

Summer Reading

Summer, a great time for leisure reading, a great time to try something different! Hal Harris, Jeff Kovac, Dick Pagni, and Brian Coppola provide plenty of suggestions to tempt you.

Hal Harris recommends

That's the Way the Cookie Crumbles: 62 All-New Commentaries on the Fascinating Chemistry of Everyday Life by Joe Schwarcz

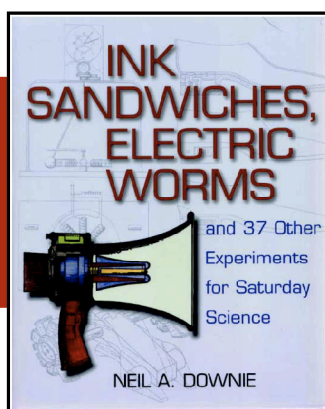
ECW Press: Toronto, 2002. 275 pp. ISBN 1550225200 (paper). \$14.95

Joe Schwarcz's books are irresistible to me because they constitute just the kind of morsels that I look for—the connections between what we teach in chemistry courses and the world in which our students (and we) live. My only surprise in this book was that Schwarcz was able to come up with so many additional high-quality essays. One would think that his previous two compilations *The Genie in the Bottle*, and *Radar, Hula Hoops, and Playful Pigs* would have gotten him to near the bottom of the barrel, but there is no sign of a letup here. This compilation is heavy on health issues (which are the chemistry topics of greatest interest to students, in my experience). It includes 35 essays totaling 163 pages on those subjects. As usual, he brings chemical sense to bogus topics such as the claim that mercury amalgams in dental fillings are a health hazard and the much more complex issues surrounding genetically modified foods. The other three sections of *That's the Way the Cookie Crumbles* are devoted to Everyday Science, Looking Back (history of science), and Poppycock (frauds and pseudo-science).

Ink Sandwiches, Electric Worms, and 37 Other Experiments for Saturday Science by Neil A. Downie

Johns Hopkins University Press: Baltimore, 2003. 352 pp. ISBN 0801874106 (paper). \$18.95; ISBN 0801874092 (cloth). \$45

I am always looking for science/engineering projects that would be fun to do, and to encourage students to try.



Neil Downie's first book, *Vacuum Bazookas, Electric Rainbow Jelly, and 27 Other Experiments for Saturday Science* was recommended in 2002. His latest one has three electrochemical projects, Red-Hot Batteries, Unusually Cool Sunglasses, and the surprising Wet Solar Cell (the earlier one also had only a few that were explicitly chemical). However, there are plenty of other phenomena that are part of the chemistry curriculum, such as Coulter's Bubbles, Glacial Oscillations, and Electronic Elastic. In this last one, it is shown that a rubber band becomes more opaque to the light of a green LED as it is stretched, contrary to what you might expect.

The science in these projects is very nicely explained and the directions are good enough for their completion, although some improvisation and experimentation will be necessary. Of course, that's where much of the fun lies!

The Measure of All Things: The Seven-Year Odyssey and Hidden Error That Transformed the World by Ken Alder

The Free Press (Simon and Schuster): New York, 2002. 432 pp. ISBN 074321675X (cloth). \$27; ISBN 0743216768 (paper). \$15.

Measuring America: How an Untamed Wilderness Shaped the United States and Fulfilled the Promise of Democracy by Andro Linklater

Walker & Co.: New York, 2002. 288 pp. ISBN 0802713963 (cloth). \$26. [See also the reissued version, *Measuring America: How the United States was Shaped by the Greatest Land Sale in History*. Plume: New York, 2003. ISBN 0452284597 (paper). \$15]

In 1792, the French Academy of Sciences appointed two respected scientists to survey a north-south meridian from Dunkirk to Barcelona, for the purpose of determining the size (and shape) of the earth. This was important because it would establish an international basis for the meter, foundation of the metric system. It was expected that the work would be finished in about a year. As it turned out, the expeditions, led by Pierre Francois Andre Méchain and Jean Baptiste Joseph Delambre, outlasted both the Academy and the monarchy. They were carried out amidst the chaos of the French Revolution. Ken Alder has located the lost correspondence between the two expedition leaders, and has discovered the surprising fact that Méchain's guilt over the possibility of a critical error in a measurement near the southern end of the meridian led him to agonizing self-doubt that brought him close to what we would call

a nervous breakdown and almost prevented his completion of the project.

Until I read *Measuring America*, I was only vaguely aware of the importance of surveying to the economic and political history of the United States. Like most students, I had read that George Washington was a surveyor, but I did not know that he earned more income in that occupation than he did as President, or that his estate on the Potomac was a direct result of his work as a surveyor. The ownership of a continent could not become legal until it was clear what was owned, and that task depended on agreement upon a system by which the measurements were to be made. Contemporary with the French meridian survey, Thomas Jefferson devised his own version of a "metric system", based on the length of an iron rod that swings with a one-second period. The system had thoroughly decimal relationships for length, area, volume (one decimal ounce to be the mass of one cubic inch of rainwater, and the inch to be one-tenth of a decimal foot, which was based on the length of the iron rod. Science and technology are not the real focus of *Measuring America* but, as the book makes clear, commerce has always depended on a reliable system of measurement.

The Cognitive Style of PowerPoint by Edward R. Tufte

Graphics Press LLC: Cheshire, CT, 2003. 23 pp. ISBN 0961392150 (paper). \$7

It's about time that somebody should write this essay, and there is no better "somebody" for the job than Edward Tufte, author of thoughtful and beautiful books about the presentation of scientific data. This booklet will resonate if you have been insulted by the paucity of content in the typical PowerPoint presentation. The program has the capability to "automatically" turn informative data tables into meaningless low-resolution graphs not resembling what one would consider standard for scientific presentations, and the layout templates in the program "organize" the slides into a few ideas with a few words, accompanied by sappy clipart. We seem to have acquiesced to this dumbing-down of seminar presentations, and students often get the idea that colored borders, lines of text that "fly in" from off-screen, and a unified "look" can make up for a lack of evidence and integrity. You should see his PowerPoint rendering of the Gettysburg Address!

Jeff Kovac recommends

Universities in the Marketplace: The Commercialization of Higher Education by Derek Bok

Princeton University Press: Princeton, NJ, 2003. 256 pp. ISBN 0691114129. \$22.95

The University in a Corporate Culture by Eric Gould

Yale University Press: New Haven, CT, 2003. 272 pp. ISBN 0300087063. \$35

In *Universities in the Marketplace*, Derek Bok asks the question, "Is everything in the university for sale, if the price is right?"

Although universities have always been short of cash and attempts to raise funds through commercial enterprises go back at least a hundred years, commercialization of education has become a major issue in recent years. Bok surveys the history and problems of commercialization focusing on three major areas: intercollegiate athletics, scientific research, and for-profit educational ventures, particularly those involving the Internet. In the final chapters he offers suggestions on how to balance the benefits and costs of commercialization. This is a fine, and brief, introduction to this important issue.

As a former university president, Bok approaches the question of commercialization from an administrative perspective. Eric Gould, a Professor of English at the University of Denver, approaches the issue as a teacher and scholar concerned about the values and mission of the university. Gould's book is an exploration of how market culture affects the university culture: what and how we teach, the pro-

duction of knowledge, and the role of the liberal arts. Ultimately, Gould makes a case for a pragmatic, democratic undergraduate education based on the liberal arts. While his perspective is that of a humanist, his message is one that scientists should also consider.

Right Hand Left Hand: The Origins of Asymmetry in Brains, Bodies, Atoms and Cultures by Chris McManus

Harvard University Press: Cambridge, MA, 2002. 412 pp. ISBN 0674009533 (cloth). \$27.95; ISBN 0674016130 (paper). \$16.95

I am left-handed, one of that approximately 10% of the population that has to struggle with a right-handed world. I have never understood why the percentage of left-handers was 10%. It is a number that made no sense. If handedness is genetically random, the percentage should be 50. If there is some evolutionary advantage to being right-handed, then the percentage should be nearly zero.

This book gave me an answer to my question based on genetics, as well as a wealth of other information about asymmetry. For example, I learned that the percentage of left-handers has actually increased in the past 100 years from about 3% in 1900 to its current value, a fascinating observation for which McManus proposes a plausible cultural explanation. The topics discussed range from the possible role of the weak interaction in the origin of asymmetry in the natural world to why muppets are left-handed. This book is an intellectual tour de force, a volume to be read, enjoyed, and read again.

Summer Reading

Dick Pagni recommends

What is This Thing Called Science? Third Edition

by Alan F. Chalmers

Hackett Publishing Co. Inc.: Indianapolis, IN, 1999. 200 pp.
 ISBN 0872204537 (cloth). \$37.95; ISBN 0872204529
 (paper). \$14.95

Anything Goes—Origins of the Cult of Scientific Irrationalism, Third Edition by David Stove

Macleay Press: Paddington, Australia, 1998. 218 pp. ISBN
 1876492015. \$32.95 [A U. S. edition published in 2001 by
 Transaction Publishers has the title *Scientific Irrationalism: Origins
 of a Postmodern Cult*. ISBN 0765800632. \$32.95]

Defending Science—Within Reason: Between Scientism and Cynicism by Susan Haack

Prometheus Books, Amherst, NY, 2003. 411 pp. ISBN
 1591021170. \$28

Few scientists have any knowledge or interest in the underpinnings of what they do. Many philosophers, historians, and sociologists, on the other hand, do. Although scientists are busy, I believe it is worth their time to explore the nature of the scientific enterprise. It is a fascinating, often controversial, and important subject, especially in light of the fact that many individuals who study science and scientists have a negative and, in my opinion, erroneous view of what science is. To help you through the maze of the “good, bad, and ugly” of science studies, let me recommend three books.

I would start with *What is This Thing Called Science?*, a short, very readable discussion of the philosophy of science by the Australian Alan Chalmers. In addition to learning about the myriad theories of what science is and how it works, you will discover who the major contributors to this enterprise, especially in the 20th century, are. Popper, Kuhn, Lakatos, and the eccentric Feyerabend, for example, have all proposed grand theories about how science works, all of which have been shown by others to be lacking in some details. Kuhn is arguably the most famous of these people because of his “paradigm shift,” but he strikes me oddly; more of a historian or sociologist interested in how scientists persuade others about their work than in the scientist’s search for truth. Popper is more to my liking, but his idea that falsifiability of a scientific theory is the key to understanding how science progresses, which derives from David Hume’s ideas about induction, strikes me as wrong or at least incomplete. Lakatos, who originally was under the influence of Popper, was more concerned with research programs and novel predictions which are later confirmed by experiment.

Feyerabend equates science with voodoo. He is so concerned with personal freedom that he believes that “anything goes” which is the title of David Stove’s (another Australian) brilliant and devastatingly witty critique of the philosophies

of the above four individuals, all of whom he believes are irrational. Stick with this book, even though on occasion it gets a little “philosophical,” not only for the wit but also for the reasoned analysis. Stove’s beautiful arguments in favor of induction are, to my mind, essentially right. How could one live without inductive reasoning even if it can’t be proven to be an unambiguous path to truth?

My last suggestion is Susan Haack’s *Defending Science—Within Reason*, which is the most balanced appraisal of the scientific enterprise that I have discovered. Unlike the other two books which deal mainly with philosophy, this book also covers many other areas including the relationship of sociology, literature, law, and religion to science. She takes a common sense, middle-of-the-road approach to what science is and demonstrates both that there is no overarching, single theory of science and that the methods scientists use are not appreciably different than those used in many other disciplines. She vividly describes the ideas of the “postmodern” sociologists and rhetoricians who so often find the scientific enterprise without merit. Are these radicals whom Haack calls the new cynics to be believed? Why should anyone believe sociologists who claim that electrons, pulsars, etc. are created by scientists, not discovered?

Haack is a very good writer although a little tedious at times. One gets tired of hearing how fallible scientists are. Haack’s chapter on science and the law is the best in the book (She teaches philosophy and law.) with many examples where science and the law collide. Her chapter on religion and science, on the other hand, is too strident for my taste. She believes science is “pure” and religion is “tainted,” which is hardly the case. One only has to remember the history of the 20th century to know that science isn’t pure. Her idea that religious belief is based on unprovable certainty of the believer is not correct, in my opinion. Zealots, be they theistic or atheistic, may have certainty, the rest of us have doubts. In spite of misgivings I have about one chapter, I think this is a marvelous book, one not to be missed.

Isaac Newton by James Gleick

Pantheon: New York, NY, 2003. 288 pp. ISBN 0375422331
 (cloth). \$22.95; Vintage: New York, 2004. ISBN
 1400032954 (paper). \$13

Isaac Newton is justifiably the most famous scientist and mathematician of all time. He was one of the inventors of the calculus, the most widely used mathematical tool in science, the discoverer of the laws of gravity and motion, the basis of all classical mechanics, the experimenter on the nature of white light, and the inventor of the reflecting telescope. Few know that this secretive, prideful man was also an avid alchemist and seeker of hidden meanings and codes in the Bible, an odd undertaking for someone we would call today a Unitarian. He had lots of acquaintances but never seemed to have an intimate relationship with any of them. He sur-

prisingly gave up science and his professorship at Cambridge to become Warden of the Mint of England, which made him a very wealthy man for the last 30 years of his life.

If what I have said above has piqued your interest, but you are not interested in the minutia of detailed scholarship found in a large tome, I recommend you read James Gleick's *Isaac Newton*, a short, non-mathematical and insightful biography. This is an excellent choice for summer reading.

Einstein's Clocks, Poincaré's Maps: Empires of Time by Peter Galison

W. W. Norton: New York, NY, 2003. 256 pp. ISBN 0393020010. \$23.95

Even though time is hard to define and its root causes unknown, it controls our lives in so many ways. We are so bathed in it that we take it for granted. Very few of us worry about the measurement of time. This has not always been so. In 19th century Europe and the United States serious and pragmatic consideration was given to standardizing and synchronizing time.

Peter Galison has written an engrossing account of this endeavor when ideas about absolute and relative time were in the air. This is also the story of two great men who made profound contributions to our present understanding of time. Albert Einstein (1879–1955), considered by many the greatest of all theoretical physicists, is an icon of science. Henri Poincaré (1854–1912), certainly less known to the general public than Einstein, made major contributions to mathematics and mathematical physics. In addition to publishing hundred of technical papers, both applied and basic, he wrote

extensively—and well—for the general public and made contributions to the philosophy of science and mathematics which are admired to this day.

The measurement of time has played a significant role in mapping the world. Knowing exact time differences between two places was crucial in determining longitude, for example. Solving the longitude problem was key in the development of accurate time pieces. One had to have an arbitrary standard longitude to map the world and compartmentalize the globe into time zones. By international agreement in 1884, the Prime Meridian was placed at Greenwich, England, to the chagrin of the French. The French including Poincaré, who was a senior member of the French Bureau of Longitude, attempted to decimalize the 24-hour day (and circle), but this failed, just as it did during the turbulent French Revolution.

As most everyone knows, Einstein worked in the Swiss patent office during his early adulthood. This was not a starry-eyed job, but a very practical one. His job was to make certain that the potentially patentable devices actually worked. Many of these often complicated machines involved the measurement of time. It is not hard to believe that Einstein's practical involvement with time influenced his more abstract thoughts on the subject.

In 1905 Einstein published his Special Theory of Relativity where time became the fourth dimension and where simultaneous events for two observers may not be so to a third. In 1906 Poincaré published a similar theory starting from a different set of premises. Who should get credit for the theory? Read Galison's entertaining book and decide for yourself.

Summer Reading

Brian Coppola recommends

Teaching as a Subversive Activity by Neil Postman and Charles Weingartner

Delta: New York, 1971. 240 pp. ISBN 0385290098 (paper). \$15

Does this sound familiar? "The inquiry method is not designed to do better what older environments try to do. It works you over in entirely different ways. It activates different senses, attitudes, and perceptions; it generates a different, bolder, and more potent kind of intelligence. Thus, it will cause teachers and their tests, and their grading systems, and their curriculum to change. It will cause college admissions requirements to change. It will cause everything to change."

Or this? "...the meaning-maker metaphor puts the student at the center of the learning process. It makes both possible and acceptable a plurality of meanings, for the environment does not exist only to impose standardized meanings but rather to help students improve their unique meaning-making capabilities. And this is the basis of the process of learning how to learn, how to deal with the otherwise 'meaningless,' how to cope with change that requires new meanings to be made."

When you think about how so many parts of our culture shifted on their axes in 1969, it is hardly surprising to find these words contained in the now-reprinted classic that launched the public career of Neil Postman. Postman, who died last year, challenged the world of education to think differently from its long traditions of memorization and standardized testing. This book represents one of the first prominent voices in a conversation that is familiar to us, today, and it is worth the time to read the original arguments.

Fully 10 years prior to the time that Lockhead and Clement visited this intellectual territory in *Cognitive Process Instruction*, Postman promoted a model of a subversive teacher, that is, one who understood about learning, and who actively redesigned instruction to focus on "process" of learning over and above—or at least in addition to—the "products" of learning. In his later work, Postman, a devotee of Marshall McLuhan, argued against automatically adopting progressive (he would say "progressive") social and cultural changes into education, particularly technology. Where is the proof, he would ask, that information and its organization ever changed people's minds?

Reading, or re-reading, the freshness of Postman and Weingartner's 1969 arguments could be depressing because we are still re-inventing and re-publishing the tenets they described so well. But it is not so bad: the ideas are good, and there is some satisfaction in understanding that these notions, literally considered subversive in 1969, have a kind of mainstream appeal today. The premise is still a good one, too: teaching is a subversive activity, and sitting this title on your shelf and having to look at those words every now and then is an inexpensive and potentially useful course of therapy.

Why Things Break: Understanding the World by the Way it Comes Apart by Mark E. Eberhart

Harmony: New York, 2003. 272 pp. ISBN 1400047609. \$24

He draws pictures with words.

Eberhart is a professor of chemistry and geochemistry at the Colorado School of Mines, and he knows lots of interesting stories about why things break. In this semi-autobiographical romp, Eberhart mixes personal anecdotes and good humor with what seems like hundreds of explanations for the everyday phenomena of things falling apart.

As a child growing up in the 1960s, after hearing so much about the terrible explosions that accompany the splitting of atoms, Eberhart began to worry about what was going on as his kitchen knife sliced through butter. Might he accidentally blow up the neighborhood?

Starting with the Stone and Bronze Ages, and moving right up through the *Titanic*, WW II ships that broke in half, and the *Challenger* disaster, Eberhart illustrates (without pictures!) and explains some basic tenets of materials science in one fascinating context after another. And all the while, we have the author's kind presence making science a human enterprise.

The author has a distinctive talent for crossing the usual fault line... fissure, cleft or crack... that separates the lay audience from atoms and molecules, and these are easily stories that can find their way into your classrooms.

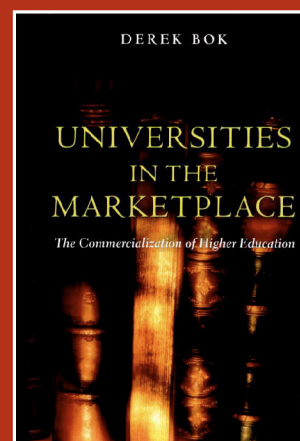
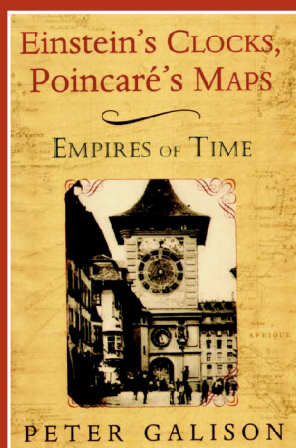
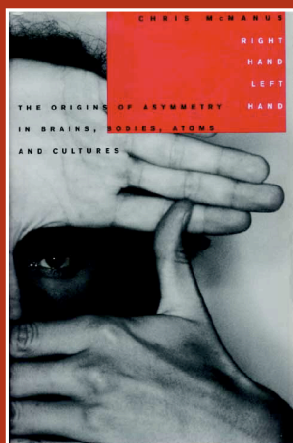
Defending Diversity: Affirmative Action at the University of Michigan by Patricia Gurin, Jeffrey S. Lehman, and Earl Lewis, with Eric L. Dey, Gerald Gurin, and Sylvia Hurtado

University of Michigan Press: Ann Arbor, 2004. 168 pp. ISBN 0472113070. \$24.95

As a faculty member at the University of Michigan, it is difficult to resist editorializing the events that eventually linked our campus to the Supreme Court. One of the things we all learned quite early in the process was how to separate the discussion about the benefits of creating diverse learning environments from the selection mechanisms (such as affirmative action) used during an admissions process.

The authors, all UM colleagues, were important players in constructing the case for a broad and beneficial value from creating a diverse setting for student learning. Pat Gurin, a professor emerita of psychology, presents her review of the primary social science research that was argued in the court. Jeff Lehman, who is a former dean of the law school, reviews the historical development of diversity as a factor in shaping higher education. And Earl Lewis, a historian and recently-departed dean of our graduate school, argues a strong and compelling "critical juncture in history" perspective for the inevitability of bringing these issues forward into a large socio-cultural forum.

This book is not the last word on this topic, but it surely represents the best we have to say at this moment.



Cerebus the Aardvark, Volumes 1-16

Aardvark-Vanaheim, Inc.: Kitchener,
Ontario, Canada.

Volume 1: Cerebus by Dave Sim.
1987. ISBN 0919359086 (paper).
\$25

Volume 2: High Society by Dave
Sim. 1986. ISBN 0919359078
(paper). \$25

**Volume 3: Church & State,
Volume 1** by Dave Sim. 1987. ISBN
0919359094 (paper). \$30

**Volume 4: Church & State,
Volume 2** by Dave Sim & Gerhard.
1988. ISBN 0919359116 (paper).
\$30

Volume 5: Jaka's Story by Dave
Sim and Gerhard. 1990. ISBN
0919359124 (paper). \$35

Volume 6: Melmoth by Dave Sim
and Gerhard. 1991. ISBN
0919359108 (paper). \$17

Volume 7: Flight by Dave Sim and
Gerhard. 1993. ISBN 0919359132
(paper). \$17

Volume 8: Women by Dave Sim
and Gerhard. 1994. ISBN
0919359140 (paper). \$17

Volume 9: Reads by Dave Sim and
Gerhard. 1995. ISBN 0919359159
(paper). \$17

Volume 10: Minds by Dave Sim
and Gerhard. 1996.
ISBN 0919359167 (paper). \$17

Volume 11: Guys by Dave Sim and
Gerhard. 1997. ISBN 0919359175
(paper). \$20

Volume 12: Rick's Story by Dave
Sim and Gerhard. 1998. ISBN
0919359183 (paper). \$17

Volume 13: Going Home by Dave
Sim and Gerhard. 2000. ISBN
0919359191 (paper). \$25

Volume 14: Form & Void by Dave
Sim and Gerhard. 2001. ISBN
0919359205 (paper). \$25

Volume 15: Latter Days by Dave
Sim and Gerhard. 2003. ISBN
0919359221 (paper). \$30

Volume 16: The Last Day by
Dave Sim and Gerhard. 2004. ISBN
0919359213 (paper) \$20

In one of my other reviews, I have
played with the provocative phrase,
"drawing with words..."

Dave Sim, from whom I borrow
this phrase, is a creative genius who has
both drawn with words and written with
pictures for over 25 years. In March
2004, Sim's 6000 page narrative, told in
pictures and words, once a month and
20 pages at a time since December
1978, ended. The title character, who
began as a parody of the "sword and sor-
cerer" genre (think: Conan), is ulti-
mately carried forward by the forces of
a world he does not understand. He is
propelled (buffeted and manipulated)
from barbarian to prime minister to
Pope. He ascends, and may or may not
speak with divine beings. He owns a bar;
he returns to the good earth; and he fi-
nally becomes the figurehead of his own
religious movement. He (not a he, but
a hermaphrodite, actually) is constantly
caught in big conflicts: man and
woman, church and state, faith and re-
ligion. Parodies of popular and literary
culture paint a rich backdrop of char-
acters: Oscar Wilde, the Marx Brothers,
F. Scott Fitzgerald, the Rolling Stones,
Woody Allen, Ernest Hemingway, and
the Three Stooges, to name a meager

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Brian Coppola recommends

few. And comics... always the comics: allusions and situations related to Marvel and DC heroes abound. The 6000 pages, available as 300 issues or collected into 16 volumes, by the way, is one long comic book story.

Unfortunately, here in the United States, at least, an epic and literary story told in a comic book format is a really difficult sell. Aren't they for kids? Even the Pulitzer Prize winning *Maus*, which is an extraordinary tale of the Holocaust told in two volumes, is a cult piece appreciated by a narrow audience. Cerebus, the title character, is a stylized aardvark (one of three) living in a world of humans. The "funny animal" genre (think: Pogo) has long been a place for biting satire. Sim is a master—perhaps the modern master—of this art form. Why an aardvark? Well, according to Sim, we are all funny animals living in a world of humans, anyway... so why not?

Dave Sim wrote, drew, and self-published this work from beginning to end. Sim's artistic partner, Gerhard, joined him at issue 65, and provided a keen draftsman's hand to background and details while Sim continued to draw the characters. I cannot say much more about the series without taking up pages and pages, so I will end with these.

This series is not for the timid. The allusions are deep and unexplained: you get them or you do not. Fortunately, I

get most of them, so I do not know what it would be like to not get them.

If you are still curious, I recommend that you begin with Volume 2 (called *High Society*), where the barbarian aardvark gets civilized, and in doing so gets swept up in a wonderful paroxysm of politics and power.

Let's see: think of this as honoring the total synthesis of some incredibly complex natural product, if for no other reason than the loud cheer that goes up: they did it, they really did it!

It is a summer reading list, right?

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