

The Jonathan E. Rhoads Lecture

Books and Men, Redux¹

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“**A**nother damned, thick, square book! Always scribble, scribble, scribble! Eh, Mr. Gibbon?” So the Duke of Gloucester is said to have exclaimed one day in 1781, when Edward Gibbon presented him with a copy of the second volume of *The Decline and Fall of the Roman Empire*. We have no record of the portly little scholar’s response, but it may be guessed that he paid little heed to the nobleman’s foolishness, and with good reason: The first volume of his chronicle had been so astonishingly successful that he had no doubt already begun daring to hope that his “scribbling” might be destined for literary immortality.

Since the *Iliad* and the Bible, the course of our civilization has been marked by the appearance of great books, some of which have become famously designated as Great Books. For every one of these that competes for inclusion in the so-called Western Canon, there are dozens, of equal importance to the development of our culture, that are little read or are remembered only by specialists of one sort or another. Among them are some of the landmark works in the history of medical knowledge. More than any other profession or calling—except perhaps the clergy—doctors have always recorded their experiences and interpretations. They have done this primarily for instructional and archival reasons, but a byproduct has been the influence of such works on the ways in which their readers think about humankind’s relationship with nature.

This is why the presence of renowned libraries of the history of medicine—and storehouses of the most current of medical science—have graced some of the leading universities and other scholarly

¹ Read 18 November 2011. Professor Nuland died on 3 March 2014.

institutions of the Western world. Included—to speak only of the Northeast of our nation—are the Countway in Boston, the Cushing/Whitney at Yale in New Haven, the New York Academy of Medicine, and the College of Physicians (among others) here in Philadelphia.

On 12 January 1901, the then fifty-one-year-old William Osler, at the height of his career as professor of medicine at Johns Hopkins, spoke at the official opening of the newly reconstituted Boston Medical Library (since then subsumed into the Countway) on the topic “Books and Men.” Eleven years later, when he was Regius Professor at Oxford, Sir William Osler collected a group of his short writings that he liked to call *Men and Books*, written mostly for the *Canadian Medical Association Journal*, which were published long after his death in a small volume of that name.

But it is the original “Books and Men” to which I’d like to return, in which Osler spoke of the well-known phenomenon of *bibliomania*, a major species of which is a fanatical interest in the works and authors of bygone eras. “The men I speak of,” he said, “keep alive in us an interest in the great men of the past and not alone in their works, which they cherish, but in their lives, which they emulate.” By “emulate,” Osler meant what he referred to as “the silent influence of character on character and in no way more potent than in the contemplation of the lives of the great and good of the past, in no way more than in the touch divine of noble natures gone.” In his closing words, Osler referred to the great library in which he was speaking and, by association, libraries in general as “this home for your books, this workshop for your members.”

Like virtually everyone here this afternoon, I have spent countless hours in such workshops. But it is in the Medical Historical Library of the Cushing/Whitney at Yale that I have found my scholarly home. I like to think of it as my own personal place, even though it is shared by hundreds of men and women very much like me, who are often overcome by the need to look backward in the midst of trying to move forward. To my knowledge, none of us has yet been turned into a pillar of salt.

It is there that I have been able to make what one of the library’s original donors called “voyages to other times and other places.” That inspiring arena creates an atmosphere in which medical bibliomaniacs can book passage on uninterrupted voyages to yesteryear.

Over the huge fireplace built into the wall at the far end of the reading room, there is a large plaque on which is engraved an eloquent inscription, addressed to those who would best use the collections for their intended purpose. The visitor has but to wander among those collections, and figuratively “listen” to appreciate the wisdom of its opening words: “Here, silent, speak the great of other years.”

Among those great are four huge personalities, each of whom has written a hugely important book, of any of which it might be said, in the words of Walt Whitman,

Camerado, this is no book,
Who touches this, touches a man.

These days, the vast majority of additions to medical knowledge are transmitted via the medium of professional journals and meetings, or online. Thus, the contribution destined to have the most profound effect on scientific medicine of any advance of the twentieth century—the discovery of the structure of DNA—was communicated in a few pages of the British scientific periodical *Nature*. In fact, *Nature*, *Science*, the *New England Journal of Medicine*, *The Lancet*, and a few others are the sources to which physicians have become accustomed to turning when they seek the most reliable information about the latest findings of biomedical research and even clinical implications. Books, on the other hand, are nowadays more likely to represent the compilation of material long since reported in journals, or to serve as repositories of the theoretical or philosophical speculation that has always accompanied the healer's art.

The reliance on periodicals to spread new findings is a phenomenon that came into being early in the nineteenth century or late in the eighteenth and grew rapidly once it got under way. The situation is unlikely to revert to its former state, now that rapidity of dissemination and virtually immediate sharing have become crucial to the scientific enterprise. In some ways, that is a pity. Much has been gained, but something has indubitably been lost. Gone is the literary or even artistic quality of the books that have marked the long road upon which medicine traveled once it came to realize that science was its most fitting partner for the journey, rather than religion, superstition, or all-encompassing but ultimately baseless theories of the universe.

The beginnings of the entwining of medicine with science came about when physicians finally began to understand that universalizing, all-knowing speculative theories to explain nature or human biology without real evidence only served to foster misinterpretation of the individual phenomena being observed. Until that time, any disagreement between what was actually experienced and what the theoretically constructed grand conceptual scheme told a physician he *should* be experiencing were always resolved in favor of the vaporous speculative doctrine.

Among the most egregious examples of this kind of thinking was the invention—for “invention” is precisely what it was—of a structure

called the *rete mirabile*, by the second-century CE medical mahatma, Galen. In keeping with the inherited and invented dogma of his predecessors, Galen taught that the *vital pneuma*, an inscrutable airy quality that was believed to bring the life and spirit of the universe into the body, is inhaled from the surrounding cosmos. In order, he assured his centuries of unquestioning followers, for intellectual activity and movement to be regulated, the vital pneuma must be converted into a formulation he called *psychic pneuma*, before it reaches the brain. He claimed to have found the structure in which this process takes place, a coiled network of blood vessels at the base of the skulls of the dogs, monkeys, and pigs he dissected. Because Galen never once opened the body of a human being, he assumed that these vessels are to be found in all mammals.

To Galen's mind, guided as it was by the all-elucidating notions of pneuma, spirit, the four humors, and that entire edifice of inherited and erroneous cosmic philosophy that was invoked to explain the workings of nature, the discovery or fantasy of such structures as the *rete mirabile* was virtually a necessity. It filled one of the gaps in his comprehension of the grand plan thought to have been set in motion by a masterful demiurge or prime mover. In fact, there was not a shred of evidence for the existence of the *rete mirabile*, in animals or elsewhere, except for Galen's assertion that he had identified it in his dissections. Because he was virtually alone in such anatomical explorations, the few criticisms of his findings were drowned in the loud chorus of approval that would establish Galenic domination over medical thought for a millennium and a half to come.

It was by means of a great book that the process began, by which Galen's seemingly indestructible temple of baseless theory eventually crumbled into the dust of history and gave way before the solidity of fact. In August of 1543, a twenty-eight-year-old professor (yes, a *twenty-eight-year-old professor!*) of anatomy published a remarkable volume called *De Humani Corporis Fabrica* (On the Workings of the Human Body), and the world of medicine was changed forever.

The *Fabrica*, as it is commonly called, is one of four books I've chosen, each representing a separate century, to illustrate the uses to which some of the greatest of medical scribblings have been put by their authors. The volume's 663 folio pages, 11 large plates, and almost three hundred other illustrations were the product of the first systematic dissections of man ever to be published for the instruction of physicians. Rejecting the fanciful Galenic theoretics to which the physicians of his time were heir, Professor Andreas Vesalius of the University of Padua had meticulously dissected a series of cadavers and, influenced only by what he actually saw, faithfully recorded his observations. He refused

to be guided by the errors of the past or by the supposed grand scheme of the theoretical demiurge or master designer. In a triumphant proclamation of the new way of discovering biological reality, he exhorted his readers to “begin to put faith in their own not ineffectual sight and powers of reason rather than in the writings of Galen.” He urged them to place reliance only on “the book of the human body that cannot lie.” Galen, he said, had been “deceived by his monkeys”—or perhaps by his imagination—and by his determination to find evidence supporting the worldview he espoused. Not only was there no *rete mirabile* to be found at the base of the brain, but some two hundred other of the anatomical formulations that Galen had put forward to conform to the all-embracing conceptual framework of ancient authority were also found to be erroneous.

Vesalius’s was far more than a mere textbook of anatomy. Realizing that its publication would mark one of the great turning points in the history of ideas, he was determined that every detail of production should be as painstaking and technically peerless as were his dissections. The book’s illustrations were drawn by Stephan van Calcar, a student of Titian; the young anatomist traveled to Venice to employ the most highly skilled wood-block cutters of the time. When all was completed, he packed the blocks and text on the backs of mules and personally followed them on the long, perilous journey over the Alps to Basel, where Joannes Operinus maintained one of the finest printing establishments in Europe. The appearance of the Vesalian masterpiece signaled not only a great achievement in the history of anatomy, but in the craft of bookmaking and in the art of pedagogy as well.

But the most important result of the *Fabrica*’s appearance was its underlying doctrine of reliance only on one’s own observations, unbiased by the influence of the past or of theoretical constructions based on invented philosophical concepts. It is by the small steps of interpreting individual observations that theories should be constructed, said Vesalius, and not the other way around; observations must not be deformed by squeezing them into grand philosophies hatched in the minds of abstract thinkers of bygone days.

This was precisely the direction taken in the following century by William Harvey when in 1628, he produced the great book that some have called the most important contribution ever made to the study of human biology, *De Motu Cordis et Sanguinis in Animalibus* (On the Motion of the Heart and Blood in Animals). In accordance with received wisdom, Galen had taught, and physicians continued to believe, that blood reaches the structures of the body by a process of ebb and flow through the veins originating in the liver; because the tissues use

up most of the blood that reaches them, it must be constantly replenished by the liver, from the products of digestion. Following the example of Vesalius, Harvey was determined to see for himself. The conclusion of his series of experiments and measurements (the first use, incidentally, of quantitative evidence in the study of physiology) was, in the words of the two-sentence fourteenth chapter of *De Motu Cordis*, “that the blood is driven into a round by a circular motion in creatures, and that it moves perpetually . . . and lastly, that the motion and pulsation of the heart is the only cause.” Flying in the face of accepted dogma, Harvey had discovered the circulation of the blood and its origin in the pumping action of the heart.

Unlike the *Fabrica* of his predecessor, Harvey’s *De Motu Cordis* is an unprepossessing little book. Its seventy-two quarto-sized pages measure 5 ½ by 7 ½ inches and are printed in the most pedestrian style. Placed on a shelf of medical classics, it is hardly noticeable. But its physical qualities and especially its brevity are of no account—it is a kind of Declaration of Independence of medical discovery. After Harvey’s elucidation, the value of inductive reasoning—championed in another great book of the time, Francis Bacon’s *Cogitata et Visa* (Things Thought of and Things Seen)—became the standard of medical research and theory. Bacon’s work was at the core of what has been called “the Scientific Revolution” taking place in that extraordinarily productive seventeenth century. It fell to William Harvey to capsule the entire process in his usual succinct manner by saying of Mother Nature, “[A]s long as we confer with our own eyes, and make our ascent from lesser things to higher, we shall at length be received into her closet-secrets.” This had been the philosophy of Vesalius, and it would be the philosophy of every medical scientist who came after.

From the standpoint of clinical progress, the great book of the following century was one published by a man near the end of his long life. In 1761, when he was seventy-nine years old, Giovanni Battista Morgagni brought forth his monumental three-volume work, *De Sedi-bus et Causis Morborum per Anatomen Indagatis* (The Seats and Causes of Disease as Shown by Anatomy), and in a single stroke put the last of a long series of nails into the coffin of the slowly dying theories of Galen and their proposition that disease is the result of the imbalance of four magically invested liquids or humors. In reporting a series of seven hundred dissections, Morgagni demonstrated that people become sick not on account of fluxes of one or another humor, but because of pathological anatomical changes that occur within the organs of the body. It is therefore not the excess or deficiency of phlegm or blood or black or yellow bile that produces the symptoms associated with disease, but abnormalities in the tissues themselves. In referring to

symptoms as “the cries of the suffering organs,” Morgagni called attention to the ways in which inner pathologies may be detected by a knowledge of their manifestations as elicited by the taking of a history or by examining the patient. Not surprisingly, *De Sedibus* led to the development of the techniques of physical examination and directly to the invention of the stethoscope in 1816. A single medical scribbler had raised the curtain on the dawn of modern diagnosis and eventually therapeutics.

The last century in which progress in healing and the dissemination of medical knowledge were delineated primarily by great books was the nineteenth. Though journals were being established and professional meetings were held with increasing frequency, a number of important volumes nevertheless maintained the old landmark tradition. The one I’ve chosen to represent the entire century is, in fact, not a volume in which new discoveries were presented, but rather one that has come to represent the acme of medical teaching. It had no effect on theory or on comprehension of the biological basis of healing. Its only purpose was instructional.

Given ten seconds to answer, how would any member of the American Philosophical Society respond to the challenge of being asked to name one textbook used by medical students? Almost certainly, the reply in every case would be something like, “Why, *Gray’s Anatomy*, of course!” The answer would have been the same a century and a half ago. Now in its thirty-ninth American edition, this workhorse of medical pedagogy has remained in everyday use far longer than any medical instructional volume of modern times, and is likely to go on, and on, and on—as far as the futuristic eye can see. It outlives one after another of its now-huge stable of editors, even though much of the text in its pages, and a great multitude of its illustrations, have not significantly changed since its original publication in 1858. In my 2005 review of that latest edition, published in *Scientific American*, I quoted the eminent medical historian F.N.L. Pointer, who had said some fifty years earlier, “What began as a book has become an institution.”

And yet, the first publication of *Anatomy Descriptive and Surgical* (the actual title of Henry Gray’s classic contribution to medical teaching) was greeted by the reviewer for the *Boston Medical and Surgical Journal*—as the *New England Journal of Medicine* was then called—with a harsh and even derisive critique. So violently opposed were the Brahmins of Boston medicine to Gray’s approach and contents that the editor of the esteemed journal gave over fully half of the pages in two successive issues to the scathing remarks of the critic. Paragraph after paragraph describes supposed errors and omissions, in a tirade of carping criticism, at the motives for which one can only guess.

Of all the reviewer's indictments, the most vehement was reserved for Gray's illustrations. No doubt astonishing the medical students whose enthusiastic outpouring of pounds and dollars made the book an immediate success, he denounced the clarity of the drawings, their large number, and even their very presence. To compound the book's problems, he declaimed, Gray had chosen the worst possible course by not only labeling each structure in his pictures, but by actually printing its name rather than the footnoted numbers or letters that previous and contemporary authors customarily used. In his opinion, this kind of pap made things too easy for medical students; clear and well-labeled diagrams divert a young man's attention from the place where it belongs, namely, the endless rows of sentences: "Let a student have general illustrations, and he will use them at the expense of the text." To the ascetic puritan mind of the proper Bostonian, Gray's book was apparently an illustrated, labeled road to pedagogical hell.

As reviews in other prominent journals pointed out, it was precisely that innovative way of presenting illustrations that was one of the greatest strengths of a book endowed with many other praiseworthy qualities. In striking contrast to its rival American periodical, *The Lancet* concluded its laudatory review with a sentence as true in 2011 as it was in 1858: "As a full systematic, and advanced treatise on anatomy, combining the various merits of the volumes of many countries, scientifically excellent, and adapted to all the wants of the student, we are not acquainted with any work in any language, which can take equal rank with the one before us."

The *American Journal of the Medical Sciences* (originating here in Philadelphia) wrote, "[I]n our judgment, the mode of illustration adopted in the present volume cannot but present many advantages to the student of anatomy. To the zealous disciple of Vesalius, earnestly desirous of real improvement, the book will certainly be of immense value; but at the same time we must also confess that to those simply desirous of 'cramming,' it will be an undoubted treasure."

Who was the caviling American critic, and what was the source of his fierce animosity to a book whose publication almost all other reviewers recognized as a significant event in the field of medical pedagogy, and one that moreover was greeted with such a favorable response from the students and practitioners for whom it was intended?

The two-issue screed is unsigned but for a single letter, *H*. That letter is as scarlet and revealing as one that had been introduced to American readers by Nathaniel Hawthorne less than a decade earlier. Gray's literary assassin was almost certainly none other than Harvard's professor of anatomy, Oliver Wendell Holmes, no mean scribbler himself. Who else but Holmes would have been chosen to critique a

major new textbook in his specialty for a Boston journal? Who else would have been granted the luxury of using half the pages of two successive issues of that prominent periodical? And who else, rejecting the anonymity favored by virtually all other medical reviewers of the time, would identify himself with one initial and be certain that he was in essence pridefully telling each reader who he was, probably assuming that the authority of his name would drown objections to his objections?

What was Holmes's motive? Was it merely transatlantic competitiveness or might something else have been a factor? A clue may perhaps be found in the valedictory speech given more than thirty years later by the Autocrat of the Breakfast Table when he retired from the presidency of an earlier incarnation of the Boston Medical Library in 1889 after a thirteen-year tenure. In that address, Holmes spoke of his reverence for the book familiarly called "Sharpey and Quain," the leading anatomy text of his teaching days. He called it and two other volumes on the subject "the stepping stones of my professional life" and added that his donation of them to the library on that parting day "costs me a little heartache to take leave of such old and beloved companions." Perhaps the Autocrat's real problem with Gray's masterwork was that it seemed very likely to replace his revered literary mainstay as *the* textbook for instruction of medical students. In fact, this was exactly the prediction that had been made for it in an earlier review in the *British Medical Journal*, which called Gray's work "a book which must take its place as *the* [italics in the original] manual of *Anatomy Descriptive and Surgical*." Other reviewers said much the same thing.

Gray's *Anatomy* was destined to become a classic of pedagogical literature, truly one of the healing profession's Great Books. Oliver Wendell Holmes, ensconced somewhere on high among the immortals of American medicine, would be chagrined to know that the nickname of the volume he so aggressively maligned comes easily to the lips of every modern-day medical student or even television-watcher, while the transient ascendance of the names of Sharpey and Quain is unknown to them.

Few new medical advances are still disseminated in "damned, thick, square books," such as those of Edward Gibbon. Other than volumes dealing with the philosophic aspects of medicine, it is unlikely that the world will see another tour de force by a future Vesalius, or Harvey, or Morgagni, or Gray. Even journals are beginning to take a different form. The medical scribbling of today is likely to be found online.