

Happy birthday, *Gray's Anatomy*

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I met *Gray's Anatomy* for the first time during the beginning of September 1939.¹ In that first week World War II erupted in Europe, I started as a medical student and bought my first copy of *Gray's Anatomy*. We students were greeted by the Regius Professor of Physic, who talked for an hour about the hand—hence my career choice—and then herded us into the dissecting room to start cutting on a corpse. Unfortunately, my girlfriend was not assigned to my corpse, so I arranged an exchange with another of the few women students. This provoked a large notice: “Flatt will *not* enter this dissecting room.” So, off to see the professor. Pointing at me, he said, “Flatt, you are mixing sex with dissecting.” With some enthusiasm, I replied “Yes, sir.” He burst out laughing and sentenced me to go buy my first copy of *Gray's Anatomy*. He mentored me and kept a demonstrator's job for me until I eventually got out of the Royal Air Force. Thereafter, I have collected a number of anatomy books, amongst which I treasure a 6th edition of *Gray's* published in 1872. I have taught anatomy continuously; I will shortly be 88 years old.

Anatomy Descriptive and Applied was first published in London in the summer of 1858 by two young demonstrators of anatomy in St. George's Hospital at Hyde Park Corner. The building still exists but as a very expensive hotel where each room has its own butler who insists on unpacking your suitcase!

These two young men were very different. Henry Gray wrote the text; he was 4 years older than Henry Vandyke Carter, who

¹**A note on sources:** Significant parts of this account are based upon the English author Ruth Richardson's scholarly book *The Making of Gray's Anatomy* (1). She is a historian attached to the Department of History and Philosophy of Science at Cambridge University. She has kindly given me permission to quote from her excellent book, which describes the education of English medical students in the 1850s and relates it to the times of Dickens and *Oliver Twist* and the introduction of anesthesia in 1847.

A different book, *The Anatomist*, by American Bill Hayes, is a more personal account (2). He has been described as “part science writer, part memoirist and part cultural explainer.” Hayes became fascinated by Gray's picture in a dissecting room, which has appeared at the front of every edition including the current 40th. Hayes decided, “I would come to know Henry Gray by coming to know human anatomy.” Accordingly, he became an “observer” of the dissections being done by students at the University of California at San Francisco. He adds little to the circumstances surrounding production of the first edition. However, he writes extensively about Carter and the entries in his diary.

drew all the illustrations. Gray came from a well-off and well-connected family and lived with his widowed mother near the hospital. He was politically adept and dedicated his first copy of *Gray's* to the most senior surgeon of the hospital in highly appreciative words:

To Sir Benjamin Collins Brodie, BART., F.R.S., D.C.L., Serjeant-Surgeon to the

Queen, corresponding member of the Institute of France, this work is dedicated, in admiration of his great talents, and in remembrance of many acts of kindness shown to the author, from an early period of his professional career.

Sir Benjamin was his mentor and no doubt helped his rapid rise in the hospital staff. Gray appears in the classic photograph of the dissecting room at St. George's Hospital, which has been printed at the front of all editions of *Gray's*, including the 40th edition (*Figure 1*).

Gray was born in 1827. In his time, to be a medical student in England, one had first to go to Oxford, Cambridge, or some other university. In addition, one had to be a member of the Church of England; followers of other faiths would not be admitted. When I was accepted as a student at Cambridge in 1939, religion was no longer important, but what did matter was



Figure 1. The dissecting room at St. George's Hospital. Image obtained from Richardson's book; reprinted with permission from St. George's Hospital Medical School.

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one's ability to translate a page of Latin prose, which at that time I could do, thereby proving I was a "gentleman."

In Britain, in the early 1940s, there were three paths to becoming a physician. The first and easiest exams were those of the Worshipful Society of the Art and Mystery of Apothecaries of the City of London, an important ancient city guild. The next was exams conducted by the Royal Colleges of Surgery, Medicine, Obstetrics, etc., and finally the most difficult exams were those of the universities. Many

of us took the Apothecaries exam, since it was wartime and the easiest way to become a practitioner. The first two types were really trial runs before the tough university examinations.

To become a staff surgeon at St. George's Hospital, Gray would first have to pass the Apothecaries exam, then an exam to obtain membership in the Royal College of Surgeons, and later a difficult exam to become a Fellow of the Royal College. The same route existed until recently; nowadays the Apothecaries can no longer grant a license to practice medicine.

Gray started dissecting in 1842 at age 15 and is thought to have advanced his age to 17 when registering as a student at St. George's Hospital. There is no record that Gray ever passed a university examination. He is described as being a fine-looking, slightly dandyish young man who was a competent and hardworking surgical trainee (*Figure 2*). When he was 21, he got prizes in surgery and clinical surgery. He later became a member of the Pathological Society of London and a member of the Royal College of Surgeons. In 1852 he was made a governor of the hospital.

Henry Vandyke Carter, however, had a father well known as a marine artist and a deeply religious, nonconformist mother; they lived in the north of England on a limited income. He was a shy, diffident nonconformist bachelor (*Figure 3*). When he was 14, his grandmother gave him a diary, and he started a habit of recording his thoughts, concerns, and views on everyday life. He kept writing throughout his lifetime at St. George's Hospital and for a time later. It is clear that he hoped to have a deep religious life but he felt he lacked faith. He knew himself to be reserved, and it was hard for him to make friends. Robinson considered him "a deeply decent sort of person, often paralyzed by self-doubt and believing himself abjectly undeserving."

As he matured, he leaned towards medicine as a career. However, the family finances could not afford a university education, so he chose to train as an apothecary and then study to train as a surgeon. He went to London, trained as a surgeon apothecary, and later joined St. George's Hospital to get all the required training. He did well, getting many awards, and, to his parents' relief, gained both junior and senior scholarships.



Figure 2. Henry Gray, from a contemporary photograph. Reprinted with permission from Wellcome Library, London.

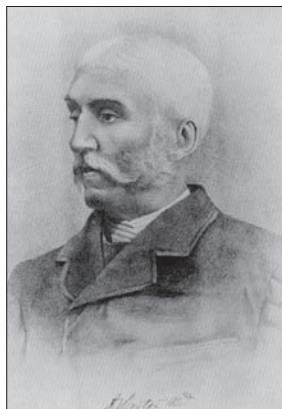


Figure 3. Henry Vandyke Carter, self-portrait. Reprinted with permission from Wellcome Library, London.

In 1853, when Gray was 26 years old, he entered a competitive essay competition for the Astley Cooper prize. He won the prize of 100 pounds and published his work as "The structure and use of the human spleen." The book is an impressive 350 pages divided into four parts—development (embryology), structure, comparative anatomy, and physiology. He employed Carter to draw over 50 illustrations, a number of which were later used in the *Gray's* book. Gray, however, omitted any thanks or credit to

Carter for his excellent drawings. A copy of this book still exists, but no trace of its drawings has been found.

In 1855, Gray discussed the possibility of jointly publishing *A Manual for Students* with Carter. Carter's pay for the drawings in the book on the spleen had been intermittent and incomplete, and he was timid about asking for all his money. This time, Gray probably promised prompt payment. However, Carter hesitated and finally told Gray he was fed up with not being paid "the full sum" for earlier work and that if he was to work on the new book it could not be on the old footing.

On December 9, 1855, Gray offered 10 pounds per month for 15 months to Carter, but he worried because he regarded Gray as "very shrewd." On January 31, 1856, Carter capitulated and started work on the drawings even though he was concentrating on studying for his London University medical degree.

Richardson pointed out that from their experience as students and later as demonstrators, they both knew what should be in the book. It had to be well organized, simple in plan, well illustrated, and affordable to students. The illustrations had to be clear and the parts clearly labeled.

In the early editions, all illustrations were drawn on paper and then carved into wood blocks by skilled men known as "woodpeckers." This process was needed to transfer the drawings in reverse onto the wood so that they appeared facing the correct way on the printed page. Carter was such an excellent artist that he made his drawings in reverse directly onto the wood surface, thereby eliminating the transfer stage. His excellent style, delicacy of line, and skillful use of shadows produced drawings of a quality not seen in previous anatomical books (*Figure 4*).

Together with the authors, the printer's son, William, was given the responsibility for producing the book. Unfortunately, he did not keep in touch with them, and problems arose. Carter's drawings were so large they encroached on the wide margins planned for the book.

The print number of 2000 books had been decided, page size was fixed, and all the paper purchased. Considerable

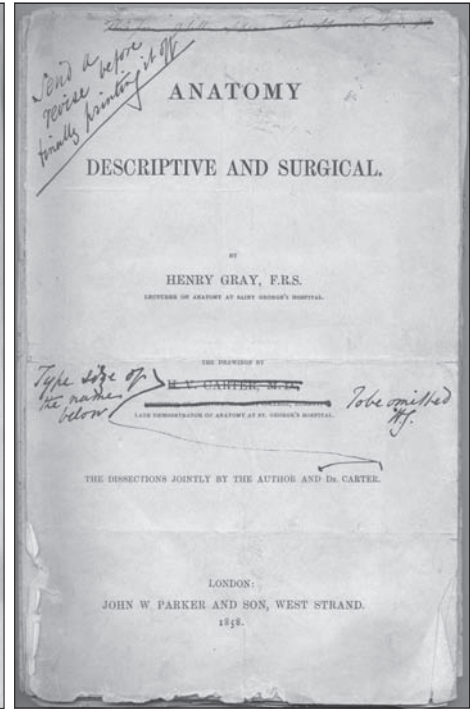
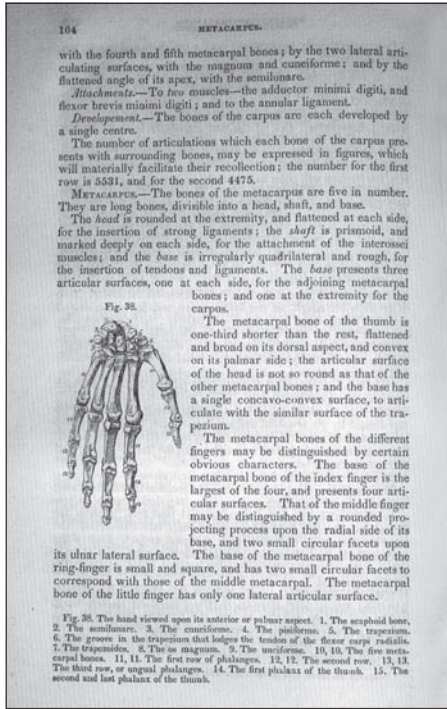
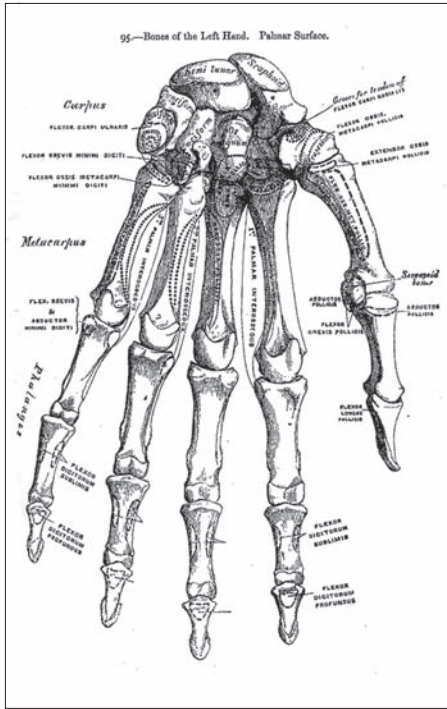


Figure 4. (a) The bones of the hand from *Anatomy Descriptive and Surgical*, compared with (b) an anatomical drawing from a contemporary book, Erasmus Wilson's *Anatomy*. Images obtained from Richardson's book. Part a reprinted with kind permission of the President and Council of the Royal College of Surgeons of England; part b reprinted with permission from Ruth Richardson.

Figure 5. Gray's markings on the first edition's title page, downplaying Carter's contributions. Reprinted with permission from the Royal College of Surgeons, Edinburgh.

adjustments were successfully made and by mid May 1857, the work was going well but was to be interrupted by the absence of Gray. He had received an invitation to "attend" the Duke of Sutherland on his private yacht sailing around England and Scotland and at the estate at Dunrobin Castle for the next 6 months, from June to November 1857. This was manna from heaven for Gray; service for such an aristocrat would be of enormous help to his practice. Carter continued work on the book, of which the final proof corrections were done in late June or early July 1858, in time for the book to be available for students arriving in September.

Gray insisted his name be on the spine of the book and altered the lead page to diminish Carter's contribution; he reduced the size of Carter's name and deleted his new job title, leaving only "late demonstrator of anatomy at St. George's Hospital" (*Figure 5*). Carter, unhappy with the relationship, decided to take the exams for the Indian Medical Service. In February 1858 he sailed for Bombay. By mid October 1858, Carter received a copy of the book from its publisher, John Parker. Carter's succinct comment on the book: "The book is out and looks well." Gray never gave Carter one penny from all the royalties the early editions of the book earned.

The reviews in the medical press were excellent. Within a week, *The Lancet* review called it "a work of no ordinary labor" and commented that it "demanded the highest accomplishments both as anatomist and surgeon for its successful completion. . . . There is not a treatise in any language in which the relations of anatomy and surgery are so clearly and fully shown." *The British Medical Journal* characterized *Gray's* as "far superior to all other treatise on anatomy, . . . a

book which must take its place as THE manual of *Anatomy Descriptive and Surgical*."

In early 1859 the *Medical Times and Gazette* published its lengthy very unfavorable review. "Mr. Gray has published a book that was not wanted and which, at any rate, ought not to have been dedicated to Sir Benjamin Brodie. It is low and unscientific in tone and it has been compiled, for the most part, in a manner inconsistent with the professions of honesty which we find in the preface. . . . A more unphilosophical amalgam of anatomic details and crude surgery we never met with."

Later in the same year, despite this attack, a new edition appeared in the United States in which an extensive index was added and a number of small errors in the British volume were corrected. A second British edition appeared in early 1861.

This year a thoughtful review of Richardson's book in the *New England Journal of Medicine* (3) by John H. Warner, PhD, of Yale's School of Medicine emphasized how the first edition was created. "Carter must be repositioned at center stage. . . . He was deliberately pushed to the wings by his ambitious, credit-grubbing collaborator. . . . Indeed, Carter's distinctly respectful anatomical drawings may be one reason that *Gray's Anatomy* emerged as the world's best known medical textbook."

On June 13, 1861, Gray, aged 34, died of "confluent smallpox" 3 years after the first edition was published. He had been vaccinated but was grossly exposed to the disease while nursing a young nephew who had smallpox. At that time, it was common practice to burn everything in the room of a smallpox victim. Thus, no written records of Gray exist.

Carter's life in Bombay went well professionally but was a disaster domestically. In his Bombay lodgings he met a lively,

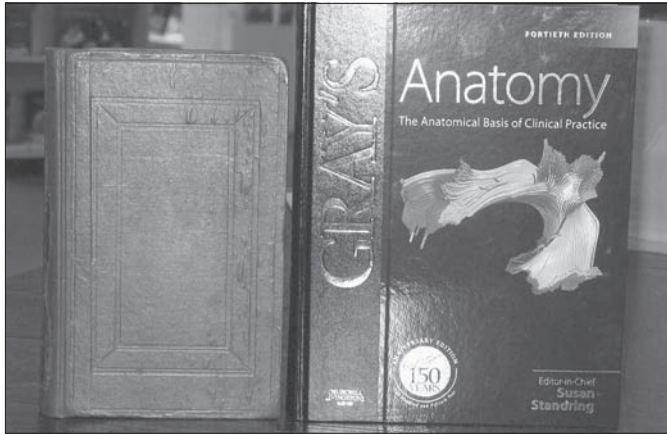


Figure 6. The author's first and latest copies of *Gray's Anatomy*: the 6th edition and the 40th edition.

ladylike, and agreeable young widow, Harriet Bushell. They rapidly married and then he found out the “widow” was, in fact, married and had previously been legally divorced. After paying her a yearly allowance of 150 pounds, he resumed his bachelor-style life and finished his time in India as principal of Grant Medical College. He was the first in India to describe

the organism of leprosy. After 30 years in India he returned to England in 1888. By then his first “wife” had died and in 1890 he married Mary Ellen Robison; they had two children. Carter died of tuberculosis in 1897.

THE REST IS HISTORY

Gray's has never been out of print in 171 years. It has been reprinted and revised by varying teams of anatomists and currently suffers from obesity. For instance, my own copy of the 6th edition published in 1872 contains 778 pages and weighs 3 pounds, 2 ounces. The 40th edition is larger in all dimensions and weighs a hefty 10½ pounds; it contains 1551 pages (*Figure 6*). Weight reduction treatment may have started because the 38th edition used 2092 pages. But beware: even the “skinny” new edition costs \$199!

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1. Richardson R. *The Making of Mr. Gray's Anatomy: Bodies, Books, Fortune, Fame*. New York: Oxford University Press, 2008 (322 pp.).
 2. Hayes B. *The Anatomist: A True Story of Gray's Anatomy*. New York: Ballantine Books, 2008 (272 pp.).
 3. Warner JH. *The Making of Mr. Gray's Anatomy* [book review]. *N Engl J Med* 2009;360(12):1263–1264.