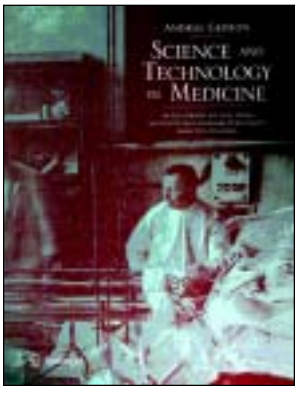
Book Reviews

Science and Technology in Medicine: An illustrated account based on ninety-nine landmark publications from five centuries. Andras Gedeon. New York, Springer, 2006. *551 pp, US$ 89.95.* ISBN 10: 0–387–27874–5.



Some years ago, I reviewed John Gribbin's *Science: A history 1543–2001* in the *BMJ* (2003;**326:**341). I had commented in the review that there was much on science, but little of technology or of medicine in the book and had ended with 'A companion volume on the people who contributed to technology would be apt––with a little more representation of medical science'. It must be pure coincidence, of course, but Andras Gedeon presents a book which deals with a substantial amount of what Gribbin had largely missed out on: technology in medicine.

At a time when one hears that technology is overtaking the humane aspects of medicine, it is a pleasure to see a book that welcomes technology in medicine and shows that the idea of technological advances in medicine is 500 years old! Writing a book on the histories of science, technology and medicine must indeed be difficult, but Gedeon accomplishes this with great success and turns out a veritable classic, a work of art entitled *Science and technology in medicine.*

Gedeon chooses 99 of the most important conceptual and technological advances, and inventions which have had an impact on medicine. These are by 97 people (Santorio turns up thrice!!), with pictures of 93. There are no pictures of Robert Hooke, Francis Hauksbee, Charles Kite and Jean Jallabert because there is doubt about the veracity of the images of these scientists. The innovations include the usual suspects—the electrocardiogram, the stethoscope, X-rays, CT, MRI, PET—but Gedeon goes well beyond this and brings to light many people and many inventions that at least I, and I suspect many other people, would be unaware of. Just some examples include Albrecht Durer's attempt to apply mathematical principles to the pictorial representation of the human body, Bernoulli's theory of gases and fluids, Robert Boyle and the beginnings of physiological chemistry, the use of titanium implants and of LASER. The discovery is not necessarily the first to be made in its field—thus, John Snow's use of anaesthesia is chosen rather than Crawford Long's or Morton's discoveries.

This is obviously a subjective list but I cannot imagine any other similar list missing out on most of these. If I have any reservations, it is that Professor Sir John Charnley's work on hip replacement could have found a mention (but perhaps it was left out because the use of titanium as a dental implant by Branemark has been included instead). More importantly, the exclusion of the discovery of monoclonal antibodies by Kohler and Milstein is something I cannot accept. Monoclonal antibodies are among the hottest topics in medicine today and, among other things, have revolutionized the practice of surgical pathology, my own area of specialization.

Each chapter contains a brief, succinct biography, which illustrates the salient features of the life of the scientist. This is followed by a paragraph explaining the scientific discovery (written in the present tense, for some reason) and finally, a paragraph which puts the discovery in perspective with respect to other research, prior to and after that particular paper. This last paragraph, in all cases, is particularly scholarly. The areas of medicine served are largely physiology, surgery and radiology.

The illustrations and photographs that follow over the next 2–4 pages (most chapters are 4–6 pages long) are what make the book special. You will be delighted, like me, to see a facsimile of the original Gregor Mendel paper from 1866 and the first English translation by William Bateson in 1909, as well as Hookes' own illustration of his microscope of 1665. The page containing the path-breaking report by Fick on cardiac output in 1870, at the Society for Physics and Medicine in Wurzburg, is interesting in more ways than one—the line which precedes this report mentions the name of the latest elected member of the society—25-year-old Wilhem Roentgen, a quarter of a century before he was to make history! Not surprisingly, Roentgen makes for a separate, well-deserved entry a few pages later.

How much medical science and its practitioners—and its patients—have benefited from other fields and by discoveries made by non-medicos becomes clear when reading the book. I learnt to my astonishment that Wilhelm Herschel, the discoverer of Uranus, was initially a musician before he took to astronomy and physics. His discovery of infrared radiation from the sun makes this list, because it was the precursor to spectroscopy, pulse oximetry and infrared thermography. Similarly, Johannes Kepler who gave us the laws of planetary motion—and who, like Herschel, would easily be in any list enumerating great astronomers—is included because of his work on the physics of image formation on the retina.

We also learn unusual facts; Antoine-Laurent Lavoiser worked for tax reform, employment for the poor and old age insurance. Mouth-to-mouth resuscitation was described by John Fothergill in 1744 but fell out of favour for almost two centuries before being rediscovered!

In the absence of a separate list of Nobel prize winners from among these stalwarts, I added up the numbers and discovered that of the 39 scientists who worked in the last part of the nineteenth century or in the twentieth century (the Nobel prize era), as many as 19 were awarded the Nobel prize in either physiology or medicine, physics or chemistry—absolute proof, so to say, of the genius of these scientists. I would have liked to see a table of the scientists and their countries of origin or research. Sweden, for instance, makes it 5 times in the last 13 chapters (chapters 87, 89, 90, 91, 93).

A chart on page 521 illustrates the cross-connections between many papers. This chart illustrates that each of the 99 papers is linked from at least one other paper to as many as 14 other papers, in that they reference each other or contain common references and involve closely related topics or personalities. Thus, papers in diverse fields are interrelated—over periods of as much as three centuries!

How long in the making was this magnum opus? I found no mention in the book but learnt from the author that he indirectly assembled material for almost 10 years but then organized the material and concentrated on it for about one-and-a-half years.

For all this, he used material from numerous museums, institutions, companies and individuals from around the world. Dr Gedeon also added, in a mail to me: 'Comparing advances and putting priorities become increasingly difficult because the fields narrow down and get more specialized while the scientific base of the advances is getting wider.' Gedeon quotes his own papers in 4 chapters (chapters 6, 47, 56, 66) showing why he is best suited to write this book.

Because of the very subject of the book, while physicians are most likely to enjoy the book, even scientists, technologists, inventors and anyone interested in science and history will learn something new from practically every page of the book.

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