ibid.

any provincial situation."[19] Council members hoped that the university might help to rectify a system of the professions in which the majority of practitioners of both law and medicine had not graduated from universities, and in doing so, provide those practitioners a more thorough and consistent education.[20] The University was meant to be flexible and utilitarian. Its founders, in an attempt to make it adaptable to the changing sciences and the needs of students, instilled in it a "perfect freedom of competition,"[21] providing faculty with only small salaries, the bulk of their income coming from student fees, much like the system at the University of Edinburgh. As it was explained by Thomas Macaulay in the Edinburgh Review, "Under such a system […] whatever language, whatever art, whatever science, it might at any time be useful to know, *that* men would surely learn, and would as surely find instructors to teach. The professor who should persist in devoting his attention to branches of knowledge which had become useless would soon be deserted by his pupils."[22] Good teachers who taught useful courses would prosper.

Even the allocation of space, set out in the original prospectus, was evidence of London University's commitment to a practical, useful education. The initial plans for the university building called for four lecture halls of varying sizes. The prospectus makes clear that the largest rooms would go to Anatomy, Surgery, Midwifery, Chemistry, Materia Medica, Chemistry applied to the Arts, Mechanical Philosophy,

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[19] *Statement by the Council of the University of London, Explanatory of the Nature and Objects of the Institution*, (London: Longman, Rees, Orme, Brown, and Green; and John Murray, Albemarle Street, 1827), 8.

[20] Ibid., 9. "There are now 6,000 members of the College of Surgeons, not six of whom, it has been stated, have graduated at the universities. In the higher branch of law, a very considerable proportion have graduated at Oxford and Cambridge; but among those, who belong to a very important branch of the profession—the attornies [sic], of whom there are not less than eight thousand in England, it is believed that scarcely one in a thousand has had the advantages of an university education. Those, who hold places in the offices of government, a class that ought to enjoy the benefits of a liberal education, are also unable to avail themselves of the facilities afforded at Oxford and Cambridge, because they usually enter such offices at or before the age of the youngest under-graduate of those universities."

[21] Macaulay, "Thoughts on the Advancement of Academical Education in England," 324.

[22] Ibid.

Geology and Mineralogy, Mechanical Philosophy applied to the Arts, the Nature and Treatment of Diseases, Physiology, and English Law.[23] The biggest rooms, it seems, would be reserved for subjects with direct and clear practical application. Sciences would be taught in those rooms if they were to be applied to the Arts, while only the most practical of medical and surgical subjects, along with a practical course on English Law, would be taught to audiences large enough to require such space. Smaller lecture rooms would be used by courses like Latin, Greek, and Mathematics and Jurisprudence, while the smallest rooms would be saved for classes on subjects like History, Logic and Philosophy of the Human Mind, Botany, and Zoology. These classes designated for the smaller rooms reflect the anticipated lower enrollments in courses that largely lack clear utility in professions or trades. This plan reflected the anticipated "utility which prevails in the class for whom the Institution is peculiarly destined."[24]

In medicine, "useful" and "practical" knowledge was cultivated at the bedside. The Diploma of Master of Medicine and Surgery (note that medicine and surgery were granted as a unified degree) required that students acquire certificates of honor in classes on the "practice of medicine, anatomy, physiology, surgery, midwifery and diseases of women and children, materia medica, botany, chemistry, and anatomical demonstrations and dissections as well as attending the medical practice of a hospital containing at least 100 beds for 12 months; and surgical practice in an hospital meeting the same requirements."[25] The extensive hospital practice required attests to the importance accorded it by the founding members of the medical faculty.

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[23] *Statement by the Council of the University of London, Explanatory of the Nature and Objects of the Institution*, 19.
[24] Ibid., 31.
[25] Leonard Horner, "University of London, Medical Diploma," *London Medical Gazette* 6 (1830), p.219-21.

By teaching medicine and surgery side by side to all of its students, London University's council was catering to a group of general practitioners who were becoming more and more prevalent in London and the countryside. Although men within London were forbidden by the corporations from crossing disciplines (surgeons could not practice medicine, and apothecaries could choose to dispense drugs or medical advice, but not both), in practice most men outside of London were apothecaries and operated as "general practitioners." As a result, apothecaries were the first branch of medicine to undergo formal educational reform in the nineteenth century. The Apothecaries' Act of 1815 required that apothecaries possess a license from the Society of Apothecaries in order to practice. Formal qualifications for a license required courses in anatomy, botany, chemistry, materia medica, and physic, six months of hospital experience, and apprenticeship.[26] The course offerings of London University were built around these requirements, as well as the interests of surgeons who planned to work as general practitioners. London University and its early proponents were working to reform the sort of medicine that was practiced in the majority of Britain, providing a systematic education to the general practitioner.

According to those founding reformers of London University, who sought to offer cheaper and more practical classes, the apothecaries and surgeons who engaged in general practice were not well served by English universities and had a reputation for doing the bare minimum.[27] London University was meant to remedy that. In other words, it was meant to rectify a problem particular to the structure of the British medical profession—that the professional group of surgeons and apothecaries (general practitioners) who treated the majority of British patients had little systematic

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[26] For more on The Apothecaries' Act and general practitioners, see Irvine Loudon, *Medical Care and the General Practitioner, 1750-1850* (Oxford: Clarendon Press, 1986), Chapters 7-8, p. 151-89. See also Lawrence, "Private Enterprise and Public Interests: Medical Education and the Apothecaries' Act, 1780-1825."

[27] Horner, "University of London, Medical Diploma."

education and no universities built to suit their needs. It was born as a particularly British institution, but that national character was to be questioned within a few years of its birth.

II. The Battle Over Reform: From Educating the General Practitioner to Importing a Cosmopolitan Medical Science--London University, 1828-1835

The physicians and surgeons who staffed London University in its early years, including Charles Bell, were great proponents of systematizing medical education, of making a science of it by making it comprehensive and by grounding it in anatomy and practical therapeutics. Bell, who is representative, refers regularly to medicine as a science and also writes of medicine's constituent "sciences," so to say that the reformers thought they were making a science of medicine is to take them at their word. Bell wrote explicitly about teaching as the best of improving a science.[28] A systematic education, grounded in anatomy and hospital practice, seemed to underpin and perhaps even to constitute the sciences of medicine and surgery. Bell wrote in his letter of resignation from London University, "it is impossible that medicine, as a practical science, can be taught without a constant reference to the chambers of the sick, any more than chemistry can be taught without apparatus, botany without plants, or anatomy without bodies."[29] This passage illustrates one aspect of the practical nature of medical science that Bell discusses—medicine was practical in that it was "hands-on"; it was practical as opposed to theoretical. Both conservative and radical reformers would have seen value in practical, hands-on sciences (for radicals, physiology and chemistry would have fit the definition), and in moving away from the purely theoretical medicine taught at Oxford and Cambridge, but for conservative

[28] See quote on page 37 and footnote 88.
[29] Editor, "Resignation of Mr. C. Bell," *London Medical Gazette* 6 (1830), p.469-73: 473.

reformers, practical also meant teaching subjects that were directly related to patient care, that would bear an immediate relationship to the *practice* of medicine and not teaching subjects that did not have such a relationship. Medical science, for conservative reformers, required a sort of instrumental effectiveness.[30] It was a science based in hospital experience. The practical science of surgery, according to Bell, depended on an extended, comprehensive course of study (and I speak here of medicine and surgery somewhat interchangeably, as Bell and his cohort claimed that there was a need for general training in both fields in order to truly master the sort of general practice likely to be required).

In his *Institutes of Surgery* Bell laid out a plan of instruction, recommending that students have a background in natural philosophy before beginning their study of medical subjects; that they begin with anatomy, practicing dissection frequently; that they then add some form of mechanical exercise such drawing or anatomical preparation; that they dissect always with reference to the living body, of which they should acquire a knowledge in the hospital, where they should observe the body and how much the natural constitution can bear; and that they also acquire a knowledge of the medical treatment of disease for the many times when they will need to treat surgical diseases medically. Finally, Bell says, "clinical instruction is the last and best stage of this laborious course of study: and to maintain his spirits and perseverance during it, the student must look to the noble consequences, the power which knowledge places in his hands."[31] The sciences of medicine and surgery would be

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[30] For more on the significance of instrumentality, the ability to *do something*, in modern science, see Dear, *The Intelligibility of Nature: How Science Makes Sense of the World*, 173-95. This sort of instrumentality seems to resonate with the sort of medical science being created by conservative reformers.

[31] Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*, xix-xxii.

improved through such a systematic training, grounded in anatomy and in hospital training.

Bell and his fellow reformers intended to improve medical education by making it comprehensive, affordable, and particularly suited to the general practitioner. There were innovative courses proposed at the University: John Connolly proposed a course of instruction in mental disorders and recommended that students be allowed to observe an asylum, and John Hogg opened a dispensary where he conducted post-mortems for the benefit of the students.[32] And, as Charles Bell put it in his lecture at the opening of the University, the founders hoped that "great advantage and satisfaction [would] result from a combination of learned men, each active in his own sphere, whilst all combine for the greater object […] the improvement of science and literature."[33] But the new university's faculty proved to be less harmonious in its pursuits than Bell and the others on staff had hoped.

Staff appointments were initially determined by a council whose members were themselves businessmen, politicians, and lawyers and paid little heed to philosophical consistency in their early appointments.[34] The founding Council of twenty-four men included six Members of Parliament and seven Fellows of the Royal Society, but only one physician; their expertise was not in medical pedagogy. From the outset there appeared to be problems with administration and organization of classes; for example, anatomy was taught (under classes of different names) by at least

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[32] John Cohen, "Medical Education in the University of London, University College and Middlesex Hospitals 1800-1840" (Master's Thesis, University of London, 1991).
[33] Ibid., 68.
[34] According to the *London Magazine* the following were members of the founding Council of the University: Hon James Abercrombie, MP; Zachary Macauley, Esq. FRS; Right Hon. Lord Auckland; Sir James Mackintosh, MP, FRS; Alexander Baring, Esq. MP; James Hill, Esq.; George Birkbeck, MD; His Grace the Duke of Norfolk; Henry Brougham, Esq., MP, FRS; Lord John Russell, MP; Thomas Campbell, Esq; Benjamin Shaw, Esq.; Right Hon. Viscount Dudley and Ward; John Smith, Esq. MP; Isaac Lyon Goldsmid, Esq.; William Tooke, Esq., FRS; O. G. Gregory, LL.D; Henry Warburton, Esq. FRS; George Grote, Jun. Esq.; Henry Weymouth, Esq.; Joseph Hume, Esq., MP, FRS; John Wishaw, Esq., FRS; Most Noble the Marquis of Lansdowne, FRS; Thomas Wilson, Esq. Editor, "London University," *London Magazine* 5 (1826), p.554: 554.

three different professors—Bell, Bennett, and Pattison—and each complained in public about the activities of the others. In the *London Medical Gazette* of 1830 an editorial pointed out that the "three were lecturing in the same classroom on the same subjects, with the same preparations put upon the table, three successive times in the same day."[35] Debates between those who had professional differences took on a personal tone,[36] and arguments became particularly vitriolic when they involved the professors' pay. The pay arrangements for faculty, arrangements that depended on student fees for particular classes, caused controversy.[37] While professors disagreed about the content of medical education, those disagreements coexisted with disputes that were local, professional, and monetary.

The competitive aspect of London medicine seems to have been at the root of a dispute that had significant pedagogical implications: the dispute over a hospital. The council of the University declared in an 1827 statement explaining the strengths of its proposed arrangement that one of the advantages of London was that it presented opportunities to combine theory and practice. To that end, "an hospital capable of containing a sufficient number of patients to afford opportunities of clinical practice, both medical and surgical, and of illustrated lectures" was to be provided, "as an essential requirement of a medical school."[38] Initially it looked as though that hospital would be the Middlesex Hospital, as both Charles Bell, who occupied the Chair of Physiology and Surgery, and Dr. Thomas Watson, the Professor of Medicine, had appointments there. Bell was in favor of such a union. He wrote to his brother,

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[35] Editor, "London University--Mr. Bell," *London Medical Gazette* 7 (1830), p.308-11: 309.
[36] See Cohen, "Medical Education in the University of London, University College and Middlesex Hospitals 1800-1840", 82. "The dispute was originally about teaching […] but it became involved in issues of procedure, the organization, administration and constitutional structure of the University. The true situation was, however, complicated by personal enmities and bitterness, and the press was bombarded by letters and pamphlets from the various parties."
[37] Editor, "Memorial of the Medical Teachers," *London Medical Gazette* 14 (1834), p.241-4.
[38] *Statement by the Council of the University of London, Explanatory of the Nature and Objects of the Institution*, 15.

"There is a plan for uniting the University and the Middlesex Hospital. I have calmly looked to this as the only thing to do […] a hospital is necessary for our curriculum."[39] But members of the University's council were less sure that this was desirable. George Birkbeck, the only physician on the Council, for example, wrote of the incorporation of the Middlesex that "it can benefit nobody but Charles Bell."[40] Surely he meant that such an arrangement would be to Bell's benefit financially. Bell subsequently suggested a link with St. George's Hospital in addition to the Middlesex, allowing students to be admitted to clinical courses at either institution.

In May of 1830 Bell threatened to resign unless the medical school was remodeled to eliminate the overlap in teaching and to include a hospital. In September of the same year he resigned the University's Chairs of Surgery and Clinical Surgery but retained its Chair of Physiology. At the same time it was claimed that he had posted a notice at the Middlesex Hospital saying that he no longer supported the university medical school, at which time the Council asked him to leave.[41] Charles Bell's resignation was highly publicized (all the more so because he was rumored to have resigned, and in fact submitted his resignation several times, before he actually left the University, mid-term, in 1830), but it was only one of many resignations in the early years of London University.

As previously quoted in the second chapter of this dissertation, Bell wrote of the term physiology in a letter to his students, published in the *London Medical Gazette* because of his sudden departure, saying: "To those who know how little I value physiology, in the common acceptation of the term, it will be a proof of my desire to see the experiment of the new school fairly tried, that I submitted to be called

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[39] Bell, *Letters of Sir Charles Bell*, 299-300.
[40] Cohen, "Medical Education in the University of London, University College and Middlesex Hospitals 1800-1840", 65.
[41] Editor, "London University--Mr. Bell."

professor of that science (if a science it be) […]. You are aware that the subjects on which I lectured were the higher departments of anatomy."[42] With the term "physiology" standing in here for continental or experimental physiology, Bell's letter suggests a philosophical difference between him and some of his colleagues that went beyond a hospital: Bell wanted to maintain a British anatomical tradition in the medical sciences. London University was increasingly becoming a home to radicals like those at *The Lancet*, who, in 1829, could recommend only London University to students. After all, other medical schools, places like St. Bartholomew's Hospital School, "profess[ed] to be a complete school of medicine and surgery, but there [were] no lectures on either *comparative anatomy* or *physiology*."[43] Those radical reformers represented the sort of "Frenchness" that was the focus of conservative refomers' rhetoric, as described in the previous chapter. Conservative reformers accused the radicals of having brought the sort of callous, materialist, revolutionary, and most importantly, non-therapeutic sciences to London University that they associated with the French.

Dr. John Elliotson, who was selected in 1831 for the professorship of the Principles and Practices of Physic, said in his introductory lecture that when teaching at St. Thomas' hospital school he found of his former *hospital-school* colleague

> with whom I am on the very best terms, and who is a most amiable man, in the complete course which, according to our arrangement, he delivered during the season, and I in mine, upon the same subject,—inculcated both principles and practice so diametrically opposite upon almost every subject, that, to use his expressions, 'we must have differed toto coelo, both as physiologists, pathologists, and therapeutists, in many most essential points of doctrine and practice.'[44]

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[42] Bell, "Mr. Bell's Letter to His Pupils of the London University, on Taking Leave of Them," 308.
[43] Editor, "St. Bartholomew's Hospital," *Lancet* 1 (1829), p.47: 47. [emphasis in the original]
[44] John Elliotson, "Introductory Address to a Course of Lectures on the Principles and Practice of Medicine," *The Lancet* 1831-2, Vol. 1 (1831), p.64-70: 64-5.

Elliotson, who had been educated in Edinburgh, did not elaborate on the points of difference between himself and his hospital-school colleague. But the fact that he spoke with pride about London University as "the first and only medical school founded in England upon the full and extensive plan of the celebrated and systematic schools of the Continent and of Scotland…"[45] suggests that this might have been one instance of the more general debate taking place between the radical faculty of London University and the conservative reformers, traditionalists of the hospital schools. Elliotson was not the only early faculty member touting London University's Continental style. James Bennett, who had set up an English school in Paris, was hired initially as an anatomy demonstrator at London University. He advocated teaching anatomy in the style of the French, distinguishing tissue types and treating those tissues' general characters and functions. Bennett was promoted to professor when Granville Sharp Pattison, who was constantly maligned as old-fashioned, was removed from the position for incompetence in 1830.[46] Bennett, who was supposed to have been in a position of lower standing than Pattison, had long outshone Professor Pattison, even when still in his position as demonstrator, and was immensely popular with students. With Bell and Pattison both gone by 1830, London University lost all representatives of the practical, anatomy-based approach to surgery, anatomy, and physiology that had been the hallmark of a London education.

The *London Medical Gazette* in 1834 could paint a picture of educational turmoil at London University, saying that most "respectable men," had resigned "in despair or in disgust"—"the Warden and the Professors of Medicine, or Surgery, of Anatomy, of Medical Jurisprudence, of Clinical Medicine… &c. &c. have all changed

[45] Ibid.: 65.
[46] For more on Bennett and on the scandal surrounding Pattison's dismissal, see Desmond, *The Politics of Evolution*, 81-100.

within an inconceivably short period."[47] The resignations within the medical faculty were partly a result of disputes over turf, of local and professional politics, but they were also tendered by faculty such as Bell and Leonard Horner, the warden and also a Scottish geologist, who felt that London University was not doing an adequate job of maintaining the virtues of, much less advancing, British medical education and its strengths in practical training. The rhetoric of conservative reform was built upon the notion that British medicine and medical education were superior because they were fundamentally practical.[48] While radical reformers certainly would have considered elements of their system of education to be practical as well, conservative reformers had a tendency to emphasize hospital training (objectionable to radical reformers because the hospitals were controlled by the conservative establishment) and, perhaps more problematically for radical reformers, to deemphasize sciences like experimental physiology that seemed to have no relevance for therapeutics. For those men who resigned, men who hoped to reform medical education through the implementation of a practical curriculum at London University, the university had offered the possibility of uniting courses in medicine and surgery in order to provide a well-rounded education for the general practitioner, but such an education would be incomplete without a hospital. As Charles Bell described his position in his letter of resignation addressed to his students: the practice of "medicine is not sufficiently attended to by the rising generation of practitioners;--but it is an evil which the London University is incapable of remedying within the precincts of its present establishment, for it is impossible that medicine, as a practical science, can be taught without a constant reference to the chambers of the sick, any more than chemistry can be taught without

[47] Editor, "Memorial of the Medical Teachers," 242.
[48] See Chapter 4 of this dissertation.

apparatus, botany without plants, or anatomy without bodies."[49] It was a position grounded in the conservative reform movement described in the previous chapter.

According to Adrian Desmond, London University's medical department was an important site in the battle by radicals to wrest control of medical education from the Tory elite.[50] Read that way, the eventual incorporation of French morphology and experimental sciences into the curriculum was simply one way of undermining the established hierarchy. But to see only the radical elements of reform at the school ignores reformers whose politics were more local and whose aims had more to do with the professional practice of medicine than with asserting a major ideological shift. By attending only to big historical trends, to national politics, we obscure the local, situated politics that motivated many of the historical actors involved in this story. It becomes clear, when one looks closely, that both radical and conservative reformers acted for reasons that had little to do with large-scale politics: they left (or joined) London University in part because it was disorganized, in part because salaries were based on popularity with students, and in part because they had philosophical differences with their colleagues. Historians have painted those who opposed the importation of continental experimental sciences as conservatives and members of the old guard. This line of argument would make the events that occurred within a few years of the opening of the London University seem inevitable: professors who had already achieved prominence within the Royal Colleges and fame within private London institutions quit the University, more conservative medical journals like the *London Medical Gazette* chronicled the disarray within its walls, and the University's future seemed uncertain until the radicals and their new French sciences like morphology won out.

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[49] Editor, "Resignation of Mr. C. Bell," 473.
[50] Desmond, *The Politics of Evolution*, Chapter 2.

Although the radical medical men who sought to establish London University's curriculum on the pattern of medical science in France claimed to be the true medical scientists, their opponents also considered themselves to be systematizing medicine in order to establish medicine as a science as well. Some opponents of radical experimental science built a well-organized and comprehensive educational program in medicine that was based in therapeutic practice. The opposing of French science to London practice is one that these practitioners recognized themselves—the importation of French science would be done at the *expense of* practice. When London University became a radical institution and home to experimental sciences, it also lost its "British" character, and its faculty began to see it as cosmopolitan. But those reformers who meant to keep London medical education "British" and to achieve their own scientific reforms—by promoting practical experience, the integration of surgery and medicine into a single curriculum, and competition among faculty members and among institutions in order to reward teaching skills—went elsewhere. Often they went to the hospital schools that were built around practical medicine and its science.

III. Hospital Schools: Creating a Practical Alternative to Radical London University

While faculty at London University were making a science of medicine by importing the latest life sciences (physiology, morphology, and comparative anatomy), those hospital-school reformers who sought to create a medical science based on British anatomy and practical medicine found a new venue within which to further their pursuits. Growing directly out of the ward-walking practices of eighteenth-

century London medical students,[51] nineteenth-century hospital medical schools essentially merged the institutional forms of private medical schools, universities, and hospital clinical lectures, crafting a form of medical education that was built around the practice of patient care. If London University represented the site of radical medicine in London and marked a change in the nature of medical education, then the hospital schools represented the site of conservative reform, accommodating the more conservative interests of the Royal Colleges by attempting reform through gradual shifts in pedagogy. The hospital medical schools, without the connections to laboratories and non-medical sciences, became a last bastion for the conservative reformers, but can also be seen as a product and outgrowth of London University. Where hospital schools had previously been ad-hoc additions to the private schools, by the 1830s they became places of systematic education in clinical practice, partly in response to a model of medical education set out by London University. The nineteenth century revolution in medicine is known as much for clinical empiricism[52] as it is for the integration of experimental sciences into medicine,[53] and the hospital schools were the site of this revolution in London.

Hospital schools were established in two groupings—one set was established in the 1790s and the other set was born as a response to London University in the 1830s. In the 1790s, students could identify schools associated with Guy's, St. Thomas's, St. Bartholomew's, and the London Hospital. In some cases powerful private school lecturers managed to convince their hospitals to build lecture theaters to house some variety of courses, while in other cases private schools were located in

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[51] Lawrence, "Entrepreneurs and Private Enterprise: The Development of Medical Lecturing in London, 1775-1820."; Lawrence, *Charitable Knowledge*, Chapter 4.
[52] For two very different treatments of French clinical medicine, see Ackerknecht, *Medicine at the Paris Hospital, 1794-1848*; Michel Foucault, *The Birth of the Clinic; an Archaeology of Medical Perception* (New York: Pantheon Books, 1973).
[53] Andrew Cunningham and Perry Williams, *The Laboratory Revolution in Medicine* (Cambridge ; New York, NY: Cambridge University Press, 1992), particularly Chapter 10.

close enough proximity to the hospitals that they became identified with those hospitals. Susan Lawrence has written, "The Guy's 1807 announcement that the hospital lectures, together with courses at St. Thomas's, formed a 'school' illustrates the gradual development of a collective identity, a moving away from the situation characterized by the individual advertisements…"[54] These schools developed in an ad-hoc manner. Several hospital schools—the Westminster, St. George's, and the Middlesex—by contrast, developed as comprehensive medical schools later, in the 1830s and 40s. They developed in a more self-conscious fashion and as an alternative to London University.

As natural as the emergence of hospital schools may seem, relationships between the governing boards of charitable hospitals, their staffs, and the teachers in their wards and schools were both symbiotic and sometimes conflict-filled. Hospital boards needed convincing that the creation of hospital medical schools would serve the hospitals' charitable mission—taking care of impoverished patients. These concerns are reflected in what appears to have been a standard sort of rhetoric used by hospital staff in appeals made to hospitals' governing boards for the establishment of schools. John Abernethy, a famous surgeon and lecturer at St. Bartholomew's Hospital, along with his colleagues, convinced the Board of Governors in 1787 to build an auditorium on hospital grounds, and later to build other facilities. The St. Bartholomew's Hospital staff made the argument that "it is impossible for the Medical Officers […] to do all that is necessary to be done for the relief of Patients [without] recourse to the subordinate assistance of Students."[55] In addition to arguing that students were necessary to the normal functioning of the hospital, Abernethy and his

[54] Lawrence, "Entrepreneurs and Private Enterprise: The Development of Medical Lecturing in London, 1775-1820," 182.
[55] Waddington, *Medical Education at St. Bartholomew's Hospital, 1123-1995*, 38.

colleagues also argued that medical education was important for furthering medicine.[56] Such appeals connected medical teaching to medical science and medical science to the curing of patients so as to make the support of medical teaching a necessary part of social charity. In order to get the support of the hospitals' usual benefactors, medical education in the hospital schools had to serve, or appear to serve, patients directly.

Over four decades later, Charles Bell used tactics similar to those of Abernethy in attempting to establish a hospital school at the Middlesex Hospital. After leaving London University in 1830, Bell focused much of his attention on finding or creating another faculty post for himself. In April of 1835, six members of the Middlesex Hospital staff,[57] including Bell, presented an address to the Hospital Board that defined a hospital as a place "for the relief of those who are both sick and indigent" but also "the grand means and materials of medical instruction,"[58] and that ended with the statement "there is an immediate connection between the promotion of its immediate purposes [treating the sick poor], and the extension of that science on which the relief and prevention of diseases depend."[59] The address continued by saying that the only compensation that the house staff of the hospital received for their time and efforts came from the reputation they got from the hospital and compensation they got from students. That form of compensation was dwindling as other hospitals began to eclipse the Middlesex, offering schools with lectures in addition to opportunities to walk the wards. Bell and his co-signers identify London University directly as a proximate cause for the need to establish a school, saying that the Middlesex used to get its hospital pupils from the private teachers on Windmill Street,

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[56] Ibid.
[57] The address was signed by the physicians Francis Hawkins and Thomas Watson, and by the surgeons Charles Bell, Herbert Mayo, and Edward Tuson. Gordon-Taylor and Walls, *Sir Charles Bell, His Life and Times*, 148.
[58] Reproduced in Wilson, *The History of the Middlesex Hospital* 165.
[59] Ibid., 169.

but "upon the establishment of the London University and King's College, the school of associated teachers in Windmill-street was broken up," as both schools (though their impact and popularity differed) offered faculty positions to teachers who had formerly taught as independent, private instructors. They also offered an example of how governors should deal with such a problem, citing those private school lecturers affiliated with St. George's Hospital as surgeons or doctors: "Those who belonged to St. George's transferred their lectures at once to the hospital [where they have been] granted ample accommodation for teaching the other branches of medical science within the building itself."[60]

Bell and his colleagues proposed to diminish the flow of students from the Middlesex to other hospitals, according to their proposal, by "establishing a complete school of medicine in avowed connection with the hospital, and under the sanction of its patrons."[61] To do so, they said, would promote the "efficient working of the charity, even in respect of its sick inmates, [which] should not be impaired by the want of a due supply of pupils, from whom must be chosen the house-surgeons, dressers and clinical assistants."[62] Their argument, essentially, was that hospitals of the time drew their unpaid staff (house-surgeons, but also those who dressed wounds, etc.) from the ranks of their students. Those students who took on jobs like house-surgeon and dresser did some of the unglamorous work of the hospital in order to learn from the established staff members and to make a name for themselves, hoping one day to become hospital surgeons or physicians or well-paid private doctors. If those students went elsewhere for a more complete education, the hospital's patients would suffer for want of adequate personnel. The opening address printed in the *Lancet* ended by repeating almost word for word the last line of the letter to the governors of the

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[60] Ibid., 168.
[61] Charles Bell, "Middlesex Hospital School: Opening Address," *Lancet* 1835, vol. 1 (1835), p.89: 89.
[62] Ibid.

Middlesex, claiming an "ultimate connection between the promotion of [the hospital school's] immediate purposes, and the extension of that science on which relief and prevention of diseases depend."[63] These men tied the charitable mission of a hospital to medical education by asserting that making a hospital into a classroom would advance the clinical care of the hospital's patients, the incomes of the hospital staff, and the science of medicine. The governors of the Hospital built a school in October of 1835 (a school at which Bell, who was to teach surgery and anatomy, gave the opening address).

At first glance it appears that St. Bartholomew's and the Middlesex hospital schools were founded using similar rhetoric to overcome the concerns of a charitable board, but schools established in the late eighteenth century and those developed in the 1830s were born under very different circumstances. St. Bartholomew's Hospital School came into existence in 1788, more as a matter of convenience than design,[64] as a loose affiliation of instructors already teaching in private schools who thought that a centralized location would be convenient. Those hospital schools, on the other hand, born in the 1830s, hospital schools like the Middlesex, were offering an alternative to London University rather than to the private schools, and thus aspired from the outset to be a "complete school of medicine."[65] All hospital schools, whether the loosely affiliated ones of the late eighteenth century or those developed to be complete medical schools in the nineteenth century, had to build the charitable mission of the hospital into their proposals, and that shaped the kind of pedagogical program they promoted.

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[63] Ibid.
[64] Waddington, *Medical Education at St. Bartholomew's Hospital, 1123-1995*, 36.
[65] Bell, "Middlesex Hospital School: Opening Address," 89.

IV. Systematizing Practical Medicine: Pedagogical Programs within the Hospital Schools

In 1838 Benjamin Brodie wrote in his "Introductory Discourse on the Studies Required for the Medical Profession," "while engaged in attendance on the hospital, always bear in mind that there is no one of your other studies which, as to real importance, can compete with this."[66] For those with such views on the significance of hospital education, hospital schools offered obvious advantages in practical training over any other venue. In addition to offering clinical training, hospital schools integrated classroom lectures in the medical sciences into their curriculum. Their courses outside the hospital wards, however, tended to be limited to subjects with relevance to practice as well. The Middlesex Hospital was fairly typical in offering courses in medicine, surgery, anatomy and physiology, midwifery, therapeutics, chemistry, forensic medicine, and botany (note that they did not separate their physiology course from that on anatomy or offer a separate course on comparative anatomy as London University did), all of which were intended to be practical in nature.[67]

Nineteenth-century hospital schools allowed education in the practice of medicine to be systematized in a way that stressed therapeutics. The joint emphasis on the practical and on its philosophical or principled underpinnings was very much a part of the conservative reformers' program for pedagogical reform (above, chapter 2), and followed directly from complaints about London University's deficiencies and its lack of a hospital, the site of instruction in the practice of medicine. In his Clinical Lecture on Diseases of the Spine, delivered in 1835 at the Middlesex Hospital School,

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[66] Brodie, "Introductory Discourse on the Studies Required for the Medical Profession," 470.
[67] Gordon-Taylor and Walls, *Sir Charles Bell, His Life and Times*, 149.

Charles Bell explained how the structure of the hospital served his pedagogical purpose:

> I have requested you to come into the theatre rather than your [class]room in the hospital, that I might show you these preparations in connexion with the cases you have seen. And now observe the advantage of giving clinical remarks to those whom I know the right elements have been taught, instead of addressing gentlemen from three or four neighboring schools, who have in all likelihood no ideas in common with me. I will furnish you with an example of how easy it is to give such lectures to those who have been initiated in the principles.

Bell stressed the importance of principles and of experience jointly—principles were the things that allowed a student to make sense of that which he observed, they constituted the natural philosophy that allowed one, for example, to assert that form and function should be related. He went on, then, to jump straight into a case that illustrated those principles in practice, saying:

> If you go into Percy ward you will there find a man lying with a wandering and bewildered eye, with a very very pale face, and spasmodic twitching of the eye ball… This man has fallen upon the vertex of his head; and were I to enter upon the consideration of the case with those who had not gone through the demonstration of the bones of the cranium with us, you know full well that I should be obliged to enter upon the whole structure of the skull, and the mechanical principles on which it is built. But now, with one word, one half sentence, I can say to you there is the example of which I have been speaking. Here a blow has been inflicted upon the upper part of the parietal bone, and you see the effect upon the temporal bone, and upon the ear… It is not requisite that I should go into the whole proof, and repeat the demonstrations; I have merely to say, that this is an illustration of the principles I formerly established.[68]

[68] Bell, "Clinical Lecture on Diseases of the Spine, Delivered, Nov. 3, at the Middlesex Hospital School," 231.

In other words, Bell considered it crucial to be able to make reference to hospital cases to which all of his students had access when in the lecture theater and, equally importantly, to know that his students had the same background in anatomy and other basic medical sciences when explaining practical or clinical medicine in the hospital. These interrelated aspects of medical education—experience related to practice and underlying principles—necessitated a *system* of medical education, a thorough training not just through apprenticeship, but uniting a study of the principles of human anatomy and disease with that of therapeutic practice. Bell's pedagogical philosophy, and that of the hospital school lecturers such as Benjamin Brodie and Astley Cooper, clearly involved drawing on clinical cases from the hospital in order to illustrate physiological and pathological principles.[69] The disease history within a living patient was taken as crucial to the development of pathology by such men. The development of hospital schools advocated by medical men like Bell had to do with establishing a pedagogical system in which basic sciences like anatomy were taught systematically, with reference to each other and to actual practice in the hospital wards. In 1838, Brodie, of St. George's Hospital School, described such a system of education as follows: "Thus you will perceive what are the three principal divisions of the course of education in which you are now engaged. The first comprehends the science of Anatomy and Physiology; the second, that of Pathology, or the science of disease; and in the third division we find whatever relates to Medical and Surgical Treatment."[70] The three were intimately interrelated.

In his introductory address at the Middlesex Hospital School, Bell directly juxtaposed the new hospital school to his old affiliation, London University. In *The*

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[69] For example, Bell wrote, "Your long list of certificates you must have; but I conjure you to act as if anatomy, and such uses of anatomy as you see in hospital practice, were the business of your life in London, and not to be satisfied with learning to answer such questions as may be put to you at any board." Ibid.

[70] Brodie, "Introductory Discourse on the Studies Required for the Medical Profession," 466.

Lancet's paraphrase: the Middlesex "had been established in order to counteract the effect of a rival party (London University), who had deprived of its pupils the Middlesex Hospital, the governors of which were no sooner fully informed of the fact, than they enthusiastically came forward and supplied the funds necessary to institute a medical school in connexion with the hospital."[71] The statement reads like that of a bitter former employee, but Bell also made it clear in the address that there would be substantial differences between London University and the Middlesex Hospital School and that the founding of Middlesex Hospital School could be read as an attempt to establish an alternative to London University. Bell said that he had thought it bad for the Hospital School to have both a professor and a demonstrator of anatomy (as London University did), since the pupils "would be more intimate with the demonstrator than the professor […]. Anatomy was not to be learned without the constant presence of the teacher in the dissecting-room, and he thought that the proper plan was for the teacher himself, the 'professor' or the 'demonstrator,' whichever name they chose to give to the *teacher*, should put on the sleeves and apron, and demonstrate in the dissecting room, as he (Sir Charles Bell) had done."[72] The *science* of practical medicine that Bell hoped to establish would unite the practical and philosophical elements of anatomy, rather than viewing the practical parts of anatomy instruction as derivative. The teacher/demonstrator would need to be in the room with students, who were literally practicing surgery and medicine through dissection. This important shift shows the commitment of Bell and his peers to teaching all of medicine's component sciences as practical (both in the sense that they were not theoretical and in the sense that the had a relationship to therapeutic practice). The Middlesex Hospital School would rectify such segregation of the hands-on

[71] Editor, "Introductory Address on the Opening of the Middlesex Hospital Medical School," *The Lancet* 29 (1835), p.148: 148.
[72] Ibid. Emphasis in the original.

components of medical education, with all faculty members being involved in the practical part of the students' education. For Bell, the Middlesex Hospital School represented the realization of his ambitions. He said of its establishment, in an 1835 letter to his brother, "it has ever been my pride to join the pursuits of science (and lecturing is of all conditions the most conducive to scientific pursuits) and practice.... It has been in truth under that conviction that I have just formed a School at the Middlesex Hospital and you cannot conceive a prettier thing than that School."[73]

Anatomy was taught in the hospital schools as the fundamental medical science, a science that informed surgery and medical therapeutics. Physiology was taught as part of the anatomy course at St. Bartholomew's until the 1840s, as it was believed that physiology was subservient to anatomy.[74] And in 1838, Benjamin Brodie, surgeon and teacher at St. George's Hospital, and fellow conservative reformer, described the way that the sciences were divided at St. George's, saying, "Anatomy and Physiology are one science, and to teach them separately is about as absurd as it would be to divide Astronomy into two sciences, the one teaching the figure and size of the heavenly bodies, and the other their motions."[75] This sort of linking of anatomy and physiology seen in the course registers of St. Bartholomew's, the Middlesex, and St. George's, with anatomy being granted primacy, was typical of the hospital schools, again placing them in sharp opposition to London University, with its emphasis on new sciences like experimental physiology. This can be seen as an extension of the practical concerns of hospital schools. In 1838, Benjamin Brodie compared London's practical courses on anatomy to those of the French in his "Introductory Discourse on the Studies Required for the Medical Profession:"

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[73] Bell, *Letters of Sir Charles Bell*, 345 (27 November 1835).
[74] Waddington, *Medical Education at St. Bartholomew's Hospital, 1123-1995*, 68.
[75] Brodie, "Introductory Discourse on the Studies Required for the Medical Profession," 469.

> I have no doubt that the praises which are bestowed on some of the continental anatomists are well founded: that there are universities in which the anatomical professors, devoting their whole time, and industry, and intellect, to this one pursuit, explain the mysteries of minute anatomy at greater length and with more precision, than the teachers here: but nevertheless, I assert that ours is the better method with a view to the education of those who wish to become not mere philosophers, but skilful and useful practitioners.[76]

It was the superior British-style anatomy, which was taught with reference to practice, that lay at the core of the medical science taught in British hospital schools.

Physiology in the hospital schools was accorded a lower place than anatomy partly because it was seen as a derivative discipline, based on anatomy and not on vivisection or another independent set of methods. Charles Bell wrote of his anatomy course in 1838: "The objects which should occupy the young surgeon in the dissecting-room are these: Every thing done should have reference to the living body—the forces which act on the bones and ligaments—the classification of the muscles, and their action in cases of fracture and dislocation."[77] In other words, anatomy was meant to encompass physiology. Physiology was also given low standing because on its own it was seen as having very little therapeutic value. Other specialties, like pathology and materia medica, covered treatment of a diseased body, whereas physiology simply explained the workings of a healthy body without reference to therapeutics.

Brodie described pathology at St. George's Hospital School by likening it to physiology, in that it relied heavily on other sciences, "In like manner, Pathology is not taught here as a separate science, but you receive your instructions in it from the Lecturers on the practice of physic and surgery, who, while they explain the changes of function or structure, which constitute disease, point out also the symptoms by

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[76] Ibid., 6-7.
[77] Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*, xx.

which the existence of these changes is indicated in the living body, and the means to be employed for the patients' relief."[78] The sort of disease history of a patient in the hospital given by Bell in his *Clinical Lecture on Diseases of the Spine* (footnote 59), with reference to anatomy and pathological structures, was exactly the sort of pathology that Brodie, Bell, and the reformers of the hospital schools thought should be taught. Everything should be done with reference to practice. Brodie explained further the benefits of such a system, saying, "while you are taught Pathology, you are taught also its uses and application; and these different subjects, brought under your view at the same time, serve mutually to elucidate each other; for, while Pathology assists you in obtaining a knowledge of symptoms, the study of symptoms, and of the operation of remedies, contributes in no small degree to extend your knowledge of Pathology."[79] To such men the kind of pathology practiced in the laboratory with dead tissues, a kind that might have been practiced at London University or by the French, was an uninformed pathology and one with very limited applicability, as it was most useful only in highly localized diseases. In all other cases, pathology had to be studied in the hospital as much as the dissecting room, combining anatomy, physiology, detailed disease histories, and even therapeutics.

The stress on practical therapeutics in the development of a medical curriculum and even in the defining of medical sciences like physiology and pathology distinguished the hospital schools from both London University and continental medical schools. Unlike universities, which had interests in, and space for, the pursuit of knowledge unrelated to patient care, hospital officials' chief emphasis had to be on the treatment of patients. As a site for the development of medical science and medical education, therefore, hospital schools' pedagogical programs were

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[78] Brodie, "Introductory Discourse on the Studies Required for the Medical Profession," 468.
[79] Ibid.

fundamentally shaped by the joining of practice and charitable alleviation of suffering, both of which can be seen in the rhetoric of British hospital teachers. This coupling can be seen in Charles Bell's 1838 textbook *Institutes of Surgery*, in which Bell writes:

> …moderation ought to be acquired in the hospital. The student sees there great operations dexterously performed amidst the applause of hundreds: But it would be well for him to study the consequences of these exhibitions;--to follow the patient into the ward, there to learn the difference between dissecting and operating;--to see how much the human constitution can bear, and be directed to the stuff of the powers of life and of the constitution.[80]

It is also evident in the advice of Benjamin Brodie in his address to students from the same year: "never losing sight of the ultimate object of all your investigations, you must estimate the value of whatever other knowledge you acquire by the degree in which you find it to be directly or indirectly applicable to the healing art."[81] It is this focus on the sick in the hospital, on their care over the long term, that illustrates the utility of the hospital as a place to teach humility and to highlight the alleviation of suffering, rather than technical operative success, as the marker of achievement in medicine. It was this focus on the patient that the British saw as distinguishing them from the practitioners of other nations and it was this character that was built into the charitable hospital's school.

Like London University, the hospital schools geared classes toward the general practitioner, attempting to provide students with a guide to general practice by offering courses that focused on routine diseases and injuries. In order to reflect the realities of practice, medicine and surgery were taught together. In his *Institutes of Surgery*, Charles Bell declared of the surgeon, "He is no longer a mere artist, a worker with his

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[80] Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*, xxi-xxii.
[81] Brodie, "Introductory Discourse on the Studies Required for the Medical Profession," 467.

hands alone. The common sense of mankind has thrown into his department the treatment of many diseases, which require all the advantages of education hitherto imparted to the physician. The studies of the physician and of the surgeon have become the same."[82] During the early part of the nineteenth century, the vast majority of practitioners of surgery and medicine, professions once considered distinct, dabbled in both.

These general practitioners were served by two new sets of institutions in the British capital. While London University was planned and built to satisfy the need for professional (not only medical) education in London, London's hospital schools grew up in a more unplanned manner, as hospital practitioners, mostly MDs and surgeons, banded together to offer full curricula in a single, convenient location, sometimes absorbing the small private schools that surrounded them. By 1830, they were being developed systematically, as the practical response of conservative reformers to London University. The hospital schools had to be made to serve charitable ends in order to gain the support of the hospitals' governing boards. The hospitals' staffs made their appeals to the governors by claiming that hospital schools advanced practical medical science (therapeutics) and that schools offered free sources of labor to the hospital. These appeals ultimately contributed to the way that British practitioners saw themselves and their medicine.

While London's hospital schools were founded during the same period that France's famous clinics were born, the two sets of clinical schools, according to the British, had different origins and strengths. That clinical training in London took place in charitable hospitals mattered: autopsies were uncommon, patients were not subjected to repeated physical examinations, and surgical operations were less

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[82] Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*, xix.

frequently performed for a crowd.[83] These differences allowed British medical practitioners to depict education in their country as being conducted by men who focused on therapeutics and who were pragmatic and humane, as opposed to the scientifically-minded but callous medical scientists abroad, who devoted themselves to vivisection and pathology without regard for preserving life.[84] British hospital teachers, however, still saw their education as scientific—the scientific element of it coming from a well-designed system, or progression and interrelationship, of courses, rather than from the sort of repeated observation of the French. And, more importantly to the hospital practitioners, it was scientific and practical in a way that London University could never be (no matter how many new sciences it imported from the Continent), so long as it did not have a hospital.

V. Conclusion

In the late 1820s and early 1830s, London University and London's hospital schools offered new institutions through which medical education could be systematized and reformed. London University became the home to more radical reformers who used the new institution to import sciences like morphology and experimental physiology. Conservative reformers of medical education strove to create more practical training for surgeons, physicians, and general practitioners. According to them, London's main advantage as a center of teaching was its many charitable hospitals, its many locations at which to *practice* medicine. London University was first conceived as an attempt to systematize medical education, and that mission was brought to the hospital schools as the medical community and even

[83] Bynum, *Science and the Practice of Medicine*, 47-49.
[84] See Chapter 4 of this dissertation for examples of such juxtapositions One student, for example, quoted on page 108, wrote "Indeed, they [the French] seem to think that the perfection of medicine consists not so much in keeping patients alive as in foretelling with precision the appearances which will be found after death." "Voyageur", "Letter to the Editor: Parisian Medicine," 695.

the community within London University became divided about just *how* to systematize that education. Hospital schools that were developed in the 1830s were created to offer a comprehensive, practical alternative to London University. In both cases, the institutions were messy, imperfect instantiations of the philosophies that they were built to represent.

In 1835 the building of London University's University College Hospital was begun, with careful consideration of the implications of the hospital becoming more important than the teaching facilities, of difficulties over running costs, and of the ownership of patients.[85] And by this time, James Bennet, Robert Grant, and others had, as Adrian Desmond puts it, helped to make London University a "French school in England […] with its insistence on prestigious European science before local London practice."[86] But those who prioritized "local London practice" had an alternative set of ambitions for medical science and were not simply resisting change and improvement. By the 1830s, the venue for their reforms and their model of a practical medical science was the hospital school, a kind of pedagogical institution that they spoke of as being entirely British in its style and ambitions.

By the late 1830s, these two institutional forms, the university and the hospital school, had become symbiotic: the London Hospital School, the Middlesex Hospital School, St. George's Hospital School, and St. Bartholomew's Hospital School had all become affiliated with London University, which had also incorporated King's College and which had previously offered clinical teaching only at the North London Dispensary. Each institution operated independently, with the University having no power to inspect or control the hospital schools, but the hospital schools' students were able to take advantage of the University's laboratory classes, while the

[85] See Desmond, *The Politics of Evolution*, Chapter 2, Importing the New Morphology.
[86] Ibid., 82.

University's students were able to pursue clinical experience at the hospital schools.[87] This sort of compromise arrangement actually represented something of a victory for London University, which had always wanted a hospital for its students. The educational reformers of the hospital schools, on the other hand, had intended their pedagogical program to be an alternative to London University's and to be overwhelmingly practical in nature. The increasing incorporation of laboratory classes and classes without direct reference to medical practice into medical education would slowly dilute the practical British character of the medical science being built in the classrooms of the hospital schools.

Historians have often remarked on the disconnectedness of medical science from medical practice in the nineteenth century, assuming that science was simply used as a rhetorical tool and a legitimizing bulwark for medicine. But early attempts to make a science out of medicine in Britain were made by men whose focus was actually on medical practice itself—the attempt really to systematize medical education and to ground it in practice was one that the actors themselves termed an attempt to create a "science of medicine." Charles Bell speaks for those reformers when he says in his 1835 letter quoted previously in this chapter, "it has ever been my pride to join the pursuits of science (and lecturing is of all conditions the most conducive to scientific pursuits) with practice. In surgery they cannot be safely separated […]."[88] These men wanted to unite surgery and medicine, practice and theory, thereby elevating the practical art of surgery while making a system of medical learning that would use hospitals as "living museums of disease" or pathology laboratories and that would rely on careful deductions from anatomical dissection to

[87] Waddington, *Medical Education at St. Bartholomew's Hospital, 1123-1995*, 75.
[88] Bell, *Letters of Sir Charles Bell*, 345 (27 November 1835).

create an experience-based physiology.[89] Though this early science of medicine, based in hospital practice, practical anatomy, and pedagogy, has been marginalized by those historians who see experimentation and laboratories as the markers of scientific medicine, the origins of medical science can also be seen taking shape in the classrooms of the early nineteenth century. As Charles Bell declared in his Inaugural Lecture at the University of London, "I deam [sic] the right teaching in any department of science the surest way of improving it."[90]

[89] For more on British ideas about experimentation see Chapter 2 of this thesis and Carin Berkowitz, "Disputed Discovery: Vivisection and Experiment in the 19th Century," *Endeavour* 30, no. 3 (2006), p.98-102.
[90] Charles Bell, "Sir Charles Bell's Introductory Address on the Opening of London University," *London Medical Gazette* 2 (1828), p.566-8: 568.

6. **The Aesthetics of Anatomy: Visual Displays and Surgical Education in Early Nineteenth-Century London**

"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."[1] (Amédée Pichot, 1860)

Charles Bell begins his 1806 treatise for painters, *Essays on the Anatomy and Philosophy of Expression,* 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."[2] 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 in medicine and surgery, 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 one looks at the relationship between the fine arts and anatomy, Charles Bell can be seen as both a representative and an

[1] Pichot, *The Life and Labours of Sir Charles Bell*, 101.
[2] Bell, *Essays on the Anatomy and Philosophy of Expression*, 7.

exceptional figure.[3] 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 chapter will explore the roles that visual displays played in anatomical and surgical instruction conducted both through texts and in classrooms. In addition, I will address questions raised by other historians about the style and aesthetic character of illustrations made by Bell and used by Bell's 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 chapter extends my discussion of surgical education in London in the early nineteenth century. Where the previous chapter looked at the structure of educational institutions and at the rhetoric surrounding those institutions, I here address pedagogical practices themselves. Using Bell's letters to his brother, his instructional texts for both surgical and fine arts students, lecture notes printed in medical journals, and, most importantly, Bell's drawings and other visual displays themselves, I look at the uses to which visual displays were put in the classroom. I also examine the philosophies of beauty and of learning that motivated Bell's use of visual displays in teaching. Images, art, and visual culture in science have been increasingly popular subjects of study among

[3] Ludmilla Jordanova extols the virtues of a biographical approach of this sort when discussing Bell herself, saying, "This essay mentions some of the ways in which it is possible to use an individual as a case study to facilitate our appreciation of early-nineteenth-century Britain. Such a biographical focus 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." Jordanova, "The Representation of the Human Body: Art and Medicine in the Work of Charles Bell," 1794.

historians of science. Much of their work focuses on materiality, instruments, inscriptions, and visual languages.[4] I have not seen similar attention devoted to the relationship between scientific displays and pedagogical practice or theory;[5] this chapter, therefore, provides a valuable examination of the roles that the visual takes in science.

I. **The Places and Spaces for Visual Display:**

Visual displays were very much a part of anatomy work in early nineteenth-century Britain. 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 used in Florence and elsewhere to teach anatomy.[6] But medical men in the early nineteenth century were consciously formulating a pedagogical program that would systematize medicine. This endeavor to systematize and 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. Similar

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[4] A very nice survey and assessment of some of the existing literature on the visual in the history and social studies of science can be found in Alex Soojung-Kim Pang, "Visual Representation and Post-Constructivist History of Science," *Historical Studies in the Physical and Biological Sciences* 27 (1997), p.139-70. Work that deals specifically with visual arts and anatomy includes: 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, UK: Cambridge University Press, 1993); 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); Michael Lynch and Steve Woolgar, *Representation in Scientific Practice*, 1st MIT Press ed. (Cambridge, Mass.: MIT Press, 1990).

[5] David Kaiser offers one exception, with his book David Kaiser, *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: The University of Chicago Press, 2003); David Kaiser, *Pedagogy and the Practice of Science: Historical and Contemporary Perspectives*, Inside Technology (Cambridge, Ma: MIT Press, 2005).

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

attempts to craft pedagogical programs incorporating the senses, particularly vision, were occurring in other fields as well.[7]

In the early nineteenth century, drawings appeared in journals, books (though often not textbooks because the cost was prohibitive), and lecture halls. Museums containing preserved specimens and models were common and those specimens and models were bought and sold as collections. Lectures were sometimes given in the middle of museums so that the lecturer could illustrate his point. And, of course, actual bodies were displayed in dissection rooms, in which students would customarily watch a demonstrator perform a dissection before practicing themselves, if they were lucky enough to have a body on which to practice.[8]

Bell's visual displays took a variety of forms. Almost all of the articles based on his clinical lectures and hospital cases were printed in the *London Medical Gazette* in its early volumes (1827-28) and most of those articles were illustrated.[9] 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

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[7] Anne Secord, "Botany on a Plate: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge," *Isis* 93 (2002), p.28-57.

[8] Jonathan Reinarz, who writes about the role of the museum in teaching medicine in Birmingham during the nineteenth century, and who even goes so far as to suggest that this time period could be called the Age of Museum Medicine, says: "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." He also argues that dissection involved a similar sort of visual display, rather than hands-on practice, writing, "the first medical subjects that students encountered when commencing their studies were already passive, whether laid out on dissection tables or preserved in methylated spirits." Jonathan Reinarz, "The Age of Museum Medicine: The Rise and Fall of the Medical Museum of Birmingham's School of Medicine," *Social History of Medicine* 18, no. 3 (2005), p.419-46: 420.

[9] See, for example, Charles Bell, "On the Diseases and Accidents to Which the Hip-Joint Is Liable," *London Medical Gazette* 1, no. 6 (1828), p.137-42; Charles Bell, "Observations on Hemmorhage," *London Medical Gazette* 1, no. 13 (1828), p.361-5; Bell, "Observations on Haemorrhage by Charles Bell, Taken from His Clinical Lectures."

written by students based on the notes they took.[10] It is clear, however, that the drawings played a significant part in Bell's lectures, because whether it was Bell or his students who recorded them in the *Gazette*, 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."[11] And Bell often wrote in his letters to his brother, George, about making drawings for his class.

Bell's former student and demonstrator, Herbert Mayo, was one of the few other authors who had illustrated articles in the *London Medical Gazette*, and presumably he adopted the practice of including a number of drawings in his lectures from his teacher and mentor. Bell's drawings[12] in the *London Medical Gazette* are sometimes intricate and naturalistic sketches and at other times are schematic drawings (see Figures 4 and 5, both from Bell's 1828 lecture on the hip joint). Sometimes they are inserted without any notice being taken of them within the text. If an article is on diseases of the hip, there will be a picture of a hip, unremarked upon, within the article. At other times, the text will say something like "The coagulum lies in this way,"[13] with a drawing beneath it. The drawings are treated as straightforwardly and unproblematically readable, although they vary significantly in style and substance.

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[10] I explore this style of publication in greater depth in the third chapter of this dissertation, which is on publication and printing.
[11] Bell, *Letters of Sir Charles Bell*, 409.
[12] I will refer to them as Bell's drawings, even if they were reproductions by students.
[13] Bell, "Observations on Hemmorhage," 364.

Figure 4. Bell, Charles. "On the Diseases and Accidents to Which the Hip-Joint Is Liable." *London Medical Gazette* 1, no. 6 (1828): 137-42, p. 137. This is a rough schematic of a femur from the *London Medical Gazette* article "Diseases and Accidents to Which the Hip-Joint is Liable." 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, which is presumed to stand readable on its own, 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. Though the description of the injury in the text includes much on the color and texture of the tissues surrounding the bone, none of that is depicted in the rather sketchy illustration.

Figure 5. Bell, Charles. "On the Diseases and Accidents to Which the Hip-Joint Is Liable." *London Medical Gazette* 1, no. 6 (1828): 137-42, p.141. This drawing, which comes from the same article as Figure 4, is very different in style from the first sketch. The drawing appears to be naturalistic rather than schematic, showing students how the neck of a fractured femur looks. One can only infer that this is the subject matter being depicted 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.

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 seems to have used two different techniques for reproducing drawings in his texts: etching and engraving. Etching was the cheaper of the two techniques and was used frequently by Bell, who gained facility with the technique 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. Bell continued his letter, describing his own competence at etching, writing, "Landseer, 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."[14] 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) or his *Dissertation on Gun-shot Wounds* (1814) that he hoped would sell widely.[15] Etching also offered the advantage that Bell could perform the etching himself, whereas engravings required an engraver, an intermediary who copied Bell's drawings. By using etchings, Bell was able to incorporate visual displays into the large percentage of his texts that were intended for students and therefore had to be inexpensive to print and to buy. In part, this technical

[14] Bell, *Letters of Sir Charles Bell*, 160 (9 November, 1809).
[15] Bell, *Letters Concerning the Diseases of the Urethra*; Bell, *A Dissertation on Gun-Shot Wounds*.

competence allowed Bell to imagine a broad audience for his teaching 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 said to his brother in August of 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."[16] 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*[17] (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.

Both Bell's etchings and his engravings have a similar style and are clearly depictions of individual, rather than composite, corpses. Bell wrote in one of his earliest texts, *The Anatomy of the Human Body*, co-authored with his brother in 1801, "Of 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."[18] Bell's unwavering commitment to strict empiricism, still somewhat rare, 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

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[16] Bell, *Letters of Sir Charles Bell*, 265 (5 August, 1819).
[17] William Hunter, *Anatomia Uteri Humani Gravidi Tabulis Illustrata* (Birmingham: John Baskerville, 1774).
[18] Charles Bell, *Engravings of the Arteries, Illustrating the Second Volume of the Anatomy of the Human Body*, ed. John Bell, Anatomy of the Human Body (London: Longman and Rees, 1801), 6.

"normal."[19] 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 also probably shared by many of Bell's colleagues.[20] To those who would do otherwise or who objected to the peculiarity of individual bodies, Bell offered text as an antidote, saying, "let us allow ourselves no license but copy accurately. By noting in the description any little deviation every necessary end is answered."[21] Thus the text and images worked together for Bell: the text provided indications of what could be universalized and the little individual details characteristic of his illustrations—depictions of facial 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—*The Anatomy of the Brain, Explained in a Series of Engravings* (1802), and *A Series of Engravings, Explaining the Course of the Nerves* (1803)—when he wrote the letter to his brother, quoted above, about unveiling his work on the nervous system. He would later

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[19] According to Lorraine Daston and Peter Galison, anatomists of the 17th-19th centuries crafted their anatomical illustrations from "ideal types." They write, for example, of the eighteenth-century anatomist Bernhard Albinus, "They were pictures of an ideal skeleton, which may or may not be realized in nature… Albinus was all too aware of the atlas maker's plight: nature is full of diversity, but science cannot be. He must choose his images, and Albinus's principle of choice was frankly normative." Daston and Galison, *Objectivity*, 73. As notions of objectivity changed in the 19th 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*, 69-83; Lorraine Daston and Peter Galison, "The Image of Objectivity," *Representations* 40 (1992), p.81-128.

[20] According to Martin Kemp, "This warts-and-all style was particularly characteristic of British illustration. Hunter's abrupt sering of the women's legs, a standard technique in the preparation of obstetric models and other abdominal dissections, is portrayed with a raw directness that underlines the incisive realness of the dissection." Martin Kemp and Marina Wallace, *Spectacular Bodies: The Art and Science of the Human Body from Leonardo to Now* (London, Los Angeles: University of California Press, 2000), 50.

[21] Bell, *Engravings of the Arteries, Illustrating the Second Volume of the Anatomy of the Human Body*, 15.

publish a final volume, "On the Nerves of the Face" (1829).[22] 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 (see Figure 6, below, for one example). They were supposed to impress and to make an argument for Bell; they assumed the most prominent place within the works. But even when Bell highlighted the drawings, he valued them as a part of his system of reasoning, his natural philosophy, and not simply as pictures. In 1808, he wrote to his brother with frustration, "What the world will speak of is my drawings. I have often been troubled with the perverseness of people attaching merit to the drawings of my book, and closing their eyes altogether on the reasoning…."[23] There was reasoning built into the drawings themselves—the nerves worked as a beautiful, symmetrical system, and the elegance of that system, the product of a designful creator, was meant to be conveyed in the drawings. Bell's visual displays were very much a part of Bell's natural philosophy and his medical pedagogy. His drawings were also simply one element of a system of visual display that Bell felt illustrated his natural philosophy. The passage above continues, "You know that this subject cannot have due importance given to it by etchings on the margin of a book,—that it requires a great establishment of casts and models."[24] Casts and models provided a complementary mode of illustration, of argumentation, for Bell. Like other early botanists, naturalists, and anatomists, Bell used the exposure to specimens themselves to enhance the efficacy of his drawings.[25]

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[22] Bell, "On the Nerves of the Face."
[23] Bell, *Letters of Sir Charles Bell*, 132 (17 November, 1808).
[24] Ibid.
[25] For more on this, see Anne Secord, Botany on a Plate. She writes about the ways in which botanists used the plants themselves to temper the pleasurable effects of viewing drawings and about how drawings helped to illuminate the experience of viewing a plant. "in both botany and anatomy, plates were used alongside specimens to enhance the observation of natural objects through comparison with the more obvious depiction of their distinguishing features in pictures." Secord, "Botany on a Plate: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge," 46.

Figure 6. "Nerves of the Neck," from Bell, *A Series of Engravings Explaining the Course of the Nerves,* plate ii. 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 will discuss more in section IV.

Bell's visual displays assumed a central place in his classroom, just as they did in his texts. He wrote to his brother about oil paintings of gunshot wounds for his museum in 1809[26] and about making "gigantic drawings of the nervous system for [his] class,"[27] in an 1819 letter. In 1825 Bell donated 25 of his paintings (see Figure 9 and Figure 12) to the Royal College of Surgeons of Edinburgh, where they are still held today. Scholars have described Bell's paintings as rather ordinary stylistically, saying, for example, "the technique is only that of a competent amateur and the style is heavily influenced by darkened old masters,"[28] but the paintings did convey surgical and anatomical information as well as depicting clearly the anguish of battle injuries. In addition to drawings and paintings, Bell also used preserved specimens and models to teach students and to increase his fortunes: he amassed museum collections of normal specimens, pathological specimens, and curiosities, some of which he sold for profit to other lecturers and even to the University of Edinburgh. In February of 1806, Bell wrote to his brother, saying, "I got yesterday the skull of a Roman with an obolus in his mouth and a very curious diseased bone belonging to the same skeleton. I have other preparations in promise from another surgeon in town. I shall soon be universally known and my museum will increase rapidly."[29] Like other surgeon-anatomists, Bell gathered his collections through the efforts of those around him—fellow surgeons who gave or sold him specimens—and from individuals that he himself treated. Bell evidently displayed these collections at his own Great Windmill Street School of Anatomy for both his students and for the general public.[30] Classes

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[26] Bell, *Letters of Sir Charles Bell*, 145 (22 April, 1809).
[27] Ibid., 265 (5 August, 1819).
[28] J. Chikwe, "Art and Literature in the Anatomy of Charles Bell," *Journal of the Royal College of Surgeons of Edinburgh* 39, no. 4 (1994), p.201-7: 203.
[29] Bell, *Letters of Sir Charles Bell*, 64-65 (4 February, 1806).
[30] For a description of Bell's efforts in creating the Great Windmill Street School's Museum, see Ibid., 199 (3 May, 1812).

were sometimes held amidst the specimens and sometimes specimens were brought in for the class. Figure 7, a photograph of one of Bell's plaster and wax models, is fairly typical, and many such models, as well as specimens preserved in glass jars, are still held by the College of Surgeons in Edinburgh. Most specimens were jarred organs, removed from their bodily contexts and preserved in liquids or in dried form. Such specimens were a form of visual display very different from that of Bell's drawings, in which the organs being displayed were always carefully contextualized and, when removed from the body, displayed within the context of anatomical systems that helped to explain and organize a functioning body. But 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:

> the 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, and not nearly so much as we find in Patients who having affections of the Heart, afford no morbid appearance on dissection: the 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: though we learn that such Aneurisms have been mistaken for chronic Abscess, he died exhausted from weakness.[31]

[31] Bell Collection BC.xii.2.M.57. GC 11006.

Figure 7. Bell Collection GC. 13656, Royal College of Surgeons of Edinburgh. The text in the caption is from Bell's own catalogue BC., xiv. L.M.69a. Urinary bladder and rectum. "The cast was taken to show the relation of the stone to the opening of the bladder and the great depth of the outward incision to the inside of the bladder."

This caption 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 diseased organ compared to other, similarly diseased organs. The catalogue text offers *context* for the pathological specimen. Most museum specimens would have included a similar sort of contextualizing catalogue, filled with the history of the specimen being displayed.[32]

Each of the forms of visual display described here—rough sketches and small drawings from journals, beautiful and intricate engravings from published treatises, large-scale oil paintings and drawings, and three-dimensional specimens and models—formed a part of Bell's natural philosophical arguments and his pedagogical practices. Though Bell's artistic abilities were exceptional, as was his stress on visual displays, certainly he was not alone in using specimens, models, and illustrations in his classroom and in his production of grand, illustrated anatomical texts, as those who were less talented might simply purchase specimens or hire others to illustrate their printed work. These visual displays were especially significant in a context in which bodies for dissection were scarce.

II. Visual Displays in Place of Bodies: the Museum as Pathology Laboratory

While the theater of anatomy provided one opportunity for medical and surgical students to observe anatomical structures and the hospital provided a chance to see sick patients, it was the medical museum that really allowed students to examine and study diseased and normal organs and acquire a sense of what pathological tissue looked like. Although dissections were performed infrequently in the early nineteenth century and often were performed on exhumed, and therefore decaying, corpses,

[32] 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).

preserved specimens and drawings helped students to "see" disease.[33] This became increasingly important as medicine became less theoretical and more practical. Drawings and preserved specimens 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. They became increasingly important as pathology and visual identification of pathological tissue became more significant in the practice of medicine and surgery.[34] For a variety of reasons then, museums were widely considered a valuable component of early nineteenth century medical education, providing substitutes for corpses as the material of medicine and surgery.[35]

Museum collections incorporated drawings, models, and specimens together (see Figures 8-10 for examples of Bell's museum displays). Bell described his

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[33] According to Jonathan Reinarz, "Although its contents were wide ranging, human specimens were particularly sought after in the days before the passage of the Anatomy Act (1832). Even after 1832, bodies were not always available in numbers that permitted lecturers to illustrate all of their lessons." Reinarz, "The Age of Museum Medicine: The Rise and Fall of the Medical Museum of Birmingham's School of Medicine."

[34] 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." He continues by including a passage written in 1836 by the London anatomist Frederick Knox: "'[w]ithout museums the profession [of anatomy] would be in the state of man without a language.'" A.W. Bates, "'Indecent and Demoralising Representations': Public Anatomy Museums in Mid-Victorian England," *Medical History* 52, no. 1 (2008), p.22: 1. Jonathan Reinarz makes an argument similar to Bates's about the availability of specimens of pathological tissue, saying, "Although many of the first English medical schools emerged alongside hospitals, where students could usually expect to encounter examples of the cases their instructors lectured upon, teaching staff were quick to establish museums in order to ensure that at least one pathological manifestation of a disease was available for pupils to study during their classes or peruse at the leisure." Reinarz, "The Age of Museum Medicine: The Rise and Fall of the Medical Museum of Birmingham's School of Medicine," 423.

[35] Susan Lawrence describes the value of museum-like collections of visual displays for a variety of medical practices. She argues that "lecturers in materia medica relied on collections of simples and compound medicines to aid instruction. Midwifery teachers, such as Colin Mackenzie, used both anatomical preparations to show foetal development and a 'machine' representing the pregnant uterus to demonstrate difficult births. Within medical teaching, anatomy has long been recognized as the paradigm for instruction through the use of an increasingly complex array of preparations, from freshly dissected parts to intricate specimens of injected arteries and veins." Susan Lawrence, "Educating the Senses: Students, Teachers and Medical Rhetoric in Eighteenth-Century London," in *Medicine and the Five Senses*, ed. W.F. Bynum and Roy Porter (Cambridge, UK: Cambridge University Press, 1993), 165.

Figure 8. Royal College of Surgeons of Edinburgh, Bell Collection, GC 1.43.04. Wax and plaster cast of torso. 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 9. The Corunna Oils, Royal College of Surgeons of Edinburgh, Bell Collection GC 13844. Charles Bell, oil painting, 'Gunshot wound of the clavicle and scapula.' Bell's catalogue entry records "The musket ball is lodged in the back of the scapula this I took from the body of Capt…the ball entered in the breast, broke the end of the clavicle, entered the chest, and went across the lungs, broke a rib on the back part, stuck in the scapula the spent ball being nearly divided in two by the spine of the scapula; I was present when he was brought ashore in Portsmouth, in a very exhausted condition, and labouring in his breathing, he died the next day, which was the twelfth from receiving the wound. On opening the body I was astonished at finding the quantity of serum, which poured out from the chest, as out of a barrel, the lungs were condensed and gorged with blood, he could have been much relieved by the operation of paracentesis."

Figure 10. Royal College of Surgeons of Edinburgh, Bell Collection BC.1.3.M.24 GC 13690. According to Bell's catalogue, this is "A very remarkable case of distortion by rickets. This woman died in childbirth. The skeleton measuring from the top of the head to the heel 31.5 inches. The heel touches the knee. The measurement from the G sacrum to the pubes is 2 1/8 inches. From the prominence of the os coccyges to the pubes 3 inches, from the brim of the ilium to the brim of the other 4 ¾ inches. The spine is distorted in the form of an S. The ribs on the left side especially are flattened and compulsed (?) together. The cranium has a natural appearance and the teeth are not at all affected. The arm bone are only distorted by the action of the muscles upon them but these muscles, it will be observed, were the muscles which carried the weight of the body."

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."[36] The museum room Bell described was literally connected to the classroom, convenient because of the close reliance on the museum in Bell's pedagogical practices. A footnote written by Bell's wife in Bell's posthumously collected letters says of Bell's models, "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."[37] The note is revealing for a number of reasons. First, "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. Second, Bell's wife revealed that Bell's students constituted the imagined audience for his models. Bell also discussed this hypothetical audience, saying, "It would require a month to go round the museum with a book in your hand."[38] Bell both referred to his visual material during his lectures and, his passage about going 'round the museum with a book… in hand" suggests, expected his students to spend time going around to some of the displays to take notes and make their own drawings, much as he would expect them to make rounds at the hospital on their own time if they were his students on the wards or to practice in the anatomy laboratory if they were taking a dissection course.

In addition to these rather obvious pedagogical functions for novice students, however, museum specimens helped more advanced students map out anatomical organs, in essence allowing those students to perform medical research without a large sampling of cadavers with which to work, and here again Bell was uniquely positioned

[36] Bell, *Letters of Sir Charles Bell*, 200 (1 June, 1812).
[37] Ibid., 73 (19 May, 1806).
[38] Ibid., 200 (1 June, 1812).

as both an anatomist and model-maker himself to allow students to assist him in creating preserved specimens. Bell described one such instance in a lecture on the nervous system, saying, "There was a pupil in Windmill Street, a German physician, who dissected the nerves with extraordinary perseverance, so that when the body was lifted out of the spirits in which it was preserved, it presented a complete tissue, or net-work of nerves all over it…."[39] But as with bodies being dissected, a master was needed to impose order and make specimens or visual displays intelligible. The visual had to be paired with explanation.[40] Even removing the nervous system from the body did not make its pathway clear. Bell added to his discussion of the German physician, saying,

> If you contemplate a body that has been thus preserved in spirits for three months, and dissected morning, noon, and night, the tissue of nerves which is displayed appears in inextricable confusion. It is difficult to conceive that there is design and system here: look even to this drawing, or to these preparations, and you see threads of nerves passing in all directions—some part of the body receiving one nerve, another two; some three, or even more: you see little ganglions seated in different parts, as if it were by chance; and nerves diverging from them or seeming to terminate in them, and the whole is apparent confusion.[41]

To impose clarity, as well as to further their own physiological arguments, men like Bell would pose, position, and extract anatomical structures in the specimens and models that formed the surrogate body—the stand-in for actual corpses—in early nineteenth century anatomy. The very inclusion or exclusion of particular parts of the anatomy helped to condition how a specimen could be read, and text and lectures

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[39] Charles Bell, "Lectures on the Nervous System Delivered at the Royal College of Surgeons," *London Medical Gazette* 1 (1828), p.553-6: 553-4.
[40] See Secord, "Botany on a Plate: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge." for more on the necessity of contextualizing drawings. Without text or objects to provide context, illustrations could become dangerously pleasurable, or, as seems to be more Bell's concern, one could simply lose control of their interpretation.
[41] Bell, "Lectures on the Nervous System Delivered at the Royal College of Surgeons," 553-54.

helped to shape further the meaning of the visual displays that were most useful as part of a comprehensive pedagogical program.

Not everyone felt that such museum-building offered adequate or desirable solutions to the problems resulting from a scarcity of bodies for dissection. Objections to Bell's museum work specifically were voiced in *The Lancet* in 1827. One editor wrote:

> we were highly amused at the zeal evinced by him [Alexander Shaw] and his partner [Charles Bell] in museum making, for the pretended cause of *science;* forgetting that, in their professed anxiety 'to ascertain if they had formed a correct prognosis,' they had let out that '*they kept the man in the hospital for the sake of examining his body*!!' and, they might have added, for the sake of obtaining a 'spicimin' of a disease, of the progress of which they were the inactive spectators, that would look well in a bottle, and *sell well.*[42]

The editor, who included a little jab at Bell's Scottish accent by the spelling "spicimin," was claiming that Bell and Shaw allowed diseases to progress and patients to languish in the hospital without treatment so that they could ascertain whether they were correct about the cause of disease, but also to collect specimens, and with those specimens, profit. Interestingly, the accusations regarding the use of patients as experiments for testing medical knowledge are ones that Bell and Shaw would have made about the radical reformers who ran *The Lancet* and emulated the French. But the profits Bell made from selling his museum preparations seem to be the real offense to the editor here. And Bell certainly did make money from his collections: he sold museums to the lecturer on obstetrics at Edinburgh, to the College of Surgeons, and to his successors at the Great Windmill Street School, among others (as had been the practice of the Hunters and others before Bell).[43] That other medical men were willing

[42] Anonymous, "Museum Making," *The Lancet* 12, no. 199 (1827), p.374: 374.
[43] In one of the most successful such transactions, John Hunter's "collection of more than 10,500 specimens was bought by the government for 15,000 GBP and given to the Company (from 1800 the

to pay for both the access to body parts and the skill required to display and preserve them suggests the value that they were ascribed by Bell's contemporaries.

But while these visual displays were meant to serve as accurate representations of normal and pathological anatomy to be used for the instruction of students, they did more than simply illustrate texts and lectures in a way that bodies might have, had there been plenty of cadavers to go around. Ludmilla Jordanova argues that visual displays in medical texts did more than simply teach practitioners. She says, "there has been a tendency to see anatomically precise illustrations as serving a clear medical 'need', for example, as a substitute for satisfactory specimens. It is vital to be suspicious of such claims. Many illustrations have limited medical content, that is, they do not convey information otherwise unavailable…Even where there was 'medical' content, its usefulness for medical practice could be limited or unclear."[44] I will argue here that 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 that those displays also served as aesthetic objects, incorporating a whole natural philosophical framework into their styles of composition.

III. 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

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Royal College) of Surgeons in London, who spent 66,577 GBP on it, including building work, between 1846 and 1856." Bates, "'Indecent and Demoralising Representations': Public Anatomy Museums in Mid-Victorian England," 3.

[44] Deanna Petherbridge and L. J. Jordanova, *The Quick and the Dead: Artists and Anatomy* (Berkeley: University of California Press, 1997), 111. Martin Kemp makes a similar argument in Kemp and Wallace, *Spectacular Bodies*, 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. Rather, the disclosing of the 'divine architecture' that stood at the summit of God's Creation remained the central goal of anatomical representation across at least three centuries."

the body, as essential to both the visual arts and anatomy. He viewed the eye and the hand as similar organs and wrote of them as such in his Bridgewater Treatise *The Hand, its Mechanism and Vital Endowments as Evincing Design* (1833): "we have to show how much the sense of vision depends on the Hand, and how strict the analogy is between these two organs."[45] Martin Kemp has argued that the hand had long been considered by anatomical artists an organ of expression akin to the face.[46] Bell refined this analogy, specifying the eye rather than the face as a single organ of expression and presenting an argument about training the two organs similarly, both attaining better functioning with age and practice: "in 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 impression on the nerve of sense is accompanied with an effort of the will, to accommodate the muscular action to it."[47] Two decades earlier, Bell had devoted much of his *Essays on the Anatomy and Philosophy of Expression* (1806) to an assessment of the eye and its anatomical functions and used almost all of his Bridgewater Treatise to discuss 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 lays out his argument for using the construction of visual displays to teach students the manual dexterity and hand-eye coordination they would need as surgeons.

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[45] Bell, *The Hand, Its Mechanism and Vital Endowments as Evincing Design*, 329.
[46] According to Kemp, "For artists the hand was a communicative device second only in eloquence to the face. The refined motion of Tulp's left hand [in the portrait of the anatomist by Rembrandt] precisely demonstrates the subtlety of this intricate piece of bodily design. As the 'Dutch Vesalius,' it is appropriate that Tulp should be portrayed extolling the hand, just as Vesalius had done in the portrait image he included in the Fabrica." Kemp and Wallace, *Spectacular Bodies*, 8.
[47] Bell, *The Hand, Its Mechanism and Vital Endowments as Evincing Design*, 336.

> 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 John Bell 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.[48]

The reason, Bell claimed, that the art of anatomical preparation was superior to that of 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."[49] Bell thought the art of preparing anatomical visual displays, the preserved specimens of the sort he housed in his museum, doubly rewarding to students because it 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. J. R. Alcock, a reader of the *London Medical Gazette*, made a similar point in an 1830 letter about anatomical models, saying of the act of preserving specimens: "Although the intrinsic value of such productions, when completed, is very considerable, I believe it is yet much less than that which the surgical student, anxious to qualify himself for the duties of actual practice, derives from the more severe study of relative [comparative] and surgical anatomy…."[50] By "more severe study," the author meant the study involved in the preparation of specimens, claiming, like Bell, that the preparation itself served educational purposes, supplying both manual and observational training. He wrote just a sentence later that

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[48] Bell, *Institutes of Surgery; Arranged in the Order of the Lectures Delivered in the University of Edinburgh*, xx.
[49] Ibid.
[50] J.R. Alcock, "Letter to the Editor on Anatomical Models," *London Medical Gazette* 6 (1830), p.178-80: 178.

knowledge and skill "may be acquired by whomever is willing to pay the price of accurate observation, and of persevering labour."[51]

It is not terribly surprising, considering 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 his *Essays on the Anatomy and Philosophy of Expression*, 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,"[52] claiming that, as art trained the hands of surgeons, anatomy could train the eyes of artists. It was apparently a controversial point—at the time, the Royal Academy of Arts in Britain taught anatomy by having students draw from other drawings and models rather than from cadavers.[53] 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).[54] Bell's strong opinions regarding training artists in anatomy might have cost him a coveted appointment as the professor of anatomy at the Royal Academy of Arts.[55]

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[51] Ibid.
[52] Bell, *Essays on the Anatomy and Philosophy of Expression*, 7.
[53] 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, "For a time, it appeared that the British artists were becoming the 'Anatomical School' to quote Robert Knox, writing in 1852 in *Great Artists and Great Anatomists*, where he decried the worst excesses in which 'death-like dissected figures' were displayed on canvas.' At its worst, over-exaggerated displays of musculature could become a tired mannerism." Kemp and Wallace, *Spectacular Bodies*, 88.
[54] Bell, *Essays on the Anatomy and Philosophy of Expression*, 184.
[55] 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. Bell was indeed sharply critical of the teaching methods employed in the Academy and often castigated painters for their ignorance of anatomy. He also had very decided opinions on how such ignorance should be remedied." Jordanova, "The Representation of the Human Body: Art and Medicine in the Work of Charles Bell," 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

Bell confronted objections to the teaching of anatomy to painters explicitly. In *Essays on the Anatomy and Philosophy of Expression*, Bell wrote: "The question is often discussed, of what use is anatomy to the painter? 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…."[56] William Hunter had been the first professor of anatomy at the Royal Academy of Art and used dissection (of illegally supplied bodies) to teach artists. But according to Bell, some felt that those artists who learned anatomy using dead bodies emphasized anatomical parts (like musculature) in a way inappropriate to the depiction of living bodies and others thought that paintings of living people, portraits, contained the colors and contorted shapes of death in the faces and movements of their subjects. 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.[57] Bell's student Benjamin Robert Haydon, who established London's first private art school, continued Bell's approach, emphasizing drawing over painting and history painting over portraiture, in contrast to the Royal Academy of Art.[58] Describing two of his own pupils, performing dissections under Bell at the Great Windmill Street School as Haydon himself had done, Haydon wrote, "Three weeks they have been

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Arts in 1808 (to Anthony Carlisle) and in 1825 (to John Green). William T. Whitley, *Art in England, 1821-1837* (Cambridge: University Press, 1930).

[56] Bell, *Essays on the Anatomy and Philosophy of Expression*, 184.

[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," *Journal of the Warburg and Courtauld Institutes* 26, no. 3/4 (1963), p.367-80: 373.

[58] "Haydon's 'school' was the first private art school in the London area in the nineteenth century, and in a more direct way than has heretofore been supposed, it was responsible for the superb draughtsmanship of the later nineteenth century English painters, the pre-Raphaelites in particular. With a method of instruction, based on anatomical dissection and mastery in drawing rather than in painting, which was the traditional forte of the English School, Haydon set the new direction for the nineteenth century." Ibid.: 367.

hanging over a putrid carcass, dissecting and drawing for twelve and fifteen hours a day at a time of the year when surgeons generally give it up. They have made some capital drawings, examined every muscle, from its origin to its insertion, even to the very bones…."[59] Haydon had learned from Bell the importance of human anatomy and comparative anatomy. He promoted Bell's pedagogical program by teaching detailed, practical anatomy to art students, in Bell's classrooms themselves when possible, and 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,"[60] 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.[61]

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. It was this training of the

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[59] Ibid.: 370.
[60] For example, Chikwe, "Art and Literature in the Anatomy of Charles Bell."
[61] Bell, *Essays on the Anatomy and Philosophy of Expression*, 184-85.

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 the 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."[62] 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 simultaneously. 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 the 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 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."[63] This sounds very similar to 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. The similarities between Bell's work and the group of mineralogists that Dolan depicts is also striking. Dolan writes of the natural philosopher and artist, James Sowerby, "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

[62] Ibid., 183.
[63] Secord, "Botany on a Plate: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge," 32.

in mineralogical training."[64] Moreover, the mineralogist for whom Sowerby did many of his illustrations, John Mawe, thought that minerals provided "an example of nature's coherency and order,"[65] and that as a result individuals could be trained to see a classification scheme and apply it. The focus on objects, visual displays and the significance of observation for learning seems 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.[66] Practitioners of practical life 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 arguably slightly different because it was meant for expert practitioners (or those training to be experts) and not to attract amateur audiences, but the idea of using visual displays to train sensory apparatus and to create lasting thoughts in the mind seems to have been widely shared, despite the different expected audiences.

Bell's ideas 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

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[64] Brian Dolan, "Pedagogy through Print: James Sowerby, John Mawe, and the Problem of Colour Illustration in Early Nineteenth-Century Natural History," *British Journal for the History of Science* 31 (1998), p.275-304: 283.
[65] Ibid.: 280.
[66] "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: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge," 52.

artists, all served an underlying philosophy of aesthetics, intelligibility, and truth. That philosophy was, to some 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 two manual arts, so much dependent on one another in the classroom if not in professional practice—but Bell's written work picked up elements of other pedagogical programs and also of prior work by anatomists who valued visual displays. Most important among these were John and William Hunter, while Bell's drawings and visual displays were similar in style to those of Jan Van Riemsdyck, the artist for William Hunter and others; these, while excellent, were fairly conventional in approach.[67] Both Bell's ideas about disciplining the hand and eye and his aesthetic philosophy (pieced together in the following section) bring together the many, seemingly disparate, influences that stemmed from Bell's participation in a number of 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 a unique collection of interests. It is to Bell's philosophy of aesthetics, in which all these varied pieces come together, that I now turn.

IV. Aesthetics and Intelligibility in Anatomy

Bell spoke about images of both art and the human countenance as being readable in the same way that written language was readable. It was anatomy, Bell

[67] Petherbridge and Jordanova, *The Quick and the Dead: Artists and Anatomy* 110.

believed, that provided that language. He wrote in his *Essays on the Anatomy and Philosophy of Expression*: "Anatomy, in its relation to the arts of design, is, in truth, the grammar of that language in which they [the arts of design] address us. The expressions, attitudes, and movements of the human figure are the characters of this language, adapted to convey the effect of historical narration, as well as to show the working of human passion, and to give the most striking and lively indications of intellectual power and energy."[68] Bell's strong belief in the ability of anatomy, and specifically the variety of 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 and Philosophy of Expression* 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 the subject of a great deal of the sculpture from antiquity that was considered to be the most beautiful. 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 a variety found in nature, be more beautiful than God's creation? Having recognized the unnaturalness of some of the most beautiful sculpted faces of antiquity, Bell asked at the outset of the text, "How do

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[68] Bell, *Essays on the Anatomy and Philosophy of Expression*, 8. Physiognomy texts were common at time and Bell himself wrote about reading Lavater. Bell's *Essays on the Anatomy and Philosophy of Expression* tapped into this existing literature and its audience.
[69] Ibid., 136.

we admit that to be beautiful which is not natural?"[70] The 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. For example, they have applied the principles of harmony in music to the beauty of the human figure."[72]

Instead of surmising that some mysterious relationship helped to define beauty, Bell argued that true beauty could only be defined using anatomical principles. A knowledge of comparative anatomy would allow artists to identify that which separated man from beast and that which was most human about the face, and then enhance those elements that were most 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:

> When the animal frame is surveyed as a whole, or as composed of parts more or less common to all living creatures, which is taking 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.

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[70] Bell describes the unnatural beauty found in these classical sculptures, saying, "In the statues of antiquity we see that the artists had a perfect knowledge of the human frame, and could 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 referrs to John Hunter, Petrus Camper, Johann Friedrich Blumenbach, and Georges Cuvier, but says that he would address his comments mostly to Camper. Ibid., 25.
[72] Ibid., 56.

In this passage, Bell is arguing 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, etc. 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 the conclusion may be arrived at, that by magnifying, in works of art, what is peculiarly characteristic of man, we may ennoble his countenance, and, without being strictly natural, attain what is better."[73] Ultimately that which was most human and most beautiful was also most expressive and most "readable," according to Bell. Artists could only accentuate these elements, could only create sublime beauty by understanding both human anatomy and comparative anatomy.[74] 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

[73] Ibid., 56-7.

[74] In the following passage, 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 perfection 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; and I am persuaded that while it enables him to give vigor to the whole form, it teaches him to represent niceties of expression which would otherwise pass unnoticed." Ibid., 192.

resonated with an audience that read Paley's *Natural Theology* and *The Bridgewater Treatises* and that might be expected to find such arguments compelling.

Amédée Pichot, a French acquaintance of Bell's who edited the periodical *Revue britannique,* wrote in his 1860 biography 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."[75] 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.[76] 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 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."[77] 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

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[75] Pichot, *The Life and Labours of Sir Charles Bell*, 101.

[76] Bell compares the Elgin Marbles favorably to Michelangelo, praising the simplicity of their form, for example, writing to his brother of one figure: "It is the trunk, part of the arms and thighs, and one leg, colossal, of a character distinctly Grecian, from the simplicity of the form. There is a massiveness and breadth in the laying out of the muscles, in the flatness of the thighs; there is fleshiness in the form of the joints, great strength in the twisting of the trunk, great beauty and display of difficulties overcome." Bell, *Letters of Sir Charles Bell*, 115 (19 November, 1807). His ideas about beauty permeate other art forms as well. When describing an opera singer, Bell writes about "the dignity, the truth, and affecting simplicity of Grassini." Bell, *Letters of Sir Charles Bell*, 135 (December, 1808).

[77] Bell, *Letters of Sir Charles Bell*, 14. David Allan was a relatively well-known Scottish history and portrait painter, sometimes known as the Scottish Hogarth, who became the director of the Edinburgh Academy of Arts. Sir James Lewis Caw, *Scottish Painting, Past and Present: 1620-1908* (Edinburgh: By T.C. and E.C. Jack 1908), 34.

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? 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 natural economy—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. And Bell used "simple" to describe anatomical systems that could be understood through fundamental, intelligible principles, speaking of the very 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.[78] Simplicity was an important marker of truth in Bell's idea of a designful world. In his wife's recollections, published alongside his letters to his brother, 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."[79] 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."[80] In other words, simplicity was associated with beauty and was an important

[78] 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 of nerves, preferring instead "accidental facts." See Chapter Two of this dissertation, "Defining A Discovery: Changes in British Medical Culture and the Priority Dispute over the Discovery of the Roots of Motor and Sensory Nerves."
[79] Bell, *Letters of Sir Charles Bell*, 409.
[80] Ibid., 117-18 (5 December, 1807).

signifier of correctness, both in philosophical theories describing the natural world and in images depicting it.

A reviewer of Bell's *Bridgewater Treatise on the Hand* 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: "This may, in a great measure, be traced to the diversified nature of the illustrations which the plan of his work has enabled him to present."[81] Bell's drawings helped to attract an audience and to make his subject interesting. The human elements of the bodies included in the anatomical drawings—the depictions of faces and other markers of humanity—might also have been a way of humanizing the dissected (usually criminals).[82] This was a matter of the medical politics of the early nineteenth century: some believed strongly that dissection should be seen as punitive and dehumanizing, while others believed that the only way to increase the number of corpses legally available was to encourage legislators to permit the dissection of the unclaimed poor or to convince some voluntarily to donate bodies after their death. Regardless, the beauty of Bell's drawings did help him to teach. Although some 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,[83] 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,[84] etc.) and some have claimed that they simply serve to allow readers to "virtually witness" Bell's

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[81] Anonymous, "Charles Bell's Bridgewater Treatise," 253.
[82] This is simply a conjecture—Bell and his contemporaries agitated for reforms to dissection laws and some prominent men, like Jeremy Bentham, even designated that they themselves would be dissected upon death, so that dissection might come to be seen as something other than a punitive measure. By 1831, four hundred medical men and other volunteers in Dublin had offered to be dissected when they died as well, though the London medical community did not follow their lead. Richardson, *Death, Dissection, and the Destitute*, 168.
[83] See figures 6 and 11.
[84] See figure 12, and the caption, below.

work,[85] I argue that to Bell, beauty—derived from "simplicity," fidelity to nature, and the inclusion of the details that made a corpse human—enhanced the pedagogical efficacy of his drawings. Aesthetics were 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*:

> 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.[86]

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 would be learned.

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 nature herself. The more real

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[85] 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 " *Social Studies of Science* 14, no. 4 (1984), p.481-520.
[86] Bell, *Engravings of the Arteries, Illustrating the Second Volume of the Anatomy of the Human Body*, 15-16.

Figure 11. Bell, *Engravings of the Arteries, Illustrating the Second Volume of the Anatomy of the Human Body*, plate IV. This is an engraving of the arteries of the head from Bell's *Engravings of the Arteries*. 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.

Figure 12. Bell, "XIII, Waterloo..." Wellcome Library, RAMC 95/13. 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 the clothing he is wearing, and for the rope that the soldier is gripping with his remaining arm.

the effects, the more the work 'makes stronger impressions on the mind.'"[87] 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 lasting."[88] 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.[89] 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. And though Hunter depicted corpses as they were often dissected—a woman's torso, her abdomen dissected down to the uterus, and her legs severed mid-thigh in the image—Bell enhanced the beauty of his images by draping bodies with sheets and leaving the corpse mostly intact. 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. Some reformers who hoped to improve

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[87]Kemp, "'the Mark of Truth': Looking and Learning in Some Anatomical Illustrations from the Renaissance and the Eighteenth Century," 118.

[88] Lawrence, "Educating the Senses: Students, Teachers and Medical Rhetoric in Eighteenth-Century London," 170.

[89] Bell wrote happily in a letter to his brother 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, who I really believe has an affection for me.… he says, 'You must remain here; I see you must. I see you are calculated to be William Hunter amongst us. You may carry every thing before you.'" Bell, *Letters of Sir Charles Bell*, 33 (8 January, 1805).

medicine in London during the early nineteenth century focused on the classroom. They expanded the student base by requiring general practitioners to get formal medical training. 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. Teachers used a variety of forms of visual displays: 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. Medical subjects were also taught using large paintings 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 (and not 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. Like some contemporary botantists, who believed that, as Anne Secord puts it, "Because of the keen visual skills involved…the practice of drawing offered a test of an observer's accuracy and indeed functioned as 'a moral engine that leads to habits of accurate observation,'"[90] Bell believed that drawing could help medical practitioners to learn anatomy, to

[90] Secord, "Botany on a Plate: Pleasure and the Power of Pictures in Promoting Early Nineteenth-Century Scientific Knowledge," 28-29.

observe it accurately.

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 an 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 should be simple in order to be beautiful and to be 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 his particular arrangement of arteries.

Bell's aesthetic made a lasting contribution to British art, even though the practice of anatomy was in decline in the Royal Academy of Art. Bell's *Essays on the Anatomy and Philosophy of Expression* 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, and during his session in the dissecting laboratory, Haydon became fascinated with the mechanical arrangement of the human body…. 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.[91]

Haydon and David Wilkie[92] 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.[93]

Irving Loudon says of 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."[94] For Bell, that was exactly the point. 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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[91] Cummings, "B.R. Haydon and His School," 370.
[92] A famous Scottish painter best known for his history paintings.
[93] See, for example, Herbert Mayo, "Professor Mayo's Pathological Lectures, in Kings College, London," *London Medical Gazette* XV (1835), p.183-7: 185.
[94] Irving Loudon, "Sir Charles Bell and the Anatomy of Expression," *British Medical Journal* 285 (1982), p.1794-6.

7. **Conclusion**

If the term "conservative reform" is a paradox, it is also an appropriate one. Charles Bell and his cohort of medical men were shaped by a variety of contradictory impulses. Their medical science carefully walked a line between revolution and stasis; materialism and romanticism; natural philosophy and medicine as an art. They sought to popularize science, but only safe science, while at the same time contributing to highly politicized journals that were crafted to be read only by experts. Bell exemplifies the sort of piecemeal approach to all of these seemingly conflicting themes in the life sciences of the early nineteenth century that was typical of medical men. We ask too much when we expect internal consistency, even within a particular issue, much less what we consider consistency between philosophical, political, and professional concerns.

To give one example of the incomplete adoption of terminology and the philosophy behind it, Bell sometimes spoke like a romantic, talking about "higher anatomy" and "philosophical anatomy," but he adopted the terms when they were convenient and used them in a flexible manner to mean things that fit with his own natural philosophy. He was not one of Desmond's radicals who supported Geoffroy's morphology and provided support for early evolutionary theories. Desmond says that "Philip Rehbock…missed the large medical contingent of higher anatomists in London... [and that] it is by reconnecting higher anatomy to its medico-political base that we can appreciate just how many teachers actually supported Geoffroy, and why."[1] Rehbock's response is to say of Richard Owen that he would have been "'The British Geoffroy' had it not been for the fact that he had already become known as 'the British Cuvier.' Desmond's approach was an eclectic one, employing

[1] Desmond, *The Politics of Evolution*, 375. Desmond is referring to Philip F. Rehbock, *The Philosophical Naturalists: Themes in Early Nineteenth-Century British Biology*, Wisconsin Publications in the History of Science and Medicine (Madison: University of Wisconsin Press, 1983).

transcendentalism and teleology as the situation warranted."[2] In fact, Owen's eclecticism was typical. Desmond identified radical politics and radical science in the London medical scene of the 1830s and 1840s, and that recognition is an important one. Medical practitioners did have politics, and some of them were radical. Their politics and their science, however, were not necessarily connected, and their politics were often varied, local, and context-dependent or changeable. Desmond does not allow for that. It is that lack of consistency, the sort of piecemeal creation of their medicine, that makes Desmond's attempts to wrangle people into politico-scientific camps inappropriate.

I suspect that while such fragmented politics and philosophies could be found in any group, they would be more likely among medical men in this period, men who were trying gain legitimacy for the profession of medicine, whose incomes were insecure, who still required patrons, whose science was meant to relate to a natural philosophy and an art, and whose work could have significant political and religious implications. To satisfy these many demands, medical men put together elements of different philosophies and political platforms in an ad-hoc way that helped to generate support from patrons, to make sense for their practice-based pedagogy, and to build the consensus of a reform-minded community. It is, perhaps, more likely that an embattled group of outsiders with nothing to lose and with a vocal leader would demonstrate consistency in their politics and science, but politics were not dichotomous, non-radicals were mostly not conservatives either, and most historical actors cobbled together both a set of politics and a science. So, to give another example, this time of seemingly contradictory positions; conservative reformers would claim that their work was different from that of the French because it was not a set of disparate facts, it was held together by a system or a natural philosophy; but at the

[2] Rehbock, "Transcendental Anatomy," 153.

same time, Benjamin Brodie could also say "nevertheless, I assert, that ours is the better method with a view to the education of those who wish to become, not mere philosophers, but skilful and useful practitioners."[3] The French were depicted as either collectors of facts or mere philosophers as the situation warranted.

It is this very problem, the problem of asking for internal consistency in historical actors, that renders a quasi-biographical approach useful methodologically. Without it we risk glossing over the interplay of individuals' many personal, professional, and intellectual commitments. By focusing on Charles Bell one can see that he was a pragmatist subject to a variety of pressures and exposed to a host of communities and epistemologies. He was both a lecturer at the College of Surgeons and a critic of entrenched hierarchy; an artist, natural theologian, practicing surgeon who treated troops after the Battle of Waterloo, and anatomist who sent his assistant to Paris to demonstrate a new system in front of the French; he was an avowed anti-vivisectionist who experimented on animals when a theory needed proving. In all of this he was typical. Conservative reform, paradox though it may be, describes a medical world full of contradiction.

Half of that term, *reform,* was used frequently, if not always with the same implications, to unite the medical community. In the Age of Reform, few professed to be against the idea. Couched inside the language of reform, however, conservative reformers managed to insert nationalist rhetoric of preservation and even rediscovered heritage. Through this sort of crafting of tradition and heritage, medicine became one of the sites at which the British nation and British nationalism were made. This dissertation follows in the vein of Benedict Anderson's *Imagined Communities*, which argues that nations are intellectual and cultural inventions, and makes a nice corollary to Linda Colley's *Britons: Forging a Nation.* Colley argues that the war with France

[3] Brodie, "Introductory Discourse on the Studies Required for the Medical Profession."

and opposition to an "other" played an important role in forging a British national identity that united Scots, Welsh, and English.[4] She is interested in uncovering "the identity, actions and ideas of those men and women who were willing to support the existing order against the major threats their nation faced from without."[5] The medical community participated in similar kinds of identity-building: unifying practitioners against a foreign threat, France, with which Britain was often at war; involving them in the shared project of political and institutional reform; and simultaneously positing a common history and national character that superseded or incorporated their identities as apothecaries, surgeons, or doctors.

Linda Colley's account of the creation of a national identity is meant as a response to E.P. Thompson, whose portrayal of the eighteenth century was largely about the rise of political radicalism and class conflict.[6] Colley suggests that Thompson's radicals did not account for the majority of the working class. Similarly, the conservative reform movement was made up of a large percentage of medical men and was meant to appeal widely within the medical community. Conservative medical reformers clearly have a place in the social and political history of the Age of Reform and its relation to the making of British nationalism. If both political and medical reform movements were fundamentally unifying and supportive of institutions already in place, we should acknowledge their members, as in the case of Bell and men like Benjamin Brodie and Astley Cooper, considered them reform movements nonetheless. Just as Colley writes that "the growing involvement in politics of men and women from the middling and working classes was expressed as much if not more in support for the nation state, as it was in opposition to the men who governed it"[7]; so too the

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[4] Colley, *Britons: Forging the Nation, 1707-1837*, Introduction.
[5] Ibid., 1.
[6] E. P. Thompson, *The Making of the English Working Class* (New York: Pantheon Books, 1964).
[7] Colley, *Britons: Forging the Nation, 1707-1837*, 371.

conservative, and even the radical, medical reformers (as exemplified in the discussions surrounding Wakley's London College of Medicine) supported British medicine and even most of its institutions, if not the people occupying positions of power. Reform was popular, but revolution was not.

Medical reformers of the early nineteenth century, when examined as individuals, exemplify the multifaceted nature of politics in the Age of Reform. They show medicine to have been an important arena in which a rhetoric of tradition helped to constitute the nation. The majority of reformers adopted bits and pieces of different politics and scientific philosophies, ultimately falling somewhere in the middle of the political spectrum. These reformers helped to support a British medicine that built its science in the classrooms of London University and in the hospital schools of London, pedagogical spaces that, like most other aspects of British medicine at the time, seemed to live uneasily in a union of opposites.

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