The remaining essays are by no means devoid of general interest, but they are also examples of application of explicit theory to archeological problems. I can mention only a few highlights to illustrate something of the range of problems and results. Two papers, those of L. R. Binford and G. Ll. Isaac, are concerned with the 98 percent of culture history embraced in the Lower and Middle Paleolithic periods. Both authors emphasize the intractable character of the assemblages from these periods when explanatory concepts drawn from more recent prehistory are applied. Briefly, archeologists usually explain differences between assemblages (if environmental circumstances are a constant) as products of separation in time or space or both—as inverse functions of the degree of communication between the people who produced the assemblages. Close similarities are correspondingly taken to mean a high degree of communication. But the Lower and Middle Paleolithic periods exhibit substantial and consistent differences between assemblages that are not explicable by time-space separation. Binford argues that these differing assemblages are to be explained as activity-specific loci; the various types of assemblages represent the appropriate combinations of flint tools for particular kinds of activities such as preparation of vegetable foods or butchering of animals. In effect, there was essentially one broad and very slowly evolving cultural tradition manifested only in specialized facies, in ad hoc tool kits reflecting spatially and seasonally distinctive subsistence activities. Isaac is more cautious, pointing to more or less random "cultural drift" and other factors as possible explanation. He also emphasizes difficulty in interpretation because of the wide scattering in space and time of the Lower Paleolithic sites. The two authors agree on the inadequacy of the culture tradition concept customarily applied to Upper Paleolithic and more recent data; with the advent of the Upper Paleolithic (and biologically modern man) some 40,000 years ago, a new and familiar order of cultural behavior appears. The other papers are less sweeping in subject, but they illustrate the methodological versatility and theoretical liveliness of current archeology. Pervading concepts are "action archeology" (detailed ethnographic studies designed to illuminate archeological data), assemblages as manifestations of spatially organized cultural systems (in medieval England as well as in the prehistoric Great Basin of the United States), and assemblages as elements in a thermodynamic system (ecology in the carefully used sense of the term).

I conclude that the basic claims of the new archeology are justified by the quality of the work exhibited here. There is indeed notable progress in our ability to explain past human behavior, and the progress is the result of theoretical originality, careful formulation of hypotheses, and the incomparably better field and laboratory research resulting from explicit hypotheses. There are some undesirable side effects, of course: one can with some justification poke fun at jargon, pretentious and inappropriate appeals to philosophy and logic complete with misspelled technical terms ("ideographic" for "idiographic"), and excessive enthusiasm for currently fashionable ideas (surely there is less to locational analysis than meets the eye). But there will be a sobering-up process. There is plenty of solid matter underneath the froth.

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Transition Zone

Bridge and Barrier. The Natural and Cultural History of Torres Strait. Proceedings of a symposium, Canberra, Australia, Dec. 1971. D. WALKER, Ed. Australian National University Press, Canberra, 1973. xviii, 438 pp., illus. Paper, U.S.$7.50. Research School of Pacific Studies Publication BG/3.

Because of its unique biota, stemming from its protracted period of isolation, the Australian biogeographic region has long fascinated biologists. Of only slightly less interest are the rather marked biological differences between its two major subregions, continental Australia and insular New Guinea. These differences are great in the case of plants and insects, those of New Guinea being strongly Oriental in character, whereas in mammals and birds an endemic Australo-Papuan fauna of monotremes, marsupials, birds of paradise, honey eaters, mound-building birds, and parrots is shared by the two regions.

In 1971 a symposium was convened at the Australian National University to investigate the significance of Torres Strait, the 150- to 500-kilometer-wide, 13-meter-deep water barrier that separates Australia and New Guinea, relative to the biotic differences, and similarities, between mainland Australia and insular New Guinea. The resultant volume consists of 21 chapters devoted to the paleogeography, geomorphology, late Quaternary and contemporary climates, vegetation communities, plant distribution patterns, insects, lower vertebrates, mammals, birds, and human linguistic and culture patterns of the Torres Strait area. The emphasis is specifically on the Strait rather than on the Australian and New Guinea biotas as a whole. Several authors, however, provide data of the wider type. The book merits full praise as an in-depth appraisal of a fascinating biogeographic and cultural transition zone.

The Torres Strait water barrier apparently came into existence only in late geological times, possibly middle or late Pleistocene, and probably in association with downfaulting that also produced the Gulf of Carpentaria. Prior to this a much smaller New Guinea (roughly equivalent to the southern half) was broadly joined to Australia and formed the leading edge of the Australian continental plate. This plate, sea-floor-spreading data suggest, only reached its present proximity to Asia in the Miocene. Subsequent to its original formation the Torres Strait seaway was interrupted with each of the major drops in sea level. These drops, which some authorities are now suggesting amounted to as much as 180 meters, were more than sufficient to bring Australia and New Guinea again into extensive contact, and to extend Australia far to the northwest. What was the climate like during these times of contact? The evidence is that cooler sea surface temperatures, cooler trade winds, and the greatly extended land surface made northern Australia significantly drier than at present; thus it would have supported tropical savanna such as occurs in the interior of northern Australia today (P. J. Webster and N. A. Streten). If these deductions are correct, then, there would not have been any accelerated southward movement of the New Guinea lowland rain forests at such times.

New Guinea and Australia have long been independent, major centers of radiation. Author after author, however, brings out how very differently adapted the two biotas are. The former,

living mostly in lowland rain forests, is tropically adapted; the latter, by contrast, inhabits dry, open savannas and woodlands. Tropical rain forest is poorly developed in Australia, being restricted to a few pockets in the northeast and east. As would be expected, the rain forest biota of Cape York has strong Papuan affinities (as do those of intervening islands like the Arus), those of coastal central and south Queensland less so. The Australian dry woodlands and savannas extend into southern New Guinea, where they are inhabited by typical Australian forms (though the biota needs better analysis).

Rain-forest–woodland junctions, both in Australia and New Guinea, are marked by a biotic change that is abrupt, striking, and fairly complete. This is the case in plants, insects, birds, and mammals, as well as other groups. This steep biotic changeover was, of course, noted long ago by Tate and others; one of the big achievements of this symposium volume is to document how widespread and basic it is. The real factor keeping the Australian and Papuan biotas distinct, then, is not the physiographic barrier of Torres Strait but the basically different adaptations of the two biotas and the fact that the climatic and vegetation transition between the two regions has remained so steep that adaptation from one to the other has been difficult.

Moreover, the persistently Asian character of the New Guinea rain forest plants and insects shows that it has been much easier for these forms to "island hop" through Indonesia, a west-east journey that though it is very long does not entail switching latitudinal and climatic belts, than it has been for them to move southward over land into the drastically different climatic zones of Australia.

The book concludes with a series of chapters on the cultural and ethnic relationships of the native peoples of the Torres Strait. As would be expected, the Strait turns out not to be a linguistic barrier but a transition zone. Thus, an "old Australian influence" is discernible in the Trans-Fly languages of New Guinea, and there appears also to be a recent Papuan influence in the Cape York Peninsula languages (S. A. Wurm). Studies on the physical anthropology of the Torres Strait peoples are inadequate to provide a proper picture of relationships. However, serum protein and enzyme genetic markers show populations in New Guinea and northern Australia, but not central Australia, to share a significant proportion of genetic traits (R. L. Kirk). One major human cultural problem has long puzzled anthropologists, how the Australian aborigine was able to maintain his "hunter-gatherer" economy despite some thousands of years of marginal contact with Papuan agriculture. This is the more surprising since three important food plants used wild by aborigines, the yam (*Dioscorea bulbifera*), the arrowroot (*Tacca leontopetaloides*), and the tree *Terminalia catappa*, are widely cultivated in Malaysia. Again, 35 of the 36 genera which provide the 43 plant species that supply the northern aborigines with edible roots, fruits, seeds, and leaves are Malaysian in origin (J. Golson). The explanation earlier suggested was that the best soils for cultivation were covered by tropical rain forest in Australia and hence were inaccessible for agriculture. Rain forest margins (where most of the gardens are established in the Port Moresby area of New Guinea) are readily modified by fire, however, and fire is extensively used by the aborigines in hunting. Two more plausible reasons for the cultural conservatism of the Australian aborigines are advanced by Golson: (i) the hunter-gatherer economy remained unaffected by the marginal contacts because it was "buttressed" by the considerable population of gatherers behind the contact zone, and (ii) in the environment of Torres Strait conversion to horticulture would require a greater labor input than a hunter-gatherer economy. The Australian aborigine, moreover, with his adequate "family planning," was never placed in the position where he was forced to adopt agriculture to support a rapidly increasing population. There may be a parallel, it is suggested, in the retention of the spear against the bow and arrow. Large kangaroos are a dominant food source in Australia, whereas in New Guinea the largest mammal is a small wallaby: the spear, it is suggested, is the better weapon for big game. Support of this comes from the eagerness with which the islanders of western Torres Strait sought mainland spears and spear-throwers: they were demonstrably more efficient than the bow and arrow in both fishing and fighting.

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