

schist-eclogite zones. Unlike most Phanerozoic (dominantly Mesozoic) high-pressure belts, eclogitic pods and complexes in a variety of Siberian, Uralian, and Mongolian orogenic zones of the U.S.S.R. have late Proterozoic or mid-Paleozoic crystallization ages (Soblev *et al.*), as indicated by geologic relationships and rubidium-strontium and uranium-lead radiometric dating. Some Russian eclogites are associated with ultramafic diapirs and may represent deep upper-mantle fragments, whereas others reflect high - pressure - intermediate - temperature conditions appropriate to basal portions of thick continental crust (see also Newton); still others occur as clasts in olistostromes, as extensive tracts of glaucophane schist, and as ophiolite-decorated suture zones. Overviews and details of recrystallization and contemporaneous deformation in Phanerozoic Japan—type-locality for paired metamorphic belts—are presented (Banno; Kunugiza *et al.*; Toriumi and Masui; Maekawa). Owing to post-convergence terrane reshuffling, some of the original pairings have been obliterated. The final chapter (Yokoyama *et al.*) summarizes mid-Tertiary blueschist-eclogite facies metamorphism in New Caledonia and documents the mineral parageneses, spacing, and shallow dips of isogradic surfaces, as well as an apparent increase in thermal gradient in the more intensely recrystallized rocks. According to these authors, geologic data are not in accord with profound burial; hence pressures exceeding 10 kbar required by mineral thermobarometry are postulated to reflect tectonic overpressures at relatively shallow crustal levels.

This memoir brings together for the first time integrated, modern observational, theoretical, and laboratory data bearing on this tectonically significant suite of rocks. Impressive because of their near ubiquity are the described association of high-pressure-low-temperature mineral assemblages with oceanic crust and deep-sea sediments, serpentinized mantle material, imbricate thrust belts, and tectonic melanges and the virtual confinement of these provocative features to Phanerozoic convergent plate junctions. Protoliths are extremely variable in composition, and pressures of metamorphism evidently ranged from approximately 4 to 25 kbar. The compendium has been meticulously edited and is abundantly illustrated but lacks a subject index. It is required reading for metamorphic petrologists and tectonicians and will be useful for many years to come.

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Memory Systems

Synapses, Circuits, and the Beginnings of Memory. GARY LYNCH with commentaries by GORDON M. SHEPHERD, IRA B. BLACK, and HERBERT P. KILLACKEY. MIT Press, Cambridge, MA, 1986. xii, 124 pp., illus. \$22.50. The Cognitive Neuroscience Institute Monograph Series. A Bradford Book.

In this interesting monograph Gary Lynch, one of the most innovative and productive researchers on the neurobiology of memory, sets forth his ideas on the cellular mechanisms that underlie memory in the brain and the network of neurons that participate in memory storage. Though the book can be criticized for its selective presentation of data and its brief or nonexistent treatment of alternative ideas, it offers a valuable glimpse into the reasoning of an active scientist who is attempting to make sense of an array of incomplete and often inconsistent data.

Though written for a general neuroscience audience, the book assumes familiarity with long-term potentiation (LTP) and central nervous system anatomy. After a flawed introduction by Michael Gazzaniga, in which the development of the brain-slice technique and the discovery of LTP are incorrectly attributed to Lynch, Lynch briefly describes his theory of LTP, according to which glutamate receptors are unmasked through the action of Ca^{2+} on the fodrin-degrading enzyme calpain. However, little of the book is devoted to the extensive work of Lynch and his colleagues on LTP and the LTP correlates of calpain-fodrin manipulations. Rather, in a surprising departure from his past focus on the hippocampus, Lynch introduces the olfactory system as a model for studying the associative interconnections, termed combinatorial circuits, widely thought to be required for memory and cognitive systems.

The olfactory system was chosen as a model because of its unusually clear combinatorial neuronal architecture. Lynch's emphasis on combinatorial systems and the specific features of the olfactory system provides an intriguing alternative to topographic theories that concern cerebellum-brainstem and hippocampus-neocortex, among other systems. Although he implicitly contrasts the combinatorial and topographic approaches, Lynch gives little consideration to topographic ideas and none to conceptual similarities between topographic and combinatorial memory theories. Notwithstanding his statement that the olfactory modality "has direct and well-defined connections with subcortical structures that play a prominent role in human memory" (p. 3), there are many differences between olfactory

learning and memory and more commonly studied systems. The validity of the approach, as always, will depend on the ability of the model to provide insight into brain processes in memory. The book is sure to generate controversy (at one point Lynch writes, "It seems unlikely that behavioral pharmacology can be used satisfactorily to test hypotheses about memory") and to stimulate new thought and experiments.

The book closes with three papers described as commentaries. Gordon Shepherd presents a fascinating analysis of the possible role of dendritic spines in plasticity, showing by means of computer modeling the interactions between adjacent spines. Ira Black describes recent findings of the flexibility of transmitter systems and provides a needed contrast to Lynch's emphasis on postsynaptic processes. Herbert Killackey reviews the conference that spawned this book and discusses the role of neocortical anatomy in focusing ideas about the brain's memory systems. These are not strictly commentaries, as they go beyond Lynch's theses, but they are well worth reading in their own right.

As with many theories in their early stages, there are holes and inconsistencies in Lynch's work. Yet it is a testimony both to Lynch and to the rapid advances in the study of brain substrates of memory that such ideas can be seriously advocated and considered.

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Comparative Ecology

Ecology and Natural History of Desert Lizards. Analyses of the Ecological Niche and Community Structure. ERIC R. PIANKA. Princeton University Press, Princeton, NJ, 1986. xii, 209 pp., illus., + plates. \$45; paper, \$19.95.

Lizards have been touted as model organisms in ecology, and Eric Pianka's efforts have played a major role in focusing the attention of ecologists on these fascinating animals. In addition, Pianka's detailed quantitative observations on resource partitioning in assemblages of lizards have become paradigmatic of an entire approach to community ecology. Thus this monograph, an overview and synthesis of Pianka's empirical work, will be greeted with interest.

The monograph is organized through the descriptive comparison of lizard communities in three desert ecosystems. The Great Victoria desert in Australia, the Kalahari semi-desert of Africa, and the Great Basin—

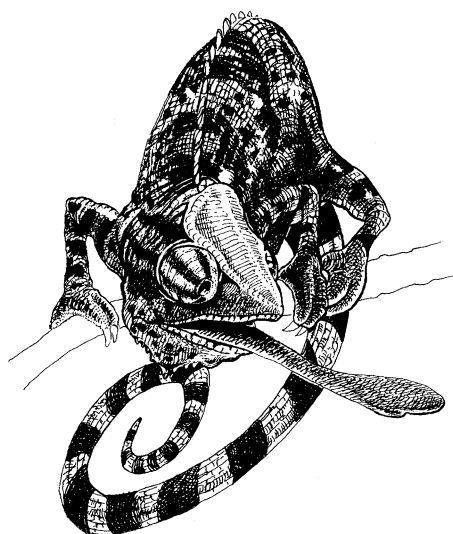
Sonoran deserts of North America offer three sets of communities whose members have independent phylogenetic affinities and thus represent three independently evolved desert systems. The three areas differ dramatically in the numbers of lizard species and in the population densities of those species. Comparative ecology in these assemblages offers the potential for considerable insight into problems of species coexistence, convergent evolution, and a host of autecological questions. With this in mind, Pianka reviews the data he has collected over the last two decades, adds new results, and, in extensive tabular appendixes, put his life's work on display for anyone to use in further hypothesis testing.

The monograph includes extensive data on the thermal relations, activity patterns, foraging modes, reproductive tactics, and morphology of 60 to 90 or more species (depending upon the topic), but nearly all the data are focused upon one theme: how do coexisting species differ? Observed differences are discussed in terms of their importance in avoiding or of having evolved in response to interspecific competition.

Pianka's approach to community ecology depicts a group of species within some major taxon as a static unit at or near equilibrium with respect to relative abundances of species and patterns of resource use. Resources are the factor limiting abundance, and nearly all the resources that are available are used up by the community as a whole. In this sense the community is very much the sort of "super-organism" envisioned by the American plant ecologist Frederick Clements.

There is nothing intrinsically wrong with this point of view as a hypothesis, testable in principle by manipulative experiments. And here in Pianka's monograph the reader will find a crossroads: no such experiments are reported, and indeed in the final chapter the author states that they are not feasible. There are no attempts to test any of the fundamental assumptions upon which the entire theory of resource partitioning is based. Pianka takes the assumptions as true and proceeds to interpret all of his data in the light of one theoretical construct. He gives mention of alternative explanations in every chapter, but it is clear that he puts little stock in them. This is a crossroads because this very issue, whether analyses of observational data alone are sufficient to test any single ecological hypothesis, has been at the core of a vigorous and often bitter argument among ecologists for the past decade. Pianka, whose approach to ecology has been at the center of that debate, cites its literature only in passing.

Whether the approach to ecology this



"*Chameleo dilepis*, a bizarre and uncommon arboreal lizard in the eastern Kalahari." [From *Ecology and Natural History of Desert Lizards*]

monograph represents and the conclusions derived therefrom are correct or not is an empirical problem; only further study and, in my view, experimentation will resolve this issue. For many animals, regardless of taxon, the manipulative experiments are difficult to perform and require long time periods for conclusive results to be obtained. Thus resolution of the more general issues will be a long time coming. Nonetheless, in Pianka's book we have a monograph that is full of information, thoroughly interesting, and provocative from start to finish. Different ecologists will be provoked in different ways, but if they are provoked enough to perform more empirical studies on lizard communities, then Pianka's book will stand as a landmark in the literature.

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Reprints of Books Previously Reviewed

Foundations of Space-Time Theories. Relativistic Physics and Philosophy of Science. Michael Friedman. Princeton University Press, Princeton, NJ, 1986. Paper, \$14.50. *Reviewed* 222, 1007 (1983).

Historical Writing on American Science. Perspectives and Prospects. Sally Gregory Kohlstedt and Margaret W. Rossiter, Eds. Johns Hopkins University Press, Baltimore, 1986. Paper, \$15. *Reviewed* 232, 406 (1986).

Books Received

American Electoral Mosaics. J. Clark Archer and Fred M. Shelley with cartography by Ellen R. White. Association of American Geographers, Washington, DC, 1986. x, 97 pp. Paper, \$6. Resource Publications in Geography.

Andrology. Male Fertility and Sterility. John D. Paulson *et al.*, Eds. Academic Press, Orlando, FL, 1986. xxiv, 656 pp., illus. \$89.

Antigenic Variation in Infectious Disease. T. H. Birkbeck and C. W. Penn, Eds. IRL Press, McLean, VA, 1986. x, 170 pp., illus. \$58; paper, \$36. Special Publications of the Society for General Microbiology, vol. 19. Based on a symposium, Nottingham, UK, Sept. 1985.

Arterial Behavior and Blood Circulation in the Brain. George Mchedlishvili. John A. Bevan, Ed. Consultants Bureau (Plenum), New York, 1986. xvi, 338 pp., illus. \$75.

Artificial Intelligence and Expert Systems Sourcebook. V. Daniel Hunt. Chapman and Hall (Methuen), New York, 1986. xii, 315 pp., illus. \$34.50. Advanced Industrial Technology Series.

Atlas of the Human Oocyte and Early Conceptus. Lucinda L. Veeck. Williams and Wilkins, Baltimore, 1986. xviii, 331 pp. \$110.

The Automated Battlefield. Frank Barnaby. Free Press (Macmillan), New York, 1986. x, 180 pp. + plates. \$18.95.

Basic Methods in Molecular Biology. Leonard G. Davis, Mark D. Dibner, and James F. Battey. Elsevier, New York, 1986. xii, 388 pp., illus. Spiral bound, \$35.

Bee Genetics and Breeding. Thomas E. Rinderer, Ed. Academic Press, Orlando, FL, 1986. xvi, 426 pp., illus. \$65.99.

Bergey's Manual of Systematic Bacteriology. Vol. 2. Peter H. A. Sneath *et al.*, Eds. Williams and Wilkins, Baltimore, 1986. xxiv pp. + pp. 965-1599, illus. \$65.50.

Biochemical and Molecular Epidemiology of Cancer. Curtis C. Harris, Ed. Liss, New York, 1986. xx, 473 pp., illus. \$140. UCLA Symposia on Molecular and Cellular Biology, New Series, vol. 40. From a symposium, Steamboat Springs, CO, April 1985. Reprinted in part from the *Journal of Cellular Biochemistry*, vols. 29 and 30.

Cool Stars, Stellar Systems, and the Sun. M. Zeilik and D. M. Gibson, Eds. Springer-Verlag, New York, 1986. xii, 501 pp., illus. \$46.40. Lecture Notes in Physics, 254. From a workshop, Santa Fe, NM, Oct. 1985.

Cooperation in Science and Technology. An Evaluation of the U.S.-Soviet Agreement. Catherine P. Ailes and Arthur E. Pardee, Jr. Westview, Boulder, CO, 1986. xxviii, 334 pp. Paper, \$26. Westview Special Studies in Science, Technology, and Public Policy.

The Correspondence of Henry Oldenburg. Edited and translated by A. Rupert Hall and Marie Boas Hall. Taylor and Francis, Philadelphia, 1986. Vol. 12, Oct. 1675-July 1676. Letters 2755-2940. xxii, 409 pp., illus. \$81. Vol. 13, July 1676-July 1681. Letters 2941-3139. Additions and Corrections to Vols. 1-11. xxx, 459 pp., illus. \$81.

Criminal Careers and "Career Criminals." Vol. 1. Alfred Blumstein *et al.*, Eds. Panel on Research on Criminal Careers, National Research Council. National Academy Press, Washington, DC, 1986. xvi, 458 pp., illus. \$34.95.

Culture, Politics, and Medicine in Costa Rica. An Anthropological Study of Medical Change. Setha M. Low. Redgrave, Bedford Hills, NY, 1985. xii, 131 pp., illus. Paper, \$14.95.

Data Base Organization for Data Management. Sakti P. Ghosh. 2nd ed. Academic Press, Orlando, FL, 1986. xiv, 487 pp., illus. \$65; paper, \$39.50. Computer Science and Applied Mathematics.

Design Sensitivity Analysis of Structural Systems. Edward J. Haug, Kyung K. Choi, and Vadim Komkov. Academic Press, Orlando, FL, 1986. xvi, 381 pp., illus. \$60; paper, \$34.95. Mathematics in Science and Engineering, vol. 177.

The Developmental Field Concept. John M. Opitz, James F. Reynolds, and LaVelle M. Spano, Eds. Liss, New York, 1986. xvi, 476 pp., illus. \$65. Also published in *American Journal of Medical Genetics*, vol. 21, no. 1, 1985, and supplement 2, 1986.

Developmental Neuropsychobiology. William T. Greenough and Janice M. Juraska, Eds. Academic Press, Orlando, FL, 1986. xx, 485 pp., illus. \$64.50; paper, \$33.50. Behavioral Biology.

Dialogues with Scientists and Sages. The Search for Unity. Renée Weber. Routledge and Kegan Paul, New York, 1986. xvi, 256 pp., illus. Paper, \$14.95.

Examining the Submicron World. Ralph Feder, J. Wm. McGowan, and Douglas M. Shinozaki, Eds. Plenum, New York, 1986. xii, 372 pp., illus. \$65. NATO Advanced Science Institutes Series B, vol. 137. From an institute, Nova Scotia, Canada, July 1984.

Excavations at Tepe Yahya, Iran 1967-1975. The Early Periods. Thomas Wright Beale *et al.* C. C. Lam-