on, and vector. Purists might quarrel with this choice, but I would agree with Buchwald that if one truly wants to make sense of the history of electromagnetic theory, unified mnemonic notation is a necessity. Beyond this, Buchwald is concerned to establish the differences between the Maxwellian and the modern formalisms by explicit comparison and contrast, and uniform vector notation is a great help in this. Both for substantive reasons and for the sake of appearances, however, I wish that Buchwald had been more explicit in specifying the relationships between his renderings of the mathematical arguments and the originals, as regards both notation and content. Also, more careful and explicit definition of symbols would have been a help to the reader. These caveats notwithstanding, the book is required reading for anyone with a serious interest in the history of electromagnetic theory and represents a major contribution to the field.

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Papers from Khabarovsk

Beringia in the Cenozoic Era. V. L. KONTRIMAVICHUS, Ed. Balkema, Rotterdam 1985 (U.S. distributor, International Publishers Service, Accord, MA). xvi, 724 pp., illus. $38.50. Russian Translations Series, 28. From a symposium, Khabarovsk, May 1973. Translated from the Russian edition (Vladivostok, 1976).

The Special Foreign Currency Science Information Program made funds available to the U.S. Geological Survey to translate and publish this collection of papers presented at the All-Union Symposium on Beringia held in Khabarovsk in 1973. Beringia is that area of northeastern Asia and northwestern North America that lies north of 50° latitude between the Lena River, U.S.S.R., and the Mackenzie River, Canada. The interest of some scientists has been focused on this region because of the periodic emergences of the Bering land bridge, each lasting thousands of years, during the roughly two million years of the Quaternary as well as extended episodes during the Tertiary. The dynamics of landmass and sea level that controlled the existence of the land bridge and the exchange of the biota that this connection allowed continue to fascinate.

The Khabarovsk symposium was stimulated by the very successful one convened at the 1965 Congress of the International Union for Quaternary Research in Boulder. The volume that resulted from the earlier symposium (*The Bering Land Bridge*, D. M. Hopkins, Ed., Stanford University Press, 1967) contained several papers by Soviet scientists, but these gave us only a glimpse of the work being done in the U.S.S.R. The 1973 symposium, followed in 1976 by the publication of the papers (in Russian with English abstracts), more fully displayed the extent of the Soviet research. Contributors from the United States, Finland, East Germany, Hungary, and Switzerland rounded out the picture. Naturally the impact of the volume was limited to those who read Russian or were able to have translations made. Now the complete translation opens the work to a much wider audience.

Some of the papers are short, no more than extended abstracts, and most are rather broad-brush generalizations of the type endemic to symposium volumes. Nevertheless, we can read their conclusions, be introduced to the Soviet literature, and also appreciate how much of the English-language literature the Soviet scientists have incorporated into their syntheses. One difficulty lies in the vagueness of the geographic context, fossils, cores, and even mountain ranges typically not being placed with any precision.

The volume opens with ten papers that deal very generally with geologic structure, vegetation, and the invertebrate fauna of marine deposits. A section of 15 papers on the vegetation and paleogeography of Beringia includes studies of macro- and microfossils as well as contemporary floristics. These tend repetitively to demonstrate continuous and disjunct distributions as a confirmation of the Beringian connection of the two continents. Yurtsev's opening paper is one of the few that fully develops mechanisms and timing of exchanges as well as descriptions. His concept of temporal zonal dynamics in Beringia has already been assimilated into our botanical literature. Faunistic studies are divided into sections on fossil and contemporary taxa. The review of mammalian relationships by Sher is a nice companion to Yurtsev's paper in that Sher also establishes the basic outlines with evidence from both eastern and western Beringia. Eleven papers deal with the migration and evolution of such diverse taxa as esocoid fishes, birds, voles, and of course the megafauna and associated predators. Guthrie's paper on the environmental influences on body size, social organs, and population dynamics of mammals is not a review but original and should be consulted for a fuller understanding of his position in the debate over late-glacial paleoecology. Six papers are devoted to mammals (three of these to interesting karyological studies), three to insects, and one to the helminths of mustelids. Ten papers on human prehistory discuss the movement of antecedent cultures from the Old World to the New with evidence from archeology and (in one paper) population genetics.

The drawings, graphs, and maps were redrafted, but unfortunately no attempt was made to reduce the clutter of many, so that in the final, smaller, format of the translation volume the obscurity has been preserved or worsened. The reproduction of the photographs, which was mediocre in the original, is often poor. Misspellings and errant word choice are common. Altogether not a particularly good job of production has been done.

Although some conclusions have been modified in the decade since its first publication, the book remains a good reference. I value it for the papers that provide background for the Soviet contributions to the Burg Wartenstein conference of 1979 and the subsequent volume edited by Hopkins and others (*Paleoecology of Beringia*, Academic Press, 1984). The record of the Khabarovsk symposium is a significant link in a growing chain of statements, challenges, and replies that testify not only to sustained but also to increasing interest in Beringian history, here and abroad.

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Herpetology in the Pacific

Biology of Australasian Frogs and Reptiles. GORDON GRIGG, RICHARD SHINE, and HARRY EHMANN, Eds. Published in association with the Royal Zoological Society of New South Wales by Beatty, Chipping Norton, N.S.W., Australia, 1985. xvi, 527 pp., illus., + plates. $59. From a conference, Aug. 1984.

This volume presents papers from a conference held in Sydney in 1984. The program comprised eight symposia that form the sections of the book: Population Ecology, Ecological Biogeography, Phylogeny of Elapid Snakes, Reproductive Biology, Physiological Ecology, Rare and Endangered Species, and Husbandry and Snakebite. The 63 chapters reveal diverse approaches to herpetological research. The treatment of population ecology is disappointing. Many of the papers are purely descriptive, and few integrate information beyond the context of the individual study. Among the exceptions is T. D. Schwaner's account of morphological variation in the populations of tiger snakes on several islands off the coast of South Australia. The islands were isolated from each other and from the mainland by rising sea levels some 6,000 to 10,000 years ago. The snakes on the islands vary in mass

(by as much as sixfold), in sexual dimorphism (males the same size as females or larger), and in the distribution of individuals among age classes (unimodal or bimodal). Schwaner suggests that the maximum size of snakes on an island is related to the size of the prey available, which varies from island to island. The smallest snakes occur on islands where lizards are the principal prey, and progressively larger snakes are found on islands where the snakes prey on house mice, rats, and bandicoots. Sexual dimorphism may be correlated with differences in food habits of male and female snakes. In a later chapter R. Shine points out that sexual dimorphism among elapid snakes is frequently associated with male-male combat and sexual selection, suggesting the possibility of differences in social behavior among the island populations that parallel the differences in sexual dimorphism.

The section on biogeography focuses on the long history of the amphibian and reptilian faunas of Australia, New Zealand, and the islands of the western Pacific. J. D. Roberts and L. R. Maxson summarize their view that, contrary to previous interpretations, the diversity of frogs in southwestern Australia has resulted from speciation in situ rather than from multiple invasions from the east. They tentatively place the date for east-west divergences in the Tertiary. G. F. Watson and M. J. Littlejohn favor Pleistocene changes in sea level as the basis for speciation among frogs of southeastern Australia. These events also enter largely into J. R. H. Gibbons's ambitious synthesis of geological, climatological, and biological factors to explain the distribution of reptiles and amphibians in the archipelagos of the southwestern Pacific. When water gaps between islands were narrower, Gibbons suggests, species with reproductive characteristics such as internal fertilization, direct developing eggs, parthenogenesis, and long incubation times were able to colonize new habitats by rafting. Other species, particularly on New Zealand, represent ancient lineages that have radiated in situ.

The most dramatic example of speciation in the Australasian region is the elapid snake fauna of the Australian mainland, and a quarter of the book is devoted to this subject. In the near or complete absence of vipers and colubrid snakes, elapids have radiated into a continent-wide complex of some 75 species. The origin and phylogeny of that radiation are addressed by authors using techniques ranging from microcomplement fixation (Schwaner *et al.*) and venom proteins (M. Tamiya) through karyotype (M. King, G. A. Mengden) to soft tissue morphology (V. Wallach) and ecology and behavior (Shine). Points of agreement include regarding Australian elapids as a natural group, distinct from the elapids of Asia and Africa but close to the hydrophiine sea snakes. Affinities within the Australian snake fauna are more problematic, but a split between viviparous and oviparous lineages suggested on ecological grounds by Shine receives support from other approaches.

The papers on reproductive biology and physiological ecology are mostly descriptive and make no attempt to formulate or test hypotheses. Notable exceptions are syntheses of information about viviparity among reptiles by Shine and by L. J. Guillette. Shine emphasizes the association of viviparity with cold climates in Australia, a relationship that has previously been noted on other continents. Guillette suggests a mechanism by which an environmental stress, such as low temperature, could act through the general adaptation syndrome to prolong the secretory activity of the corpus luteum and thereby promote the retention of eggs in the oviducts as a preliminary step toward viviparity.

The sparse information about the ecology of most species of Australasian amphibians and reptiles makes conservation difficult. M. J. Tyler and M. Davies point out that in less than a decade the gastric brooding frog (*Rheobatrachus silus*) was discovered, attracted worldwide attention because of its unique mode of reproduction, and disappeared: No individuals have been seen in the field in the past five years. What is the normal abundance of this species—the large populations that existed in 1973, when it was discovered, or its current invisible state? The difficulties of shaping effective protection for poorly known and possibly rare species of amphibians and reptiles are outlined by H. Ehmann and H. Cogger, who produce estimates of the annual mortality of Australian reptiles and frogs suggesting that road kills and habitat destruction are the major categories of mortality resulting from human activities. Protective legislation is currently based on regulating the collection of animals for commercial and scientific purposes, uses that are estimated to account for less than 1 percent of the total human-induced mortality. (Ironically, the only major commercial exploitation of reptiles in Australia—the capture of sea snakes for their skins—is not regulated because Queensland does not classify sea snakes as reptiles.) Ehmann and Cogger make a strong plea for protection of habitats rather than protection of species.

The volume is enhanced by color photographs. Few of these are directly relevant to the text, but they are among the finest photographs of Australian amphibians and reptiles I have seen.

This volume is remarkable in that it summarizes the activities of the herpetologists of an entire continent, drawing participants from all parts of Australia and the Pacific and from a variety of settings—universities, museums, zoos, and government departments. It thus provides a rare opportunity to evaluate the state of the discipline. Biogeography and systematics emerge as the strongest areas of research, partly because of the well-organized symposium on elapid snakes. Ecology and physiological ecology are represented by important individual contributions, but experimental and broadly integrative approaches are more the exception than the rule. Studies of behavior are surprisingly few. The unique phylogenetic and geographic histories of the Australian herpetofauna provide opportunities for ecological, physiological, and behavioral research that have yet to be fully exploited.

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Reprints of Books Previously Reviewed

Evolution of Insect Mating Systems. Randy Thornhill and John Alcock. Harvard University Press, Cambridge, MA, 1986. Paper, $19.95. *Reviewed* **223**, 808 (1984).

The Mathematical Theory of Quantitative Genetics. M. G. Bulmer. Clarendon (Oxford University Press), New York, 1986. Paper, $19.95. *Reviewed* **212**, 320 (1981).

The Periodic Table. Primo Levi. Shocken, New York, 1986. Paper, $6.95. *Reviewed* **228**, 66 (1985).

The Psychology of Literacy. Sylvia Scribner and Michael Cole. Harvard University Press, Cambridge, MA, 1986. Paper, $10.95. *Reviewed* **215**, 1494 (1982).

Books Received

Ancient Sedimentary Environments and Their Sub-surface Diagnosis. Richard C. Selley. 3rd ed. Cornell University Press, Ithaca, NY, 1986. xviii, 317 pp., illus. $49.50; paper, $19.95.

Applications of Circulary Polarized Radiation Using Synchrotron and Ordinary Sources. Fritz Allen and Carlos Bustamante, Eds. Plenum, New York, 1985, xii, 193 pp., illus. $45. From a workshop, Albuquerque, NM, May 1984.

Applied Classical Electrodynamics. Vol. 1, Linear Optics. F. A. Hopf and G. I. Stegeman. Wiley-Interscience, New York, 1985. x, 262 pp., illus. $29.95. Wiley Series in Pure and Applied Optics.

Applied Polymer Science. Roy W. Tess and Gary W. Poehlin, Eds. 2nd ed. American Chemical Society, Washington, DC, 1985. x, 1342 pp., illus. $59.95. ACS Symposium Series, 285.

Arterial Variations in Man. Classification and Frequency. Herbert Lippert and Reinhard Pabst. Bergmann, Munich, 1985. vi, 121 pp., illus. $29.

The Burning Forest. Essays on Chinese Culture and Politics. Simon Leys. Holt, Rinehart and Winston, New York, 1986. xiv, 257 pp. $16.95. A New Republic Book.

Causation of Cardiovascular Risk Factors in Children. Perspectives on Cardiovascular Risk in Early Life. Gerald S. Berenson, Ed. Raven, New York, 1985. xxii, 408 pp., illus. $69.50.

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