

do not explicitly address the question, but little in the timing of the climatic changes they describe seems out of phase with equatorial or Northern Hemisphere events. There are a few suggestions of an early Holocene thermal maximum, but early post-glacial warming is known in climatically similar parts of the Northern Hemisphere such as Alaska.

A major exception is a paper on paleoclimatology by Harrison *et al.* that incorporates a substantial lag in its model of the last glacial-interglacial transition. Data to support the model are partly marine and are not presented in sufficient detail to permit comparison with the evidence of the many other authors who imply interhemispheric simultaneity. Evidence of simultaneous change comes from the land, not the ocean, so the issue cannot be regarded as settled. Most current theorists of climatic change believe that astronomical irregularities in the terrestrial distribution of solar energy produce climatic oscillations by changing the size of Northern Hemisphere ice sheets. It is not inconceivable that the marine temperature effects of waning northern glacier ice might first become apparent in the southern ocean, but it is difficult to imagine how that would happen without simultaneously affecting the climate of the southern lands. Some of the apparent field facts or their theoretical interpretation must be faulty.

The book provides enlightenment and provocation on scales from that of a time series model embracing the entire climatic history of the earth to scanning electron microscopy of a minute charcoal fragment. The Taung site has been dated: it is apparently less, perhaps much less, than a million years old. Great progress is reported in the study of arid landforms, especially dunes. Those of Australia are much better dated by radiocarbon than those of Africa, but nowhere have the new radiometric methods more suitable for wind-blown silts and sands been widely employed. Africanists will enjoy Cooke's lucid history of horses, elephants, and pigs, Butzer's well-balanced multidisciplinary assessment of the late Quaternary, and the new paleoclimatic evidence from caves. Equally valuable are Bowler and Wason's sweeping review of ice-age environments in inland Australia, Mildenhall and Pocknall's account of the Miocene and Pliocene paleobotany of New Zealand, and Mercer's summary of South American glacial geology. Mercer soberly reminds us of field evidence that is not consistent with current ideas about climatic change.

The last chapter of the book is a synopsis of a workshop on climate change and mammalian evolution that followed the symposium. The workshop concluded that two

episodes of biological change, one around the end of the Miocene at 7 to 5 million years ago and one in the late Pliocene at 2.5 to 2 million years ago, seem especially suitable for study concerning possible climatic effects. A plausible case can be made for these as times of rapid global climatic change.

The book can be read with pleasure and profit by anyone interested in climatic change, in evolution, or in the general geology of late Cainozoic time. It will compensate them, as it did me, for missing an excellent meeting.

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## The Austronesian Expansion

**Prehistory of the Indo-Malaysian Archipelago.** PETER BELLWOOD. Academic Press, Orlando, FL, 1986. xii, 370 pp., illus. \$58; paper, \$34.50.

Bellwood's *Prehistory of the Indo-Malaysian Archipelago* concentrates on Indonesia and Malaysia because of their central position in the spread of early Austronesian language and culture. He relates evidence from biological anthropology, archeology, linguistics, and ethnology in reviewing the peopling of this area. The survey, from the first prehistoric human occupation to the historically documented civilizations, offers a long-term cultural development perspective essential for understanding modern ethnolinguistic diversity.

A detailed discussion of Pleistocene geology and environment emphasizes the impact of changing sea levels on land migration routes into the main island groups. The earliest peoples in Asia are seen as belonging to *Homo erectus*; these small scattered populations came as migrants originally out of Africa and were in Java more than 1,000,000 years ago. Still problematic for the archeologist is that evidence of culture, even in the form of stone tools, has not been found in direct association with the early fossils. The Hoabinhian, perhaps the earliest widely accepted stone tool complex in Southeast Asia, dates to the terminal Pleistocene and early Holocene; Bellwood accepts the Sonviian tools from northern Vietnam, at around 23,000 B.C., as the oldest known. Ax-like stone tools with cutting edges finished by grinding occur unexpectedly early throughout East Asia and Australia: in Japan (30,000 years ago), Australia (20,000 years ago), and Indo-Malaysia (more than 10,000 years ago?). Bellwood holds out the possibility of as yet unclarified relationships

between early Japanese tools and those found in Southeast Asia.

Bellwood sees "the main Austronesian expansion between 3000 and 1000 B.C. as the foundation for major biological, linguistic, and cultural changes in the prehistory of the archipelago" (p. 320). The early view that waves of migrants inundated Southeast Asia from the north and introduced new technology and languages is shown here to be inconsistent with much available evidence; however, the Austronesians are still seen as derived from the north, specifically South China, via Taiwan. Bellwood ties the Austronesian expansion to agriculture and challenges two widely held ideas about early food production in the tropics: that cultivation of vegetative planting species preceded that of the cereals, and that agriculture began in an "affluent foragers" condition of leisure and plenty. Agricultural origins in Southeast Asia are reinterpreted in terms of shifting emphases, with dominance of cereals prior to 4500 B.C., then an increase in the importance of tubers, spread of tuber and fruit cultivation into new areas, and complicated developments involving wet rice and animal husbandry in Indo-Malaysia.

The pre-Austronesian occupants of Indo-Malaysia—except in the Malay Peninsula—were not practicing food production in the sense of purposeful cultivation of plants, according to Bellwood. Root crop cultivation was being developed early in the New Guinea highlands, however, and a case could be made that a similar process of increasing control over food resources was under way in Indo-Malaysia prior to Austronesian expansion.

Bellwood finds the earliest center for annual rice cultivation at about 5000 B.C. in China's Lower Yangtze drainage, and this center is independent from others in India and possibly Thailand. Rice was introduced into Taiwan, the homeland Bellwood posits for the Initial Austronesian language group, before migrants moved from there on to the Philippines. The earliest dates for rice in Taiwan become critical in this interpretation, then. The lack of evidence from Indonesia makes an assessment of early Austronesian food production difficult; Bellwood offers a credible hypothesis.

The working hypothesis that "the Austronesian languages of Sumatra, Malaya, and Vietnam (and possibly Java?) were not established prior to about 1000 B.C. or later in some areas" (p. 123) is generally acceptable. At about that time Indo-Malaysia was rapidly brought into the Neolithic world. That this was without population replacement (p. 168) brings into question the mechanisms of such a major shift in language, culture, and thus, potentially, in

physical type. These issues will continue to be debated.

The logical antecedents of western Oceania's Lapita pottery complex are to be found in mid-second-millennium B.C. eastern Indonesia. According to Bellwood, the pottery here may have lacked the well-established Lapita's intricate and complicated designs, but this seems to sidestep the derivation question. Reassessment of the antiquity of the Proto-Oceanic language grouping so that "the spread of the ancestral Polynesian Lapita culture through Melanesia after about 1600 B.C. correlates in linguistic terms with the period of Proto-Oceanic" (p. 322) fits more closely with the views of other Pacific archeologists.

In this volume, Bellwood ties together diverse findings into a masterly synthesis of early Southeast Asian prehistory and Austronesian origins. The book is essential reading for anyone interested in the prehistory of Southeast Asia.

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## Some Other Books of Interest

**The Genus *Coelomomyces*.** JOHN N. COUCH and CHARLES E. BLAND, Eds. Academic Press, Orlando, FL, 1985. xvi, 399 pp., illus. \$84.50.

The fungal genus *Coelomomyces* was discovered by David Keilin in 1921. These fungi, writes Bland in the preface to this volume, are of interest for having "a life cycle that is unique among all known fungi, i.e., a pattern involving alternation of sporophytic and gametophytic phases between obligate mosquito/chironomic hosts and copepod hosts, respectively." Moreover, "because of their narrow host range and high degree of lethality" they are of potential use in the biological control of mosquito vectors of disease. This review of the genus opens with a brief introduction followed by accounts of life history (H. C. Whisler) and structure and development (Bland and Couch). A 217-page treatment of the taxonomy of the genus is then provided by Couch and Bland. There follow treatments of experimental systematics (B. A. Federici), physiology and biochemistry (R. A. Nolan), and culture (Bland). Biological control is the focus of the two final chapters in the volume: a brief general review of studies relevant to the use of *Coelomomyces* (H. C. Chapman) and an account of efforts using *C. stegiomyciae* in the Tokelau Islands (M. Laird). The illustrations in the volume include several color plates.—K.L.

**Current Perspectives in Primate Biology.** DAVID M. TAUB and FREDERICK A. KING, Eds. Van Nostrand Reinhold, New York, 1986. xx, 315 pp., illus. \$44.50; with *Current Perspectives in Primate Social Dynamics*, \$84.50. From a congress, Atlanta, GA, Aug. 1982.

**Current Perspectives in Primate Social Dynamics.** DAVID M. TAUB and FREDERICK A. KING, Eds. Van Nostrand Reinhold, New York, 1986. xxii, 531 pp., illus. \$54.50; with *Current Perspectives in Primate Biology*, \$84.50. From a congress, Atlanta, GA, Aug. 1982.

These companion volumes have their origins in the ninth congress of the International Primatological Society, characterized by the editors as the largest scientific meeting devoted to primates ever held and comprising some 500 presentations. With the aid of reviewers, a selection of 64 of the research reports presented at the congress was made. The biology volume contains 26 of these, grouped under the headings Reproductive Behavior, Biology, and Endocrinology; Physical Anthropology; and Biomedicine. The 38 papers allocated to the social dynamics volume are classified as dealing with Social Organization and Behavioral Development; Ecology; or Communication. Both volumes include two general addresses from the congress—"Primate biology today" by King and "The origins of modern European primatology and the IP" by Helmut O. Hofer—and each has a brief index.—K.L.

## Books Received

**Acid Rain and Friendly Neighbors.** The Policy Dispute between Canada and the United States. Jurgen Schmandt and Hilliard Roderick, Eds. Duke University Press, Durham, NC, 1985. xiv, 333 pp., illus. \$45. Duke Press Policy Studies.

**Advances in Neurology.** Vol. 43, Myoclonus. Stanley Fahn, C. David Marsden, and Melvin H. Van Woert, Eds. Raven, New York, 1985. xx, 730 pp., illus. \$125.

**Advances in Nuclear Physics.** J. W. Negele and Erich Vogt, Eds. Vol. 16, Brian D. Serot and John Dirk Walecka, Eds. Plenum, New York, 1986. xiv, 327 pp., illus. \$49.50.

**The Age of the Crowd.** A Historical Treatise on Mass Psychology. Serge Moscovici. Cambridge University Press, New York, and Maison des Sciences de l'Homme, Paris, 1985. viii, 408 pp., illus. \$49.50; paper, \$17.95. Translated from the French edition (1981) by J. C. Whitehouse.

**Alpha-Fetoprotein and Congenital Disorders.** Gerald J. Mizejewski and Ian H. Porter, Eds. Academic Press, Orlando, FL, 1985. xvi, 363 pp., illus. \$35. Birth Defects Institute Symposia. From a symposium, Albany, NY, Oct. 1983.

**Amazonia.** Ghilleen T. Prance and Thomas E. Lovejoy, Eds. Published in collaboration with the International Union for Conservation of Nature and Natural Resources by Pergamon, New York, 1985. xiv, 443 pp., illus. \$27.95. Key Environments.

**Antarctica.** W. N. Bonner and D. W. H. Walton, Eds. Published in collaboration with the International Union for Conservation of Nature and Natural Resources by Pergamon, New York, 1985. x, 393 pp., illus. \$25.95. Key Environments.

**Antinuclear- and Nucleon-Nucleus Interactions.** George E. Walker, Charles D. Goodman, and Catherine Olmer, Eds. Plenum, New York, 1985. x, 504 pp., illus.

\$79.50. From a conference, Telluride, CO, March 1985.

**Biological Museum Methods.** Vol. 1, Vertebrates. George Hangay and Michael Dingley. Academic Press, Orlando, FL, 1985. xvi, 379 pp., illus. \$68.

**The Biology of Echinococcus and Hydatid Disease.** R. C. A. Thompson, Ed. Allen and Unwin, Boston, 1986. xiv, 290 pp., illus. \$50.

**The Biology of Parametrium.** Ralph Wichterman. 2nd ed. Plenum, New York, 1986. xx, 599 pp., illus. \$89.50.

**Biotechnology of Marine Polysaccharides.** Rita Colwell, E. R. Pariser, and Anthony J. Sinskey, Eds. Hemisphere, New York, 1985. xii, 559 pp., illus. \$79.95. From a lecture and seminar, Cambridge, MA, April 1984. MIT Sea Grant College Program Report no. MITSG 84-1.

**Building Models by Games.** Wilfrid Hodges. Cambridge University Press, New York, 1985. viii, 311 pp. \$42.50. London Mathematical Society Student Texts, 2.

**Calibration of Fundamental Stellar Quantities.** D. S. Hayes, L. E. Pasinetti, and A. G. Davis Philip, Eds. Reidel, Dordrecht, 1985 (U.S. distributor, Kluwer, Hingham, MA). xxiv, 644 pp., illus., + microfiche. \$69.50; paper, \$29.50. From a symposium, Como, Italy, May 1984.

**Cardiovascular Effects of Dihydropyridine-Type Calcium Antagonists and Agonists.** A. Fleckenstein et al., Eds. Springer-Verlag, New York, 1985. xiv, 511 pp., illus. \$59. Bayer-Symposium 9. From a symposium, Boppard, Germany, Oct. 1984.

**The Case for Animal Experimentation.** An Evolutionary and Ethical Perspective. Michael Allen Fox. University of California Press, Berkeley, 1986. xiv, 263 pp. \$24.95.

**Cell Components.** H. F. Linsens and J. F. Jackson, Eds. Springer-Verlag, New York, 1985. xx, 399 pp., illus. \$69. Modern Methods of Plant Analysis, new series, vol. 1.

**Cell Culture and Somatic Cell Genetics of Plants.** Vol. 2, Cell Growth, Nutrition, Cytodifferentiation, and Cryopreservation. Indra K. Vasil. Academic Press, Orlando, FL, 1985. xvi, 330 pp., illus. \$49.50.

**The Cellular and Molecular Biology of Invertebrate Development.** Roger H. Sawyer and Richard M. Showman, Eds. University of South Carolina Press, Columbia, 1985. xii, 339 pp., illus. Belle W. Baruch Library in Marine Science, no. 15. From a conference, Georgetown, SC, 1984. A collection of 15 papers dedicated to the memory of Ernest Everett Just.

**Central Nervous System Pathology.** A New Approach. G. N. Kryzhanovskiy. Consultants Bureau (Plenum), New York, 1986. xxii, 421 pp., illus. \$79.50. Translated from the Russian edition (1980) by Nicholas Bobrov.

**The Challenge of Pain.** Ronald Melzack and Patrick D. Wall. Basic Books, New York, 1985. 447 pp., illus. Paper, \$10.95. Reprint, 1983 edition.

**The Chemist's English.** Robert Schoenfeld. VCH, Weinheim, 1985. xii, 173 pp. DM 42.

**Cloning and the Constitution.** An Inquiry into Governmental Policymaking and Genetic Experimentation. Ira H. Carmen. University of Wisconsin Press, Madison, 1986. xvi, 224 pp. \$22.50.

**Contractile Proteins in Muscle and Non-Muscle Cell Systems.** Biochemistry, Physiology, and Pathology. Emanuele E. Alia et al., Eds. Praeger, New York, 1985. xx, 732 pp., illus.

**Database Machines and Database Management.** Esen Ozarahan. Prentice-Hall, Englewood Cliffs, NJ, 1986. xx, 636 pp., illus. \$42.95.

**Death and the Sexes.** An Examination of Differential Longevity, Attitudes, Behaviors, and Coping Skills. Judith M. Stillion. Hemisphere, New York, 1985. xiv, 166 pp. \$28.50. Series in Death Education, Aging, and Health Care.

**Deception.** Perspectives on Human and Nonhuman Deceit. Robert W. Mitchell and Nicholas S. Thompson, Eds. State University of New York Press, Albany, 1986. xxx, 388 pp., illus. \$44.50; paper, \$16.95. SUNY Series in Animal Behavior.

**The Deep Proterozoic Crust in the North Atlantic Provinces.** Alex C. Tobi and Jacques L. R. Touret, Eds. Reidel, Dordrecht, 1985 (U.S. distributor, Kluwer, Hingham, MA). xii, 603 pp., illus. \$74. NATO Advanced Science Institutes Series C, vol. 158. From an institute, Moi, Norway, July 1984.

**Developmental Biology of Higher Fungi.** D. Moore et al., Eds. Cambridge University Press, New York, 1985. xii, 615 pp., illus. From a symposium, Manchester, England, April 1984.

**Dietary Fiber.** Basic and Clinical Aspects. George V. Vahouny and David Kritchevsky, Eds. Plenum, New

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