

**Fundamentals of Air Pollution.** Third Edition. Richard W. Boubel, Donald L. Fox, D. Bruce Turner and Arthur C. Stern. 574 pp. Academic Press, Inc., 1994. \$69.95.

This text is an easy-to-read book about six major aspects of air pollution, including "The Elements of Air Pollution," "The Effects of Air Pollution," "Measurement and Monitoring of Air Pollution," "Meteorology of Air Pollution," "Regulatory Control of Air Pollution" and "Engineering Control of Air Pollution." The three major authors are recognized leaders in their respective fields, who have combined their skills to update and develop this edition of this book. Overall, the book provides an effective overview of the air-pollution problem. However, like many books authored in this fashion, *Fundamentals of Air Pollution* suffers from an uneven treatment of subject matter between chapters and major subheadings.

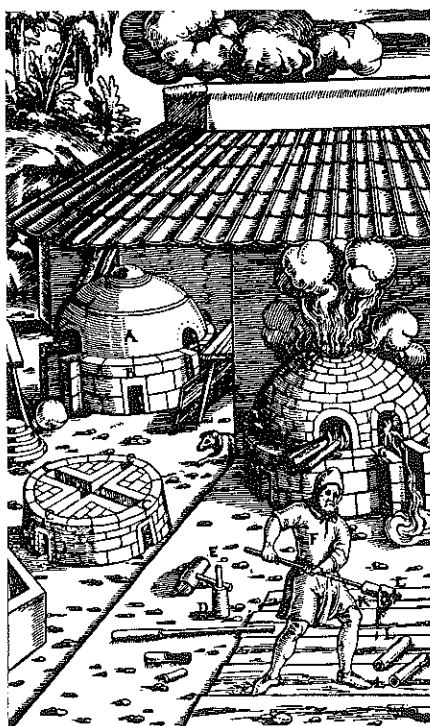
The six chapters comprising Part I cover the history of air pollution and the basic concepts involved with air pollution, such as its sources, scales and definitions, which will be used throughout the rest of the book. The chapters are written in logical sequence and properly prepare the reader for the remainder of the text. The questions at the end of each chapter are disappointing, however, both because they are qualitative rather than quantitative in nature and because they are not up to the level of difficulty expected in a college textbook. Regrettably, this is true for all of the chapters.

Part II of the book, describes how airborne pollutants damage materials, vegetation, animals and humans. This section devotes five chapters to different effects. Although the discussions are very thorough, the reader may consider it too much of a good thing. Instructors using the text in their courses may choose to be judicious in their reading assignments.

Part III deals with the measurement and monitoring of air pollutants. Among the topics covered are ambient-air sampling, air-pollution monitoring and ambient-air-pollutants measurement. The chapter on atmospheric chemistry included in this part of the book does not do justice to the complexity and importance of the reactivity, kinetics, photochemistry and products of chemicals in the atmosphere.

Part IV of the book is perhaps its strongest section. Topics covered include atmospheric physics, dispersion modeling and air-pollution climatology. Part V of this book deals with the rather dry subject of regulatory control of air pollution. It is a good overview of a very complicated process.

The final portion of the book, Part VI, discusses the engineering control of air pollution. Once again this chapter pro-

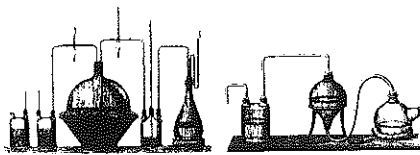


Lead smelting furnace, 16th century. From *Fundamentals of Air Pollution*.

vides a good overview of the subject, but it does not draw on recent sources to illustrate the state-of-the-art technology now offered in air-pollution control. This problem of older sources seems to pervade all the chapters in this new edition.

This book could serve as an excellent textbook for an undergraduate curriculum dealing with environmental issues. Any book attempting to discuss such a broad subject in a small space is bound to have trouble conveying the whole story of air pollution. This book is an outstanding place to begin learning about any number of air-pollution topics and how these topics relate to other problems in air pollution.—*Viney P. Aneja, Marine, Earth and Atmospheric Sciences, North Carolina State University*

## Science History, Philosophy and Policy



**World Trade since 1431: Geography, Technology, and Capitalism.** Peter J. Hugill. 376 pp. The John Hopkins University Press, 1993. \$59.95.

This sweeping synthesis argues that technological breakthroughs fueled the

major political and economic transformations in the Western world since 1431. A geographer by discipline, Peter J. Hugill establishes three major phases for this almost six-century-long period. The first, called the eotechnic, which had begun as early as 800, was dominated by agriculture, when "growing the three 'Fs'—food, fiber and fuel—prevailed on the economic scene. The second, called the paleotechnic phase, circa 1700–1880, was initially commercial and then industrial. Coal became readily available to smelt iron, wind and water power gave way to steam power for transport and machines, and iron and steel replaced wood for construction. Finally, the third, termed the neotechnic, which began circa 1880, saw transport revolutionized by the use of electricity and petroleum, and the introduction of cars, trucks, buses, bicycles, electrically propelled trolleys and, finally, commercial aviation. The development of synthetic materials with a heavy dependence on nonrenewable resources also characterized this phase.

After the close of the early eotechnic phase, circa 1430, Portugal prevailed as the first European (world?) hegemon, because it was the first to embrace new technologies to expand into Africa, Asia and the Atlantic. Because seaborne transport was so crucial for hegemony in this epoch, tiny Portugal gave way to Holland in the later eotechnic for technological reasons: The Dutch built larger, cheaper merchant ships, called *fluyts*, and developed a sophisticated banking and credit system.

Near the beginning of the 18th century, England replaced Holland as hegemon during the paleotechnic phase, first as a commercial and then as industrial leader. Victory over the Dutch in the wars of the late 17th century, the use of coal, the development of the steam engine, the formation of the factory system, capital availability and more efficient agricultural production all combined to give Britain its dominant position.

At the beginning of the neotechnic age in the late 19th century, first Germany and then the United States slowly mounted a challenge to England. As electricity and petroleum replaced coal as power sources, England could not maintain its dominant position. Innovative use of these new energy sources allowed the United States to develop new internal markets and to improve communications. So, too, the early adoption of improvement in air transport enabled the United States to prevail as world hegemon.

Because innovations in transportation—on the sea first, then on land and finally in the air—are so crucial to Hugill's thesis, he devotes three chapters to a descriptive narrative of changes in ship transportation, the increasing flexibility in modes of land travel in the 19th and early 20th century