Australian Archeology

A Prehistory of Australia, New Guinea and Sahul. J. PETER WHITE with JAMES F. O'CONNELL. Illustrations by Margrit Koettig. Academic Press, New York, 1983. xiv, 286 pp. $29.50.

It has been relatively recently that Australia has developed its own group of professionally trained archeologists. The first of these was appointed to the staff of the University of Melbourne in 1953; four other institutions made appointments in the early 1960's. The first Australian-earned Ph.D. was granted in 1965. By 1980, there were public archeological programs in all states and degree work at eight universities, and there now exist eight Australian newsletters and journals in the field. The present volume is the first book-length overview of published works and theses on Australian and New Guinea archeology.

Sahul is the name for the continent including Australia that existed in the Pleistocene. Rising ocean levels separated Tasmania and then New Guinea from Australia. The Pleistocene human occupation of Sahul is estimated by the authors to have commenced some 50,000 years ago.

White and O'Connell report the discoveries—some of importance to everyone interested in world prehistory—that the professional archeologists of Sahul have made in the last quarter century. Simulation of population dynamics suggests that the first peopling of Sahul was by a society practicing polygyny; it is proposed that no small monogamous group could have continued the slow expansion of the minute immigrant population that arrived by raft from Wallacea. A carefully reasoned argument suggests that only one significant Pleistocene migration brought Sahul's early inhabitants.

The record of culture change now established by archeologists working in Sahul is startlingly different from what one would have guessed 25 years ago, when ancient Aborigines were thought to have had a culture within the range of their modern counterparts. A date of over 40,000 years ago has been suggested for the earliest inhabitants of Kangaroo Island, South Australia, a large landmass that lacked humans when first discovered by Europeans in the early 19th century.

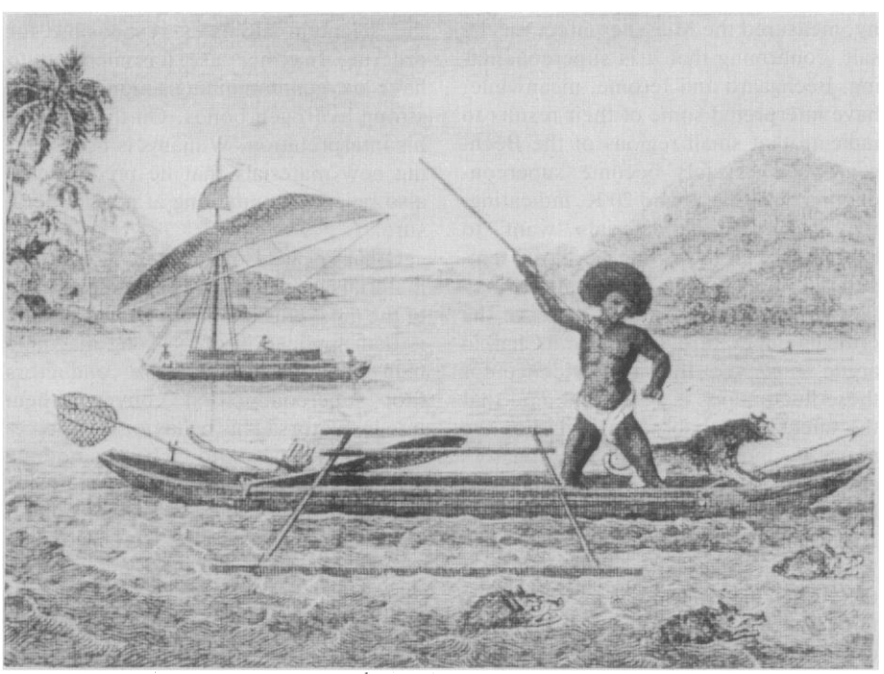
Human occupation of Australia is now firmly established as contemporaneous with Diprotodontidae and other extinct animals; however, evidence of human hunting of these forms is limited, there being no known kill or butchering sites. Review of the *Diprotodon* data gives us new ideas about how Pleistocene forms might have come to extinction. The proposition made is that each extinction and any evolutionary changes that preceded it—such as miniaturization—must be considered species by species, area by area.

At Lake Mungo, a late Pleistocene lake in southwestern New South Wales, a local population—possibly consisting of individuals all of whom were more robust than modern Aborigines—practiced both burial and cremation, the latter a practice unknown to 19th-century Aborigines, at a period suggested to have been around 30,000 years ago.

In the Oenpelli area of the Northern Territory, edge-ground stone tools were in use possibly as early as 14,000 years ago, a date suggesting that a type often thought to be Neolithic occurred independently in Sahul. At Devil's Lair, in southwestern Western Australia, perhaps about 12,000 years ago, Aborigines were making bone beads from the bones of large marsupials, again a practice unknown to the 19th century.

At Kuk, in New Guinea's highlands, trenching and other soil modification for plant-production purposes have been dated at roughly 9000 years ago. Could it be that a local development in New Guinea would be our first sign of human movement toward agriculture?

The history of Sahul stone tools is noteworthy. Throughout the continent the early forms are mainly "a range of loosely formalized 'scraper,' " although a specialized pebble-tool industry and a small-flake industry are known from Kangaroo Island and the adjacent mainland. The generalized "scraper" industry lasted in Tasmania until the 19th century. In Australia, maybe 10,000 years ago, the ground stone hatchet and the flaked stone adz came into use and ultimately spread throughout the continent. Also starting about that date is the development of many regional stone tool types. In New Guinea, although an early generalized flake industry is present, data have not yet been encountered telling of the transition to later highly specialized tool types. In regard to the lat-



"Pigs being hunted while swimming." [From *A Prehistory of Australia, New Guinea and Sahul*; original source unknown]

ter, the elaborate pecked and polished stone "mortars" of the central highlands occur in no context suggesting a use for food preparation, or even grinding; they are not so used ethnographically.

In Tasmania, where 19th-century natives did not eat fish, the earliest human debris found so far shows fish constituted up to 20 percent of the meat consumed. These lower levels of the earliest Tasmanian site—Rocky Cave, in the northwest—show a gradual increase in the proportion of unmodified bones to bone tools (from five marsupial bones per bone tool to 68 bones per bone tool). A comparable change is signaled by the increase in the proportion of stone tools to bone tools (from two to 20 stone tools per bone tool). Later levels of the Rocky Cave site lack bone tools. Such items were used by 19th-century Tasmanians in the making of bark canoes, skin cloaks, and water containers.

A weakness in White and O'Connell's overview is their uncritical acceptance of the work of some of their colleagues. Foremost of these oversights is the lack of challenge of the radiocarbon dating of Lake Mungo material. This site group has a date of 33,000 to 24,000 years ago derived from "freshwater mussel shell." Major radiocarbon specialists have long concluded that freshwater shell is not a sound basis for dating a culture; it often yields overly old results, yet sometimes the dates are skewed in the opposite direction; possibly such material should simply not be submitted for dating.

If the Lake Mungo date is unacceptable, what is at present the earliest proof of human occupation of Sahul? Review of White and O'Connell's presentation suggests it is to be found in levels 28 through 30, at Devil's Lair, where dates of 24,000 to 27,000 years ago have been reported.

White, O'Connell, and their Australian (and American Australianist) colleagues are to be complimented that only 25 years after the first work by professionally trained archeologists, only 15 years after the production of the first locally awarded Ph.D., such a series of stimulating findings concerning a continent has been produced. New models for evolutionary change, both biological and cultural, have been offered. North American scholars should not overlook the work in Sahul prehistory. We can but hope that overviews of the quality of this one will be produced regularly.

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Classic Ore Deposits

Precambrian Sulphide Deposits. H. S. Robinson Memorial Volume. R. W. HUTCHINSON, C. D. SPENCE, and J. M. FRANKLIN, Eds. Geological Association of Canada, Waterloo, 1982 (distributor, GAC Publication Division, Business and Economic Service, Toronto). viii, 792 pp., illus. C$57; to members, C$47. Geological Association of Canada Special Paper 25.

About half of this book is made up of papers presented at a symposium sponsored by the Geological Association of Canada during their joint meeting with the Geological Society of America and the Mineralogical Association of Canada in Toronto in 1978. The other half is made up of solicited papers. The book has been a long time in coming, but it turns out to be well worth the wait, and, fortunately, the papers are not of the type that becomes dated rapidly.

The book opens with a paper comparing the metallogeny of the Superior, Slave, and Churchill provinces, in large part a comprehensive summary of deposits, their production history and reserves, with notes concerning their geological setting. Three papers then follow describing the geology of specific areas; these are a curious inclusion, since the areas described are relevant to only a few of the deposits covered in the book.

The nucleus of the book is a series of 18 papers describing massive sulfide deposits, all but two of which are located in Canada. Nine of the deposits would be accepted by all economic geologists as volcanogenic massive sulfides. The papers describing most of the deposits ascribe their origin to exhalations of hot brines on the sea floor. Relatively little is contributed in the way of advancing our understanding of exhalative processes, but the papers provide a valuable account of the geology of this class of deposit. Particularly welcome are the first comprehensive account of the large Crandon deposit in Wisconsin and the description of the classic, highly metamorphosed Geco deposit north of Lake Superior. The Agnico Eagle deposit has all of the hallmarks of a volcanogenic massive sulfide deposit, but it carries gold rather than copper and zinc. The paper describing it provides important input into the current argument about the formation of Archean gold deposits.

Whether because of legal complications, the number of geologists involved in their study, or just their complexity, some of the world's classic deposits are never written up comprehensively. In this regard, a paper in the book on the 160-million-ton Sullivan ore body rectifies a major lack. Finally, we learn from COMINCO geologists in print what they have been showing us during mine tours for so many years—that the deposit is exhalative in a sedimentary setting, that it is located within a former sea-floor depression, and that the massive core of the deposit overlies the main conduit for the mineralizing brines.

A paper on the Redstone copper belt of the Mackenzie Mountains is an important addition to the Copper Belt literature, because it reviews the geology of the area in the light of recent ideas on the significance of the sebkha environment to the genesis of this type of deposit. In the current economic climate these deposits constitute perhaps the most attractive target for copper exploration, and this paper is a must for anyone interested in identifying the environment in which such copper deposits are likely to occur.

The Thompson nickel belt is underrepresented in the literature, and thus a paper on it in the book is welcome. The paper is important in that it emphasizes the volcanic rocks of the belt more than has been done in the past, pointing out that highly magnesian lavas are present. Personally, I was disappointed that individual deposits did not receive more attention, including more plans and cross sections and data on metal ratios, if not grades. The district is 25 years old, and a summary of deposits and prospects, their approximate size and type, as has been provided for the much more recent Kambalda nickel camp in Western Australia, would have been most helpful.

Though the Thompson deposits are interpreted on the basis of a magmatic model, Robinson and Hutchinson interpret the Redstone nickel sulfide deposit, associated with Archean komatiite flows (in Ontario and having nothing to do with the Redstone copper belt of the Northwest Territory) as exhalative. Their key evidence is the presence of a metasomatically chloritized dacite layer between the ore and the overlying ultramafic rocks, which would prevent the sulfides from settling directly from the latter. In a summary paper Hutchinson also refers to nickel sulfides interbedded with chert at Jan shoot, Western Australia, as evidence of an exhalative origin. I have seen the location at Jan; the interbedded sulfide and chert occur within a zone across which massive sulfides grade into sulfide-free banded chert and in which the sulfides appear to be penetrating and replacing the chert. Anyone who has had occasion to handle molten iron sulfide oxide liquids knows the ex-