

Six papers address the organization and coding properties of units in the medial geniculate body. Aitken *et al.* report finding long latencies, labile responses, and wide tuning curves in the dorsal region of the principal division. Heierli *et al.* studied functional interactions between pairs of cells and report finding almost none displaying inhibitory interaction. Rouiller *et al.* examined temporal jitter and conclude that temporal information is preserved well enough up to 1 kilohertz to deal with the fundamental frequency of most species' vocalization and with their fine structure.

The sixth section deals with auditory localization. Masterton *et al.* show that at the level of the lateral lemniscus or higher each side of the auditory pathway contains a neural representation of its contralateral hemifield sufficient to support normal sound localization. The possibility of a monaural component for localization is reported by Casseday and Smoak on the basis of deficits resulting from lesion of the anteroventral cochlear nucleus in the tree shrew. Altman directs attention to the perception of moving sound sources. Data from psychoacoustic, physiological, and clinical studies demonstrate that memorization of some properties of the stimulus must be made in order for a "fused image" to be formed, to estimate movement, and to respond to the moving sound stimulus.

The topic of section 7 is neural coding of speech and complex stimuli. Both simple artificial and species-specific vocalizations are used by Manley and Müller-Preuss to study the response of inferior colliculus neurons in the squirrel monkey. They found that vocalization elicited a higher percentage of tonic responses with clear stimulus envelope following. Müller-Preuss used electrical stimulation to induce phonation and compare the response from higher auditory centers during phonation and playback. About half the cells studied responded more weakly during phonation. Langner *et al.* report formant responses in the mynah bird to be very similar to those found in humans. Bibikov and Gorodetscaya report that adaptive changes considerably increase the synchronization of the discharges with the modulation waveform and that midbrain units are less likely than central nervous system units to respond tonically to amplitude modulation. Several papers also deal with the use of tritiated amino acids and deoxyglucose to map the auditory system.

The eighth section, on deprivation and developmental studies, has several papers dealing with the use of deoxyglucose. In particular, Taniguchi reports the

demonstration of a marked decrease in inferior colliculus activity following cochlear destruction, with a normal level of activity returning in one month.

The last section deals with auditory prosthesis. The discussion of the physiological background of hearing prosthesis by Keidel is very well done. He addresses many important questions and relates much of the research performed in his own lab. A couple of other papers relate the improvements in lipreading that take place following a single channel implant.

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## The Solar Outer Atmosphere

**Solar Active Regions.** A Monograph from Skylab Solar Workshop III. FRANK Q. ORRAL, Ed. Colorado Associated University Press, Boulder, 1981. 350 pp., illus. \$17.50.

Although historically solar physics has had much to contribute to astrophysics, the remarkable level of detail achieved in observational and theoretical solar physics over the past decade has contributed to setting it somewhat apart from the rest of astronomy. This isolation has many aspects, the most worrisome of which is perhaps the separation between the respective research communities; it is a pity because there is much in recent solar research that is of interest to the larger astronomical community. The book under review, the third and last of a workshop series dealing with data from the Skylab solar observatory, represents a valuable effort to bridge this gap: it describes our current understanding of the quiescent solar atmosphere, a subject that is of some importance not only in its own right but also from the point of view of understanding the outer atmosphere of other stars (for which data are now available) and (perhaps) other astronomical objects in which—as on the sun's surface—magnetic fields that are exposed to turbulent buffeting of fluid motions alter local plasma transport properties.

The past decade has seen a radical revision in our conceptual view of the solar atmosphere. The central role of magnetic fields in the more dramatic manifestations of solar surface activity (such as solar flares) has long been recognized; but it was not until the Skylab data were analyzed that the extent to which magnetic fields control the geo-

metric structure and energetics of even the most quiescent portions of the solar atmosphere was widely appreciated. The importance of this book largely derives from the central role played by Skylab observations in defining our new view of the solar corona and associated solar activity.

The hot solar corona and the underlying transition region separating it from the far cooler photosphere seem to be largely the product of magnetic activity. By focusing on the basic physical processes, the workshop organizers have succeeded in producing a monograph of considerable usefulness. Each chapter deals with a major theoretical issue, the issues ranging from the geometric structure of the hot plasma, and its mass and energy balance, to the vexing problems of plasma diagnostics and plasma heating; each chapter is written by the "leader" of the working group that focused on the particular topic. A nice feature of these presentations is the close tie maintained between the observations (principally from Skylab, but also from much more recent sources, such as Orbiting Solar Observatory 8 and various rocket experiments) and theory. Much attention is paid to the ambiguous nature of the data; the healthy skepticism of solar experimenters toward theorists' constructions (a habit born of experience) is much in evidence. It should thus be enlightening to those unacquainted with solar astronomy that the basic why of the hot solar corona is still not understood. We now know that magnetic fields play an essential role in the coronal heating process and have eliminated a (very) few candidate theories, but it is also clear that deciding between the remaining contenders is observationally far more difficult than was previously imagined. For example, some theories for solar coronal heating hypothesize regions of active local heating as small as a kilometer or less in extent; when viewed from the earth, such regions subtend angular dimensions well below 0.01 arc second and are thus orders of magnitude smaller than can be resolved at present. This and related observational difficulties are in fact addressed in the final chapter, on the future of observational solar astronomy. From today's rather dismal funding perspective, this book also teaches a valuable lesson: although the Skylab flight lasted less than a year, it has taken almost a decade to absorb the scientific implications; such science cannot be carried out on the operational time scale of space experiments.

Virtually all presentations are marked by a balanced treatment of (often diver-

gent) views within working groups. The reader of this book is thus not likely to be set astray by overly parochial viewpoints and can hence obtain a reasonable overview of current ideas on the processes that maintain the solar outer atmosphere in its very hot and very inhomogeneous state. The few chapters that are exceptions are rather easy to spot by virtue of the detailed attention given by some authors to their own work; this seems inconsequential. If fault is to be found with the book, it is rather in the long delay between the event and publication. As a result of the delay, some of the theoretical material (such as that on hydrodynamic stability) has already been superseded by published papers in refereed journals. This problem should not detract from the enormous usefulness of the book. It is a valuable addition to the literature on solar atmospheres, one that should be on the reading list of all who are interested in the physics of the outer layers of stars such as the sun.

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## Life of a Giant Lizard

**The Behavioral Ecology of the Komodo Monitor.** WALTER AUFFENBERG. University Presses of Florida, Gainesville, 1981. x, 406 pp., illus., \$45. A University of Florida Book.

He is coming at you, flicking his tongue. He is almost three meters long and, with a meal in his stomach, can weigh over 200 kilograms. His rapid gait sounds somewhat like "a muffled machine gun." His kind has been known to attack and kill humans. This is the Komodo dragon pictured on the dust jacket of this new book on the world's largest lizard. If the jacket doesn't grab your attention perhaps the book cover will; it is textured like reptile skin.

Despite this veneer of sensationalism, this book is a substantial and serious account of the ecology and behavior of the Komodo monitor. Indeed, the author spends many pages correcting misconceptions in the literature about the biology of *Varanus komodoensis*. He scrupulously avoids idle speculation, carefully documenting his conclusions.

Large chapters are assigned to macro- and microecology, activity and movement, demography, reproduction, feeding dynamics, scavenging, predation, and inter- and intraspecific coactions. Subjects that fit under more than one

heading are often treated in more than one chapter. This repetition is conspicuous, but not excessive. It makes the chapters independent and makes information accessible to readers with specific interests without obligating them to track through the whole book.

Few readers are likely to be interested in all the material in this book, but portions should interest scientists in fields well beyond herpetology and behavioral ecology. Geographers will find extensive edaphic, climatic, and vegetational data on the Lesser Sunda Islands (Republic of Indonesia), where *V. komodoensis* lives. Botanists will be surprised and presumably pleased by all the attention given plant communities in this ostensibly zoological treatise. Researchers concerned with conservation of rare and endangered species may focus on the book's epilogue, where Auffenberg addresses the topic of wildlife management.

The many tedious man-months that Auffenberg spent behind blinds watching

monitors are revealed in the details of his ethograms. Everything has been recorded down to the sneezes of lizards trying to dislodge fly larvae from their nasal passages while feeding on carrion.

The ecological core of the book documents that *V. komodoensis* is an opportunistic predator "more similar to unspecialized predaceous mammals than to most reptiles." Comparisons with top carnivores elsewhere in the world show that this giant lizard does differ from predaceous mammals in being able to sustain a higher predator-to-prey ratio and in having a smaller hunting range. Consistent with this is the fact that average daily meat ration is much lower in the Komodo monitor than in mammals of comparable size. Though such results may seem predictable, they are impressively quantitative in the present work.

A few topics given little or no coverage stand out just because the book is otherwise so comprehensive. Among these are some that are dealt with more



Dominant male Komodo monitor of Loho Liang, Komodo. [From *The Behavioral Ecology of the Komodo Monitor*]