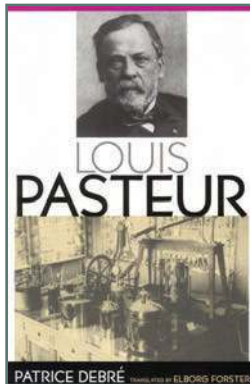


Reviews and reflections



Louis Pasteur

Patrice Debre, translated by Elborg Forster
Johns Hopkins University Press,
Baltimore, Maryland, 1998, 552 pages

Reviewed by Jean D. Gray, M.D.
($\Omega\Lambda$, University of Alberta, 1966)

As the world deals with emerging new infections such as SARS, West Nile Virus, and monkeypox, a biography of the man who recognized that “microbes” cause disease (and are not a consequence of disease) is very timely. Many of the commonsense precautions, procedures, and policies utilized to stem the spread of SARS were actually originally proposed by Louis Pasteur. He was the first to fully appreciate the value of linking basic science research to technology transfer, knowledge translation, and public policy development (to borrow a few of the “buzz words” currently in vogue in university research offices).

This book was published initially in French in 1994 to mark the centenary of Pasteur’s death and, in part, to stem some of the rising tide of criticism of Pasteur’s work (particularly the ethics of his research) raised by American historian Gerald L. Geison. Geison’s own book on Pasteur,¹ a detailed and scholarly review of Pasteur’s original notebooks and manuscripts, became available in 1995, but he had published a number of papers in the previous three decades that had not escaped the attention of the French scientific community, although no one had commented on

them. Hence author Patrice Debre felt a need existed to create an equivalently scholarly review of Pasteur’s papers by a French scientist fully cognizant of the underlying science, the history and politics of the era, and the importance of Pasteur to the French people. And Debre is, in fact, well qualified for the task. He is the head of the biological immunity laboratory at a noted teaching hospital in Paris, and directs a research unit (studying AIDS) associated with the French National Centre for Scientific Research. Debre previously published a biography of French Nobel Prize winner Jacques Monod.

Pasteur emerges from the pages of Debre’s book as a pragmatic, complex man with many facets. A devoted family man, he chose his wife because of her suitability as a scientific mate, rather than for romantic reasons (and Marie Pasteur was his constant helpmate, advisor, and scribe throughout their 46 years of marriage, as well as the mother of his five children). Pasteur was devastated by the loss of his parents and siblings. He drew around him some of the brightest and most capable young minds in French science, demanded total and complete dedication from them, but rarely, if ever, shared any of his scientific thinking with them. They did as they were told, without question, and the master kept all the notes and notebooks himself. Some of Pasteur’s disciples even dared to disagree with him later in his life (e.g., Emile Roux), but had such respect for their mentor that these disagreements neither became public nor influenced the subsequent career development of the disciple.

Pasteur suffered his first stroke at the age of 46, with obvious residual neurological deficits (and experienced several more in subsequent years), but continued to make major scientific contributions until his death in 1895. And he invested almost as much energy in self-promotion as he did in research, recognizing the importance of honors and awards, of connections to important government officials, and of publicity

(sometimes even attempting public research demonstrations that his disciples felt were premature and risky). Pasteur was a tireless French nationalist, refusing honors from Germany because of his anger over the French loss of Alsace and Lorraine during the Franco-German conflict of the 1870s. And he did almost all of his research using funding either from his own pocket, from the sale of the vaccines that he developed, or from public contributions.

In wonderful prose (thanks to the superb translation by Elborg Forster), this book outlines Pasteur’s mediocre career as a student, his early and groundbreaking chemical research on tartaric acid crystals that identified dextro- and levo-rotatory isomers and the existence of racemic solutions, as well as his many and differing early academic appointments. His initial “microbiology” work (a term that he coined) began at the request of the wine industry and identified, for the first time, that yeast is essential to the fermentation process and not just a by-product. Over the next several years, Pasteur developed procedures that revolutionized French wine-making and then turned his attention to beer-making, giving rise to the process now known as “pasteurization.” Ironically, French brewers did not adopt his techniques, but the Jacobsen family in Denmark wisely and avidly embraced the methodology in developing the now-famous Carlsberg brewery.

Pasteur then became interested in the concept of “spontaneous generation,” a theory widely accepted by the intelligentsia of his time. Although it took many decades to quell the debate, some of his most public research occurred as he carefully developed the concepts of asepsis and antisepsis, proving that “microbes” cause disease. This unique concept was developed more fully during his many years of work for the French silk industry in identifying the microorganisms decimating the valuable silkworms. The “germ theory” was finally proven conclusively when Pasteur identified and cultured the

microorganism responsible for anthrax, and subsequently demonstrated that the disease could be prevented by vaccination. His proudest (but also most ethically suspect) moment came when he created and tested a vaccine to prevent rabies that could also be employed to cure the disease.

This book provides not only a clear exposition of the science underlying Pasteur's most significant discoveries (in language accessible even to those without scientific training), but also many anecdotes of the human aspects of the work. For example, the two young men (Joseph Meister and Jean-Baptiste Jupille) who were the first to receive the rabies vaccine subsequently worked as concierges at the Pasteur Institute. Similarly, a discussion of the careers of many of Pasteur's disciples (including Pasteur's nephew, Adrien Loir, as well as Emile Roux, Charles Chamberland, Eli Metchnikoff, Alexandre Yersin, Albert Calmette, and second-generation disciples like Charles Nicolle and Jules Bordet) provides an outline of the history of microbiology and immunology. And the rigorous opposition of the medical profession to Pasteur's concepts reads like a horror story. Hopefully, medicine today is somewhat more open to new ideas!

Debre provides a balanced account of both the man and his science. The warts (so clearly outlined in Geison's book) are obvious, but so are the strengths. If you are interested in reading about a somewhat cold and even paranoid genius who spent a great deal of time assuring his own legacy while revolutionizing contemporary medical and veterinary science, this book will serve both as a fascinating biography and an outline of the history of infectious disease and microbiology.

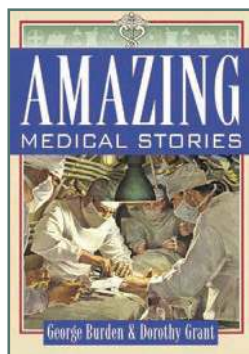
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Amazing Medical Stories

George Burden and Dorothy Grant
Goose Lane Editions, Fredericton, New Brunswick, 2003

Reviewed by T. J. Murray, M.D.,
M.A.C.P. (AQA, Dalhousie University
Faculty of Medicine, 1962)

In recent years there has been an exclusionary confrontation between the long tradition of clinical historians who mostly saw the history of medicine as a series of great men and great events, and the newer generation of Ph.D. historians who came at medical history from a sociological standpoint. Little attention has been given to another group, often more widely read by the physician community and the public: the storytelling writers. They publish in non-peer-reviewed medical magazines, newspapers, and general interest magazines. *Reader's Digest*, women's magazines, and local newspapers have long noted that there is great public interest in medical stories, particularly the gee-whiz tales characterized by overcoming

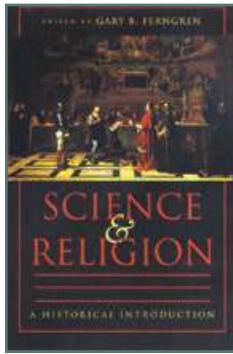
adversity, dramatic discoveries, great events, scientific achievements, and the threat of terrible disease.

In this little volume, George Burden, a rural Nova Scotia family physician, and Dorothy Grant, a nurse/journalist, present 20 medical tales. They don't pretend to be medical historians—they are storytellers. The stories they relate are not all as "amazing" as the title suggests, but they are all interesting, and some are downright fascinating.

Although they all relate to the home province of the authors, Nova Scotia, the tales are of wide interest. They tell of the cerebral death of the ill-fated captain of the French armada who aimed to capture North America; the local physician who discovered kerosene, which gave birth to the petroleum industry; the giantess Anna Swan, standing at a shade under eight feet tall, who toured with P.T. Barnum and delivered the largest baby on record (23 pounds); the medical inventions of Alexander Graham Bell (many carried out at his summer home in the hills of Cape Breton, where he is buried); the medical offspring of Anna Leonowens (*Anna of The King and I*); the physicians and undertakers who responded to the sinking of the Titanic; the physicians who cared for survivors of the devastating Halifax Explosion. The authors do not neglect an array of braggarts and frauds, including Ferdinand Demara, who stole the identity of a maritime doctor, and whose escapades were told in the film *The Great Imposter*. They are captivating tales, told with enthusiasm and verve.

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Science and Religion: A Historical Introduction

Gary B. Ferngren, editor
The Johns Hopkins University Press,
Baltimore, Maryland, 2002

Reviewed by Peter L. Eichman, M.D.
(AQA, Jefferson Medical College,
1947)

For those of us with a scientific background, the relationship between science and religion conjures images of conflict. The paradigm of fact versus faith, scientific method versus revealed truth, springs to mind. In the past, questions have often been fashioned by religionists or scientists, most often reflecting their particular biases. In *Science and Religion*, Gary B. Ferngren, a professor in the History of Science Department at the University of Oregon, in a most ambitious undertaking, has assembled the intellectual product of a group of distinguished scholars to address this issue. They are overwhelmingly from the academic discipline of history, rather than religion or science. Ferngren has edited and collated 30 essays, each dealing with one aspect of the relationship. The essayists are predominantly American, with English, Scottish, Irish, Canadian, and German authors making up the rest. An organizing principle is the unfolding of science since the time of the Greek philosophers, through the era of Islamic science and the Middle Ages, the Renaissance, the Enlightenment, and into the Modern and Postmodern eras.

Within each historical period there is an exploration of the interplay between science and religion.

The work deals primarily with Western Christendom. From its establishment, Christianity underwent enormous changes from the early primitive, persecuted Christian communities, to become the official religion of the Roman Empire. The Latin Church (Roman Catholic) dominated central and western Europe. After the schism with the Eastern Church (Greek Orthodox) came the Protestant Reformation. Thus, not only was science changing drastically over the centuries, but so was western Christianity. This juxtaposition of historical events made for exceeding complexity. Since the source of the analyses is derived from the input of scholars of history, this book provides a level playing field, free from the prejudices of scientists or religionists. This thoughtful dimension of objectivity adds greatly to *Science and Religion's* appeal. All the essays except one are drawn from *The History of Science and Religion in The Western Tradition: An Encyclopedia*, edited by Ferngren.

One of the most significant points made is the characterization of the "conflict thesis" as an oversimplification and distortion of the true relationship between religion and science. Some of the contributors argue for a "complexity thesis" in its stead. In fact, some of the essayists make the point that there was considerable cooperation and support of religious institutions in the pursuit of natural philosophy during significant periods of the Middle Ages and the early Modern period.

Richard J. Blackwell deals with the "Galileo affair" in a special essay. He makes the point that, after the Protestant Reformation, the Roman Catholic Church was extremely sensitive to criticism related to a lack of fidelity in biblical interpretation. The church linked literal biblical exegesis with its counter-reformation stance. Having already endured the schism of

the Eastern (Orthodox) Church in 1054, and seen the split off of northern Europe in the Protestant Reformation, the Latin Church became extremely defensive and overly rigid. Nevertheless, some elements of the church were not in favor of censuring Galileo. Personalities and legalisms played a significant role in his rejection. Any interpretation that that event was typical of the attitude of the church toward science is an oversimplification and virtually a "caricature," in Blackwell's view. Thus, his analysis takes into account circumstances and details that were crucial to the outcome, facts not often mentioned in contemporary accounts.

As science gained ascendancy in secular academic institutions, compromise and reconfiguration became a frequent response of the religious institutions and their theologians. But, in some instances, polarization and unyielding rigidity led to turmoil. On the Continent there was less open conflict. Because of the influence of Immanuel Kant and strong secularity in France, there was a greater sense of separation between theology and natural philosophy. Most French scientists were more indifferent to the issue. But in the British Isles and North America it was otherwise. For example, in many instances scientists educated in geology also took Holy Orders in the Anglican Church. This placed a special burden on them in attempting to reconcile an awareness of the geological age of the Earth with the biblical accounts of Genesis. Nonetheless, in fits and starts, almost all religions of the day evolved some accommodation with emerging scientific truths. The exceptions were sects that relied heavily on a literal interpretation of an inerrant Bible.

By way of contrast, some of the great advances in scientific understanding were used to reinforce the belief in a creator. Isaac Newton, a deeply religious man, appended the *General Scholium* to the second edition of his *Principia* with a memorable quote: "This most beautiful system of sun, comets and

stars could only proceed from the counsel and dominion of an intelligent and powerful Being." Similar views were expressed by Johannes Kepler and Nicolaus Copernicus.

The publication of the *Origin of Species* (1859) by Charles Darwin was a major event for science and religion. Darwin had much trepidation about the reception of his work by his peers. His fears were justified. Though some theologians were sympathetic and saw Darwin's work as a great scientific contribution, many others inserted a divine intelligence as the designer. Darwin did not steadfastly postulate a creator. His belief in Christianity withered away over the years, and his writing and communications reflected this fading of faith. Increasingly, over the years, there was resistance and animosity to his works, expressed by traditional Christians. This was especially the case among evangelicals and fundamentalists, a condition that persists to this day. Not only was there suspicion of science by some religionists, there was also contempt and hostility expressed by some scientists. Academician Andrew Dickson White published *A History of the Warfare of Science with Theology*, and, as cited by essayist David B. Wilson, such polemic did much to exacerbate matters. On the other side, the Creationists pressed on every front to defeat the teachings of Darwinian evolution. The famous Scopes trial is well described by essayist Edward J. Larson, who places this event into the larger context of the conflict. It is of interest to trace the pattern of the gradual incorporation of many aspects of Darwin's ideas into the theology of many Christian churches. Such adoption usually includes the addition of a creator and the process of evolution as a method of creation.

Of the 30 essays presented, about six of them deal with the cosmological sciences, especially the more recent concepts of Albert Einstein and others. In this arena there has been less conflict between science and religion. The abstruse mathematical concepts

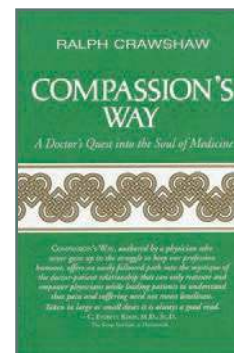
and nonintuitive relationships revealed in relativity and quantum mechanics are difficult to comprehend, and thus serve as barriers to popular dissent. It is of interest that Einstein had a firm conviction in the impersonal, objective aspect of a rational God. As reported in Richard Olson's essay, "theoreticians such as Hawking and Weinberg allude directly to Einstein as their inspiration and persist in arguing that their work is allowing them to see into the mind of God."³⁰⁷ Furthermore, some aspects of quantum mechanics have stimulated old arguments dealing with the possibility of design of the universe by an intelligent agent. These views are reminiscent of those expressed by deists as described by essayist John Henry. Thus, the grand debate continues!

There is a short expository essay by William A. Dembski, a mathematician and philosopher, regarding his idea about Intelligent Design (not necessarily a creator). It is based on examining data for specified complexity, which by inference may be regarded as the best possible explanation. He recapitulates the "designer" arguments from the time of the Greek philosophers to the present. His views on Intelligent Design are the most recent in this tradition and as such have special interest.

The closing essays summarize the Postmodernist movement, including the Deconstructionists, the Social Construction of science and the defense of the objectivity of sciences, the role of women in science, and lastly the relationship between Christian beliefs, ecology, and the environment.

I started as an advocate of the "conflict thesis" and ended favoring the "complexity thesis." This elegant book is filled with facts, diverse viewpoints, sweeping views of history, interesting details, and is generally well written. The editor's introduction is very helpful to the nonhistorian; it explains the competing and changing perspectives used by historians without taking sides. I enjoyed the book very much and recommend it highly.

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Compassion's Way: A Doctor's Quest into the Soul of Medicine

Ralph Crawshaw
Medi-Ed Press, Bloomington, IL, 2002

Reviewed by Robert L. Perlman,
M.D., Ph.D.

Readers of *The Pharos* will already be familiar with Ralph Crawshaw and will know what pleasure a collection of his essays (many of which originally appeared in these pages) will bring. Crawshaw, a psychiatrist in Oregon, cares deeply and writes passionately about patients, medicine, and society. Compassion—identification with and striving to alleviate the suffering of others—is central to Crawshaw's idea of what it means to be a physician and a human being. Suffering is inherent in the human condition. It is exacerbated by isolation and loneliness, and can be relieved only by compassionate relationships.

Unless suffering moves others, generates empathy in a confidant, the sufferer remains locked in an empty world of loneliness . . . Feelings, here-and-now feelings, are points of our emotional compass for navigat-

ing social life. To set those compass bearings, feelings must have a commonality with kindred feelings.^{p104}

The healing role of physicians begins with acknowledging and relating to the suffering of our patients. Acknowledgment of suffering does not distance physicians from patients, but unites us in our common humanity.

Crawshaw's encounters with patients with leprosy remind him of the importance of reaching out to—and touching—people with this disfiguring disease. In "Leprosy, a Disease of the Heart" (1982), he writes:

Diabolically, leprosy preserves the illusion of health by destroying the pain fibers that lead to the brain. Only those fibers that run to the heart remain intact. The pain of leprosy originates in the eye of the beholder and becomes pain for the patient as he is shunned and ostracized, as he loses the humanness he once possessed. The pain of leprosy is not inflicted by the bacillus but by his fellow man.^{p70}

Crawshaw is concerned with the twin problems of impaired physicians and physician suicide. His view of physicians is characterized by what he calls "professional diplopia," admiration for the ideals of the profession, coupled with distress over those who do not live up to those ideals. The statistics he cites are staggering:

The profession loses the equivalent number of a medical school class each year to suicide, while the equivalent of three medical school classes are incapacitated by alcohol and drug dependence.^{p481}

Characteristically, Crawshaw presents the problem in human terms. "A medical school class" evokes images of real people—the reader's own medical school class—and is more compelling than an objective but lifeless number. Despite his distress, he recognizes that suicide,

alcoholism, and drug abuse are signs of suffering, and he urges us to respond compassionately to impaired physicians as suffering human beings. Our challenge is to respond in ways that are respectful of the impaired physicians, as well as protective of their patients and of society.

The suffering of individual physicians is a symptom of trouble in the medical profession. In an engaging parallel between medicine and the calling of knighthood, Crawshaw traces the downfall of knighthood to "the subtle redirection of the knight's dedication from autonomous service into preoccupation with organizational aggrandizement, allegiance to a lord rather than principle."^{p555} Whatever readers may feel about the virtues of knighthood, the warning for medicine is clear.

Crawshaw's compassion is coupled with outrage at a society that isolates people and heightens their suffering. He confesses, "I have become an expert in outrage at the way the richest country in the world fails in its duty to children, worldwide,"^{p443} and goes on to urge that

Every idea espoused, professional association endorsed, clinic supported, yes, every policy our nation proposes, for ourselves and for others across the world, from highway taxes to Star Wars, should answer to an inevitable, elemental question, "What will this do for children?"^{p448}

Crawshaw's essays challenge readers to live up to their ideals, to be the best they can be, to make a difference for their patients and for society. He knows that people can act dishonestly and dishonorably, that "if given the chance most men will reach for the blinders necessary to willingly cooperate with evil."^{p117} This realization leads to his interest in the role of oaths in medicine. Although we may no longer subscribe to the wording of the Hippocratic oath, the purpose of the oath remains valid:

[I]t is a sacred agreement between the student who stands with hand uplifted and the future physician he

or she will be, to protect, not self, nor the profession, but the patient. I commend it highly as an honorable reminder to ourselves of what we can be.^{p117}

Likewise, in a review of William Menninger's book, *A Psychiatrist for a Troubled World*,¹ Crawshaw challenges readers: "If you wish to share the honor [Will Menninger] gave to his profession, take his work to heart and answer with your own effort his question, 'What are you doing here?'"^{p294}

The essays, lectures, and movie and book reviews in *Compassion's Way* were written for diverse audiences over a 30-year period. Inevitably, there are many repetitions, but these only serve to deepen and enrich the author's message. Because Crawshaw writes personally about his own experiences, reading the book gives one the feeling of knowing the author, of becoming his friend. But friendships don't develop all at once; they take time. To give your friendship with Crawshaw time to mature, and to absorb the lessons he is teaching, read and savor his book slowly.

In "Is There a Doctor in the Nation?" (1972), Crawshaw refers to Sir John Richardson, then president of the Royal Society of Medicine, as exemplifying "the kind of men you wished all your medical school teachers had been." This encomium could apply to Crawshaw himself. His compassion for his fellow human beings and his outrage at social injustice represent medicine at its finest.

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