new and complex relations with government agencies and university scientists. It did not, however, result in systematic efforts to exploit science. The pharmaceutical industry had grown dependent on scientists for their contributions to production and quality control but continued to rely on Europe, especially Germany, for ideas and innovative products. World War I, the second critical event in Liebenau's story, decisively changed this. Lucrative government contracts supplied the capital necessary to underwrite a wave of mergers. More important, disruptions in commerce caused severe shortages of the comparatively sophisticated drugs monopolized by German producers: barbital, benzocaine, and salvarsan, among others. To duplicate these products of the synthetic art called for more than simply the information available in German patents; it was also necessary to expand and intensify research efforts. Created during the war, this research capacity was turned to work on product development after the armistice. The ethical drug industry thus had come to approximate its modern form.

Neither business nor medical historians will find major surprises in this story. Liebenau does correct those who see the modern pharmaceutical industry as a product of the antibiotic era, but we are accustomed to thinking of 19th-century public health services as important innovators, of the movement of persons as crucial to the transfer of technology and science, of regulatory legislation as a tool wielded by big firms against small, and of World War I as a watershed in the development of industrial research in America. *Medical Science and Medical Industry* then is not original in big ways, but rather in small, especially in the author's skillful use of new detail, much of it drawn from corporate archives, to illustrate these familiar and important themes. It thereby adds significantly to our knowledge of the history of one of the first science-based industries.

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Changes in Sea Level

Sea Surface Studies. A Global View. R. J. N. DEVOY, Ed. Croom Helm, Beckenham, U.K., and Methuen, New York, 1987. xiv, 649 pp., illus. $95.

The specter of a worldwide rise in sea level in the next century, perhaps in excess of 1 meter, makes the topic of sea-level change attention-catching. This volume, despite its opaque title, provides a much-needed report of our state of knowledge of sea-level changes ranging from the effect of continental drifting on continental freeboard to expected annual rise due to the greenhouse effect. As a contribution to the International Geological Correlation Program's Project 200, editor R. J. N. Devoy has assembled an excellent array of 19 review papers by 15 authors from 8 countries.

The book is divided into five sections that treat the mechanisms of sea-level change, the evidence for change, current knowledge of sea-level history, coastal processes and management, and some economic implications of sea-level changes.

The following themes weave through the book: sea-level changes are caused by an extremely complex mixture of simultaneously occurring phenomena; the record of simultaneous sea-level changes varies widely from continent to continent; the study of near-future sea-level rise needs more input from paleo–sea-level studies; coastal response to sea-level change is perhaps as complicated as the cause of sea-level change; and our understanding of all these phenomena is rudimentary.

Eustatic sea-level changes may be caused by glaciation (with accompanying glacial and water isostasy), tectono-eustasy resulting from plate motions, geoidal eustasy due to changes in gravity related to changing distributions of crustal mass, and dynamic sea-surface changes related to climate. Nils-Axel Mörner argues that geoidal eustasy causes changes with sufficient speed to be responsible for the lack of a global eustatic sea-level curve for the Quaternary. Devoy, however, notes that the geoid explanation of rapid sea-level change is "not necessarily supported unreservedly" by other workers. The practice of averaging sea-level trends from different continents and the general applicability of Peter Vails's "Exxon" sea-level curves come under fire from several authors owing, they say, to the override of local factors on the global sea-level change signal. John Chappell argues that "there seems to be little to be gained by averaging sea-level records on different continents, except for late-Quaternary changes and changes on the scale of continental drifting (200 million years)." Ian Shennan discusses the assumptions behind projections of near-future sea-level rise, especially the widely used Environmental Protection Agency model, and the need for more input from past sea-level-change history. By way of example he notes the evidence from the northwest coast of England of a catastrophic (7-meter) sea-level rise over a 200-year period as a result of the breakup of the Laurentide ice sheet. The melting or breakup of the portion of the West Antarctic ice sheet positioned over the Antarctic continental shelf will determine sea levels in the next century or two. There is some indication that this ice mass, like the Laurentide of 7500 years ago, may today be in a condition of threshold instability. J. Orford sorts out prevailing views on the response of different types of coast to sea-level rise and emphasizes the danger of using simple models such as the Bruun rule to predict shoreline change.

In one of the more innovative papers, R. W. G. Carter presents an overview of societal responses to sea-level change. He compares the "loose" U.S. system of pleading with people to evacuate before a storm with the rigid, disciplined approach of the Dutch. In contrast, citizens of Bangladesh may willingly suffer through a cyclone in anticipation of post-storm government aid.

The extensive bibliography, averaging 80 entries per paper, together with the useful though brief index, makes this an excellent entry into the sea-level literature. No one even peripherally concerned with sea-level changes should be without access to this book.

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Interstellar Physics

Interstellar Processes. DAVID J. HOLLENBACH and HARLEY A. THRONSON, JR., Eds. Reidel, Dordrecht, 1987 (U.S. distributor, Kluwer, Norwell, MA). xiv, 807 pp., illus. $139. Astrophysics and Space Science Library, vol. 134. From a symposium, Grand Teton National Park, WY, July 1986.

Physical Processes in Interstellar Clouds. G. E. MORFILL and M. SCHOLER, Eds. Reidel, Dordrecht, 1987 (U.S. distributor, Kluwer, Norwell, MA). x, 554 pp., illus. $92. NATO Advanced Science Institutes Series C, vol. 210. From an institute, Irsee, F.R.G., Aug. 1986.

The interstellar medium is the breeding ground of stars. It is also their burial ground, most of the stellar mass and a modest but significant fraction of the nuclear energy release being returned into the interstellar medium. The ecology of interstellar matter involves continuous recycling and chemical evolution and is affected by both local environmental events and global processes. Although interstellar clouds are more diffuse than a laboratory vacuum, the vastness of interstellar space provides appreciable column densities of gas and dust whose absorption and emission properties are studied over wavelengths spanning the gamma ray and the radio spectral regions.