if it were repeated again and again across the nation, would have much less desirable consequences. After all, maneuvering in electoral politics has always been one way minorities have improved their lot in society. Close off that avenue and one loses an important path for social advancement.

The point, then, is that, despite its simplicity and seeming fairness, approval voting might create as many problems as it solves. Nevertheless, Brams and Fishburn are sufficiently convincing that one believes the idea deserves a try. One of the benefits of federalism is that states can serve as laboratories for reforms. It would certainly make sense to test approval voting in, say, New York's statewide elections. One might then have grounds for deciding whether it will enhance or detract from electoral democracy.

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## An Environmental Campaign

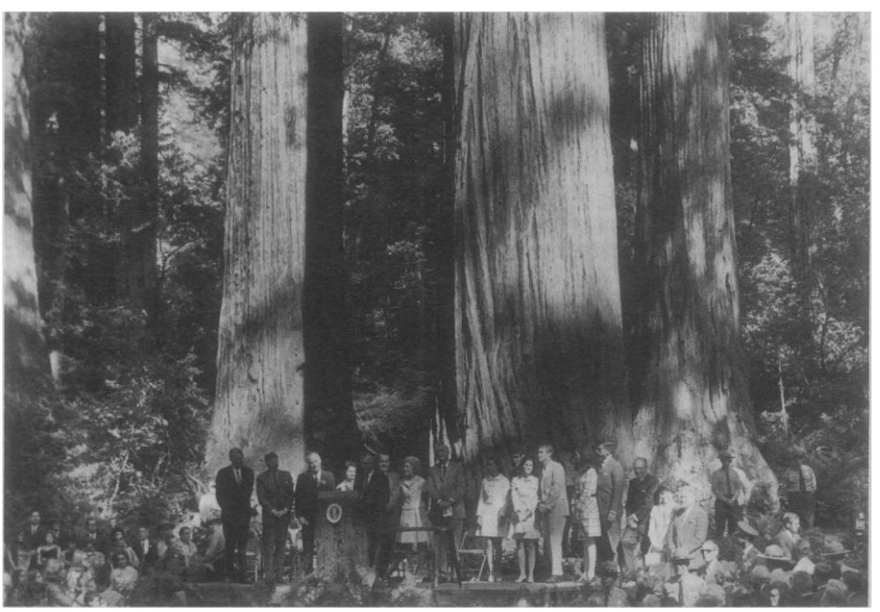
**The Fight to Save the Redwoods**. A History of Environmental Reform, 1917–1978. SUSAN R. SCHREPFER. University of Wisconsin Press, Madison, 1983. xviii, 340 pp., illus. $22.50.

For 60 years, from the founding in 1918 of the Save-the-Redwoods League to the enlargement of the Redwood National Park in 1978, the monumental stands of virgin redwoods in northern California have provided a major focus of wilderness preservation in California. In the turbulent 1960's, with the Sierra Club beating the drum of militant preservationism, the movement to halt redwood logging and establish a national redwood park seemed to raise environmentalism to a moment of political apocalypse. Scientists and scientific knowledge played central roles in this dramatic struggle over land-use policy. John Campbell Merriam, a paleontologist at the University of California at Berkeley and later president of the Carnegie Institution, was a founder of the Save-the-Redwoods League and a continuing influence on its official philosophy. After the Second World War, scientists, such as Loren Eiseley, filled the rhetorical coffers of the Sierra Club. Particularly in the movement to enlarge the Redwood National Park, scientists' studies of the impact of logging on hydrology and forest ecology were important in the interpretation of statutes and in shifts of policy.

Susan Schrepfer has thoroughly mined the organizational papers of the two major preservation advocacy groups and numerous other collections and has conducted interviews with participants to provide a detailed and important narrative of the redwoods fight. She sees the establishment of the redwood park as involving a major shift in popular consciousness about nature and the entrance into politics of a new class constituency. Prior to the First World War, the Save-the-Redwoods League guided preservation of the trees with a reform Darwinist ideology stressing the value of the virgin redwood stands as educational museums of evolution and the importance of private initiative and philanthropic donation for the purchase and protection of reserves. In the 1950's, the Sierra Club seized leadership of the redwoods fight, basing its appeal upon an ideology of wilderness and its politics upon confrontation with the federal government and with the logging industry, rather than upon cooperation. Strident rhetoric and the politics of no compromise, under the executive directorship of David Brower, capped the wave of environmentalist concern of the decade of the 1960's and appeared to work; at least, the nation got its redwood park.

Schrepfer maintains two important theses. The first is that a fundamental shift in scientific knowledge regarding the theory of evolution motivated a fundamental shift in political behavior and ideology. The second is that preservationism after the Second World War represented a fundamental discontinuity with prewar preservationism, in political constituencies, citizen activism, and reform ideology. As a consequence of this discontinuity, preservationists were generationally divided, and the division blunted their political effectiveness, eventually causing the loss of virgin redwoods and delay in the establishment of the park. Through detailed and well-researched analysis, Schrepfer demonstrates that the complicated politics of public resources policy exacerbated ideological difference. Preservationists must share the blame for the loss of much of the redwood forest they sought to preserve.

Both of Schrepfer's theses enrich our understanding of the role of scientists and the use of scientific knowledge in the arena of national politics. Unhappily, not all aspects of her lines of argument are equally credible. She does not sufficiently distinguish between scientific microparadigms, which provide research programs for practicing scientists, paradigms that carry universalistic values, and scientific ideology, which is the political employment of scientific values in defense of the interests of scientists. Consequently, in developing her first



Dedication of Redwood National Park, 27 August 1969. The ceremony was held in Lady Bird Johnson Grove, "one of the few large groves of old growth actually saved by the park. Lady Bird played little role in the establishment of the park, but its formation was a credit to her husband's administration." Left to right: the Reverend Billy Graham, Governor Ronald Reagan, Congressman Don Clausen, Lady Bird Johnson, Secretary of the Interior Walter J. Hickel, President Richard M. Nixon, Pat Nixon, former President Lyndon B. Johnson, Julie Eisenhower, David Eisenhower, Luci Nugent, Patrick Nugent, Lynda Robb, Charles Robb, Senator George Murphy. [From *The Fight to Save the Redwoods*; courtesy of the Save-the-Redwoods League]

thesis she fails to convince the reader that she has not confused rationalization with motivation.

Similarly, Schrepfer does not articulate the political framework of the developments she discusses, which weakens her argument that the Second World War marked a discontinuity in political processes. Though class constituencies of preservationism may have indeed shifted and reform ideology and rhetoric found new language, it is not at all clear that postwar politics represented a break with prewar politics of interest-group administrative government. This form of government had been developing since the turn of the century and was fully in place with the New Deal. The preservationism of the 1950's and 1960's, with its citizen activism and militancy, appears less as the appearance of a new form of politics than as the clamorous entry of a new interest group into an old form of politics.

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## Atomic Processes

**Atoms in Astrophysics**. P. G. BURKE, W. B. EISSNER, D. G. HUMMER, and I. C. PERCIVAL, Eds. Plenum, New York, 1983. xviii, 356 pp., illus. $49.50. Physics of Atoms and Molecules.

This volume commemorates the 60th birthday of Michael J. Seaton of University College London. It contains a collection of papers by Seaton's students and colleagues that review some of the research in which Seaton has played a pioneering role. Because Seaton has been the dominant figure in the application of atomic physics to astronomy over the last quarter century, the topics include many of the most important ones in the field.

Seaton's great contributions are due in part to his ability to work in both atomic physics and astrophysics. Most of the readers of this book are likely to be narrower in perspective, falling into one of two camps: atomic physicists, who produce atomic data, and astrophysicists, who consume the data. (This reviewer is one of the latter.) Despite its title, the book is primarily concerned with the calculation of atomic processes, and much less with the astrophysical applications of the atomic data. As a result, the book will be of great value to astrophysicists who want to learn more about the calculational techniques employed by atomic physicists and to graduate students in atomic physics. The book does not primarily address the pressing problem of communicating the atomic data needs of astrophysicists to the atomic physicists.

In general, the book provides excellent reviews of the topics covered. Most of the sections have very detailed bibliographies. For the most part, notation is consistent throughout the book. The level of the book is closer to that of an advanced textbook than to that of a collection of professional reviews, in that fairly detailed derivations of important results are usually given rather than just the results themselves.

The book emphasizes the calculation of collisional processes. There is an excellent review of electron-ion (or atom) collision calculations, including discussion of the basis of the close-coupling equations and techniques for their numerical solution. The coupling of these solutions to valid asymptotic solutions and the form of the electron-atom and electron-molecule potentials at large distances are also discussed. The close-coupled equations are not useful for calculating collisional processes for the highly excited states that produce radio recombination lines in astrophysics, and the semi-classical techniques pioneered by Seaton for this problem are described. As Seaton first pointed out, protons may be more important than electrons in collisional exciting closely spaced energy levels, and these proton excitation processes are discussed. The utility of quantum defect theory in extrapolating sparse experimental or theoretical data is reviewed.

One very useful feature of the book is that it provides a helpful introduction and general discussion of the various computer program packages for atomic calculations. These programs (IMPACT, SUPERSTRUCTURE, RMATRX, and so on) can provide consistent and extremely accurate atomic data. By consolidating the numerical methods used into a small number of general-purpose programs, these packages have helped to reduce the proliferation of atomic data calculated at different levels of approximation. (Seaton described this proliferation of calculations as the "one man—one cross section" problem.) In most cases, the programs use standardized input and output and have preprocessors that allow the code to be optimized for the specific task and computer (and array processor) being used. Recent extensions of these programs to include relativistic effects are discussed.

Though the applications of the atomic data are not discussed extensively, there is an introduction to electron-ion collisional processes in diffuse plasmas, a review of the excitation of forbidden lines in aurora, and a more detailed review of the observations and theory of planetary nebulas. This last section has a nice, concise summary of recent infrared and ultraviolet observations of these systems.

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## Books Received

**Abscisic Acid**. Frederick T. Addicott, Ed. Praeger, New York, 1983. xiv, 608 pp., illus. $49.95.

**Adolescent Gynecology**. A Guide for Clinicians. Alfred M. Bongiovanni, Ed. Plenum, New York, 1983. xx, 258 pp. $32.50.

**Advances in Heterocyclic Chemistry**. Vol. 32. A. R. Katritzky, Ed. Academic Press, New York, 1982. x, 404 pp., illus. $74.50.

**The Body at Work**. Biological Ergonomics. W. T. Singleton, Ed. Cambridge University Press, New York, 1983. x, 430 pp., illus. $59.50.

**Botany**. Principles and Applications. Roy H. Saigo and Barbara Woodworth Saigo. Prentice-Hall, Englewood Cliffs, N.J., 1983. xx, 538 pp., illus. $27.95.

**Cancers Induced by Therapy**. Israel Penn, Ed. Published for the Imperial Cancer Research Fund by Oxford University Press, New York, 1982. iv pp. + pp. 565–790, illus. Paper, $26. *Cancer Surveys*, vol. 1, No. 4.

**Chemical and Geochemical Aspects of Fossil Energy Extraction**. Papers from a symposium, Las Vegas, Aug. 1980. T. F. Yen, F. K. Kawahara, and R. Hertzberg, Eds. Ann Arbor Science (Butterworths), Woburn, Mass., 1983. x, 266 pp., illus. $37.50.

**Disposal and Recovery of Municipal Solid Waste**. A Review of Realistic Options Facing the Public Authorities and Industry. Michael E. Henstock, Ed. Ann Arbor Science (Butterworths), Woburn, Mass. 1983. x, 194 pp., illus. $49.95.

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**The Effects of Punishment on Human Behavior**. Saul Axelrod and Jack Apsche, Eds. Academic Press, New York, 1983. xii, 356 pp., illus. $34.50.

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**Foundations of Quantum Mechanics I**. G. Ludwig. Translated from the German by Carl A. Hein. Springer-Verlag, New York, 1983. xii, 428 pp. $48. Texts and Monographs in Physics. Revision of German edition (1954).

**Freud, Biologist of the Mind**. Beyond the Psychoanalytic Legend. Frank J. Sulloway. Basic Books, New York, 1983. xxvi, 612 pp., illus. Paper, $13.50. Reprint of the 1979 edition.

**Fusion Technology 1982**. Proceedings of a symposium, Sept. 1982. Published for the Commission of the European Communities by Pergamon, New York, 1983. Two volumes. lvi, 1532 pp., illus. Paper, $250.

**A Gauge Theory of Dislocations and Disclinations**. Aida Kadić and Dominic G. B. Edelen. Springer-Verlag, New York, 1983. viii, 290 pp. Paper, $12.50. Lecture Notes in Physics, vol. 174.

**Gender and Psychopathology**. Ihsan Al-Issa, Ed. Academic Press, New York, 1982. xiv, 384 pp. $32.60. Personality and Psychopathology, 33

**Genetic Disease**. Diagnosis and Treatment. Proceedings of a conference, Monterey, Calif., 1981. Albert A. Dietz and Virginia S. Marcum, Eds.

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