could have been done with the information available to 1976. The storms are still too complex for us. The data, though they are sometimes spotty, are too plentiful to be fully assimilated, and the instrumental constraints are too severe. It would be foolhardy to say that these difficulties will soon be overcome (that's what some believed in the '50's), and yet it may not be too much to hope that the means of measuring all the parameters have become available, in no small part thanks to this experiment. Then, the tough imagination may emerge to go after the important data and with them to construct a quantitative taxonomy and mechanism of the major storm types.

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Geophysical Fluid Dynamics

Atmosphere-Ocean Dynamics. ADRIAN E. GILL. Academic Press, New York, 1982. xviii, 664 pp., illus. Cloth, $60; paper, $30. International Geophysics Series, vol. 30.

The economic and social impacts of the floods, droughts, and severe winters of the past decade have generated unprecedented demands for the development of useful weather and climate forecasts on monthly and seasonal time scales. Unfortunately, rapid mixing by transient weather systems appears to cause the atmosphere to lose all memory of its initial state after only a few weeks, suggesting that prospects for seasonal forecasting may be bleak.

Recently, however, meteorologists and oceanographers have found evidence suggesting that a small portion of the observed interannual climate variability in the Northern Hemisphere is associated with surface temperature anomalies in the equatorial Pacific, which are themselves excited by atmospheric motions. Apparently the oceans, with their huge thermal inertia, provide a means by which the climate system can retain some memory on seasonal and interannual time scales. Developing an understanding of the complex coupling between the atmosphere and oceans suggested by such observations will require the close collaboration of dynamic meteorologists and oceanographers. Such efforts appear to represent the only reasonable hope for climate forecasting.

Despite the scientific importance of treating the atmosphere and oceans as a coupled system, until recently no books presenting a unified treatment of atmosphere-ocean dynamics have been available. This is perhaps surprising since, contrary to superficial appearances, the dynamical processes governing the motions in the two fluids are virtually identical. The atmosphere and oceans are merely special cases of so-called "geophysical" fluids in which density stratification and rotation control the dominant motions.

The first attempt at a unified treatment of this subject was Joseph Pedlosky's *Geophysical Fluid Dynamics* (Springer-Verlag, 1979). Pedlosky's book provides an excellent systematic introduction to the theory of geophysical fluid dynamics, but with only minimal reference to observations. Gill's *Atmosphere-Ocean Dynamics*, by contrast, offers a wealth of information on observed phenomena in the atmosphere and the oceans, while still providing a carefully developed introduction to the fundamental dynamical theory, albeit with less rigor than Pedlosky's book.

The first several chapters of Gill's book cover the basic thermodynamics and fluid dynamics needed for analysis of atmospheric and oceanic motions. In subsequent chapters these concepts are further developed and applied to the study of forced motions, motions influenced by lateral boundaries, equatorial motions, midlatitude motions, and instabilities. Throughout the book Gill emphasizes the ubiquitous nature of waves in the atmosphere and oceans. Many novel linear wave solutions are presented to elucidate observed phenomena. Special emphasis is given to the equatorial regions, where, as indicated above, the large-scale interactions between the atmosphere and oceans may play a special role in climate variability.

The treatment is at a level suitable for introductory graduate courses in dynamic meteorology and dynamic oceanography. But the book will probably find its widest use as a reference work for professional meteorologists and oceanographers. The breadth of coverage, the strong emphasis on observational aspects, the comprehensive bibliography of recent literature, and the catalogue of data sources provided all make this book a treasure for the active researcher. The author's efforts to highlight critical historical developments in the subject are also to be applauded.

Atmosphere-Ocean Dynamics, with its clear focus on the application of dynamical principles to observed motion systems in the atmosphere and the oceans, should become the standard reference for oceanographers who wish to learn about the atmosphere and meteorologists who wish to learn about the oceans. The dynamics of these two geophysical fluids can no longer be treated in isolation. In providing a unified treatment, Gill has performed a vital service for the community.

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Social Medicine: Early Efforts

Death Is a Social Disease. Public Health and Political Economy in Early Industrial France. WILLIAM COLEMAN. University of Wisconsin Press, Madison, 1982. xxii, 324 pp., illus. $35. Wisconsin Publications in the History of Science and Medicine, no. 1.

"I have adopted throughout this work a subdued tone, one that is best suited, I believe, to portraying the central drama of this story, namely, the persistence of the discord between what one science, sociomedical investigation, presumed to teach and the action that another science, political economy, refused to countenance." In his introduction the author thus describes his approach and his organizing idea. His subject in the broadest sense is the relation between the empirical studies a society undertook of itself and its dominant values or ideology. At issue is research on health and human welfare undertaken in France during the years 1820 to 1850, years in which France experienced the first unsettling effects of the industrial revolution. Although Louis René Villermé, the leading sociomedical investigator in France in these decades, provides its focus, this book is not a biography; it is, rather, a case study of the emergence of the empirical study of the well-being of people in industrial society.

Coleman ably discusses both the nature of Villermé's research and the social and scientific notions he brought to it. The first third of the text considers the circumstances surrounding the work of this ardent investigator. Both the process and the economic and social consequences of early French industrialization are considered, as is the intellectual heritage of contemporaries who sought to investigate the human cost of such change. In the realm of ideas we are introduced to the skeptical and empirical tradition of Paris clinical medicine and to the legacy of French sensationalist psy-