

Head-hunting Terms

tai ngayau	tai asat laki	visit men	go head-hunting
ulu ngayau	buah kiut	little fruit	head
ulu ngayau	buah urong	gourd	head
ulu slap	sala sanam	ants' nest	skulls hanging up
alot	kulup	decorated caves	boat
alot	la-un janan	large rattan which bends upwards	boat
baeng	obo pué	rusty knife	long sword
baeng	chen tarieng	at one's side	long sword
tapong	tuban	a plant which grows in fork of trees	head-dress with feathers
besunong	laya	cloth round the head worn by women in the fields	war coat
abat	akar lunok	strand which winds itself round trees	loin cloth
kanan	lajang	uncertain meaning	food
borak	telang	juice (of sugar cane)	rice wine

In general, the Kenyahs prefer to use circumlocutions in their speech and a good speaker is one who can make full use of analogies and metaphors. Often, the true meaning is disguised, perhaps to make the hearers think more about the problem posed to them; perhaps because the speaker wants to convey two or more meanings by the one phrase. It is thought that a direct statement might give offence or be thought too bold or shameful and hence it is considered correct to speak in a round-about fashion.

It is well known, for instance, that a Kenyah, on being questioned about what he is doing, will always be evasive. It is considered etiquette not to brag about anything; to underestimate your capacities. "*Naun inu inu na iko*" . . . we have nothing to give you, they say when offering a sumptuous meal or a glass of good *borak*. The *borak* might be referred to as "juice of the sugar cane", "drops of water which a swallow makes as it dips over the water". On the other hand, the stories of their giants are full of the most fantastic descriptions; heroes who can never suffer a hurt; who can stride over mountains; who are never fatigued, with all the hyperbole of the Greek and Celtic epics. The use of veiled language seems to be part of their everyday speech and it is necessary to be acquainted with its intricacies if one is to appreciate the Kenyah character. The habit of speech may well have something to do with the many variations which are found in the language. Very often a particular longhouse uses a word peculiar to that house, but in point of fact other Kenyahs will understand it because they have heard the word used perhaps in a song or proverb.

Animal Remains from Lobang Angus, Niah

by

LORD MEDWAY

The excavation of Lobang Angus, a large east-facing mouth of the Great Cave at Niah, was carried out by Sarawak Museum personnel in two phases, both directed by the Curator, Mr. Tom Harrisson. The first phase was in 1959, when the following trenches were dug:— US/10, US/11, US/14, US/15, US/17b, US/18, US/19, US/21b, US/22, US/26, US/30, US/31. Subsequently, in 1965 the remaining deposit was removed as trenches US/5, US/9, US/13, US/16, US/17a, US/19, US/20, US/21a, US/23, and US/27 (successively). All trenches were 10 ft. x 5 ft. in plan; the suffixes a or b indicate half trenches (i.e. 5 ft. x 5 ft.).

I did not participate in either dig, and the present report is therefore based upon examination of material brought back to the Sarawak Museum after excavations were completed.*

The material treated comprises all animal remains excavated from Lobang Angus. Included are the remains of vertebrates, of arthropods and of molluscs. Also treated are obvious artifacts made from parts of animals as a source material.

Vertebrate remains from Lobang Angus consist only of bone and teeth. Hair and horny material such as claws, nails and hoofs, the horns of cattle, the beaks of birds, tortoise shell, and the scales of fishes, have not been recovered. Evidently conditions in the deposit in Lobang Angus, as in the West Mouth of Niah cave, do not favour the preservation of these parts of the vertebrate body.

Invertebrates are represented by parts of the exoskeleton of crabs, and by the shells of molluscs. Again conditions apparently have favoured the preservation of calcareous material.

*In 1965, owing to the great quantity of other material being processed at Niah, it was not possible to preserve, pack and bring back *all* bone and related remains, after initial excavation, counting and weighing. I therefore spent 5 days on this site, selecting out every piece which I judged—from experience—could possibly be identified by Medway, and only this group was brought back to Kuching as the basis for the 1965 part of his study. The earlier material is complete.—T.H.

In the following report, in sections concerning vertebrate remains, a broad analysis of the material is presented. Only in the case of mammals has it been possible to assign a proportion of the material to family or smaller taxonomic group. Primate material, and selected remains of reptiles, amphibians and fishes have been retained for separate study by appropriate authorities. Detailed treatment of both groups will be presented separately.

Among invertebrates, crab remains form only a very small proportion of the total. It is hoped that identifications will be provided in due course. Mollusc remains however are abundant, and in most cases are identifiable. Detailed analysis of their distribution in the area excavated in 1959 has therefore been possible.

A. VERTEBRATES

1. General

Both in 1959 and in 1965, the vertebrate bone was examined and sorted within a few weeks of being excavated. Most was uniformly dry, light, and hard although not mineralised. However only a small proportion of skeletal material was recovered unbroken. In all but a few cases, staining of fractured surfaces, and slight abrasion, indicated that the breaks had occurred a long time before the excavation, and had possibly occurred at the same time as the deposit was formed. Many fragments of larger bone were of shapes that we could duplicate by shattering shaft bones of large animals (deer, pig) by blows with a heavy stone. It is consequently assumed that such fragments in the deposit resulted from deliberate human activity, and are themselves evidence of human occupation of the cave mouth.

Charred pieces of animal bone were present at all depths in the deposit. Again human activity is inferred, in this case the use of fire.

2. Distribution by depth and area

Very few of the fragments of bone could be matched and reassembled. The counts and identifications given below are accordingly based largely on broken material. For the purpose of comparative counts, the unit of skeletal remains treated here is the *piece*. Any element of skeletal material was counted as a

TABLE 1
WEIGHT OF ALL SKELETAL MATERIAL IN OUNCES (AVOIRDUPOIS), GIVEN BY TRENCH AND LAYER (1959-65)

Trench US/	Weight of bone in ounces avoirdupois																															Totals (oz.)
	5	6	7	8	9	10	11	13	14	15	16	17	18	19	20	21	22	23	26	27	30	31										
Depths																																
0-6"	‡	7	7	5	‡	2	10‡	1‡	2	3‡	2‡	0	‡	9	1‡	‡	1	‡	‡	1	1	‡	1	1	‡	57‡						
6-12"	3‡	11	10	9	21‡	13	16	6	6	25	40	2	1	27‡	13‡	‡	6	4	4	3	4	/	22‡									
12-18"	3	6	4‡	11	108	37‡	99	21	31	18‡	60‡	6	20	8‡	7	2	11‡	14	14	17	2‡	488‡										
18-24"	‡	1	/	3	9	17	117	72	22	7	27‡	11	23‡	25‡	9‡	16	31	60	8‡	533												
24-30"	1	/	/	1	1	/	32‡	32	4‡	‡	82	17	5‡	17	18	16‡	17	36‡	41	/	323											
30-36"	‡	/	/	/	/	26	2‡	2	/	141	30	8	7	38	47‡	16	56‡	25	400													
36-42"	‡	/	/	/	7‡	/	/	/	160	6	1	/	13‡	38	/	26‡	/	252‡														
42-48"	‡	/	/	/	2‡	/	70‡	9‡	/	23‡	/	/	/	131‡																		
48-54"	‡	/	/	/	/	18‡	1	‡	7																							
54-60"	/	/	/	/	/	1‡	1	2‡																								

NOTES: Figures for trenches dug in 1959 converted from counts of pieces (see text).
[/] indicates bedrock.

single piece, including for example whole bones, individual fragments of bone or of jaws, isolated teeth or fragments of tooth.

From trenches dug in 1959 a total of 13,508 pieces were recovered, weighing 950 ounces. Ignoring intrusive boulders, the volume of deposit excavated was 3,350 cubic feet. The average concentration of skeletal material was therefore 4.0 pieces per cubic foot. For comparison, in the sectors of the West Mouth of the Great Cave dug in 1958, 70,360 pieces were recovered from 19,000 cu. ft., giving a very similar average concentration of 3.9 fragments per cu. ft.

Comparable *counts* were not made in 1965, but all bone was weighed in the field at the time of excavation. Weights kindly provided by Töm Harrison show that a total of 1,496 ounces of bone were recovered from 1,527½ cu. ft. of deposit, an average of 0.91 oz. per cu. ft. Comparable figures for the sector dug in 1959, given above, are much lower, at 0.39 oz. per cu. ft.

The distribution of all skeletal material by trench and layer is given in Table 1, in which the numerical counts of 1959 have been reduced to weights to allow direct comparison with 1965 figures. It is seen that the concentration is irregular in both depth and in area. In all trenches a greater proportion was recovered from the middle levels. The surface 6 inches were relatively sterile. The lower layers also yielded proportionately less skeletal material. This reduction downwards undoubtedly reflects the progressive diminution in volume of deposit excavated towards the bottom of each trench, due to irregularities in the contour of the bedrock. There is no sterile layer underlying the main bone-rich deposit, corresponding to the "pink-and-white" in the West Mouth (T. Harrison, 1959).

As well as differences in the concentration of pieces of vertebrate skeleton at different depths, these are also marked variations in distribution by area. This is illustrated by the differences in total weight of skeletal material per trench (Table 1). The figures given show that the bulk was recovered from the central part of the area excavated.

3. *Human remains*

No articulated human skeletons were found in the excavation, and there was no evidence of direct inhumation in this cave

mouth. There is certainly no section of the deposit corresponding to the extensive cemetery of Neolithic and earlier age in the West Mouth.

Positively identified remains of human origin are limited to a few isolated pieces recovered from widely scattered levels in the excavation. All material is listed below:—

US/6	6-12"	(i) First upper (i.e. maxillary) premolar, represented by the crown only; wear slight. Dimensions: 9.2 x 11.6 mm., crown height 8.2 mm.
		(ii) Upper molar; wear moderate. Dimensions: 11.9 x 12.7 mm., crown height 8.7 mm. There is a slight V-shaped extension of the enamel between the buccal roots; this character may be racially diagnostic (cf. Tratman, 1954).
US/7	0-6"	Lower (i.e. mandibular) molar, represented by the crown only; wear very slight. Dimensions: 9.9 x 11.5 mm.
US/7	6-12"	(i) Upper canine, represented by the root and part of the crown. The attrition of this tooth is considerable, and the crown height is only 5.0 mm. on the buccal face.
		(ii) Lower molar, represented by the crown only; wear moderate. Dimensions: 11.1 x 12.1 mm.
		(iii) Lower molar, represented by crown and part of the root; wear moderate. Dimensions: 10.7 x 12.0 mm., crown height 6.6 mm.
		(iv) One subterminal phalanx, length 22 mm. This bone has been incinerated.
US/13	12-18"	(i) Molar.
		(ii) Tarsal bone.
US/16	12-18"	Molar, represented by crown only.
US/21	18-24"	Fragmentary metapodial.
US/21	30-36"	Molar.
US/21	36-42"	Part of fibula.
US/23	6-12"	Phalanx.
US/23	24-30"	Two phalanges.

Comparison of the degree of wear of the undamaged teeth suggests that at least three individuals are represented, one adolescent, one middle-aged, and one old. The structure and measurements of all teeth examined are consistent with a Mongoloid racial stock (Tratman, 1950).

The single phalanx from US/7, 6-12", is hard and brittle in texture, of light weight, and pale grey in colour. Its appearance suggests that this bone has been subjected to intense heat, probably in a reducing flame. Bone fragments of similar colour and consistency have been recovered in quantity from other sites in the Niah cave complex. Their distribution and associated materials, together with the appearance of the bone, indicate that these fragments result from the disposal of corpses by cremation. The single bone in the Angus excavation suggests the scattering of the cremated remains of at least one person.

All other non-dental fragments of human skeleton have a different appearance and texture, being uncharred, buff to pale brown in colour, light in weight, but soft and friable in texture. Again experience in other cave mouths at Niah has indicated that fragments of this nature result from buried corpses. Since no complete skeletons were exposed, and since the fragments recovered clearly represent only partial remains of several individuals, it is unlikely that the first or primary burial, of the whole corpse after death, took place in this cave mouth. Possibly the very small number of human remains concerned represent secondary disposal (with or without reburial) of a token selection of exhumed skeletons.

Alternatively, these few fragments, including the cremated phalanx, may have had an extraneous origin, perhaps from peripheral niches round the main cave floor. It is also possible that some at least may have fallen from Lobang Tulang, the small accessory cave system opening at a higher level above the Angus mouth, which undoubtedly served as an important funerary site (B. Harrison, 1959).

In either event, the paucity of human remains and the lack of organised burials in this mouth indicate that the deposit has

not been disturbed in the past by the digging of graves or tombs, or placing of funeral jars or similar objects.*

The absence of charred (as opposed to incinerated) fragments of human skeleton suggests that cannibalism is not involved.

4. *Artifacts of bone and tooth*

As already noted, skeletal remains of animals from Lobang Angus are mostly fragmented. The nature of the breaks indicates that here, as elsewhere in the Niah Cave system, many are due to the deliberate action of man. The use of the term "artifact" in this context has been defined in the preliminary classification of Niah material by Harrison and Medway (1962):— Pieces of bone or tooth accepted as artifacts are only those which bear indisputable signs of use after breaking, in the form of marks showing accessory grinding, or decoration, or polished or use-worn edges.

All artifacts of bone and tooth from the 1959 excavation of Lobang Angus have already been treated in the preliminary classification cited above. Detailed measurements have been given, and many objects have also been illustrated (Harrison and Medway, 1962). All further material subsequently excavated from Lobang Angus in 1965 is listed below in Appendix A. All items conform satisfactorily to the categories proposed in the preliminary classification, which may consequently be used in the discussion below.

A total of fifty artifacts of bone and tooth have been recovered from the excavations at Lobang Angus. The distribution of these by trench and depth is shown in Table 2, and the more distinctive of those found in 1965 are illustrated in the two Plates.

The stratification of these artifacts in the deposit is clear from Table 2. It is seen there is a definite concentration in the middle levels, with 82 percent occurring in the layer 12-24 inches, only 8 percent in the upper 12 inches, and 10 percent in the layer 24-36 inches. In all trenches, below the artifact bearing levels there was a significant depth of deposit in which undoubted evidence of human activity exists, in the form of food shells and bones. In all trenches except US/11, this artifact-free layer is at

*This is confirmed on other archaeological grounds, also.—T.H.

TABLE 2
DISTRIBUTION OF SOME ARTIFACTS OF BONE AND TEETH

Depth	Trench			USJ												Category TOTALS					Grand Total									
	5	6	7	9	10	11	13	14	15	16	17	18	19	20	21	22	23	26	27	30		31	A	M	N	O	P	Q	R	
0-6"				Q																										
6-12"							Q										O						/	1			1	2		3
12-18"													3P(a) 3P(a) N(a)	Q	P(a)		P(b) R(c) Q		P(a) P(b)				1	1		9	9	1	21	
18-24"													3Q P(a)	P(a)			2P(a)		P(a) P(b)					1	3	6	10		20	
24-30"			/ /			/												Q		/						1	1	2	4	
30-36"			/ /						/																			1	1	
36-42"									/								/		/									1		
42-48"									/			/					/													
48-54"							/																							
54-60"	/									/																				
Totals	0	0	0	1	1	3	5	8	7	0	2	2	11	0	1	2	6	1	4	0	0	1	1	5	1	17	24	1	50	

NOTE: Categories of artifact indicated by letters, according to groupings listed in the text; figures give actual numbers if more than one. [/] indicates broken.

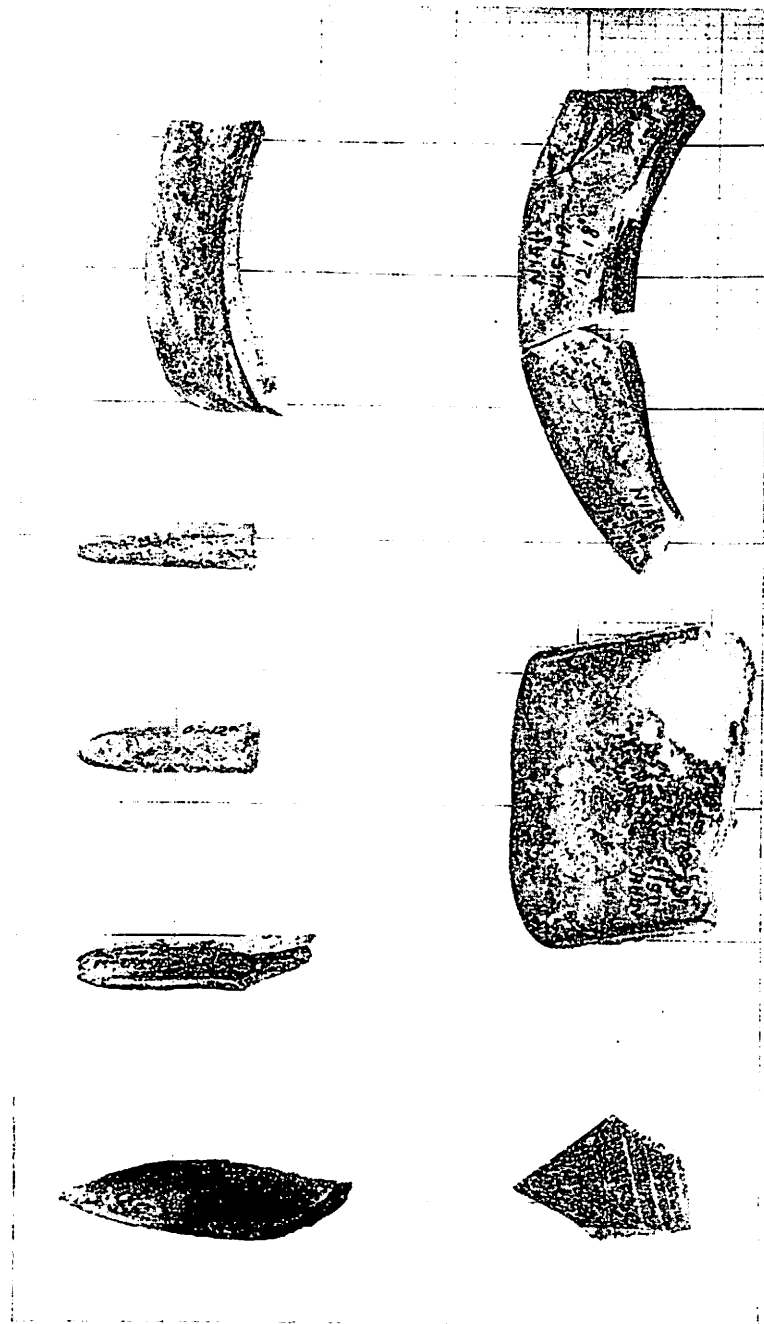


PLATE XIV: BONE TOOLS FROM LOBANG ANGUS, NIAH CAVE

Top row, left to right: Awl, US/23, 6-12"; Gouge, US/23, 12-18"; Gouge, US/13, 6-12"; Spatula, US/23, 12-18"; Pig tusk knife, US/27, 24-30"; Bone carving (decorated turtle bone) US/23, 12-18". Bottom row, left to right: Bone carving (decorated turtle bone) US/23, 12-18"; Turtle tool, US/13, 18-24"; Pig tusk tool, US/19, 12-18"; Bone carving (decorated turtle bone) US/23, 12-18"; Pig tusk knife, US/27, 24-30".

TABLE 2

DISTRIBUTION OF SOME ARTIFACTS OF BONE AND TEETH

Depth	Trench			US/													Category TOTALS																				
	5	6	7	9	10	11	13	14	15	16	17	18	19	20	21	22	23	26	27	30	31	A	M	N	O	P	Q	R									
0-6"				Q																																	
6-12"							Q		Q								O				/																
12-18"				Q	3Q	3Q	2Q		P(a) Q	3Q		Q	3P(a) 3P(a) N(a)	P(a)					P(a) P(b)																		
18-24"							M		2N(a) N(c) 3Q	3Q	P(a)	3Q P(a)		Q		Q	2P(a)	P(a) P(b)																			
24-30"	/	/		/	/	/	N(a)				Q							Q		/																	
30-36"				/	/				/	/		Q																									
36-42"								/	/			/		/			/	/																			
42-48"																		/																			
48-54"							/																														
54-60"	/											/	/																								
Totals	0	0	1	1	3	5	8	7	0	2	2	11	0	1	2	6	1	4	0	0	1	1	5	1	17	24	1										

NOTE: Categories of artifact indicated by letters, according to groupings listed in the text; figures give actual numbers if more than one [/] indicates bedrock.

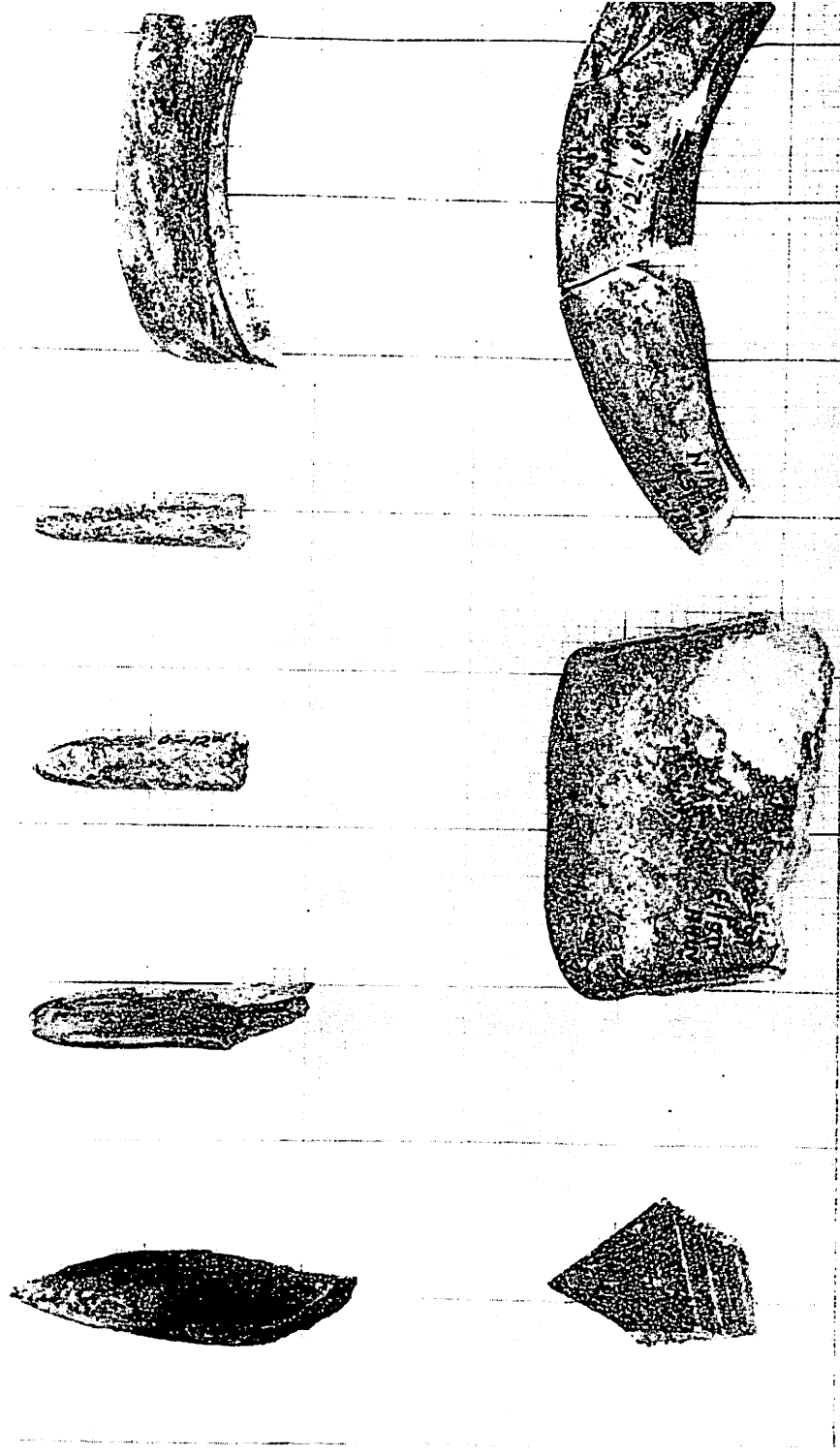


PLATE XIV: BONE TOOLS FROM LOBANG ANGUS, NIAH CAVE

Top row, left to right: Awl, US/23, 6-12"; Gouge, US/23, 12-18"; Gouge, US/13, 6-12"; Spatula, US/23, 12-18"; Pig tusk knife, US/27, 24-30"; Bone carving (decorated turtle bone) US/23, 12-18"; Turtle tool, US/13, 18-24"; Pig tusk tool, US/19, 12-18".

least 12 inches deep, and may include major concentrations of food bone and shell (compare for instance the lower levels of US/17, and US/22 in Tables 1, 2 and 4).

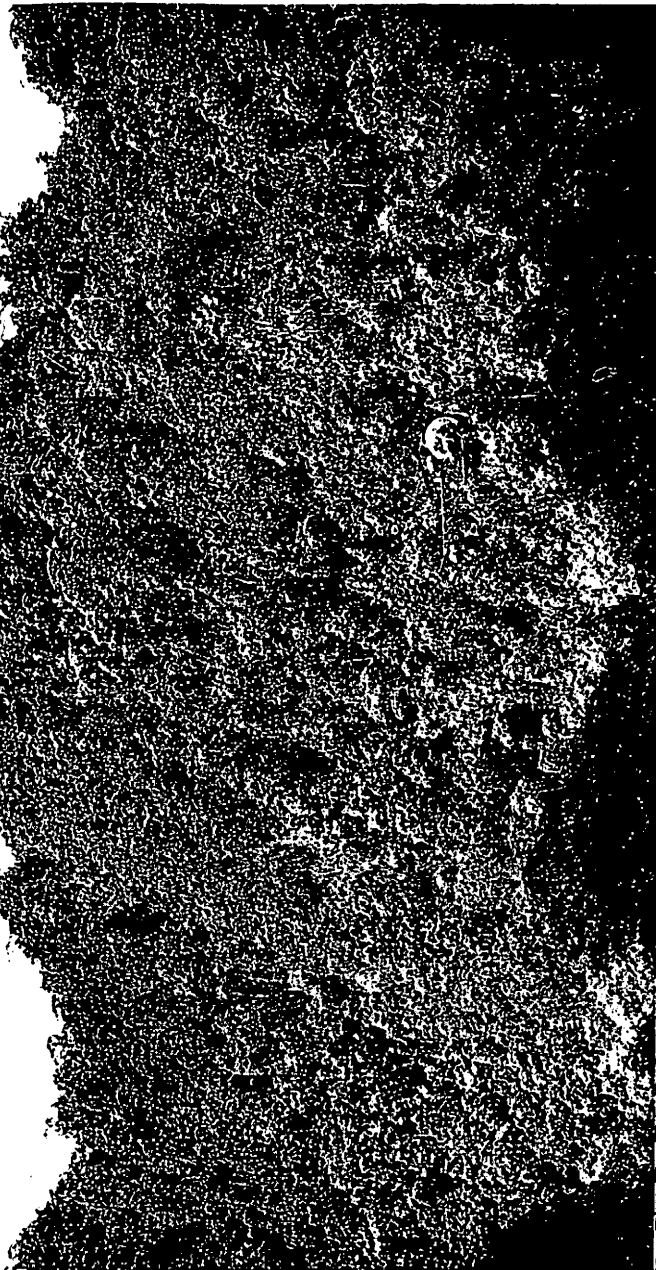
The stratification of artifacts of bone and tooth thus supports a tentative inference of at least two periods of human frequentation in Lobang Angus, initially by men making little or no use of skeletal remains of animals as source material for artifacts, subsequently by a culture in which such artifacts were important.

The typology of the artifacts from each layer is indicated in Table 2 by the index letters of the categories of the preliminary classification of Niah material already mentioned (Harrisson and Medway, 1962). Those represented in Lobang Angus are as follows:—

- A. *Bone carvings*: bone onto or into which a design has been carved.
- M. *Turtle tools*: made from the subdermal bone of chelonians, which underlies and is distinct from the carapace.
- N. *Pig tusk tools*: artifacts made from the lower canine of the bearded pig (*Sus barbatus*), falling into four classes, (a) Knives, (b) Scrapers, (c) Chisels, and (d) Points.
- O. *Awls*: medium-sized bone shafts worked to a sharp point.
- P. *Simple points*: divided into two classes, (a) small slivers split from large or medium bone shafts, and (b) small shafts sharpened without splitting.
- Q. *Gouges*: medium shafts on which the worked face cuts obliquely across the long axis, producing a blunt or rounded tip, in contrast to awls (above).
- R. *Spatulas*: wide splinters from large bone shafts, worked on one side only to a flat surface nearly or quite parallel to the long axis of the shaft, and terminating in a rounded end.

It is notable that functional tools preponderate markedly, with simple points (P) and gouges (Q) forming 82 percent of all artifacts recovered. Totally absent from this mouth are the sophisticated and ornamental artifacts of bone and animal teeth

PLATE XIX. The gorge outside the Great Cave at Niah, photographed by Barbara Harrisson from inside the West Mouth. The *Belle Sioux* helicopter hovering in low foreground almost entered the cave. It contains Capt. Peter Stoner (pilot) and Tom Harrisson (then Curator) making one in a series of extensive aerial reconnaissance surveys of the limestone formations at Niah and elsewhere (see also the papers on Sarang and Kakus for other helicopter usage).



associated with remains of Neolithic and later cultures in the West Mouth, Lobang Tulang and Gan Kira mouths at Niah (Harrisson and Medway, 1962, for example bone beads, pendants, bored teeth and fine carvings). Categories of artifact associated primarily with the upper (i.e. Neolithic and later) levels in the West Mouth and Gan Kira are limited to one example each of (A) carved bone (in this case extremely primitive and dubiously of decorative function), (O) an awl, and (M) a "turtle tool". It has already been emphasised (Harrisson and Medway, 1962 p.358, note 7) that some of the categories of this preliminary classification are not "natural" and may include morphologically similar artifacts that in fact are not culturally related. In the circumstances, without other supporting evidence, these three examples from Lobang Angus cannot be accepted conclusively as of Neolithic affinity.

The more obviously functional types of bone or tooth artifact are associated in the West Mouth at Niah with the middle levels. Examples of the homogenous class (P a), simple points in particular are distinctly stratified in the horizon of abundance of quartzite flakes. This associated flake culture has been described by T. Harrisson (1959) as fully Palaeolithic, continuing to c. 32,000 B.C.

5. Other vertebrate remains

Human remains and the bone artifacts discussed above constitute only a very small proportion of total vertebrate skeletal material recovered from Lobang Angus. All five vertebrate classes—fish, amphibian, reptile, bird and mammal—are represented among the remainder. The relative abundance of pieces of bone (whole or fragmented) attributed to each class is illustrated below (data based on spot classification of material from trenches excavated in 1959):—

	Mammal	Bird	Reptile & amphibian*	Fish
No. of pieces (1959)	11,638	187	1,513	109
% of total	86.5	1.4	11.2	0.9

*Whereas bird and mammal bones are easily recognised even if badly broken, it is difficult to distinguish small or undiagnostic fragments of amphibian and reptile skeleton. The two classes are therefore lumped together.

It is seen that there is a great preponderance of mammalian remains over those of all other classes combined. A similar representation was found in the vertebrate remains from the West Mouth (Medway, 1959).

In Table 3 representation of the different classes at different depths in the excavation is analysed. Because the stratification of bone tools may delimit a distinct cultural phase, three levels have been recognised, respectively (i) above, (ii) within, and (iii) below layers in which artifacts of bone and tooth were found. Figures have been taken only from trenches in which bone tools occurred (data from 1959 excavation). It is seen that all major divisions of vertebrate are represented in every level. There are only limited and irregular changes in the proportion of the total constituted by mammal, bird, and reptile and amphibian at the different levels. The regular decline in the proportion of fish remains is as likely to reflect the greater delicacy and fragility of fish bones which are more susceptible to damage or decay at depth, as to indicate a cultural change.

TABLE 3

Distribution of skeletal remains attributed to the vertebrate classes, in relation to the level of bone artifacts. Data from 1959 excavation, only trenches yielding worked bone. Whole bones and teeth or fragments thereof, irrespective of size, each counted as one piece.

Level in relation to bone artifacts		Mammal	Bird	Reptile & amphibian	Fish
(i) Above	No. pieces	900	25	121	20
	% total	84.5	2.3	11.4	1.8
(ii) Within	No. pieces	6,374	95	884	61
	% total	85.9	1.3	11.9	0.9
(iii) Below	No. pieces	3,865	163	438	26
	% total	86.0	3.6	9.8	0.6

Recognised fragments of bird skeleton are mostly of large birds (cf. hornbills). Reptile remains include much attributable to monitor lizard (*Varanus* sp.), and much to terrestrial tortoise and fresh-water turtle, as well as a certain proportion of snake vertebrae. But apart from these broad categorisations, at this stage detailed identifications can only be given of mammalian remains.*

*Fish and reptile from Angus is now with experts in U.S.A.—Ed.

6. Mammalian remains

In the preliminary sorting of skeletal remains in 1959, all mammalian material was first divided into three broad categories, as follows:

- (a) *Big*—including the larger game mammals (pig, sambhur, wild ox), orang utan, and anything bigger.
- (b) *Medium*—monkey and barking-deer to porcupines, civets and mouse-deer.
- (c) *Small*—bats, rats, small squirrels, etc.

The total number of pieces in each category, including small lengths of shaft and other unidentifiable fragments of bone which were classified by shaft diameter and thickness, was as follows:—

	<i>Big</i>	<i>Medium</i>	<i>Small</i>
Number of pieces	5,161	3,853	2,624
% total	44.2	33.1	22.7

The remains of small mammals are less liable to fragmentation than are those of larger mammals. On average, the skeleton of a small mammal, if incorporated whole in the deposit, will therefore yield a smaller number of what I have called "pieces", i.e. whole bones and/or fragments of bone or teeth. On the other hand, the smaller bones of the skeletons of small mammals—the tail vertebrae, wrist and ankle bones, or phalanges, are extremely small and in many cases will not have been recovered whole at any depth. In contrast, the corresponding bones of the skeleton of a large mammal are themselves fairly big, are strong and resistant to decay and fragmentation, and were in fact recovered in large numbers from the deposit in Lobang Angus. For general considerations, the two effects may be taken to cancel each other, and the relative numbers of pieces of bone recovered may be accepted as a broad indication of the number of individual animals represented.

The representation of these three size classes of mammal (i) above, (ii) in, and (iii) below the levels of the deposit in which the artifacts of bone and teeth occurred is given in Table 4 (cf. Table 3). There is a marked proportional increase in the remains of medium-sized mammals within the levels of the deposit contain-

ing bone tools. It has already been shown (above, and Harrison & Medway, 1962) that the source material for bone artifacts of the types most common in Lobang Angus consisted principally of shaft bones of medium-sized mammals, mostly monkeys.

TABLE 4

<i>Level in relation to bone artifacts</i>		<i>Big</i>	<i>Medium</i>	<i>Small</i>
(i) Above	No. pieces	434	231	235
	% total	48.2	25.7	26.1
(ii) In	No. pieces	2,742	2,501	1,131
	% total	43.0	39.3	17.7
(iii) Below	No. pieces	1,753	943	1,169
	% total	45.4	24.4	30.2

A list of all identified mammalian material is given in Appendix B. It is seen that, as in the West Mouth, pig and monkey (the latter category including both macaques and leaf-monkeys, and also a small proportion of gibbon remains) predominate very markedly over all other groups of mammal. Both were represented in virtually every layer of every trench excavated throughout the deposit.

Also numerous are the binturong or bearcat which is a large arboreal civet, large squirrels (mostly the arboreal giant squirrel *Ratufa*), and orang-utan, which again is largely arboreal in habit. Among non-scansorial mammals, porcupines as a group are well represented, and wild cats are common.

Ungulates other than pig are poorly represented. Remains of all genera of deer at present occurring in Borneo, sambhur, barking-deer and mouse-deer, have been found at all levels, but none are frequent. Rhinoceros is also represented, but is scarce too.

Among smaller mammals, rats, small squirrels and tree-shrew (*Tupaia* sp.) are all represented in small numbers. Remains of bats are abundant. Both groups may very well have been taken for food by the early human visitors to this cave mouth, but may also represent some animals which died naturally in the cave.

The total collection of mammals thus represents most groups occurring in the extant fauna of modern Borneo (Medway, 1966). Measurements of a few specimens suggests that limited evolutionary changes may have occurred in the intervening period, but no extinct species of mammal are represented.

B. INVERTEBRATES

1. Molluscs

(a) General

Only material from the trenches excavated in 1959 has been examined in the preparation of the following sections. All identifications are based on external characters of the shells of the species or genera represented by reference to sample series identified by E. R. Alfred and A. J. Berry (see Medway, 1960). Data on freshwater molluscs of the streams of the neighbourhood of Niah cave are from Miss S. Adams, Niah, 1959.

Numerical data are based on counts of individuals not of pieces, as with vertebrate remains. Figures for the total number of individuals represented were obtained as follows: (a) Gasteropods—only whole shells, or pieces of broken shell that included the apical whorl were counted. (b) Bivalves—only whole valves (i.e. half-shells), or pieces of valve that included all or most of the hinge were counted; the resulting figure was then divided by two to reduce it to a number of individual. All counts were made by Sarawak Museum staff, in the field, under supervision (T.H. or B.H.).

(b) Land Snails

The shells of several species of terrestrial gasteropods occurred in large numbers throughout the deposit. These land snails are the common species of the forest, which are still found at Niah. They are not considered edible by any group of the modern indigenous population of Borneo. It is assumed that these shells represent snails which entered the cave spontaneously and died there. They are not further discussed.

(c) Aquatic molluscs

The shells of 24,057 aquatic molluscs were recovered from the trenches excavated in 1959, at an overall concentration of

7.2/cu. ft. The concentration in the West Mouth trenches dug in 1958 was considerably lower, at 0.8/cu. ft.

At Lobang Angus, such shells were found at all levels of the deposit (see Tables below). It is impossible that these aquatic species could enter the cave spontaneously. Accordingly it can be inferred that throughout the period concerned, shellfish were important to the men who visited the cave, and may have formed a significant part of their diet.

Big decorative sea shells such as those found in the cemetery in the West Mouth, and artifacts of shell such as those abundant in Lobang Tulang and Gan Kira were absent from Lobang Angus. Both groups were associated with Neolithic and later cultures. Their absence supports evidence of the bone tools (above) that this deposit represents primarily the occupation debris of earlier cultures.

The molluscs identified in Lobang Angus have all been found in the West Mouth. Genera occurring in quantity are listed below:

- (i) Fresh water molluscs, occurring today in streams in the neighbourhood of Niah Cave: the snails *Bellamya*, *Clea*, *Pila*, and *Neritina* spp. including *pulligera*, and the bivalves *Corbicula* and *Rectidens*.
- (ii) Estuarine molluscs, today found in the nipah and mangrove swamp fringing the lower reaches of the Niah river: the snails *Cerithidea*, *Ellobium* and *Neritina* cf. *zigzag*, and the bivalve *Cyrena*.

In addition to these, four other molluscs are recorded sparingly. These are all salt-water forms, all marine except for *Nerita* which is found in mangrove swamp:

2. *Arca*. (US/7 18-24", US/11 12-18", US/14 18-24", US/15 12-18", US/18 18-24").
14. *Ostrea*. (US/10 0-6").
18. *Nerita*. (US/18 30-36", US/22 18-24" (2)).
19. *Pinna*. (US/14 12-18").