



Henry Gray (1827 -1861),

The Treaty of Anatomy, Descriptive and Surgical

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ABSTRACT

Henry Gray (1827-1861), English anatomist and surgeon at Saint George's Hospital at London, most notable for publishing his treaty of *Anatomy, Descriptive and Surgical*. His career was developed at Saint. Georges Hospital, from medical student to demonstrator to lecturer of anatomy, and curator of the museum. He was Fellow of the Royal Society and Fellow of the Royal College of Surgeons.

Key words: Henry Gray, treaty of *Anatomy*, Human Anatomy, Gray's Anatomy.

INTRODUCTION

The objective of this paper is to perform a briefly review of Henry Gray 's contribution in the field of human anatomy. The knowledge of human anatomy (from the Greek word ανατομία (*anatomē*), which means "dissection") composes a fundamental pillar in the extensive and complex field of medicine. Human anatomy has historically been a cornerstone in medical education and this is the field of medical studies where students learn the fundamental language of medicine, learn to develop understanding through experimentation and develop skills in solving several medical problems. Among the main contributions in the field of learning and teaching of human anatomy in English language, those made by Henry Gray, stand out. Little is known about Henry Gray's life but he was an outstanding anatomist notable for publishing his treaty of *Anatomy, Descriptive and Surgical*.

Henry Gray's childhood and his medical studies

Henry Gray was born in Belgravia, London, England in 1827 and lived his entire life in his family's home with his widowed mother Ann, near the Saint George's Hospital. Facts about his personal life are quite few. Henry Gray came from a well off and well connected family. He was one of four children of Thomas Gray a private messenger to George IV and William IV, the family apparently had no financial problems. Basically nothing is recorded of his preparatory education (Hayes 2008). His father's position as a royal messenger allowed him to secure professional training at Saint George's Hospital. where Henry Gray registered as a student at 17 years old. on 6 May 1845 For those who knew him since he was a student, he was an extremely persevering and disciplined learner and also a systematic worker. He seemed very early to have paid considerable attention to anatomical studies. Henry Gray learnt his human anatomy by the priceless method of making dissections for himself, that rendered him an in depth knowledge of human anatomy (Pearce, 2009).

He quickly got preference for research in human anatomy rather than clinical practice. While Gray was still a medical student he won in 1848 the Royal College of Surgeons' Triennial Prize for an essay entitled "The Origin, Connexion, and Distribution of the Nerves of the Human Eye and Its Appendages, Illustrated by Comparative Dissections of the Eye in the Other Vertebrate Animals." Part of this essay was incorporated into his later paper on the development of the retina.

Henry Gray's career as anatomist and surgeon
After completing his medical studies, Henry Gray (Figure 1, above) remained at Saint George's Hospital. To become a staff surgeon at Saint George's Hospital, Gray first had to pass the apothecaries exam, then an exam to obtain membership in the Royal College of Surgeons, and later an exam to become a Fellow of the Royal College. He qualified as a member of the Royal College of Surgeons in 1850 after Gray had presented his paper "On the development of the optic and uditoric nerves", and the same year he was appointed house surgeon at Saint George's Hospital. In 1852 he was selected demonstrator of anatomy. Later in 1853 Gray was designated lecturer in anatomy a position that permitted him to continue his research in surgical anatomy. Henry Gray was also curator of the Saint George's Hospital Museum. Gray's career as a surgeon and anatomist was oriented around Saint George's Hospital but he was also surgeon to Saint James' Infirmary (Richardson 2008 and Hayes 2008). Besides his outstanding treatise of *Anatomy, Descriptive and Surgical* Gray published several papers, the earliest of which was "On the Development of the Retina and Optic Nerve, and of the Membranous Labyrinth and Auditory Nerve," these researches were almost exclusively on the chick embryo. He clearly revealed that the retina develops from a protrusion of the brain, a point then still being discussed. Gray also presented one of the earliest major accounts of the development of the layers of the retina. He believed the labyrinth in the ear, develops in a mode analogous to that of the retina. Gray's other anatomical paper was "On the Development of the Ductless Glands in the Chick," in which he dealt with the suprarenals, thyroids, and the spleen. On the basis of his

observations Henry Gray refused much of the earlier writings on the embryological origin of each of these glands. From his paper he considered it to be confirmed that these, with the thymus, should be classified in one group, the ductless glands, a classification by no means in general acceptance at that time, which has since developed into what are now known as the endocrine glands. He classified these three glands on the basis of the similarity of their mode of origin, their structure in the first stages of development, and the mode in which their tissues develop throughout the fetal period (Hayes, 2008 and Pearce, 2009). With the support of a grant from the Royal Society, Gray continued his researches on the spleen. These studies culminated with his paper titled, *The Structure and Use of the Spleen*, which was awarded the prestigious Astley Cooper Prize in 1853, which was given every third year by a judging panel that accepts manuscripts of original research on a predetermined part, pulled from a list that Sir Astley Cooper (1768 –1841) had drafted. The spleen was current topic of inquiry and his paper was published in 1854 (Richardson, 2008). In a historical introduction Gray reviewed most of the preceding earlier previous writings on the spleen. His own observations included the origin of the spleen from the dorsal mesogastrium, often attributed to Johannes Müller (1801–1858) and early, if not initial, descriptions of the closed and open circulations, the lymphatics, and the nerves in the spleen. He also performed chemical experiments and ligaturing on the blood of the spleen. This is a work of 350 pages divided into four parts: development (embryology), structure, comparative anatomy, and physiology. Gray wrote others remarkable papers as "An Account of a Dissection of an Ovarian Cyst" (1853), "On Myeloid and Myelocystic Tumors of Bone, Their Structure, Pathology and Mode of Diagnosis" (1856) and "Injured of the Neck" (1861). He also wrote papers in pathology and is reputed to have made good progress on a major treatise on tumors at the time of his death. In May 31, 1860 Henry was elected Fellow of the Royal College in recognition of his contributions in the field of anatomical studies. Gray was candidate for the position of assistant surgeon

at Saint George's Hospital in 1861 but he never assumed his new status because he died that year.

Gray's treaty of *Anatomy, Descriptive and Surgical*

In 1858 when Henry Gray was only 31 years old, and after almost a decade of research he published the first edition of his treaty of *Anatomy, Descriptive and Surgical*, which covered 750 pages and contained 363 figures (Rifkin and Ackerman 2006). The arrangement of the information and the close relation between the text and the illustrations were Gray's work and demonstrate his clear understanding of the fundamentals of his field of study. The Gray's ability to present, to students and practitioners alike, the practical information which they needed in an accessible form. This accessibility has been one of the great factors in the Gray anatomy's success and has influenced others writers of human anatomy textbooks. The first edition of *Gray's Anatomy* was dedicated to the most senior surgeon of the Saint George's Hospital Sir Benjamin Collins Brodie (1783 –1862), Serjeant-Surgeon to the Queen and corresponding member of the Institute of France. Sir Benjamin Collins Brodie was Gray's mentor and no doubt helped his rapid rise in

the hospital staff (Gray 1974). Henry Gray wrote the original version of *Gray's Anatomy* with an audience of medical students and physicians in mind, especially surgeons. Despite the existence of competing anatomical texts, Gray's anatomy quickly became the standard reference work, a position which still retains currently Gray's treaty of *Anatomy, Descriptive and Surgical* was created in collaboration with Henry Vandyke Carter (1831-1897), an anatomical artist and medical doctor and formerly a demonstrator of anatomy at Saint George's Hospital, who assisted him with dissections to get the most accurate representation possible and he provided illustrations (Roberts 2000). Gray and Carter dissected unclaimed bodies during eighteen months from the mortuaries under the Anatomy Act of 1832 to explore human anatomy. Carter's drawings were then made into engravings by Butterworth and Heath. Carter made his meticulous line drawings accented by shadow to create the appearance of depth. Because of Henry Vandyke Carter's illustrations, this treaty of *Anatomy, Descriptive and Surgical* became superior to any other human anatomy text around at the time (Gosh 2015).

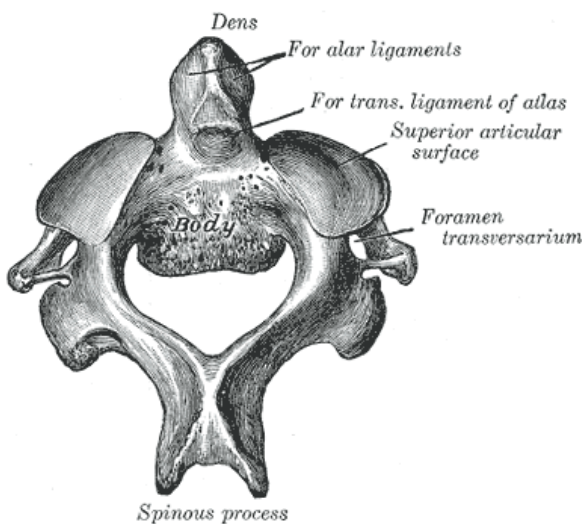


Figure 2. Second cervical vertebra, or epistropheus, from above view. (Henry Vandyke Carter's illustration Adapted from Gray's Anatomy. Anatomy Descriptive and Surgical 1918 Edition.

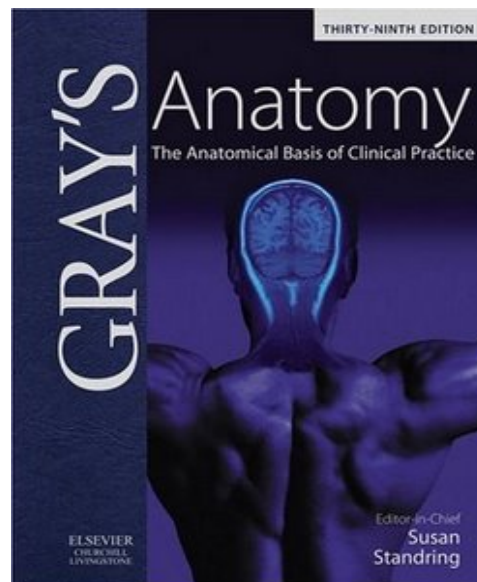


Figure 3: Cover of Gray's *Anatomy* 39th Edition.

The artistic and the diagrammatic combine impeccably with Carter's added innovations of the anatomical terms appearing on the parts themselves (Figure 2). Unfortunately, Henry Vandyke Carter never received any credited neither royalties for his painstaking work. The literary style apparently was greatly polished by the assistance of Timothy Holmes, who also was editor of the third (1863) through ninth (1880) editions of the Gray's anatomy. A major Holmes innovation, which greatly aided the success of the book was the introduction of remarks on surgical anatomy into an English textbook of anatomy. Holmes probably more than any single person over the next twenty years help keep Gray's legacy alive. The reviews of the first edition of *Gray's Anatomy* 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*," (Hayes, 2008). After Gray's death, a second British edition appeared in 1861 by the editor J.W. Parker, with a number of revisions and corrections by Gray and with 32 additional illustrations, 27 of them by JG Westmacott (1811-1884). An imprint of this English first edition was published in the United States in 1859, with slight alterations, in which an extensive index was added and a number of small errors in the British volume were corrected, edited by Richard James Dunglison who also edited the next four editions.. Colored pictures were introduced in the eleven edition in 1897, by its editor T. Pickering Pick. The book was retitled *Gray's Anatomy* in 1938. The thirty five edition of 1973 edited by Peter Williams and Roger Warwick contained substantial changes: over 780 new pages appeared and many illustrations were added, the text was in double columns. The references were introduced by Professor Susan Standring also in 1973 and she is currently the editor of the *Gray's Anatomy* 39th edition (Figure 3). This

treaty is still published under the title *Gray's Anatomy* and is widely appreciated as an extraordinary and authoritative textbook for medical students (Pearce 2009). It has to date seen thirty nine editions in United Kingdom and thirty seven editions in the United States. It has been translated no more than a dozen language, been pored over generation after generation of medical students, and sold millions of copies. *Gray's Anatomy* has never been out of print in more than 150 years. It has been reprinted and revised by varying teams of anatomists It is a practical textbook that would remain useful long after the student entered their professional world. *Gray's Anatomy* main relevant point would be its emphasis on surgical anatomy. Henry Gray was working on the second edition of his treaty of *Anatomy, Descriptive and Surgical* when he caught smallpox from his nephew and although he had been vaccinated, Henry Gray died at the age of 34 on June 13, 1861 in London, 3 years after the first edition of his treaty was published (Richardson 2008). At that time, it was common practice to burn everything in the room of a smallpox victim. Thus, no written records of Gray exist. He was buried at Highgate Cemetery in London (Hayes 2008 and Pearce 2009). Henry Gray was a pioneer and a prodigy of modern descriptive and surgical human anatomy. He had an outstanding career at Saint Georges Hospital from demonstrator to lecturer of anatomy and also curator of the museum (Netter and Friedlander 2014). A precisely illustrated work, Gray's treaty of *Anatomy, Descriptive and Surgical* is as beautiful as it is practical, and is still highly valued as an authoritative textbook in the field of human anatomy. that has influenced and instructed many student of medicine over more than 150 years . *Gray's Anatomy* has undergone many refinements and revisions throughout the years, but it is substantially still the same brilliant work. Despite the aforementioned efforts to keep *Gray's Anatomy* readable by students, when the 39th edition was published, students were identified as a secondary market for the textbook, and companion publications such as *Gray's Anatomy for Students*, *Gray's Atlas of Anatomy* and *Gray's Anatomy Review* have also been published in recent years.

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