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1930s. The real contribution of the book, however, lies less in this somewhat unconvincing thesis than in its description of the way in which knowledge of relativity was disseminated in Spain. The book is also an addition to the literature on Einstein himself, providing an exhaustive account of his visit to Spain and of his reception in the scientific and intellectual communities.

Historians of science interested in how scientific ideas are understood (or misunderstood) and popularized will find this book of great utility, particularly since Glick is a systematic comparativist who contrasts the Spanish encounter with Einstein with the reception of the man and his theories elsewhere in the world. In the opening chapters, Glick shows how the structure of the Spanish scientific community shaped the reception, understanding, and propagation of the new theory. Because its principal advocates were mathematicians and its initial audience mathematically trained engineers, relativity was discussed in the 1920s primarily in terms of the General Theory; the Special Theory, which received wide attention only after the empirical confirmation of its postulates in 1919, was frequently misunderstood or rejected as counterintuitive. Glick convincingly demonstrates, however, that Spanish scientists were less "backward" than their detractors charged; their understanding and acceptance of relativity compared favorably with its reception in countries with larger and more mature scientific establishments. Among the Spanish intelligentsia and the educated general public, however, the deficiencies in Spanish scientific education were an insuperable barrier to the comprehension of relativity (although incomprehensibility apparently added to its charm for many).

The early champions of relativity in Spain included devout Catholics as well as progressives. On this evidence Glick concludes that there was an elite commitment to civil—that is, ideologically neutral—discourse on scientific matters. Although he establishes beyond a doubt the existence of an extensive and intensive discourse on relativity, closer analysis of that discourse, as well as of the disparate group that Glick labels the "elite," suggests that right and left had divergent motives for accepting relativity and that the consensus was more apparent than real.

Although Glick finds it surprising that Catholic scientists should embrace relativity theory, relativity was less threatening to Catholic philosophical and theological assumptions than was, say, Darwinism. Indeed, in its ambitious attempt to provide a single, overarching explanation for all physical phenomena, it was congenial to neo-Scholastic efforts to reunite philosophical and scientific conceptions of the universe. As a branch of cosmology, relativity was additionally attractive because it could be made to reinforce Catholic assertions about the spiritual and universalistic tendencies of Spanish culture; for example, Glick cites José María Salaverría, a rightist literary figure, who praised relativity for its compatibility with the "noble" Spanish "cult of the useless" (p. 272). In accepting relativity, Catholic scientists could take aim at an old enemy—19th-century positivism and its ally, the liberal state—and at the same defend the achievements of Spanish science by demonstrating how well they understood the mathematical proofs of the new theory.

The left intelligentsia, on the other hand, found different uses for Einstein. Their inability to comprehend the mathematics of the General Theory provided an excuse for deploring the inadequacy of Spanish scientific education, while the paradoxes of the Special Theory became a springboard into "relativistic" philosophical arguments. In Catalonia, receptivity to Einstein was viewed as a hallmark of the region's modernity. Moreover, for both the progressive left and the Catholic right, enthusiasm for relativity provided an indirect way of criticizing the university professoriate and, by extension, the state that employed them.

The "recovery of science" was thus probably not as disinterested or consensual as Glick believes it to have been. Had he analyzed the institutional and political context of the relativity debate and of Einstein's visit more systematically, the cultural and intellectual significance of this episode would have become clearer and the breakdown of the supposed consensus in the 1930s less anomalous. Glick's failure to perceive the political dimensions of the controversy over modern science flaws this otherwise interesting study.

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Optimal Foraging

Foraging Behavior. ALAN C. KAMIL, JOHN R. KREBS, and H. RONALD PULLIAM, Eds. Plenum, New York, 1987. x, 676 pp., illus. $115. Based on a conference, Providence, RI, June 1984.

Foraging Behavior consists of papers stemming from a conference financed in part by the royalties from a 1981 conference volume of the same title. The royalties from the present volume will again be applied to a conference, to be held in 1989 or 1990.

Foraging Behavior contains 23 papers grouped into sections on theory, selectivity, patch utilization, reproductive consequences, learning, and coaching. One paper stands out: T. W. Schoener's account of the difficult birth of optimal foraging theory that opens the book. Everybody concerned with optimal foraging should read this paper. It is written in a personal style and recounts difficulties of getting papers in this field published. Having read Schoener's paper, one starts wondering what optimal foraging theory would have been without him and *Theoretical Population Biology*—a journal edited by him for many years that has played a central role in the publication of papers on optimal foraging. Schoener has therefore played a twofold role in this field, contributing some of the best papers and serving as a promoter for others. (It is unfortunate that his name is misspelled in the table of contents.)

Schoener's paper is grouped with a paper by R. D. Gray. Even though he discusses optimal foraging theory, Gray's paper is not really about optimal foraging—it is an attack on modern evolutionary biology. To my mind, it is not a very good one. Much of the criticism leveled against optimal foraging theory is, I believe, based on misunderstandings on Gray's part. He uses a strategy that is commonly used in critiques of modern evolutionary biology, presenting a vague version—a caricature—of the theory and then criticizing the caricature. Although no direct commentary on Gray's paper is provided, many of his criticisms are in fact rebutted by Schoener's paper. Both Schoener's and Gray's papers are supplied with extensive lists of references that will be of great help for those wanting to orient themselves in the field of optimal foraging.

The remaining 80 percent of *Foraging Behavior* is of a very different kind. Here we find what are essentially research papers that could have been submitted to journals. The quality of these papers varies considerably. Some are very good, such as those by Green and by Kacelink and Cuthill on modeling.

Quite a few of the papers are theoretical, and some are a blend of theory and empirical material. A few exemplify the problem of having too many data not properly collected for answering *any* scientific questions.

The papers on the role of learning and memory in foraging behavior constitute a valuable part of the book. Attention is also given to integrating foraging behavior with game theory. Here the volume benefited from combining the efforts of biologists and psychologists.

The book is reasonably well produced, but the editors could have done more to make it coherent. Altogether, I would rec-

ommend that libraries buy it and that everybody working in the field have a look at it and read some of the chapters. As evidenced by this book, optimal foraging is emerging from a troubled adolescence into an uncertain future. I shall guess that its future will be shaped, at least in part, by the ideas on learning and memory—and possibly on game theory—presented in this volume.

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North American Paleontology

Late Quaternary Mammalian Biogeography and Environments of the Great Plains and Prairies. RUSSELL W. GRAHAM, HOLMES A. SEMKEN, JR., and MARY ANN GRAHAM, Eds. Illinois State Museum, Springfield, IL, 1987. xiv, 491 pp., illus. Paper, $20. Illinois State Museum Scientific Papers, vol. 22. Based on symposium, Iowa City, IA, 1980.

The 12 papers in this volume are dedicated to Ernest L. Lundelius, Jr., in recognition of his work on the paleontology of mammals in North America, especially central Texas. The main authors are R. W. Graham and H. A. Semken, Jr., who author or coauthor five papers and the introductory chapter, "Philosophy and procedures for paleoenvironmental studies of Quaternary mammalian faunas."

The Late Pleistocene or Holocene faunas of Illinois and Missouri, of the northern, central, and southwestern Great Plains, of the Northern Bighorn Mountains, of Montana and southern Alberta and Saskatchewan, and of the Lange/Ferguson Clovis Site in South Dakota are considered in individual chapters. Each of these chapters assembles many data on mammalian, particularly micromammalian, temporal distribution over the past 30,000 or fewer years, especially the last 10,000 years, and on the geographical distribution of the known sites that have produced local faunules. These chapters are usually supported by extensive tables listing the sites, their archeological context if any, radiocarbon dates, and taxa recovered. Often the taxa are assembled as faunas for particular swatches of Holocene time and these observed faunal changes over time used for paleoclimatic reconstructions.

Semken and C. R. Falk's chapter "Late Pleistocene/Holocene mammalian faunas and environmental changes on the northern plains of the United States" (pp. 176–313) is an extensive treatment of present and past loci of sympatry for small faunules of ten or so micromammalian taxa, showing the generally northern shift of the areas of sympatry from Pleistocene-Holocene boundary times to today or the separation of the now-western montane from the now-eastern woodlands taxa as the plains became drier as the Holocene progressed. Other papers give similar treatments but not as broadly, often because they treat smaller geographic areas. Maps showing the areas of present-day faunal sympatry for an extinct local faunule are numerous and illustrate well the points made by the authors.

The book is well produced, easy to read, and well printed and bound, with an index of all localities. Most of the figures are line diagrams; the few half-tones are clear but not strongly printed.

This is not a work that may be read at a sitting but one to be consulted or dipped into. It brings together many scattered records and places them in environmental and faunal perspectives. It is thus a "Handbuch" or compendium that summarizes much of the present knowledge of Holocene faunas and environments for the central plains of