tivity in different parts of the tree. These meristems, the shoot apices and the cambium, operate under complex hormonal control that is regulated by internal hormonal correlations modified by environmental factors. In the third part of the book, three chapters discuss water stress, one of the factors limiting tree growth most severely. Drought-resistant trees either avoid drought (by such means as suppressing water loss or developing deep root systems) or tolerate desiccation. Trees can be selected according to criteria indicating drought avoidance. Another possibility is to breed trees with leaves that tolerate lower water potential while maintaining a high net carbon dioxide assimilation. Two other chapters deal with root respiration (the effect of waterlogged soils). Frost-hardiness is the topic of the fourth part of the book. The survival of trees in cold climates depends on their frost-hardiness, but the underlying physiological mechanisms and their relation to dormancy are still poorly understood. Wild trees are adapted to their native climates, but the periodicity of dormancy and frost-hardiness are important factors when trees are transplanted to another region. Selection for hardiness is time-consuming, but a good correlation has been found between hardiness and electrical impedance ratios, measured at kilohertz and megahertz frequencies, in the upper part of the stem. Two chapters on mineral nutrition make up the fifth part of the book. The final four chapters discuss various aspects of tree genetics, competition, productivity, and wood quality. A discussion section at the end of the book not only summarizes each of the previous parts, but also contains recommendations for the immediate application of past research and for desirable future research. It is a welcome addition for the busy reader who just has time to browse.

Tree physiology is not a crowded field of scientific endeavor. The present volume is a good representation of present-day activities, one that should be accessible both to researchers and to students. Applied biological research is more difficult to carry out with fully grown trees than with agricultural plants, not only because of trees' size, but also because it takes much longer to study successions of generations in trees. Foresters usually do not have as much control over weeds as agriculturists do, and their use of fertilizers is much more restricted. Yet, in the long run, humanity will probably be dependent on improved forest production.

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Herpetology

Morphology and Biology of Reptiles. Papers from a symposium, London, Sept. 1975. A. D'A. BELLAIRS and C. BARRY COX, Eds. Published for the Linnean Society of London by Academic Press, New York, 1976. xii, 290 pp., illus. $31.75. Linnean Society Symposium Series, No. 3.

Herpetology has remained a single coherent discipline, Bellairs and Cox write, because its practitioners attempt to cross the boundaries between different aspects of their subject. This book tests this idea, for in it diversity is maximized and cohesion is nearly nonexistent. Some chapters will be of interest only to the most narrow specialist. Others are written for the general reader and contain either analytical reviews or new syntheses. Those calling themselves herpetologists will want the book in their libraries, for it is like a thick issue of a journal aimed at them. The quality of certain articles is sufficiently high that the book should be of considerable value to general vertebrate paleontologists and functional morphologists as well.

E. C. Olson's lead chapter dealing with the exploitation of land by early tetrapods is one of the most general in the book, providing perspective on subjects ranging from phylogeny to ecology and physiology. Other chapters, such as those by Gasc on mechanical analysis of snake vertebrae and Saint Girons on comparative histology of parts of anguimorph lizards, are more narrowly focused.

The most successful chapter is a long, highly analytical, and incisive review by Charig of the controversy surrounding dinosaur relationships and the suggestion by Bakker and Galton that dinosaurs and birds together constitute a new vertebrate class, the Dinosauria. All major aspects of the controversy are considered. Points made by others are reexamined, and new data and interpretations are presented. Charig argues that the major conclusions drawn by Bakker and Galton are unwarranted.

The book is heavily morphological in orientation. Two chapters on thermal biology (by Avery and Spellerberg) seem like appendages, quite detached from potentially related chapters, notably de Ricqlès's review of his work on bone histology of fossil and living forms. Useful new information is offered by Robinson on acrodont teeth of *Sphenodon* and *Uromastyx* (they are really very different), Gans on uropeltid snakes (a bizarrely specialized, burrowing group), Russell on the feet of geckos, and Underwood on boid snake structure and relationships (two families are recognized; McDowell's recent work appeared too late to be adequately considered in detail). The turtlelike exoskeleton of placodonts is described by Westphal and compared with the epithecal armor of dermochelids. A speculative article by Swain considers the possibility that the evolution of the angiosperms was accompanied by the production of antiherbivore chemicals such as tannins and alkaloids. Swain argues that Mesozoic reptiles were less able to detect the presence of alkaloids than mammals and that they built up sufficient loads of these toxins to lead to eggshell thinning. Thus we are treated to yet another somewhat plausible explanation for Cretaceous extinctions.

We need books like this to demonstrate that even though a synthesis of reptilian biology may not be possible, general knowledge of the group is still an attainable goal.

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Cell Biology

Reproduction of Eukaryotic Cells. DAVID M. PRESCOTT. Academic Press, New York, 1976. x, 178 pp., illus. $14.50.

Prescott's book is intended to "organize in a single source the principal facts and observations on the cell life cycle and reproduction of eukaryotic cells in an effort to increase our overall understanding of how these cells reproduce themselves and how this reproduction is regulated." The work reviewed in the book is primarily that done since 1971, the publication date of J. M. Mitchson's *Biology of the Cell Cycle* (Cambridge University Press), to which the present volume is to be a complement. The author's emphasis is appropriate and timely: regulation and control at the genetic and molecular levels have become focal points of current work and thought in cell biology and are likely to remain so for some time.

Despite some overemphases (on synchronization methodology and on variability of G_1, for example) and some omissions, inadequate treatments, and inaccuracies (concerning chromosome movement, cytokinesis, and chromosome puffing, for example), the volume provides the reader with a good perspective of a wide range of current experiments and of the specific contexts in which they are done, and thus serves a useful pur-

pose, especially for people at the periphery of cell biology. The author also identifies areas where data are insufficient or conflicting and on the whole succeeds in delineating the extent of our factual knowledge of cell reproduction and its regulation.

It is, however, a pity that Prescott did not see fit to elevate his book from the level of a review of the current literature by incorporating some of the insights accruing from his over 20 years' experience with work on the cell cycle. Such a treatment of the subject would have made for a more interesting book and could have extended the useful life of the volume significantly beyond that of the majority of the papers reviewed.

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Atomic Physics

Atoms and Molecules in Electric Fields. NILS RYDE. Almqvist and Wiksell, Stockholm, 1976. iv, 456 pp., illus. Sw. kr. 315.

In this book Nils Ryde presents a unique survey of the spectroscopy of free atoms and molecules in electric fields. He discusses the characteristic difficulties of spectroscopic investigation of electric fields in sufficient detail to make clear why the use of spectroscopy to investigate magnetic fields has always been easier. It is no accident that Stark's discovery of the splitting of spectral lines in an electric field came so much later than Zeeman's work on the splitting of spectral lines in magnetic fields.

Ryde reviews the most fruitful experimental techniques for investigating the behavior of atoms and molecules in electric fields, from Stark's original work with canal rays to the more recent methods of optical double resonance, level crossing, and laser spectroscopy. Although he mentions the peculiarities of the Stark effect in rapidly oscillating fields, he is concerned mainly with the Stark effect in static electric fields.

The theory of the Stark effect is discussed with regard to both hydrogenic and nonhydrogenic atoms. A nice review of the use of parabolic coordinates is used to discuss the Stark effect in hydrogen. Field ionization is mentioned briefly, but much of the recent work on the ionization of Rydberg states by static or oscillating electric fields was completed too late to be included in the book. The theory of the Stark effect in molecules is also reviewed.

Approximately half the book is devoted to a thorough discussion of the literature on the Stark effect in atoms and atomic ions. Simple molecules are discussed in much less detail, with sufficient references to allow the reader to fill in the details from the original articles.

The numerous applications of the Stark effect in chemistry, plasma diagnostics, and astrophysics are mentioned, but they are not discussed in detail. The discussion of excitation mechanisms for the investigation of canal rays makes a fascinating story, and, on reading about some of the early experimental designs, one cannot help wondering if this or that Stark apparatus would have lased if appropriate mirrors had been provided.

One of the most valuable parts of the book is the extensive bibliography, which includes references to Stark's original publications in 1914 and also to articles published just before the book went to press in 1976.

The printing and proofreading of the book are excellent, and the tables and figures are instructive and well chosen. The book would be a valuable addition to any scientific or technical library.

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