'...an example of debased compilation and unscrupulous assumption': The Reception Of Gray's Anatomy.

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Introduction

'...an example of debased compilation and unscrupulous assumption'[1]

The book with which we associate Henry Gray was first published in London in 1858 under the title *Anatomy, Descriptive and Surgical* by John William Parker.[2] Parker, who also published the second edition in 1860, retired and sold his presses and the copyright of the book to Longmans in 1863. Subsequent editions maintained a link with St. George's Hospital in that they were revised by two of Gray's colleagues.[3] Originally conceived as a textbook for students of surgery the book has grown into what reviewer of the thirty–second, centenary, edition sees as essentially a first–stop reference book for anatomists; it is a work that is overly descriptive— and therefore arcane, unsuitable for the instruction of the beginner, and the result of a

[1] *Medical Times & Gazette* (5th March , 1859 pp. 241–4).

[2] Parker was previously printer to the University of Cambridge and was the inventor of the steam press that greatly increased the output from presses at the time; bibles were an exception— to print these with the new presses was considered a profanity. Poynter, 1958 p. 610.

[3] Timothy Holmes (1827–1907) revised the third (1863) through to the ninth (1880) editions until Thomas Pickering Pick (1841–1919) assumed the role of editor for the tenth (1883) through to the fourteenth (1897) editions. The fifteenth (1901) and sixteenth (1905) editions were under the joint editorship of Pick and Robert Howden until Howden assumed the sole position in the seventeenth edition (1909).

'Great Compromise' i.e. it aims at exhaustion within the limited space of a single volume. Moreover it is never read.[4] How much more so with the current, thirty–seventh edition!

For professional anatomists and for students of anatomy the most recent edition is obviously the preferred choice but other readers are less discerning; many popular copies of the earlier editions are reissued each year. It is a classic, occupying '...a similar place in the popular mind as say *The Complete Works of William Shakespeare*, i.e. no home is complete without it'.[5] Clearly Gray has found considerable fame despite the mixed reactions to the first edition of his book.[6]

Little is known of the life of Gray and those brief biographies that do exist are based upon the information given by Gray's niece, Ms Stonhill, to Clinton Dent which he published in an obituary in 1908.[7] His education prior to entry to St. George's Hospital is unknown and it has therefore

[4] *The Lancet* 1958: 2, pp. 1047–8

[5] Personal correspondence with Alex Stitt of Magpie Books, publisher in 1993 of a facsimile of the first edition. Mr Stitt estimates that upwards of 50, 000 copies were sold in 1993 by his company.

[6] *The Lancet* (1858:2 pp. 282–3) reviewed the book very favourably whilst the *Medical Times & Gazette* (5th March , 1859 pp. 241–4) considered that the book was a prime example of plagiarism and unscientific compilation.

[7] Dent, 1908 pp. 49–54, in *St. George's Hospital Gazette*. 1908: 16. The biographies that are based on this, often verbatim, are to be found in: Boland, 1908 pp. 429–435; Plarr, 1930 pp. 463–465; Poynter, 1958 pp. 610–611 & Goss, 1959 pp. 13–17. Obituaries include *The Proceedings of the Royal Society* 1862–3: 12 p. xi; *The Proceedings of the Medical and Chirurgical Society of London* 1861–4: IV pp. 78–79; *The British medical Journal* 1861: I p. 639; *The Lancet* 1861: I p. 600.

been suggested that he was apprenticed to a surgeon as was then commonly the case.[8] Entering St. George's Hospital on 6th May, 1845 Gray studied anatomy at seventy–five Kinnerton Street until he qualified as a member of the Royal College of Surgeons in 1848. The following year he wrote an essay entitled *The Origin, Connections and Distributions of the Nerves of the Human Eye and its Appendages, Illustrated by Comparative Dissections of the Eye in Other Vertebrate Animals* for which he was awarded the Triennial prize of the Royal College of Surgeons. The prize was instituted in 1822, and since 1867 has become associated with the John Hunter Medal. The essay, in an abridged form, was later presented to the Royal Society and published in the *Philosophical Transactions of the Royal Society* in 1850, entitled *On the Development of the Retina and Optic Nerve, and of the membranous labyrinth and Auditory Nerves.*[9] On 3rd June, 1852 Gray was elected to a fellowship of the Royal Society, this following the presentation of *On the Development of the Ductless Glands in the Chick*[10]— a paper that contains much embryological work on the structure of the spleen—, communicated by William Bowman, and read to the Royal Society on 15th January. Upon his election Gray was immediately granted funding for work on the spleen, the result of his work being *The Structure and Uses of the spleen*, that was awarded the Astley Cooper prize of £300 in 1853 and was published by Parker

[8]Dent, 1908 p. 49. & Newman, 1957 pp. 18–24.

[9]*The Lancet* 1861:1 p. 600 & *Proceedings of the Royal Society* 1862–3:12 p. xi.

[10]Subsequently published by the Philosophical Transactions of the Royal Society (1852: 142 pp. 295–309).

in London in 1854.[11] Other published works of his that I have been able to locate are *An Account of an Ovarian Cyst which Contained Brain* and *On Myeloid and Myelo–Cystic Tumours of Bone; their Structure, Pathology, and Mode of Diagnosis.*[12] From 1855 until his death on 13th June 1861 Gray was lecturing on anatomy at St. George's Hospital.[13]

Gray's anatomy and that of his day

By the 1840s English anatomy had accepted much of the learning and developments made at the turn of the century in France.[14] There were fewer medical students travelling to Paris to learn medicine than in earlier decades,[15] and though many of the most influential French anatomy books[16] were still in use (in the original language and also in translation) English books, with distinctly French approaches, were being written and widely read. Jones Quain's *Elements of Descriptive and Practical Anatomy* of 1828, in conception and development through subsequent editions, is a clear example and

[11] *The Lancet* 1853:2 p. 99 & Gray, 1854.

[12] In *Medico–Chirurgical Transactions* vols. 1853: XXXVI pp. 433–7 & 1856: XXXIX pp.121–149) respectively.

[13] *The Lancet* 1854–1860 (students' medical timetable for the forthcoming academic year).

[14] For which see Newman, 1957.

[15] Poynter, 1970 p. 241

[16] E.g. Cruveilhier, J. C. — *Traité D'anatomie Descriptive.* (1st edt.,1821) and later translated by Madden, W. H. and revised by Sharpey, W. (1841)&Bichât, M. F. X. — Anatomie Générale. (1st edt., 1812) and later translated by Coffyn, C. in 1824.

by the time of the publication of the sixth edition by W. Sharpey and G. V. Ellis in 1856 the book had become seminal.[17] It is a work that seems to stress a 'living', physiological anatomy and combines this with a 'philosophical' anatomy that had arisen from the writings of the post–revolutionary French biologists Etienne Geoffroy Saint–Hilare and George Cuvier.[18]

This philosophical anatomy was the result of the linking together of the two previously unconnected and relatively new scientific disciplines (comparative anatomy and embryology) was accomplished through the invention of theories of development of the animal series, that is the transformation of 'lower' animals into 'higher' ones according to a deistic blueprint. The phylogenetic development of any given animal was then reflected, even determined, by its ontological development: following Geoffroy's 'Unity of Plan' a fish, given a long enough gestation period, would develop into a reptile or bird. A dialectical relationship was established between ontogeny (discernible through embryological observation) and phylogeny (observable through the fossil record and comparative anatomy).

The ability to detect anatomical structures that are homologous between

[17]It is the book against which Gray's *Anatomy* is unfavourably compared by the *Medical Times & Gazette*. 1859 pp. 241–4

[18]The positions of Cuvier and Geoffroy differ on elements of animal series development but they are fundamentally in agreement on the relevance of the combined comparative anatomical/ embryological approach. For their positions and the subsequent establishment of the new anatomy within the medical schools in London— which was complete in the University colleges, London and in the teaching hospitals by 1850— see Desmond, 1989.

taxa is one clear result of this dialectical relationship. That the arms of humans are homologous to the wings of fowl, despite differences of their form and uses was astonishing. In terms applicable to medicine the ability to discern homologies meant the ability to identify structural relationships that would not otherwise have been observable. The case is clearly made by reference to Gray's *Ductless Glands* which permits the classification of the spleen with the adrenal and thyroid glands not on the basis that in the adult form they are structurally similar, or perform similar functions in a similar manner, but because they derive from embryonic forms that are essentially the same. A hidden relationship is revealed. There is a reorganization of thought concerning the relationship of anatomical structures like that seen in Bichât's recognition of tissues—defined by their constancy under chemical testing despite the gross anatomical differences in the organs from which they have come. A further application of this philosophical anatomy comes in the identification of congenital abnormalities as evidences of arrested development; the scientific explication of such abnormalities presumably lessening the disgust that 'monsters' might otherwise have caused.

Gray had considerable firsthand knowledge of the new anatomies, and their relative absence in his *Anatomy* cannot be said to be a result of his ignorance nor of his knowing of them only through the scientific literature. His earlier work shows that he had a great awareness of the values of these approaches to anatomy, not just in a purely academic or arcane manner but in that they might prove directly relevant to practical medicine and surgery. His *Ductless Glands* shows not only that he can identify new anatomical

relationships but that this may be achieved through 'evolution', that is the mechanism or process of structural formation from an undifferentiated tissue–type to the realization of the perfect (adult) form, and by the identification of the similitude of actual structures at earlier developmental stages. Those are what we might call processive and static embryological techniques:

> I trust however that I may be able to prove the close affinity that it [his description of the evolution of the supra–renal glands] has both with the spleen and also with the thyroid, not so much from any resemblance that it may present in its elementary parts [static], but in the development of those elements to their perfect form [processive][19]

In *On the Structure and Uses of the Spleen* Gray dates the division, 1837, between the 'elder school of anatomy' (infra p. 9 n. 27) and the new structural anatomy 'the researches into which were now not confined to outward form and position, but extended with scrutinizing and inquiring gaze into the structure of the ultimate tissues of parts, and the laws which govern their development, growth, and decay'.[20] Moreover, 'It is only... within the last few years, that the anatomy and physiology of the ductless glands has been more carefully examined, and their function attempted to be displayed in the cautious spirit of philosophical generalization'. It is this philosophical generalization that concerns Gray in this work on the spleen in particular, and in all his work before publication of the *Anatomy.* In part five of *Spleen*

[19]Gray, 1852 p. 302
[20]Gray, 1854 p. 45

(pp. 340–372) Gray infers the function of the spleen, and hence proof of its classification as a gland, from the structure and development he has ascribed to it in the preceding chapters. Proof of the spleen as a gland is not arrived at through the identification of a secretory product but by logical analogy with those whose status as glands are beyond doubt (the suprarenal and thyroid glands) and which share processive anatomical features with the spleen.

Gray's paper *On the Development of the Retina* shows the same appreciation of embryology and developmental anatomy in his proof that the eye and the ear may be considered directly comparable in anatomical terms; they are both modifications of the brain itself, possessing directly analogous structures in the auditory bulla and the retina, and the auditory nerve and the optic nerve. The proofs he contributes he considers significant not only in their own terms but in their applicability:

> These facts I think are of some importance, and prove how deductions formed from microscopic embryology may be applied to confirm dissections or microscopic investigations made on the same parts in the mature animal.[21]

The application of this embryology is perhaps nowhere more clearly shown in Gray's writings than in his last published work before the *Anatomy*; in *On Myeloid and Myelo–Cystic Tumours* he discredits the seemingly

[21]Gray, 1850 p. 195. There is reiteration of this in *On the Structure and Uses of the Spleen*, 1854, particularly p. 55

standard notion that all bone tumours are malignant cancers, thus developing and scientifically investigating an intuition of Sir Benjamin Brodie's.[22] By showing that the contents of many bone tumours and cysts consist of tissue that is very like natural fœtal tissue, that is not malignant and abnormal, he has produced a new classification for tumours and has established the necessity of microscopo–embryological analysis in the determination of tumour pathology. For the surgeon there is now the knowledge that if his patient's tumour is as classified by Gray then amputation will remove the tumour and pain and be untroubled by recrudescence.

Gray's anatomy emphasises what I have called processive anatomy, an anatomy that investigates the dynamics of structural and developmental change, and attempts to provide an anatomy that is more powerful in that it is not constrained by time. Though the dynamics of development must not be confused with the dynamism of function they are intimately related in that function may be *deduced* from a processive knowledge of structure.[23] Only when Gray deduces the use of the spleen from the structure he has given it does a curious relationship appear between them. It is as if processive anatomy combined with structural anatomy are used to identify elements of the spleen which can be used to understand the *idea* of its function—regulation

[22]Gray, 1856 p. 122. Brodie as professor of anatomy at the Royal College of Surgeons, former full surgeon at St. George's Hospital and Surgeon–Serjeant to George IV and William IV was perhaps allowed to have intuitions without fully developing and proving them—such work was left for others.

[23]Gray, 1854 p. 54 & 340, and supra, p. 6, n. 21.

of the quality and quantity of blood. Instead of working then with components or parts of the organ (and their spatial relationship) that have no value other than their position within the whole of the organ, he is dealing with ideas whose value comes from the dialectical interchange between ontology and comparative anatomy/ phylogeny. Organs develop, they are what is arrived at, the end of development; as such they are capable of being defined not as what they *are* nor as what they *were* but by the processive mechanism of development, that is conceptual.

Taking this, the overbearing detail of what seems to be purely descriptive, somewhat classical anatomy in the *Anatomy* is explicable and acceptable to an anatomical community that is working with the new anatomical approach. The collection of as much structural knowledge as possible will permit of a fuller understanding of analysis of the body into parts, subparts, and so on, hence its organization and its reality. This analytical dissection of the body creates structural hierarchies, different analyses producing different hierarchies. These hierarchies are then to be 'tested', confirmed, by the study of the development of their constituents (n. 16). In the second edition of the Anatomy (1860) Gray, for example, changed his presentation of the lower and upper extremities in order that they might better approach the true (viz. embryological) nature of their relationship with the trunk. Where the first edition has the description of the limb bones following the sections on the trunk and the pelvis the second has the bones of the upper extremity following the section on the thorax with the pelvis and lower limb bones

combined.[24] This simple change in the ordering of the sections involved is a clear indication that Gray now sees the relationships of the structures differently, whereas the limbs had been seen as an obvious grouping they are now defined by developmental relationships; that is that the upper limb has developed as an extension of the thorax and the lower limb from the pelvis,[25]

In *On the Structure and Uses of the Spleen*[26] Gray presents to the reader a history of the study of the spleen. It is a history that draws together the anatomical (and physiological) conclusions of earlier researchers, spinning their work into a unified theme of progressive advancement to the truth that he knew of the form and function of the spleen. The implication for his own anatomy is that it is based on a series of successes of which his is the capstone, where he integrates histology, embryology and comparative anatomy into an anatomy that—through eliciting the correct use, or functions, of organs—is able to assist in therapy not just surgery:

> We have now arrived at a period when the elder school of anatomy had almost exhausted its task of displaying the general [gross] anatomy of the human body; these investigations, however, were of the very highest importance, for they not only were the means of completely eradicating the unphilosophical notions of the ancients, but they served to place the science of physiology on a more secure foundation, and, what is of infinitely more im-

[24]See the contents pages of each edition for these changes. It is nowhere in the second edition made explicit that these changes have been made nor indeed why.

[25]Wilson, 1853 p. 76, describes the embryological development of upper limb from hæmal arches.

[26]Gray, 1854, pp. 1-53

> portance, materially to aid in the diagnosis and treatment of disease.[27]

Gray, an obvious adherent of the new anatomical sciences, was patently aware that when he was writing his *Anatomy* that there was a need for a textbook that directly avoided the new research elements and the philosophical arguments that often ran with them.[28] For the most part reviewers of his book concurred, the Medical Times & Gazette did not. Why was there a need for a less contentious work and why was it so vehemently opposed by the *Gazette*?

The *Anatomy*

Given that by the 1850s it is possible for an anatomist to view the structure of the animal body in two radically new ways—through the organization and relationship of structures with reference to a deistic blueprint or to the elemental constituents (tissues) of organs[29]—it is surprising that Gray's *Anatomy* should avoid the new techniques and present an almost purely descriptive anatomy. The subject of the work is very detailed description of the

[27]Gray, 1854 p. 43. He continues for several pages commenting on the ability of his generation to resolve the microscopic 'texture' of organs, which for diagnosis is of importance for the physician not just for the anatomist or the surgeon. See also note 31, infra.

[28]For which see Desmond, 1989.

[29]Bichât *Anatomie générale* (Introduction), 1812. Engl. Transl. Coffyn, C., 1824.

gross anatomy of structural systems, rather than regions of the body, which are organized within the book in a traditional manner—osteology, arthrology, myology, angiology, neurology, and splanchnology, followed by a section on pelvic surgical anatomy especially of hernias and lithotomy[30]—, that is an anatomy that 'fleshes the bones'. There are few references within the body of the text to homologies or to the embryological development of structures or of the tissues of which the body is constructed, with the possible exception of the sections on osteology that contains perfunctory comments on the ossification of bones and on the development of the teeth. Scant regard is paid to the microscopic anatomy of tissues characteristic to a given system, though the minute structure of the splanchna is glossed. In short the new developments in anatomy are largely absent and do not figure highly in the text.

The *Anatomy* presents the subject of the body in a detail that is devoid of function or meaning, only the briefest comments are made on the use of organs; 'The kidneys are two glandular organs, intended for the secretion of the urine' (p. 660), 'The liver is a glandular organ of large size, intended for the secretion of bile' (p.613) the only exception to this is the short section on fœtal circulation (p. 639). In presenting an anatomy of this type Gray produces a volume that is relatively slim and contains only those

[30]Sections of a similar nature are to be found in Wilson, 1840 (and subsequent editions), & 1853 &Quain 1828 (and subsequent editions), suggesting that surgery of hernia and lithotomy were considered important operations.

elements that may be of principal importance to the student in his appreciation of gross form in the dissecting room. Though it is not a manual of dissection many sections of the book read the student into the study of the body 'If the upper part of either hemisphere [of the cerebrum] is removed with a scalpel, about half an inch above the level of the corpus callosum, its internal white matter will be exposed' (p. 460–1). The reader is included in the work to a far greater extent in short 'Dissection' passages that often serve as an introduction to the structure later presented (e.g. of the spinal cord and membranes [p. 442]). These sections are presumably included to allow the student to integrate his study of the material presented in the book with the dissections he is to carry out under instruction in his medical school. They are not inserted as to be of primary importance, merely as an adjunct to Gray's material. A most important series of other adjuncts are supplied with the description of structures, these are the sections of 'surgical anatomy' that follow description and highlight the most common clinical cases taken from medical literature. These sections are often perfunctory but aid to place his descriptive anatomy in a context that is of introductory importance for the student.

When compared to other anatomy books of the period Gray's *Anatomy* is somewhat bland, it is not embellished with philosophical asides, it does not draw together theories from other sciences to explain its position—it simply states what is. The style of the writing is dry, directed to presentation of the facts; once these are known, the impression is that only then will the full implications of embryology, comparative anatomy and histology be

realized.

This is far removed from the importance placed on philosophy found in Quain's *Elements*; in the introduction to the first edition anatomy is described as the 'science of organization' and 'has for its object of study of ... structure and properties, physical as well as vital' (p. 1). Quain's anatomy contains strong elements of physiology, and of comparative anatomy; he sees them as inextricably linked with the description of the structure of the body important in their determination of meaning for structures. Organs are instruments of function[31] and their description should allow of this. Moreover he believes that one cannot make sense of pure description (p. vii) and that the anatomist should concern himself with philosophical extrapolation from the physical form of the body. Two quotations from the fourth-edition of the *Elements* illustrate his position:[32]

> '... We cannot, however, confine ourselves to a mere statement of facts [anatomical description], or an enumeration of events. The very constitution of our minds compels us to draw inferences from the facts observed...' (p. xv)
>
> 'Without principles deduced from Analytical Reasoning, experience is a useless and blind guide.' (p. xxiv, a quotation he uses of Cullen's').

Quain's emphasis on meaning for anatomical description is evident in

[31]Quain, 1837 (4th edition) p. xxiv.

[32]The fourth edition—the last by Jones Quain himself—is here quoted to show that the position adopted by him in the first edition is still valid and is vehemently held.

the sections on surgical anatomy found in Gray's Anatomy, it is, however, of a different nature; Gray's meaning comes not through a philosophical relationship of form with function but simply through the applicability of descriptive anatomy to surgery, it is a meaning of surgical utility. There is no need for him to describe 'general' anatomy,[33] the 'texture' of organs, the tissues that constituted the body since Bichât. General anatomy (that which was beginning to become known as histology)[34] presented a view of anatomy in which the body was considered indivisible; that there was a continuity of microscopic form that was independent of gross anatomy was of extreme importance for the physician to understand for his diagnosis of conditions determined by 'signs' apparent from morbid anatomy.[35] The anatomy with which the surgeon is primarily concerned is that that admits of the divisibility of the body into compartments, one that is topological.[36]

That the *Anatomy* is more a work of descriptive rather than of surgical anatomy is perhaps evident from the layout of the book in which the body is analyzed into systems, of the bones, of the joints and so on. In an arrangement of this sort there is no continuity between systems. One does not operate just on the knee joint, one is concerned also with the muscles acting on the joint, nearby arteries, veins and nerves. A systematic arrangement

[33]Quain, 1837 (4th edition) p. viii.
[34]Quain & Sharpey, 1848 (5th edition) footnote on p. xviii
[35]Quain, 1837 (4th edition) p. ix–x & Newman, 1957 p. 83
[36]Quain, 1837 (4th edition) p. ix–x

fails to recognize the importance of practical relations and is disparate, emphasis being rather on the separation rather than the synthesis of systems. In his *Dissector's Manual* Wilson describes analysis of this type as physiological ordering—each system being functionally united, e.g. the nervous system is concerned with the reception and response to stimuli—and compares it to the second method of ordering or presenting anatomy, that is by demonstration of the all the systems as they are found in any given region of the body. Thus anatomy is presented as it is uncovered in the body during dissection or operation. This regional anatomy '. . . displays the component structures [of a region] in their relations to each other, and their complicity in the injuries and surgical operations to which the body may be subjected.' (n. 32). Wilson finds merit in both types of anatomical organization and presents them both in his *Anatomist's Vade Mecum* and *Dissector's Manual* respectively.

In a very real sense the *Anatomy* is just an anatomy book. That is from it, and it alone, one may learn only anatomy. The lack of importance placed on anatomically related subjects highlights a rising division between the medical sciences. Each has become so detailed and specialized that it ought to deserve its own textbook. An anatomy book no longer has the prerogative of describing function, or development, or microscopic structure. The book that Gray produced was solely for the instruction of gross topological anatomy. If one wishes to know about development, consult a text of embryology; if function, one of physiology.

The plain presentation of descriptive anatomical detail may be an indication of the changing environment of medical education in the 1850s. Medical education was in a state of flux as medicine was becoming increasingly vocationalized and the new medical sciences were becoming applied to the study and practice of medicine.[37]

There was a shift of emphasis from the university[38] development of the good character of a Christian gentleman (upon whom a brief postgraduate medical education could be applied, where medicine was essentially secondary to the well rounded wisdom imparted by the study of the classics) to the technical education of medics. General education was reduced in importance and the medic was to learn only that which would be directly, and observably, necessary for him to practise safely. The importance of the specific and the technical in medical education was raised further with the introduction of premedical sciences into the curricula[39] and these developments were recognized on 2 October, 1858 with the passing with Royal Assent of the Medical Reform Act and the later establishment of the General Medical Council for Medical Education and Registration, which was to confer the status of 'Registered medical Practitioner' on all newly qualified medics. It is in the state of increasing segregation of the medical sciences combined with the expansion of their technical nature and the decrease in value of a more

[37]Newman, 1957 pp. 194–206.
[38]I.e. Oxford and Cambridge.
[39]Newman, 1957 p. 210

general education for medics that Gray's *Anatomy* was written and is one explanation of why the work is shorn of the implications of the new sciences of histology, embryology and comparative anatomy. It also serves as a model for the explanation of the criticism heaped upon the work by the *Medical Times & Gazette*,[40] which as one of the more conservative medical journals[41] would have valued the preservation of the 'university spirit' of Classical education and served to foster the completeness of the general education ideal of Victorian liberal philosophy. That expensive and exclusive university was not available to all was a source of discontent for the medical education reformers of the 1840s and 1850s and any reduction in its centrality to the medical profession was welcomed by them. Thomas Wakely[42] was one such radical reformer and through his organ, *The Lancet*, and later as a member

[40]'A more unphilosophical amalgam of anatomical details and crude surgery we never met with. Not one word about the homologies of any part or organ appears. Mr. Gray ignores that aspect of anatomy altogether, and rests contented with such unalloyed description of parts that must be crammed for examination, or that may be cut in operations, as would be welcomed by a college of Barber Surgeons'. *Medical Times & Gazette*, 1859 p. 241. The reference to crude surgery and barber surgeons seems indicative of the arrogance of surgeons who had only recently begun to enjoy, through the Royal college of Surgeons, something of the privileges that physicians once had solely for themselves.

[41]The journal was established (as the *Medical Gazette*) to counteract the excesses of *The Lancet*, 'A publication which sets all morality, courtesy, and even decency, at defiance, — which outrages every feeling acknowledged among gentlemen, and violates every principle held sacred in society.', *Medical Gazette* (later the *Medical Times & Gazette*) 1834:13, p. 677. The rivalry between them is still clear in the 1850s

[42]See Desmond, 1989 for Wakely's opposition to the Royal College of Surgeons, the establishment of The Lancet and its opposition by the *Medical Gazette* in the late 1820s, and 1830s. Newman, 1957 pp. 134–193, gives details of Wakely's attempts to force a reform of medical education. Both works highlight particularly turbulent times of social change from the 1830s until c. 1860, represented to some extent by the establishment of University College London (1827–8) and the attempts at levelling social privilege and nepotism.

of parliament he called for the removal of privilege in the profession, and the reduction of Oxbridge hegemony.

As lecturer in anatomy at St. George's Hospital Gray would certainly have been in a position to appreciate the specific curricular needs of his students, and a work that was geared to an increasingly vocationalized anatomy, setting forth merely the details required for examination and for the needs of the new generation of surgeons he was training would obviously have caused a considerable degree of alarm amongst reviewers. Thus the primary concern for two reviewers was not the poor quality of the work, or its lack of meaningful homologies, as was the case with the reviewers' of the *Medical Times & Gazette*, but that its presentation and ordering of matter, unhampered by implications and applications, might tempt students to use the book to learn their anatomy to the exclusion of dissection.[43] With the excellence of the illustrations from the original drawings by H. Vandyke Carter—the senior anatomist[44] of the pair, who has also illustrated Gray's paper *On myeloid and Myelo–Cystic Tumours of Bone*—this danger must have been very real; in 1908 Clinton Dent writes '... Vandyke Carter's drawings still hold their own as some of the best illustrations to a work on anatomy that have ever been designed. They form the happiest blend of diagram and of a realistic

[43] *Dublin Journal of Medical Science* 1858: XXVI pp. 443–7 & *The Lancet* 1858:2 pp. 282–3.

[44] Former professor of anatomy at Queen's College, Bombay and demonstrator of anatomy at St. George's Hospital (*The Lancet* 1858:2 p. 282).

drawing that that ever been produced.'[45] Moreover, at least one drawing is considered to be of sufficient accuracy that it is reproduced in the current, thirty–seventhth edition (p. 827).

Charges against the *Anatomy*

'*Mr. Gray has worked under a false estimate of his duties as a teacher, and without fairly appreciating the intellectual condition and requirements of the present generation of medical students.*'[46] In the sense that Gray avoids philosophical implications, of ontological and phylogenetic development and origin of function or purpose of structures, in his *Anatomy* this is valid, though it does presume to prescribe what modern anatomy ought to be and what it should aim at—that it ought to be 'living' and involve more than the mere description of structures and their spatial relations. Whether he is negligent in failing to alert his readers to new developments in anatomy is another question and rather depends on what his intentions for the book were, but his successful appreciation of new developments in his earlier anatomical work is a clear indication that was intended to be as it is. He sees the needs of his students and readers differently.

[45] Dent, 1908 p. 53

[46] *Medical Times & Gazette*, 1859 p. 241

'*Mr. Gray. . . furnishes us with a great many statements of facts, unattested, simply adopted. So far as Mr. Gray is concerned, the literature of this part of anatomy [descriptive anatomy] may be presumed to have been a complete blank. No name is fairly mentioned in connexion with it*'[47]: Gray does not give acknowledgement to generally observable anatomical facts, or facts that have so long been established that reference to their source would prove, if not impossible, unnecessary. Pictures taken from other anatomy books are given due credit and their source is cited so that the reader might consult it in its original context (e.g. p. 619, sections of a portal vein after Kiernan). Alleged statements of fact are also referenced, for example the supposed but as yet unaccented structure of teeth (p. 587), as are specific detailed anatomical analyses, e.g. of the grey and white matter (p. 438). *The Dublin Journal of Medical Science*[48] defends Gray's stand against excessive referencing on stylistic grounds adding that '. . . any work on a demonstrative subject, such as anatomy, can, in the present age, be nothing but a compilation, and the chief, if not the only merit which a writer on it can claim, is to the manner in which he arranges his materials and the language he employs. To interlard his sentences with constant references to authority would but mar the context, and, spoiling the style, render its reading tiresome and troublesome.' On the charge of plagiarism of the then period text, Quain's *Elements* (6th

[47] *Medical Times & Gazette*, 1859 p. 241

[48] *Dublin Journal of Medical Science* 1858: XXVI pp. 444

edition)[49], Clinton Dent[50] writes: 'Undeniably many passages in Gray's Work could be cited in which the phraseology and description closely resemble that of Quain and Sharpey's "Anatomy",[51] but it is somewhat absurd in ordinary anatomical descriptions to accuse one writer of paraphrasing passages to be found in another . . . Forgetfulness of the source from which we are borrowing is an extremely common form of originality.'.

Plagiarism is certainly a major thrust of the review with pages 242–244 consisting of sections from Quain's *Elements* and Gray's *Anatomy* presented side by side; his use of what is perceived to be the work of others with only nominal regard being paid to them is clearly distasteful to the reviewers as it '. . . neither conveys information to the reader nor honour to the man who bore it' (p. 242). In the sense that the work is viewed as dishonest, the 'debased compilation' is complaint that 'Mr. Gray has not even taken the trouble to draw from the well of primary work, but has again satisfied himself with draining the pitchers of the text–book.'.

'*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*'[52]: As stated

[49]Sharpey & Ellis, 1856

[50]Dent, 1908 p. 52

[51]And also of Wilson's *Anatomist's vade mecum* (1st edition, 1840). Compare the plans of the relations of arteries and veins to surrounding structures (Wilson, 1840 p. 185 and Gray, 1858 pp. 310–11) and several sections of the text (e.g. Wilson, p. 131 and Gray, p. 185). Dent here confuses the editors of the fifth edition (1848), Quain (Richard) and Sharpey with the contents of the sixth edition (1856) edited by Sharpey and Ellis.

[52]*Medical Times & Gazette*, 1859 p. 241

above (p. 15) Gray would certainly be aware of the needs of his own students and the book would have been written with them in mind. That the second edition of the Anatomy (1860) was unchanged with respect to the charges levelled at it by the *Medical Times & Gazette* is an indication that the book had achieved recognition by its intended audience and that the poor review had had little effect on Gray's attitude toward the contents of the second edition. *The Dublin Journal of Medical Science*[53] ardently believed the book to be an essential for medics qualified and as yet unqualified: 'Thus the volume constitutes a perfect book of reference for the practitioner, demanding a place in even the most limited library of the physician or surgeon, and a work of necessity for the student to fix in his mind what he has learnt by the dissecting knife from the book of nature.'. *The Lancet*, too finds, the work perfectly adapted to the needs of students, and that it shall function as a ready reference for the practitioner.[54] Moreover the book is seen as a book of medical, and perhaps more significantly, English national pride. Thus in *The Lancet*:

> It is the first time that such an endeavour has been made by an English anatomist. It is a work of no ordinary labour, and demanded the highest accomplishments, both an anatomist and as a surgeon, for its successful completion. . . As a full, systematic, and advanced anatomy, combining the various merits of many countries, scientifically excellent, and adapted to all the wants of the student, we are not acquainted with any other work in any

[53] *Dublin Journal of Medical Science* 1858: XXVI pp. 444

[54]

language which can take equal rank with the one before us.[55]

For the *Dublin Journal of Medical Science* the work is an indication that finally, in England, anatomy is being treated in the serious and systematic manner it deserves. The Anatomy was also wanted in the united States of America where it was published in 1859 by Blanchard and Lea of Philadelphia[56] who, whilst praising the presentation of the matter and the 'high character' of the content, found it necessary only to extend the index somewhat and correct typographical errors to make the book suitable for the American market. American reviews of the Anatomy tend to stress the value of the book comes through the logical and systematic arrangement of the matter, the inclusion of practical points on surgery, the originality and clarity of the illustrations and the close correspondence between the illustrations and the text.[57]

Editions three and four of the anatomy published in 1863 and 1869 respectively under the editorship of Timothy Holmes, a friend and colleague of Gray's at St. George's Hospital, who also played a large role in the proof reading of the first and second editions, remained largely in the spirit of Gray's original. It was only with the publication of the fifth edition in 1869 that the introduction of histology, embryology and comparative anatomical

[55] *The Lancet* 1858:2 p. 282–3
[56] Goss, 1959 p.24
[57] Goss, 1959 p.27

studies was made.

The reviewers at the *Medical Times & Gazette* find the dedication to Sir Benjamin Brodie offensive. Whether this because of the lack of philosophical anatomy in the book makes the dedication inappropriate to one who had spent much of his career studying not practical, descriptive anatomy but philosophical anatomy[58] or because a book that they consider to be so base and unscientific should be associated with the president of the General medical Council and the Royal Society is of little concern. Gray shared a close relationship with Brodie who maintained strong links with St. George's Hospital even after his retirement from the post of full surgeon in 1840[59] and allowed Gray access to his extensive casebooks for the writing of the paper *On Myeloid and Myelo–Cystic Tumours of Bone*. Gray clearly felt indebted to Brodie, and their closeness is perhaps revealed by Brodie's expression of grief at Gray's death in a letter he wrote to a mutual friend of theirs, C. Hawkins:

> ...Poor Gray, his death, just as he was on the point of realizing the reward of his labours, is a sad event indeed. If you have any means of doing so, I wish that you would express to miss...[the writing is near illegible here, but he may mean Gray's fiancée] how truly I sympathize with her in her affliction. Gray is a great loss to the Hospital and the School. Who is there to

[58]Plarr, 1930 pp. 144–8.

[59]He, for example, bought the lease for the Kinnerton Street buildings where the Hospitals medical school was housed. Dent, 1908 p. 51.

take his place?[60]

Conclusions

The review of Gray's *Anatomy, Descriptive and Surgical* by the *Medical Times & Gazette* is certainly a heavy contrast to those from *The Lancet* and the *Dublin Journal of Medical Science*. The Gazette's defence, or promotion, of the new approaches seems determined; they reprove Ledwich and Ledwich's *The Practical and Descriptive Anatomy of the Human Body* (1852) for the same reasons as Gray—lack of recognition of the new sciences, particularly comparative anatomy and, for being unscientific and unphilosophical—though the reproach is not so vehement as with Gray. Perhaps Gray was thought to be something of a turncoat, abandoning the new approaches with their philosophical overtones after early success.

After the complementary comments made on Gray and on the nature of his work in a review of *On the structure and uses of the Spleen*: 'Mr. Gray's work is indeed fully worthy of the high honour it has received; it cannot fail to place its author in the first rank among European anatomists

[60]When the letter was written Brodie was only partially sighted and near death himself. It is one of the last letters he wrote. Dent, 1908 pp. 53. A facsimile of the letter is found appended to Dent's obituary biography of Gray.

and physiologists [my emphasis].'[61] the *Gazette* may have felt slighted in that one who it recognized as being firmly behind an anatomy that was to include the new sciences not to separate them into distinct disciplines—an anatomy that was to be ever larger and involved not just with structure but also with function and purpose, ontogenetic and phylogenetic origin—left the fold and pursued an anatomy that was separatist. I do not believe that Gray renounced the approaches that he had so successfully appreciated and applied in his researches; he had identified the needs of students in a time of increasing vocationalization of the medical profession, and written a descriptive anatomy containing practical guides to the practice of surgery that was pædagogic, acted as an *aide memoir* for students and a ready reference for qualified practitioners.

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[61] *The Medical Times & Gazette*, 1854: 9 pp. 375–6.

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