

Summer Reading

Ah, summer approaches! Perhaps you will find some time for leisure reading. With this hope in mind, here are a few suggestions that Jeff Kovac, our Book & Media Reviews Editor, has assembled with the help of Dick Pagni, Hal Harris, and Brian Coppola.

Dick Pagni recommends

Galileo's Daughter, by Dava Sobel
Walker and Company: New York, 1999.
ISBN 0140280553. \$14.00.

Dava Sobel has surpassed her previous best selling *Longitude* with this unusual book. It is the biography of one of the founders of modern science, Galileo Galilei, seen through letters to him from his illegitimate, cloistered daughter and a history of the events and times that shaped the great scientist. Those fascinating people and times seem so strange to us now. What will future generations think of us and our times?

The Sun in the Church,
by J. L. Heilbron

Harvard University Press: Cambridge, MA,
1999. ISBN 0674854330. \$35.00.

Unlike Christmas, Easter does not occur on a common day each year. Its date depends on the sun and the moon. As the positions of these bodies were not known accurately for the first 1500 years of the Christian church, Easter was celebrated on the wrong Sunday on many occasions. To rectify this deficiency,

scientists converted several large cathedrals of Europe into solar observatories. This is the remarkable story of how these individuals at the dawn of the modern age accomplished this. These people were smart and ingenious, and they learned how to make accurate measurements. By the way, Galileo makes several appearances in this book.

The Advent of the Algorithm,
by David Berlinski

Harcourt: New York, 2000.
ISBN 015003386. \$28.00.

This is not a book about computer programs. It is instead a history of the ideas that led to the development of the algorithm. If you are interested in, or would like to learn more about, the development of modern mathematical thought and logic and their paradoxes and the often eccentric, quirky individuals who brought this about, I recommend that you read this book. Berlinski is a very fine writer. He knows how to present this often difficult material in a lucid, engaging, and entertaining manner.

Forbidden Knowledge: From Prometheus to Pornography,
by Roger Shattuck

St. Martin's Press: New York, 1996.
ISBN 031246027. \$14.00.

Are there things that humans should not know? Are there avenues of inquiry that humans shouldn't pursue? These are the difficult questions that the award winning emeritus professor of French and Comparative Literature, Roger Shattuck, tackles eloquently in this book. He does this in two ways. First, he examines these questions in the light of several prominent authors and their works and characters, including Milton and Adam and Eve. It is, of course, in *Genesis* where the issue of forbidden knowledge is first raised. Second, he examines several case histories, including one on the Marquis de Sade and pornography. Scientists will particularly enjoy the chapter on science and technology and the perplexing issues they raise. One only has to think of Robert Oppenheimer and Edward Teller and their profoundly differing views of the "bomb" to appreciate this.

Jeff Kovac recommends

The Game of Life: College Sports and Educational Values, by James L. Shulman and William G. Bowen

Princeton University Press: Princeton, NJ, 2001.
ISBN 069107075X. \$27.95.

In this disturbing book, Shulman and Bowen document the increasing influence of intercollegiate athletics on higher education, not just at the high-profile Division I universities such as Michigan and Tennessee, but also at Ivy League universities and at selective liberal arts colleges. Using extensive data from 30 institutions for the students—athletes and non-athletes—who entered college in the fall semesters of 1951, 1976, and 1989, Shulman and Bowen show that the gap between sport and education has been growing. College athletes in the early 1950s were statistically no different from

other students; athletes in the late 1980s were quite different—less academically well qualified and with quite different career goals. Athletes also tend to underperform in the classroom. As a result, the growth of college athletics is having profound effects on the culture of higher education in this country. This is a problem that should concern all of us.

Owning the Future, by Seth Shulman

Houghton Mifflin: New York, 1999. ISBN 0395841755. \$25.00.

University scientists are being encouraged to work on practical problems and to patent and commercialize their discoveries, either by starting their own companies or by developing relationships with established industry. Huge amounts of information are being placed into privately owned

Hal Harris recommends • • • • •

Voodoo Science: The Road from Foolishness to Fraud, by Robert L. Park

Oxford University Press: New York, 2000.
ISBN 0195135156. \$25.00.

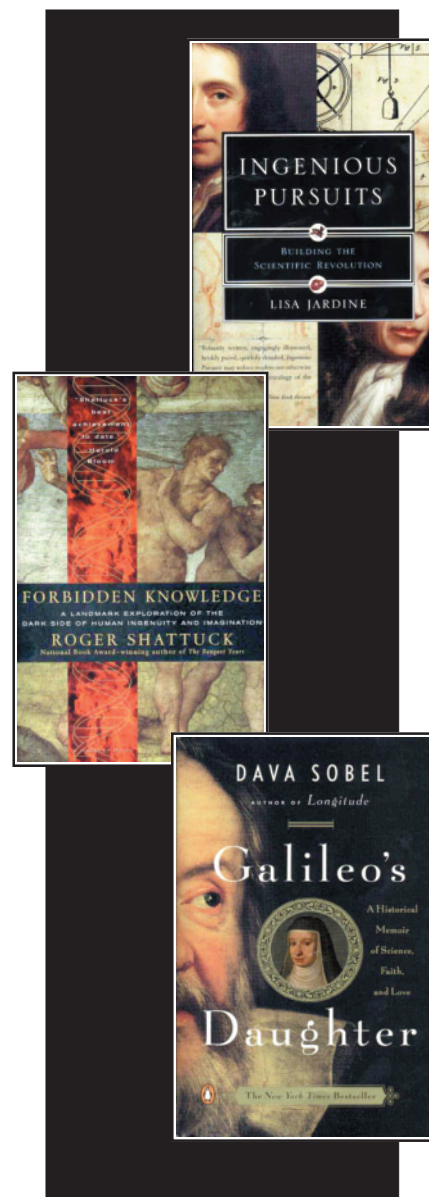
Though we have never met, I feel that I know Robert Park, Director of the Washington Office of the American Physical Society, because of his weekly "What's New" column (see <http://www.aps.org/WN>). *Voodoo Science* distills his thoughts on some of the most important recent examples of pathological science in the news and public life. In these ten chapters, he discusses Congress's perpetual credulity for claims of perpetual motion and "free energy" (not the kind I teach!), the low-frequency EMF scare, the politics of manned space exploration, Roswell and aliens, homeopathy, and Deepak Chopra, among others. While Park sympathizes with some whose lack of technical knowledge and understanding of the methods of science makes them susceptible to charlatans, he also has a good theory about how well-meaning amateurs like Joe Newman get caught up in the process that leads from an experiment in the garage to fraudulent claims of infinite energy. A constant throughout these episodes is the irresponsible

behavior of the news media when reporting controversial issues with a scientific or technical component. CBS News was doing it again recently, when they devoted a full *48 Hours* program to psychic detectives, ESP, communication with the dead, and similar nonsense. Hardly a skeptical viewpoint was mentioned (as usual).

Ingenious Pursuits: Building the Scientific Revolution, by Lisa Jardine

Doubleday: New York, 1999.
Cloth: ISBN 0385493258. \$35.00.
Paper: ISBN 0385720017 \$16.00.

A year or so ago, I greatly enjoyed reading another book by Lisa Jardine, *Worldly Goods: A New History of the Renaissance*. When I heard about *Ingenious Pursuits*, I bought it from a book club and read it right away. My regret is that I didn't buy the hardcover version, because this is a book that I will keep for a long time. Lisa Jardine is professor of English at Queen Mary and Westfield College, University of London, but she is also a daughter of Jacob Bronowski, and she displays the independence of thought and the ability to view history in creative ways that characterized her late father.



electronic data bases. The current buzz word among librarians is the digital library. All of these developments are being hailed as progress. This book, however, sounds a cautionary note. What are the consequences of the privatization of knowledge, both for scholars and for society? Shulman tells some stories from the legal battlefronts where deep and disturbing fights are taking place over rights to knowledge. This is an important and sobering book.

Science in Public: Communication, Culture, and Credibility, by Jane Gregory and Steve Miller

Perseus: New York, 1998. ISBN 7382-0357-2. \$18.00.

What does the general public need to understand about science? What responsibilities do scientists have to communicate? These are important questions in our technological

world. Gregory and Miller provide a comprehensive look at the complex problems involved in effective science communication. Drawing on history, social science, communications research, and detailed case studies, the authors lay out a detailed protocol for science communication to facilitate a better public understanding of contemporary science—an important goal.

The Undergrowth of Science: Delusion, Self-deception and Human Frailty, by Walter Gratzer

Oxford University Press: New York, 2000. ISBN 0198507070. \$27.50.

In this lively book Gratzer recounts a large number of incidents of science gone astray, including the well-known

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Hal Harris recommends

In *Ingenious Pursuits*, she follows the early history of Western science (mostly 17th and 18th centuries) by focusing on the work of the inventors who created the equipment essential to the progress of science. Many of these names are already familiar: Hooke and Huygens, for example. I, for one, was unaware of the extent of the scientific interests of the famous architect Christopher Wren until I read this book. I also didn't know that many of the early experiments with vacuum pumps involved the asphyxiation of small animals, often for entertainment. Wren and Robert Boyle, famous to chemists for his contribution to gas laws, were involved in gruesome experiments to discover how respiration works by vivisectioning large numbers of dogs.

Exploring the Art and Science of Stopping Time: The Life and Work of Harold E. Edgerton,
CD-ROM, by James Sheldon

MIT Press: Cambridge, MA, 1999.
ISBN 0262550318. \$37.95.

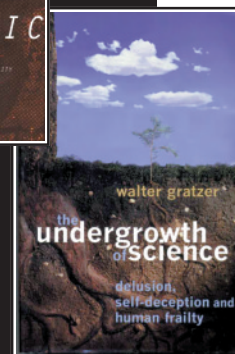
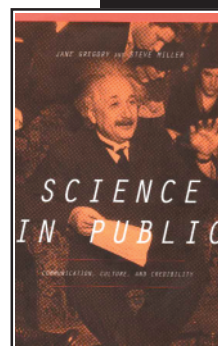
This is the first time that I have recommended something for summer reading other than a book; you will have to take your laptop to the beach for this one. This particular subject is, however, better treated in digital format than on

paper (although several good books on Edgerton and his work are also available). When the object is to describe a visual technique such as the use of stroboscopic, stop-action, or high-speed photography, there is no substitute for an animated medium. This CD contains not only hundreds of examples of Edgerton's still photos, but also many movie clips that convey the result of his work and the engaging personality of this popular and gifted teacher. I'm sure that you have seen many of these photos and films before, but they are sure a lot of fun. The interface is a bit corny and navigation is not always intuitive, but you can just keep clicking around until something happens.

Before It's Too Late: Report of the National Commission on Mathematics and Science Teaching for the 21st Century (Glenn Commission Report)

U.S. Department of Education: Washington, DC, October 2000. Free. Available on the Web at <http://www.ed.gov/americaaccounts/glenn/toc.html>.

This report is potentially very important. If Washington reads the Commission findings and recommendations and funds the five-billion-dollar programs it recommends, science and



mathematics education in the United States could get the "shot in the arm" that it so desperately requires. *A Nation at Risk* was published in 1983. Since then, we've had NSTA's SS&C, AAAS's Project 2061, and the National Science Education Standards. TIMSS has unmistakably shown how far behind other nations our students are, and states have developed their own standards and are mandating assessments. But the key to real progress in science education, as this report shows, is teachers. We need more. We need better-educated teachers. The investment recommended in this report could begin to make a difference.

Jeff Kovac recommends

stories of cold fusion and polywater, but also some lesser known incidents (at least to me) from the biological sciences and medicine. He also discusses the influence of politics on science in both the Soviet Union and Nazi Germany as well as cultural influences as exemplified by the eugenics movement.

In the Shadow of the Bomb: Bethe, Oppenheimer, and the Moral Responsibility of the Scientist,
by S. S. Schweber

Princeton University Press: Princeton, NJ, 2000.
ISBN 0691049890. \$24.95.

Robert Oppenheimer and Hans Bethe were two of the most important "public scientists" in the years after the

Second World War. Both were involved the decisions concerning the development and use of nuclear weapons and both were challenged by the hysterical politics of the Cold War. Schweber uses these two men as his vehicle for exploring the difficult moral questions of the relationship between science and society in the postwar world. Though raised in different countries, the two had similar educations that emphasized character development, Oppenheimer at the famous Ethical Culture School in New York and Bethe in the classical German gymnasium where the concept of "bildung" was the governing philosophy. Their responses to the difficult ethical questions that confronted them in the postwar world were quite different, however, leading to a fascinating comparative study.

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Brian P. Coppola recommends

Learning from Change, by Deborah DeZure

Stylus Publishing: Sterling, VA, 2000. ISBN 1579220010. \$59.95.

Change: The Magazine of Higher Learning has been a major conduit of thinking about higher education for 30 years. Commemorating this landmark anniversary, Deborah DeZure, together with a panel of distinguished contributing editors, has selected seminal articles published in *Change* from its inception in 1969 through 1999.

This book is a rich resource that has already found its way into higher education bibliographies. DeZure frames the text with opening and closing remarks that provide noteworthy reflection on the changes in higher education over this significant period of time. Teaching and learning, she concludes, has become more "democratized", providing access and lowering barriers across nearly every line imaginable. In each of 13 sections, encompassing 160 articles, one of the expert contributing editors comments on the state of the art of his or her topic and then supports these theses with readings drawn from *Change*. The topics include Promoting a Culture of Teaching and Learning (Pat Hutchings), Philosophy, Psychology, and Methods of Teaching (Wilbert McKeachie), and Evaluating College Teaching (Peter Seldin). The text, taken as a whole, presents a strong case that changes in higher education have taken place and that the vectors point toward a world where teaching and learning takes its appropriate and scholarly place within the work of faculty. The times, according to DeZure and her associates, they are a-changin'.

Snow Crystal Physics, by Kenneth G. Libbrecht

<http://www.cco.caltech.edu/~atomic/snowcrystals/> or

<http://www.snowcrystals.net>

Kenneth G. Libbrecht is professor of physics at California Institute of Technology. He maintains a beautiful Web site, *Snow Crystal Physics*. Quoting from his mission statement:

This project is aimed at understanding pattern formation in nonlinear non-equilibrium systems, specifically a case study of the growth of snow crystals. Pictures (and movies) of growing snow crystals can be found at the Snow Crystal page, and some of our research can be found at Snow Crystal Physics.



Ken Libbrecht, Caltech

Topics include a trip through the history of snowflake study and its connection to crystallography, a look at the process behind the natural formation of snowflakes, and a detailed account of the synthetic or "designer" snow crystals that Libbrecht and his students grow (including instructions on how to grow your own). The site is a visual and scientific winter wonderland.

CookWise, by Shirley O. Corriher

William Morrow and Company: New York, 1997.

ISBN 0688102298. \$28.50.

Shirley O. Corriher is a food sleuth. She also did research in biochemistry, and it shows. Corriher takes the reader through the how and why of ingredients and techniques, optimizing the results in a way that will strike the scientist in you with awesome familiarity. I used to be insulted by that old chestnut about how similar chemistry is to cooking, but no longer after reading this great book. There are more than 250 recipes here that cover the usual gamut from appetizers to main dishes and desserts.

When I first opened this book at the bookstore, I found myself lingering over the section on chemical leaveners (p 73):

Baking powders can be fast-acting, slow-acting, or double-acting, depending on the acid or acids they contain. Fast-acting baking powders contain an acidic ingredient that dissolves fairly rapidly in cold water (like

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cream of tartar, tartaric acid, or monocalcium phosphate monohydrate). If the baking powder has an acidic ingredient that does not dissolve easily (like sodium aluminum sulfate or anhydrous monocalcium phosphate), it does not start producing gas until the batter is hot; it is a slow-acting baking powder).

And later, in the section on baking cookies, we get an advanced lesson (p 129):

Sometimes you will see a cookie recipe with 3/4 teaspoon or more of baking soda. These larger amounts of baking soda do not contribute to leavening but are there for better browning. Baked goods made with an acidic batter set faster but do not brown well. Baking soda neutralizes the acidity so the cookies will brown better.

In many gratifying places, Corriher leaves in the details from her (laboratory) notebook, letting us know how changing the stoichiometry (proportions) of the starting materials (ingredients) affects the product (food). Bon Appetit!

Intercollegiate Athletics and the American University, by James J. Duderstadt

University of Michigan Press: Ann Arbor, MI, 2000.
ISBN 0472111566. \$29.95.

"It is time we de-coupled [collegiate] football and basket-

ball from the world of big-time show business ... and went about reconnecting these programs to the educational mission of the university." And if that cannot be accomplished, then "it might be better ... to phase them out." Former University of Michigan President Jim Duderstadt has thrown down the gauntlet, speaking both as a past high executive at (arguably) one of the most sports-crazy institutions in the country and as a former collegiate athlete. And if these programs cannot be phased out, then Duderstadt argues for truth: to spin these activities off from the university as the independent and commercial entertainment industries that they actually represent. Duderstadt's insider perspective, covering his 30 years at Michigan as a faculty member, then provost, then president, and now as faculty member again, are compelling and convincing. Some have argued that he should have taken these stands while he was president and that he is now sitting too comfortably outside the system. He would respond (and he does so in the text) that any president would have an impossible time making or influencing such change while inside the system. Extreme pressure to maintain the status quo closes in from every direction: students, alums, media, politicians, athletes, and so on. If you have ever been curious about the tension that surely must exist between collegiate athletics and the academic mission of our institutions of higher education, and how radical solutions might take form, then *Intercollegiate Athletics and the American University* should catch your attention.