HISTORY OF SCIENCE

The Nobel Scientists: A Biographical Encyclopedia. By George Thomas Kurian. 2002. Prometheus Books (ISBN 1-57392-927-1). 420 pp. Hardback.

Usually one seeks out a reference book like Kurian's **The Nobel Scientists** for a very specific purpose, and this one will serve specific purposes admirably. It lists all 466 Laureates chronologically within the three categories of the prize (chemistry, physics, and physiology and medicine), and includes very concise biographical information about each scientist. This includes nationality, birth and death, education and career institutions, life's work, publications, and bibliography.

However, it's the kind of book I probably wouldn't have picked up without a specific reason, and certainly wouldn't have considered using as a classroom tool. Having read through a great deal of it, I am happy to report that, for a reference book, it really is uncommonly interesting. Although most of the biographical information consists of names, dates, initials, and abbreviations, the "Life's Work" paragraphs are extremely well written. As I searched out some of the familiar biologists in the index, I was impressed with the simplicity of these paragraphs. They are, as the preface claims, written in simple, understandable language as frequently as possible, but without a trace of "dumbing down." These paragraphs are a great way to get a sense of what was happening in a particular field during a certain era, and most are written so that a high school student can grasp the important information contained within.

Good science teachers tend to include a fair amount of history in their curriculum as recommended by the *National Science Education Standards*. With that in mind, there are multiple ways to put this book to use in the classroom: As a stand-alone reference for a timeline of the important scientific discoveries of a certain period in history; as a starting point for a skit or report about a particular scientist; as a way to investigate the difficulties women have faced in science (of 466 laureates, only 9 are women); as a way to discover that, in fact, many famous scientists (and most Nobel Laureates) have *not* been American.

Yes, this is a reference book. However, it is an exceptionally interesting and well-constructed one, and if the science teacher/science enthusiast is not careful, he/she will find herself immersed in the excitement of, say, the early 1920s, somewhere between Einstein's revolutionary equation and Meyerhof and Hill's groundbreaking work in muscle physiology.

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ENVIRONMENTAL SCIENCE

Outlooks. Readings for Environmental Literacy (Second Edition). Edited by Michael L. McKinney. 2004. Jones and Bartlett Publishers (ISBN 0-7637-3280-X). 156 pp. Paperback. $21.95.

This anthology of recent articles encompasses diverse viewpoints on environmental issues and problems. With few exceptions, the 36 articles appeared in general interest publications (e.g., *TIME, Christian Science Monitor, Sierra, The Economist*) for a lay audience, and hence are easily comprehended. The articles are arranged in five major sections: The Environment and Humans; The Environment of Life on Planet Earth; Resource Use and Management; Dealing with Environmental Degradation; and Environmental Issues: Social Aspects and Solutions. Each article is prefaced by a brief overview (e.g., for the article "Rich vs. Poor," the overview begins with: "As the World Summit on Sustainable Development of 2002 drew to a close, critics of the Summit commenced. Critics argued that reproductive policy and population woes were not mentioned."). Each article is followed by three quite easy questions that focus on the main points (e.g., for the article on arsenic and the environment, one of the questions is, "What is an arsenometer?").

The timeliness of the articles (none earlier than 2000), the scope of issues addressed, and their accessibility to the non-scientist provide a current snapshot of the human environment–its present as well as projected future. As to be expected, some articles are "doom and gloom." For example, "Silent Spring: A Sequel?" reports that, as a result of warming trends, state birds such as the Baltimore oriole (Maryland) and black-capped chickadee (Massachusetts) will have vanished from their official residences. Other articles are forward looking and/or problem solving. For example, "Needed: A National Center for Biological Invasions" notes: "Introduced organisms are the second greatest danger, after habitat destruction, of species endangerment and extinction worldwide." Yet other articles "tell it like it is." "Ill Winds: The Chemical Plant Next Door" notes: "In May of 1999, Borden Chemical and Plastics did to Illopolis what it did to Geismar, Louisiana: It released 500 pounds of vinyl chloride gas. An 'accidental' release, they said." Perhaps only one article is in the skeptical mode ("News on the Environment Isn't Always Bad" notes: "As an example of nationwide improvement in air quality, experts noted that Los Angeles this year enjoyed the third

consecutive summer without a single smog alert."). In total, there is a good balance and much to provoke on all sides of the issues.

If there is a failing, it is in not identifying author credentials and/or affiliations. Such information would add credibility (or not) to the stance assumed by the writer.

Although the editor did not provide pedagogical suggestions for using the readings, they could well serve as a stimulus to group or class discussions or as a starting point for a research paper. Some possible topics for discussion sessions and/or research papers: What are the major pollution problems and their sources in our city/region/state? What are the effects on human health of the pollution problems in our city/region/state? Are pollution controls working–if yes, how? And if not, why not? What are the major causes of global warming? What are possible short-term and long-term effects of global warming? What can I/we do to reduce pollution in our city/region/state? Are international treaties effective in reducing global warming? Given short-term and long-term projections on population growth in countries such as India and China, what are the implications for resources such as water and food? What are the impacts of urban sprawl on such resources as water?

The appropriate users would be high school seniors (or honors students) and freshmen/sophomore college students. It is not sufficiently sophisticated in content and quantity for upper division college students.

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ANATOMY AND PHYSIOLOGY

Prime Mover: A Natural History of Muscle. By Steven Vogel. 2001. W.W. Norton & Co. (ISBN 0-393-32463-X). 370 pp. Paperback $15.95.

The first chapters, 1-5, are concerned with the structure and function of muscle. Throughout these chapters the author discusses the scientific investigation of muscle, both human and animal. He includes contributions of Aristotle, Vesalius, Huxley, Hill, Szent-Gyorgyi, and others. He also includes information that students love such as: "At no time does a muscle contain much ATP. Running at top speed on ATP alone, a human would run out, having converted it all to ADP, in two to four seconds" (p. 17). These chapters cover the sacromere, the neuromuscular junction, and contraction as well as what affects the strength of contraction. "We vary the strength of contraction of a muscle in two ways: by adjusting the rate at which impulses arrive and by changing the number of motor units active at any time" (p. 23). This section also has several diagrams that facilitate understanding of the presentation of material.

The second section of the book, chapters 6-9, investigates the way humans have manipulated their strength by developing tools. This part goes into detail on the physics of the work done through the use of tools. It also touches on the history of the development of a wide range of tools. For example, he describes tools in the following sentence: "Hand tools, the present concern, work as handy extensions of our bodies. They apply the force and power of our muscles to the tasks we do" (p. 127). "The exact amplification of most of these hand tools depends on how you use them. To crack an especially hard nut, you grasp the handles of the nutcracker as far out as you can and put the nut as close to the pivot as it will go" (p. 129). He addresses the use of the hammer, the development of the screw, axe, and hand saws, as well as the ergonomics of tools in general. The breadth of review of tools in this section is impressive.

The last part of the book examines the use of animals to accomplish tasks that would be beyond the strength of human muscle design, or that would facilitate work done by humans. It also includes a short section on weapons, as well as meat as food. There are many interesting examples showing the development and physics of weapons created over time. The author also details the development of animals for work in this section, including why, historically, some animals became more common for tasks than others. "Second comes plowing force and power. The horse pulls about as hard as the ox, but it can move 50 percent faster while pulling, and it can reportedly work several hours longer each day" (p. 150).

As an Anatomy and Physiology instructor, the first part of this book has the most personally applicable material. However, as I was reading this book, I felt strongly that a physics instructor would get more out of the examples that Steven Vogel uses in the analogies to motors and engines. Luckily, I didn't need to understand his examples in order to identify with what he was trying to explain; I had other hooks I could draw on for comprehension. Overall, I would rate this book with 2-3 frogs due to its preponderance of physics explanations and examples (many with comparison to engines or some mechanical device that would not be familiar to all students).

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