

The Prehistory of Borneo

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BACKGROUND

THIS paper surveys and summarizes to date the archaeological work carried out in Sarawak, and to a lesser extent in Sabah and Brunei, since 1945 when I began archaeological activity in west Borneo. These three territories were each separate colonies under British rule during most of that period, but Sarawak and Sabah are now states in east Malaysia, and Brunei is an independent state under British protection. Most of the work has been done through the Sarawak Museum, of which I was curator and government ethnologist from 1947 to 1967, but there are museums now in operation in both Brunei and Sabah. (As emeritus curator of Sarawak Museum and consultant to His Highness the Sultan, I am in close touch with archaeological activities in Sarawak and visit Brunei every year to discuss museums and related matters.)

This paper is based partly on information not yet published, but I have also had recourse to the many but scattered published reports of excavations done through the Sarawak Museum, the Brunei government, and the Sabah government from 1947-1970. Other material is in press. For a useful and readable survey concerned mainly with the Sarawak River delta sites, see Te-k'un Cheng's *Archaeology in Sarawak* (Cheng 1969).

With the assistance of the Sarawak Museum and the cooperation of the present curator, Benedict Sandin, I will contribute to a forthcoming issue of the *Sarawak Museum Journal* a full bibliography of Borneo archaeology. I am spending part of each year at Cornell University reanalyzing and writing up the Borneo excavations. Two volumes entitled *Excavations of the Prehistoric Iron Industry in West Borneo* have been published (Harrison and O'Connor 1969), as has *Gold and Megalithic Activity in Prehistoric and Recent West Borneo*, also two volumes (Harrison and O'Connor 1971). A large number of papers on work in Borneo have been published internationally, and approximately one thousand pages of text have been devoted to that subject in the *Sarawak Museum Journal*. The 1966 issue, for example, contained twelve archaeological papers, including specialist studies by Lord Medway, the Earl of Cranbrook, J. E. Hill, J. L. Reavis, and myself.

Despite this appreciable and developing body of publications, results of most of the fieldwork remain unpublished, particularly with reference to the Niah caves. Much of this

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material is now in draft, and I hope to put it out in a five-year program of publication, now that the main on-the-spot excavations are almost complete. Excavation has proceeded on a planned basis over the past two decades with the purpose of covering the main inaccessible facets of prehistory from the coast to the far interior of northern and western Borneo. As the program developed slowly, it was necessary to start from zero, to train personnel on the spot, and to build up from nonexistent funds.

More recently, with an efficient local staff, adequate funds, and expert outside help available as required, it has been possible to accelerate the project considerably. However, much remains to be done, especially in the laboratory and the library, before we can see even a preliminary picture of the human continuum over this great, tangled arc of inland rain forest-jungle and coastal tidal swamp.

Before 1945 no systematic excavation had been attempted anywhere in Borneo. In this respect, knowledge of the island lagged far behind that of most of adjacent Indonesia and the Malay Peninsula. It has been an advantage to have started fresh, drawing in advance upon the experience, collections, and publications from these surrounding countries.

However, the first twenty years of archaeology in west Borneo emphatically indicate that we are dealing with an appreciable number of prehistoric phenomena that are *not* closely—and in some cases not even remotely—paralleled to date by the results from most of the surrounding areas. This lack of correlation with neighboring areas is often noted by our many visitors to Sarawak, particularly regarding the stone-age material from Niah and other caves along the subcoastal zone. The differences are underlined by the absence of the so-called Hoabinhian culture which is represented by one of the most widely spread and abundant classes of stone-tool typology on the Southeast Asian mainland and through much of the Indonesian archipelago. These and other differences and specialities should be borne in mind in considering this presentation; they will be referred to later in a more general discussion.

Most of Borneo is still inaccessible by modern means of communication. The island includes some of the wildest and most difficult country in Southeast Asia. Much of it is sparsely inhabited. Seventy-five percent of the whole terrain remains uninhabited virgin rain forest. The difficulty of locating sites is accentuated by the absence of any striking visible structures or phenomena resulting from human effort in the past. The wonderful luxuriance of tropical vegetation in a flora that has not changed significantly from the Pleistocene through the total span of human evolution would have itself disrupted any building structure not kept regularly and permanently cleared. The discovery of open sites has therefore depended partly on chance, but very largely on a developed system of native informants, and particularly on the collection of folklore relevant to iron. The following up of folk tales attributing specific incidents to identifiable places has been one of the most rewarding—and frustrating—techniques that we have had to employ under these conditions (Harrisson and Sandin 1966).

The only archaeological sites that are readily identifiable are those in limestone caves. Such caves are, however, on the whole less numerous and certainly much more localized in Borneo than in other areas of Southeast Asia. It has therefore been possible to locate and visit virtually all the limestone formations in the three territories. Whenever we decided to excavate these formations, as part of the plan, some positive results were obtained. In contrast to the few caves that meet all the criteria for optimum excavation, particularly sites that have not been disturbed by later man and other animals or by flooding or

climatological variants, the large majority of cave sites could be dismissed as relatively insignificant.

As archaeologists in Borneo, we have had both the advantage and the disadvantage of an *earlier* interest in prehistory that dates back well beyond this century. Interest in Borneo caves has an honorable scientific antiquity. In 1864 Thomas Henry Huxley recommended that Borneo caves should be made the subject of special study and that an expedition be sent there. This interest was in part aroused by Alfred Russel Wallace, who of course had spent two of the crucial years of his life as a naturalist in Borneo. In May of that same year he wrote to Charles Darwin:

I was very much gratified to hear by your letter of a month back that you were a little better, and I have since heard occasionally through Huxley and Lubbock that you are not worse. I sincerely hope the summer weather and repose may do you real good.

The Borneo Cave exploration is to go on at present without a subscription. The new British Consul who is going out to Sarawak this month will undertake to explore some of the caves nearest the town (Kuching) and if anything of interest is obtained a good large sum can no doubt be raised for a thorough exploration of the whole country. Sir J. Brooke will give every assistance and will supply men for preliminary work.

Even in those days things took a long time to happen in Borneo. Darwin, Wallace, and Huxley did well to get A. H. Everett into the field to explore the caves, tentatively, in 1873, and more specifically in 1878-1879. Sponsored by various learned societies, Everett ostensibly explored the Bau group of caves in southwest Sarawak and the Niah caves three hundred miles farther north along the coast. His report was published by the Royal Society (Everett 1880). It is now doubtful if Everett really made a decent job of this exploration—his record in and out of commercial collecting and the Borneo Civil Services is an extraordinary and erratic one. He found very little, in any case, and the Royal Society concluded that researches were not worth pursuing and “that no further expense should be hazarded” in this area. As Everett left various reports of his findings—mainly nonfindings—in the local literature of Sarawak itself, one may imagine that his work was no help to us when we started asking the British government for money to begin modern archaeology sixty-five years later at the same caves.

Like Everett, we started at Bau because, in 1948, there was a rough road from Kuching (where the Sarawak Museum is situated) to the expiring Bau gold field set among the limestone. The results at the Bau caves were not of great importance, though of course we found much human material—I have yet to find a Borneo cave where one does not. (Finding a nil cave would itself be of considerable significance.) But this first excavation was an exercise in training staff. In my wanderings through all four of the Borneo territories, I had already decided that the Great Cave at Niah was the one we should go for, when we were ready (cf. Harrison and Tweedie 1951).

Readiness consisted of a fully trained and experienced staff, at all levels, and adequate funds to ensure that we could work without any sort of pressure of time, or need to produce results. By 1954 the Sarawak government had more confidence in the validity of archaeological ideas, and the Shell group of companies had, for various reasons, become even more interested. With over thirty Asian assistants having become experienced in the techniques of digging, sorting, labeling, and preserving material, we made a preliminary trial at Niah in 1954. Initial results from the enormous Great Cave's west mouth—with a 23-acre cave floor—were even more gratifying than I had dared to hope. It was at once evident that to

tackle this cave properly, we were going to need personnel by the score, financial resources by the tens of thousands, and a long-term program of continuing work both in the field and with the excavated material back in the museum.

It was not until 1957, therefore, that we returned to dig at Niah. Here we were greatly helped by photographic collaboration with my friend Hugh Gibb—and incidentally, by the fact that a film Gibb and I made together on the caves won a Grand Prix at the Cannes Film Festival and attracted worldwide attention to this superb limestone formation.

Since 1957 we have had a permanent staff at the Niah caves and a satisfactory camp set up there. Barbara Harrison or I spent a total of nearly four years on active excavations, based on a thorough exploration of the Niah limestone formation, which is something like Gruyère cheese, honeycombed with holes. Eight main caves have now been completely excavated and many others have been checked sufficiently; in all, 45 caves have been fully examined.

Niah: The Great Cave

The main Niah site is the west mouth of the Great Cave, which is about two hundred yards wide and in places over one hundred yards high. This area is so light that it is free of guano and thus remained untouched until 1954. After initially proving the site in 1954, we took some time to raise the large additional funds and outside help that were clearly going to be necessary. In 1957 we started large-scale regular excavation. In 1964 we built a house inside the cave mouth and set up a base organization on the river two miles away, with a connecting hardwood plank walk from river to cave. We averaged four to five months' field excavation during the year and year-round analysis back in Kuching.

The simplest fact about the Great Cave's west mouth is that what appears to be earth, producing a wide pleasant floor, is really largely "human" deposit, from at least as far back as the end of the Palaeolithic. The outer part of the mouth was used primarily for *frequentation* in the Neolithic, by which time people were making some permanent dwellings out in the rain forest, and for regular *habitation* in the earlier phases of the Stone Age (Palaeolithic-Mesolithic)—let us say "pre-neolithic."

Farther in, but still in front of the guano belt of darkness, the whole floor is netted with burials, of which we have removed more than one hundred and left others exposed *in situ*—some under perspex covers—for later full study. Burials also occur in the habitation-frequentation zone, mostly at the deeper levels; usually the bodies are distorted, crouched, or the head alone is found. The deepest of these burials found so far is a young male *Homo sapiens*. The excavation results have been fully published by Brothwell (1960). The burial is generally accepted as broadly corresponding to a radiocarbon dated level of ca. 38,000 B.C. There is good reason to believe that its date is correct within, at the worst, a few thousand years. We will return to the west mouth later in this report.

The results from Niah have been rewarding. Finds retained in our workshop there and in the museum reference building at Kuching occupy a large study space, while much other material is in the hands of specialists, mainly in Britain, Holland, and the United States. Since a fairly clear pattern emerged from Niah (see below under GENERAL CONSIDERATIONS: THE TIME SCALE), effort has been directed toward comparing other caves as remote from and unlike Niah as possible, using the west mouth as a study baseline.

Inland Areas

Unexpectedly, the Indonesian confrontation with Malaysia furthered archaeological research in Borneo. Many British army and Royal Air Force helicopters operated actively in west Borneo from December 1962 to the main British withdrawal in October 1966. It proved possible to interest the higher command in our work and to obtain extensive helicopter assistance, particularly in exploring the faces of inaccessible limestone outcrops far inland. A particularly useful result was the discovery of caves far inland at the headwaters of the Kakus River, which were selected as a test for full comparison. Here and elsewhere in the interior, preliminary results (still being worked out) do not suggest stone-age activity comparable to that of subcoastal Niah. On the contrary, the present picture is of a very low or negative degree of pre-Neolithic frequentation far inland.

Sabah Explorations

Smaller scale explorations and three excavations of caves on the northeast coastal plain of Sabah have revealed an early stone-age element, but without, so far, the clarity of Niah. (A full-length monograph [T. and B. Harrison 1971] reports a detailed reconnaissance of Sabah caves. The oldest Carbon-14 date for a Sabah cave thus far is 10,800 B.P. at Madai. Richard Shutler and Cathleen Kess have suggested interesting comparisons between the excavated flake tools from Madai and some from New Guinea [Shutler and Kess 1969]). The *later* stone-age phase in the northeast is decidedly different from Niah and the west coast generally, with different tools and pottery, partly influenced by evident later contact with Celebes to the east. Put another way, Niah and coastal west Borneo, with large low-land caves enormously rich in protein food supplies (millions of swifts and bats) has developed in some respects rather separately from the rest of Borneo, so far as we can see at present. This separate development, if correct, is in contradiction to what little we really know about a later *continuous* stone-age sequence from the Palaeolithic onward in Malaya, Thailand, and Indo-China, for instance, where closely similar artifacts are reported in cave after cave for over hundreds of miles on the mainland.

Lack of Stone

In connection with Borneo's later stone-age sequence, stone-age man was technically limited in one important respect over much of west (but not northeast) Borneo. There was and is a great shortage of readily workable hard stone suitable for tools in this sector. Most of the terrain is composed of a poor, soft sandstone and sandstone clays, which continue to limit the development potential of the country. (The Public Works Department and private enterprise regularly find it difficult to obtain stone sufficiently hard even for road-fill.) The lack of a stone supply clearly affected the people who frequented Niah, Bau, Kakus and other caves south of Sabah. Many of their tools were not of stone, and many have perished. Those of bone have been the subject of a detailed analysis (Harrison and Medway 1962), but bone does not normally survive more than about thirty thousand years in the Niah deposits (see below). Available hard stone has been treated with care, used and reused, without the development of some sophisticated craft techniques that must surely rely on a reasonably good supply of available working material.

Lack of stone complicates the interpretation of chopper tools and flakes (to be discussed). Absence of stone also produced a more difficult complication, in that it is now clear that the

cave dwellers also relied largely on almost casual artifacts made of limestone from the cave surroundings (Harrisson 1957, 1959c). Michael Tweedie and I suspected such a solution in our first report of the 1949 excavations at Bau near Kuching (Harrisson and Tweedie 1951). Limestone artifacts have proved to be major features at Niah, especially in the Lobang Angus grottoes that we completed in 1965. But it is virtually impossible to draw a line between artifacts and nonartifacts under most cave conditions in Borneo (e.g., in the Kakus). One suspects, too, that the possible significance of lime tools has been underestimated in Southeast Asia generally. H. R. van Heekeren mentions limestone *passim* in his general work on the Stone Age in the area (van Heekeren 1957). Most other writers have not taken the *passim* into account.

Surface Finds

The late I. H. N. Evans made the first small surface collection (purchased) of non-excavated stone tools in Sabah (Evans 1913). The Sarawak Museum has acquired about five hundred more, of which about one-fifth are documented with find details. Only three of these can be regarded as earlier than neolithic. Only one is fully palaeolithic (see MAIN RESULTS FROM WEST BORNEO). Java, Sumatra, and Borneo were, of course, part of Sundaland and were connected with the present mainland in the Pleistocene; this continuous terrain reached through Sabah to Palawan in the southern Philippines, but no farther.

Nowhere have we succeeded in finding any sort of stratified or coherent stone-age *open* site in west Borneo. (Stone-age tools have been found extensively in the open in Sabah, though not in Sarawak, but thus far stratified finds have not been made [T. and B. Harrisson 1971].) No fruitful gravel terraces or other geological formations have been identified, despite the use of helicopters to search and valuable assistance from the Geological Survey and the Shell field parties. It is some compensation, however, that a series of noticeably rich metal-age open sites has been identified, usually through local folklore or native informants, and subsequently, where possible, the sites have been mapped both with mine detectors and aerial photography. The most extensive of these sites are grouped in the delta of the Sarawak River, within an hour of Kuching by speedboat. Excavation began at one of these in 1949 and has continued, when other priorities have permitted. In 1966, a particularly successful season resulted from a program run jointly by Professor Stanley O'Connor from Cornell University and myself (see THE ADVENT OF IRON below). The earthenware pottery from one of the earlier delta sites, Tanjong Kubor, has been the subject of an important and exhaustive analysis by W. G. Solheim II (1965), while full-scale monographs on the delta as a whole are now published (Harrisson and O'Connor 1969, 1971).

Sarawak River Delta Complex

The Sarawak River delta complex stands to date as the richest single agglomeration of *entrepôt* trade and occupational debris in Southeast Asia prior to the Ming dynasty (A.D. 1368-1644), the period to which the wonderfully rich sites in southern Luzon and elsewhere in the Philippines are dated. The outstanding characteristics of the delta sites are the locally made earthenware and imported stoneware. The stoneware, which we classify in twenty-seven recognized types, is always Chinese. (For T'ang and Sung categories, see C. Zainie and Tom Harrisson [1967], and B. Harrisson [1970] for a parallel new study of

Ming works excavated in Brunei only.) The imported fine hard wares are often completely intermixed, in varying degrees, with the local soft product. Both these forms of pottery occur with smaller numbers of glass beads, nearly always small monochromes, which are of types widely found in the area and primarily imported to Borneo from farther west (toward India) rather than north (toward China). Detailed analyses of these beads, undertaken through Corning Glass Museum, have been published for comparison (Harrison 1968), and an extensive series of others from the mainland has been presented earlier by Alastair Lamb (Lamb 1965; cf. Harrison 1964b).

These three predominant types of artifact—earthenware, stoneware, and glass—are intimately associated with material evidence of a massive iron smelting industry, which occurs in at least six sites. The most strikingly placed of these sites is up the Jaong and Buah creeks, now walled off from access by wide belts of mangrove swamp, except at full tide. At Jaong, the industry's resulting debris of clay crucibles and iron slag stretches along the old silted-up riverbed for at least one thousand yards. At Buah, the center of the iron working yields a 9- to 11-foot deposit—in which, characteristically, are quantities of Chinese stoneware and local earthenware. The Buah find is described succinctly by Cheng (1969) and more fully by Harrison and O'Connor (1969).

Some idea of the scale of archaeological recovery may be simply given from the catalog figures for quite small sections of three sites worked in 1955, a rather busier-than-average delta season (considering 1949–1966). (See Table 1.)

TABLE 1
PRINCIPAL ARTIFACTS RECOVERED IN 1955 DELTA WORK

SITE	CHARACTER	NUMBER OF PIECES			
		Chinese stoneware	Local earthenware	"Western" glass	Metal other than iron wasters
T. Kubor	Early T'ang cemetery	1,383	34,416	49	58
Bongkissam	Riverside major Sung iron works	49,393	66,668	659	84
Bukit Maras	Uphill trade occupation	40	85,582	508	152

Ninety-six percent of the pottery from Kubor cemetery is local earthenware, which has been especially studied by W. G. Solheim II (Solheim 1965; T. and B. Harrison 1957). A similar but smaller T'ang cemetery on another knoll 1 mile across the estuary from Kubor, which appears to have specialized in aristocratic burials, shows, however, 1,623 pieces of stoneware as against only 43 earthenware, with 2 glass and 7 metal (one gold).

Well over one million artifacts have been excavated and indexed during these delta operations, which in 1966 were concentrated on following up particular problems that required qualitative clarification and to which answers remained unclear from the previous primarily quantitative approach. A small series of whole T'ang pots was excavated at Jaong, bringing the total from previous years up to greater than 50. Complete unbroken pieces have not been found at any other site, and those from Jaong present a considerable puzzle

as to kiln origin (see color illustrations of earlier series in *Transactions: Oriental Ceramic Society*, Harrison 1953-1954). In 1966, also, a small permanent stone structure was identified for the first time anywhere in the lowlands. This proved to contain a silver box with human or animal remains associated with 142 gold objects, and numbers of semi-precious stones and charms with a decided impress of Tantric Buddhism (Harrison and O'Connor 1967, 1971).

The Sarawak River delta complex is of value in documenting the sudden and tremendous impact of outside materials on west Borneo. There is ample secondary evidence that this impact reached far inland and produced a technological revolution of prime importance in a terrain covered with dense and self-regenerating equatorial rain forest (see THE ADVENT OF IRON, below). Previous studies of trade and trade routes in this part of the world, notably those by Paul Wheatley (1961) and Gungwu Wang (1958) based on difficult early Chinese texts, have located the main trading sites on etymological analysis seldom supported by archaeological or other evidence. Those authors have placed none of these sites in southwest Borneo. (A good recent example, Nicholas Tarling's *Southeast Asia—Past and Present* [Tarling 1966: 10], places trade and culture centers "to about the middle of the 13th century." Borneo (only) is shown to be destitute of a single contact point.)

By contrast, the existence of a large-scale trading station in Brunei Bay (Poli or Poni in many early texts) has long been accepted. This is largely because Magellan's first circumnavigation of the earth in 1521 touched at Brunei, by then a Moslem area, and he left a vivid description of its rich and numerous population. By that time, anyway, the sites farther to the south and west had vanished almost without surface trace. Not one sherd of Ming porcelain has been recovered in the Sarawak River delta, although there are evidences of Sung contact continuing into the early part of the Yuan dynasty (A.D. 1280), so far as Chinese produce was concerned. The approximate terminal date of the Sarawak River delta occupation is supported by a Carbon-14 date of A.D. 1315 as reported in *Asian Perspectives* (Harrison 1968) and the first Cornell monograph (Harrison and O'Connor 1969). A very full series of Carbon-14 dates from Kota Batu in Brunei, fresh at hand, covers the whole time range from before T'ang to late Ming and later.

Brunei

Early in my Borneo travels, I identified the ancient capital of the Brunei Sultanate at Kota Batu, then covered in rubber gardens, and since acquired by the state government on my advice. In 1952-1953, preliminary excavations were made with sample trenches in selected sectors of the 36 acres which appeared immediately relevant, the prime object being to prove to the government and the public that this was indeed an important center for the history of the Sultanate and Borneo. Preliminary reports have been published in the *Sarawak Museum Journal*, and further work is projected through the Brunei Museum in the near future. Very briefly, the picture is of a trade center more limited in size than the Sarawak River delta, *without* iron working. The earlier phases of occupation are at least contemporary with those of the delta but it actively continued after the Yuan until the two quite "unjustified" Spanish attacks in the second half of the sixteenth century, the latter of which was disastrous to Borneo. Details of this period are discussed in several papers in the first issue of *Brunei Museum Journal* (1969), as well as in the later volumes now in press (Harrison 1968; 1969a, b, c).

The Kota Batu site differs from those in the Sarawak River delta in that the water table is near the surface; the soil is peaty, and the saline content has preserved much that normally deteriorates or completely disintegrates in open sites under Borneo conditions. Thus we already have from Kota Batu a very good collection of ancient wooden implements of all sorts, whereas none of these are known from the delta. (This prehistoric collection is in the course of interim study at Brunei. The study is to be completed in 1972.) Similarly, 99 coins have been recovered intact from Kota Batu, whereas from the delta only a single one has been obtained in identifiable form—a seventh century T'ang Chinese coin from Tanjong Kubor.

Of the 99 Kota Batu coins, 56 percent are old Chinese, the rest "Islamic" and largely "local." If we take only those Chinese coins that can be dated with certainty (dating is difficult for Islamic coins), we get what is probably a fairly rough picture of the degree of intensity of trade and other contact with Brunei, which is 350 mi. northeast by the coast from the Sarawak River delta (see Table 2).

TABLE 2
DATABLE CHINESE COINS FROM KOTA BATU, BRUNEI

DYNASTY	TOTAL	NUMBER IN TOP 24 INCHES
T'ang	2	0
Sung	27	6
Ming	7	3
Total	36	9

Although the earlier stonewares at Kota Batu usually have parallels in finds of the same period from the Sarawak River delta much farther southwest, many of the other emphases in Brunei of that period are different from those of the same time in similarly coastal Sarawak. As regards later prehistory, the area from Brunei Bay northward across Sabah in many respects seems to belong to a somewhat different culture complex that reaches back well into the Stone Age. For instance, the characteristic late neolithic stone tools found around Brunei Bay, in a small cave excavated on Bird Island (Pulau Burong) out in the bay, and continuing around to the east coast of Sabah and the Kalimantan border, are either long, almost cigar-like gouges or small and often beautiful trapezoidal ("roof-shaped," in Roger Duff's terminology) adzes. These have not been found at Niah, anywhere south along the coastal plain, or among the late stone-age remains of the interior. For particulars, see *The Prehistory of Sabah* (T. and B. Harrison 1971).

In ethnological terms, there is a distinction in this sector between some of the dominant pagan and converted Islam peoples which is parallel to that in south and west Borneo. Islam reached Brunei after the fourteenth century. Particularly, the Bisayas and related folk of Brunei Bay show strong linguistic and other affinities with the people of the Visayan islands of the southern Philippines. Equally, the now entirely Moslem Bajau people, until recently generally called "Sea Gypsies," have played a large part in the cultural story from Brunei Bay through Palawan and the Sulu Sea, but are no longer identifiable farther south.

Interisland Contact

In addition, north and east of Niah there are numerous indications of intensive late interisland contact continuing with a frequency and an intensity that seem to have been lacking farther down the west coast of Borneo, where the exposed shores of the South China Sea and its peculiarly difficult navigational winds and hazards have acted against direct outside impact and in favor of endemic development of local specialization. Such later cultural influences as can be directly traced in the southwest of Borneo contain many more Western elements, despite the strong overall "Chinese" influence. Very important in Borneo has been the somewhat later movement of people overland through southeast Borneo and across the central dividing watershed—now the political border between Indonesian and Malaysian territory. The Iban Sea Dayaks, happily, have kept a detailed and to some extent demonstrably reliable record of their own major movements in this direction that dates back over thirty generations. In fact, however, the record represents a longer period in time when one takes into account the "telescoping" of the early generations (see Table 3). This overland impact of the Dayaks in the Iron Age continues through the center of the island, but sharply decreases in intensity north of the hinterland to Brunei Bay. (See *The Sea Dayaks of Borneo before White Rajah Rule* [Sandin 1969].)

The Interior

The hinterland, which includes the highest permanently occupied and intricately irrigated uplands in the island, with wide and unusually fertile plains above 3,000 ft, has been of special interest to me personally since I first entered there by parachute during World War II. I have subsequently been able to keep up regular contact with the Kelabit and Murut peoples, a small element of whom live in Sarawak and Sabah; a larger number live over the border in Kalimantan. The upland area is described in partly ethnological terms in *World Within* (Harrison 1959a).

Megalithic Activity

The upland culture is characterized most dramatically by an ancient megalithic activity that was still enthusiastically pursued when I first got there. After nearly two years of research in the uplands, often supported by Sarawak Museum personnel, it has not been demonstrated that even the great dolmens, stone avenues, and carved stones—some of which are to be found in now completely uninhabited areas—date earlier than the beginning of the Metal Age. Other megalithic activity in Borneo is confined, on present knowledge, to an exciting group of rock carvings intricately associated with the iron-age working site of Sungei Jaong in the Sarawak River delta (see above) and on the northwest coastal plain of Sabah around Jesselton, in what is now Dusun country. In Dusun country the emphasis has been almost entirely on single-stone menhirs, which were erected into historical times (cf. H. E. Loofs 1967: 81-86). The Kelabit upland megaliths are the most imposing and variegated of the three; on the whole, they show little affinity with other megalithic remains from Sumatra and elsewhere. Excavations at some of the largest megaliths regarded by the present-day Kelabits themselves as "prehistoric" produced imported stoneware, notably "Sawankhalok" and other broadly datable Siamese sherds (thirteenth or fourteenth century). Intact examples of these well-known Thai pots and bowls usually remain in the upland long-houses, and since 1945 many have been collected for the Sarawak Museum.

Identical sherds show up in Ming levels of the Kota Batu site at coastal Brunei Bay, and clearly all this hinterland was supplied with trade goods from Brunei Bay after the establishment of an Iron Age. Many other ancient jars (prehistoric, of course) have been studied in the uplands, where, with glass beads, they long guided the values, standards, and much of the drama in native life and death.

Folklore and Genealogies

Some of the valued heirlooms of the interior have genealogies of their own. My introduction to oriental art, especially ceramics, was through the eyes of the uplanders. My subsequent experience and comparison of upland art objects with those in world museums has proved to me that many of the uplanders' estimates of antiquity and sequence are nearly or wholly correct. This fact brings out a point that should be emphasized in any presentation of prehistory in Borneo: the continuity of living out of the past into the present is in many ways literally unbroken and is paralleled in present-day cultures much as in the stratification of the west mouth at Niah, where it continues from full Palaeolithic to contemporary times.

Indeed, it is not possible to understand the living cultures of Borneo today without tracing them back through history into prehistory. This history of peoples who until recently were wholly illiterate is nevertheless firmly held in a most elaborately sung and spoken folklore; past events are often identified with specific persons, places, and numbers of generations back from the present. Though the material is subject to even more error and argument than is the work of Western historians, recent work in Borneo has shown that there is much of objective value in this folklore. A considerable part of our museum's energy has been expended in collecting what is left of these stories and legends before the great old singers and storytellers die out.

Often we have followed up folktales by actual excavation and proved an association between spoken words and excavation finds. By and large this folk information can be regarded as having a varying but appreciable validity up to twenty generations back, especially among people like the Kenyahs and Sea Dayaks, who use remarkable aide-memoires in the form of marked sticks to refresh the compositions of successive generations. Even in the twilight of 1970-remembered thought, it is possible for me to identify distinct major events registered by twentieth century Bornean bards: the advent of Islam; the impact of great Hindu figures even earlier than that; and the arrival of iron.

The arrival of iron and other technological devices is particularly well documented in the great chant cycles of the Iban *gawai* festivals, which are controlled by the writing boards called *papan turai*. This and other forms of native writing inside Borneo astonishingly had gone unrecognized until I published a paper on the subject in *Bijdragen* (Harrison 1965); the wide scale of this native literature has now been documented by a full monograph (Harrison 1966a).

One of the important figures in this ritual lore is Merom Panggai, who is especially associated with early technology, specifically with the introduction of the compass, and writing itself. (See Joseph Needham on the twelfth century development of the compass in China [Needham 1962].) According to the Iban record, the genealogy of Merom Panggai is as shown in Table 3.

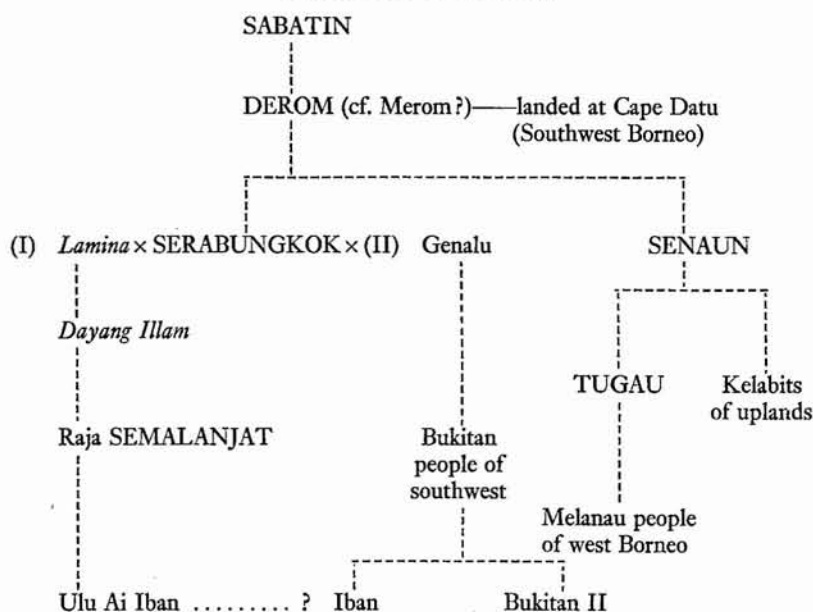
As usual, we must assume that the earlier generations here covered a longer (perhaps a much longer) time span than those from approximately No. 9 downward, which can be

TABLE 3
GENEALOGY OF MEROM PANGGAI

NAMES (MALE NAMES IN CAPITALS)	LEGEND OR HISTORY
1. MEROM PANGGAI	Middle East (Persia?) by folklore
2. MEROM PANGGAH	Moved to "Indonesia"
3. ABANG MUSA	In Java and traded to Brunei
4. PATEH SIMPONG	Near Brunei (possibly Niah)
5. PATEH REJAB	Wandered about West Borneo
6. RAJA RENDAH	At coastal Mukah and back to Kapuas in Kalimantan
7. PATEH GURANG	All three in the Kapuas under Javan or Sumatran domination?
8. PATEH IRI	
9. PATEH TELIANG	
10. PATEH AMBAU	Moved overland westward to Sarawak
11. NUNONG	In Batang Ai, Sarawak
12. CHAONG	In Skrang River
13. TINDIN	Paku, Saribas reached
14. Rinda × DEMONG	A Bukitan from Saribas, son of ENTINGI
15. KALANANG	
16. TUAH	
17. SEING	
18. BUSU	
19. UYUT	(Called "Bedilang Besi" = Iron Heart)
20. Pala	
21. KALANANG II	
22. UYUT II	
23. Penghulu LINGGIR	("Mali Lebu")
24. Umang × Penghulu GARRAN	
25. UYUT III	
26. Penghulu SANGGAT	Born 1925 × Lada
27. DIN	Schoolboy, 1968

authenticated as increasingly "correct" from other sources and fieldwork. The Merom Panggai genealogy reflects the Western influence and then traces an overland movement into west Borneo, which has already been mentioned for the southern part of the island. But the Iban also keep genealogies that cover a much wider range; these genealogies can sometimes be checked from other groups. Thus the example in Table 4 stretches far north, covering both the Melanau group, who were established coastally as well as inland well before the Ibans moved westward into what is now Sarawak, and the upland Kelabits, whose Megalithic culture dates back at least six and perhaps twelve centuries.

TABLE 4
GENEALOGY OF SABATIN




Both Tugau and Senaun/Semaun are picked up again in the folklore of the Brunei Bay area 300 miles to the north: Tugau as one of the great pre-Islamic culture heroes and originators of the Brunei Sultanate, and Semaun as the first Kelabit in the uplands (but also associated with the lowland peoples of Brunei Bay).

Genealogy-keeping is quite a game among some, but alas not all, Borneo groups. It can be a valuable checking scale when pursuing metal-age prehistory. The riverine Kenyahs of the middle interior are also strong on genealogies but can seldom go back more than fourteen generations. Then they enter into a sort of miasmic period of protohumanity. Some of the Kenyahs, like most of the adjacent Kayans, attribute their original ancestry to propagative acts in the vegetable kingdom, notably connected with the durian, and the ancestral figure of Aki Dian (literally "Grandfather Durian"). There is usually a gap, or at best an unconvincing link, between Aki Dian and the definite ancestor, such as Lenjou Apoi, thirteenth generation ancestor of the great chief Pelek at Long Nawang, Leppo Tau clan, top class of the Kenyah peoples. But one sometimes picks up this time scale through objects—jars with the Kelabits, eye beads with the Kenyahs, special charms and metal objects with the Kayans. Thus the beautiful small bronze of a human figure surmounted

by a hornbill head (fully published and illustrated in *Artibus Asiae* [Harrison 1964c]) that the Sarawak Museum obtained by special dispensation from the highest Kayan aristocracy in the Upper Baloi, central Sarawak, is called Erang Imun Ajo' Uyan. Usually known as Imun Ajo', this shaman control-figure is regarded as a human being in metal form and has an authentic genealogy of its own which links back to the trees at another level of origin (see Table 5).

TABLE 5
GENEALOGY OF IMUN AJO'

MALE	FEMALE
"THUNDER GOD": AKI BELARIK UBONG DO'	Tree base
1. KELUVAR GAPE (limbless man)	× Keluvek Angai'e (limbless woman)
2. BELARIK ABAI	× Ketirak Murai
3. PANGOK NGAI	× Lahai Abai
4. BELAKIRK UDAI	× Hunai Lahat
5. WEE AMAI	× Buring Unai Lahai
6. JOK OYOK UNAI	× Huring Keluhing Makai
7. JO' KELAKAWAN	× Huson Telun Bawai
8. HANYI KENDALAN	× Do' Lengok Parai
9. HANYI KELIAN JEHI DANGAI	× Seloi Buring Unay
10. HANTU NYAT BUTIT AJAT BELIN ANG	× Lahai Tedak San
11. HARAN KUMAN PAKAN DANGAI KIAN	× Hulo Nang'o Do' Bulan
12. ERANG IMUN AJO' UYAN	× Hurai Alang Mamong Dangai Kian
<div style="text-align: center;">  </div>	
13. AKI DIAN (durian ancestor of present Kayans)	

This bronze figurine is of added interest because it is clearly of local and probably Bornean origin. Though easily related to the dancing hornbill figures on Dongson drums, the species of hornbill unmistakably and dramatically carried on Imun Ajo's head is *Buceros rhinoceros*, which does not occur in Indo-China. This is a suitable place at which to emphasize that although there are Dongson-like objects obtained from native owners over many years represented in Sarawak Museum collections, nothing of this sort is represented in sequential archaeological sites excavated so far. Moreover, there is strong evidence of a powerful indigenous bronze industry native to Borneo, and particularly to Brunei, as well as to adjacent Celebes. This industry has continued in Brunei until modern times and has produced splendid objects, notably drums, water pots, cannons, and miniature animals, all with unmistakably island character as well as a background of "Chinese" influence. There is no sign of a separate Bronze Age in Borneo, any more than there is of a distinct Megalithic period (see above).

MAIN RESULTS FROM WEST BORNEO

The previous section has given a general survey of much that has been learned in the last twenty years and indicated much that we have not learned. In this section, the scope of presentation will be restricted to west Borneo, with special reference to the Niah Caves and

that sector of the subcoastal plain and foothills. It is for this sector that we have the most complete information to date, although much of the discussion is based on unpublished material.

In separating the succession into five subsections, the terminology has deliberately been kept loose. The localized Borneo experience, set against the rich deposit documentation at Niah, gives rise to some considerable misgivings about the sometimes rather dogmatic application of terms such as Mesolithic or Dongson when tested against the realities of excavation in this sector. When such terms are used hereafter, this limitation should be borne in mind. It would be easy to set up Borneo categories, as has so often been done elsewhere in this part of the world (e.g., the "Tampanian" in Malaya or the "Toalian" in Celebes). But to coin adjectives such as Niahian or Sabahan (though attractive to one's ego and even easy to hear) is likely to delay and confuse rather than accelerate and clarify problems of classification. These classification problems apply not only in Borneo but throughout those areas of Asia where archaeology is still in its infancy and where, in consequence, there has been too much readiness either to take for granted the application of systems established elsewhere, or to go to the other extreme and invent one's own.

Early Stone Age

The early Stone Age in Borneo includes all the evidences of stone-age man that would normally be termed palaeolithic and that occur in the Pleistocene epoch geologically. The boundaries of the Pleistocene remain fairly obscure in Borneo, owing to incomplete geological information. Indeed, the raising and occasionally the resolution of new issues of this sort outside archaeology have been side products of the Niah work. (Several Niah papers by geologists and palynologists are now in draft or press, while soil scientist David Wall has reviewed the geomorphological data in *Sarawak Museum Journal* [Wall 1967].) The land and sea levels at different periods of the Pleistocene are clearly of first significance here, particularly when using old water lines to decide where to seek and in which caves to study. As stated earlier, the distribution of limestone especially in west and north Borneo is erratic, and much of it is either low-lying and close to the coast (the formations would have been small islands with any significant submergence) or is in inland areas of difficult access and extremely costly in which to operate.

One of the reasons for selecting the Great Cave at Niah for the Sarawak Museum's main operation after 1954 was the siting of large undisturbed deposits well over one hundred feet above present sea level; thus it was supposedly clear of all later Pleistocene level changes in west Borneo. In fact, the presence of beds of fossil oysters at the bottom of the human deposit in the Gan Kira mouth of the Great Cave and in the Painted Cave half a mile away has enabled us (with the help of Carbon-14 determination through W. F. Libby's laboratory at the University of California at Los Angeles) provisionally to place a saline level up to nearly 50 ft in the last postglacial epoch and as late as about 35,000 B.C. Would this then be enough to cut off the Niah limestone into an island group—thus restricting regular hominid frequentation in the immediately preceding period?

In the Great Cave human deposits, we have radiocarbon datings from associated charcoal down to about 38,000 B.C. at and 145 ft above present sea level (see Table 6). The special conditions at Niah have enabled the human deposits to lie *in situ* for thousands of years without any factors operating to fossilize the remains or to deposit "purely geological"

overlying strata (except in particular sub-sites). Therefore, we have the extraordinary situation in which human food and other remains lie in the deposit and disintegrate "naturally," undisturbed. Under these special conditions, the normal life of human and most mammal bone is 30,000 years or less; most food shell disintegrates earlier than that. It follows that the only way we can certainly identify human presence below these levels is through stone tools. But, as already mentioned, there is something close to stone starvation at Niah and it may well have been more acute further back in time.

Although there are signs of irregular human presence prior to approximately 35,000 to 40,000 B.C., more solid answers beyond this level now require the discovery of an additional cave or other site that cannot have been affected by the last major land submergence in the Pleistocene. Despite geological support, helicopter transportation, and other assistance, such a site has not been satisfactorily spotted. For the present we can only proceed with Niah as the established base.

Taking the period from approximately 35,000-40,000 B.C. to approximately 1000 B.C., we get three main types of stone tool:

1. "Chopper tools," crudely struck from whole pebbles, monofacial, and with something of a beak effect as the lower part of the face continues out to a point.
2. Large flakes, mostly of quartzite, which have at least a superficial resemblance to those generally classed as Sohan from the early stone-age sites of India.
3. Small quartzite flakes, which are more numerous and tend to be concentrated in a band determined by Carbon-14 to fall broadly between 20,000-30,000 B.C., and probably later, also. (In Palawan, Philippines, the situation is closely similar. This similarity is confirmed by a direct comparison of Niah artifacts [cf. Shutler and Kess 1969].)

The chopper tools and larger flakes of numbers 1 and 2 above *tend* to occur below the smaller flakes, number 3. But there are important exceptions. In some instances, chopper tools unquestionably occur at levels much later in time; one has been found almost on the surface. The relevant excavation data are subject to further analysis. But it is clear that some tools have been used and reused over long periods of time. Reuse is no doubt partly because of the aforementioned scarcity of hard stone. But apart from this scarcity, it seems likely that tools were reused elsewhere in the area; if so, new caution must be exercised in associating certain types of tools with predetermined phases on the time scale. (For instance, choppers found on unstratified *open* sites would not necessarily prove such an early human frequentation as the appearance of the tools initially might suggest.)

If the foregoing account seems somewhat inexact, it is a proper reflection of the evidence. The further this general period of human presence is explored in west Borneo, and the more material evidence is accumulated, the less satisfactory are precise, cut-and-dry explanations. Here again, it must be mentioned that for some other territories in this part of the world, precise sequences have been accepted on less evidence or on more incomplete evidence, largely because of assumptions derived from more sophisticated archaeology (and archaeological training) elsewhere.

Clearly, we are not much helped by the fact that there is no normal fossilization at Niah and that the area's natural geology as a whole seems to be working to restrict rather than to enlarge archaeological interpretation in this sector. Unhappily—and the facts must be faced—the biological sciences are not noticeably more helpful. Whereas in many countries there have been marked climatological and other changes powerfully modifying the fauna and

flora, zoologists and botanists now agree that such changes have been modest in Borneo through the Pleistocene, and certainly through the period presently under review. The rain forests and the swamp forests of west Borneo are among the oldest vegetation habitats and have remained almost unchanged over a long period of archaeological time. Only minor climatic changes have so far been postulated over this period. Thus, attempts to distinguish changes through pollen analysis of the Niah deposit have been negative, despite expert assistance from the Shell Company.

With a view to obtaining other time clues, we have taken special pains to preserve for study all sorts of food remains from the Niah deposits, wishing to learn from them the food habits of stone-age Borneo man. Much of this material is still awaiting analysis, or is out with experts. But through the patience of Lord Medway, who formerly was actively associated with the Sarawak Museum in the field and is now at the University of Malaya, and his father, the Earl of Cranbrook, as well as the help of D. A. Hooijer and Ralph von Koenigswald on special material, the mammal remains from Niah have been the subject of the fullest study of this kind yet made in Southeast Asia. Again, as might be expected, the mammal fauna shows little sign of change within the 40,000 year span. There is, however, one remarkable exception: the occurrence of the giant pangolin, *Manis palaeojavanica*.

Manis palaeojavanica, an enormous scaly anteater, was previously known from fossil remains collected in association with *Pithecanthropus* in Java by E. Dubois. Working with the Dubois collections at Leiden, Dr. Hooijer has shown that this species is quite well represented in the deeper levels of the Niah deposit as ordinary, nonfossil bone. Here again, it would be easy to leap to the conclusion that its presence implies that the adjacent "chopper tools" represent a pre-*Homo* association. In this case, the inference is that this strange and vulnerable animal survived into relatively recent times in part of Borneo, in somewhat the same way as the chopper tools carried on! On the other hand, such survival itself once more underlines the need for caution in using any such "extinct animal" to date a horizon archaeologically unless there is other adequate supporting data.

Manis palaeojavanica is the only example of a mammal occurring in the Niah food remains but unknown in Historic times anywhere in the archipelago. Lord Medway, however, has identified several examples of the large and clumsy tapir, which does not now reach farther east than Java-Sumatra. Tiger, so strongly present in Borneo folklore and ritual, but not known in Historic times, is represented by a single subadult canine tooth from Niah Great Cave's west mouth. Of much interest also are food remains of two mammals that are otherwise only known as part of the specialized high montane fauna of the northern interior and have not in modern times been recorded anywhere in the lowlands. These are the lesser gymnure, *Hylomys suillus*, a large nocturnal shrew particularly common at the 10,000 ft mark on Mount Kinabalu in northern Sabah (the highest mountain in Southeast Asia), and the ferret-badger, *Melogale orientalis*, occurring at 54 to 60 inches in the west mouth (equals ca. 20,000 B.C. at that point), previously recorded only from the upper slopes of Mount Kinabalu.

The occurrence of these montanes in Niah's prehistory raises difficult biological problems outside the scope of this report; they are under further review. But the identifications also illustrate the thoroughness with which this mammal fauna has been examined (detailed reports are published serially in *SMJ*). I hope to begin shortly similar reports on reptile, fish, and bird remains, while two papers on food shell are now in preparation. (The reptile bone from Niah is now under detailed analysis at Michigan State University.) Despite its

advantages as an "undisturbed" cave deposit, Niah does present these difficulties. It is unlikely that a simple solution to the outstanding problems will be found anywhere in the west or north. The answer, so far as Borneo is concerned, may well lie eastward in Kalimantan (see EAST BORNEO VACUUM late in this report).

Meanwhile, I hardly need emphasize that the present picture, with *Homo sapiens* as described by Don Brothwell down to 35,000 plus years at Niah, is basically incomplete. Common sense, as well as the continuity of Sundaland, must mean that earlier forms of hominid reached eastward to Borneo, as did the orangutan (abundant in the Niah food remains) and the giant pangolin. But unless we postulate, as others have done elsewhere, that the chopper tools must "belong" that much earlier, there is no trace of anyone like *Pithecanthropus* anywhere in Borneo to date. However, a massive multifacial chopper tool of quartz was recently recovered from the Sematan bauxite mine, 30 miles southwest of Kuching and close to Cape Datu where Derom landed (see Table 4). This chopper tool represents a quite different level of thinking from anything we have excavated in sequence. A critical examination by Kenneth Oakley confirms my view that this tool may have a pre-*Homo* association. (A cast of this chopper is now available in the British Museum of Natural History, London.)

It may well be significant that this large "hand axe," which is quite unlike the Niah chopper tools, was found close to the mangrove swamp and within a mile of the sea beach. There would appear to be a positive correlation between the propinquity of lowland swamp, tidal water, and coast line and the fully palaeolithic evidences in western Borneo. On the very large rivers, saline tidal water and consequent marginal swamp may continue far inland. But everywhere else here, within a few miles of the coast, we come to the great rain forest which can only have been kept permanently cleared by man in quite recent times (see below). The difficulties of hunting and of contact in the virgin forest under early stone-age conditions were considerable and presented problems of a magnitude unimagined in most human habitats. There was no open or savannah land, and without special equipment very little animal food was easily obtained in quantity over an extended period. The vegetable food available without the use of iron was subject to complicated and often very erratic seasonal fluctuation. These factors presumably put a premium on one's moving around large expanses of water and the associated low and more open terrain. The limestone caves also provided open spaces with large built-in supplies of animal food. Even so, where caves are in remote hinterland areas, such as in the headwaters of the Kakus River 70 miles in and southeast of Niah, certain evidence of early stone-age activity is lacking, as was also the case with the initial cave excavations at Bau in the headwaters of the Sarawak River behind Kuching (cf. BACKGROUND section, above).

Later Stone Age

The intermediate phase between the "fully Palaeolithic" and the Neolithic, with its characteristic polished tools and pottery, has been identified by archaeologists in Southeast Asia as Hoabinhian, derived from cave sites near Hanoi in what is now North Vietnam. But the recent new Russian and Vietnamese studies in that area only accentuate one's uncertainties about some previously assured placing of this sequence, which is certainly absent in west and north Borneo. During the twenty years of our excavating cave sites and collecting stone tools from native informants and in the open, we have no example of an artifact that would anywhere be characterized as necessarily "Hoabinhian."

The rather more "sophisticated" edge-ground pebble tools are, however, adequately represented in the Great Cave at Niah and regularly occur in positions intermediate between the main choppers and flakes on one hand and the more or less polished tools on the other.

I say more or less polished because at Niah advanced techniques of polishing and otherwise finishing stone tools are weakly represented. A few quadrangular adzes, similar to those that characterize the Neolithic in Malaya (and elsewhere) are found mostly in association with porcelains and always in the highest level of the deposit. Underlying them occur less polished and often pretty rough or "round" axes, broadly parallel to those so familiar in Melanesia, and known casually from Malaya and elsewhere in the area, though not previously in stratified association with the quadrangulans.

Put very briefly, once we leave the difficulties of the Palaeolithic, the succession, though meager, is remarkably complete—through edge-ground to "round" and then quadrangular tools. Farther north, quadrangulans appear to be replaced by the trapezoidal adzes already described from Brunei Bay and Sabah. In the Kelabit uplands of the far interior a number of crescentic adzes, perhaps somewhere intermediate between the round axe and the quadrangular, have been found *in situ* (but not in stratigraphy) and provide proof of late stone-age penetration into the heart of the island. (Of the hundreds of stone artifacts collected in the upland area since 1945, none can be regarded as pre-Neolithic.) The Niah work strongly suggests that at this time there were three major changes in the human pattern for west Borneo:

1. The tempo of development changed from a long, slow endemic evolution into rapid technological innovations, with a large increase in population and population mobility. (The deep-water islands off the coast are included.)
2. What may be described as wealth, and certainly a lively interest in things of scarcity (jade-like stone, gypsum ornaments, non-glass beads) and of real artistic merit with technical skill (e.g., fine double-spouted earthenware vessels and massive urns decorated in three colors) had their beginnings at this time.
3. From being largely centers of regular and perhaps later sporadic occupation and frequentation, the caves were increasingly vacated for living and became instead the foreground for dying.

Although there are a fair number of probably earlier burials in the west mouth of the Great Cave and elsewhere at Niah, funerary use becomes regular and indeed intense in the Neolithic period. Several of the other cave mouths are little else but burial grounds; often an earlier burial has been cut through by a later one. Although the skeletal remains have generally been compressed and distorted by later human movement over the cave floor, under the conditions at Niah preservation is usually quite good. Thus nicely laid-out Neolithic bodies retain rush matting, netting, and wood, either as coffins or pillows. There is also some hair in recoverable condition (now with D. R. Brothwell at the British Museum). In 1961 I made a preliminary summary of the principal types of burials then identified at Niah (Harrison 1962) totalling forty separate "methods," including carefully extended burials laid out on matting or wood, or both; flexed, crouched, and contorted positions; double burials; separated skulls; urn burials (especially of babies); and a wide range of secondary burial practices, including various forms of lustration, cremation, etc. Since then we have added considerably to this picture, and Barbara Harrison has been working out a much fuller analysis. I was determined that full use should be made of the best of this material *in situ*, and where possible all burials in the west mouth had been left in position

and carefully protected since excavation began there in 1954. After many unsuccessful attempts, in 1966 we were fortunate in obtaining, through the good offices of Richard Shutler and with generous support from the National Science Foundation, Washington, the services of Sheilagh Brooks and her husband Richard. They worked for two months with Mrs. Harrison in the west mouth, and together they removed some fifty proper burials at that time. With previously removed material, I believe that Brooks has at the University of Nevada over one hundred varied sets of human remains from the one cave mouth that are well documented for study with modern techniques. A separate complete series from the Lobang Jeragan Cave about two miles farther up the Niah River is in the hands of Calvin Wells at Norwich, England, for a parallel study (cf. B. Harrison 1967).

The Advent of Iron

Under conditions of poor soils, slow-growing but immensely resilient rain forest-jungle and a very rugged terrain behind the coastal plain, early man faced obstacles in Borneo that appear to have given him few advantages. The advent of iron, even in its crudest form, literally opened up new horizons.

Though individual pieces of iron and other metals occur sparsely in loose association with neolithic polished stone tools, notably along with the cast for a bronze adze at Tapadong Cave well up the Segama River in eastern Sabah (with Celebes "links" there), the general impact of metal and its technology cannot now be placed much earlier than the seventh century at any point in the area under review. This brings us back to the delta sites mentioned earlier, with their impressive documentation of a strong if simple iron smelting, intermixed with the "Chinese" import porcelains, the "Indian" glass, the dynamic local earthenware, and much else, including the golden emblems of Tantric Buddhism. These external signs of course indicate that western Borneo had become a very important (and hitherto ignored) *entrepôt* in the rapidly growing trade routes, which by the Sung dynasty (tenth century) connected the east coast of Africa at least as far south as Kenya, across the Indian and Pacific oceans to China, the Philippines, and Micronesia. But by no means do I wish to say that all sorts of different people came and lived in or culturally overran this part of Borneo, any more than culturally different people overran the east coast of Africa. The contacts were normally subtle, and it is necessary to draw a sharp definition between material contacts and other types of contacts.

The broad evidence is that the radical effect of iron, facilitating techniques for jungle clearing and cultivation, further accelerated the developmental trends that were already well established toward the end of the Stone Age. Iron technology itself, spreading inland from the coast, also gave a great advantage to those who received it first. It reached parts of the hinterland quite slowly. Indeed, when I arrived among the Kelabits in 1945 the relics of stone tools were still being used among the iron; and of course in the parallel conditions of central New Guinea, great populations have been living stone-age existences until now.

There is much to show that iron produced technological acceleration throughout Borneo, rather than, strictly speaking, a technological revolution. To a large extent the revolution was adapted to and developed within the continuing framework of emerging advances in neolithic techniques and social organization, both of which had a very long localized indigenous heritage. It is against this background that we must view, for instance, the dynamic movement of the Iban Sea Dayaks out of the Kapuas basin in Kalimantan north-

westward across Borneo, much of which they were taking over by destroying or assimilating earlier and less powerful groups, until the advent of European order.

It is also significant that large areas of Borneo's interior (but never the coastal plain) remain to this day not only uninhabited but seemingly untouched by man. In some of these areas, mainly the central interior, bands of truly nomadic Punans have continued their way of life into this century, though none of these are known from Sabah to the north. (One small band penetrates the headwaters of the Belait River in the State of Brunei.) These nomads depend for full success on three forms of assistance:

1. The blowpipe made of polished wood, with a sufficient muzzle velocity on the dart to reach the arboreal fauna of the forest canopy.
2. Steel axes with which to chop very hard outer wood protecting the pith of the sago palm, their food staple.
3. "Pye" hunting dogs to hunt and corner pig and other game.

Numbers 1 and 2 above require an iron technology. Number 3, "Pye" hunting dogs, were acquired in present form by the Punans only relatively late, according to their folklore. The only dogs found in archaeological deposits are a smaller form, similar to the Japanese neolithic ones. Such small dogs were found in the late stone-age deposits both at Niah and in a cave near Bau. The type is more of a lap-dog and would appear unsuitable for jungle conditions. Anyway, it has vanished from the Bornean and Southeast Asian scene without a trace, like the Seru people of the Kalaka River in southwest Borneo who were overrun by the Iban.

Folklore supports the belief that the nomadic Punan Busang acquired their present superb dogs in fairly recent times and that the other notable interior jungle folk, the settled Kelabits of the uplands, had a pre-dog hunting style. This style, according to the Kelabits' emphatic belief, included use of the yellow-throated marten (*Martes flavigula*) to operate rather like the closely related ferret in Europe, but in the open. To my knowledge, this vicious predator, which usually pairs for life and hunts *en famille*, can pull down even the big Sambhur buck: one marten hangs on to the testicles while another bites the fetlocks.

By the fourteenth century, when the Sarawak River delta sites suffered total eclipse and the whole of that coastline seems to have been vacated, even by the natives who were hitherto largely engaged in iron working, the internal population had, over a large area, acquired effective means of controlling the jungle—the means that alone enabled the Ibans in the south, the Kayans and Kenyahs farther north, and the Muruts and Dusuns even farther north, in every case to spread across the interior. As well as the material needs of life, these people had an extremely elaborate religion, generally described as animism. However, because animism inadequately describes their marvelous intricacy of belief, I have therefore termed it "universism." These people had acquired many objects that would be fully acceptable in the more sophisticated museums of Europe or America today, notably T'ang jars, celadon bowls from the Lung Chuan kilns, glass beads (individual fine beads could be worth a human life and exchanged for a slave), beautiful brass gongs and vessels, and elaborate music. Entrenched aristocracies were established that continue in power today.

Islam and Ming

Islam has a special importance in that it is the first distinct, international, organized "influence" to enter Borneo from any direction and leave its own coherent literature and observances that continue complete to the present time. Even so, the exact date of arrival

at points along the coast remains the subject of scholarly argument, subject to intensive new research with early texts now being conducted by Dato Jamil and his Dewan Bahasa in Brunei. These texts became important for the whole of west Borneo after the collapse of the ironworking sites at the end of the Sung-Yuan period (see BACKGROUND above).

This discussion is, therefore, now moving out of prehistory into at least protohistory. But this transition applies only to a limited area around what is now Brunei Town and the coastal plain generally (the earlier capital of Kota Batu having been abandoned after Spanish attacks in the sixteenth century). A large proportion of the plains people—not Chinese migrants arriving within the past century—are now Moslems duly classified as “Malay.” But serious misunderstanding has arisen from this terminology, particularly in connection with recent political events. Ninety-nine percent of Borneo Malays have no direct blood connection with Malaya. At least 90 percent of their ancestry is pagan Dayak. They were people of the accessible tidal lowlands converted to Islam—sometimes under pressure, sometimes by conviction or convenience—within the past five centuries. (This non-Malayness is fully documented in *The Malays of South-West Sarawak* [Harrison 1970: 117–161].)

This Islamic influence has until now failed to penetrate inland, largely because of inadequate protein supply in the jungle terrain away from the recurrent fish supplies of the tidal rivers. The inlanders overwhelmingly rely on pork for their protein. An insignificant fraction of Malays, however, did penetrate the inland three-quarters of Borneo until the Indonesian-Malaysian confrontation from 1963.

Moslem control of the coastal band, and therefore of the maritime trade, had a major effect also on the pagan people inland. The Brunei Sultanate was one of several factors operating to restrict direct trade with the non-Moslem population and to channel contacts through a few sea-points. This activity corresponded in time—and to some extent in improved communications and technology—with the establishment of the Ming dynasty in China, which then became a major source of traded goods and valuable objects penetrating through these channels into the interior. But large sectors of the west coast, southwest of Brunei, were in effect abandoned commercially before that, by about A.D. 1350. This eventually led to a state of near anarchy which white adventurers, early in the nineteenth century, were able to use both to their own advantage and to the benefit of unhappy populations living under conditions that were economically inferior to those of the preceding period. The inlanders tended to build up strong independent groupings in contact with the plain, but organized to prevent intrusions therefrom. This dichotomy has had numerous and complex effects in shaping the movements of tribal groups in the interior, and in determining standards of living and development, as is repeatedly illustrated in individual tribal prehistories.

With the coming of organized and voracious Spanish, Portuguese, British, and Dutch trading fleets, starting in the sixteenth century, the monopoly of the sultanates went into decline, and gradually the whole aura of the sultanates began to deteriorate. The initial impact of these theoretically Christian outsiders was normally to accentuate disorder and instability. An important subsidiary influence was the introduction of epidemic diseases, such as smallpox and measles, which spread inland among peoples without immunity. Among some, such as the Muruts, whole long-house communities and valleys of long-houses were wiped out.

The effect was often shattering, especially on a ritual and religious life dependent on

elaborate knowledge and orderly sequences. What we see today in native cultures is often little more than a shadow of a more lavish past. This is most difficult to reconstruct prehistorically (except at the folklore level) because it was going on over jungle terrain where the evidence is obliterated within at most a century, unless we have the good fortune to find megalith memorials. These are the only form of sufficiently permanent structures known in the island except for the shaped stones of the one "Tantric Shrine" at Santubong in the delta.

European Order

Here, of course, we come into history. I refer to the period when government in depth was set up, by the Brookes in Sarawak, the British-controlled Chartered Company in Sabah, and the Dutch in what is now Kalimantan. Despite many harsh and even barbaric acts by whites, order was so necessary that, in retrospect, the faults of the Europeans are compensated for by the many advantages gained by the native peoples. Most important of these was the introduction of a system by which disputes could be settled without recourse to bloodshed, both at the territorial level between groups and at the personal or ritual level between and inside communities.

Nevertheless, large interior groups remained determinedly unchanged until the beginning of the twentieth century. Some, like the upland Kelabits, were influenced only indirectly up to the end of the Brooke regime and until the introduction of colonial government in 1945. The nomadic Punan Busang in the headwaters of the Rejang remained untouched by European influence until they got into the firing line near the Indonesian border in 1963.

To pursue these later phases would be to overlap, of course, ethnology, anthropology, demography, and other disciplines. I have attempted to trace the character of some of these later human developments in a series of lectures published by the Royal Geographical Society in London (Harrison 1949, 1959*b*, 1964*d*), and more are in preparation. Let us now look back over the whole panorama presented so far, inadequate though this is.

GENERAL CONSIDERATIONS: THE TIME SCALE

It does not yet seem appropriate to attempt to simplify any explanations of the human prehistory of Borneo. Attractive as it might be to draw lines on maps and arrows across oceans, the research of the past two decades in this limited area suggests that on the whole such graphics would falsify rather than clarify actual occurrences. The fieldwork of the last two decades has, I am afraid, made the picture less clear in some respects rather than more so. The more we excavate and the more we correlate the evidence of archaeology with that of related disciplines in the field, the less satisfactory the imposed formal sequences and completely coherent systems of phasing or contact seem to be. This does not at all imply a defeatist attitude. But a "quick answer" may obscure some fundamental questions which the prehistorian should attempt to answer. Perhaps the largest of these questions, in the present context, is: How much of the culture of Borneo peoples is indigenous, how much derived from outside impact, and in what degrees? Parallel questions can be posed at different levels—for instance, in biology for the genetic influences that have produced the present population. If this appears to be rather ambitious, I hasten to add that every incident and step along the way must be regarded as fully relevant in itself.

Table 6 is the time sequence as we now see it specifically for the Niah Cave complex and the immediately adjacent coastal plain of west Borneo.

Twenty reasonably assured Carbon-14 dates, linked to satisfactorily identified facets of excavation, are so far available from Niah, and a similar number have been obtained from

TABLE 6
REVISED NIAH AREA PHASEOLOGY
(As Known or Assessed at I.XI.69)

PHASE	MAIN MATERIAL CHARACTERISTICS	APPROXIMATE SIGNIFICANT START DATE AT NIAH (IN ROUND FIGURES)
1. Early Stone	Tiny "chip flakes" ?	?
2. Early Stone	Large flakes and chopper tools (see text)	ca. 40,000 B.C. +
3. Early Stone	Quartzite flakes	ca. 30,000 B.C.
4. Intermediate ("Mesolithic")	Advanced flakes; edge-ground pebble tools	ca. 10,000 B.C.
5. Neolithic	"Round axe"	ca. 4000 B.C. ?
6. Neolithic	Quadrangular adzes; pottery; mats; nets	ca. 2500 B.C.
7. Intermediate ("chalcolithic")	"Soft tools," first metal; elaborate pots	ca. 250 B.C. ?
8. Metal	Iron tools; import ceramics; <i>glass</i> beads; "death ships" (for burials)	A.D. 700
9. Islam	Site looting; Malay texts	A.D. 1400
10. White	Glass <i>bottles</i>	A.D. 1860

TABLE 7
SOME RADIOCARBON DATES

SITE	DATE (MEAN AGE YEARS B.P.)
West mouth, near deep skull	41,500 ± ca. 1,000
West mouth, near deep skull	39,600 ± 1,000
Gan Kira, fossil oysters	37,500 ± 2,400
West mouth, E/1, 72 in.	32,630 ± 700
West mouth, E/1, 48 in. +	19,750 ± 190
West mouth; outer edge of frequentation	11,030 ± 280
West mouth; outer edge of frequentation	10,110 ± 310
Jeragan Cave, burial	4,300 ± 160
West mouth, at 12 in.	4,040 ± 70
Megala Cave, burial	3,130 ± 240
Jeragan Cave, burial	3,070 ± 410
West mouth, subsurface	2,700 ± 70
West mouth, late Neolithic	2,695 ± 65
Painted Cave, death-ship coffin	2,300 ± 80*
Gua Samti, death-ship coffin	2,115 ± 150*
Painted Cave, death-ship coffin	1,180 ± 70*
Painted Cave, death-ship coffin	1,045 ± 75*

* Subject to special error owing to the age of the tree used and the part of the tree trunk employed for the coffin.

other sites. I hope that a separate series will be completed soon, in connection with fully documented individual skeletons as part of the joint study with Sheilagh and Richard Brooks that has already been mentioned. Charcoal is very unevenly distributed at Niah; some of the results from bone have proved unsatisfactory, particularly on account of the special cave conditions previously described. Dates from coffin and other wood are complicated by the fact—in part demonstrated for the first time from a set of our own samples—that forest trees used for these purposes may be as much as five hundred years old.

Table 7 summarizes significant dates considered satisfactory; these have been obtained from the University of Groningen in Holland, the U.C.L.A. Laboratory, courtesy of W. F. Libby, the New Zealand Geological Survey and Geochron.

GENERAL CONSIDERATIONS: PLACE AND MOVEMENT

Much has already been said about the terrain and other factors that have affected human distribution, occupation, and mobility over west, north, and interior Borneo as a whole. Certain points should be emphasized here in summary form:

1. At nearly every stage of development since early *Homo sapiens* at Niah (before 30,000 B.C.), there are strong indications that man developed his techniques and habits to a large extent on an indigenous and even local basis, under the special conditions prevailing in this part of Borneo in the pre-neolithic past.
2. Indigenous development led to specializations or variations in, for instance, stone and bone artifacts, which frequently make the material from one place or period difficult to interpret by interpolation with adjacent, let alone remote, territories.
3. Such specializations extend from the fully primitive chopper tools through to most of the pottery and artifacts of the late Stone Age (but decreasingly thereafter).
4. It is probable that there has been a continuous human development inside Borneo during most of the time span of *Homo sapiens*, though so far there is no evidence that these people penetrated to the far interior in the early stages.
5. Outside impacts of any kind are difficult to demonstrate and certainly weak until the late Stone Age, and even then not nearly so considerable as one might expect in view of most accepted theory for Southeast Asia, as it refers to adjacent island areas (Java, Celebes, etc.).
6. It seems possible that modern man or his immediate ancestors reached the eastern limit of Sundaland (at its last stages) early in the Asian human picture, subsequently lost touch with the parent stock, became isolated, but were able to continue effectively, especially in areas centered on abundant food supplies (around Niah, for example).
7. There is no question that outside influences became immensely important toward the end of the Stone Age, terminating the era and bringing in outside metal technology, durable ceramics, etc.
8. Even so, it seems that many of these impacts from outside were in the forms of *objects* or of *related ideas* or of a few persons having direct physical effect on the population. There is, at present, little evidence of any clear-cut migrations of people, let alone of cultures, across the *seas* in this sector over a long period of time.
9. With increased communications and techniques, the various island empires (e.g., Sri Vijaya, Majapahit) had certain temporary effects. But these were limited in character and perhaps statistically negligible in relation to the inland population as a whole.

10. Islam achieved a more lasting effect, but only in the accessible lowlands and, in the long run, largely in directions not necessarily implicit in the faith or intended by the faithful.
11. Much else, such as Tantric Buddhism, can only be deduced to have had some impact either through individual objects (e.g., the shrine found in the delta, 1966) or ideas (e.g., the *palang* penis-bar and its folklore associations). The *palang* is an extraordinary and important clue in this area (see Harrison 1966b).

Certain other points of a more general character also should be emphasized:

12. Subject to the work now in hand, it presently appears that although many of the early Borneans, like some of the present ones, were small in stature, no specifically distinctive Negrito elements can be identified.
13. A special word must be said about the term *Dongson*, which has been too loosely used for Southeast Asia generally. A few *objects* that can be classed as Dongson—if the validity of the wider term is assumed—have been found casually in Borneo, but none archaeologically. On the other hand, there has been a long and strong indigenous craftsmanship in bronze and associated metals centered in Brunei but with later links to other Southeast Asian areas, including Celebes.
14. Celebes's influence on the northeast edge of the island is strong, dating back into the Stone Age. This reflects, again, the pattern of local differences and specializations even inside an area covering less than half of Borneo.
15. "Cremation" is one of the rather widely spread features of Borneo life (e.g., contemporary among the Land Dayaks in the southwest and the Ma'anyan in the interior southeast) which has most often been taken as clear-cut evidence of outside influence—in this case, "Hindu." But the Niah excavations now demonstrate beyond reasonable doubt that forms of cremation were operative there before any breath of Hinduism could be postulated, and therefore must be regarded as "endemic."
16. Within the limitations stated earlier in this section, it seems fair to say that the strongest single outside influence detectable today is "Chinese," using that term in the widest sense. Chinese material contact from the T'ang dynasty can be abundantly demonstrated. But many Borneo things and ideas, present and prehistorical, belong to an older and deeper complex, which Professor Heine-Geldern has placed back in the Chou and which evidently has some special associations with the Lake Baikal region at some early stage.
17. By comparison, "Indian" influences are often appreciably weaker, though Hindu and other religious beliefs have had considerable effect, especially among those who have moved across Borneo from the southeast in the present millennium. "Indian" influences were of course important in special ways in west Borneo, noticeably in ironworking techniques, as is shown elsewhere (Harrison and O'Connor 1969: I, *passim*; II, chap. 34). There may be big time-lags in this sort of spread, too.
18. These internal movements have no doubt always been considerable since the advent of iron, and certainly both extensive and complicated since (approximately) the advent of Islam.
19. Nowhere is anything previously said intended to suggest that Borneo people and cultures have been static or stagnant at any time, and especially in protorecent times. "Indigenous" is never intended to imply "static." Indeed, it is difficult for

an individual, let alone a society, to exist on a static basis in the Bornean jungle environment.

It would be plausible to continue this summary list for many pages. In this paper as a whole, I have hardly touched upon such relevant subjects as rock paintings and carvings (known from five distinct areas, without any obvious common features between any two of them); the value traffic in cowries and other sea shells; the death-ship cult; the frequency of "phallic" objects traceable far back into the Stone Age and the related function of ritual soft tools; the question of tektites (restricted to Brunei), or the still meager evidence of fossils. But I hope that such broad points that I can make with confidence have now been made. If the cumulative effect is somewhat confusing, the excuse must be that the evidence is likewise incomplete.

EAST BORNEO VACUUM

Perhaps the most important conclusion to be drawn from this discussion is, alas, a negative one. The lesson from two decades of energetic fieldwork in west and north Borneo again and again points up the need to follow through the same points, phases, and technologies *into the remainder of the island*. This is a case in which literally an all-round picture for Borneo as one topographical, insular unit is required. For political and later also for military reasons, those of us who have been operating in what is now East Malaysia or the State of Brunei have had little and then no contact with the corresponding problems and persons in the Indonesian territory of Kalimantan. But Kalimantan comprises two-thirds of the island. It contains several known areas exceptionally rich in seemingly suitable limestone formations, including at least two well inland, beyond the reach of any likely Pleistocene disturbance. Regarding later times, the biggest internal human movements of the present millennium *all* took place broadly from (now) Indonesian Kalimantan west or northwest into East Malaysia. We have been able to study and recover these remains, insofar as that is possible at all, only in situations remote from their easterly points of movement origin.

It also seems likely, for geological reasons, that there is a better chance of finding some of the early Pleistocene hominid material in the southeast part of the island.

For every reason, it is now desirable that priority be given to archaeological and related research in Kalimantan and all eastern Borneo—sections that are, in effect, vacuums on the prehistorical map of Southeast Asia, as was west Borneo in 1945. Hopefully, this report indicates our efforts to improve the situation in areas that were until recently British territories, at the least with energy and at the best with intelligence and a minimum of needlessly preconceived ideas.*

* Special mention must be made of the intelligent support given by the Sarawak Government over many years; of the Calouste Gulbenkian Foundation of Lisbon for a series of generous grants to assist work at Niah; to the Shell group of companies for frequent and sometimes massive assistance with materials, fuel, and when needed, personnel or transportation; and to many other institutions and specialists, notably those connected with the Field Museum of Natural History at Chicago and the two branches of the British Museum (South Kensington and Bloomsbury) in London. The Royal Geographical Society and the Royal Society of Arts in Britain have also taken an active interest in the Borneo work and been good enough to make honor awards to us as well.

Special mention must be made of the assistance given by the Raffles Museum (now National Museum), Singapore, through its former Director, Mr. Michael Tweedie, who contributed considerably in the earlier phases of the work. It is also an encouragement now to have Dr. Robert Fox and his colleagues from the National Museum of Manila working along somewhat similar lines in the Philippines, and especially in Palawan.

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