

gether with an emphasis on how modern telescopes work and how powerful and exciting modern telescopes can be. All four give the essential parameters of the telescope, so this book should be useful to potential users and interpreters of data alike. My feeling after reading the book was one of enthusiasm for new and innovative projects. This book should be in the library of the technologist, the working astronomer, and the historian alike. Although it certainly does not describe all the new ventures in astronomy, it gives an excellent insight into today's potential for astronomical research through concrete examples. I recommend the book highly.

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U.S. Earthquake Observatories: Recommendations for a New National Network

National Academy Press, Washington, D.C., xvii + 122 pp., 1980.

Reviewed by Alan S. Ryall

This publication summarizes recommendations of the NAS/NRC Panel on National, Regional, and Local Seismograph Networks, chaired by B. A. Bolt. The report's nine chapters and seven appendices deal with recommendations to upgrade and reorganize observational seismology in the United States by integrating all seismic stations in the country into a United States Seismograph System (USSS), by constructing a National Digital Seismograph Network (NDSN), and by establishing new lines of authority and responsibility to ensure that development of the new national seismic system proceeds along lines prescribed by the panel.

Of the 14 recommendations in this report, 4 are likely to be the subject of continuing dialogue between seismologists involved in network studies of earthquakes and representatives of federal agencies that support those studies: (1) The concept of a USSS should be adopted to integrate all aspects of observational seismology in the country. The U.S. Geological Survey (USGS) Branch of Global Seismology would have responsibility for the integration and overview of the USSS, and funding agencies would be asked to consider national support for seismological research in the light of an overall USSS structure. (2) Construction of the NDSN should proceed immediately, with a minimum of 36 broadband, digital stations to be built within the first 4 years of the program. The NDSN would be designed for specific detection/location thresholds (magnitude about 3.0 in the central United States, 3.5 in the east, and 3.25 in California (in the report magnitudes are given as ML, but calculations were based on mb; as a result the ML thresholds would be about 0.5 unit higher than stated in the report)). The panel concludes that the NDSN is 'vitaly necessary to bring observatory instrumentation up to available technology in order to provide a first-rate data base for seismology research.' (3) As the USSS develops, a 'cer-

tain number of seismological research centers' should be designated as Regional Centers, serving as repositories of data from the NDSN and from local and regional networks. Seven existing university laboratories are listed as likely candidates for the new centers. (4) A 'Working Group on the USSS,' under the aegis of the NAS/NRC Committee on Seismology, should be created to guide the development of the USSS and NDSN. This working group would include representatives from the USGS, seismologists involved with regional networks and university research groups, and scientists from federal agencies concerned with earthquake monitoring and with data management and distribution.

Other recommendations of the report deal with addition of ocean bottom seismic systems to the USSS, improvement of existing regional networks, archiving and distribution of data from the NDSN and regional networks by the Environmental Data and Information Services of NOAA, optimization of future instrument development, integration of strong motion systems into the USSS, and construction of a portable research array.

Some of the panel's recommendations—particularly those that give high priority to maintaining and upgrading the regional networks, continuing the excellent work of the U.S. Geological Survey Albuquerque Laboratory, and establishing a special working group on instrumentation—should be well received by those involved in network seismology. However, other recommendations could, if implemented, lead to a significant shift in the U.S. observational seismology program, and as a result will be viewed as controversial. For example, under current budgetary limitations, construction of the NDSN would probably have to be supported by reprogramming funds now earmarked for other parts of the national effort in seismology, and the cost of this program for the first 4 years could well be far in excess of the panel's \$15 million estimate.

Many seismologists will also be disturbed by the recommended leap to digital networks, before pilot studies have demonstrated how the new systems can best be used to improve research in areas cited in the report ('earthquake-hazard evaluation, critical-facility location, and work on earthquake prediction in all parts of the country'). A more gradual approach would be to use existing digital networks in California, Nevada, and the eastern United States as testbed systems to evaluate techniques for improving regional monitoring by the addition of high-quality digital data.

In another area likely to generate vigorous discussion within government circles, the panel has recommended substantial modifications to the way in which regional networks are currently operated, funded, and managed. Implementation of these recommendations would transfer much of the responsibility for program guidance from federal agencies and peer review panels to a working group of the National Academy, and authority for managing the national program of observational seismology would also shift within the USGS.

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The Hurricane and Its Impact

R. H. Simpson and H. Riehl, Louisiana State University Press, Baton Rouge, Louisiana, xxvii + 398 pp., 1981.

Reviewed by Robert W. Burpee

Recent population increases in coastal regions of the tropics and subtropics have greatly enhanced man's vulnerability to tropical cyclones. Thus, this book on hurricanes by Robert H. Simpson and Herbert Riehl, two of the leading contributors to hurricane research during the last 35 years, comes along when people of differing backgrounds want to learn more about hurricanes. In the 20 years since Dunn and Miller published *Atlantic Hurricanes*, technical advances in weather satellites, computer modeling and data processing, and research aircraft have substantially increased the tropical meteorologist's understanding of hurricane structure and dynamics. During this same time, field experiments have led to detailed knowledge of the atmospheric environment within which tropical cyclones are initiated. The authors have attempted to describe many aspects of hurricanes for readers that range from students of meteorology to those concerned with planning for natural hazards in the coastal zone. Because Simpson and Riehl have addressed such a wide audience, many readers with a knowledge of atmospheric science will find that the book is overly descriptive, while readers without some background in physics will find it is too technical.

The chapters on the destructive aspects of hurricanes and the steps that can be taken to avoid or minimize potential risks will be of interest to many readers. Simpson and Riehl have built upon and significantly extended the material presented by Dunn and Miller. Their discussions of storm surge and surface winds clearly describe the major findings of recent observations. The threat assessment section summarizes simple statistical procedures for estimating the hurricane threat, illustrates the methods with examples for the central Texas coast, and discusses some limitations of the techniques. An appendix contains a summary of the Saffir/Simpson damage potential scale that is used by the National Weather Service to describe the wind and storm surge strength of landfalling hurricanes.

Hurricane enthusiasts will find the anecdotes about memorable storms, such as the 1938 New England hurricane, Hazel (1954), Camille (1969), and Anita (1977), particularly enjoyable. They will also gain valuable insights about problems facing hurricane forecasters as hurricanes approach land areas in the first scenario of chapter 14.

The weakest part of the book is the chapter on the origin of hurricanes where discussions of balanced flow, thermal wind, and conservation of vorticity are unnecessarily complicated for a book aimed at readers with differing backgrounds. Unfortunately, there are also a few erroneous statements here, such as the one on page 65 concerning the mass between two constant-pressure surfaces that is correct only for a hydrostatic atmosphere. Some of the material describing hurricane formation and energetics in this and other