READINGS

BOOK REVIEWS

UNDER THE WEATHER: CLIMATE, ECOSYSTEMS, AND INFECTIOUS DISEASE

Committee on Climate, Ecosystems, Infectious Disease, and Human Health, Board on Atmospheric Sciences and Climate, National Research Council, 2001, 160 pp., $37.95, hardbound, National Academy Press, ISBN 0-309-07278-6

That climate affects human health has long been known, but advances in climatology are renewing interest in this subject. Evolving techniques for climate forecasting could be the basis of systems for early warning to take action to protect public health. A growing understanding of the impact of human activities on the global climate system raises larger concerns about the potential increase of threats to public health.

The National Research Council appointed the Committee on Climate, Ecosystems, Infectious Disease, and Human Health (CEIDH) in 1999 to review the known linkages between temporal and spatial variations in climate and the transmission of infectious disease agents. Other aspects of climate-related health impacts, such as heat stress, were beyond the scope of their work. The CEIDH was also charged with examining the potential for climate-based early warning systems in public health and identifying future research activities. *Under the Weather* is their report.

The CEIDH report aims to introduce scientists to the study of climate and infectious disease with seven major components: 1) a historical overview of environmental medicine and meteorology; 2) basic concepts in climatology and infectious disease epidemiology; 3) the influences of climate on some specific diseases; 4) analytical approaches for studying climate–disease linkages; 5) an ecological perspective on temporal and spatial scaling; 6) the feasibility of using climate forecasts in public health warning systems; and, 7) key findings and recommendations.

The CEIDH has great breadth and depth. They have presented far more than studies of temperature, rainfall, and specific diseases. The reader will learn, for example, that 1) the links between meteorology and medicine reach back to the early scientific revolution; 2) stakeholder participation is critical for the implementation of early warning systems; and 3) nonclimatic factors that affect infectious disease dynamics are essential for appreciating the "web of causation" in public health.

The inset boxes provide succinct commentary. For instance, box 3-5 compares the border towns of Reynosa, Mexico, and Brownsville, Texas, with similar climates to show the effect of nonclimatic factors on the incidence of dengue, which is caused by a virus transmitted by *Aedes aegypti* mosquitoes. Despite a higher number of *A. aegypti* pupae per person in Brownsville, the level of dengue transmission is much lower in Brownsville because its residents make much greater use of air conditioning and window screens that reduce exposure to biting mosquitoes.

The CEIDH report does have some surprising deficiencies. Its list of observational study designs in epidemiology includes only populations as units of analysis, comparing disease incidence across time or space. That list omits cross-sectional, case-control, and cohort studies that can assess the effects of multiple factors on an individual's risk of disease (Aron and Patz 2001). Yet the report itself presents this kind of information, such as a reference (shown above) to cross-sectional surveys of household living conditions influencing dengue transmission in Texas. Another problem is a curious lack of ethical or legal concerns in a section on field-based experimental manipulation of disease ecology. And a study of climate and health that is "global in scope" should have at least one committee member based in an institution in a developing country.

The analyses of climatic influences on specific diseases could have been much richer, as demonstrated here by examples from cholera epidemiology. An assessment of the cholera epidemic that struck Peru in early 1991 should consider the complexity of the El Niño–Southern Oscillation during 1990–95 (Glantz

1996) and the effect of stopping the chlorination of water in coastal areas of Peru in the 1980s (Aron and Zimmerman 2002). The limitation of official disease reports is dramatically illustrated by the recognition that Bangladesh does not report cholera cases to the World Health Organization (WHO). Bangladesh probably had between 250,000 and 400,000 cholera cases in 1998 (R. B. Sack 2002, personal communication), which is greater than the 211,748 cases in Africa reported to WHO in 1998 and cited by the CEIDH.

The topic of evaluation deserves more attention. How should one interpret a claim of "success"? A seasonal climate forecast might successfully predict above-average rainfall in a region for three months, but its spatial and temporal resolution might not be adequate for making public health decisions. Must an early warning system handle both climatic and nonclimatic factors that cause epidemics? Key factors in a dengue epidemic in Rio de Janeiro in early 2002 appear to have been the introduction of a new strain of dengue virus and a cutback in mosquito control programs. It is unfortunate that the "evaluation/feedback" component of a disease early warning system in fig. 7-2 lacks the discussion in the text accorded the other components.

A clear explanation of climate change and climate variability is missing and would have contributed to the stated goal of helping "different groups of researchers involved in climate and infectious disease studies gain a more realistic understanding of the current capabilities and limitations of each other's fields." Climatologists use "climate change" to refer to changes from all causes over at least a century. The report's background section on climate change stresses the consequences of enhanced global warming due to increased emissions of greenhouse gases from anthropogenic sources; later, "anthropogenic global climate change (AGCC)" is used. The chapter on early warning systems focuses on shorter time periods and climate variability, but avoids that terminology. More emphasis is placed on making decisions related to climate variability, although a lot of the publicity surrounding this report has dealt with climate change.

On balance, I recommend *Under the Weather*. Its key findings and recommendations are sound. It provides insights on climate and infectious disease that can assist the reviewer of climate-related health assessments, such as those from the Intergovernmental Panel on Climate Change and the U.S. Global Change Research Program. The reader will gain even greater benefit by using *Under the Weather* as a point of departure for exploring a variety of perspectives on climate and health.

—Joan L. Aron

NEW PUBLICATIONS

HEAT WAVE: A SOCIAL AUTOPSY OF DISASTER IN CHICAGO

Eric Klinenberg, 2002, 305 pp., $27.50, hardbound, The University of Chicago Press, ISBN 0-226-44321-3

The 1995 heat wave in Chicago killed more than 700 people in one week. Record-setting heat obviously played a major factor in the deaths, but this book looks more deeply at the social factors that turned this heat wave into the worst disaster in Chicago's history. The author looks at housing conditions, city services, government response, racial factors, news coverage, and numerous other aspects of the heat wave and ties them into a broader picture of the decay of urban life.

STORMCHASERS: THE HURRICANE HUNTERS AND THEIR FATEFUL FLIGHT INTO HURRICANE JANET

David Toomey, 2002, 314 pp., $24.95, hardbound, W. W. Norton, ISBN 0-393-02000-2

In 1955 a routine naval reconnaissance mission to track Hurricane Janet resulted in tragedy when the nine-man crew never returned. The author of this work used interviews and historical documents to reconstruct the events of that mission, combining a history of storm tracking with the dramatic story of the ill-fated mission. In so doing, he highlights the limitations of weather prediction at that time.

INSTRUMENTS FOR CLIMATE POLICY

Johan Albrecht, Ed., 2002, 304 pp., $100.00, hardbound, Edward Elgar Publishing, ISBN 1-84064-759-0

The Kyoto Protocol introduced international flexible mechanisms into climate policy and since then, the design and most effective use of flexible instruments have become key areas for climate policy research. This title focuses on economic and political aspects related to the recent proposals and the debate on limits in flexibility, and discusses European Union and U.S. perspectives on climate policy instruments and strategies.

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Glantz, M. H., 1996: *Currents of Change: El Niño's Impact on Climate and Society.* Cambridge University Press, 208 pp.

GLOBAL WARMING AND THE AMERICAN ECONOMY: A REGIONAL ASSESSMENT OF CLIMATE CHANGE IMPACTS

Robert Mendelsohn, Ed., 2001, 224 pp., $80.00, hardbound, Edward Elgar Publishing, ISBN 1-84064-593-8

Questions this collection of studies seeks to address include: "If the country experiences a few degrees of warming, what will happen in each region? What difference will it make to each region if the change in climate turns out to be more substantial? Are the effects about the same for everyone or are some regions more vulnerable than others?" (p. 1). Set forward in this collection is the hypothesis that the impact of climate change will not be uniform across regions. Factors such as the initial climate of a region and type of regional economic activity, along with the magnitude of the climate change, will determine the impact climate change has on regional economies. Although not new by any means, this hypothesis is intuitively pleasing. Economists generally accept the notion that change to the economic and/or physical environment will have differing regional impacts. In addition to the regional impacts, and maybe more important, this collection of studies illustrates the complexity and uncertainty surrounding climate change and its economic impact.

HYDRAULIC INFORMATION MANAGEMENT

C. A. Brebbia and W. R. Blain, 2002, 488 pp., $246.00, hardbound, WIT Press, ISBN 1-85312-912-7

Hydraulic information management is a complex topic and one that requires the extensive use of computational resources. The development of new software for the analysis of data and the production of effective designs open up fresh opportunities to those involved with hydraulic engineering and water resources projects. The papers here were first presented at the Ninth International Conference on Hydraulic Information Management (HYDROSOFT). Topics discussed include coastal and estuarial engineering, hydrology, dams and flooding, and numerical modeling.

PHYSICAL OCEANOGRAPHY OF THE ADRIATIC SEA: PAST, PRESENT AND FUTURE

Benoit Cushman-Roisin et al., Eds., 2001, 320 pp., $63.00, hardbound, Kluwer Academic, ISBN 1-4020-0225-4

The first book on the oceanography of the Adriatic Sea, this title explores the sea's physical oceanography as well as its water masses, circulation, and regional dynamics; summarizes its interaction with the Mediterranean Sea; and includes historical perspectives, current simulation methods, and a look at potential relevant topics to explore in the future.

CURRENT PROBLEMS OF HYDROGEOLOGY IN URBAN AREAS, URBAN AGGLOMERATES AND INDUSTRIAL CENTRES

Ken W. F. Howard and Rauf G. Israfilov, Eds., 2002, 500 pp., $166.00, hardbound, Kluwer Academic, ISBN 1-4020-0600-4

Groundwater issues have generated worldwide concern in recent decades. The problems include too little or too much groundwater as well as groundwater contaminated by either saline water or industrial and domestic pollutants. Many urban groundwater problems are not unique to any one region, which is a key point of this book. The papers here reveal the magnitude and scope of groundwater problems and identify future challenges, potential courses of action, and emerging technologies.

Limiting the regional impacts to the United States, Mendelsohn compiles a series of studies examining the market effects of climate change on various sectors (agriculture, timber, energy, and coast structures) for the year 2060. This series is largely a compilation of Mendelsohn's work, as he is a contributor to six of the nine chapters. The main contribution of the collection is the estimation of potential regional impacts of climate change. Discussion of theoretical issues, methodological procedures, and model development for the most part are limited. Readers interested in theory and methodology details will be disappointed with the book; however, readers interested in regional impacts will find the book enlightening. Focusing on impacts, instead of methodological details, makes the book accessible to a wider audience. As with all modeling efforts and projections of future events, assumptions and procedures used could easily be questioned. Such questions serve, however, to draw additional attention to the complexity and uncertainty surrounding the impact of climate change on the U.S. economy.

Chapters 2 and 3 use different approaches to estimate the regional impact of climate change on the agricultural sector. This is the only sector in which different approaches are used to derive estimates of the impacts of climate change. In chapter 2, McCarl and Adams use simulated crop yield changes in a general equilibrium model of the U. S. agriculture sector to estimate potential impacts of climate change. Mendelsohn, in chapter 3, uses a statistical Ricardian approach to estimate the impacts to the agriculture sector. The results between the two studies are similar. Sohngen and Mendelsohn (chapter 4) estimate the impact on the timber sector using a dynamic ecological–economic model. The complexity of the issue at hand and need for further intuitive explanation are illustrated in these chapters. Results presented in chapter 3 indicate an increase in cropland will occur; similarly, results in chapter 4 suggest an increase in forestland. Urban sprawl and limited land area suggest such results may not be feasible, highlighting the need for a more comprehensive modeling effort. Such efforts, however, would be subject to even more questions concerning methodological procedures. The need for integrated assessments and further intuitive explanation are also illustrated between the agriculture analysis and the water resource analysis (chapter 5, Hurd and Harrod). It appears that within similar scenarios, the agricultural analysis shows irrigated cropland increasing, but the water analysis indicates withdrawals for agriculture decreasing. Climate change studies tend to focus on impacts in the future. Of more importance is the path taken to the future. Both Solingen and Mendelsohn (timber sector) and Neumann and Livesay (chapter 6, coastal structures)

NEW PUBLICATIONS

THE BLUE PLANET: SEAS OF LIFE

Andrew Byatt, Alastair Fothergill, and Martha Holmes, 2002, 384 pp., $40.00, hardbound, DK Publishing, ISBN 0-789-48265-7

A comprehensive and readable description of the whole ocean system, this book was published in conjunction with a television series on the Discovery Channel. It includes extensive information on animal and plant life in the world's oceans, while also discussing such topics as ocean mechanics and chemistry; ocean–atmosphere interaction; waves, currents, and tides; and, the various oceanic regions (Tropics, poles, etc.). The book contains numerous photos, maps, figures, and charts.

INSTANT WIND FORECASTING

Alan Watts, 2002, 128 pp., $14.95, paperbound, Sheridan House Publishers, ISBN 1-57409-143-3

A companion to the author's earlier *Instant Weather Forecasting* (see "New Publications" in the April 2002 *Bulletin*), this book helps weather watchers read the skies by showing color photographs of various sky conditions and then providing wind forecasts based on those conditions. It should especially appeal to sailors and other outdoor enthusiasts.

URBAN AIR POLLUTION AND FORESTS: RESOURCES AT RISK IN THE MEXICO CITY AIR BASIN

M. E. Fenn, M. de Lourdes, and T. Hernandez-Tejeda, Eds., 2002, 416 pp., $139.00, hardbound, Springer-Verlag, ISBN 0-387-95337-X

Scientists have studied air pollution and its effects on forests and vegetation in the Mexico City Air Basin for some time; this book is the first to summarize those studies. With air pollution and global urbanization growing as environmental threats, this work examines many of the major considerations of those topics, including regional geology, sociological factors, climate and hydrology, and exposure to pollutants.

present paths of potential impacts of climate change on the respective sectors. Mendelsohn (chapter 7) presents differing impacts of climate change on residential and commercial energy customers. Residential consumers in all regions are hurt by climate change, whereas for commercial customers, warming hurts southern regions, but northern regions benefit. In chapter 8, Mendelsohn presents a good review of adaptation. A more coherent discussion and intuitive explanation of the differences between the studies in the concluding chapter would have improved the book. In addition, each chapter would have benefited from additional intuitive explanation of the results presented.

If a reader is looking for a comprehensive treatment of or definitive answer to the impacts of global warming, this is not the book for them. Very little theoretical basis is presented on both the economic and physical aspects of climate change. As noted earlier, methodological details are mostly omitted. The book does provide interesting results on potential regional impacts. Mendelsohn and Smith conclude with this thought-provoking idea: "... climate change is not a great threat to the U.S. economy in the twenty-first century. The results in fact suggest that climate change for this century could be beneficial" (p. 199). It must be noted, however, that this conclusion is limited to market impacts. Generally, results from the collection support the hypothesis of regional differences. It appears cooler northern regions will be impacted less or be net benefactors of climate change, whereas warmer southern regions will experience more of the costs.

—James W. Mjelde

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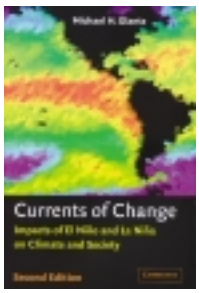
CURRENTS OF CHANGE: IMPACTS OF EL NIÑO AND LA NIÑA ON CLIMATE AND SOCIETY

Michael H. Glantz, 2001, 252 pp., $24.95, paperbound, Cambridge University Press, ISBN 0-521-78672-X

The *Currents of Change* in the title of this book may refer equally well to the nineteenth-century Peruvian experience with the warm water current known as El Niño that alters their local ecosystem, or to the broader concept of society's evolving relationship with the climate. Such a multilayered interpretation is representative of the breadth of this clearly written treatise on the most popular of global climate phenomena. The author's treatment of the historical, technical, and policy aspects of El Niño and La Niña (i.e., El Niño–Southern Oscillation, or ENSO) will make it appealing to a wide range of readers, and a must read for ENSO groupies. The second edition includes updated scientific findings and has been expanded to cover the 1997/98 El Niño event that received worldwide attention. Glantz, a political scientist, has dedicated much of his career to studying the social impacts of this recurring climate phenomenon, and in so doing has taken the lead role in bridging the scientific and policy communities. In this book, he brings together massive amounts of information from his own work and from diverse secondary sources, and presents the information with clarity, humor, and the novel use of concepts from other disciplines (e.g., metaphors, cartoons, interviews, schematics, flip charts, etc.).



The book is divided into three parts: 1) an introduction to climate variability and the history of emerging interest in El Niño; 2) an explanation of the physical characteristics of ENSO; and 3) the societal implications of ENSO. In the first section, Glantz demonstrates how seemingly unconnected streams of scientific inquiry, politics, ecology, economy, and climate variability can intersect in unforeseen ways. The book recounts the early twentieth-century studies of the Indian monsoon that led to a chain of scientific breakthroughs resulting in our current ability to predict some important characteristics of ENSO. Of interest to the current debate of whether science should be problem-driven or conducted for the sake of knowledge itself, this historical perspective reminds us of the original "applications-driven" goal of Sir Gilbert Walker—improved administration of British colonial territory of India—that led to the identification of the Southern Oscillation. Broader societal lessons can be gleaned from this history. For example, the book traces the interest of the Peruvian society, whose fishermen are attributed with naming El Niño, in this event. The rise and fall of the guano and fishmeal (anchovy) industries that are linked to changes in the coastal environment and to Peru's de-

BOOK EXCERPT

Disaster . . . had manufactured rebellion throughout Chinese history. When rivers broke their levies or changed their channels, a traditional adage warned that "the old died and the young became bandits." Thus officials were hardly surprised when flood distress fused with perceptions of foreign conspiracy to produce a significant local uprising in the neighborhood of Wo Yang in northern Anhui as well as widespread violence in northern Jiangsu. In the traditional bandit country of western Henan (especially Baofeng, Lushan and Linru counties) where "water works were in poor repair and thus unable to blunt the harshest effects of geography and climate," a Robin Hood army of 10,000 terrorized foreigners and Qing alike. As Elizabeth Perry has pointed out, these unusually disciplined brigands were scrupulously respectful of the poor and shared with them the impressive ransoms from missionary kidnappings. (A decade later, following a new round of natural disaster, the famous outlaw Bai Lang would assume command of these indomitable Henanese farmer-brigands.)

More menacingly, the anti-Christian "Spirit Boxers"—direct progenitors of the 1899 "Boxers United in Righteousness" *(Yihetuan)*—began to spread like wildfire throughout the stricken districts of western Shandong, where the fall harvest had been drowned and the soil subsequently remained too wet to plant winter wheat. A martial arts movement of poor peasants, agricultural laborers and unemployed canal bargemen that combined the attributes of predatory social banditry with the defensive role of traditional village militias, the Spirit Boxers were quickly embroiled in escalating conflicts with both Christian villagers and local authorities. The foreign powers exerted enormous pressure on the Qing court to exterminate the movement, and it might well have been contained in December 1898, following the execution of the three principal leaders, if flooding had not been punctually followed by renewed drought.

The failure of the spring rains in 1899 was like throwing a match into a pool of gasoline. "The drought was great and practically universal," wrote Arthur Smith. "For the first time since the great famine in 1878 no winter wheat to speak of had been planted in any part of northern China. Under the most favorable circumstances the spring rains are almost invariably insufficient, but that year they were almost wholly lacking. The ground was baked

velopment policies resonate as cautionary tales: what current human activities are we engaged in that rely too heavily on resource extraction under assumed conditions of climatic stability?

Section two contains details on several of the ENSO events of the twentieth century, summarizing how each event manifests in different physical characteristics and impacts around the globe. These examples serve to illustrate how the state of the science and societal context at the time of the event can influence the impact and reshape human perception for the next event. From a local perspective, each event has different ecological impacts, and expectations are developed according to recent experience. For instance, in 1997, some groups in Peru were hesitant to act early on the forecasts given their most recent experience with the prolonged 1991–95 El Niño(s) that lingered in an unprecedented manner, never reaching significant strength.

This second section also pays much attention to forecasting, providing a balanced presentation of current capabilities and limitations of various statistical and dynamical approaches. Glantz's assessment of forecast skill is more sobering, he notes, compared to the media and the meteorological communities' claims of success. This can be partially attributed to substantive differences in what constitutes a "good" forecast (i.e., characteristics of ocean in the Pacific versus environmental impacts in specific locales). Of importance is the crucial role that environmental observations have played in supporting the development of forecasts and their real-time use for manage-

so hard that no crops could be put in." Idled peasants and agricultural laborers by the tens of thousands flocked to local boxing grounds where they imbibed the potent new doctrine of Boxer militancy combined with spirit possession and invulnerability rituals derived from the underground White Lotus sect.

Chiping hsien in western Shandong, which had been literally under water during the floods and now was hammered by drought, was the reputed home of "more than 800" of these boxing associations. "The weather in my region," wrote the local magistrate to Beijing, "has been exceptionally dry and the numbers of the poor have increased. When these poor people assemble they all claim to be Boxers. The majority of these Boxers are poor people without any means of livelihood." Later, after beheading some of the "Eighteen Chiefs" of the original Yihetuan, another mandarin corroborated the plebeian, hunger-driven character of the movement: "These Boxers are mostly homeless people. . . . Yan Shuqin and 'Little Pock-Mark' Gao, both of whom have already been executed, did not have any property or other means; . . . the twelve households connected with Xi Desheng, who also has been executed, altogether owned [a mere] 140 *mu* of land. All of it was ordered confiscated and sold at auction."

The government's inability, variously through insolvency or corruption, to mount a credible relief effort, together with frequent refusal of the rich to share food with the poor, only confirmed the core Boxer conviction that the masses themselves must take responsibility for China's salvation. "A wide range of sources," Cohen writes, "including gazetteers, diaries, official memorials, oral history accounts, and the reports of foreigners, indicate a direct link between the spread and intensification of the Boxer movement, beginning in late 1899, and growing popular nervousness, anxiety, unemployment, and hunger occasioned by drought." Tiedemann, another eminent historian of the uprising, agrees when Cohen adds: "It was this factor [drought famine], more than any other, in my judgment, that accounted for the explosive growth both of the Boxer movement and of popular support for it in the spring and summer of 1900."

Joining the Boxers, moreover, was a sure way of filling one's belly. Everywhere the movement was active it patriotically cajoled or, if necessary, simply expropriated surplus food from merchants and rich peasants. More violently, it seized and divided the foodstocks of Christian villages and missions. *Wanguo gongbao,* the missionary newspaper founded by Timothy Richard, warned that while the "weak topple in the roadside ditches . . . the stronger become outlaws [and] advocate dividing the wealth among rich and poor." Indeed, most accounts agree, the radical slogan "equal division of grain" was central to the explosive growth of the Boxer uprising.

ment. Vignettes of forecast use and misuse by decision makers in various sectors are presented, giving a flavor of the complexity and challenges of using probabilistic information. For instance, the case of northeast Brazil shows how trust in the provider of information may be quickly undermined based on one "bad forecast," tainting future responses. Experts in climate forecast applications may likely contest the relatively simplified presentation of some of these cases, but for the lay audience, the points remain salient.

The final section focuses on linkages between climate and health, the media, and perception, and offers some important take-home lessons. While pointing out the potential uses of climate information for anticipating outbreaks and epidemics, Glantz emphasizes the many obstacles (e.g., data and resource limitations) and risks (e.g., variable forecast skill) of putting too much reliance on forecasts versus taking more direct action to alleviate underlying causes (e.g., eliminate open sewers, increase funding for vaccination programs). From a cost–benefit perspective, we are led to question how much science is being promoted for "societal benefit" at the expense of more concrete development-related solutions.

In response to the media frenzy surrounding the 1997/98 event, many pages of this final section are dedicated to analyzing the role of the media in the translation of information from scientists to society. Glantz discusses the pros and cons of media hype and the difficulties in attributing causality to a single phenomenon. It can be argued, on one hand, that too much conflicting information may lead to confusion

and desensitization of the public, resulting in inaction. However, reliance on only one "official forecast" risks putting all our eggs in one basket, which, given the range of forecast skill, may be unwise. Thus, the current role of the media in dissemination of forecast information is an awkward one: the existence of conflicting forecasts, especially in terms of specific impacts of ENSO, may actually be the best reflection of our state of scientific knowledge; communicating this knowledge to the public, however, can lead to confusion, and ultimately misuse of information. Glantz puts the onus on the scientific community to educate the media in order to minimize misrepresentation of their findings.

To conclude, the book warns us not to be complacent: humans have continually been surprised by events, and despite the impressive understanding summarized in the book, we continue to be surprised by each ENSO event in different ways. (Incidentally, this book holds other surprises as well. Presumably the author would not have predicted the collapse of the presidency of Peru's Alberto Fujimori—who wrote the epilogue to this second edition —as the book was being printed.) The book ends with a distillation of experiences and studies of climate variability into seven lessons "that people ought to know about El Niño" (p. 213) and nine "El Niño 'traps' that people ought to know about" (p. 216).

Currents of Change contains a wealth of detail beyond what can be covered in this review. The presentation of information ranges in structure from the simplest forms (e.g., definitions from the Oxford English Dictionary) to personal interviews with key scientific figures, to the detailed description of cutting-edge approaches to understanding climate and societal interaction. This second edition will serve as a launching point and an indispensable reference for those interested in the physical or social issues related to climate. Experts and nonexperts alike will reconsider the linkages between climate and society, and the role of science in mediating this relationship, after reading this book.

—Kenneth Broad

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REANALYSIS

Looking back at "Shorter Contributions" in the *Bulletin* of March 1940:

Weather Bureau Adds to Winter Sports Service

So popular was the winter sports service of the United States Weather Bureau in the Northeastern States and New Mexico last winter that it is being continued this year as far south as Pennsylvania and New Jersey and extended to the Michigan–Wisconsin–Minnesota area. Although individual offices of the Weather Bureau have issued reports on conditions at skiing fields and have issued winter sports forecasts from time to time for many years, the general regional service was first offered in winter months of last year because of the need for reliable and unbiased information on skiing, tobogganing, skating, and other winter sports conditions.

In recent winters thousands of persons in cities have found the relaxation they need in week-end sports. Better roads and special trains have made it possible for a city worker to go many miles to snow-covered winter playgrounds and be back at his desk on Monday morning. Often, however, weather conditions such as a thaw or an unusually heavy snow leave imperfect conditions for winter sports in some areas. But in another direction week-end conditions may be perfect. The actual conditions that may prevail in any area on a Saturday morning are given in the sports weather service.

Each Friday morning volunteer reporters wire conditions in their area to Weather Bureau district centers. Supervisors there combine all reports and relay them to all other district offices for the sports region. A summary of conditions for the entire region is available Saturday morning for newspapers, radio broadcasts, and in bulletins.

In general the reports give depth and condition of snow and ice for each area, as well as conditions for snow and ice sports. The service, reports to the Weather Bureau indicate, is used by thousands of persons each week as far south as Washington, D.C. In the Lake States it will be of special benefit to residents of cities such as Chicago and Detroit who by going a little farther north may find ice and snow for sports denied them at home. The service is, of course, available to all persons, whether city or rural residents.—*U.S.D.A.*

—*Bull. Amer. Meteor. Soc.*, **21,** 124