Reviews and reflections

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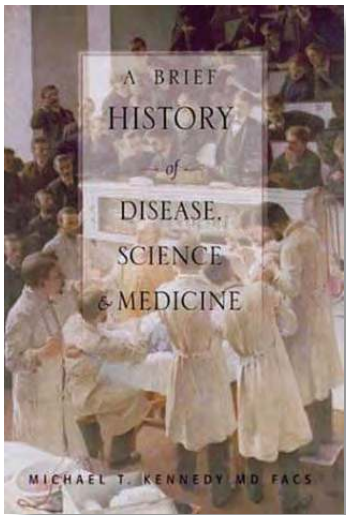

A Brief History of Disease, Science and Medicine: From the Ice Age to the Genome Project

Michael Kennedy
The Writers' Collective. Cranston, Rhode Island, 2003, 562 pages

Reviewed by Jean D. Gray, M.D. (ΑΩΑ, University of Alberta, 1966)

When I was a medical student in the early 1960s, my favorite course was pharmacology. The course was a wonderful amalgam of chemistry, biology, and medical history. The classic textbook of the time was Goodman and Gilman's *The Pharmacologic Basis of Therapeutics*, in which the description of every drug began with a short historical vignette (an element sadly missing from recent editions). So I approached Dr. Kennedy's book with enthusiasm because it was written for an individual such as I was in the 1960s—one who wanted to understand how the discovery was made, almost as much as he or she wanted to understand the applications of that work.

Michael Kennedy is a retired vascular surgeon who now teaches first- and second-year medical students at the University of Southern California in a program called Introduction to Clinical Medicine. He claims not to be a historian, but his avid interest in the topic and, in particular, his passion for surgical history suggest that what he lacks in training he more than makes up for in scholarship and experience. He claims in the foreword that "the first third of the book is what the historians write about in minute detail," whereas "the last two-thirds are about the development of modern medicine." In fact, the first third tends to be a bit dry while the last two-thirds sparkle with energy, largely derived from Dr. Kennedy's personal experience.

The choice of topics for discussion is both traditional and idiosyncratic. The first third (the historian's view) of the book covers topics ranging from the early Ice Age (inferred from the Iceman discovered in the Tyrolean Alps in 1991), through the practice of medicine in Greece and Rome, India and China, Arabia, and the Middle Ages in Europe. Historically accurate, this part of the book tends to be somewhat terse, with little expansion on the bare facts. It is a necessary prelude to the remainder of the material, but it lacks the fascinating anecdotes that fill the last two-thirds and make the history come alive.

Dr. Kennedy's real forte lies in describing relatively complex scientific thinking in clear language. He weaves together the early physics and chemistry discoveries of individuals such as Robert Boyle with the progress in anatomical and physiological research occurring about the same time. Discoveries that are vital to the practice of surgery, including anatomy, respiratory physiology, and especially cardiac function, are described in an accessible and comprehensible fashion. The chapters that focus on surgical developments are new information for me and helped to put the contributions of a variety of individuals, whose names are associated with procedures (e.g. Billroth, Sims, Halsted, and others), into both a temporal sequence and rational perspective. So careful has Dr. Kennedy been in his own research that the reader learns that some techniques are probably incorrectly named, as they were "rediscovered" by those who actually published the procedures that have become associated with their names. (You'll have to read the book to find out the remarkable examples he quotes!)

Dr. Kennedy devotes considerable attention to the work of Florence Nightingale and concludes that not only did she establish nursing as a legitimate profession, but she is also responsible for founding biostatistics and infection control. (This intrigued me enough that I will now pursue a biography of this remarkable woman.)

The last half of the book discusses contemporary history. As Dr. Kennedy and I have practiced for about the same length of time, he as a surgeon and I as an internal medicine specialist, it was fascinating to contrast his view of the developments of the last five to six decades with my own. His discussion of the development of modern surgery and cardiac surgery were eye-openers for me. The story of the founding of the Mayo Clinic is described in some detail, for example. I had no idea that the elder Dr. Mayo had to run a steamboat to make ends meet when he established his first practice in Minnesota, nor that he encouraged his pharmacy clerk, Henry Wellcome, to study chemistry and eventually work for and marry the daughter of a manufacturer named Burroughs! Dr. Kennedy moves with ease into discussions about the discoveries of antimicrobial agents and research on blood, the structure of DNA, the evolution of anesthesia and critical care medicine, the background of transplantation, and even contemporary psychiatry.

I was particularly impressed with the careful attention devoted to assuring that credit is given to those whose work was critical for the subsequent developments in a particular discipline, even though such individuals are often overlooked in the popular press. One example that stands out are the contributions made by Oswald T. Avery, Colin Macleod and Maclyn McCarty, and Rosalind Franklin to the understanding of the importance and structure

of DNA, despite the fact that James D. Watson and Francis Crick receive most, if not all, of the credit for their somewhat opportunistic discovery of the structure of DNA.

The final chapter deals with the economics of medicine. Although this is not a topic that one normally encounters in a typical medical history book, Dr. Kennedy provides an interesting overview of the impact of health care initiatives in both the United States and Europe. He places this discussion within the larger context of the simultaneous medical and surgical developments. He takes a somewhat partisan view of the Canadian health care system with which I would argue, but his description is relatively accurate.

All in all, this book is a good read! I learned a lot, and any medical student who peruses it will benefit. It is particularly valuable for those with a surgical interest; it will remain a valued and oft-used addition to my own personal library.

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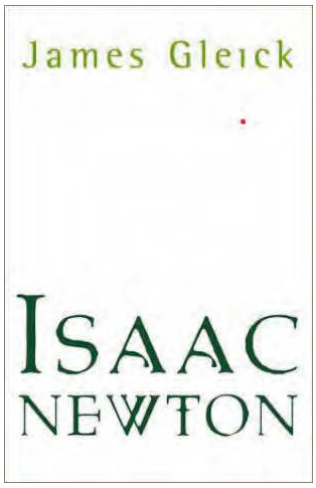
Isaac Newton

James Gleick
Pantheon Books, New York, 2003

Reviewed by Thoru Pederson, Ph.D.



The gold standard biography of Isaac Newton is Richard S. Westfall's *Never at Rest* (Cambridge University Press, 1980). So what else was left for James Gleick? Perhaps little as pure biography, but, as it turns out, much as *style*. Gleick previously wrote an acclaimed biography of physicist Richard Feynman and a didactically powerful book on chaos theory, among others. Perhaps few authors in the world are more uniquely qualified than Gleick to give us a fresh look at Newton. He has done this through a quasi-essay form, writing accurately, frequently punctuated with unique insights.

Gleick gives us all the familiar details. Newton was born on a poor farm, his father died before his son's birth, the sense of isolation and of a lonely childhood, all under a cold mother who would later abandon him. As a child, Newton wrote down: "A little fellow; My poore help; Hee is paile; There is no room for me to sit; In the top of the house—In the bottom of hell; What imployment is he fit for? What is hee good for? . . . I cannot but weepe. I know not what to doe."[p14]

Later, when his mother had remarried into wealth and her son had entered the University of Cambridge, she nonetheless kept his allowance to the bare minimum. Newton thus waited on tables in the dining hall as one of the subsizars, the socially-economically lowest student group at the university.

Gleick tells us of a significant event of Newton's youth: how the boy luckily happened to acquire paper. The first paper mill in England went into production in the late 1500s and in Newton's childhood days (he was born in 1642) paper was prized. Newton's remote stepfather bequeathed him a bound book of 1000 pages little written upon. Later, on his first days as a student at Cambridge, Newton recorded that he had acquired "a notebook of 140 blank pages, three and a half by five and a half inches, with leather covers" and "'a quart bottle and ink to fill it.'"[p21] Paper was Newton's eye and window, the substrate onto which he could record his amazing mind's whirling adventures.

Newton was no precious child; he was not adored by doting parents or stimulated by admiring teachers at crack schools equipped to detect future superstars. As Gleick so movingly conveys, Newton was alone throughout his childhood and had no admiring teacher or mentor in his young years; his only motivation was the exciting path on which his own mind was leading him. This very moving part of the story will cause virtually every reader to stop and remember the one teacher who gave encouragement, often making all the difference.

Would the young Newton have moved faster or achieved more with supportive mentors? We cannot know. But a few years later, at 24, Newton had an explosive burst of creativity, the enormous dimensions of which are almost beyond comprehension. It was as if some extraordinary final burst of brain neurogenesis or synaptogenesis suddenly occurred to complete the maturation of his incredible brain. Gleick describes this year, Newton's "annus mirabilis," with particular insight and clarity. These paragraphs alone are worth the price of the book.

Newton became the Lucasian Professor of Mathematics at Cambridge at the age of 27 (the chair presently held by cosmologist Stephen Hawking). He lectured rarely, usually to a near-empty room. In a footnote, Gleick informs us that, amazingly, "The historical record contains not a single recollection from anyone who heard Newton lecture."[p212]

One of the most erudite and engaging sections of this book is Gleick's presentation of Newton's work in optics, in which the author covers both

the laboratory work (Newton's lens grinding and mirror polishing), and the theoretical aspects. Recognizing that the edges of lenses unavoidably create an unwanted prismatic effect, Newton built a reflecting mirror-based telescope instead, realizing that the mirror would obviate the lens-edge chromatic aberration. Six inches long and capable of 40x magnification, this telescope showed Newton the moons of Jupiter. He showed the design of his telescope to Isaac Barrow (then the Lucasian Professor), who passed it along to the Secretary of the Royal Society, Henry Oldenburg. This was an early but major step in Newton's growing recognition.

Having kept his extensive work under wraps for years, Newton later wrote and submitted his first definitive scientific report. This described a two-prism experiment in which sunlight was diffracted by an initial prism into the then-familiar spectrum of colors. Then an individual ray of red was passed through a second prism, without further diffraction. This established conclusively that the initial ray was what we now call polychromatic and that, once separated, each component ray could not be further subdivided; it was a "pure" optical element. Any doubt about Newton's confidence in these experiments (or as a feature of his personality) is erased by this sentence in his manuscript: "For what I shall tell concerning them is not an Hypothesis but most rigid consequence, not conjectured by barely inferring tis thus because not otherwise . . . but evinced by the mediation of experiments concluding directly & without suspicion of doubt."[p84] Gleick tells us that the editor (the aforementioned Oldenburg) removed this sentence before publication. This is a vignette with which most of us can sympathize, having shared with Newton the benefit of an editor's good judgment on an occasional excessive sentence in a manuscript.

As the story of Newton's adult life in science unfolds, the reader wonders, "How many more things can he possibly be doing?" At such a point, Gleick presents a spellbinding chapter on Newton's work in chemistry and alchemy. Newton was unsurpassed in painstakingly weighing his chemicals on a delicate balance, to a then-amazing accuracy of approximately 15 milligrams (0.0005 ounce). Gleick's description of how alchemy, later discredited, could so passionately command the attention of even Isaac Newton is yet another high point of this superb book. Within only a few years of work in his home-built lab, Newton had produced a private chemical index/handbook of over 100 pages, with more than 5,000 references to earlier works, going back centuries.

Gleick keeps Newton the person before the reader as all the science unfolds. A particularly engaging chapter deals with Newton's religious perspectives. He believed in a god similar to the one Einstein later endorsed—an abstract, unfathomable concept behind the order of the universe. Curiously, however, Newton kept a notebook in which he wrote details of biblical stories and rhetorically posed all sorts of religious questions to himself. He was particularly fascinated with biblical prophecies, which he viewed as metaphorical riddles to be solved. He studied everything he could find on the Temple of Jerusalem, taking its complicated geometric description in the Bible as a mathematical puzzle involving calculation of the cubit unit of measure. In 1675, the University of Cambridge was required to ordain all professors as clergy in the Anglican Church. Newton, then 33, reacted with a voluminous stream of religious scholarship, replete with his analyses of both the Hebrew Bible and the (then new) English translation, then added his argument that the concept of the divine Trinity was a complete hoax. Wisely, King James II released Newton from the ordainment requirement. A few years later, Newton was elected by the University of Cambridge senate to be their representative in Parliament. The lonely, abandoned child had become a very public man.

While Newton is the main story, on every page Gleick luminously engages the reader in a continuing stream of all the key back stories. What was the philosophical view of natural history at Newton's time? Is matter "solid" or something else? Is light particulate or wave-like? How can energy be described? Was Descartes right in his view of a geometric universe? Did Newton privately admire Robert Hooke, even as he publicly ravaged him? Could Newton's *Principia* have enjoyed even its modest initial attention without Edmond Halley's extreme promotion? The author informs us richly on all these stories while developing the primary tale.

Gleick's description of Newton's final days is elegiac. In declining health (he succumbed to a kidney stone), in his last year Newton worked furiously in his study on nothing less than a history of the world. The abandoned, lonely country boy had gone from obscurity to fame in his first 50 years, and lived another 34 as the most famous scientist of his time. He would remain among the most famous of all scientists for another two and a half centuries, and now well beyond that. He had been in constant motion all of his life, exhibiting a degree of dynamic intellectual output beyond comprehension. Combining the titles of Westfall and Gleick, we have *Never at Rest, Isaac Newton*.

Having praised this book, are there any shortcomings? How Newton came to the calculus could have been developed further, even for the intended lay audience. His later periods of emotional impairment and declining health are also presented in a rather sketchy manner. There are a few places where the book's editor missed repetition. A pair of comets is presented on page 114 and then again on page 115. Edmond Halley's admiring ode to the *Principia* is mentioned on page 129 and again on page 141. These are minor editorial lapses, not a flaw in Gleick's brilliant scholarship. Another defect, a production issue, is the disappointing quality

of the figures, some taken from originals of admittedly low contrast, yet with inadequate attention to reproduction quality. Newton's famous memorandum to himself on page 168, in which he encrypted his communication to Leibniz, the independent discover of the calculus, could have been reproduced at better quality and enlargement to allow the reader the sport of trying to decode this historic message.

These quibbles aside, this book is an absolute joy. The extensive notes, usually arcane and beyond any general reader's interest in such works, are every bit as engaging as the text. This book is warmly recommended to all who admire the pursuit of knowledge, and I applaud James Gleick for his unique, engaging style, lying at the interface between history of science and the art of the essay. *Isaac Newton* may not have the technical depth that more so-called "definitive" works claim, but everything important about Newton is here.

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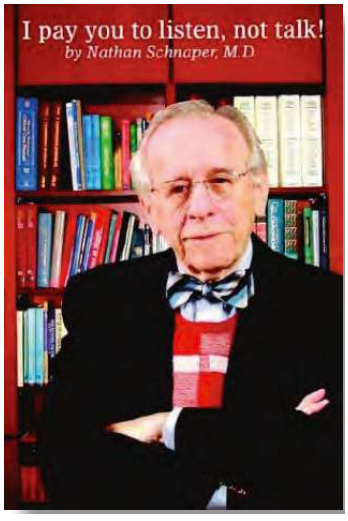
I Pay You to Listen, Not Talk!

Nathan Schnaper, M.D.
Publish America, Baltimore, MD, 2003

Reviewed by Ralph Crawshaw, M.D. (ΑΩΑ, New York University, 1973)

Dr. Schnaper's book offers a pleasant encounter, much as during a long flight when the seat next to you is occupied by a congenial colleague, interesting and willing to pass the time in easy shop talk. The author tells of ideas and experiences based on 40 years of practiced psychiatry, with cancer patients. You listen to the heartbeat of a fine doctor.

Dr. Schnaper's style is bright and clear, vacillating somewhere between narrative, as exemplified by Thomas Mann's tale of the patient in *The Magic Mountain*, and Osler's textbook account of how death completes life. Rather paradoxically, the author's accumulation of stories of suffering and death turns out to be a good thing—a sensitive look at humane care. Unless the reader takes time to close the book and reflect, "chart fatigue" tends to occur. Consequently, the book makes for excellent happenstance reading; it will not afford CME credits, yet it rewards the practitioner with wisdom and renewed interest in patients.



Unlike a pile of charts, Dr. Schnaper's material is loaded with profound clinical lessons about the human side of medicine. Politely, the author begins with an informative description of who he is and how he became a psychiatrist focused on the plight and care of cancer patients. What you come to appreciate are the bits and pieces of your own experience as the author weaves in and out of his own sustained relationships with patients. He dramatizes a personal sense of "doctoring."

Like most things of value, there are some fringe issues that stir the curiosity. In Dr. Schnaper's case, his sense of pride is obvious as he relates being known throughout his bailiwick for a particular style with patients that he cites by quoting a rather earthy Southern resident: "Doctuh Snappuh's leathuh finguh up the ass treatment." I submit that the ultimate form and structure of this approach bears close academic examination prior to suggesting its incorporation into the bedside training of medical students and residents. But, like any consideration of the appropriateness of "death house" humor in medical education, it remains an open question.

There is no mistaking the author's credo: the art of medicine lies in listening. But a careful reading of his words indicates a slight revision might be in order; perhaps the art of medicine lies in artful listening—in a manner that welcomes the patient's words as gifts.

In addition to a better title, the book needs an index and more glue on its binding. As I read on, the pages scattered gracefully as the leaves of fall. The overriding theme of the book is clear. Every person dies in his or her own way, and that is how it should be. Every thoughtful clinician would agree with the author—"Quality of life: It is not yours or mine, it is the patient's decision."

The next time you find yourself wandering about an airport bookstore, searching for something to read on the plane, pick up a copy of *I Pay You to Listen, Not Talk!* It may well turn out to be an excellent traveling companion.

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