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A COMPARATIVE STUDY OF
MELANESIAN HAFTED EDGE-TOOLS
AND OTHER PERCUSSIVE CUTTING IMPLEMENTS

VOLUME II

APPENDICES

Eleanor Crosby

Department of Prehistory,
Research School of Pacific Studies,
Australian National University

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APPENDIX I

POPULATION DESCRIPTIONS

INTRODUCTION

The descriptions given here are the basic information upon which this thesis rests and their contribution should be given priority over any generalisations in the main text.

A policy of giving a separate designation to all forms of hafted implement which might represent different populations has been followed. Thus a passing reference in the literature or a single implement in a collection has sometimes formed the basis of a separate population where indications of difference from other populations have been judged sufficient to warrant it. One hundred populations set up from the collections studied (i.e. from the recorded implements) have also been recognised in the ethnographic literature, 36 have been recognised from recorded implements alone, 110 were recognised in the literature but not in the collections and one predicted population (WI 19) has been left a place, though it is neither in the collections nor the literature.

For each population description, the information presented includes the localities of recorded artefacts and those mentioned in the literature, the number of recorded artefacts, a note of the major collectors, and the dates of collection or acquisition by the current owner or repository. Specific literary references are given. Where possible and appropriate the population is illustrated by photographs of a typical implement.

The description itself includes a listing of the hafting features, a description of the stylistic features of handle, lashing, and blade by which the sample may be recognised, attributions of function, either from an observer, or inferred from use-wear and general morphology, and the manufacturing tradition employed in making the implements.

Any appropriate literary references and any other points of interest are given in a comment section.

Where more than six recorded implements make up a population, two statistical tables and a short discussion follow the comments. The first table gives the means, standard deviations, skewness and kurtosis readings for the ratio scale measurements, V7 - V22 and V34. The second

table gives the number and percentage frequency of the nominally scaled features of blade morphology, V23 - V33.

These are followed by a list of the recorded artefacts of the sample. In these lists a number of conventions are followed. If a locality has a query before it, it is a provenance suggested by me, not the museum's attribution; if it has a query after the locality then the attribution is queried by the owner or institution. Some items may be queried by both sources. The dates given are usually the dates of acquisition by the repository so far as they are known. An asterisk before a date indicates an actual date of collection. The column termed 'Collector' subsumes, besides names of actual collectors, anyone who donated, exchanged, or sold the item to its present holder, or whose collection was confiscated (PNGM only).

The following abbreviations for repositories or private collectors have been used:

IA	National Ethnographic collection, Institute of Anatomy, Canberra;
DL	D. Laycock;
RL	R.J. Lampert;
M	S. Moriarty;
AIM	Auckland Institute and Museum, Auckland, New Zealand;
AM	Australian Museum, Sydney, NSW;
CM	Canterbury Museum, Christchurch, New Zealand;
DM	Dominion Museum, Wellington, New Zealand;
NMV	National Museum of Victoria, Melbourne;
OM	Otago Museum, Dunedin, New Zealand;
PNGM	Papua New Guinea Museum, Port Moresby;
QM	Queensland Museum, Brisbane;
UQM	Anthropology Museum, University of Queensland, Brisbane;
SAM	South Australian Museum, Adelaide;
LS	L. Steadman;
RS	R. Scarlett;
RDM	R.D. McKay.

FIJI 1

Locality. Fiji.

Number. 40.

Collectors. Various.

Dates. 1876 - 1969.

References. Moseley, 1879:313; Hinderling, 1949:157; Cranstone, 1964:Pl. 14b.

Figure. Plate A1, figs. A and B, (no. 761).

Hafting features. A1, B1, C3, D28 = no. 562; A1, B1, C4, D27 = nos. 241, 242, 243, 244, 245, 246, 255, 278, 289, 323, 345, 352, 354, 566, 757, 758, 759, 760, 761, 762; A1, B1, C4, D28 = nos. 247, 253, 254, 288, 290, 346, 347, 348, 350, 563, 564, 565, 763; A1, B1, C5, D26 = no. 279; A1, B1, C5, D27 = no. 766; A1, B1, C5, D28 = no. 453.

Handle. Shaft short and thick with short heel and long toe. Adze marks may be left on shaft except where it is smoothed by use.

Hafting. Three forms of blade setting were recorded — step, trough and canal. The last is restricted to Fiji. Trough and canal forms were made for individual blades. Soft fibre cushioning sometimes put between blade and toe. Lashings are always made of coir, either a two-ply twist or a three-ply plait cord, and always a simple or elaborate whipping.

Blade. As table A2 shows the blade form may be characterised as having a rounded poll, no taper in plan and parallel sided in profile, with a convex cutting edge, having an adze bevel, and usually straight looked at edge on. The cross section is high rounded and either symmetrical or bilaterally symmetrical. The blades are ground and pecked and often show evidence of flaking. Most are considerably battered (cf. comment 1) but underneath this the remains of previous fluted use-wear can often be detected. Only one blade (no. 278) has an unaltered tongue-like cutting edge, and the rest have cutting edge indices (V34, table A1) from 79 - 105. Most are from what appear to be volcanic rocks but not one which splits into tabular form.

TABLE A1: Distribution of ratio scale features. Fiji (FJ1). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	40	90.38	19.38	52	141	0.508	0.328
8	WIDTH OF BLADE - HAFT	40	43.65	4.02	34	53	0.132	0.338
9	THICKNESS OF BLADE	40	32.88	4.40	24	41	0.112	-0.486
10	WIDTH OF BLADE - EDGE	40	24.55	4.08	18	35	0.638	-0.371
11	LENGTH - CUTTING EDGE	40	26.22	5.18	18	38	0.450	-0.754
12	ANGLE - CUTTING EDGE	40	72.70	9.55	55	93	0.473	-0.067
13	LENGTH OF HANDLE	40	353.37	51.56	284	520	1.258	1.381
14	SHAFT DIAMETER	39	33.56	3.85	24	41	-0.598	0.063
15	LENGTH OF FOOT	40	169.30	31.71	103	238	0.018	-0.427
16	TOTAL LENGTH OF FOOT	40	260.42	40.18	186	363	0.272	0.001
17	POINT OF BALANCE	37	80.54	26.83	10	140	-0.455	0.367
18	ANGLE - B/FOOT - SIDE	40	52.25	7.51	40	70	0.309	-0.126
19	ANGLE - B/HANDLE - BELOW	40	88.00	6.28	70	105	-0.471	1.669
20	WEIGHT	36	827.11	182.90	507	1149	0.184	-0.847
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 on 11 WC/LC	40	94.55	8.42	63	105	-1.745	3.411

TABLE A2: Distribution of nominal scale features. Fiji (FJ1).

VARIABLE NUMBER	23	POLL OF BLADE	N=40		
CODE VALUE:	2	3			
FREQUENCY:	38	2			
PERCENTAGES:	95.0	5.0			
VARIABLE NUMBER	24	PLAN OF BLADE	N=40		
CODE VALUE:	1	2 3			
FREQUENCY:	38	0 2			
PERCENTAGES:	95.0	0.0 5.0			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=40		
CODE VALUE:	1	2			
FREQUENCY:	30	10			
PERCENTAGES:	75.0	25.0			
VARIABLE NUMBER	26	PROFILE OF BLADE	N=40		
CODE VALUE:	1	2 3 4 5			
FREQUENCY:	36	3 0 0 1			
PERCENTAGES:	90.0	7.5 0.0 0.0 2.5			
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=40		
CODE VALUE:	0	1 2 3			
FREQUENCY:	1	2 34 3			
PERCENTAGES:	2.5	5.0 85.0 7.5			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=40		
CODE VALUE:	1	2			
FREQUENCY:	30	10			
PERCENTAGES:	75.0	25.0			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=40		
CODE VALUE:	2	3 4			
FREQUENCY:	5	22 13			
PERCENTAGES:	12.5	55.0 32.5			
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=40		
CODE VALUE:	0				
FREQUENCY:	40				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=40		
CODE VALUE:	1	2 3 4			
FREQUENCY:	2	0 21 17			
PERCENTAGES:	5.0	0.0 52.5 42.5			
VARIABLE NUMBER	32	USE-WEAR	N=40		
CODE VALUE:	4	5 6			
FREQUENCY:	1	0 39			
PERCENTAGES:	2.5	0.0 97.5			
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=40		
CODE VALUE:	1	2			
FREQUENCY:	39	1			
PERCENTAGES:	97.5	2.5			

Function. Moseley (1879:313) reports the use of stone adzes for canoe making. The fluted use-wear discerned below the later battering supports this and the thickness of the blades with their narrow cutting edges also support this supposition. However, the implements may be divided into two groups, one with handles between 28 and 39 cm long (33 implements), and the rest between 42 and 52 cm. Thus a range of functions is probably indicated.

Manufacturing tradition. T1.

Comments. 1. The superficial use-wear on many of these implements is a heavy battering explained by Moseley's observation (1879:313) that "Many of these were still mounted onto their handles, and are now used by the people who have not parted with them for cracking nuts".

2. Thompson (1938) records these round sectioned blades as the most common in her Lau collections. Gifford (1951) records them very rarely in the archaeological deposits he investigated in Fiji. This apparent gap between ethnographic and prehistoric records should be investigated.

Statistics. The descriptive statistics of tables A1 and A2 have been commented on above. As the population is so isolated it has not been included in any statistical comparisons.

FIJI 1

No.	Repository	Reg. No.	Locality	Date	Collector
241	AIM	11691	Fiji	1886	T. Steel
242	AIM	42025	"	1969	H. Webster
243	AIM	30939	"	1949	W.H.O. Johnston
244	AIM	12901	"	1886	T. Steel
245	AIM	13478	"	1925	J.B. Turner
246	AIM	2018	"	1928	Frater Bros.
247	AIM	13793	"	1930	C.R. Ford
253	AIM	31608	"		Oldman Coll
254	AIM	14811	"	pre 1900	Edge Partington
255	AIM	14812	"		" "
278	DM	F.E. 5253	"		Armytage Coll
279	DM	F.E. 3291	"		
288	DM	O 2065	"		Oldman Coll
289	DM	F.E. 2185	"		
290	DM	F.E. 3690	"	1887	
323	OM	D39.1721	"	1939	Mrs Cook
345	OM	D40.165	"	1940	G. Fisher
346	OM	D24.2006	"	1924	Fels Coll
347	OM	D24.2007	"	"	" "
348	OM	D33.1322	"	1933	Dunlop Coll
350	OM	D25.908	"	1925	Thompson Coll

No.	Repository	Reg. No.	Locality	Date	Collector
352	OM	D28.466	Fiji	1928	C.E. Napier
354	CM	E152.23	"	1952	Adamson
356	CM	E76.11	"	1876	R.L. Holmes
357	CM	E156.227	"	1956	
453	NMV	X14875	"		
562	SAM	A7300	"	pre 1900	W. Owens
563	SAM	A7299	"	" "	"
564	SAM	A12958	"	1925	J.S. Callaghan
566	SAM	A7296	"	pre 1900	J.A. Johnson
757	AM	E29013	"	1924	T. Steel
758	AM	E29014	"	"	"
759	AM	E29819	"	1926	F. Davers Power
760	AM	E28244	"	1923	Tost & Rohu
761	AM	E17703	"	1909	L. Priestley
762	AM	B4131	"	1884	Capt. Wolsch
763	AM	E25402	"		
764	AM	E49075	"	1940	J. St. Clair Steel
765	AM	E53484	"	1949	Spencer
766	AM	E52740	"	1949	F.J. Bayldon

FIJI 2

Localities. Fiji.

Number. 5.

Collectors. Various.

Dates. Pre-1900 to 1947.

References.

Figure. Plate A1, figs. C and D, (no. 359).

Hafting features. A1, B1, C3, D27 = no 359; A1, B3, C4, D27 = nos. 349, 355, 358, 565.

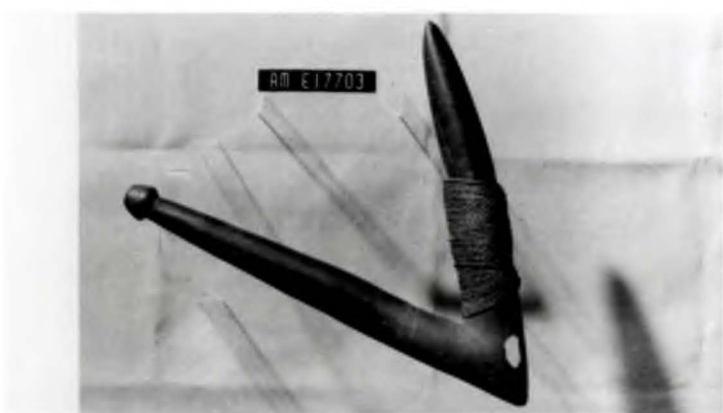
Handle. Very similar to FJ 1.

Hafting. Very similar to FJ 1.

Blade. Wider, thinner than FJ 1 with wider and longer cutting edges. Cross-section low oval to rectangular without sharp corners. Rock appears to split into tabular pieces. Compare Thompson, 1938: figs. 4 and 5.

PLATE A1.

- A and B. FJ 1, 761, AM E17703, Fiji.
C and D. FJ 2, 359, CM E155.173, Fiji.
E and F. NC 1, 655, AM E2859, New Caledonia.
G and H. NC 2, 341, OM D24.4, New Caledonia.



A



B



C



D



E



F



G



H

Function. Two blades have fluted wear (Feature 32 attribute 3), the others have considerable nibbling use-wear. The implements are probably general purpose tools.

Manufacturing tradition. T1.

Comments. FJ 2 is the same as FJ 1 apart from the blades, thus any suggestions that the implements are perhaps of Tongan origin could not easily be upheld. However, the question of blade origin is not clear. The differences may be solely caused by different rocks.

Statistics. Too few implements.

FIJI 2

No.	Repository	Reg. No.	Locality	Date	Collector
349	OM	D22.602	Fiji		
355	CM	E155.172	"		Webster
358	CM	E147.581	"	1947	T. Burns
359	CM	E155.173	"		Webster
565	SAM	A7297	"	pre 1900	J.A. Johnson

FIJI 3

Locality. Fiji.

Reference. Moseley, 1879:313.

Hafting features. Unclear, see illustration in Moseley, 1879:313.

Handle. Typically Fijian, short heel, thick shaft.

Hafting. The implement has a separate socket but the sketch seems to show that the blade almost adjoins the toe, so the socket may not be an adjustable one. Furthermore the lashings look as if they would need retying if an alteration of the angle was required.

Blade. The blade figured appears to have flat sides, and might thus be more comparable with FJ 2, but I would hesitate to place any reliance on such a small sketch as this.

Function. No information.

Manufacturing tradition. T2.

Comments. Probably a specialised function. This T2 tradition is not recorded for Tonga (Mead, 1968) despite the large late canoe trade between the two groups, so adjustable implements are probably an uncommon, but nevertheless Fijian, form and may be associated with canoe making (cf. MAS 8).

FIJI 4

Locality. Fiji.

Number. 6.

Collector. J.B. Turner collected all the iron bladed implements.

Dates. Early Twentieth Century.

References. Wilkes, 1845:347.

Figure. Not figured.

Hafting features. Al, Bl, C3, D27 = nos. 249, 250; Al, Bl, C3, D28 = no. 251; Al, Bl, C4, D27 = nos. 248, 252; Al, Bl, C4, D28 = no. 351.

Handle. One has a handle like FJ 1 or FJ 2 implements, the others are modified to hold the variously shaped butts of the metal blades. Some shafts are much longer than those of any stone bladed implements recorded.

Hafting. The blade seating modifications arranged to fit the blades, in particular some have a shortened toe quite unlike other Fijian implements. The lashings are all coir.

Blades. All metal: two axe blades set as adzes, one plane blade set as an adze, and one iron bolt, one brass rod 3/4" in diameter, and a much modified object originally meant to be spiked into wood which retains the spike and the flange carefully fitted into the toe of the handle.

Function. Probably a variety of tasks.

Manufacturing tradition. T1.

Comments. Three of these are likely to have originated early in the Nineteenth Century, judging by the effort put into modifying three chunks of metal into adze-blades. As early as 1844 Wilkes (1845:347)

recorded that it was almost impossible to see a stone bladed adze in use; American hatchets were preferred.

Statistics. The handles and blades are very varied and for this reason no statistical description is given.

FIJI 4

No.	Repository	Reg. No.	Locality	Date	Collector
248	AIM	13481	Fiji	1925	J.B. Turner
249	AIM	13480	"	1925	"
250	AIM	13482	"	1925	"
251	AIM	13479	"	1925	"
252	AIM	13483	"	1925	"
351	OM	D28.466	"	1928	C.E. Napier

NEW CALEDONIA 1

Localities. New Caledonia. Sarasin figures implements from Bouloupari, Thio and Koinde, and Lifu.

Number. 4.

Collectors. Various, Glaumont was an early missionary.

Dates. 1890 - 1930.

References. Edge Partington, 1890 - 98: Series I, Pl. 129, fig. 2, Series II, Pl. 68, fig. 8; Hadfield, 1920:101; Sarasin, 1929: Pl. 25, figs. 2, 3, 5, 7 and 8, Pl. 26, fig. 3; Leenhardt, 1930:27; Hinderling, 1949:128.

Figure. Plate A1, figs. E and F, (no. 655).

Hafting features. A1, B1, C1, D28 = no. 340; A1, B1, C3, D27 = nos. 353, 655; A1, B1, C3, D28 = no. 257.

Handle. Small, pointed, forward projecting heel which overhangs the blade and is emphasised by the acute angle at which the foot and shaft are set. Shaft thin.

Hafting. One of the implements is set against a flat foot but the others all have a small step. All the lashing material is coir cordage.

Blades. One implement has a nephrite-like blade, the others are all dark, probably volcanic rocks. The dark stone adze blades show evidence of flaking, pecking and grinding, while the nephrite one shows only pecking and grinding. All, except no. 353, are of the wide, flat, pointed poll New Caledonian form, with a long curved cutting edge and adze-like conformation.

Function. Some may be single handed. Probably the least specialised of the New Caledonian adzes.

Manufacturing tradition. T1.

Comments. 1. The only New Caledonian percussive cutting implements whose blades are not set in a slot.

2. The implements are varied and are not a good sample as they may well represent more than one geographic population.

3. Hadfield (1920:101) says of the Loyalty Islands, "the adzes were of much the same shape [as the axes] except that the mountings varied light or heavy, according to the needs of the workman".

4. Adzes such as these may have been used for felling trees (Leenhardt, 1930:27).

5. Hinderling's New Caledonia Type a covers this population although he includes Sarasin, 1929: Pl. 25, fig. 4, which I have put into NC 4.

6. No. 353 is given as coming from Fiji. Its blade may fit within the FJ 1 series but its handle is more like NC 1.

Statistics. Too few implements.

NEW CALEDONIA 1

No.	Repository	Reg. No.	Locality	Date	Collector
257	AIM	13747.1	New Caledonia	1930	W.M. Cole
340	OM	D28.333	" "	1928	H.D. Skinner
353	CM	E138.667	?Fiji	1938	Macmillan-Brown
655	AM	E2859	New Caledonia	1890	G. Glaumont

NEW CALEDONIA 2

Locality. New Caledonia, Sarasin locates one to Canala.

Number. 1.

Collector. E. Heyman.

Date. 1924.

References. Edge Partington, 1890 - 98: Series I, Pl. 128, fig. 5; Sarasin, 1929: Pl. 25, fig. 1, Pl. 26, figs. 1 and 2; Hinderling, 1949: 129.

Figure. Plate A1, figs. G and H.

Hafting features. A1, B1, C8, D28.

Handle. Wide foot, high tapering heel, relatively thick shaft.

Hafting. Blade set in a slit with coir cordage.

Blades. Wide and thin, nephrite-like.

Function. The thin blades suggest a more specialised function than NC 1.

Manufacturing tradition. T1.

Comments. Hinderling's New Caledonia Type d partially covers NC 2.

Statistics. Too few implements.

NEW CALEDONIA 2

No.	Repository	Reg. No.	Locality	Date	Collector
341	OM	D24.4	New Caledonia	1924	E. Heyman

NEW CALEDONIA 3

Localities. New Caledonia, probably far north (Forster figures one from Balade (Sarasin, 1929:123)).

Number. 3.

Collectors. One collected by Erskine in 1850, probably in the far north.

Date. *1850 - 1884.

References. Edge Partington, 1890 - 98: Series I, Pl. 128, figs. 1 and 2, Series II, Pl. 68, fig. 4; Sarasin, 1929: Pl. 26, figs. 5 - 8; Hinderling, 1949:129.

Figure. Plate A2, figs. A and B, (no. 302).

Hafting features. A1, B1, C8, D24 = no. 451; A1, B2, C8, D24 = no. 302; A1, B3, C8, D27 = no. 747.

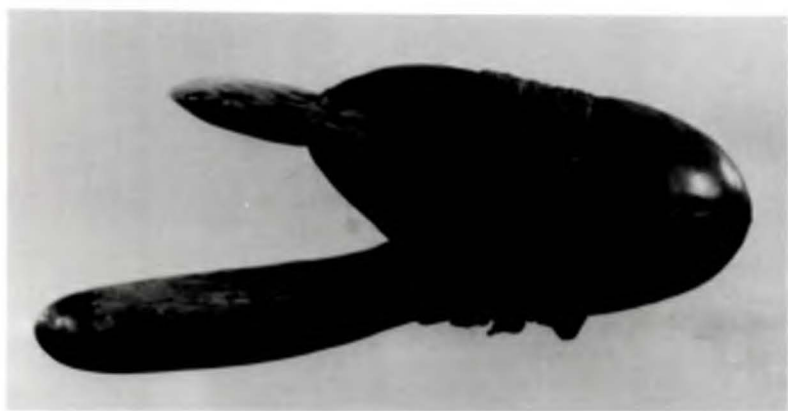
Handle. Very short shaft with bulbous foot and acute angle of foot and shaft of 30° - 40°.

Hafting. The blade is set in a slit and appears to be held by pressure alone as the lashings seem more designed to keep the foot from splitting apart. The lashings are set in a slot and are usually simple whippings made in a variety of complex plaited cords.

Blade. All the blades recorded were small but of the typical squat triangular shape and made in nephrite.

PLATE A2.

- A and B. NC 3, 302, DM O 667B, New Caledonia.
C and D. NC 4, 276, AIM 13747.2, New Caledonia.
E and F. NC 5, 774, AM E2866, New Caledonia.
G and H. NC 7, 205, AIM 15040, New Caledonia.



A



B



C



D



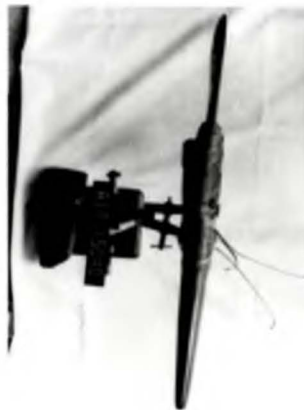
E



F



G



H

Function. Leenhardt (1930:27) calls them "*outils de sculpteurs*". They are obviously designed for close work, perhaps on the house posts or other carvings.

Manufacturing tradition. T1, a T1 variation with wooden cover and T2 are recorded. I suggest that these implements are basically T1 simple adzes but that the difficulties of obtaining the peculiarly shaped handles has necessitated compromise forms. Thus it seems that the foot was very likely to split into two pieces making the outer part into a *de facto* cover. Likewise, two implements have separate handles (rather than separate sockets) and no question of adjustability of cutting edge angle arises.

Comments. 1. T1 implements = no. 451, Sarasin Pl. 26, fig. 8; T1 implements with cover = no. 302, Sarasin Pl. 26, figs. 5 and 6; T2 implements = no. 747, Sarasin Pl. 26, fig. 7.

2. The great care bestowed in maintaining the same style despite the difficulty of getting the proper handles suggests that they were of great value, and probably of specialised use.

3. Hinderling's *Dickdechsel*, Type f, New Caledonia.

Statistics. Too few implements.

NEW CALEDONIA 3

No.	Repository	Reg. No.	Locality	Date	Collector
302	DM	O 6678	New Caledonia	*1850	Admiral Erskine
451	NMV	X1982	" "		
747	AM	B1753	" "	1884	E.G.W. Palmer

NEW CALEDONIA 4

Localities. New Caledonia.

Number. 2.

Collector. W.M. Cole.

Date. 1930.

References. Edge Partington, 1890 - 98: Series II, Pl. 68, fig. 5, Series III, Pl. 69, fig. 3; Sarasin, 1929: Pl. 25, fig. 4, Pl. 26, fig. 4; Hinderling, 1949:128-9.

Figure. Plate A2, figs. C and D, (no. 276).

Hafting features. A1, B1, C3, D27 = no. 450; A1, B1, C8, D27 = no. 276.

Handle. Long handle, bulbous heel.

Hafting. One blade set on a step, the other in the usual slit. The lashings of coir cordage are wrapped over the whole toe, not as in NC 3, in a slot part way up, and the toe is cut away to prevent the lashings from moving.

Blade. Nephrite, very similar to the NC 3 blades.

Function. Obviously very similar to NC 3. Edge Partington (1890 - 98: Series III, Pl. 69) notes "when used it is held near the head, the long handle being only for balance".

Manufacturing tradition. T1.

Comments. Hinderling divides this population between his New Caledonia Types a and d.

Statistics. Too few implements.

NEW CALEDONIA 4

No.	Repository	Reg. No.	Locality	Date	Collector
276	AIM	13747.2	New Caledonia	1930	W.M. Cole
450	NMV	X6961	" "		

NEW CALEDONIA 5

Localities. New Caledonia, Sarasin figures three from Canala.

Number. 5.

Collectors. Various, Glaumont was an early missionary.

References. Edge Partington figures six - Series I, Pl. 129, figs. 5 - 8, Series II, Pl. 68, figs. 6 and 7, Series I, Pl. 132, fig. 4;

Sarasin figures eight — 1929: Pl. 23, figs. 1-4, Pl. 24, figs. 3-5 and 8; Hinderling, 1949:130.

Figure. Plate A2, figs. E and F, (no. 774).

Hafting features. A2, B1, C8, D23 = nos. 344, 771; A2, B1, C8, D25 = no. 773; A2, B1, C8, D27 = nos. 772, 774.

Handle. This straight handle is sometimes wrapped in cloth or skin.

Hafting. The blades are set between prongs and held by lashings which force the prongs together like a vice. The prongs may, however, be very short and the blade held in by a cord loop. On the illustrated specimen, most of the lashing is three-ply coir cord, but the terminal has red wool tags.

Blades. The blades in these handles are less tapering, more squarish in outline than those hafted as adzes, and on the whole are less well finished. All are nephrite.

Function. Possibly general purpose. Labillardière records a demonstration of the use of axes to cut off a tree branch, in a rather inefficient manner (1800:230-31). Hadfield (1920:99) notes that the Loyalty Islanders used axes for making canoes. It seems unlikely that they were used in the more intricate tasks of this process.

Manufacturing tradition. T3.

Comments. 1. The only exactly similar manner of hafting the blade elsewhere in Melanesia is Nissan (SOL 11) (Krause, 1907:123, fig. 87).

2. Apart from a possible plan shape difference, no other distinguishing differences such as cutting edge bevel between the NC 1-4 adzes and the NC 5 axes were noticed.

3. This comment may refer to axes of this kind:

Each of them carried an axe of serpentine stone: and one of them wishing to show us how they made use of them to cut wood, hacked off a branch of *melaleuca latifolia* [sic], about four inches thick. It was not till after a number of strokes that he was able to make a slight notch in it, then he broke it by forcibly bending down the end of it (Labillardière, 1800:230-31).

4. This is partly covered by Hinderling's Type h, *Axt mit Spaltfassung*.

Statistics. Too few implements.

NEW CALEDONIA 5

No.	Repository	Reg. No.	Locality	Date	Collector
344	OM	D36.981	New Caledonia	1936	Fels Fund
771	AM	E2874	" "	1890	G. Glaumont
772	AM	E57273	" "	1955	M.S. Stanley
773	AM	E2863	" "	1890	G. Glaumont
774	AM	E2866	" "	1890	"

NEW CALEDONIA 6

Localities. New Caledonia.

References. Sarasin, 1929: Pl. 24, figs. 6 and 7; Hinderling, 1949:130.

Hafting features. A2, B1, C8, D27?

Handle. The straight wooden handle has a proximal end carved in the same style as the wooden house carvings from New Caledonia (cf. Guiart, 1963:257). The terminal of one is fashioned into a point.

Hafting. Both blades are set in a slot which does not pierce the shaft. One is held in by a cord passed through a hole in the stone, and the other while unpierced, is also held in by cordage. The cords appear to be coir.

Blade. The blades are probably nephrite.

Function. The ornamentation of the proximal end of the handle suggests that these implements may not have been utilitarian percussive cutting implements. It is possible that they may be clubs.

Manufacturing tradition. T3.

Comments. Hinderling's Type g *Art mit Einsteckfassung*.

NEW CALEDONIA 7

Localities. Lifu.

Number. 5.

Collectors. Edge Partington collection, Oldman collection.

Dates. 1914 - 1927.

References. Edge Partington, 1890 - 98: Series I, Pl. 128, fig. 4. This is not the one in the Edge Partington collection in the Auckland Institute and Museum. Sarasin, 1929: Pl. 23, fig. 5, Pl. 24, fig. 1; Hinderling, 1949:129-30.

Figure. Plate A2, figs. G and H, (no. 205).

Hafting features. A2, B3, C29, D28.

Handle. The long shaft has small prongs between which the separate socket is set. The top of the handle is cut away behind the prongs and usually is formed into cleats or nubbins so that the cords may get a better purchase. The terminal of the shaft is fashioned with a slightly wider cylindrical end, rather like that on clubs on the main island.

Hafting. The non-adjustable separate socket has a characteristic flattened shape with one side cut into a cover piece so that the space for the butt of the blade may be accurately hollowed out. The top of the socket is squared off. The socket is held onto the handle by very fine three-ply plait coir cords wrapped in complex diamond patterns where the whipping holds the blade, and in triple triangle patterns where the cords hold the socket to the rest of the handle.

Blade. The blades in these implements are mostly nephrite, but the one from the Oldman collection has a *Tridacna* blade. These blades appear to be less tapering than those in the axes. One which is loose has a squared butt. The cross section is a thin oval.

Function. The general weakness of assembly, particularly the short prongs which give no support to the handle - separate socket junction suggests that these were probably non-utilitarian implements. This impression is strengthened by the fine workmanship evidenced in the fine neat cords and the careful carving of the shaft.

Manufacturing tradition. T4.

Comments. 1. This form is not mentioned by Hadfield (1920) but the localisation is given by both Edge Partington (in his collection and in his volumes) and by Sarasin (1929: Pl. 24, fig. 1). Hinderling's Type f, *Knieaxt*.

2. The similarity of the terminals of these handles with those on New Caledonian clubs may also be noted.

3. One further implement (Sarasin, 1929: Pl. 23, fig. 6) may be associated with this population, although it has quite a different form of separate socket with a pointed top. It probably comes from a different locality or date.

Statistics. Too few implements.

NEW CALEDONIA 7

No.	Repository	Reg. No.	Locality	Date	Collector
205	AIM	15040	Loyalty Is		Edge Partington
238	AIM	12865		1914	Rinaldo
256	AIM	1300	New Caledonia	1927	M. Davis
298	DM	O 668	" "		Oldman Coll
568	SAM	A8140	" "		D. Murray

NEW CALEDONIA 8

Localities. New Caledonia. Apparently very widespread.

Number. 7.

Collectors. Early missionaries.

Dates. 1889 - 1936.

References. Edge Partington figures two (1890 - 98: Series I, Pl. 128, fig. 3, Series III, Pl. 67, fig. 2). Sarasin figures seven parade axes (1929: Pl. 23, figs. 7 and 8, Pl. 27, figs. 1 - 5). Many minor references to other illustrations. Hinderling, 1949:131-2.

Figure. Plate A3, figs. A and B, (no. 452).

Hafting features. A2, B1, C8, D1.

Handle. The straight shaft is usually covered by elaborate wrappings





of skin (Labillardière (1800:224) says this is bat's skin) and dog hair cords. The terminal of the shaft often has as a pedestal half a coconut attached to it, and covered over with skin or cloth, within which small pebbles are placed as a rattle. I have figured one of the simpler ones so that the features may be more clearly shown.

Hafting. Thin canes were passed through holes in the blade and tied beside the shaft with coir cords. The blade fits between the prongs. These prongs may sometimes be carved with a mask.

Blade. All but one of these blades are nephrite and typically have an oval disc shape, although other smaller and less beautiful blades are fitted in some of the ones shown by Sarasin (and may have been made for sale). Edge Partington (1890-98: Series III, Pl. 67, fig. 2) illustrates one with a large blade having scoops cut out at the outer and inner sides. The blades appear to have a continuous edge which is not sharp and have a pair of holes drilled in characteristic double-cone manner, about half way to the centre on one side. The blades are very thin.

Function. Leenhardt (1930:27-28) distinguishes three functions for these implements. 1. for cutting "the Flesh of their Enemies which they divide among them after a battle" (Labillardière, 1800:19); 2. in a rain making ceremony when the implement is ritually struck against the sun; and 3. as a mark of chiefly authority. Métais (1952:144) also comments on "*L'hétérogénéité des rites qui lui sont attachés*".

Manufacturing tradition. T3.

Comments. 1. Guiart considers the stone disc blades of these parade axes one of the highest artistic achievements of New Caledonia (Guiart, 1963:254).

2. The French term for these implements is *hâche ostensor*, the German term *Schiebenbeil*. Labillardière (1800:19) calls them *nbouet*.

3. Wirz (1949) has speculated whether these axes are anthropomorphic in design.

4. Leenhardt (1930:28) notes that these implements were still being made at that time:

en ce sens que les Canaques recherchent les anciennes hâches commencées et les achèvent avec des limes d'acier pour les vendre soit aux Européens, soit aux Canaques d'Ouvea qui continuent de les employer comme objet d'échange dans les mariages.

PLATE A3.

- A and B. NC 8, 452, NMV X1975, New Caledonia.
C and D. NH 1, 332, OM D24.3023, Eromanga, New Hebrides.
E and F. NH 3, 327, OM D21.218, Tongoa I, New Hebrides.
G and H. NH 5, 292, DM FE2706, Epi I, New Hebrides.

PLATE A3.

- A and B. NC 8, 452, NMV X1975, New Caledonia.
C and D. NH 1, 332, OM D24.3023, Eromanga, New Hebrides.
E and F. NH 3, 327, OM D21.218, Tongoa I, New Hebrides.
G and H. NH 5, 292, DM FE2706, Epi I, New Hebrides.



A



B



C



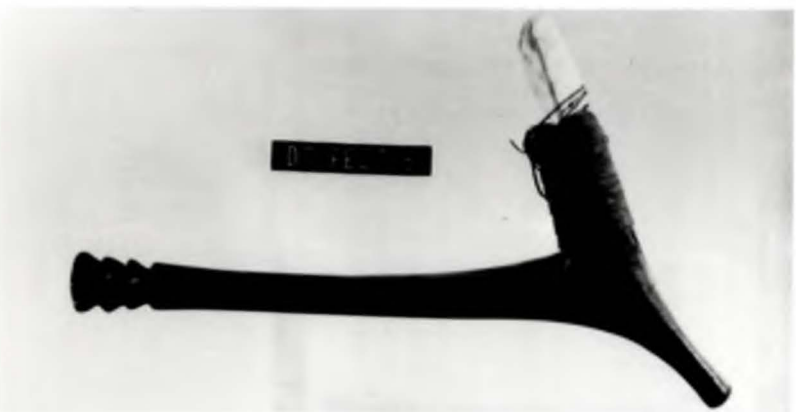
D



E



F



G



H

5. Leenhardt (1946:408) gives names for parade axes in all languages he records. However, the only attested localities are those of Balade (Labillardière, 1800), Tchambouenne near Oubatche, Canala, Houailou Valley, the south coast, and Ouebia (Sarasin, 1929).

6. Hinderling's Type j.

Statistics. The disc shaped blades make a number of ratio scale measurements difficult or impossible. Thus the length of the blade (V7) is taken at 90° from one side of the prongs of the handle to the lower end of the blade, V8, width of blade at haft, is the measurement from edge to edge parallel with the prongs, V15, length of foot, is the depth of the prongs, and V16, total length of foot, is the vertical length of the blade. All the skewed measurements of table A3 (V8, V16, and V20) are caused by one large implement no. 955. Similarly in the remarkably consistent blade attributes V23 is marred by one implement with a flattened poll, and one artefact has a blade of an unidentified metamorphic rock.

NEW CALEDONIA 8

No.	Repository	Reg. No.	Locality	Date	Collector
452	NMV	X1975	New Caledonia		
567	SAM	A19197	" "	1936	R.H. Pulleine
767	AM	E2872	" "	1890	G. Glaumont
768	AM	E58894	" "	1957	Rosebank Mission
769	AM	E8203	" "	1889	J. Ella
770	AM	E2873	" "	1890	G. Glaumont
955	IA	M TA85	" "		ex Uni. of Sydney

NEW CALEDONIA 9

Locality. Lifu.

Reference. Sarasin, 1929: Pl. 24, fig. 2.

Hafting features. A1, B1 or B2, C3, C8, or C9, D28.

Handle. Like NC 7 but one piece. High, pointed heel.

Hafting. Blade may be set in a slot, on a step, or held with a cover. The lashing is coir cords.

TABLE A3: Distribution of ratio scale features. New Caledonia (NC8). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S. D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	7	102.14	12.88	84	123	0.311	-0.071
8	WIDTH OF BLADE - HAFT	7	173.00	34.36	153	250	2.157	3.363
9	THICKNESS OF BLADE	7	19.86	5.58	13	28	0.160	-0.791
10	WIDTH OF BLADE - EDGE	0	N TOO SMALL; COUNT <=3					
11	LENGTH - CUTTING EDGE	0	N TOO SMALL; COUNT <=3					
12	ANGLE - CUTTING EDGE	6	48.50	15.54	30	70	0.189	-0.830
13	LENGTH OF HANDLE	7	442.57	77.88	354	579	0.602	0.140
14	SHAFT DIAMETER	7	31.43	5.86	25	42	0.785	0.248
15	LENGTH OF FOOT	7	33.00	9.90	20	45	-0.096	-0.941
16	TOTAL LENGTH OF FOOT	7	206.14	37.76	169	285	1.561	2.039
17	POINT OF BALANCE	3	N TOO SMALL; COUNT <=3			0	25	
18	ANGLE - B/FOOT - SIDE	6	90.00	0.0	90	90	0.0	0.0
19	ANGLE - B/HANDLE - BELOW	6	0.0	0.0	0	0	0.0	0.0
20	WEIGHT	6	1523.67	834.98	760	3005	1.104	0.682
21	SPRT SOCKET LENGTH	0	N TOO SMALL; COUNT <=3					
22	SPRT SOCKET WIDTH	0	N TOO SMALL; COUNT <=3					
34	% 10 ON 11 WC/LC	0	N TOO SMALL; COUNT <=3					

TABLE A4: Distribution of nominal scale features. New Caledonia (NC8).

VARIABLE NUMBER	23	POLL OF BLADE	N=7
CODE VALUE:	2	3	
FREQUENCY:	6	1	
PERCENTAGES:	85.7	14.3	
VARIABLE NUMBER	24	PLAN OF BLADE	N=7
CODE VALUE:	4		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=7
CODE VALUE:	0		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	26	PROFILE OF BLADE	N=7
CODE VALUE:	1		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=7
CODE VALUE:	0		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=7
CODE VALUE:	0		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=7
CODE VALUE:	2		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=7
CODE VALUE:	2		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	31	FINISH ON BLADE	N=7
CODE VALUE:	4		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	32	USE-WEAR	N=7
CODE VALUE:	0		
FREQUENCY:	7		
PERCENTAGES:	100.0		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=7
CODE VALUE:	2	3	
FREQUENCY:	1	6	
PERCENTAGES:	14.3	85.7	

Blade. Like NC 7.

Function. No direct information.

Manufacturing tradition. Blade is set axe-wise on a footed haft, as a local variant of T1.

NEW CALEDONIA 10

Locality. New Caledonia.

Reference. Edge Partington, 1890 - 98: Series I, Pl. 129, fig. 9.

Hafting features. A1, B1, C8, D27?

Handle. Long shaft, small heel, long toe.

Hafting. Blade set axe-wise between prongs on the toe and held by a simple whipping.

Blade. Appears to be a usual nephrite blade, not markedly tapering.

Function. No information, probably 'ordinary' tasks.

Manufacturing tradition. A local variant of T1.

NEW CALEDONIA 11

Locality. New Caledonia.

Reference. Edge Partington, 1890 - 98: Series I, Pl. 129, fig. 3; Sarasin, 1929: Pl. 27, figs. 6 and 7.

Hafting features. A2, B1, C8, D28?

Handle. Longish shaft, covered with a whipping for its whole length.

Hafting. The blade is set chisel fashion on the end of the shaft. The implements may be a version of the parade axe, NC 8, made by setting an ordinary blade between the prongs of a straight shaft.

Blade. The blades appear to be of usual, not too tapering forms.

Function. Perhaps an analogue of NC 8 parade axes.

Manufacturing tradition. Not strictly within the current pattern, but may be a local variant of T3.

NEW CALEDONIA 12

Locality. Mare.

Reference. Sarasin, 1929: Pl. 27, figs. 8 and 9.

Hafting features. Separate socket and blade unit?

Handle. If these are parts of T2 implements the handles are missing.

Hafting. The implements as figured look like the blade and separate socket units of T2 implements. The sockets taper, and the blades are held by a simple whipping.

Blade. Small, probably nephrite blades.

Function. Sarasin calls them chisels or knives, but I suggest they are part of more complex implements.

Manufacturing tradition. T2?

NEW CALEDONIA 13

Locality. New Caledonia.

Reference. Edge Partington, 1890 - 98: Series I, Pl. 129, fig. 7, Pl. 132, fig. 4; Hinderling, 1949:132.

Hafting features. A2, B1, C7, D?

Handle. A long bent strip of cane or wood. The one in Pl. 129 has the handle covered with bark cloth and bound with red wool, and its terminal formed into a knob.

Hafting. The bent strip is held together behind the blade with a whipping of an unspecified material.

Blade. Appears to be nephrite, triangular plan but longer than many.

Function. Ceremonial (Hinderling, 1949:132).

Manufacturing tradition. T3.

Comments. Hinderling's New Caledonia Type k *Schlingenschäftung*. I have judged Sarasin, 1929: Pl. 24, figs. 3 and 8, to be part of NC 5, not hafted in flexible handles as Hinderling suggests. Edge Partington's illustrations are quite clear.

NEW HEBRIDES 1

Locality. Eromanga (Erromanga, Erromango).

Number. 3.

Collectors. Various.

Dates. 1884, 1924.

References. Edge Partington, 1890 - 98: Series III, Pl. 62, fig. 3; Robertson, 1902; Humphreys, 1926.

Figure. Plate A3, figs. C and D, (no. 332).

Hafting features. A2, B1, C7, D33.

Handle. The handle is a long wooden shaft with a knob at the terminal and a very pointed proximal end. The blade is set in a hole in the thickest part of the shaft.

Hafting. The blades are just fitted into the hole without any resin or cord lashing. No. 559 has filler sticks to take up some of the room in the over-large hole.

Blade. The blades are of grey stone, tapering in shape but rather roughly finished, low oval in section with sometimes a rough cutting edge.

Function. No other form of percussive cutting implement is attested. If true, then these implements are probably multi-purpose.

Manufacturing tradition. T3.

Comments. 1. Humphreys and Robertson make contrary comments. Humphreys (1926:163) says "the handle of polished *more* has a groove in one end into which the blade is fitted and securely bound on with coconut fibre". Robertson (1902:373) gives the following description:

Stones were picked up as near as the desired shape and size as possible, and then ground on other stones till quite the right size, and sharpened at one end. The axe was somewhat oval in shape, and from about four to six inches in width at the largest end, and tapering to about one and a half inches at the other. The wooden handle, about two and a half feet in length, had a bowl at the end where it was tied to keep it from slipping out of hand. The other end was very large, and had a hole dug out

with pigs' tusks and sharp shells where the axe was inserted. It was then firmly secured by strong twine made of cocoanut [sic] fibre, and sometimes cemented with the glutinous part of the *ulaveri*, the 'ground orchid'.

2. Humphreys (1926:163) reports that footed handles were not recorded for Eromanga.

3. These axes have handles very similar to some South New Guinea axes (e.g. SNG 17-22) particularly in the pointed shape of the proximal end of the handle. The closest similarities otherwise are to Tana, and to New Caledonia, both of which have the same manufacturing tradition. The pointed proximal ends are almost certainly a local fashion.

4. No. 333 is figured by Edge Partington, 1890-98: Series III, Pl. 62, fig. 6.

Statistics. Too few implements.

NEW HEBRIDES 1

No.	Repository	Reg. No.	Locality	Date	Collector
332	OM	D24.3023	Eromanga?	1924	Tost & Rohu
333	OM	D21.219	Eromanga	1884	Capt. Braithwaite
559	SAM	A8182	?Tana	pre-1900	

NEW HEBRIDES 2

Locality. Tana (Tanna).

Number. None.

References. Cook, 1961:506; Speiser, 1923: Pl. 33, fig. 13; Hinderling, 1949:126.

Hafting features. A2, B1, C7, D?

Handle. Long straight shaft with squared off proximal end.

Hafting. Blade set in hole, held there by lashing (Speiser, 1923: Pl. 33, fig. 13).

Blade. Probably stone.

Function. Only form attested for Tana, probably general purpose.

Manufacturing tradition. T3.

Comments. First reported by Cook in August 1774:

Their stone hatchets, at least all those I saw, were not made like adzes as at the other islands but more like an ax [sic] — as in this form [sketch]; in the helve, which is pretty thick, is made like a hole into which the stone is fitted.

(Cook, 1961:506). The sketch shows the typical squared proximal end.

Hinderling calls this *Einsteckschäftung*.

NEW HEBRIDES 3

Locality. Tongoa Island, Shepherd group.

Number. 2.

Collectors. Capt. Braithwaite, B.R.C. Notage.

Dates. 1884, 1940.

References. For discussion of the blades Garanger, 1970.

Figure. Plate A3, figs. E and F, (no. 327).

Hafting features. A1, B1, C4, D28.

Handle. Shaft thick, the earlier one with a bulge at the terminal, shaft and foot junction marked by a stepped thickening which is ornamented on the top by nine pairs of scores sloping towards the terminal. The heel is high and pointed but does not project forward. Foot quite thick.

Hafting. Within the thick foot the blades are set in a trough which is carefully cut out and goes higher up the foot than the ledge left to prevent the lashing from moving up. Coir plait cords as whipping which in the later specimen are also tied round part of the heel and the top of the shaft.

Blade. Both blades are clam shell (*Tridacna gigas*). No. 327 is Garanger's Type B-2-7 which is a hollow backed blade very like that in no. 328 which is Garanger Type B-2-3.

Function. Good solid implements. Given Garanger's (1970:340-344) records of surface collections from Tongoa and the rareness of other kinds of blades from there it seems likely that implements of this style, perhaps with different B-2 clam shell blades, were used for all purposes.

Manufacturing tradition. T1.

Comments. 1. Both types of blades occur in Tongoa surface collections, and are unique to the island (Garanger, 1970:340-344).

2. No. 328 is glossed in the Otago Museum register as "Modern work by old man".

Statistics. Too few implements.

NEW HEBRIDES 3

No.	Repository	Reg. No.	Locality	Date	Collector
327	OM	D21.218	Tongoa Is.	1884	Capt. Braithwaite
328	OM	D40.25	" "	1940	B.R.C. Notage

NEW HEBRIDES 4

Localities. Efate, Nguna.

References. Garanger, 1970: fig. 346B; Aubert de la Rüe, 1945:165.

Hafting features. Not clear from the illustrations A1, B1, C3?, D27?

Handle. Long shaft with bulge at the terminal (Nguna). The back of the top part of the toe is squared off and notched on its corners, and the top of the shaft is fashioned with a squared off thicker portion which is very like the treatment of no. 327 (NH 3) even to the scoring on the upper part. The heel is longer, less pointed, and more peg-like than the Tongoa adzes (NH 3).

Hafting. The blade appears to be set on a toe carefully shaped to accommodate the butt of the blade. Garanger's sketch seems to indicate that no wooden cover was used to hold the blade in place (cf. NH 5). The coir cord lashing is placed below a ledge near where the top of the blade must go.

Blade. Both implements appear to have blades made from spider shells (*Lambis*) which are Garanger's Type B-3.

Function. The cutting edge has a markedly gouge-like shape, although it is quite wide. It may have been used for some more delicate percussive cutting tasks.

Manufacturing tradition. T1.

Comments. These spider shell blades are consistent with Garanger's findings for the late sites in the Central New Hebrides. A series demonstrating their manufacture is shown in Garanger, 1970: fig. 334, pp. 344-5.

NEW HEBRIDES 5

Locality. Epi and Paama, probably centred in Epi, Paama and Ambrym, possibly also in Malekula.

Number. 4.

Collectors. Various.

Dates. 1911 - 1969.

References. Speiser, 1923: Pl. 33, fig. 7; Aubert de la Rüe, 1945: 165.

Figure. Plate A3, figs. G and H (no. 292), Plate A4, fig. F (no. 293).

Hafting features. A1, B2, C9, D27 = no. 203; A1, B2, C9, D28 = others.

Handle. The terminal of the handle is usually ornamented with a series of concentric rings. The shaft is flat on the under surface and often very smooth and polished. The heel rises in a high peg-like shape and projects forward. The top of the junction of the shaft and foot, and occasionally also the front of the foot, may have a typically diamond shaped face mask carved to stand out from the rest of the handle. The mask may be painted. Handles with masks seem to be made of lighter wood.

Hafting. All the implements have elaborate fine coir plaited cord lashings. NH 5 has a knob left on the toe, over which the blade is fitted. When the wooden cover piece is in place the blade cannot be removed.

Blade. NH 5 implements have Garanger Type B-3 spider shell blades (see NH 4).

Function. Judging by the elaborateness of the handles and lashings these implements probably had very specialised functions, and might not

always be utilitarian. The projecting heel would severely curtail the kind of blows which could be made.

Manufacturing tradition. A local variant of T1.

Comments. 1. This is a highly variable and extremely characteristic style of adze. NH 6, NH 7 and NH 8 are closely related.

2. I am not sure whether to accept the Malekula location of no. 293 as its original provenance, mainly because so many other forms are recorded for this island. However, Guiart (1963:229) links the art of southeast Malekula with that of Ambrym, so the provenance may perhaps be correct.

Statistics. Too few implements.

NEW HEBRIDES 5

No.	Repository	Reg. No.	Locality	Date	Collector
203	AIM	41281	New Hebrides	1969	E. Dawson
292	DM	FE 2706	Epi	1954	Mrs Smaill
293	DM	FE 167	?Malekula	1911	A. Hamilton
618	AM	E57279	New Hebrides	1955	M.S. Stanley

NEW HEBRIDES 6

Locality. New Hebrides, probably as NH 5.

Number. 1.

Collector. Rason.

Date. *1902 - 8.

References. As NH 5.

Figure. Not figured.

Hafting features. A1, B2/B3, C9, D28.

Handle. As NH 5.

Hafting. NH 6 has a blade held in by a cover. It also has a separate foot, perhaps a response to breakage or a temporary unavailability of wood in a suitable shape. This is not an adjustable separate socket and

the separate socket-foot lashings, which may well be continuous with the blade lashings are too elaborate to be easily retied.

Blade. Turret shell blade (*Terebra* or *Mitra*) of Garanger Type B-4 or B-5. Not lashed through the columella.

Function. As NH 5.

Manufacturing tradition. A local variant of T1.

Comments.

Statistics. Too few implements.

NEW HEBRIDES 6

No.	Repository	Reg. No.	Locality	Date	Collector
259	AIM	31495	New Hebrides	*1902-8	E.G. Rason (Oldman Coll)

NEW HEBRIDES 7

Locality. New Hebrides, probably as NH 5.

Number. 1.

Collector. Unknown.

Date. 1902.

References. As NH 5.

Figure. Plate A4, figs. A and B.

Hafting features. A1, B1, C3, D28.

Handle. As NH 5.

Hafting. Lashings as NH 5, but no cover, instead the blade is set on a step on the toe.

Blade. A small clam shell blade of Garanger Type B-1.

Function. As NH 5.

Manufacturing tradition. T1.

Comments. NH 7 has a slightly shorter heel and may be closer to NH 9.

Statistics. Too few implements.

NEW HEBRIDES 7

No.	Repository	Reg. No.	Locality	Date	Collector
396	CM	E102.12	New Hebrides	1902	-

NEW HEBRIDES 8

Locality. New Hebrides, probably as NH 5.

References. Guiart, 1963: fig. 218.

Hafting features. A1, B1, C3?, D28.

Handle. As NH 5.

Hafting. As NH 7.

Blade. Oval sectioned stone blade, tapering, well finished.

Function. As NH 5.

Manufacturing tradition. T1.

NEW HEBRIDES 9

Localities. Ambrym and Malekula.

References. Edge Partington, 1890 - 98: Series III, Pl. 63, fig. 4; Speiser, 1923: Pl. 33, figs. 4 and 6.

Hafting features. A1, B1, C3, D26.

Handle. These handles are also reminiscent of NH 5 but the heel is much shorter, although it projects forward at least as much. The terminal of the shaft is plain in the two from Ambrym, while the one from Malekula has a knob on the end. One of the Ambrym items has a mask carved on the back of the shaft-heel junction. This mask is less exaggeratedly diamond shaped than the ones found occasionally in NH 5 and its features are more rounded. The Malekula one has a similar mask.

PLATE A4.

- A and B. NH 7, 396, CM E102.12, New Hebrides.
C and D. NH 12, 654, AM E9268, Malekula, New Hebrides.
E. NH 14, 570, SAM A8183, New Hebrides.
F. NH 5, 293, DM FE167, Malekula, New Hebrides.
G and H. NH 16, 202, AIM 14953, Oba, New Hebrides.



A



B



C



D



E



F



G



H

Hafting. The blades appear to be set on a step. Unlike the NH 5 - 8 forms these implements have simple whipping lashings.

Blade. Three different blades are indicated. The Ambrym ones have a B-1 clam shell blade (*Tridacna*) and an iron one, the Malekula one a turret shell (*Terebra* or *Mitra*) blade. Possibly this population should be sub-divided.

Function. Possibly specialised.

Manufacturing tradition. T1.

NEW HEBRIDES 10

Localities. Ambrym.

References. Edge Partington, 1890 - 98: Series I, Pl. 148, fig. 5; Speiser, 1923: Pl. 33, fig. 1.

Hafting features. Unclear from the illustrations, but the blade is set axe-wise.

Handle. A footed handle with a small heel.

Hafting. How the blade is set on the foot is unclear. The lashings are split cane. May have step, cover, or even separate socket of a non-adjustable kind.

Blade. Both blades are stone and appear to be tapering and flattish.

Function. No information.

Manufacturing tradition. A local variant of T1?

Comments. 1. The one illustrated by Edge Partington comes from Bishop Codrington's collection. Speiser's is unlocalised.

2. Probably a local invention. The nearest similar item comes from Florida (SOL 5).

NEW HEBRIDES 11

Locality. Malekula.

References. Edge Partington, 1890 - 98: Series I, Pl. 146, fig. 13;

Speiser, 1923: Pl. 33, fig. 3; Hinderling, 1949:123.

Hafting features. Possibly A1, B2, C9, D26.

Handle. Footed handle with knobby or bulged heel.

Hafting. Both have a solid wooden cover set against a step and both have simple whippings of coir cordage.

Blade. The one figured by Edge Partington has a turret shell blade, while that illustrated by Speiser has an oval sectioned stone blade.

Function. No information.

Manufacturing tradition. A local variant of T1.

Comments. The shape of the heel may indicate a similarity to the Oba adzes (NH 17).

NEW HEBRIDES 12

Locality. Malekula.

Number. 2.

Collectors. Both missionaries.

Dates. 1900 - 1930.

Figure. Plate A4, figs. C and D, (no. 654).

Hafting features. A1, B1, C3, D3.

Handle. These small adzes have a slight hollowing of the foot forming a forward projection, but this is more roughly finished than in say NH 5 to NH 9. The shaft is quite short while the toe is fairly long.

Hafting. The blades are set on a step and held by a simple strip whipping, the illustrated one of cane, the other of cloth, probably calico.

Blade. Both blades are thin hoop iron.

Function. These are light implements and probably used in the lighter general tasks.

Manufacturing tradition. T1.

Comments.

Statistics. Too few implements.

NEW HEBRIDES 12

No.	Repository	Reg. No.	Locality	Date	Collector
201	AIM	22954	Malekula	1930	G. Inglis
654	AM	E9268	"	1900	T. Watt Leggatt

NEW HEBRIDES 13

Locality. Torres Islands.

References. Codrington, 1891:313; Edge Partington, 1890 - 98: Series I, Pl. 153, fig. 4; Hinderling, 1949:118. These figures may be of the same implement.

Hafting features. Possibly A1, B1, C?, D?.

Handle. The implement is distinguished by a very thin longish handle, which according to Codrington's sketch joins the foot with an almost diamond shaped section. The foot is wider than the top of the shaft and appears to have keeled sides. Its heel is high and laterally flattened, but does not project forward and ends in a point. The toe is very long, much longer than the heel.

Hafting. No clear indication of the method of seating the blade is given. It is held by a simple strip whipping.

Blade. Shell, probably clam.

Function. No information.

Manufacturing tradition. T1.

Comments. Edge Partington notes "Adze with shell blade fastened to the handle with string, the wood is stained a light yellow with nutmeg, as is the case with nearly all wooden things from this group".

NEW HEBRIDES 14

Locality. Banks Island, Mota Island, Gaua Island.

Number. 2.

Collectors. Not known.

Dates. Pre-1900.

References. Codrington, 1891:313; Speiser, 1923: Pl. 33, figs. 10 and 14; Hinderling, 1949:118-9.

Figure. Plate A4, fig. E, (no. 570).

Hafting features. A1, B1, C3, D27.

Handle. These implements have thick shaft handles which taper towards the terminal from the wide flat foot without a change in line. The foot has a wide flat, cornered face, although on the small adze from Gaua (Speiser, fig. 14) the front corners seem to be less sharp. Three implements have heel-less handles, that figured by Codrington from Mota has a small heel and the one from Gaua a relatively high one.

Hafting. The blades of the two recorded are set on a step and wrapped in coconut husk before being lashed on with a simple or cross-over whipping. The one illustrated by Codrington and Speiser's fig. 10 appear to have blades set in a trough and to have more elaborate bindings. The one from Gaua has the blade wrapped in coconut fibre and lashed onto a flat face by a very coarse strip whipping.

Blades. The one illustrated here has a grey stone blade; the other recorded has a rough clam shell blade; the ones from Mota and Speiser's fig. 10 seem to have thicker clam shell blades; and the one from Gaua has a metal blade.

Function. Probably multi-purpose.

Manufacturing tradition. T1.

Comments. 1. A variable group which would possibly be split up if further information were available.

2. The small adze from Gaua may have reached there by trade. The handle is very similar to the one figured by Speiser (1923: Pl. 33, fig. 12) from Maewo. If this is so, it seems likely that the blade has been re-hafted in the Banks Islands for it is wrapped in coconut husk fibre, a

characteristic of all implements recorded for the far north New Hebrides, and otherwise recorded only for adzes supposed to have come from Nukuria (NPO 6).

Statistics. Too few implements.

NEW HEBRIDES 14

No.	Repository	Reg. No.	Locality	Date	Collector
570	SAM	A8183	?Banks Is.	pre-1900	-
571	SAM	A8184	" "	" "	-

NEW HEBRIDES 15

Locality. Maewo.

References. Speiser, 1923: Pl. 33, fig. 12; Hinderling, 1949:122.

Hafting features. A1, B1, C1, D3.

Handle. Lightly constructed with a small heel, foot not distinguished by being markedly wider than the handle shaft as is NH 14.

Hafting. Flat face, blade held by strip whipping.

Blade. Hoop iron.

Function. No information.

Manufacturing tradition. T1.

Comments. Compare with implement figured by Speiser (1933: Pl. 33, fig. 14) from Gaua. The Maewo implement does not have a blade wrapped in coconut husk fibre.

NEW HEBRIDES 16

Locality. Oba (Leper's Island).

Number. 1.

Collector. Edge Partington.

Date. Not known, perhaps from Codrington's collection?

References. Codrington, 1891:313; Hinderling, 1949:121.

Figure. Plate A4, figs. G and H.

Hafting features. A1, B1, C3, D26.

Handle. The implement is characterised by an exceedingly long toe. The handle is heel-less and generally light.

Hafting. The blade is set on a step and held with fine two-ply twisted coir cords in elaborate patterns. Part of the cord is passed through a hole in the columella of the blade. A bunch of coconut husk fibre is placed over the front of the blade.

Blade. This is probably turret shell of Garanger's Type B-5 (*Terebra*), but of an unspecified sub-variety.

Function. This implement is marked "adze with terebra shell (*til*) blade for inside of canoes". This may be compared with Codrington's observation (1891:313) that on Oba "they still use the *til* a volute shell for working the inside of their canoes."

Manufacturing tradition. T1.

Comments. 1. Garanger notes that the threading of lashing through the columella of a *Terebra* shell is also represented in adzes from Nukuria (see NPO 6). The implements I have rather doubtfully assigned to this provenance are very similar to the Oba ones, especially in having two-ply coir cordage, the fringe of coconut husk fibre in front, and a hole in the columella of the blade.

2. The same sort of blade is also noted from Ambrym (Garanger, 1970: 403).

Statistics. Too few implements.

NEW HEBRIDES 16

No.	Repository	Reg. No.	Locality	Date	Collector
202	AIM	14953	Oba		Edge Partington

NEW HEBRIDES 17

Locality. Oba.

References. Edge Partington, 1890 - 98: Series I, Pl. 146, fig. 14; Speiser, 1923: Pl. 33, figs. 9 and 11.

Hafting features. Not clear.

Handle. This implement has the usual flat face of far northern New Hebrides' percussive cutting implements but has a knob on the back of the relatively high heel. The shaft is relatively thick and the terminal is elaborately moulded.

Hafting. The blades appear to be set on a step and held by simple whipping, which in Speiser's one makes use of the knob on the heel.

Blades. The one figured by Edge Partington has a *Terebra* shell blade but it is unclear whether the cords go through the columella. The complete one figured by Speiser has an iron blade.

Function. No information.

Manufacturing tradition. Tl.

Comments. Although it does not project forward like the Malekula ones the knob on the heel of these is similar to that on one of the two adzes from Malekula (NH 12).

NEW HEBRIDES 18

Locality. Northwest Espiritu Santo.

References. Speiser, 1923: Pl. 33, figs. 5 and 8; Hinderling, 1949: 119-120.

Hafting features. Not clear but possibly A1, B3, C?, D28.

Handle. Very high heel with a knob at the back, solid looking, flat face.

Hafting. The blade appears to be set in a non-adjustable separate socket held to the foot along a mutual flat face by elaborate lashings. The lashings appear to be in a single piece, without a separate blade - socket lashing.

Blade. Both blades are hoop iron.

Function. No information.

Manufacturing tradition. This may be a local adaptation from a T1 form, but it appears, so far as may be judged from the two small sketches, to be technically a T2 form.

NEW HEBRIDES 19

Locality. Raga (Pentecost) perhaps north Raga.

Reference. Aubert de la Rüe, 1945:165, fig. C.

Hafting features. A1, B3, C?, D?.

Handle. The implement has a plain straight shaft, no heel, short toe, and acute angle of foot and shaft.

Hafting. The adjustable separate socket is of tapering form and set on the toe so that its top is just below the top of the foot. The separate socket is apparently oval in section. The blade-socket, and socket-handle lashings are quite separate and apparently of rough split vine.

Blade. Stone, identified by Aubert de la Rüe as serpentine.

Function. The blade is set as an axe.

Manufacturing tradition. T2.

Comments. 1. A marked difference exists between north and south Raga peoples (Rivers, 1914: Vol. 1:189), with the northerners being more closely related to the areas I have designated the far north and the southerners being more closely related to Malekula and Ambrym. The lack of heel on the one implement from Raga suggests that it may belong with the northern group, rather than with the southern one whose percussive cutting implements tend to have very marked heels.

2. This is the only adjustable T2 percussive cutting implement attested between Fiji and Santa Cruz (FJ 3 and SC 1).

NEW HEBRIDES 20

Locality. New Hebrides?

Hafting features. A1, B1, C3, D27.

Handle. This adze has a heavier foot than is usual in New Hebridean adzes, and the toe is quite short. The implement is unadorned except for a carefully fashioned mushroom shaped bulb on the shaft terminal.

Hafting. The blade is set on a step and wrapped in cloth (possibly webbing) and seized with fine coir cords.

Blade. Finely made from mottled, probably metamorphic stone. Blade wide and flat, not very tapering or very long.

Function. No information, but probably important because of the care used in making it.

Manufacturing tradition. T1.

Comments. Collected by the donor's father and from somewhere in the ambit of the Melanesian Mission. Perhaps closest to the Mota adze figured by Codrington, 1891:313.

NEW HEBRIDES 20

No.	Repository	Reg. No.	Locality	Date	Collector
213	AIM	41282	-	1969	E. Dawson

NEW HEBRIDES 21

Locality. New Hebrides.

Number. 1.

Collector. M.G. Stanley.

Date. 1955.

References.

Figure. Not figured.

Hafting features. A1, B1, C3, D6.

Handle. This implement is very small, and has an unusual rounded heel.

Hafting. The blade is set on a step and loosely held by a unique form of looped split vine lashing.

Blade. Garanger Type B-1 *Tridacna* shell.

Function. No information.

Manufacturing tradition. Tl.

Comments. 1. May perhaps be a demonstration specimen and thus not strictly equivalent to any traditional percussive cutting implement form. However, quite heavily encrusted with smoke and so not necessarily a fake.

2. The only other split vine lashings come from Malekula and on late implements (NH 12).

NEW HEBRIDES 21

No.	Repository	Reg. No.	Locality	Date	Collector
619	AM	E57280	New Hebrides	1955	M.G. Stanley

ADDENDUM

Since this was typed Garanger (1972) has become available. A conversion of references from the thesis to the publication follows:

page 31	Garanger	1970:340 - 344	= 1972:105-7
32	"	1970: fig. 346B	= 1972: fig. 302B
33	"	1970: fig. 344	= 1972: fig. 291
	"	1970:344-5	= 1972:107
43	"	1970:403	= 1972:131.

SANTA CRUZ 1

Locality. Santa Cruz, Vanikoro, probably all the Santa Cruz, Reef, and Duff Islands.

Number. 5.

Collector. The major collector was a missionary, G.H. West.

Date. Early 1930's.

References. Codrington, 1891:313; Edge Partington, 1890-98: Series I, Pl. 162, fig. 4; Jennings, 1898:165; Graebner, 1909: fig. 46, nos. 1 and 2; Hinderling, 1949:117-8.

Figure. Plate A5, figs. A and B, (no. 951).

Hafting features. A1, B3, C12, D22 = nos. 329, 330; A1, B3, C12, D24 = nos. 208, 343, 951.

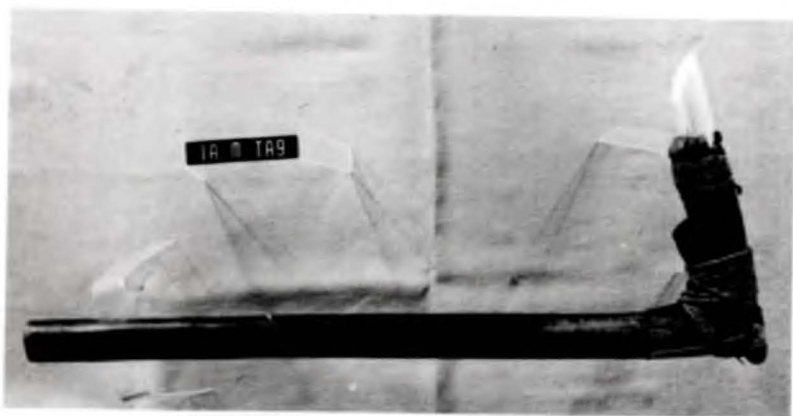
Handle. The handles have long shafts which are sturdy when the shortness of the foot is considered. The handle is heel-less and the foot is set at an acute angle.

Hafting. The back of the toe and the top of the shaft may be ledged to help hold the lashings in place. The one-piece separate socket is tapered to end in a rounded top, and may also have a knob in front. The blade is set in a hollow made especially for it and a slot is cut out of the front, probably to facilitate the carving, but also useful in giving spring to the tightening of the lashing. The simple whipping of the blade - separate socket lashings is only partly coir, though it may be made in several complicated plaited cord forms (sinnet). It may be set with resin. The separate socket - handle lashings are likewise not usually coir and are set in an open pattern around the back of the toe and over the heel. In addition the implements may have a cord tied from the separate socket to the top of the shaft. It is possible that this might have been used to ensure that the determined angular adjustment could be maintained (cf. WB 12 and WB 13).

Blade. The blades I recorded are all made of *Tridacna gigas* and are so finished that no trace of the shell cortex remains. All have a

PLATE A5.

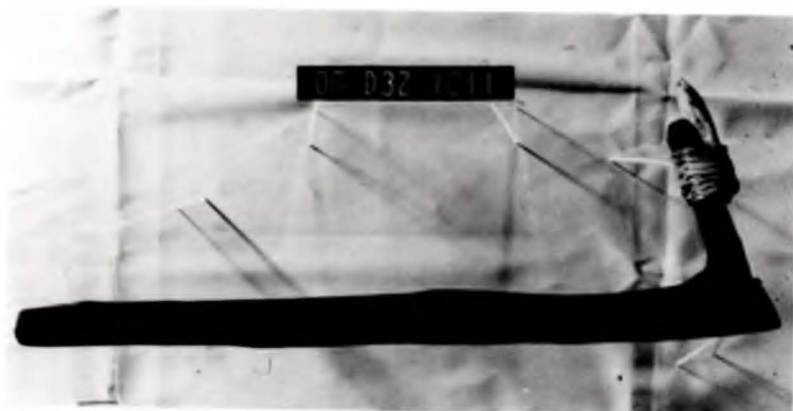
- A and B. SC 1, 951, IA M TA9, Vanikoro, Santa Cruz.
C and D. SC 2, 324, OM D32.1011, Reed Is, Santa Cruz.
E and F. SC 3, 952, IA M TA 39, Tikopia I.
G and H. NPO 1, 954, IA M TA50, Luanguia I.



A



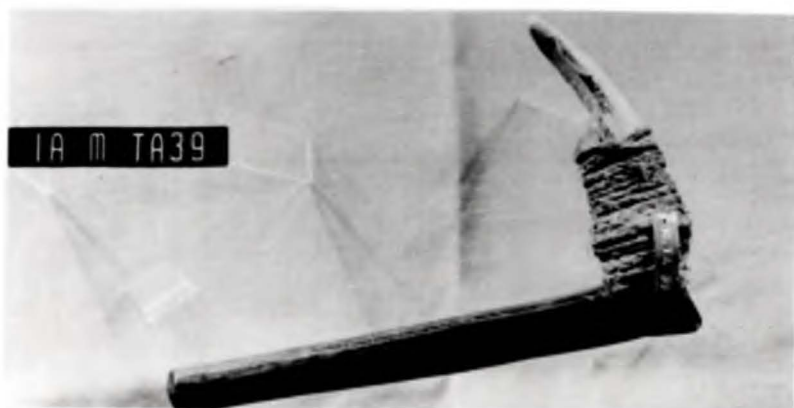
B



C



D



E



F



G



H

flattened back and long symmetrical cutting edge with a steep bevel at the back. Their sides are nearly parallel or slightly bulging, and the one loose blade has a roughly squared poll of approximately the same diameter as when it entered the haft.

Function. Jennings (1898:165) notes:

They are of 'reversible' pattern and are used for all purposes, the smaller for hollowing food bowls, bailers, and other small objects, the larger for cutting down and shaping the heavy timber used in their houses and canoes.

The size of the blade probably indicates quite precisely the size of the implement, and the proportions remain similar whatever the size. This may be demonstrated by the following lists:

V13 — length of handle 37.2 57.8 59.0 73.1 77.0;
and in the same order

V7 — length of blade 3.6 6.0 6.7 9.9 11.2.
 protruding from haft

Manufacturing tradition. T2.

Comments. 1. Two of the implements collected by the Rev. G.H. West have pocket-like covers for the blades made from leaf spathes and neatly sewn to shape, presumably to keep the blades clean.

2. Codrington remarks that the blades are roughly cylindrical in shape, "the cutting edge being a segment of the circumference" (1891:313).

3. Hinderling's Santa Cruz Type b, "*Kniebeil mit Mittelstück*".

Statistics. Too few implements.

SANTA CRUZ 1

No.	Repository	Reg. No.	Locality	Date	Collector
208	AIM	18293	Graciosa Bay	1932	A.T. Pycroft
329	OM	D32.1009	Santa Cruz	"	G.H. West
330	OM	D32.1010	" "	"	"
343	OM	D32.1008	" "	"	"
951	IN	M TA 9	Vanikoro	-	R. Milne-Wishart

SANTA CRUZ 2

Locality. Santa Cruz, Reef Islands.

Number. 2.

Collectors. West, Sir J. Kinsey.

Dates. 1932, 1936.

Reference. Hinderling, 1949:117.

Figure. Plate A5, figs. C and D, (no. 324).

Hafting features. A1, B1, C3, D22 = no. 324; A1, B1, C3, D27 = no. 291.

Handle. No. 291 has a long shaft, partly broken near the terminal and bound with string. The heel projects forward but not up, and curves to the toe so that the front of the foot is quite concave from the side. No. 324 has a small forward projecting heel, but in this case the forward projection is squared off.

Hafting. In both implements the blade is set on a step. No. 291 has very coarse plaited coir cords of a simple whipping pattern set in a black resin. No. 324 has a twisted fibre cross-over whipping.

Blade. Both implements have rough clam shell blades of Garanger Type B-1 (*Tridacna*).

Function. No information.

Manufacturing tradition. T1.

Comments. 1. This T1 form is not mentioned by Jennings (1898:165), but is Hinderling's Santa Cruz Type a, *Kniedechsel*.

2. No. 324, from the Reef Islands, is very like Tikopian implements (SC 3).

3. The handle of no. 324 was blackened after being first made, and later the blackening was scraped away on the foot.

Statistics. Too few implements.

SANTA CRUZ 2

No.	Repository	Reg. No.	Locality	Date	Collector
291	DM	FE 2784	Santa Cruz	1936	Lady Kinsey
324	DM	D32.1011	Reef Islands	1932	G.H. West

SANTA CRUZ 3

Locality. Tikopia.

Number. 2.

Collector. One collected by Firth.

Date. 1953.

Reference. Firth, 1959.

Figure. Plate A5, figs. E and F, (no. 952).

Hafting features. A1, B1, C1, D27.

Handle. Relatively thick handle, no. 212 has a thickened terminal, but is otherwise similar to no. 324 (SC 2). No. 952 has a forward jutting heel which is not squared off.

Hafting. No. 212 has a ledge at the back of the toe but is otherwise like no. 324; no. 952 has a blade cushioned by a bunch of coconut fibre and is lashed with a plaited coir whipping.

Blade. Both implements have blades of Garanger Type B-1, though the blade in no. 952 is long and narrow.

Function. "Ordinary adze blades" (Firth, 1959:149), as opposed to ritual adzes (SC 4) having specialised utilitarian functions (mainly concerned with canoes) and ritual significance, and thus the general purpose implement of Tikopia.

Manufacturing tradition. T1.

Statistics. Too few implements.

SANTA CRUZ 3

No.	Repository	Reg. No.	Locality	Date	Collector
212	AIM	33663	Tikopia	1953	J.D. O'Neill
952	IA	M TA 39	"		R. Firth

SANTA CRUZ 4

Locality. Tikopia.

Reference. Firth, 1959.

Hafting features. A1, B1, C1?, D22 and D25.

Handle. Short shaft, heel-less, very long toe. Toe notched at sides and on front of toe.

Hafting. A strip of bark cloth is laid as a bed for the blade and a strip on top so as to "catch" the lashing of coconut sinnet cord (*kafa*). The short end of the sinnet and a long piece of cord are crossed underneath the haft and the short end brought up and over. The long end is tightly bound around and over the short end. After eight bindings the long end is taken to the second tooth of the haft underneath, carried through and over again. A new piece of cord, this time of hibiscus, is added to the two ends, and binding over and under with a cross at the back continues until five teeth have been used. In joining the hibiscus cord (*uka*) to the coconut sinnet, the loose ends are left sticking up like horns (1959:151).

Blade. Certain of the Tikopia shell adze blades were known as *toki tapu* (sacred adzes). These were of two categories. The *toki tapu*, sacred *par excellence*, were much larger than the ordinary working adze blades, measuring from 8 or 9 inches up to more than 12 inches in length and 2 inches or more in thickness (Plate II). Moreover, they were not quadrangular in section, but almost oval. The second category of *toki tapu* were those of intermediate size and known as *pipi*. They were regarded as "supporters" to the major sacred adzes, and were not of such size and importance as the major blades; they seem to have been larger examples of ordinary blades (1959:149).

Function. "When in pre-European times ... these large adze blades were presumably actually used in canoe-building, they had to be properly hafted" (1959:151).

Manufacturing tradition. T1.

Comments. 1. In addition there were two other categories of ritual adzes in Tikopia. One category was comprised by a number of stone adze blades known as *toki uri* (black adzes), since the stone was in general of a very dark colour. The fourth category of ritual adzes were steel implements, in particular those known as *toki fakatu* or *faingata* (1959:149).

2. Traditionally, before the coming of iron and steel tools to Tikopia, these large sacred adzes seem to have been the prime canoe-building tools of the Tikopia. From a rational point of view one can presumably link their sacredness in part with the fact that only clams of exceptional size could provide a working blade of the length and thickness required. The elaborate ritual surrounding these adzes may then also be regarded as an enactment at symbolic level of the technological and social value of these crucial implements (1959:150).

NORTHERN POLYNESIAN OUTLIERS 1

Locality. Luanguia (Ontong Java, Lord Howe Island).

Number. 2.

Collector. H.I. Hogbin.

Date. 1920's.

References. Sarfert and Damm, 1929; Hinderling, 1949:115-6.

Figure. Plate A5, figs. G and H, (no. 954).

Hafting features. A1, B1, C3, D27.

Handle. Neither handle has an extended heel and both have quite thick shafts and acute foot-shaft angles. One figured by Sarfert and Damm (1929: fig. 157) has a slightly more bulged and rounded foot.

Hafting. The blade is set on a step and held there by a coarse coir plait whipping. No. 954's lashing extends round the top of the shaft. The one illustrated by Sarfert and Damm appears to have a blade set in a hollow on the toe which is cut away to prevent the lashing from creeping up the foot.

Blade. No. 954 has an enormous, triangular apex to front sectioned, clam shell blade; no. 953 has a thinner rough clam blade; and Sarfert and Damm's one has a turret shell blade.

Function. Sarfert and Damm (1929: figs. 147, 148, 149, 151, 155, 156, and 160) identify the triangular sectioned blades as canoe adzes. However, no. 954 is so unwieldy that it could not be used. Hogbin (pers. comm.) says nos. 953 and 954 were made as demonstration specimens for him.

Manufacturing tradition. T1.

Comments. 1. No. 954 has a point of balance 21 cm from the centre of the ankle, and could not be used. The blade is too big, and the handle too small, as the plate shows.

2. The front apex of the large triangular sectioned blade of no. 954 extends over the cutting edge rather in the manner of the Javanese pick adzes (cf. Duff Type 7 (1950:25-7); van Heekeren, 1957: Pl. 35). So

far as I know no other island in Melanesia has this form commonly, except perhaps Aua (WB 8), and it is not present in Polynesia.

3. Sarfert and Damm (1929:152) give *niapu* as the gloss for adze on both Luanguia and Nukumanu.

4. This population should probably be split into two.

Statistics. Too few and too dissimilar implements.

NORTHERN POLYNESIAN OUTLIERS 1

No.	Repository	Reg. No.	Locality	Date	Collector
953	IA	M TA 34	Ontong Java		H.I. Hogbin
954	IA	M TA 50	" "		"

NORTHERN POLYNESIAN OUTLIERS 2

Locality. Luanguia, Nukumanu.

References. Sarfert and Damm, 1929; Hinderling, 1949:116.

Hafting features. Not described.

Handle. Footed.

Hafting. Not described.

Blade. Apparently very rough clam shell, either *Tridacna* or *Hippopus*, using the hinge portion barely modified (Sarfert and Damm, 1929: figs. 152 - 154, 159 and 161).

Function. No information.

Manufacturing tradition. A variant of T1?

Comments. Implement called *somi* on Luanguia, and *homi* on Nukumanu (Sarfert and Damm, 1929:152-4). Hinderling appears doubtful about this type of implement.

NORTHERN POLYNESIAN OUTLIERS 3

Locality. Takuu (Tauu, Taku).

References. Parkinson, 1897: Pl. XI, fig. 1; Hinderling, 1949:114.

Hafting features. Appear to be A1, B1, C4, D27.

Handle. Long (about 75 cm) shaft and short thick foot with no heel.

Hafting. The blade appears to be set in a trough and lashed with simple whipping of coir plait cords.

Blade. A large oval sectioned clam shell blade.

Function. No information.

Manufacturing tradition. T1.

Comments. 1. Parkinson (1961:478) notes "the tridacna heads from Tauu are remarkable for their extraordinary length and fine workmanship".

2. Parkinson also records a single *Terebra* shell blade from Takuu.

3. Hinderling's Type a, *Kniedechsel*. Cf. Garanger, 1972: fig. 302F.

NORTHERN POLYNESIAN OUTLIERS 4

Locality. Takuu.

Number. 2.

Collector. One collected by J.K. McCarthy.

Date. *1960.

References. Parkinson, 1897: Pl. XI, fig. 3; Sarfert and Damm, 1929: figs. 163 and 162; Hinderling, 1949:114.

Figure. Plate A6, figs. A and B, (no. 798).

Hafting features. A2, B1, C6, D30.

Handle. The implements have a squared proximal end and a long laterally flattened handle. They may have a row of carved teeth along the back of the handle. No. 797 has a handle which seems to be a copy of a modern axe handle, and is much shorter than the others. Pencil marks left where the slot for the blade was outlined add weight to the suggestion that this is a recently made implement.

Hafting. The butt of the blade is set in a slot and held there by coir cords running through holes in the blade and round the handle. No. 797 and one figured by Sarfert and Damm (1929: fig. 163) have holes through the wood so that the two pieces are sewn together.

Blade. All implements have oblong blades of turtle bone which are curved longitudinally. They have an adze bevel. The one illustrated here has a painted design on the blade.

Function. No. 797 is glossed "used to cut taro".

Manufacturing tradition. T3.

Comments. 1. Parkinson (1961:478) says "the object is reminiscent of the spatulas of Matty Island, where they are used for the preparation of food." Compare WB 11.

2. No. 797 has Nukeria (Nukuria) written on it, though it is registered as Takuu, which is probably correct, judging by Parkinson's references.

3. Hinderling's Type b, *Schildkrötenart*.

Statistics. Too few implements.

NORTHERN POLYNESIAN OUTLIERS 4

No.	Repository	Reg. No.	Locality	Date	Collector
797	PNGM	E678	Takuu	*1960	G. Bladon
798	PNGM	E658	"	"	J.K. McCarthy

NORTHERN POLYNESIAN OUTLIERS 5

Locality. Nukuria (Fead, Abgaris).

References. Parkinson, 1897: Pl. XI, fig. 2; Hinderling, 1949:114.

Hafting features. A1, B1, C2, or C4, D27?

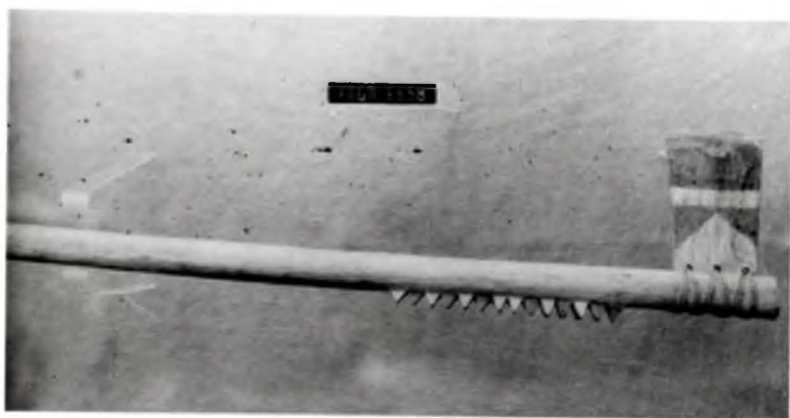
Handle. Small adze with rather thick foot and small pointed heel.

Hafting. The blade is set in a trough or shaped hollow and held by plaited coir cord simple whipped lashing.

Blade. The blade is of thinnish shell, probably *Tridacna*.

PLATE A6.

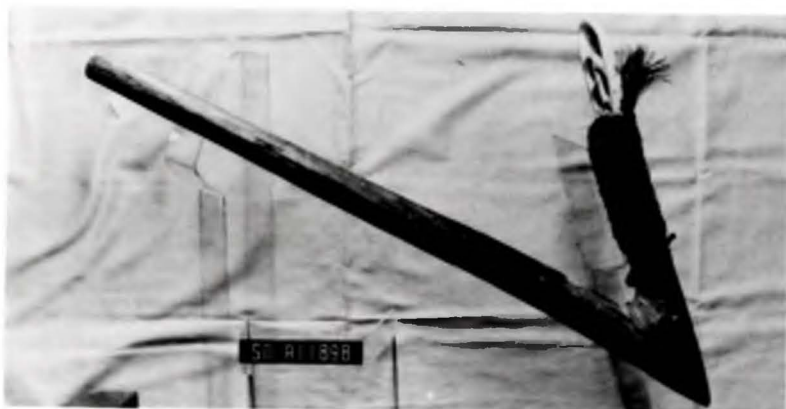
- A and B. NPO 4, 798, PNGM E658, Takuu I.
C and D. NPO 6, 519, SAM A11898, ?Nukuria I?
E and F. SOL 1, 263, AIM 15178, San Cristobal,
Solomon Is.
G and H. SOL 6, 560, AIM A8128, ?Florida, Solomon Is.



A



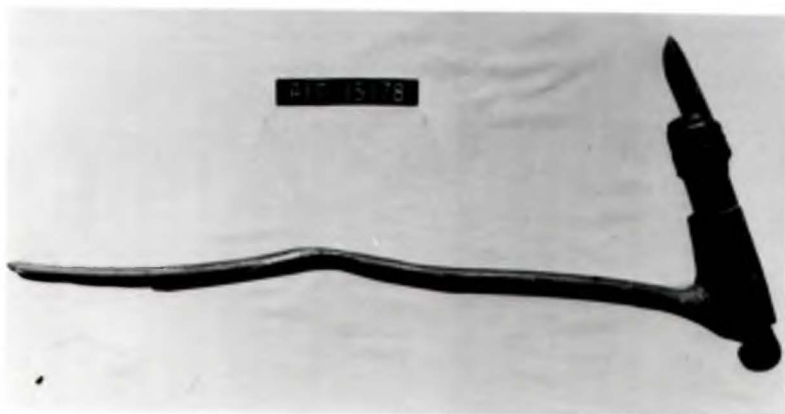
B



C



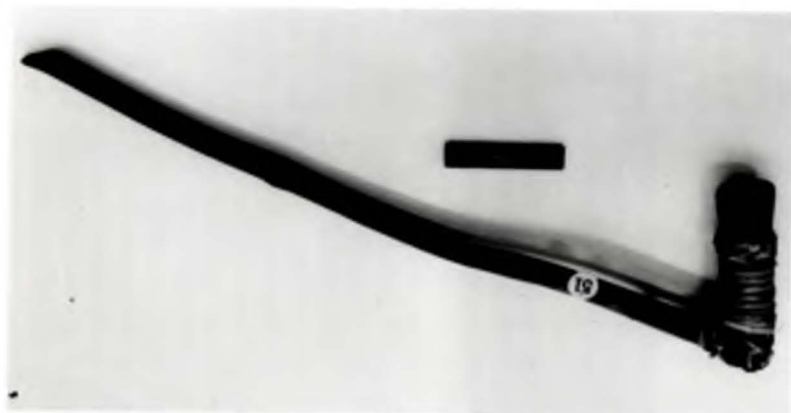
D



E



F



G



H

Function. No information.

Manufacturing tradition. Tl.

Comments. Rather like the Takuu (NPO 3) except that it is smaller (only about 40 cm long) and has a small heel. Hinderling does not make the distinction.

NORTHERN POLYNESIAN OUTLIERS 6

Locality. See note 1 below. ?Nukuria?.

Number. 3.

Collectors. Various.

Dates. 1919 - 1968.

References. Garanger, 1970:403, 1972:131.

Figure. Plate A6, figs. C and D, (no. 519).

Hafting features. Al, Bl, C3, D26 = nos. 84, 519; Al, Bl, C4, D26 = no. 525.

Handle. The toe is rather long for the foot and in common with most implements from the Outliers these adzes have no heels. Their handles are relatively long. No. 519 has a shaft to foot angle of 45° which is very narrow. The others are between 60° and 65°.

Hafting. In all three the front of the blade is covered by coconut fibre which fringes down over the blade. The lashings are two-ply twisted coir cords threaded through the columella of the blade and wound in elaborate patterns almost to the junction of the toe with the shaft. Two implements have steps, the third a trough in which the blade is set.

Blade. All the blades are *Terebra* shell of Garanger's Type B-5. In two the shell is cut rather thin towards the cutting edge, making the edge less convex than in some other turret shell blades. The cross section is the usual narrow thick shape and in all the columella is pierced to take the cords.

Function. No information.

Manufacturing tradition. Tl.

Comments. 1. The localities are obviously wrong. Stylistically, the

tools belong with Outlier populations so far as present evidence indicates rather than with the New Guinea mainland. The tentative assignation of them to Nukuria is partly on the basis of a reference by Garanger (1970:403) to hafting *Terebra* blades by utilising the columella on Nukuria, and partly because their localities suggest that they at least were made at a more northern location than Oba (NH 16).

Statistics. Too few implements.

NORTHERN POLYNESIAN OUTLIERS 6

No.	Repository	Reg. No.	Locality	Date	Collector
84	QM	E8081		1968	C. Stewart
519	SAM	A11898	?Eitape(?)	1919	A.J. Hunter
525	SAM	A18167	?Rabaul(?)	1931	L.M. Mitchell

NORTHERN POLYNESIAN OUTLIERS 7

Locality. Takuu.

Reference. Hinderling, 1949:115.

Hafting features. A1, B1, C?, D?.

Handle. Footed handle.

Hafting. Whipping.

Blade. Turtle bone blade, sides squared.

Function. Perhaps a 'hoe' as Hinderling cites for some of the Marianas Islands (1949:139, 137, 144-5).

Manufacturing tradition. T1.

NORTHERN POLYNESIAN OUTLIERS 8

Locality. Sikaiana.

Reference. Garanger, 1972: figs. 300A and 302A.

Style. This population has hafting features A1, B1, C3?, D27. The shaft is shortish, and the low heel pokes forward. The end of the shaft has a knob. The blade appears to be set on a step and held by a cross-over whipping of three-ply coir cords. It is a Garanger B-2 clam shell blade. No function is stated. The manufacturing tradition is T1.

SOLOMONS 1

Locality. San Cristobal.

Number. 1.

Collector. Admiral Davis.

Date. 1903.

References. Codrington, 1891:313; Edge Partington, 1890-98: Series I, Pl. 201, figs. 6 and 7; Cranstone, 1964: Pl. 14b (same implement as Edge Partington fig. 6); Hinderling, 1949:110-1.

Figure. Plate A6, figs. E and F.

Hafting features. A1, B1, C4, D12.

Handle. The foot is quite solid compared with the thinness of the shaft and in all cases the heel is marked by an additional ornamental knob. The one figured by both Edge Partington and Cranstone has a fretted design covering the heel and upper part of the foot. The ornamentation is like a crest, or applied strip.

Hafting. The blade is set in a neatly fitted trough deep enough so that the blade does not protrude. Lashing of plait cane band prevented from moving up the toe by a ledge at the back. The top of the trough is above this.

Blade. Small tapering blades, probably of metamorphic or igneous rock. The section is oval, cutting edge curved. Adze-head.

Function. The only form attested for San Cristobal. Mixture of simple and elaborate forms suggests that a range of stylistically similar implements was used for all purposes.

Manufacturing tradition. T1.

Comments. Hinderling (1949:111) gives the native name as *ira*.

Statistics. Too few implements.

SOLOMONS 1

No.	Repository	Reg. No.	Locality	Date	Collector
263	AIM	15178	San Cristobal	*1903	Admiral Davis (Edge Partington's collection)

SOLOMONS 2

Locality. Ulawa.

Number. 1.

Collector. W.G. Ivens.

Date. 1920's.

References.

Figure. Not figured.

Hafting features. A1, B1, C1, D3.

Handle. A small part of the blackened handle is smoothed by use. The shaft is thin and long for its size (45.5 cm long), the toe short. Heel-less, flat face to foot.

Hafting. Blade set against a flat foot and held by cross-over cane whipping tightened over some palm spathe cushioning material.

Blade. Iron plane blade. Adze bevel.

Function. One handed, light, probably general purpose implement.

Manufacturing tradition. T1.

Statistics. Too few implements.

SOLOMONS 2

No.	Repository	Reg. No.	Locality	Date	Collector
342	OM	D26.324	Ulawa	1926	W.G. Ivens

SOLOMONS 3

Locality. To'ambaita, N. Malaita.

Number. 1.

Collector. W. Dawbin.

Date. *1968.

References. Ivens, 1930:272-3; Harrison, 1931; Ivens, 1931; Russell, 1950-51; Ross, 1970.

Figure. Not figured.

Hafting features. A1, B1, C3, D16.

Handle. Very small and rough (18.9 cm long).

Hafting. The blade is set on a step but is not fitted to the step, and is held by a roughly twisted band of split cane. It is loose in the haft.

Blade. The blade is a small red chert one which might be described as a tranchet adze (cf. Harrison, 1931: figs. 2 and 3).

Function. No information.

Manufacturing tradition. T1.

Comments. 1. Obviously a demonstration specimen. I have no information on how close this might be to a traditional form. Russell (1950 - 51:13) says these flaked blades were hafted on curved handles in the 'normal fashion'.

2. Ross (1970:417) reports that the manufacturers (parents and grandparents of his informants) apparently regarded the materials and methods used in flaking chert blades as more important for classification than the shape of the blade.

3. One blade pecked and ground from igneous rock was attributed by the people to non-human manufacture (Ross, 1970:417). This accords with Ivens' reports of the lack of polished stone or shell blades in North Malaita at European contact (Ivens, 1930:272-3).

Statistics. Demonstration specimen.

SOLOMONS 3

No.	Repository	Reg. No.	Locality	Date	Collector
748	AM	E63947	To'ambaita	*1968	W. Dawbin

SOLOMONS 4

Locality. Rennell and Bellona.

References. Codrington, 1891:313; Edge Partington, 1890 - 98: Series I, Pl. 200, fig. 1; Birket-Smith, 1956.

Hafting features. A1, B1, C3, D3.

Handle. Both Edge Partington's one from Bellona, and Birket-Smith's one from Rennell are similar. The top of the heel, which is very slight, is squared off at right angles to the foot and is thus almost diagonal to the shaft. Both have long thin shafts.

Hafting. The one from Bellona is not clearly marked but the one from Rennell has a step. Both are lashed with split cane whippings.

Blade. The blades are *Tridacna* shell blades closest to Garanger's Type B-1 though he does not fit them into his sub-varieties (Garanger, 1970:401). The one from Bellona has the inside of the shell as the front of the blade.

Function. Birket-Smith (1956:92) comments on the one from Rennell "the small size of this specimen indicates that it has been used for light work: length 29.7 cm, width of edge 2.2 cm". The one from Bellona is larger.

Manufacturing tradition. T1.

Comments. 1. Codrington (1891:313) records that in early European contact times Rennell and Bellona used only shell bladed adzes.

2. The adze from Rennell has been blackened, a typically Solomonese habit (Birket-Smith, 1956:92).

SOLOMONS 5

Locality. Florida.

References. Edge Partington, 1890 - 98: Series I, Pl. 201, fig. 8.

Hafting features. Not clear.

Handle. This implement has a long thin shaft and a stumpy heel, flattened at the top. The toe is quite long.

Hafting. The modification for seating the blade is not clear, the toe may be cut away to prevent the lashings from moving up, and the simple whipping may be split cane.

Blade. Appears to have a wide shell blade.

Function. No information.

Manufacturing tradition. T1.

Comments. Codrington says that Florida percussive cutting implement blades are roughly cylindrical and made of stone (1891:313). This leaves the provenance of Edge Partington's specimen open to question.

SOLOMONS 6

Locality. Solomon Islands (?Florida).

Number. 1.

Collector. Bishop Wilson.

Date. Pre-1900.

References. Edge Partington, 1890 - 98: Series I, Pl. 206, fig. 5.

Figure. Plate A6, figs. G and H.

Hafting features. A3, B1?, C6, D12.

Handle. The one recorded has a long thin handle and small stumpy heel. The one figured by Edge Partington has a larger foot and is more reminiscent of the adze described as SOL 5.

Hafting. The blade is set in a socket and held by a plaited cane band at the lower edge with a simple whipping above this. The foot has split and a neat cane lashing holds the pieces together. Edge Partington's

one has a split cane whipping and the toe appears to be cut away.

Blade. The blade of the museum specimen is small but not cylindrical as Codrington (1891:313) suggests for the Florida blades, being a rather fat oval in cross section; blade bevel on left and hollow ground, leaving the cutting edge convex to the right, cutting edge angle 70°; edge considerably blunted and the chips burred. The stone is light grey, mottled, possibly metamorphic.

Function. No information.

Manufacturing tradition. A local variant of T1.

Comment. The one recorded has no locality and is tentatively described with the axe from Florida figured by Edge Partington mainly because no other occurrence in the Solomon Islands is presently known.

SOLOMONS 6

No.	Repository	Reg. No.	Locality	Date	Collector
560	SAM	A8128	Solomon Is.	pre-1900	Bishop Wilson

SOLOMONS 7

Locality. Roviana, New Georgia.

Number. 1.

Collector. A.H. Voyce.

Date. *October 1936.

References.

Figure. Plate A7, figs. A and B.

Hafting features. A1, B1, C4, D3.

Handle. Short solid shaft, heel-less.

Hafting. The blade is set in a shaped trough, the top of which is above the top of the cross-over split cane whipping.

Blade. A thin clam shell blade of Garanger Type B-1. It is 1.1 cm thick at the haft, and its cutting edge angle is 55°.

Function. No information. Only 2.5 cm of the total 11.3 cm of the blade length is set beyond the end of the toe.

Manufacturing tradition. T1.

Comments. 1. The hafting was probably made for Voyce as a demonstration specimen. The blade is much used but the handle is quite clean.

2. Native name *pengo*.

Statistics. Too few implements.

SOLOMONS 7

No.	Repository	Reg. No.	Locality	Date	Collector
237	AIM	38624	Roviana	*October 1936	A.H. Voyce

SOLOMONS 8

Localities. All from southern Bougainville.

Number. 5.

Collectors. Possibly all Voyce.

Dates. Possibly all December 1930.

Reference. Parkinson, 1907:499-500 (1961:440).

Figure. Plate A7, figs. C and D, (no. 210).

Hafting features. A1, B1, C1, D12.

Handle. Shaft relatively thick, long enough for two handed hold, heel relatively small, toe quite long, toe length increases with smaller blades to keep total foot and handle length proportions similar.

Hafting. Front of foot flat, blade held by plaited cane band.

Blade. Finely finished metamorphic stone blades hammer dressed and ground, taper to pointed poll, back flat, front high rounded. Shell blades of the same shape have been found on the coast (Parkinson, 1907: 500). Ralston (1945:214-6) notes shell blades from Teop and Torokina.

PLATE A7.

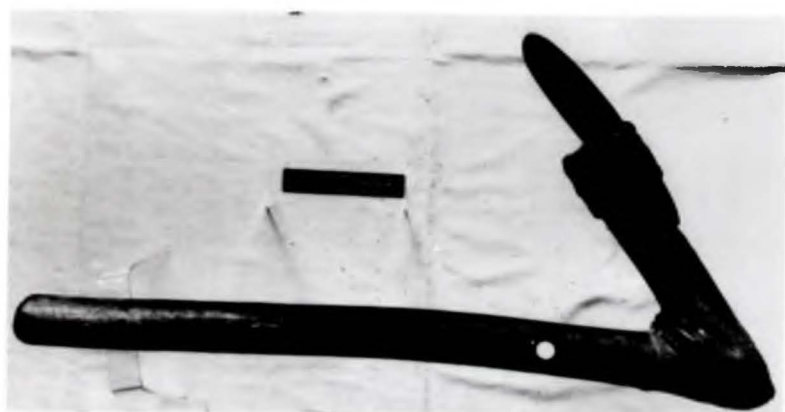
- A and B. SOL 7, 237, AIM 38624, Roviana.
- C and D. SOL 8, 210, AIM 21658, Avenia, Hita district,
Bougainville.
- E and F. SOL 9, 230, AIM 38626.3, Teop area,
Bougainville.
- G and H. SOL 10, 261, AIM 25596, Bougainville.



A



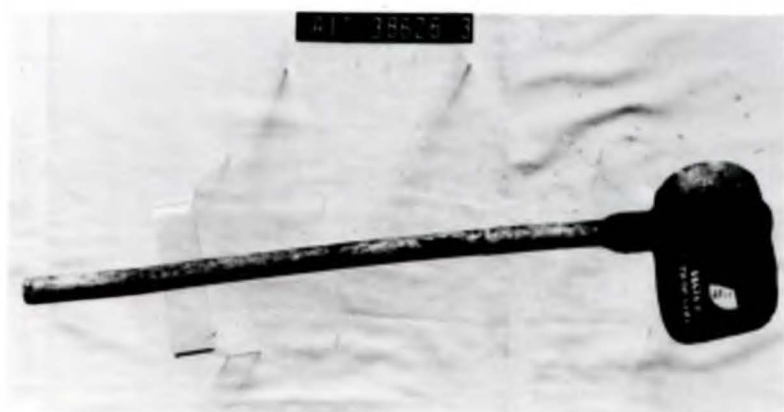
B



C



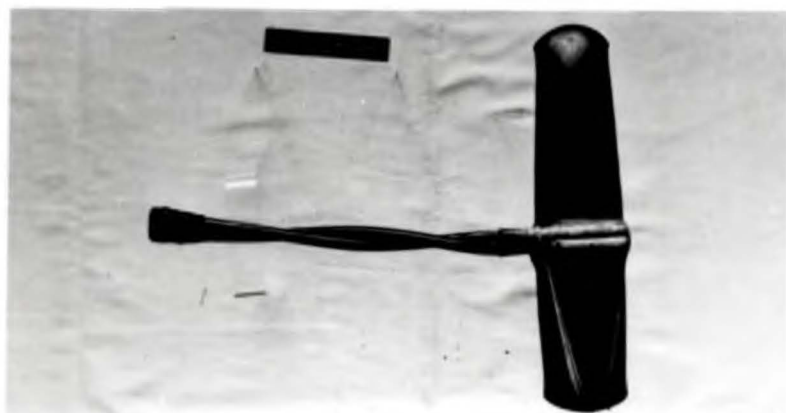
D



E



F



G



H

Function. Two handed implements, neatly balanced, probably general purpose.

Manufacturing tradition. T1.

Comments. 1. The most common form in southern Bougainville (Parkinson, 1907:499).

2. Parkinson reports blades up to 34 cm long, but the range of the recorded ones is 8.8 cm to 20.8 cm only.

3. Nos. 210, 211, 527 and 528 have the native name *kasi*.

4. Nos. 527 and 528 are possibly part of the Voyce collection — no. 527 — V663, no. 528 — V665.

Statistics. Too few implements.

SOLOMONS 8

No.	Repository	Reg. No.	Locality	Date	Collector
210	AIM	21658	Avenia, Hita dist.	*25.12.30	Voyce (V664)
211	AIM	20649.1	"	"	" (V660)
526	SAM	A47964	Tonu, Siwai dist.	1955	F.W. Brasher
527	SAM	A18573	Iru, Tupi dist.	*Dec.1930	"
528	SAM	A18574	Bakapa	"	"

SOLOMONS 9

Localities. Teop Island area, Namatoa, Bougainville.

Number. 14.

Collectors. A.H. Voyce.

Dates. Early 1930's.

References. Parkinson, 1907:499; Hinderling, 1949:106-7.

Figure. Plate A7, figs. E and F, (no. 230).

Hafting features. A2, B1, C7, D2.

Handle. Single cane 1.5 cm to 1.9 cm in diameter. Plain.

Hafting. Slot cut in cane, ends wrapped round blade and tied at inner side. Set with resin.

Blade. Six forms. 1. No. 223 has a blade like SOL 10. 2. Nos. 225, 226, 227, 228, 230, 233 have squarish outline, low oval cross section, and four have symmetrical cutting edges. 3. Nos. 224 and 236 have the cutting edge pinched in like SOL 10. 4. Nos. 229 and 213 have the butt pinched in like SOL 10. 5. Nos. 232 and 234 are small tapering blades. 6. No. 235 has a blade like SOL 8 which is responsible for the skewing of V34 as the rest fall between 83 and 97 (table A5). All are a fine grained, probably metamorphic, rock.

Function. The hafting is light and weak and might not withstand heavy blows. Some evidence suggests that these implements may have been assembled for Voyce (P. Swadling, pers. comm.). Point of balance and blade variability also suggests this.

Manufacturing tradition. T3.

Comments. 1. Possibly used side by side with SOL 8 (Parkinson, 1907:499).

2. Parkinson records that the blades from southern Bougainville are grooved. Despite the gum hafting, none of the present blades seems to have such a groove (Parkinson, 1907:499).

3. Despite the variability none of the blades are of Parkinson's Buka variety (with elaborate lugs) and only one (no. 223) is of the northern form (SOL 10).

4. Hinderling puts SOL 9 and SOL 10 into his Bougainville Type a, *Schlingenschäftung*.

Statistics. No. 223 is not included in the statistical descriptions (tables A5 and A6). Only one variable (V34) is markedly skewed in the ratio scale distributions, and this is caused by no. 235 which has a blade like those of SOL 8 implements. However, a number of the variables show considerable platykurtosis. It is not possible to make a consistent division into large and small groups although V9 appears to run 2.0-2.7/3.3-5.0 cm, V13 from 27-33/40/50 cm, V14 and V15 from 1.5-1.7/1.8-1.9 cm, V16 from 9.5-13.3/14.9-17.5 cm, and V20 from 191-566/750-1118 gm. Implements may be in either size range, but are not always consistently in any one. The morphological variability is well indicated by table A6.

Because this population is geographically isolated from all other large samples except SOL 10 no statistical comparisons have been undertaken.

TABLE A5: Distribution of ratio scale features. Solemons (SOL9). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	13	56.85	13.42	33	88	0.721	1.176
8	WIDTH OF BLADE - HAFT	13	64.08	12.72	39	85	-0.473	-0.319
9	THICKNESS OF BLADE	13	34.85	10.40	20	50	-0.014	-1.251
10	WIDTH OF BLADE - EDGE	13	58.92	8.43	44	76	0.273	0.004
11	LENGTH - CUTTING EDGE	13	67.00	8.06	58	83	0.496	-0.484
12	ANGLE - CUTTING EDGE	13	75.15	5.58	65	83	-0.723	-0.167
13	LENGTH OF HANDLE	13	412.92	78.97	278	502	-0.630	-1.048
14	SHAFT DIAMETER	13	17.23	1.30	15	19	-0.216	-1.069
15	LENGTH OF FOOT	13	17.23	1.30	15	19	-0.216	-1.069
16	TOTAL LENGTH OF FOOT	13	141.00	29.92	95	175	-0.234	-1.306
17	POINT OF BALANCE	10	11.10	6.90	0	22	-0.473	-0.143
18	ANGLE - B/FOOT - SIDE	13	87.08	4.31	80	95	0.713	0.088
19	ANGLE - B/HANDLE - BELOW	13	4.38	5.69	0	17	0.960	-0.061
20	WEIGHT	13	662.23	335.28	191	1118	-0.238	-1.282
21	SPRT SOCKET LENGTH	0	N TOO SMALL; COUNT <=3					
22	SPRT SOCKET WIDTH	0	N TOO SMALL; COUNT <=3					
34	% 10 on 11 WC/LC	13	88.15	8.09	65	97	-1.886	4.029

TABLE A6: Distribution of nominal scale features. Solcmone (SOL9).

VARIABLE NUMBER	23	POLL OF BLADE	N=13		
CODE VALUE:	2	3	4	5	
FREQUENCY:	5	6	0	2	
PERCENTAGES:	38.5	46.2	0.0	15.4	
VARIABLE NUMBER	24	PLAN OF BLADE	N=13		
CODE VALUE:	1	2	3		
FREQUENCY:	6	5	2		
PERCENTAGES:	46.2	38.5	15.4		
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=13		
CODE VALUE:	1	2			
FREQUENCY:	12	1			
PERCENTAGES:	92.3	7.7			
VARIABLE NUMBER	26	PROFILE OF BLADE	N=13		
CODE VALUE:	1	2	3		
FREQUENCY:	8	1	4		
PERCENTAGES:	61.5	7.7	30.8		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=13		
CODE VALUE:	1	2	3		
FREQUENCY:	8	4	1		
PERCENTAGES:	61.5	30.8	7.7		
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=13		
CODE VALUE:	1	2			
FREQUENCY:	11	2			
PERCENTAGES:	84.6	15.4			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=13		
CODE VALUE:	2	3	4		
FREQUENCY:	5	4	4		
PERCENTAGES:	38.5	30.8	30.8		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=13		
CODE VALUE:	0				
FREQUENCY:	13				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=13		
CODE VALUE:	3	4			
FREQUENCY:	9	4			
PERCENTAGES:	69.2	30.8			
VARIABLE NUMBER	32	USE-WEAR	N=13		
CODE VALUE:	3	4	5	6	
FREQUENCY:	1	1	3	8	
PERCENTAGES:	7.7	7.7	23.1	61.5	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=13		
CODE VALUE:	1				
FREQUENCY:	13				
PERCENTAGES:	100.0				

SOLOMONS 9

No.	Repository	Reg. No.	Locality	Date	Collector
223	AIM	38627.5	Teop Is. area	*1930-36	Voyce (V2571)
224	AIM	38627.3	"	"	" (V2066)
225	AIM	38627.4	"	"	" (V2408)
226	AIM	38625.2	"	"	" (V2068)
227	AIM	38625.1	"	"	" (V2067)
228	AIM	38626.4	"	"	" (V2588)
229	AIM	38626.2	"	"	" (V2568)
230	AIM	38626.3	"	"	" (V2569)
231	AIM	38626.1	"	"	" (V2567)
232	AIM	38623.1	"	"	" (V2572)
233	AIM	38623.2	"	"	" (V2585)
234	AIM	38623.3	"	"	" (V2586)
235	AIM	38623.4	"	"	" (V2587)
236	AIM	25684	Namatoa	"	" (V482)

SOLOMONS 10

Localities. Mostly in the interior of northwest Bougainville.

Number. 21.

Collectors. Voyce the most important.

Dates. Voyce early 1930's.

References. Edge Partington, 1890-98: Series III, Pl. 34, fig. 6; Parkinson, 1907:499 and ill 81; Hinderling, 1949:106-7.

Figure. Plate A7, figs. G and H, (no. 261).

Hafting features. A2, B1, C7, D7.

Handle. The handles are basically formed from a long piece of thin cane which is wrapped round the body of the blade one and a half times. It is usually thinned where it encircles the blade. Most of the handles are quite short and very neatly made, the two canes of the shaft being twisted together and frayed at the terminal where these ends are worked into a knob with a fine split cane strip. Two of the handles are rougher than this. No. 214 has a very long handle of thicker canes, and no. 277 is also less neatly made. Nos. 751 and 754 have the ends of their handles worked into loops rather than knobs.

Hafting. The blade is held by the cane which is wound one and a half times round the blade and held together by a figure eight looped cane whipping. This is usually blackened. No resin was noted except on no. 214. The canes are always set around the balance point of the blades. Some items have additional thin cane strips from the main cane across the poll, as the one figured here shows.

Blade. The majority of the blades fit the description given by Parkinson for blades in use in the Emperor Ranges. They are large, slightly wider at the poll than at the cutting edge, slightly sharper at the edge than at the poll and very thick oval in section. The area just behind the edge and poll is pinched in, giving the blades an eared appearance. They are very finely made and finished in a grey stone which may be volcanic or metamorphic. One blade of the same size does not have these eared projections (no. 217). The blade in no. 214 is squarish in outline, has a flat oval section and is much shorter. It looks like the main form of blade in SOL 9 and its hafting is, like theirs, set with gum. The blade in no. 277 is triangular in shape and has been much used. It may have been hafted for Voyce.

Function. Apart from the last two blades it is likely that these implements had a ritual function. This is indicated by the weak hafting and by the lack of a sharpened edge, for they appear to be hammer dressed to shape only. In addition a number of the blades are painted with some resinous substance, nos. 220 and 749 are painted black, nos. 218, 219, 262, 750, and 752 to 756 have red cutting edges and black bodies. This paint is more than one millimetre thick on some implements, and composed of many layers. This coating has been tested by W.R. Ambrose with Dimethylformamide (which dissolves proteins). No signs of solution were shown, so it is concluded that the coating is not likely to be blood, but probably gum or resin.

Manufacturing tradition. T3.

Comments. 1. Voyce records that these implements were kept wrapped up and carefully stored, only to be shown at the appropriate times.

2. It is possible that the red strip along the edge of some blades is meant to represent blood.

3. This is Parkinson's second shape of north Bougainville. Hinderling does not distinguish it from SOL 9.

4. No. 277 has a native name *nagku*.

TABLE A7: Distribution of ratio scale features. Solomons (SOL10). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	18	148.94	17.97	104	184	-0.991	1.606
8	WIDTH OF BLADE - HAFT	18	73.50	3.00	68	79	-0.140	-0.175
9	THICKNESS OF BLADE	18	50.89	3.05	45	58	0.284	0.659
10	WIDTH OF BLADE - EDGE	18	57.72	4.86	49	67	-0.127	-0.525
11	LENGTH - CUTTING EDGE	18	68.56	7.45	55	78	-0.484	-1.092
12	ANGLE - CUTTING EDGE	18	71.56	6.74	63	84	0.459	-0.695
13	LENGTH OF HANDLE	18	370.67	68.37	277	522	0.463	-0.397
14	SHAFT DIAMETER	18	18.61	3.01	14	27	1.207	1.845
15	LENGTH OF FOOT	18	19.00	3.63	14	27	1.011	0.795
16	TOTAL LENGTH OF FOOT	18	299.00	22.18	250	347	-0.193	0.731
17	POINT OF BALANCE	18	7.94	5.94	0	20	0.510	0.202
18	ANGLE - B/FOOT - SIDE	18	88.44	5.94	77	100	0.089	-0.411
19	ANGLE - B/HANDLE - BELOW	18	-2.22	4.28	-15	0	-1.979	3.133
20	WEIGHT	18	1754.39	190.85	1429	2137	0.104	-0.147
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	18	84.44	4.30	74	91	-0.546	0.279

TABLE A8: Distribution of nominal scale features. Solomons (SOL10).

VARIABLE NUMBER	23	POLL OF BLADE	N=18
CODE VALUE:	3	4 5	
FREQUENCY:	1	0 17	
PERCENTAGES:	5.6	0.0 94.4	
VARIABLE NUMBER	24	PLAN OF BLADE	N=18
CODE VALUE:	1		
FREQUENCY:	18		
PERCENTAGES:	100.0		
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=18
CODE VALUE:	1		
FREQUENCY:	18		
PERCENTAGES:	100.0		
VARIABLE NUMBER	26	PROFILE OF BLADE	N=18
CODE VALUE:	1		
FREQUENCY:	18		
PERCENTAGES:	100.0		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=18
CODE VALUE:	1		
FREQUENCY:	18		
PERCENTAGES:	100.0		
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=18
CODE VALUE:	1		
FREQUENCY:	18		
PERCENTAGES:	100.0		
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=18
CODE VALUE:	3	4	
FREQUENCY:	16	2	
PERCENTAGES:	88.9	11.1	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=18
CODE VALUE:	0		
FREQUENCY:	18		
PERCENTAGES:	100.0		
VARIABLE NUMBER	31	FINISH ON BLADE	N=18
CODE VALUE:	4		
FREQUENCY:	18		
PERCENTAGES:	100.0		
VARIABLE NUMBER	32	USE-WEAR	N=18
CODE VALUE:	6		
FREQUENCY:	18		
PERCENTAGES:	100.0		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=18
CODE VALUE:	1		
FREQUENCY:	18		
PERCENTAGES:	100.0		

5. Nos. 215 and 217 were "collected in the mountains" (AIM register).

Statistics. Nos. 214, 222 and 227 which have different blades have not been included in the statistical descriptions (tables A7 and A8). In table A7, V15 and V14 are markedly skewed by no. 755 which has a thicker cane handle. V19 is skewed by nos. 749 (-15°), 754 (-10°), and 220, 752 and 753 (-5°). This consistent minus setting should be noted. The blades may be divided into two groups for V10, one from 5.5-6.8 cm wide, the other from 7.1-7.8 cm. Table A8 shows how similar the blades are morphologically despite the measurement differences.

SOLOMONS 10

No.	Repository	Reg. No.	Locality	Date	Collector
214	AIM	23710	Bougainville	1938	E.C. Vaile
215	AIM	20554	Koaka, Kunua	*July 1932	Voyce (V1222)
216	AIM	20556	Sepekura, Kunua	"	" (V1224)
217	AIM	20555	Asiburui, Kunua	"	" (V1223)
218	AIM	20552	Kakarei, Kunua	"	" (V1221)
219	AIM	43085	Kunua dist.	-	-
220	AIM	38627.1	Soakevi	1930-36	Voyce (V2022)
221	AIM	38627.2	Totoki	"	" (V2023)
222	AIM	25679	Puskombu	-	" (V446)
260	AIM	20553	Kepui, Kunua	*July 1932	" (V1218)
261	AIM	25596	Bougainville	1940	A. Montgomery
262	AIM	43115	Soakevi, Kunua	*Aug 1936	Voyce (V2024)
277	AIM	21668	Siwai	-	"
749	AM	E31176	Bougainville	1927	E. McFadyen
750	AM	E50573	"	1943	J.H.L. Waterhouse
751	AM	E55426	"	1954	L.D. Brennan
752	AM	E57274	"	1955	M.S. Stanley
753	AM	E57275	"	"	"
754	AM	E57276	"	"	"
755	AM	E60129a	"	1961	A. Tinsey
756	AM	E60129b	"	"	"

SOLOMONS 11

Locality. Nissan.

References. Krause, 1907:122-4; Hinderling, 1949:103-4.

Hafting features. A2, B1, C8, D knotted cane strip.

Handle. The handle is curved and shaped rather like a European axe handle. It is 61 cm long.

Hafting. The blade is set between prongs which are slightly longer than the width of the blade. They are held together by a knotted split cane strip which is looped over the poll of the blade and ties behind the blade.

Blade. As Krause sketches it the blade has a lug on one side and a corresponding groove on the other. The section is a deep oval, the poll squared and the sides parallel. The blade is 13 cm long, its edge 6 cm wide. This is Parkinson's Buka blade.

Function. No information. Krause calls it a *Steinhämmer*.

Manufacturing tradition. T3.

Comment. 1. Parkinson (1907:498) says "The heads of the stone axes were formerly made exclusively on Bougainville, from whence they reached Buka, Nissan and the Carterets by way of trade" (1961:439).

2. Compare NC 5 and NC 6 axes, the only others set between prongs on the proximal end of a straight handle.

3. Hinderling calls this Nissan Type a. He also reports an adze (Type c, *Kniedechsel*) used in canoe making (SOL 12).

SOLOMONS 12

Locality. Nissan Island.

Reference. Hinderling, 1949:104.

Hafting features. A1, B1, C?, D?.

Handle. Footed handle.

Hafting. "Mallisch".

Blade. Hippopus.

Function. Canoe building.

Manufacturing tradition. T1.

Comments.

SOLOMONS 13

Locality. Solomon Islands.

Number. 1.

Collector. C.S. Belshaw.

Date. 1945.

Reference.

Figure. Not figured.

Hafting features. A1, B1, C3, D3.

Handle. Straight shaft, heel high, flat back and pointed top. Foot-shaft junction marked at sides and top. Long toe.

Hafting. Blade set against a carefully shaped step and held by a cross-over split cane whipping over a filler stick.

Blade. Plane iron.

Function.

Manufacturing tradition. T1.

Comment. Could have come from almost anywhere in the central Solomons.

Statistics. Too few implements.

SOLOMONS 13

No.	Repository	Reg. No.	Locality	Date	Collector
275	AIM	28046	Solomon Is.	1945	C.S. Belshaw

SOLOMONS 14

Locality. Bougainville Island.

Reference. Hinderling, 1949:174.

Hafting features. Not within the compass of this listing.

Handle. Apparently a footed handle.

Hafting. Unnecessary.

Blade. Apparently none, or may have had a bamboo node fitted over the toe.

Function. Sago pith chopper.

Manufacturing tradition. Tl form?.

Comments. Hinderling places this in his Type 3a sago pith choppers with SNG 14, and WB 14. Based on an observation by Ribbe (1903).

SOLOMONS 15

Locality. Shortland Islands.

Reference. Hinderling, 1949:107.

Hafting features. A1, B1, C?, D?.

Handle. Footed handle with long but forward poking heel.

Hafting. Unclear from the sketch (abb. 75). Hinderling suggests the blade may be socketed into the foot.

Blade. Iron.

Function.

Manufacturing tradition. Tl.

Comments. Based on an observation by Ribbe (1903).

EASTERN BISMARCK 1

Locality. Boang Island, Tanga group.

Number. 1.

Collector. F.L.S. Bell.

Date. *10.9.1933.

Figure. Not figured.

Hafting features. A1, B1, C3, D22.

Handle. Short, thick foot, small pointed heel. Old handle?

Hafting. Blade set on step, two-ply cord whipping, which may be a bark fibre. The whipping extends round the top of the shaft.

Blade. May be an oyster shell (not pearl oyster), roughly flaked, wide and flat, edge not ground, wavy.

Function. Probably traditional handle, *ad hoc* blade, almost certainly a demonstration specimen.

Manufacturing tradition. T1. How close this may be to traditional implements is uncertain.

Statistics. Demonstration specimen.

EASTERN BISMARCK 1

No.	Repository	Reg. No.	Locality	Date	Collector
950	1A	M TA 87	Boang Is.	*10.9.33	F.L.S. Bell

EASTERN BISMARCK 2

Locality. New Ireland.

Number. 1.

Collector. Eugelke Coll.

Date. 1918.

Figure. Plate A8, fig. A.

Hafting features. A1, B1, C4, D6.

Handle. Straight shaft, very high heel, shaft-foot junction 60°.

Hafting. Blade set in a trough half the blade thickness, back of the toe ledged at the lower end. Lashing a complex vertical interweave which covers the entire foot but not the shaft. The foot is stained white.

Blade. A large *Tridacna* blade, back hollow, edge hollow and convex to front, poll rounded, centre widest, section oval.

Function. No information. The edge of the blade is burred and appears to have been much used. The white staining might indicate that the implement was of considerable value.

Manufacturing tradition. T1.

Comment. The south of New Ireland is well known for its chalk images. If the white stain is chalk it could have come from the south. However, white paint is common on the Malanggan carvings from the north, so that this does not seem to throw much light on its provenance within New Ireland, but probably increases its chances of having come from New Ireland.

Statistics. Too few implements.

EASTERN BISMARCK 2

No.	Repository	Reg. No.	Locality	Date	Collector
561	SAM	A10308	New Ireland	1918	Eugelke Coll

EASTERN BISMARCK 3

Locality. Lamassa, off southwest New Ireland.

References. Stephan and Graebner, 1907: fig. 43; Hinderling, 1949:90.

Hafting features. Not clear.

Handle. Small heel-less handle with a long toe.

Hafting. The blade seating is unclear. It appears to be lashed with a strip whipping, probably cane.

PLATE A8.

- A. EB 2, 561, SAM A10308, New Ireland.
C and D. EB 5, 204, AIM 11547, New Ireland.
E and F. EB 11, 673, AM E19779, Northwest New Britain.
G and H. EB 12 672, AM E 19778, South coast, New Britain.



A

B



C



D



E



F



G



H

Blade. Iron, cutting edge convex.

Function. Used in making plank canoes.

Manufacturing tradition. Tl.

Comment. The blades formerly used for making such boats (canoes) were *Tridacna*. ("Diessel lombar aus Lamassa zum Bau der Plankenboote. Klinge aus Eisen, fruher wohl aus Muschel." Stephan and Graebner, 1907: caption to ill. 43.)

EASTERN BISMARCK 4

Locality. Kapsu but Parkinson (1907:228) could get no information at Kapsu, only on the coast opposite Gardener Island (Tabar).

References. Giglioli, 1890; Parkinson, 1907:287-288; Hinderling, 1949:89-90.

Hafting features. A1, B1, C3?, D3?.

Handle. Remarkably elaborate handle of heavy wood. The whole implement weighs almost 5 kg. Its length is about 67 cm and the total length of the foot 85.5 cm. Most of this foot is carved and painted in *malanggan* style. Parkinson explains (1961:271):

In a village on the coast about opposite Gardener Island I accidentally discovered that in former times decorated axes of this kind were put in the graves of certain men at burial. ... The bird which is set on the upper figure represents the totem sign of the dead man; the lizard on the back of the head is a representation of the evil spirit which, in this form, lies in wait for the totem, i.e. the bearer of the totem at the time.

Hafting. The blade appears to be set on a step and to be held on by a simple strip whipping, possibly of cane.

Blade. The blade is a tapering stone one with oval section and tongue-like cutting edge. It protrudes 13.2 cm from the haft and appears to be a large but utilitarian blade.

Function. Ritual. Very carefully made.

Manufacturing tradition. Tl.

EASTERN BISMARCK 5

Locality. New Ireland.

Number. 1.

Collector. G. Stuart.

Date. 1888.

Figure. Plate A8, figs. C and D.

Hafting features. A1, B1, C2, D12.

Handle. The end of the shaft is curved down, the heel is small, the toe long and the foot-shaft junction very acute at 45°.

Hafting. The hafting takes advantage of the pithy inside of the foot to set the blade in a tapered hollow, which, however, is slightly longer than the blade butt. The blade is held by a split cane plait band.

Blade. The metamorphic greenish stone blade is well finished, has a hollow back like a long bevel, almost circular section and is 19.7 cm long. The cutting edge is convex to the outer face and the blade tapers to both cutting edge and poll. Ten centimetres protrudes from the haft.

Function. No information.

Manufacturing tradition. T1.

Comments. 1. The use of a tapering hollow as a blade seating device is uncommon in island Melanesia.

2. This implement is closely similar to EB 6.

Statistics. Too few implements.

EASTERN BISMARCK 5

No.	Repository	Reg. No.	Locality	Date	Collector
204	AIM	11547	New Ireland	1888	G. Stuart

EASTERN BISMARCK 6

Locality. New Hanover.

Number. 1.

Collector. R. Rickard.

Date. 1887.

References. This implement is figured by Edge Partington, 1890 - 98: Series III, Pl. 38, fig. 7; see also Parkinson, 1907:288-89; Hinderling, 1949:92-3.

Figure. Not figured.

Hafting features. A1, B1, C2, D16.

Handle. Long shaft, no heel, short toe.

Hafting. The blade is set in a tapered hollow and held by two rings of twisted or plaited cane.

Blade. The blade is flat backed with a hollow ground cutting edge. It has a high convex front which is also convex laterally (in profile). The stone is grey-green metamorphic.

Function. No information.

Manufacturing tradition. T1.

Comments. 1. Parkinson (1907:288-9, 1961:272) describes the blades thus:

The stone axes of New Hanover are very different from those in New Ireland. They consist of a solid, very fine grained kind of basalt, and are always the same shape though the size may vary. I have in my collection heads of all sizes from 7 cm long and 2½ cm in diameter at the widest part, up to 25 cm in length and 4½ cm in diameter. The shape is round and the upper end is conically pointed with slightly convex sides; the cutting edge is in the lower more club-shaped end, and is formed by grinding a segment in such a way that the ground edge is slightly concave inside like a gouge. The whole head gives the impression of being a stone imitation of the customary *Terebra* shell axes which are seen in many places.

Edge Partington and Parkinson agree about the blades.

2. Unlike this implement, Parkinson (1907:289, 1961:272) records only T2 implements:

The haft is of the usual elbow shape. The head is not bound firmly to it, but is inserted into a wooden sheath which makes it possible to turn the head so that the cutting edge can be vertical or horizontal to the shaft, at will.

However, Hinderling (1949:92-3) doubts the T2 attribution.

3. This implement is closely similar to EB 5.

Statistics. Too few implements.

EASTERN BISMARCK 6

No.	Repository	Reg. No.	Locality	Date	Collector
1001	QM	E4509	New Hanover	1887	R. Rickard

EASTERN BISMARCK 7

Locality. New Hanover.

Number. 1.

Collector. R. Rickard.

Date. 1887.

Reference.

Figure. Not figured.

Hafting features. A1, B1, C3, D3.

Handle. Shaft thin, still has part of its bark, heel is relatively high, whole is roughly made.

Hafting. Blade set on a step, held by a simple cane strip whipping which is now very loose.

Blade. Stone, probably volcanic, small, with flat sides, flat back and high rounded to front, very blunt.

Function. No information, possibly sago palm felling.

Manufacturing tradition. T1.

Comments. The high heel is unusual for this region, but the same collector sold two similar handles to the Queensland Museum at the same date. The handles are so rough, however, that further confirmation of their existence as a traditional form is required, particularly when the much better finished object listed as EB 6 is considered, although sago fellers might well be fairly roughly made.

Statistics. Too few specimens.

EASTERN BISMARCK 7

No.	Repository	Reg. No.	Locality	Date	Collector
82	QM	E6475	New Hanover	1887	R. Rickard

EASTERN BISMARCK 8

Locality. Mussau and Emira, St. Matthias group.

References. Parkinson, 1907:327; Chinnery, 1925:174-7; Nevermann, 1933:117-120; Hinderling, 1949:93-4.

Hafting features. A1, B3, C12, D12.

Handle. Long shaft with small heel, flat face.

Hafting. The separate socket is one-piece. The blade - socket lashing appears to be strips of fibre, not vine, the socket - foot lashing is a coarse strip plait band of rattan. The toe is grooved to take the socket and is cut away at the back (Chinnery, 1925:174).

Blade. *Terebra* shell. Not pierced for hafting. The blades appear to be shorter than Outlier or New Hebrides' forms, perhaps more like the Admiralties.

Function. Chinnery gives the following pertinent observations on canoe building in 1925 at Emira (1925:174-7):

Chopping out the hull-bow and stern. The cutting out of the hull is usually the work of five men. Shell axes *iama* are used. First the craftsmen chop straight down with straight bladed axes, *tuapakasi*, starting in the middle and working towards the ends until a deep trough *pana*, with straight sides, is chipped out. Then, with another axe, *iasapisap* (or with plane irons), they shape the bow and stern, an operation known as *muane*. ... As soon as the *muane* has been completed *iama* axes are brought along, and the inside of the hull is finished off by the experts responsible for the bow and stern. This is very delicate work that usually takes about three days.

When the canoe is finished and tested, "The tools used by the craftsmen are returned to their owners." The identity of the *tuapakasi* and *iasapisap* implements is not clear.

Manufacturing tradition. T2.

Comments. 1. "We found no heads of stone or *Tridacna* shell" (Parkinson, 1907:327, 1961:303).

2. "Grosse Axte werden zum groben Zurechthauen und Aushohlen von Kanus Holzschalen usw. benutze" (Nevermann, 1933:120).

3. "Zum feinern Glatten der Speere dienen Eberhauer (isi mosu, its mos), mit deren konkaver seite das unverzierte Mittelstück der Speere bearbeitet wird" (Nevermann, 1933:120). This appears to be a secondary use.

EASTERN BISMARCK 9

Locality. Mussau and Emira, St. Matthias group.

References. Parkinson, 1907:327; Nevermann, 1933:117-20; Hinderling, 1949:94.

Hafting features. A1, B1, C4?, D3.

Handle. Smaller than EB 8, but probably the same style.

Hafting. The blade is set directly against the foot and bound by a strip cane whipping which may be looped together in the front.

Blade. *Terebra* shell blades same as EB 8. One figured by Nevermann has an iron blade.

Function. Multi-purpose.

Manufacturing tradition. T1.

Comments. Die feinere Arbeit wird auf St. Matthias und Emir wohl mit kleineren Axten getan. Nedenfalls werden Speere mit kleineren Axten zurechtgehauen und geglattet" (Nevermann, 1933:120).

EASTERN BISMARCK 10

Locality. Tench and Emira Islands, St. Matthias group.

References. Parkinson, 1907:343; Chinnery, 1925:174; Nevermann, 1933:118-9; Hinderling, 1949:94-5.

Hafting features. A1, B1, C2?, D12.

Handle. Solid shaft with small or no heel and long toe.

Hafting. The blades appear to be set in a shaped hollow with the back of the toe cut away to take the plait band. In Nevermann's illustrations (1933: abb. 62) this looks like cane, but Parkinson (1907:343) calls this bast.

Blade. Small *Tridacna* blades, Parkinson calls them 'crude'. Two figured by Nevermann (1933: abb. 62, nos. 1 and 3) have hollow backs. The others are oval sectioned.

Function. Probably general purpose.

Manufacturing tradition. T1.

Comments. Chinnery (1925:174) reports that on Emira trees were cut down "in the old days with *Tridacna* axes".

EASTERN BISMARCK 11

Locality. Northwest New Britain, probably Nakanai also.

Number. 4.

Collector. One from The Field Expedition, collected by A.B. Lewis, 1909-13.

Dates. Pre-1900 to 1931.

References. Edge Partington, 1890 - 98: Series III, Pl. 41, fig. 2; Parkinson, 1907:239-40; Hinderling, 1949:82-87.

Figure. Plate A8, figs. E and F, (no. 673).

Hafting features. A1, B3, C11, D3 = no. 673; A1, B3, C11, D12 = rest.

Handle. In all cases the shaft curves up to the heel very markedly. The heel is small and may have a flat top, while the toe is long and peg-like.

Hafting. All have a two-piece tubular separate socket. Three (nos. 441, 614, and 623) have lashings composed of fine plait bands at either end of the tubular socket with the areas in between filled by simple cordage whippings, one of which is also vertically interwoven (no. 623).

The one from northwest New Britain has a two-ply fibre whipping with a split cane whipping at either end joined by a split cane loop. This one has a shorter separate socket. The one figured by Edge Partington has rattan bindings.

Blade. All the blades appear to be made from dark, sometimes crystalline metamorphic rocks, and taper to a rounded or squared poll. The sections are oval varying in thickness and regularity. The cutting edges are markedly long and thus protrude considerably.

Function. Probably general purpose implements. The use-wear ranges from minimal to fluted. All set as adzes.

Manufacturing tradition. T2.

Comments. 1. Parkinson, 1907:239-40, 1961:232-3, describes this population:

West of the Willaumez one frequently finds axes in use the heads of which are made from tridacna [sic] shell; they are shaped like a hollow chisel, and are inserted into a conical sheath consisting of two halves hollowed out to receive the head, and then firmly fastened with strips of ratan [sic]. The handle is an elbow-shaped wooden shaft, the shorter end of which is pointed and stuck into the sheath.

The fastening of the Nakanai stone axes is similar, only the heads in this district are not made from tridacna [sic] shell, but from a form of pumice stone; the shape, also, is not like a curved chisel, but straight, with a rounded edge. The wooden sheath of the Nakanai axe is much thinner, more beautifully worked and longer, when compared with the sheaths east of the Willaumez; here they use thin rope twisted from strong twine for the fastening, the whole sheath being closely bound with it from top to bottom.

Judging from this description the implements in this sample appear to represent three from Nakanai (who live east of the Willaumez — Chowning, 1969:25 notes that Parkinson misplaces the Nakanai), and one from west of the Willaumez Peninsula. However, no. 673 and the one figured by Edge Partington from the Rev. G. Brown's collection which has rattan bindings, do not have shell blades.

2. Hinderling records these *Hülßenbeile* at Cape Raoult, Nakanai, Cape Merkus, Jaquinot Bay, and among the Gaktei.

Statistics. Too few implements.

EASTERN BISMARCK 11

No.	Repository	Reg. No.	Locality	Date	Collector
441	NMV	X38641	?Neneba, Mt. Scratchley	1931	D. Raymond
614	AM	E20068	?Fly River	1912	Old collection
623	AM	No. lost	-	-	-
673	AM	E19778	NW New Britain	1912	Exch. Field Mus., Chicago

EASTERN BISMARCK 12

Locality. Gasmata, South coast. Probably all southwest, and Willaumez Peninsula, Witu Island.

Number. 3.

Collectors. One exchanged with Dr A.B. Lewis, Field Museum expedition, 1909-13.

Date. 1912.

References. Parkinson, 1907:239; Hinderling, 1949:84; Bodrogi, 1971.

Figure. Plate A8, figs. G and H, (no. 672).

Hafting features. A2, B1, C7, D22.

Handle. A piece of thick cane, split in half and bent round the blade. Usually long, but no. 1002 is shorter.

Hafting. The cane is wound round with cord where it encircles the blade and the two pieces bound tightly together at the inner edge. No. 672 has a seizing all along the shaft of fine split cane, no. 947 has the shaft bound only near the blade, and no. 1002 has four fine plait rings keeping the handle strips together.

Blade. Blades are tapering with a waist where the hafting fits. Oval sectioned, sharpish sides, long rounded cutting edge, usually blunt and with axe-like bevel.

Function. See comment 1 below.

Manufacturing tradition. T3.

Comment. 1. Parkinson, 1907:239, 1961:232, says:

We find a quite characteristic axe on the French Islands, on the Willaumez Peninsula and on the south coast of New Britain around South Cape. The head is not fastened to a wooden haft, or into a wooden sheath, but, like some stone axes in the northern Solomon Islands, it is clasped round with a piece of ratan [sic]. The axe heads are of various sizes, and are made from a hard black stone; they are carefully smoothed and polished. In order to hold the peculiar haft in position, about one-third of the way up from the cutting edge, a waist is ground out, and the ratan [sic] stick which forms the handle is bent round this, and then tied together with thin strips of ratan [sic] and closely plaited. This plaiting reaches from the head to about 8 cm to 10 cm up the handle. I have seen this kind of axe in use as a tool when the natives have been making posts for houses, but they are also employed for beating out the pith of the sago palm.

2. Edge Partington (1890 - 98: Series II, Pl. 124, fig. 10) figures an implement which is said to have come from the Solomon Islands but which fits the above description, rather than SOL 9 or SOL 10.

3. Chowning and Goodale (1969:153) note that in the Senseng and Kaulong areas inland from Kandrian on the south coast the "axes are typical of those generally used in southwest New Britain and also are certainly of foreign material".

4. No. 947 was "reconstructed by an old man of Kalaka" (IA register).

5. Bodrogi (1971: abb. 1a and 1b) figures typical blades of this population from Witu, thus confirming Parkinson.

6. No. 1002 was collected at Angoram, a most unlikely provenance (see chapter 13).

Statistics. Too few implements.

EASTERN BISMARCK 12

No.	Repository	Reg. No.	Locality	Date	Collector
672	AM	E19779	S. coast New Britain	1912	A.B. Lewis
947	IA	M TA 71	Gasmata	-	-
1002	QM	E1756	?Angoram, Sepik	1925	C.F. Fricker

EASTERN BISMARCK 13

Locality. Witu.

Number. 1.

Collector. G. Stuart.

Date. 1888.

References. Parkinson, 1907:239; Bodrogi, 1971.

Figure. Plate A9, figs. A and B.

Hafting features. A1, B1, C1, D3.

Handle. Small implement, no heel, carved terminal.

Hafting. Blade set on a flat face, slot on back of toe for fine split vine simple whipping. The end of the strip is looped around the band of lashing at the sides between the toe and blade.

Blade. The blade is small (7.7 cm long) and is set with the inner side of the shell as the outer face, making a somewhat unlikely angle for use. It may be made from *Hippopus*.

Function. No information.

Manufacturing tradition. T1.

Comments. Parkinson does not mention such adzes from Witu, but Bodrogi (1971:51) discusses small shell blades having a hollow cutting edge although he does not indicate how they were hafted.

Statistics. Too few implements.

EASTERN BISMARCK 13

No.	Repository	Reg. No.	Locality	Date	Collector
258	AIM	11545	Witu	1888	G. Stuart

PLATE A9.

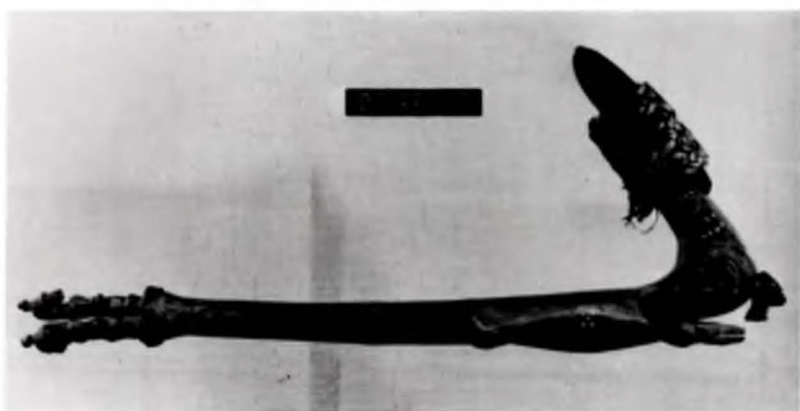
- A and B. EB 13, 258, AIM 11545, Witu.
C and D. WB 1, 297, DM FE107, Admiralty Islands.
E and F. WB 3, 884, PNGM E265.1, Manus.
G and H. WB 4, 946, IA M TA211, Admiralty Islands.



A



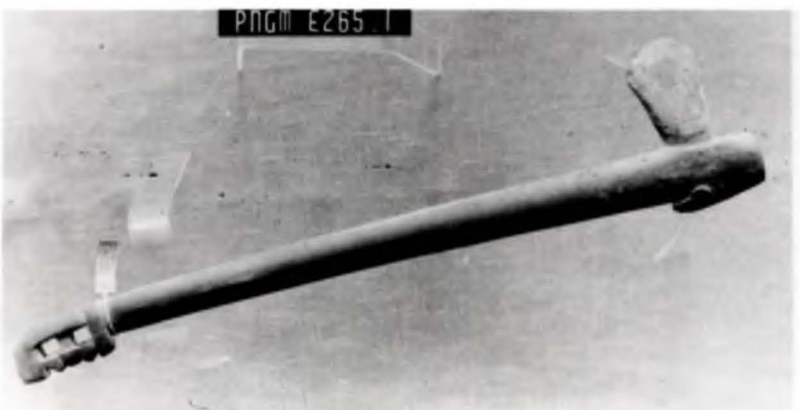
B



C



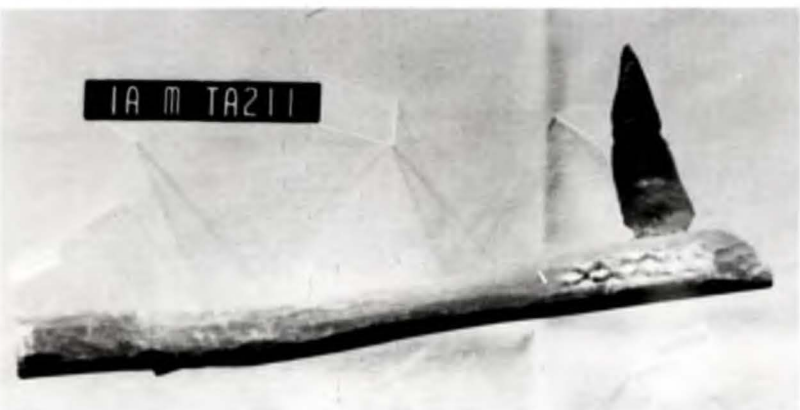
D



E



F



G



H

EASTERN BISMARCK 14

Locality. Witu.

References. Bodrogi, 1971; Hinderling, 1949:86-7.

Hafting features. A1, B3, C?, D3.

Handle. Long shaft, marked heel.

Hafting. Blade set in a tapering separate socket which reaches almost to the top of the heel. Blade to separate socket lashing is a split vine plait ring. Separate socket to handle lashing is a long split vine strip whipping.

Blade. Shell, rounded section.

Function. No information.

Manufacturing tradition. T2.

Comments. This is the only form mentioned by Hinderling.

EASTERN BISMARCK 15

Locality. New Britain.

Number. 1.

Collector and Date. Unknown.

References.

Figure. Not figured.

Hafting features. A1, B1, C1, D27.

Handle. Very long handle, has a conical pointed terminal rather like a club head (cf. Giglioli, 1897:34, fig. 2). Toe very short, heel projects forward but not up.

Hafting. The blade is set on a flat face and held by a very coarse coir three-ply plait cord in a simple whipping.

Blade. A very dirty small *Tridacna* or *Hippopus* blade, very blunt.

Function. Bluntness suggests nut cracking (cf. FJ 1 and RH 13).

Manufacturing tradition. T1.

Statistics. Too few implements.

EASTERN BISMARCK 15

No.	Repository	Reg. No.	Locality	Date	Collector
948	IA	M TA 40	New Britain	-	ex Univ. of Sydney

EASTERN BISMARCK 16

Locality. St. Matthias group.

Reference. Hinderling, 1949:94.

Hafting features. A2, B3, C?, D?.

Handle. Straight wood handle.

Hafting. Blade set in a separate socket.

Blade. *Terebra* shell.

Function.

Manufacturing tradition. T4.

Comments. Hinderling makes a passing reference to a T4 implement on St. Matthias as given by Finsch. Further confirmation is necessary.

EASTERN BISMARCK 17

Locality. Cape Raoult, New Britain.

Reference. Hinderling, 1949:82.

Hafting features. A1, B3, C?, D?.

Handle. Footed handle.

Hafting. Blade held to separate socket by a whipping, separate socket-handle lashing a plaited ring.

Blade. Shell, probably clam.

Function.

Manufacturing tradition. T2.

Comments. Hinderling distinguishes between this and the EB 11 *Hülsenbeile*.

EASTERN BISMARCK 18

Locality. Blanche Bay, New Britain.

Reference. Hinderling, 1949:83.

Hafting features. A1, B3, C?, D?.

Handle. Footed handle.

Hafting. Blade held in a two-piece bamboo separate socket by a rattan lashing.

Blade. Oval sectioned stone blade.

Function.

Manufacturing tradition. T2.

Comments. Hinderling gives this the name *riam*, *arium* or *lua*.

EASTERN BISMARCK 19

Locality. Sulka people, New Britain.

Reference. Hinderling, 1949:86.

Hafting features. A1, B3, C?, D?.

Handle. Footed handle, 50 cm long.

Hafting. Blade held in separate socket by plaited? rings.

Blade. Oval sectioned stone blade.

Function.

Manufacturing tradition. T2.

Comments.

WESTERN BISMARCK 1

Locality. Admiralty Islands.

Number. 4.

Collectors. Various.

Dates. 1911-50.

References. Moseley, 1877:407 (1879:467-8); Colini, 1890-91:37; Edge Partington, 1890-98: Series II, Pl. 93, fig. 3; Parkinson, 1907:356; Nevermann, 1934:221-4; Hinderling, 1949:95-6.

Figure. Plate A9, figs. C and D, (no. 297).

Hafting features. A1, B1, C2, D14 = no. 653; A1, B1, C4, D3 = nos. 83, 593; A1, B1, C4, D14 = no. 297.

Handle. Heel-less handle, often ornamented at terminal and on sides of ankle. Crocodile motif common on terminal, ornamentation on heel less naturalistic. Nos. 83 and 593 are plainer and have very short handles.

Hafting. The toe is usually hollowed into a trough but a very thin blade may be set into a shaped hollow or even on a step (Nevermann, 1934: abb. 133). The two very ornate implements recorded (nos. 297 and 653) have a fine plait band as lashing, the others have split cane simple whippings and filler sticks were used in both recorded instances (nos. 83 and 593). The ones figured by Nevermann and Edge Partington all have simple split vine lashings.

Blades. No. 593 has a small iron blade, no. 83 a shell blade (?*Cassis*), no. 653 a thin *Tridacna* or *Hippopus* blade, and no. 297 a dark stone blade with large green and smaller white spots. Moseley (1877: Pl. XXI, fig. 8) and Edge Partington figure implements with *Terebra* shell blades.

Function. If unornamented these adzes probably were 'ordinary' adzes, but greater ornamentation suggests more specialised tasks, or even ritual function.

Manufacturing tradition. T1.

Comments. 1. Moseley (1877:407, repeated in 1879:467-8) reports:

The tool in most constant use by the natives is a small adze consisting of a natural crook of wood with a *Terebra maculata* shell bound on to it, the shell being ground down until only one lateral half of it remains. Such small shell adzes were abundant enough still, but in most cases the shell had been replaced on the handle by a piece of hoop iron. Every man almost carried one of these small adzes hung on his left shoulder.

2. Parkinson, 1907:356, 1961:324, notes:

Another kind has the common elbow-shaped shaft to which the head is attached. These heads were sometimes made of sharpened terebra shell [sometimes of tridacna shell], and sometimes of a grey-green stone. The form and shape of these axes has persisted to the present day but the shell and stone heads have made way for those of the ordinary steel variety.

3. Colini, 1890-91:37, comments on the ornamented adzes:

L'esemplare del Museo è benissimo conservato, e si distingue specialmente per la copia e pel gusto degli ornamenti del manico, che consistono in intagli a traforo e in una figura di coccodrillo. Malgrado però che la grandezza, la forma e soprattutto le decorazioni richi amino alla mente gli utensili simili e le arti delle isole dell'Ammiragliato, tuttavia mancando indicazioni precise, è difficile con sicurezza determinare la provenienza di quest'oggetto, poichè asce poco differenti sono usate eziandio negli arcipelaghi vicini.

Statistics. Too few implements.

WESTERN BISMARCK 1

No.	Repository	Reg. No.	Locality	Date	Collector
83	QM	E3194	Admiralty Is.	1941	T.P. Skeffington
297	DM	F E 107	" "	1911	Tost and Rohu
593	AM	E51520	" "	1945	A.J. McKillop
653	AM	E53867	" "	1950	Admin. N.G.

WESTERN BISMARCK 2

Locality. Admiralty Islands.

Reference. Moseley, 1877:407.

Hafting features. No information.

Handle. No information.

Hafting. No information.

Blade. Large blades made of *Tridacna* and *Hippopus* shell.

Function. No information.

Manufacturing tradition. T1?.

Comments. Moseley, 1877:407, notes:

From the houses large blades made of *Tridacna* and *Hippopus* shell were obtained. They resemble somewhat those of the Carolines but are very roughly made indeed, only the actual edge being ground. None were seen mounted, and they appeared to have gone out of use.

Such large blades are clearly different from the small blades fitted to WB 1 implements, probably had a different range of functions, and would have been hafted in larger handles. The possibility that this is a separate population cannot be ignored.

WESTERN BISMARCK 3

Locality. Manus.

Number. 3.

Collectors. Sir Donald and Lady Cleland.

Date. 1955.

References. Moseley, 1877:407 (1879:467-8); Thilenius, 1903:285-6; Parkinson, 1907:356; Nevermann, 1934:223-4; Cranstone, 1961: Pl. 14b; Hinderling, 1949:97-8.

Figure. Plate A9, figs. E and F, (no. 884).

Hafting features. A2, B1, C6, D32.

Handle. Straight, may be ornamented at terminal and head. Thicker at head end.

Hafting. The blade is socketed into a slot in the handle and held with a resinous fixative, or possibly with *Parinarium* nut putty (Nevermann, 1934:224).

Blade. Stone, usually tapering, spotty rock, blunt edges. No. 885 appears to have a modern copy of an old stone blade. The one figured by Cranstone has a shell blade.

Function. According to Moseley these implements were highly valued and rare in the areas he visited. Their function is not specified.

Manufacturing tradition. T3.

Comments. 1. Moseley (1877:407) notes:

Axes made of hard volcanic rock were also obtained from the houses. They have ground ~~surfaces~~ and are triangular in form, and resemble the stone adzes of the Solomons, but are mounted in an entirely different and very primitive way, as axes, being merely jammed in a slot cut in a club-like billet of hard wood near its end.

2. Parkinson, 1907:356, 1961:324, notes:

Two different axes were used; one of them made in a very primitive way, the head being fashioned from a hard lava-like stone and let into the thick end of a club-shaped haft. It was and probably still is used by the Usiai. ...

The Usiai are one of the three major groups on Manus and occupy the whole of the interior, as well as Palual and Rambutjo (1961:351-2). Parkinson thinks that the Usiai look different from the other two major tribes Moanus and Matankor (1961:335-6).

Statistics. Too few implements.

WESTERN BISMARCK 3

No.	Repository	Reg. No.	Locality	Date	Collector
812	PNGM	E265.3	Manus	1955	Sir D. and Lady Cleland
884	PNGM	E265.1	"	"	"
885	PNGM	E265.2	"	"	"

WESTERN BISMARCK 4

Locality. Admiralty Islands.

Number. 1.

Collector. Not known.

Date. Not known.

References. Edge Partington, 1890-98: Series III, Pl. 46, figs. 1 and 2; Nevermann, 1934:352-3, Pl. 23, fig. 6; Hinderling, 1949:96-7.

Figure. Plate A9, figs. G and H, (no. 946).

Hafting features. A2, B1, C6, D32.

Handle. Relatively short, club-shaped, light wood, usually profusely ornamented, both relief and sculpted forms.

Hafting. Blade set in resin or vegetable substance in a socket in the handle.

Blade. Blade-shaped obsidian flake. The one recorded was retouched to a tang where it enters the handle.

Function. Probably more ceremonial than practical, rarely used as weapons (Nevermann, 1934:352).

Manufacturing tradition. T3.

Comments. 1. "Obsidianäxte werden nur sehr selten als Waffen benutzt" (Nevermann, 1934:352).

Statistics. Too few implements.

WESTERN BISMARCK 4

No.	Repository	Reg. No.	Locality	Date	Collector
946	IA	M TA 211	Admiralty Is.	-	-

WESTERN BISMARCK 5

Locality. Hermit Island.

Number. 2.

Collector. Bequeathed by J. Meek.

Date. 1945.

References. Hinderling, 1949:100.

Figure. Plate A10, figs. A and B, (no. 325).

Hafting features. A1, B1, C3, D17 = no. 325; A1, B1, C4, D3 = no. 326.

Handle. Neatly made with long thin shaft and wide toe. Marked angle between toe and shaft at the sides. No heel.

Hafting. Blades set on a stepped toe in a shallow hollow or trough.

Held by simple strip whippings of split vine or bark fibre. The back of the toe may be grooved to take a filler stick.

Blade. Small parallel sided *Tridacna* shell blades with thin oval section. Both are adze heads but no. 326 has the bevel on the outer face.

Function. No information.

Manufacturing tradition. T1.

Statistics. Too few implements.

WESTERN BISMARCK 5

No.	Repository	Reg. No.	Locality	Date	Collector
325	OM	D45.182	Hermit Is.	1945	J. Meek
326	OM	D45.183	" "	"	"

WESTERN BISMARCK 6

Locality. Luf, Hermit Island.

References. Nevermann, 1934:222, abb. 134.

Hafting features. A1, B1, C?, D3?.

Handle. Short shaft with ornamented terminal and spiral ornament on the top of the high heel. Very long toe.

Hafting. Blade may be set on a step and held by a long simple whipping.

Blade. A piece of hoop iron.

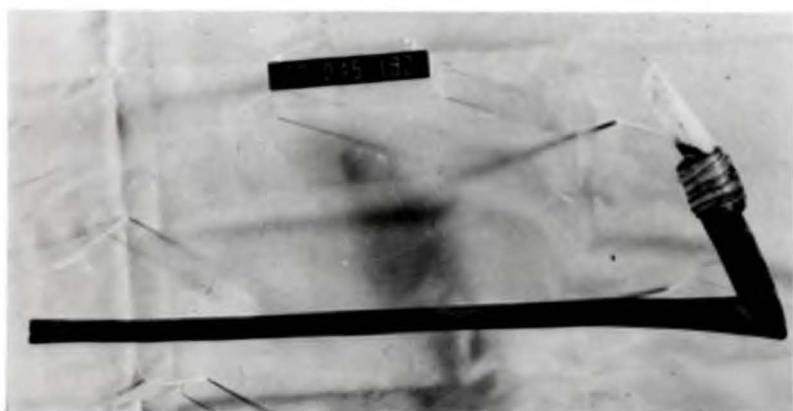
Function. No information, possibly specialised.

Manufacturing tradition. T1.

Comments. An implement with so high a heel is unusual in this region.

PLATE A10.

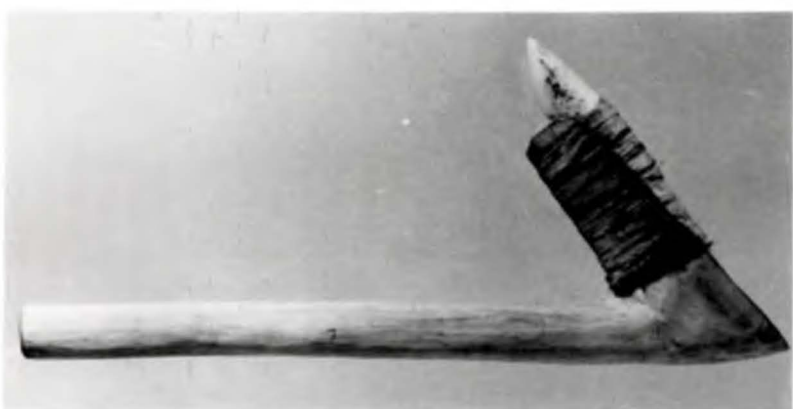
- A and B. WB 5, 325, OM D45.182, Hermit Islands.
- C and D. WB 8, 970, RL, Ava I.
- E and F. WB 11, 337, OM D24.2069, Wuvulu I.
- G and H. NEP 1, 57, QM.M4027, Dugari.



A



B



C



D



E



F



G



H

WESTERN BISMARCK 7

Locality. Kaniet.

References. Thilenius, 1903:285-6; Parkinson, 1907, 1961:412; Hinderling, 1949:99-100.

Hafting features. A2, B1, C6?, D32?.

Handle. Club-shaped.

Hafting. Probably similar to WB 3.

Blade. Stone, probably similar to WB 3.

Function. No information.

Manufacturing tradition. T3.

Comments. 1. "The Kaniet axe reminds one very much of similar tools on the Admiralty Islands; the head is let into a club-shaped piece of wood, the cutting edge being parallel to the grip" (Parkinson, 1907, 1961:412).

2. Thilenius (1903:286) considers the axes of the Usial of Tauï, and of Kaniet and Popolo to be very similar.

WESTERN BISMARCK 8

Locality. Aua.

Number. 2.

Collectors. E.G. Hicks, R.J. Lampert.

Date. 1957, 1967.

References. Parkinson, 1907:426, 1961:390; Hambruch, 1907-8:130, Pl. XXII, figs. 3 and 4; Hinderling, 1949:101-2.

Figure. Plate A10, figs. C and D, (no. 970).

Hafting features. A1, B1, C4, D17.

Handle. Shaft relatively long, handle foot junction evenly tapered, heel-less, short toe.

Hafting. The recorded ones have a trough, those figured by Hambruch have a trough whose sides are cut away. The lashings are simple

whippings, the recorded ones of strips of the inner bark of some trees; those illustrated by Hambruch are supposed to be of liana.

Blade. *Tridacna* shell, smallish. No. 886 has a cutting edge which is pointed, cf. Hambruch, 1907-8: Pl. XXII, figs. 10 and 11. Its cross-section is triangular with the apex to the front and the butt is reduced in front to give an oval section. The sides are parallel. No. 970 has a small oval sectioned blade slightly tapering to the butt, with a convex cutting edge both in plan and from below. Compare Hambruch, 1907-8: Plate XXII, fig. 9.

Function. General purpose: "*Für hackenartigen vorausschlagenden Gebrauch bestimmt*" (Hambruch, 1907-8:131).

Manufacturing tradition. T1.

Comments. 1. Hambruch's type 1. "*Stiel und Beilfutter bestehen aus einem einzigen spitzwinkligen Aststück; in den kürzeren Schenkel ist eine flache breite Nute geschnitten, in der Klinge festaufliegt und mit Lianenstreifen befestigt ist*" (Hambruch, 1907-8:130). Hinderling's Type c, *Kniedechsel*.

2. No. 970 was reconstructed for R. Lampert.

Statistics. Too few implements.

WESTERN BISMARCK 8

No.	Repository	Reg. No.	Locality	Date	Collector
886	PNGM	E462	Aua Is.	1957	E.G. Hicks
970	RJL	-	" "	1967	R.J. Lampert

Locality. Aua and Wuvulu.

References. Hambruch, 1907-8:131, Pl. XXII, figs. 7 and 8; Hinderling, 1949:102.

Hafting features. A1, B3, C?, D3.

Handle. Long shaft, short toe, short heel, may be knobbed.

Hafting. Blade set in an oval one- or two-piece separate socket which appears to have smooth sides. The top which may be knobbed is tied

against the heel with a separate lashing. The separate socket-handle lashing is fitted above a ledge on the back of the toe and is a simple whipping of liana.

Blade. The blades appear to be oval sectioned *Tridacna* ones with adze bevels.

Function. General purpose: "*für hackenartigen vorausschlagenden Gebrauch bestimmt*" (Hambruch, 1907-8:131). Both those figured are set as adzes.

Manufacturing tradition. T2.

Comments. 1. This form is not mentioned by Parkinson (1896, 1907).

2. This is Hambruch's Type 3. Hinderling's Type d, *Kniebeil mit Mittelstück*.

WESTERN BISMARCK 10

Locality. Aua and Wuvulu.

References. Linton, 1926: fig. 27; Hinderling, 1949:102, fig. 57.

Hafting features. A1, B3, C?, D none.

Handle. Long shaft, short foot, no heel.

Hafting. Blade appears to be set into a one-piece separate socket which is fitted into a hollow in the toe. No lashing.

Blade. Shell. ?*Tridacna*, appears to have a hollow backed bevel.

Function. No information.

Manufacturing tradition. T2.

Comments. This form is not mentioned by Parkinson nor by Hambruch. It is probably not very strong as the likelihood of splitting the toe is considerable. The hafting is unique but the sketch may be misleading. Its inclusion in the traditional repertoire may be suspended pending confirmation. However, Hinderling appears to accept it as an alternative form for WB 9.

WESTERN BISMARCK 11

Locality. Aua and Wuvulu.

Number. 5.

Collectors. Various.

Dates. Various.

References. Luschan, 1895: Pl. VII, figs. 22 - 25; Parkinson, 1896: 202-3, 1907:427-8, 1961:391; Krämer, 1908:256; Hinderling, 1949:102; Cranstone, 1961: Pl. 21c.

Figure. Plate A10, figs. E and F, (no. 337).

Hafting features. A2, B1, C6, D29.

Handle. Short, usually thin shafted, often faceted, and squared, straight.

Hafting. The butt of the blade may be flat, stepped, or even toothed, and the whole of the butt, if flat, or just the longer portions, may be set in a slot and held by dowels plugged through at least one side of the slot and the bone.

Blade. Turtle bone, curved laterally with an adze bevel on the concave side. Four implements have blades with the concavity on the right, one has the concavity on the left.

Function. "The crushed vegetable pulp (of taro or breadfruit) is cut up by means of a slicer, *tigo*, shaped like an axe; for a long time this article was thought to be a form of axe" (Parkinson, 1907:427-8, 1961: 391).

Manufacturing tradition. T3.

Comments. 1. Compare NPO 4. See area survey for further comment.

2. Krämer corrects Hambruch (1907-8): "*Beile, ein Panzerstück der Schildkröte in einem Stiel eingelassen, werden von den Frauen zum Reingen der Taroknollen verwendet*" (1908:256).

3. Hinderling's Type f, *Küchenbeil*.

Statistics. Too few implements.

WESTERN BISMARCK 11

No.	Repository	Reg. No.	Locality	Date	Collector
336	OM	D24.2068	Wuvulu Is.	1924	Fels Coll 1087
337	OM	D24.2069	" "	"	" " 1088
338	OM	D24.1837	" "	"	Tost and Rohu
557	SAM	A19930	Aua Is.	1939	A.G. Schroeder
558	SAM	A8590	Wuvulu Is.	pre-1900	Tost and Rohu

WESTERN BISMARCK 12

Locality. Aua and Wuvulu.

References. Parkinson, 1896: fig. 3, 202-3, 1907:426-7, 1961:390-91; Luschan, 1899: fig. 8; Thilenius, 1903:285-6; Hambruch, 1907-8:131, Pl. XXII, figs. 5 and 6; Linton, 1926: fig. 28; Hinderling, 1949:101.

Hafting features. A2, B3, C?, D35?

Handle. Long, thin, circular sectioned shaft, squared off end.

Hafting. The separate socket is set in a hole in the shaft. Small lashing bands may be fitted on either side of this hole to prevent splitting. The tapering one- or two-piece separate socket has a blade held in by a strip whipping which Hambruch says is liana. The socket has a projection, or rather is cut away on the outer side and a similar projection is made in the top of the shaft behind the hole. Around these two knobs a bast tension cord is tied, thus keeping the socket in position, and helping to prevent the handle splitting (cf. Sande, 1907: 175).

Blade. This:

kind of axe head is very long, up to 35 cm, and the same width all the way up. These are so ground that the long sides are slightly twisted in relation to the axis of the head, whereby the cutting edge acquires a slant. The cutting edge of these heads is semi-circular and the ground surfaces somewhat concave (Parkinson, 1907:427, 1961:390-91). *Tridacna*.

Function.

The wooden sheath has but one hook and cannot be turned. One therefore finds this kind of axe with the ground concave surface to the right and left, and the one who uses them can select that which appears to him suitable according to whether

the surface to be worked is to his right or left hand. The axe last described is principally used in hollowing out canoes (Parkinson, 1907:427, 1961:391).

Manufacturing tradition. T4.

Comments. 1. Compare with WB 13. See area survey for general description.

2. This is Hambruch's Type 2. He suggests (1907-8:131) that the blade can be set as an adze but Parkinson seems to be quite clear that this is not the case, otherwise why the insistence on the axial twist of these long blades which would give them an intermediate axe-adze angle. Moreover, the existence of the hook on the oval sectioned separate socket suggests that the socket could only be set as an axe or nearly at that angle.

3. Hinderling puts WB 12 and WB 13 in his Type b *Axt mit eingestecktem Mittelstück*.

WESTERN BISMARCK 13

Locality. Aua and Wuvulu.

References. Parkinson, 1907:426-7 (1961:390-1); Hinderling, 1949:101.

Hafting features. A2, B3, C?, D35?.

Handle. Same as WB 12.

Hafting. Same as WB 12, but the separate socket has a projection on both sides so that the hafting can be reversed.

Blade. *Tridacna*, three cornered shape in plan (triangular).

Function. "Employed on hewing and smoothing the sides [of canoes], planks [for canoes], and posts of houses" (Parkinson, 1907:427, 1961:391).

Manufacturing tradition. T4.

Comments. Parkinson is the only source to note this distinction of two T4 implements. Given the common distinction between thicker, robuster hollowing blades and less sturdy planing blades the distinction is likely to be valid. That a small difference between the separate sockets is suggested is further confirmation. These implements are likewise axes, for the projections make it unlikely that the socket could be held as an adze.

WESTERN BISMARCK 14

Locality. The high islands of the Admiralty group.

Reference. Nevermann, 1934:174.

Hafting features. A footed handle (A1, B1) but C and D features not within the compass of this listing.

Handle. A footed handle, with a slight expansion of the terminal, no heel and a pointed toe.

Hafting. The blade is fitted over the toe and held with a split vine lashing.

Blade. A node-ended piece of bamboo.

Function. Sago pith chopping.

Manufacturing tradition. A T1 variant.

Comments. 1. No sago felling implement is described, and Nevermann says that the stone adzes were used (see chapter 25, Part III).

2. Nevermann reports that the sago palm grows on Ahus, Baltzal, Keyte and Lindrau as well as the high islands.

3. The name for the pith chopper is given for the Lala as *ekuan*, Saha as *kada*, and Rambutjo, Lausa and Papitalai as *kual*.

WESTERN BISMARCK 15

Locality. Admiralty islands.

Reference. Hinderling, 1949:98.

Hafting features. A2, B3, C?, D?.

Handle. Wooden straight handle 65 cm long, ?like L. Sentani.

Hafting. Blade held in a two-piece separate socket by a rattan lashing.

Blade. Obsidian, or stone oval sectioned blade.

Function.

Manufacturing tradition. T4.

Comments. Hinderling gives this description based on a figure by Buschan, 1923. Neither Parkinson nor Moseley mentions this form.

WESTERN BISMARCK 16

Locality. Aua and Wuvulu.

Reference. Hinderling, 1949:102.

Hafting features. A2, B1, C8, C?.

Handle. Straight handle with prongs between which the blade is set.

Hafting. Not stated.

Blade. *Terebra* shell.

Function.

Manufacturing tradition. T3.

Comments. Like EB16 this is based on a passing reference, by Finsch. Hinderling appears to be doubtful of its authenticity.

NORTHEAST PAPUA 1

Localities. Apart from three all are from the Northeast Papua region, and of these one-third are from Collingwood Bay, with only nine from north of the mouth of the Musa River. The implements assigned to this population but collected outside the area have been commented on in Chapter 12.

Number. 75.

Collectors. Most were collected under Sir William MacGregor's aegis; four are from other collectors.

Dates. The MacGregor Collection from 1889-97, others 1906, 1916.

References. Annual Reports on British New Guinea from 1888-9 to 1897-8.

Figure. Plate A10, figs. G and H, (no. 57).

Hafting features. A1, B3, C14, D12.

Handle. The shaft is relatively thin and long, with a knobbly heel, often battered on the top. The toe is short and wide. The handle is never very smoothly finished.

Hafting. The blade is set in a two-piece, tapering separate socket and tied with a fibre strip, two-ply twist or three-ply plait cord in a simple whipping on the lower, cut-away, part. The separate socket is held on to the toe, which is shallowly grooved to take it, by a plait band formed from coarse vine strips. The separate socket usually reaches to the point on the foot where the extension of the shaft axis would divide it into toe and heel (ankle line).

Blade. 68 of the blades are of nephrite-like rocks. They are usually asymmetric in plan, and parallel-sided or tapering in intent. The section is asymmetrically oval, the cutting edge is usually also asymmetric in plan, and both faces curve towards the cutting edge although an adze form is generally discernible. The blades are usually small. The other blades will be described under NEP 5. Taken as a whole NEP 1 blades seem to divide into two groups, one from 0.4 - 1.4 cm thick, the other from 1.5 - 2.5 cm thick (V9, table A9).

Function. Almost certainly these adzes were used for canoe hollowing (see area survey), but it is possible that this style was used for all purposes depending upon the blade, and possibly on blade thickness as V9 shows the greatest platykurtosis (table A9). AM E16020 is glossed 'ordinary adze', and AM E16022 'sago adze'. As in other areas the use of otherwise complete and reasonably large stone cutting blades for sago may have been a post-metal phenomenon.

Manufacturing tradition. T2.

Comments. 1. This implement has been designated the typical form for the south of Northeast Papua (Chapter 12). NEP 5 is the typical northern form.

2. Money gives the names for 'ordinary adzes' at Wanigela (Rainu-Oreresan) as *safaru*, and at Uiaiku as *bere*. He notes that sago adzes at Wanigela are called *kwarage*.

3. MacGregor (1898c:21) gives the names on the Upper Musa, probably at Gewaduru, as: jade adze — *kowa*, handle — *ago*, socket — *kaparu*.

4. MacGregor (1894j:30) at Kwagira remarks "all the adzes of these people are of jade; they call it *saparu*".

5. Numbers following MacGregor's name are the numbers given in the first registration of the material in the Queensland Museum.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A9 and A10). As may be seen large samples clearly affect the normality of the distribution and do not noticeably increase the number of nominal scale attributes present (table A10).

NORTHEAST PAPUA 1

No.	Repository	Reg. No.	Locality	Date	Collector
1	QM	M4089	Oro	1894	W. MacGregor (11941)
3	QM	M4102	Cloudy Bay	1894	" (12025)
4	QM	E1131	-	1920	C. Marks
10	QM	M3995	Collingwood Bay	1892	W. MacGregor (9030)
13	QM	M5937	Moni	1897	" (16196)
14	QM	M4061	-	1898	" (19493)
15	QM	M5918	Collingwood Bay	1894	" (11968)
19	QM	M4054	" "	"	" (11982)
25	QM	M4098	Tobuara, Cloudy Bay	"	" (11920)
41	QM	M3996	?St. Joseph R.	1892	" (9306)

TABLE A9: Distribution of ratio scale features. NE Papua (NEP1).. Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	75	65.03	35.53	5	160	0.697	0.058
8	WIDTH OF BLADE - HAFT	75	48.59	13.69	18	80	0.146	-0.420
9	THICKNESS OF BLADE	75	15.20	5.48	4	25	-0.069	-1.096
10	WIDTH OF BLADE - EDGE	75	51.08	16.79	14	85	-0.020	-0.778
11	LENGTH - CUTTING EDGE	75	59.31	21.10	14	110	0.184	-0.504
12	ANGLE - CUTTING EDGE	75	55.91	8.76	35	82	0.189	0.291
13	LENGTH OF HANDLE	72	634.46	110.25	360	872	-0.468	-0.235
14	SHAFT DIAMETER	71	26.10	5.54	13	43	0.561	0.562
15	LENGTH OF FOOT	75	176.63	37.62	79	272	0.194	0.226
16	TOTAL LENGTH OF FOOT	75	338.33	83.01	146	530	0.283	-0.056
17	POINT OF BALANCE	71	122.10	45.24	10	280	0.550	1.506
18	ANGLE - B/FOOT - SIDE	75	62.39	6.11	50	80	0.434	0.201
19	ANGLE - B/HANDLE - BELOW	73	74.36	29.33	-5	130	-0.651	0.380
20	WEIGHT	73	647.73	377.82	62	1812	0.636	-0.110
21	SPRT SOCKET LENGTH	75	248.64	54.12	125	362	-0.133	-0.761
22	SPRT SOCKET WIDTH	75	46.87	13.69	18	73	0.072	-0.670
34	% 10 ON 11 WC/LC	75	87.36	7.90	70	100	-0.215	-0.640

TABLE A10: Distribution of nominal scale features. NE Papua (NEP1).

VARIABLE NUMBER	23	POLL OF BLADE					N=75
CODE VALUE:	1	2	3	4			
FREQUENCY:	5	48	13	9			
PERCENTAGES:	6.7	64.0	17.3	12.0			
VARIABLE NUMBER	24	PLAN OF BLADE					N=75
CODE VALUE:	1	2					
FREQUENCY:	33	42					
PERCENTAGES:	44.0	56.0					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE					N=75
CODE VALUE:	1	2	3				
FREQUENCY:	61	12	2				
PERCENTAGES:	81.3	16.0	2.7				
VARIABLE NUMBER	26	PROFILE OF BLADE					N=75
CODE VALUE:	1	2	3	4	5		
FREQUENCY:	46	8	15	5	1		
PERCENTAGES:	61.3	10.7	20.0	6.7	1.3		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE					N=75
CODE VALUE:	1	2	3				
FREQUENCY:	2	52	21				
PERCENTAGES:	2.7	69.3	28.0				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW					N=75
CODE VALUE:	1	2	3				
FREQUENCY:	66	8	1				
PERCENTAGES:	88.0	10.7	1.3				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT					N=75
CODE VALUE:	1	2	3	4	5		
FREQUENCY:	1	66	0	6	2		
PERCENTAGES:	1.3	88.0	0.0	8.0	2.7		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE					N=75
CODE VALUE:	0						
FREQUENCY:	75						
PERCENTAGES:	100.0						
VARIABLE NUMBER	31	FINISH ON BLADE					N=75
CODE VALUE:	1	2	3	4			
FREQUENCY:	59	6	0	10			
PERCENTAGES:	78.7	8.0	0.0	13.3			
VARIABLE NUMBER	32	USE-WEAR					N=75
CODE VALUE:	1	2	3	4	5		
FREQUENCY:	15	37	11	10	2		
PERCENTAGES:	20.0	49.3	14.7	13.3	2.7		
VARIABLE NUMBER	33	MATERIAL OF BLADE					N=75
CODE VALUE:	1	2	3				
FREQUENCY:	5	2	68				
PERCENTAGES:	6.7	2.7	90.7				

No.	Repository	Reg. No.	Locality	Date	Collector	
43	QM	M4031	-	1898	W. MacGregor	(19497)
46	QM	M4080	Oro	1894	"	(11945)
47	QM	M4036	-	1898	"	(19492)
49	QM	M5938	-	1897	"	(16150)
51	QM	M4012	Moni	1898	"	(19484)
52	QM	M4010	"	1897	"	(16197)
54	QM	M4108	Dugari	1898	"	(19490)
55	QM	M5944	-	1897	"	(16145)
57	QM	M4027	Dugari	1898	"	(19487)
58	QM	M4023	Keremai	1894	"	(11939)
59	QM	M4072	Dugari	1897	"	(16204)
62	QM	M4002	Gewaduru	1897	"	(16164)
67	QM	M4109	Kumusi	*1895	"	(14323)
70	QM	M4097	-	1898	"	(19501)
71	QM	M196	Moni Valley	1897	"	(16237)
86	QM	M4069	Dugari	1897	"	(16147)
87	QM	M4071	Collingwood Bay	1897	"	(16161)
91	QM	M4013	Kumusi	1897	"	(16236)
92	QM	M4462	Collingwood Bay	1894	"	(11980)
95	QM	M4060	Gewaduru	1897	"	(16163)
96	QM	M4040	Keremai	1894	"	(11937)
101	QM	M4088	Collingwood Bay	1894	"	(11989)
102	QM	M4062	-	1897	"	(16244)
107	QM	M4066	Cape Nelson	*1898	"	(19486)
119	QM	M4067	Moni	1897	"	(16158)
121	QM	M4038	Oro	1892	"	(9022)
125	QM	M4075	Tobuara, Cloudy Bay	1894	"	(11921)
126	QM	M4049	-	1898	"	(19498)
127	QM	M3999	-	1897	"	(16195)
128	QM	M4068	-	1897	"	(16222)
129	QM	M4074	Collingwood Bay	1894	"	(11981)
132	QM	M4064	Moni	1897	"	(16173)
136	QM	M4115	Collingwood Bay	1892	"	(9029)
137	QM	M4042	" "	"	"	(8721)
138	QM	M4045	" "	1894	"	(11971)
139	QM	M4119	Moni	1897	"	(16177)
419	NMV	X480	Collingwood Bay	-	"	lost
443	NMV	X494, 466	-	1897	"	(16209)
596	AM	E6457	-	1897	"	(61200)
597	AM	E6458	Collingwood Bay	1894	"	(11960)
598	AM	E6465	Aroma	1897	"	(16240)
600	AM	E7061	Collingwood Bay	1894	"	(11969)
601	AM	E23447	" "	1916	G. Manning	
602	AM	E16020	Wanigera	1906	Money	
603	AM	E16022	"	"	"	
645	AM	E6439	Collingwood Bay	1897	W. MacGregor	(16215)
718	AM	E6445	-	1897	"	(16168)
720	AM	E6438	-	1897	"	(16208)
721	AM	E6459	Collingwood Bay	1892	"	(9035)
722	AM	E6449	Kumusi R.	*1895	"	(14326)
724	AM	E6469	-	1897	"	(16221)
727	AM	E6450	Moni	1897	"	(16206)
891	QM	M4112	Dyke Ackland Bay	1894	"	(12008)
894	QM	M5924	Oro	1894	"	(11948)

No.	Repository	Reg. No.	Locality	Date	Collector
901	QM	M4017	Dugari	1897	W. MacGregor (16174)
902	QM	M5505	Moni Valley	1897	" (16194)
903	QM	M4010	" "	"	" (16197)
906	QM	M4006	Collingwood Bay	1894	" (12005)
907	QM	M4028	" "	"	" (11986)
908	QM	M4063	" "	"	" (11990)
910	QM	M5908	" "	"	" (12001)
911	QM	M5787	" "	"	" (11970)
913	QM	M4001	" "	"	" (11967)
917	QM	M4073	Keremai	1894	" (11934)
918	QM	M4041	Mailu	1894	" (11923)

NORTHEAST PAPUA 2

Localities. Equally north and south of the mouth of the Musa River.

Numbers. 15.

Collector. All are from the MacGregor Collection.

Dates. 1889 - 97.

References. Annual Reports on British New Guinea from 1888-9 to 1897-8; Egloff, 1971:114, Pl. 13a; Hurley, 1934:86 and facing page.

Figure. Plate All, figs. A and B, (no. 11).

Hafting features A1, B3, C14, D14.

Handle. As NEP 1.

Hafting. Separate socket as described for NEP 1; separate socket-handle lashing made from a plait band or several overlapping bands of fine, narrow strips of vine.

Blade. All but one ~~are~~ ^{are} of metamorphic rock, nephrite-like and as described for NEP 1.

Function. At least some were used for canoe hollowing even as late as the 1930's (Hurley, 1934:86).

Manufacturing tradition. T2.

Comments. 1. This population combines the southern blade and separate socket unit with the common northern form of socket-handle lashing.

2. The implement figured by Egloff as coming from Collingwood Bay is unlocated according to the original registration, and thus wrongly attributed by the Australian Museum.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A11 and A12). The total length of the foot (V16) is skewed by one very long bladed implement, no. 777, which is also responsible for skewing the weight. Otherwise the ranges are: V16, 21.5 - 37.7 cm, and V20, 140 - 655 gm. In all cases except V10 and V34 the ranges for table A11 are within the NEP 1 ranges, however V14 and V15 have markedly platykurtic distributions, V14 having an emphasis on both ends of its range 1.5-2.1/2.3-3.0 cm and V15 dividing into three sub-sections: 10.0-12.7/14.0-16.8/17.7-18.3 cm.

NORTHEAST PAPUA 2

No.	Repository	Reg. No.	Locality	Date	Collector
11	QM	M5930	Collingwood Bay	1894	W. MacGregor (11998)
24	QM	M4095	Tobuara, Cloudy Bay	1894	" (11918)
50	QM	M4003	Collingwood Bay	1894	" (11996)
53	QM	M4039	Oro	1892	" (9025)
56	QM	M4015	Kumusi	*1895	" (14329)
60	QM	M5932	Collingwood Bay	1894	" (11966)
89	QM	M4101	Mambare R. mouth	1897	" (16151)
103	QM	M3994	Collingwood Bay	1892	" (8719)
646	AM	E6443	-	1894	" (11983)
719	AM	E6453	Oro	1894	" (11945)
723	AM	E6456	-	1897	" (16235)
725	AM	E6442	Collingwood Bay	1894	" (12003)
777	AM	E6467	-	1897	" (16175)
893	QM	M4008	Oro	1892	" (9026)
897	QM	M4055	Kumusi R.	1894	" (12023)

NORTHEAST PAPUA 3

Locality. All south of the mouth of the Musa River. One from Aroma and one from Torres Strait were probably traded from the Cloudy Bay area.

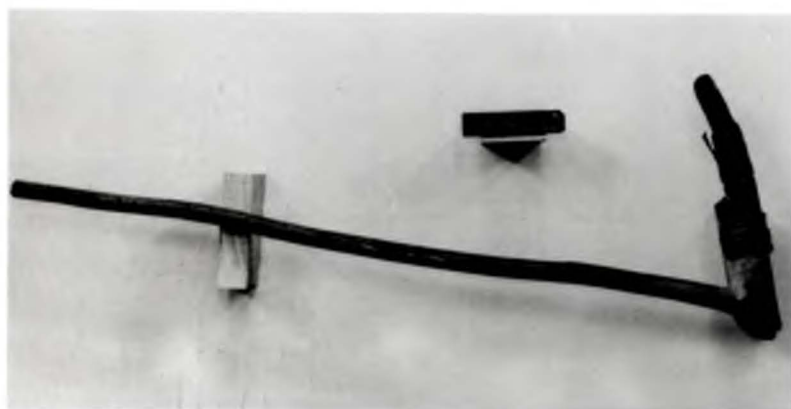
Number. 8.

Collector. All but the Torres Strait specimen were collected by MacGregor.

Date. 1892 - 1898, the Torres Strait implement in 1907.

PLATE All.

- A and B. NEP 2, 11, QM M5930, Collingwood Bay.
C and D. NEP 3, 61, QM M4058, Collingwood Bay.
E and F. NEP 4, 44, QM M4113, Kumusi R.
G and H. NEP 5, 64, QM M5922, Kumusi R.



A



B



C



D



E



F



G



H

TABLE All: Distribution of ratio scale features. NE Papua (NEP4). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	15	61.87	29.09	30	121	0.932	-0.265
8	WIDTH OF BLADE - HAFT	15	39.47	12.41	21	65	0.545	-0.500
9	THICKNESS OF BLADE	15	14.13	4.81	8	25	0.904	0.129
10	WIDTH OF BLADE - EDGE	15	39.67	14.39	13	70	0.290	0.120
11	LENGTH - CUTTING EDGE	14	47.57	17.64	26	86	0.879	0.044
12	ANGLE - CUTTING EDGE	14	55.57	7.57	42	66	-0.487	-0.793
13	LENGTH OF HANDLE	15	644.27	76.19	513	777	0.023	-0.628
14	SHAFT DIAMETER	15	21.53	4.79	15	30	0.198	-1.093
15	LENGTH OF FOOT	15	145.73	28.57	100	183	-0.415	-1.053
16	TOTAL LENGTH OF FOOT	15	290.13	69.79	215	446	1.009	-0.072
17	POINT OF BALANCE	15	102.67	44.13	40	198	0.709	-0.152
18	ANGLE - B/FOOT - SIDE	15	64.07	6.52	55	75	0.309	-0.819
19	ANGLE - B/HANDLE - BELOW	15	81.00	20.20	40	120	-0.374	0.234
20	WEIGHT	15	399.67	240.72	140	1006	1.127	0.935
21	SPRT SOCKET LENGTH	15	212.73	52.27	146	328	0.930	0.181
22	SPRT SOCKET WIDTH	15	38.67	10.84	25	65	0.842	0.650
34	% 10 ON 11 WC/LC	14	89.57	11.47	71	119	0.937	1.726

TABLE A12: Distribution of nominal scale features. NE Papua (NEP2).

VARIABLE NUMBER	23	POLL OF BLADE	N=15				
CODE VALUE:	2	3					
FREQUENCY:	7	8					
PERCENTAGES:	46.7	53.3					
VARIABLE NUMBER	24	PLAN OF BLADE	N=15				
CODE VALUE:	1	2					
FREQUENCY:	8	7					
PERCENTAGES:	53.3	46.7					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=15				
CODE VALUE:	1	2	3				
FREQUENCY:	13	1	1				
PERCENTAGES:	86.7	6.7	6.7				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=15				
CODE VALUE:	1	2	3	4	5		
FREQUENCY:	10	0	4	0	1		
PERCENTAGES:	66.7	0.0	26.7	0.0	6.7		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=15				
CODE VALUE:	2	3					
FREQUENCY:	9	6					
PERCENTAGES:	60.0	40.0					
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=15				
CODE VALUE:	1	2					
FREQUENCY:	11	4					
PERCENTAGES:	73.3	26.7					
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=15				
CODE VALUE:	2	3	4				
FREQUENCY:	13	0	2				
PERCENTAGES:	86.7	0.0	13.3				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=15				
CODE VALUE:	0						
FREQUENCY:	15						
PERCENTAGES:	100.0						
VARIABLE NUMBER	31	FINISH ON BLADE	N=15				
CODE VALUE:	1	2	3	4			
FREQUENCY:	13	0	0	2			
PERCENTAGES:	86.7	0.0	0.0	13.3			
VARIABLE NUMBER	32	USE-WEAR	N=15				
CODE VALUE:	2	3	4	5	6	8	
FREQUENCY:	7	5	2	0	0	1	
PERCENTAGES:	46.7	33.3	13.3	0.0	0.0	6.7	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=15				
CODE VALUE:	2	3					
FREQUENCY:	1	14					
PERCENTAGES:	6.7	93.3					

References. Annual Reports on British New Guinea, 1888-9 to 1897-8.

Figure. Plate All, figs. C and D, (no. 61).

Hafting features. A1, B3, D14, D16.

Handle. As NEP 1.

Hafting. Blade and separate socket unit as NEP 1. Socket-handle lashing made of several rings plaited from split vine strips.

Blade. One greywacke, the others nephrite-like as described for NEP 1. The Torres Strait specimen has a *Tridacna* blade common to that region (cf. Haddon, 1912:125).

Function. Probably the same as others in the region, but no direct references are available.

Manufacturing tradition. T2.

Comments. 1. This is found exclusively in the southern part of Northeast Papua. The ring lashing D16 is never found in the north.

2. The specimen from Nagir in Torres Strait is glossed 'dance club' and probably reached the point where it was collected late in the Nineteenth Century. It would be interesting to know at what stage it acquired the shell blade.

Statistics All implements are included in the statistical descriptions (tables A13 and A14). The skewing of V22, separate socket length, is caused by no. 97. Otherwise the range is 35 - 46 cm. A number of variables have platykurtic distributions, but these do not seem to be caused by the same implements. V10 appears to be divided into three narrow (3.6 - 3.7 cm) and five wider (4.6 - 6.4 cm) blades; V15 divides 12.9-13.8/15.6-17.0; V18 divides 45-50°/65-70°, with five implements at the wider angle; and V19 divides in 4 set at 10 - 15°, one at 40°, one at 50°, one at 80° and one at 90°.

NORTHEAST PAPUA 3

No.	Repository	Reg. No.	Locality	Date	Collector
17	QM	M5931	Aroma	1894	W. MacGregor (11928)
21	QM	M4004	-	1898	" (19502)
48	QM	M4110	Collingwood Bay	1894	" (11997)
61	QM	M4058	" "	1892	" (8717)
93	QM	M4093	-	1898	" (19500)
97	QM	M4065	Cape Nelson	1898	" (19488)
134	QM	M4092	-	1898	" (19491)
610	AM	E17382	?Nagir, Torres Str.?	1907	Hedley and McCulloch

TABLE A13: Distribution of ratio scale features. NE Papua (NEP3). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	8	64.38	30.30	26	122	0.822	0.330
8	WIDTH OF BLADE - HAFT	8	43.13	11.91	28	64	0.416	-0.260
9	THICKNESS OF BLADE	8	16.50	3.42	10	21	-0.748	0.335
10	WIDTH OF BLADE - EDGE	8	48.88	11.64	36	64	-0.006	-1.325
11	LENGTH - CUTTING EDGE	8	55.13	13.46	32	69	-0.768	-0.577
12	ANGLE - CUTTING EDGE	8	54.75	4.89	47	60	-0.670	-0.474
13	LENGTH OF HANDLE	8	589.00	98.82	428	711	-0.287	-0.479
14	SHAFT DIAMETER	8	22.25	2.25	19	26	0.514	-0.112
15	LENGTH OF FOOT	8	151.75	15.38	129	170	-0.441	-1.114
16	TOTAL LENGTH OF FOOT	8	314.50	54.33	243	398	0.487	-0.566
17	POINT OF BALANCE	7	116.86	27.54	80	152	0.088	-0.779
18	ANGLE - B/FOOT - SIDE	8	60.00	10.00	45	70	-0.500	-1.150
19	ANGLE - B/HANDLE - BELOW	8	61.88	38.54	10	110	-0.174	-1.139
20	WEIGHT	8	398.00	130.25	242	625	0.518	-0.299
21	SPRT SOCKET LENGTH	8	221.37	34.24	178	277	0.611	-0.475
22	SPRT SOCKET WIDTH	8	42.75	7.46	35	59	1.444	1.832
34	% 10 ON 11 WC/LC	8	89.88	12.38	73	113	0.480	0.378

TABLE A14: Distribution of nominal scale features. NE Papua (NEP3).

VARIABLE NUMBER	23	POLL OF BLADE	N=8			
CODE VALUE:	1	2	3			
FREQUENCY:	2	4	2			
PERCENTAGES:	25.0	50.0	25.0			
VARIABLE NUMBER	24	PLAN OF BLADE	N=8			
CODE VALUE:	1	2				
FREQUENCY:	1	7				
PERCENTAGES:	12.5	87.5				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=8			
CODE VALUE:	1	2	3			
FREQUENCY:	6	1	1			
PERCENTAGES:	75.0	12.5	12.5			
VARIABLE NUMBER	26	PROFILE OF BLADE	N=8			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	6	0	1	0	1	
PERCENTAGES:	75.0	0.0	12.5	0.0	12.5	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=8			
CODE VALUE:	2					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=8			
CODE VALUE:	1	2				
FREQUENCY:	7	1				
PERCENTAGES:	87.5	12.5				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=8			
CODE VALUE:	2	3	4			
FREQUENCY:	6	1	1			
PERCENTAGES:	75.0	12.5	12.5			
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=8			
CODE VALUE:	0					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=8			
CODE VALUE:	1	2	3	4		
FREQUENCY:	7	0	0	1		
PERCENTAGES:	87.5	0.0	0.0	12.5		
VARIABLE NUMBER	32	USE-WEAR	N=8			
CODE VALUE:	2	3	4	5		
FREQUENCY:	5	0	2	1		
PERCENTAGES:	62.5	0.0	25.0	12.5		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=8			
CODE VALUE:	2	3	4	5	6	7
FREQUENCY:	1	6	0	0	0	1
PERCENTAGES:	12.5	75.0	0.0	0.0	0.0	12.5

NORTHEAST PAPUA 4

Localities. Eight of eleven localised specimens came from north of the mouth of the Musa River.

Number. 14.

Collectors. All are from the MacGregor Collection, except for one specimen collected by Mrs. Money.

Dates. 1890 - 97, 1916.

References. Annual Reports on British New Guinea, 1888-9 to 1897-8.

Figure. Plate All, figs. E and F, (no. 44).

Hafting features. A1, B3, C13, D12.

Handle. As NEP 1.

Hafting. The blade is set in a tapering, two-piece separate socket having smooth faces, and is held by one or, more usually, several overlapping bands of fine, split vine strip plait. Lashing of this unit to handle as NEP 1.

Blade. Four of the blades are nephrite-like as described for NEP 1, six are diorite-like as described for NEP 5, two are metamorphic, one is a 'hornfels' and the last is the characteristic Suloga hornfels from Woodlark Island (see Massim, Chapter 15).

Function. Probably multi-purpose, but no direct references.

Manufacturing tradition. T2.

Comments. This combines the northern Northeast Papuan separate socket and blade units and southern socket-handle lashings.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A15 and A16). Two of the blades have cutting edge angles (V12) of 70° and 72° (nos. 775, 916). No. 775 is of Suloga hornfels, no. 916 of nephrite-like rock. Two of the 'diorite' blades have very protruding cutting edges (V34) with indexes of 59 and 67 (nos. 900 and 7). Apart from this the range of V34 is 76 - 95 and of V12 50° - 64°.

TABLE A15: Distribution of ratio scale features. NE Papua (NEP4). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	14	67.29	27.84	8	110	-0.249	0.017
8	WIDTH OF BLADE - HAFT	14	54.50	13.50	31	82	-0.132	0.339
9	THICKNESS OF BLADE	14	20.36	7.93	4	32	-0.448	-0.011
10	WIDTH OF BLADE - EDGE	14	60.57	18.92	29	104	0.355	0.886
11	LENGTH - CUTTING EDGE	14	73.50	24.96	32	116	0.011	-0.350
12	ANGLE - CUTTING EDGE	14	58.50	6.30	50	72	1.053	0.383
13	LENGTH OF HANDLE	14	620.07	135.32	303	850	-0.679	0.836
14	SHAFT DIAMETER	12	23.08	6.89	14	35	0.284	-0.908
15	LENGTH OF FOOT	14	171.29	38.06	97	223	-0.414	-0.724
16	TOTAL LENGTH OF FOOT	14	313.36	79.19	133	464	-0.430	0.864
17	POINT OF BALANCE	14	121.14	66.25	8	260	0.378	0.116
18	ANGLE - B/FOOT - SIDE	14	62.93	6.28	55	75	0.454	-0.407
19	ANGLE - B/HANDLE - BELOW	14	80.93	14.90	60	110	0.141	-0.331
20	WEIGHT	14	675.86	418.26	71	1613	0.491	0.175
21	SPRT SOCKET LENGTH	14	199.86	44.64	107	277	-0.620	0.353
22	SPRT SOCKET WIDTH	14	57.29	18.25	23	93	0.078	0.090
34	% 10 ON 11 WC/LC	14	84.29	11.04	59	95	-1.064	0.359

TABLE A16: Distribution of nominal scale features. NE Papua (NEP4).

VARIABLE NUMBER	23	POLL OF BLADE			N=14
CODE VALUE:	1	2	3		
FREQUENCY:	1	12	1		
PERCENTAGES:	7.1	85.7	7.1		
VARIABLE NUMBER	24	PLAN OF BLADE			N=14
CODE VALUE:	1	2			
FREQUENCY:	6	8			
PERCENTAGES:	42.9	57.1			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE			N=14
CODE VALUE:	1	2			
FREQUENCY:	12	2			
PERCENTAGES:	85.7	14.3			
VARIABLE NUMBER	26	PROFILE OF BLADE			N=14
CODE VALUE:	1	2	3		
FREQUENCY:	8	3	3		
PERCENTAGES:	57.1	21.4	21.4		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE			N=14
CODE VALUE:	2	3			
FREQUENCY:	9	5			
PERCENTAGES:	64.3	35.7			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW			N=14
CODE VALUE:	1	2			
FREQUENCY:	8	6			
PERCENTAGES:	57.1	42.9			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT			N=14
CODE VALUE:	2	3	4		
FREQUENCY:	11	0	3		
PERCENTAGES:	78.6	0.0	21.4		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE			N=14
CODE VALUE:	0				
FREQUENCY:	14				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE			N=14
CODE VALUE:	1	2	3	4	
FREQUENCY:	2	2	3	7	
PERCENTAGES:	14.3	14.3	21.4	50.0	
VARIABLE NUMBER	32	USE-WEAR			N=14
CODE VALUE:	1	2	3	4	5
FREQUENCY:	2	6	2	3	1
PERCENTAGES:	14.3	42.9	14.3	21.4	7.1
VARIABLE NUMBER	33	MATERIAL OF BLADE			N=14
CODE VALUE:	1	2	3	4	
FREQUENCY:	6	2	4	2	
PERCENTAGES:	42.9	14.3	28.6	14.3	

NORTHEAST PAPUA 4

No.	Repository	Reg. No.	Locality	Date	Collector
7	QM	M4090	Kumusi	*1895	W. MacGregor (14325)
44	QM	M4113	"	*1895	" (14331)
45	QM	M4099	-	1898	" (19494)
88	QM	M4114	Keremai	1894	" (11936)
116	QM	M4029	Oro	1892	" (9024)
130	QM	M4026	-	1897	" (16201)
595	AM	E6455	Oro	1892	" (9027)
599	AM	E6468	-	1897	" (16243)
609	AM	E37511	Wanigela	1934	Mrs. Money
775	AM	E6470	Kumusi R.	*1895	W. MacGregor (14330)
892	QM	M4047	Dyke Ackland Bay	1894	" (12010)
900	QM	M4091	Dugari	1897	" (16228)
912	QM	M5882	Collingwood Bay	1894	" (12002)
916	QM	M5919	Keremai	1894	" (11938)

NORTHEAST PAPUA 5

Localities. Seventeen of the nineteen localised specimens come from north of the mouth of the Musa River.

Number. 26.

Collectors. All but one are from the MacGregor Collection.

Dates. 1890 - 98, 1938.

References. Annual Reports on British New Guinea, 1888-9 to 1897-8; Williams, 1930:73, 84-85, fig. 19; Hinderling, 1949:55.

Figure. Plate All, figs. G and H, (no. 64).

Hafting features. A1, B3, C13, D14.

Handle. As NEP 1.

Hafting. Blade-separate socket unit as NEP 4, lashing as NEP 2.

Blade. 'Diorite' blades taper to butt, symmetrical oval section, convex and usually symmetrical cutting edge, faces curve to cutting edge but adze bevel generally detectable, finely finished. Blades of other stones taper to butt, are usually well finished and in general resemble the 'diorite' blades more closely than the 'nephrite-like' ones.

Function. Canoe making and general use. SAM A41203 glossed 'used for

shaping timber and cutting canoes'. See extract from Williams below.

Manufacturing tradition. T2.

Comments. 1. This has been considered to be the typical northern style.

2. Williams (1930:fig. 19) illustrates one of these implements in his description of Orokaiva axes and adzes quoted here in full (1930:84-5):

The Adze or Axe. The adze or axe blade (*oto*) is a ground river pebble. This is bound into a split tang, and the tang is driven into a groove in the forked branch which serves as a handle. Here it is held by a binding of plaited cane. The implement is either axe or adze according to the way the tang is turned.

The celt itself is made from a selected river pebble by pounding and rubbing. Very few nowadays remain in the villages, but those that I have seen vary considerably in size and form. So much depends on the original shape of the pebble selected and there is such an infinite variety of pebbles which a native can see are easily convertible into adze blades, that I think it would be unprofitable to attempt a classification.

The stone adze is still used to some small extent in the hollowing of canoes, but for all other purposes the stone has yielded place to imported steel.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A17 and A18), but the population appears to be quite variable (cf. Williams, 1930, quoted above). One small implement, no. 135 gives the lowest readings for V7 and V18, while no. 90 gives the highest readings for V7 and V20. V17 is skewed by no. 68. V19, the angle from below, demonstrates the variety of angles at which these blades might be set, although the readings are 30° (2), 40° (2), 60° (2), 70° (3), 80° (4), 90° (7), 95° (4) and 98° (1). Apart from the low scores, the blades appear to be fairly normally distributed around the adze setting of 90°. The ranges of the other skewed variables, apart from those causing the anomalies are: V7, 4.1 - 11.5 cm; V17, 7.7 - 16.6 cm; V18, 55° - 75°; and V20, 131 - 888 gm.

NORTHEAST PAPUA 5

No.	Repository	Reg. No.	Locality	Date	Collector
6	QM	M4014	Holnicote Bay	1892	W. MacGregor (9318)
16	QM	M4050	Kumusi R.	1894	" (12012)
23	QM	M4022	"	*1895	" (14328)
42	QM	M6299	Keremai	1894	" (11933)
64	QM	M5934	Kumusi R.	1894	" (12017)
66	QM	M5942	-	1897	" (16143)
68	QM	M4046	Collingwood Bay	1894	" (11992)

TABLE A17: Distribution of ratio scale features. NE Papua (NEP5). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	26	68.23	24.71	27	141	1.109	1.528
8	WIDTH OF BLADE - HAFT	26	53.38	8.93	32	71	-0.238	0.116
9	THICKNESS OF BLADE	26	19.38	4.76	8	27	-0.681	0.381
10	WIDTH OF BLADE - EDGE	26	59.38	12.93	33	84	-0.100	-0.343
11	LENGTH - CUTTING EDGE	26	66.04	15.22	36	93	-0.208	-0.340
12	ANGLE - CUTTING EDGE	26	58.12	8.56	40	75	-0.053	-0.255
13	LENGTH OF HANDLE	26	670.00	79.43	455	767	-0.955	0.441
14	SHAFT DIAMETER	25	20.20	2.83	16	25	0.422	-0.932
15	LENGTH OF FOOT	26	152.54	24.72	102	200	-0.250	-0.454
16	TOTAL LENGTH OF FOOT	26	296.31	49.60	217	427	0.519	0.488
17	POINT OF BALANCE	26	119.35	26.15	36	166	-1.228	2.644
18	ANGLE - B/FOOT - SIDE	26	65.58	6.53	45	75	-1.230	2.167
19	ANGLE - B/HANDLE - BELOW	25	75.92	21.22	30	98	-1.077	0.003
20	WEIGHT	25	568.32	272.76	131	1491	1.367	3.821
21	SPRT SOCKET LENGTH	26	202.81	26.45	147	271	0.187	0.631
22	SPRT SOCKET WIDTH	26	50.38	9.49	27	67	-0.445	0.025
34	% 10 ON 11 WC/LC	26	90.35	6.02	79	102	0.066	-0.696

TABLE A18: Distribution of nominal scale features. NE Papua (NEP5).

VARIABLE NUMBER	23	POLL OF BLADE	N=26			
CODE VALUE:	1	2				
FREQUENCY:	3	23				
PERCENTAGES:	11.5	88.5				
VARIABLE NUMBER	24	PLAN OF BLADE	N=26			
CODE VALUE:	0	1 2				
FREQUENCY:	1	3 22				
PERCENTAGES:	3.8	11.5 84.6				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=26			
CODE VALUE:	0	1 2 3				
FREQUENCY:	1	22 2 1				
PERCENTAGES:	3.8	84.6 7.7 3.8				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=26			
CODE VALUE:	0	1 2 3 4 5				
FREQUENCY:	1	16 2 1 5 1				
PERCENTAGES:	3.8	61.5 7.7 3.8 19.2 3.8				
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=26			
CODE VALUE:	2	3				
FREQUENCY:	21	5				
PERCENTAGES:	80.8	19.2				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=26			
CODE VALUE:	1	2				
FREQUENCY:	23	3				
PERCENTAGES:	88.5	11.5				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=26			
CODE VALUE:	0	1 2 3 4 7				
FREQUENCY:	1	0 17 0 7 1				
PERCENTAGES:	3.8	0.0 65.4 0.0 26.9 3.8				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=26			
CODE VALUE:	0					
FREQUENCY:	26					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=26			
CODE VALUE:	1	2 3 4				
FREQUENCY:	18	2 1 5				
PERCENTAGES:	69.2	7.7 3.8 19.2				
VARIABLE NUMBER	32	USE-WEAR	N=26			
CODE VALUE:	1	2 3 4 5				
FREQUENCY:	4	16 2 3 1				
PERCENTAGES:	15.4	61.5 7.7 11.5 3.8				
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=26			
CODE VALUE:	1	2 3				
FREQUENCY:	17	5 4				
PERCENTAGES:	65.4	19.2 15.4				

No.	Repository	Reg. No.	Locality	Date	Collector
90	QM	M4019	Mambare R.	1897	W. MacGregor (16159)
99	QM	M4087	Oro	1894	" (11943)
104	QM	M4043	Kumusi R.	1894	" (12013)
106	QM	M4016	Oro	1894	" (11944)
117	QM	M4117	-	1897	" (16171)
124	QM	M4070	-	1898	" (19495)
133	QM	M4024	Dyke Ackland Bay	1894	" (12009)
135	QM	M4118	Kumusi R.	1894	" (12014)
538	SAM	A41203	Mambare R.	1938	Howchin Coll
594	AM	E6447	Kumusi R.	1894	W. MacGregor (12024)
604	AM	E6440	-	1897	" (16233)
726	AM	E6466	-	1897	" (16152)
890	QM	M4034	Mambare R. mouth	1897	" (16160)
895	QM	M4051	Kumusi R.	1894	" (12019)
896	QM	M4005	"	1897	" (16224)
898	QM	M6158	"	1894	" (12016)
899	QM	M5920	"	1894	" (12022)
909	QM	M5923	Collingwood Bay	1894	" (11984)
915	QM	M4052	Keremai	1894	" (11935)

NORTHEAST PAPUA 6

Localities. Collingwood and Cloudy Bays.

Number. 2.

Collector. MacGregor.

Date. 1894.

References. Annual Reports on British New Guinea, 1891-2, 1893-4;
Le Roux, 1948: Pl. XCIX, fig. II 1.

Figure. Plate A12, figs. A and B, (no. 914).

Hafting features. A1, B3, C13, D16.

Handle. As NEP 1.

Hafting. Separate socket as NEP 4, lashing as NEP 3.

Blade. Nephrite-like blades, as NEP 1.

Function. Probably multi-purpose, but no direct references.

Manufacturing tradition. T2.

Comments. Apart from the separate socket which is a more typical

PLATE A12.

- A and B. NEP 6, 914, QM M4011, Cloudy Bay
C and D. NEP 7, 905, QM M4077, Mysin district.
E and F. RH 7, 871, PNGM E117.1 Awar, Hansa Bay.
G and H. RH 12, 652, AM E59065, Wantoat, Surawaged Mtns.

H



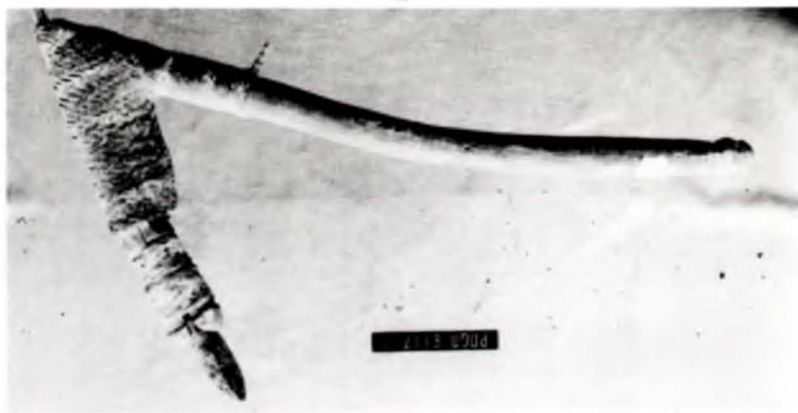
G



F



E



D



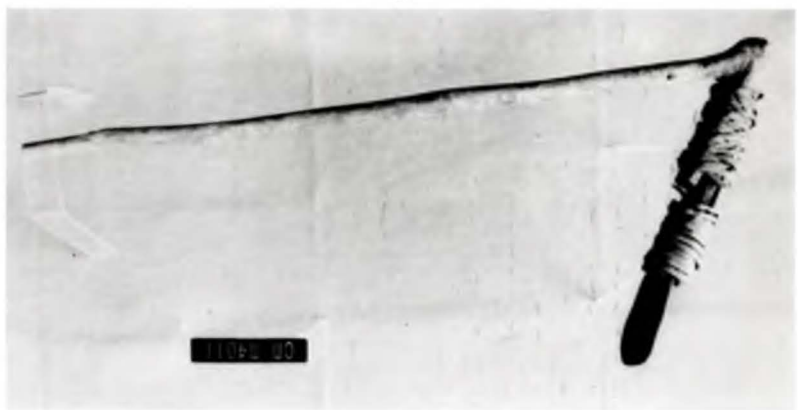
C



B



A



northern form, the other features are commonly southern forms, although the one figured by Le Roux comes from the Sawia Coast of the Huon Gulf.

Statistics. Too few implements.

NORTHEAST PAPUA 6

No.	Repository	Reg. No.	Locality	Date	Collector
65	QM	M6160	Collingwood Bay	1894	MacGregor (11999)
914	QM	M4011	Cloudy Bay	1894	" (11919)

NORTHEAST PAPUA 7

Locality. Maisina district of Collingwood Bay (southern half).

Number. 2.

Collector. MacGregor.

Date. Probably collected in 1890.

References. Annual Report on British New Guinea, 1890-91.

Figure. Plate A12, figs. C and D, (no. 905).

Hafting features. A1, B2, C12, D3.

Handle. Appears to have a rather sturdier handle than the other populations, with wider foot and slightly higher heel.

Hafting. The only NEP population to have one-piece separate sockets and also the only ones to use cane strip whipping for both the blade-separate socket lashings and the separate socket-handle lashings.

Blade. Nephrite-like as NEP 1.

Function. Probably multi-purpose, but no direct references.

Manufacturing tradition. T2.

Comment. 1. These two items have separate socket and lashing forms which were never repeated in MacGregor's later collections. I have been unable to determine if this is a form restricted to a particular village from where he never collected again, but it would appear likely, in which case the most probable places are the southernmost villages of the

Maisina district near Phillips Harbour.

2. Edge Partington (1890-98: Series II, Pl. 182, fig. 3) illustrates an adze from Clayton Inlet, Porlock Bay (east of the mouth of the Musa River) which may be like these. However, his sketches of New Guinea implements are rather inaccurate and, therefore, not completely to be trusted.

Statistics. Too few implements.

NORTHEAST PAPUA 7

No.	Repository	Reg. No.	Locality	Date	Collector
904	QM	M4076	Mysin	1892	W. Macgregor (8889)
905	QM	M4077	"	1892	" (8890)

NORTHEAST PAPUA 8

Locality. Orokaiva area.

Reference. Williams, 1930:58-60.

Hafting features. A1, B3, C?, D3.

Handle. The basic Northeast Papuan handle.

Hafting. The 'separate socket' is bound on with a cane strip whipping.

Blade. A straight wooden stick, the lower end of which has a hollow burnt in it.

Function. Sago pith pounder.

Manufacturing tradition. A variant of T2.

Comments. 1. The Orokaiva name for this implement is *evai*.

2. Williams reports that the Orokaiva use sago only in times of food shortages. It is interesting that a similar implement is not reported for Collingwood Bay (I can find no mention by MacGregor) where one NEP 1 implement (no. 603) is reported as used for sago pith.

2. No method of felling sago is given.

RAMU HUON 1

Locality. Morobe District.

Number. 1.

Collector. G.J. Leveen.

Date. 1932.

Figure. Not figured.

Hafting features. A1, B3, C13, D3.

Handle. Long thin shaft, foot almost at right angles with shaft, heel high, top of separate socket at same height as top of heel.

Hafting. Blade set in a carefully fitted hollow in the two-piece, separate socket. Separate socket held to foot by a long, very untidy, split cane whipping.

Blade. *Terebra* shell, columella not pierced.

Function. No information.

Manufacturing tradition. T2.

Comments. 1. The only *Terebra* blade from the New Guinea mainland.

2. The lashing is reminiscent of Astrolabe Bay, the lower Ramu, or Sepik, rather than that on any implements recorded from or referenced to the Morobe District.

Statistics. Too few implements.

RAMU HUON 1

No.	Repository	Reg. No.	Locality	Date	Collector
440	NMV	X40300	Morobe District	1932	G.J. Leveen

RAMU HUON 2

Locality. Huon Gulf, Umboi Island.

Number. 1.

Collector. Edge Partington.

Date. 1890's.

References. Edge Partington, 1890-98: Series III, Pl. 84; Bodrogi, 1961:58; Bodrogi, 1969: fig. 43.

Figure. Not illustrated.

Hafting features. A1, B3, C16, D12.

Handle. Long shaft, small heel, short toe, particularly the one recorded. Recorded implement plain but those illustrated by Bodrogi have incised patterns on the heel.

Hafting. The blade is set in a slotted, two-piece, separate socket. Blade-separate socket lashing a whole vine simple whipping. The lashing material of those illustrated is not clear but the method is the same. The separate socket-handle lashing is a band of coarse, split vine strip plait. The one figured by Bodrogi (1961:58) has a kind of a double twill pattern plait.

Blade. Edge Partington's implement has a very long *Tridacna* blade (34 cm) which has an almost circular section, although with a hollow along the back left by the shape of the hinge section of the shell. Compare Bodrogi, 1961: fig. 1b.

Function. The long blade of no. 206 renders the balance awkward, so it may be a non-utilitarian implement.

Manufacturing tradition. T2.

Comment. The implement recorded was figured by Edge Partington, but no location was given. The location "Huon Gulf" is written on the implement.

Statistics. Too few implements.

RAMU HUON 2

No.	Repository	Reg. No.	Locality	Date	Collector
206	AIM	13645	Huon Gulf	1890's	Edge Partington (U42a)

RAMU HUON 3

Localities. Tami Islands and nearby coasts, Umboi.

Number. 1.

Collector. S. Moriarty.

Date. ?

References. Finsch, 1888: Pl. I, fig. 4; Neuhauss, 1911:260; Le Roux, 1948: Pl. XCIX, fig. II 5; Hinderling, 1949:56; Bodrogi, 1969: fig. 42.

Figure. Not figured.

Hafting features. A1, B3, C13, D14.

Handle. Shaft relatively short, heel high and very elaborate. A face is carved on shaft of the implement recorded.

Hafting. Blade set in a two-piece separate socket and held in by plait bands made with fine strips (cf. NEP 5). The separate socket-handle lashings are also fine strip, plait bands. The separate socket of the one recorded has a double row of incised zig-zags along the front.

Blade. Adze-head made from a black stone (?basalt) having a flat, oval section. It is more symmetrical than many.

Function. Probably some specialised purpose judging by the care bestowed on it during manufacture.

Manufacturing tradition. T2.

Comments. 1. Bodrogi (1969:226) comments on the relationship of Umboi-Siassi within the trade ring which takes in Tami and Astrolabe Bay, and reports that his conclusions are in "perfect harmony" with the trade ring pattern. However, it should be pointed out that so far as the percussive cutting implements are concerned the link with Astrolabe Bay (RH 5) is tenuous, given the small amount of information I have available. The similarities of this population appear to lie more with the northern areas of Northeast Papua (cf. NEP 5, NEP 2), than with the Sepik or Ramu areas.

2. Neuhauss (1911:260) discusses the stone axes of the coastal area near the Tami Islands. His figure 175 shows a thin blade set in a C13 separate socket and held by fine strip plait bands. The handle has no heel (in contrast to the one recorded here) and is very elaborately carved, particularly on the shaft and terminal. He comments:

Steinbeile (Jabin: kiala. Bukaua: kiara. Sattelberg-Kai: kizu. Tami: mbalal) besitzt der Papua in jeder Art und Grosse, vom ziertlichen, für praktische Arbeit kaum verwendbaren, kleinen, rituellen Beile (fig. 175) bis zur mächtigen Steinart wo allein die Klinge mehrere kilo wiegt. Die Form ist immer diejenige, wie wir sie in Figur 175 sehen: das sogenannte Kniebeil. Die Steinklinge, welche hoch oder quer stehen kann, steckt in einem gespatehen Holze, in dem sie durch Rotanggeflecht festgeklemmt wird; dies Holz wird ebenfalls durch Rotanggeflecht an dem eigentlichen Holzgriff angebunden. Die Befestigungsweise ist unter Fortlassung der Geflechte in Figur 177 skizziert. Figur 174 (b u. c) zeigt zwei solcher Beilklingen. Ausser aus Serpentin fertigt man dieselben auch aus Tridakna-Muschel, und zum Glätten von Kanus werden sogar klingen aus harten Holze benutzt.

3. Neuhauss' description of the manufacture of stone blades (1911: 345) is partly translated in Bodrogi, 1961:87-88. He states that the material comes from the Salamaua peninsula.

Statistics. Too few implements.

RAMU HUON 3

No.	Repository	Reg. No.	Locality	Date	Collector
995	M	M163	Tami Is.	-	S. Moriarty

RAMU HUON 4

Locality. Tami Islands.

References. Hinderling, 1949:57-8; Bodrogi, 1961:58-9.

Hafting features. A1, B1, C1?, D2 or D22.

Handle. Heel-less handle, top of shaft close to foot marked by carved ledge, toe quite long. Upper part of shaft and heel decorated with incised patterns.

Hafting. The blade appears to be set against the flat face of the toe, perhaps with filler sticks at the side, and to be bound on with a long strip or cord whipping. The toe appears to have a ledge at the lower end at its back.

Blade. Plane-iron.

Function. Carving — the rougher work, as described by Bodrogi.

Manufacturing tradition. T1.

RAMU HUON 5

Locality. Astrolabe Bay (Bogadji, Bongu).

References. Finsch, 1888: Pl. I, fig. 3; Biro, 1901:81-83, fig. 40; Hinderling, 1949:59-60.

Hafting features. A1, B3, C13 or C17, D3 = Fig. 40, nos. 1 and 3, Bongu; A1, B3, C13 or C17, D4 = Fig. 40, no. 2, Bogadji.

Handle. Shaft relatively short, heel lower in the two specimens from than the one from Bogadji. The toe varies in length, and the face appears to be flat.

Hafting. Two-piece, separate socket, butt of blade not completely enclosed by wood pieces. Blade held in place by two rings of twisted split vine. The separate socket-handle lashing is either a simple, vine strip, whipping (Bongu) or a more elaborate whipping (Bogadji).

Blade. This tapers slightly to a rounded butt, with oval cross-section and asymmetric cutting edge. The blade is apparently well finished; black and green stones reported (Biro, 1901:83).

Function. Probably multi-purpose.

Manufacturing tradition. T2.

Comments. 1. Biro gives a considerable list of local names for parts of axes. The general names for the three he figures appear to be: No. 2 from Bogadji = *biara* (name at Krajet Is. = *ganai-ganai*); No. 1 from Bongu = *ssejam pat* (or *rhaj-pat*) (name at Bogadji = *bie-rhaj*); No. 3 from Bongu = *pat* (at Bogadji = *bie ssauete*).

2. This population might be sub-divided if more information was available.

3. These implements are more reminiscent of the lower Ramu (RH 6) or the Sepik area than of the Tami (RH 2, RH 3) or Northeast Papua.

RAMU HUON 6

Locality. Grenapu, Indibu and Kotari tribes, Ramu River.

Number. 1.

Collector. J. Wauchope.

Date. *1936.

References. Moyne, 1936:170-1, Pl. 49.

Figure. Not figured.

Hafting features. A1, B3.

Handle. Thick foot and slender shaft. The terminal has carved circles, while the heel has a knob on top.

Hafting. The blade is held in a tapering, two-piece separate socket which may be rounded or pointed at its top. The blade-separate socket lashing is made up of four overlapping fine strip, plait bands, while the separate socket is held against a groove in the toe by a long, split vine strip whipping. The back of the toe is ledged.

Blade. A streaky, fine grained, black stone, oval in section, and tapering, with an asymmetric cutting edge which is blunt and fluted.

Function. Probably multi-purpose.

Manufacturing tradition. T2.

Comments. Moyne (1936:170-1) describes this in a long passage:

At Grengapoo we had found the double-utility type of implement pegged into a wooden haft bent at right angles (Plate 49). The stone blade, finely polished to a sharp cutting edge, is bound firmly between two pieces of wood pointed like a peg. This peg, in its turn, is bedded into a carefully fitted semi-circular groove at the end of the bent haft. By merely turning the peg in the socket it can then be used either as an adze with a cutting edge at right angles to the haft, or as an axe with its blade in the same plane as the line of the handle. The stone from which these implements are made is the same as that used for the Mount Hagen and pygmy axes. Although we found one or two blades lenticular in section, they were mostly of the Indonesian pattern, with square lateral sides but without the splay from socket to blade-edge so noticeable in the Mount Hagen axe heads.

On asking for stone implements at Anabier, the same double-utility type was brought as we had found at Grengapoo, and the first double-headed axes we saw were at Asaingida lagoon.

This mixture of blades was not apparent where Blackwood was working further towards the mouth of the river. It is evident that the hafting remained in the Ramu style, despite the use of blades from the Central Interior quarries.

Statistics. Too few implements.

RAMU HUON 6

No.	Repository	Reg. No.	Locality	Date	Collector
577	AM	E46280	Grenapu, Indibu, and Kotari tribes	*1936	J. Wauchope

RAMU HUON 7

Locality. Rōm in the Ramu Bosmun group, near the junction of the Bosmun Bul and Ramu rivers, and five Bosmun villages at Awar, 25 m east of the Ramu mouth, possibly to Port Hadtzfeldt.

Number. 1.

Collector. Not stated.

Date. 1954.

References. Le Roux, 1948: Pl. XCIX, fig. II 4; Blackwood, 1951: 267-268; Hinderling, 1949:60.

Figure. Plate A12, figs. E and F.

Hafting features. A1, B3, C18, D9.

Handle. Heel-less, long shaft with 2 knobs at the terminal.

Hafting. Blade set in a two-piece separate socket and held by two bands of split vine plait set in a slot. The socket-handle lashing is a plaited cover, woven in twill patterns, which extends partway down the shaft. It is knotted into a rib along the back of the foot and shaft, where it ends in a tag. The top of the socket is slightly higher than the heel.

Blade. Made from a dark stone; Blackwood notes diabase and quartzite (1951:267). Thin oval section, asymmetric cutting edge, well finished.

Function. Probably multi-purpose.

Manufacturing tradition. T2.

Comments. 1. Blackwood's description derives from the Bosmun on the Ramu, and her description of the ordinary adzes in part runs as follows (1951:267-8):

The blade is hafted as an adze, i.e. with its cutting edge running transversely to the long axis of the shaft. The foreshaft [separate socket] with its blade is sometimes removed from the base and used as a hand-tool for fine work, but so far as I know it is never turned to bring the blade into the same plane as the shaft for use as an axe.

The generic term for a cutting tool is *tuaik*. Large ones were used for felling trees, trimming the outside of canoes, and similar heavy work. A typical specimen pointed out as suitable for such purposes measures 23 cm in length. It is pointed at the proximal end, its greatest width, 7.3 cm, is at the cutting edge: its maximum thickness (in the centre) is 4.5 cm.

Smaller adzes, *tuaik i gum*, were used for finer work, such as making food bowls, masks, figures, etc. The smallest collected measures 5 cm in length, 3.4 cm in width at the cutting edge, and has a maximum thickness (in the centre) of 1.2 cm.

Adze blades, both large and small, were occasionally made out of clam-shell (*Tridacna gigas*) obtained from the beach people.

2. The Bosmun also used RH 8, RH 9, and RH 10 for other purposes.

Statistics. Too few implements.

RAMU HUON 7

No.	Repository	Reg. No.	Locality	Date	Collector
871	PNGM	El17.1	Awar	1954	-

RAMU HUON 8

Locality. Bosmun village of Rōm on the Ramu.

References. Blackwood, 1951:268.

Hafting features. Presumably like RH 7.

Handle. Presumably like RH 7.

Hafting. Presumably like RH 7.

Blade. *Cassis*.

Function. For hollowing out the inside of canoes and slit-gongs a special tool (*rarong*) made of the rim of a *Cassis* shell was used. The natural curve of the shell makes the work easier. For the deeper parts it was fastened to a long handle (Blackwood, 1951:268).

Manufacturing tradition. T2.

Comments. The Bosmun also used RH 7, RH 9, and RH 10.

RAMU HUON 9

Locality. Bosmun village of Rōm on the Ramu.

Reference. Blackwood, 1951:268.

Hafting features. Presumably like RH 7, or as a chisel.

Handle. Presumably like RH 7, or a straight stick.

Hafting. Presumably like RH 7.

Blade. Stone, not tapering, edge flat.

Function. The rough outlining of carvings and incised designs was done with stone implements almost circular in section, with straight edges. These were sometimes hafted as adzes but were often used without a haft, as we use a cold chisel, and were tapped on the end with a hammer-stone (Blackwood, 1951:268).

Manufacturing tradition. T2 or chisel hafting.

Comments. 1. The Bosmun also used RH 7, RH 8, and RH 10.

2. Cf. MAS 9, MAS 14, and WI 15.

RAMU HUON 10

Locality. Bosmun village of Rōm on the Ramu.

Reference. Blackwood, 1951:268.

Hafting features. Presumably like RH 7.

Handle. Presumably like RH 7.

Hafting. Presumably like RH 7.

Blade. See below.

Function. Special tools are needed for working sago. For cutting down the sago-palms there was an adze with a stone blade almost circular in section, and a very blunt point as its cutting edge. The worker stood close to the trees with his back to it and struck between his legs (Blackwood, 1951:268).

Manufacturing tradition. T2?

Comments. 1. The Bosmun also used RH 7, RH 8, and RH 9.

2. Sago pith was pounded using a handle to which was attached a short piece of bamboo whose 'cutting edge' was formed from a node, which has a dimple shape (RH 11) (Blackwood, 1951:268).

RAMU HUON 11

Locality. Bosmun village of Rōm, on the Ramu.

Reference. Blackwood, 1951:268; Lewis, 1923: fig. 3.

Hafting features. Not within the present system.

Handle. One-piece wooden handle, footed.

Hafting. May have had a cord from the toe to the mid-shaft, or no lashing at all.

Blade. A node of bamboo fitted over the toe.

Function. Sago pith chopping.

Manufacturing tradition. A version of T2?

Comments. 1. The Bosmun also used RH 7, RH 8, RH 9, and RH 10. The last is a sago palm felling implement.

2. Lewis figures what may be a similar implement from Kayan and which is tentatively included here.

RAMU HUON 12

Locality. Wantoat, Surawaged Mountains, upper Markham?, north coast (Rai Coast)?.

Number. 7.

Collectors. Various.

Dates. 1920 - 1957.

References. Miklukha-Maclai, 1875:74-75; Galton, 1876:108.

Figure. Plate Al2, figs. G and H, (no. 652).

Hafting features. Al, Bl, Cl, D14 = no. 949; Al, Bl, C2, D14 = nos. 542, 543, 544, 545, and 652.

Handle. Thickish shaft, small heel, wide, flat or slightly hollowed, toe.

Hafting. Blade held against toe by a band of fine strip plait.

Blade. Tapering, relatively thick, oval section, adze bevel, hammer dressed to shape, without much grinding.

Function. Probably multi-purpose. Cutting edges burred and fluted.

Manufacturing tradition. Tl.

Comments. 1. Galton's (1876) translation of Miklukha-Maclai (1875) is more a paraphrase than a direct translation but it seems to be fairly faithful. Part is reproduced here:

The axe, which, though their chief implement is, no one will deny, a tool simple enough, consists of a hard, grey, green, or white stone which has become smooth and sharp by long polishing. Hatchets have been seen by Maclay in the "Archipelago of Contentment", which were made out of a thick clam (*Tridacna*) shell, instead of from stone. A portion of the stem of a tree, which has a branch passing off at an angle, somewhat like the numeral 7, is hewn off, and upon the branch [almost certainly meant to be the trunk], which has been cut off short and shaven flat at the top, the stone is laid horizontally and bound fast with lianas or various kinds of tree-barks. Such an implement can only be used to advantage by one accustomed to handle it; otherwise, either the stone is broken or nothing results. The aborigines, however, can with their axe, having a cutting edge of only two inches [5 cm] in breadth, fell a tree trunk of twenty inches [$\frac{1}{2}$ m] in diameter or carve with the same really fine figures upon a spear.

Every village possesses a large axe or two having a cutting edge about three inches broad, and which is wielded with both arms, while the ordinary axe of two inches edge is employed with the right arm only. The stone of the hatchets, a kind of agate, is confined to the mountain people, and is not found in superfluity. Each adult is in the possession of *only one* good axe, the large ones being kept by their owners as things of the utmost value and rarity (Galton, 1876:108).

2. The white stone of no. 652 has been identified as Wollastonite, a metamorphic aluminium silicate mineral. I am indebted to the Geology Department of the Australian Museum for the identification (D.R. Moore,

TABLE A19: Distribution of ratio scale features. Ramu-Huon (RH12). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	7	73.14	30.30	39	121	0.467	-0.672
8	WIDTH OF BLADE - HAFT	7	52.43	9.20	37	63	-0.454	-0.299
9	THICKNESS OF BLADE	7	28.57	5.22	22	35	-0.011	-1.124
10	WIDTH OF BLADE - EDGE	7	58.14	10.90	45	72	-0.020	-0.928
11	LENGTH - CUTTING EDGE	7	66.71	15.07	48	94	0.685	0.472
12	ANGLE - CUTTING EDGE	7	67.86	6.72	57	75	-0.320	-0.547
13	LENGTH OF HANDLE	7	482.14	79.73	396	584	0.207	-1.272
14	SHAFT DIAMETER	7	29.00	7.94	18	42	0.266	-0.082
15	LENGTH OF FOOT	7	201.71	38.22	153	265	0.377	-0.265
16	TOTAL LENGTH OF FOOT	7	274.86	57.23	192	352	-0.092	-0.546
17	POINT OF BALANCE	5	88.80	35.53	52	133	0.380	-0.827
18	ANGLE - B/FOOT - SIDE	7	55.71	9.76	45	70	0.247	-0.882
19	ANGLE - B/HANDLE - BELOW	7	91.43	3.78	90	100	2.268	3.643
20	WEIGHT	2 N TOO SMALL; COUNT <=3			430	1152		
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	7	88.00	8.47	74	98	-0.374	-0.361

TABLE A20: Distribution of nominal scale features. Ramu-Huon (RH12).

VARIABLE NUMBER	23	POLL OF BLADE	N=7				
CODE VALUE:	1	2					
FREQUENCY:	6	1					
PERCENTAGES:	85.7	14.3					
VARIABLE NUMBER	24	PLAN OF BLADE	N=7				
CODE VALUE:	2						
FREQUENCY:	7						
PERCENTAGES:	100.0						
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=7				
CODE VALUE:	1						
FREQUENCY:	7						
PERCENTAGES:	100.0						
VARIABLE NUMBER	26	PROFILE OF BLADE	N=7				
CODE VALUE:	1	2	3				
FREQUENCY:	5	1	1				
PERCENTAGES:	71.4	14.3	14.3				
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=7				
CODE VALUE:	2						
FREQUENCY:	7						
PERCENTAGES:	100.0						
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=7				
CODE VALUE:	1	2					
FREQUENCY:	3	4					
PERCENTAGES:	42.9	57.1					
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=7				
CODE VALUE:	2	3	4				
FREQUENCY:	6	0	1				
PERCENTAGES:	85.7	0.0	14.3				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=7				
CODE VALUE:	0						
FREQUENCY:	7						
PERCENTAGES:	100.0						
VARIABLE NUMBER	31	FINISH ON BLADE	N=7				
CODE VALUE:	3	4					
FREQUENCY:	4	3					
PERCENTAGES:	57.1	42.9					
VARIABLE NUMBER	32	USE-WEAR	N=7				
CODE VALUE:	2	3	4				
FREQUENCY:	5	1	1				
PERCENTAGES:	71.4	14.3	14.3				
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=7				
CODE VALUE:	1	2	3	4	5	7	
FREQUENCY:	2	4	0	0	0	1	
PERCENTAGES:	28.6	57.1	0.0	0.0	0.0	14.3	

letter 20/10/70). This white stone is known as *yakans* in Wantoat. Stone adzes "have a limited use today in the preparation of bamboo for house construction, i.e. crushing, splitting open and removal of interior nodes" (PNGM register). This no doubt explains why the blades are so blunt.

3. Cf. EI 1, EI 2, EI 3, and WI 18 - WI 21 which are very similarly hafted.

Statistics. All implements are included in the statistical descriptions (tables A19 and A20). Probably because of the small sample size, three variables are markedly non-normal, although the blade attributes are consistently clumped. The only markedly skewed feature, V19, shows six implements at 90°, with no. 949 set at 100°. However, the implements may be divided into two groups, one with thinner blades and shorter handles (nos. 542, 543, 544, and 949) the other with thicker blades and longer handles (nos. 530, 545, and 652). The ranges divide: V9, 2.2-2.8 cm/3.2-3.5 cm, and V13, 39.6-46.7 cm/53.3-58.4 cm.

RAMU HUON 12

No.	Repository	Reg. No.	Locality	Date	Collector
530	SAM	A11900	Aitape dist.?	1919	A.J. Hunter
542	SAM	A12190	Markham River	1920	Tyrrells Ltd.
543	SAM	A12191	" "	"	" "
544	SAM	A12192	" "	"	" "
545	SAM	A12193	" "	"	" "
652	AM	E59065	Wantoat	*1957	D.F. McMichael
949	IA	M TA44	Morobe District	pre-1936	Rabaul Coll (178)

RAMU HUON 13

Locality. Cape Gourdon (Port Hatzfeldt).

References. Finsch, 1888:23, Pl. I, fig. 6; Hinderling, 1949:60.

Hafting features. A1, B1, C1, D3.

Handle. From the sketch this implement appears to have a rather thin, short shaft with a short, heavy heel and thick toe. The terminal has a knob and the heaviness of the heel and toe are emphasised by raised, robust looking ornamentation.

Hafting. The blade is held against the flat, possibly sloped, toe by

a rattan strip whipping. The toe appears to be trimmed down where the lashing is placed.

Blade. *Hippopus* shell. The blade has a markedly concave shape to the front (like EB 13 from Witu). This may be a feature of *Hippopus*.

Function. No information.

Manufacturing tradition. Tl.

Comment. This is so distant from the other recorded provenances for Tl implements in the region that it must represent another population.

RAMU HUON 14

Locality. Mandok, Siassi Island.

References. Chinnery, 1926: Pl. 43.

Hafting features. A1, B1, C?, D3 or D27.

Handle. Small heel-less handle, short toe.

Hafting. The blade may be set on a flat face and is held by a simple whipping, the material of which is not discernible.

Blade. Shell, probably *Tridacna* or *Hippopus*, appears to be parallel sided.

Function. Chinnery's picture shows a woman breaking nuts. This would seem to be a degeneration following the replacement of shell by metal.

Manufacturing tradition. Tl.

Comments. Compare Moseley's comment about the use of FJ 1 implements for cracking nuts after their previous functions had been superseded by iron.

RAMU HUON 15

Locality. Potsdamhaven.

Number. 1.

Collector. S. Payne.

Date. 1958.

References.

Figure. Not figured.

Hafting features. A1, B3, C12, D3.

Handle. Heel-less, longish toe.

Hafting. Blade is set in a one-piece, separate socket which has almost split in two, presumably in the course of use. The blade is held in place by a neat cross-over split vine whipping. The socket reaches to the top of the foot and is held by a similarly neat, crossed, split vine whipping.

Blade. Small, perhaps basalt, partly ground, with a blunt edge.

Function. No direct information.

Manufacturing tradition. T2.

Comments. Perhaps closest to SEP 4.

Statistics. Too few implements.

RAMU HUON 15

No.	Repository	Reg. No.	Locality	Date	Collector
167	AIM	35278	Potsdamhaven	1958	S. Payne

RAMU HUON 16

Locality. Lokanu, Huon Gulf.

Reference. Lewis, 1923:19, fig. 9.

Hafting features. A1, B3, C13, D12.

Handle. Long round shaft, small heel, wide toe.

Hafting. The toe is slightly hollowed to take the top of the plain separate socket. The blade-separate socket lashings seem to be a simple whipping, the separate socket-handle lashings a wide plait band.

Blade. A cone-shaped stone blade with a roughly flattened 'edge'.

Function. Sago pith chopping.

Manufacturing tradition. T2.

Comments. 1. The style of this implement is very similar to the other Huon Gulf and Tami implements (RH 2 and RH 3).

2. No sago felling implement has been located but in view of the evidence assembled in Chapter 25, a similarly hafted implement with a rough blade might yet be recorded. (cf. RH 11.)

RAMU HUON 17

Locality. Islands off the north of the Huon Peninsula.

Reference. Hinderling, 1949:59.

Hafting features. A1, B3, C11?, D?.

Handle. Footed handle.

Hafting. Blade set in a tubular separate socket.

Blade. Stone blade.

Function.

Manufacturing tradition. T2.

Comments. As Hinderling describes them as *Hülsenbeile*, they may be like EB 11.

SEPIK 1

Locality. Hills between Aitape and the mid-Sepik. Schultze Jena records one from village 30, just west of the Yellow River and Sepik confluence.

Number. 6.

Collectors. Various.

Dates. 1899 - 1970.

References. Schultze Jena, 1914: Pl. 37, fig. 9; Le Roux, 1948: Pl. C, fig. II 10; Hinderling, 1949:60-1.

Figure. Plate Al3, figs. A and B, (no. 783).

Hafting features. Al, B3, Cl3, D12 = nos. 319, 783; Al, B3, Cl3, D14 = no. 873; Al, B3, Cl4, D14 = no. 806; Al, B3, Cl8, D12 = no. 730; Al, B3, Cl8, D14 = no. 736.

Handle. Solid shaft, heel-less to high heel. Heel may be carved into a knob. Handle may be decoratively incised. Face of toe may be grooved.

Hafting. Blade held in several variations of the separate sockets, although it seems to be a matter of preference whether the socket top is pointed or round. The blade-separate socket lashings range from simple whippings of split vine, to rings of twisted or plaited split cane. One (no. 736) has no special blade-separate socket lashing. The separate socket-handle lashing is a plaited band worked from fine or coarse strips.

Blade. Tapering with rounded-out sides, and oval section. Stones metamorphic. Usage has left either slightly rough or fluted traces.

Function. Probably multi-purpose, no evidence of sago chopping.

Manufacturing tradition. T2.

Comments. 1. Schultze Jena collected a specimen of SEP 8 with the one from village 30.

2. No. 806 is supposed to have been collected on Sohano Island in Buka Passage. Cf. no. 209 (SEP 3). This appears on present evidence to be incorrect as an original provenance. It is not mentioned by Hinderling (1949).

TABLE A21: Distribution of ratio scale features. Sepik (SEPl). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	6	63.00	29.42	24	102	-0.084	-0.599
8	WIDTH OF BLADE - HAFT	6	49.00	11.14	36	68	0.776	0.504
9	THICKNESS OF BLADE	6	23.83	7.31	13	30	-0.631	-0.711
10	WIDTH OF BLADE - EDGE	6	55.00	16.16	39	83	1.040	0.422
11	LENGTH - CUTTING EDGE	6	61.50	16.72	43	90	0.873	0.406
12	ANGLE - CUTTING EDGE	6	70.50	6.60	65	83	1.412	1.623
13	LENGTH OF HANDLE	6	611.50	124.89	457	754	-0.056	-1.246
14	SHAFT DIAMETER	6	30.33	6.28	20	39	-0.445	0.666
15	LENGTH OF FOOT	6	261.00	47.59	210	337	0.709	-0.194
16	TOTAL LENGTH OF FOOT	6	377.50	82.09	294	486	0.510	-0.876
17	POINT OF BALANCE	5	105.60	48.26	50	175	0.469	0.093
18	ANGLE - B/FOOT - SIDE	6	64.17	9.70	55	80	0.699	-0.052
19	ANGLE - B/HANDLE - BELOW	6	87.50	14.05	70	110	0.372	0.201
20	WEIGHT	6	965.83	465.64	398	1637	0.171	-0.474
21	SPRT SOCKET LENGTH	6	255.33	37.00	205	290	-0.356	-1.051
22	SPRT SOCKET WIDTH	6	54.83	8.57	42	65	-0.130	-0.216
34	% 10 ON 11 WC/LC	6	89.17	3.37	84	92	-0.766	-0.542

TABLE A22: Distribution of nominal scale features. Sepik (SEP1).

VARIABLE NUMBER	23	POLL OF BLADE	N=6
CODE VALUE:	2		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	24	PLAN OF BLADE	N=6
CODE VALUE:	2		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=6
CODE VALUE:	1		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	26	PROFILE OF BLADE	N=6
CODE VALUE:	1	2 3 4	
PERCENTAGES:	50.0	33.3 0.0 16.7	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=6
CODE VALUE:	2	3	
FREQUENCY:	5	1	
PERCENTAGES:	83.3	16.7	
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=6
CODE VALUE:	1	2	
FREQUENCY:	4	2	
PERCENTAGES:	66.7	33.3	
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=6
CODE VALUE:	2	3 4	
FREQUENCY:	5	0 1	
PERCENTAGES:	83.3	0.0 16.7	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=6
CODE VALUE:	0		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	31	FINISH ON BLADE	N=6
CODE VALUE:	1	2 3 4	
FREQUENCY:	2	2 1 1	
PERCENTAGES:	33.3	33.3 16.7 16.7	
VARIABLE NUMBER	32	USE-WEAR	N=6
CODE VALUE:	2	3 4 5	
FREQUENCY:	1	2 2 1	
PERCENTAGES:	16.7	33.3 33.3 16.7	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=6
CODE VALUE:	1	2	
FREQUENCY:	3	3	
PERCENTAGES:	50.0	50.0	

Statistics. All implements are included in the statistical descriptions (tables A21, A22). The skewing, predictable in such a small sample, shows one implement with a very wide blade (no. 319) and one with a very blunt blade (no. 873). The range of V10 otherwise is 3.9 - 6.5 cm, and of V12 is 65° - 70°. Similarly V13 divides into two handle length groups 45.7 - 52.8 cm and 69.5 - 75.4 cm.

SEPIK 1

No.	Repository	Reg. No.	Locality	Date	Collector
319	OM	D21.243	Sepik R.	1899	H. Richards
730	AM	E17128	Sepik area	1909	E. Schmidt
736	AM	E43410	Weiss, Sepik	1936	A.J. Marshall
783	AM	E44485	Woriatangi	1938	H.D. Eve
806	PNGM	E754	?Sohano, Bougainville	1961	F. Ridland
873	PNGM	E5765	Aitape	1970	R. Smith

SEPIK 2

Locality. Yambon, near Ambunti.

Number. 1.

Collector. Unknown.

Date. 1969.

Reference.

Figure. Not figured.

Hafting features. A1, B3, C17, D12.

Handle. Heel-less, shaft ornamentally carved, crocodile carved on the terminal.

Hafting. Blade set in a two-piece separate socket with no lashing modification. Blade-separate socket lashing is four twisted cane rings, and separate socket-handle lashing is a wide plait band made from coarse strips of split vine.

Blade. A bullet-shaped blade which has been hammer dressed to shape from a metamorphic rock (cf. SEP 9, RH 10).

Function. Sago palm felling judging by the blade shape, but this

PLATE A13.

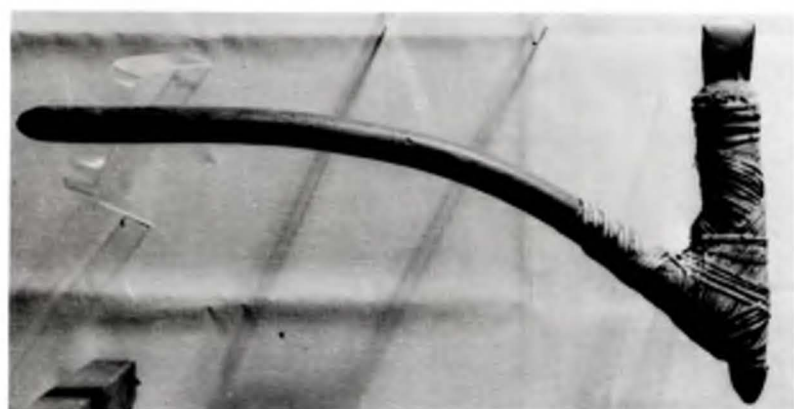
- A and B. SEP 1, 783, AM E44485, Woriatangi, Sepik.
- C and D. SEP 4, 615, AM E18115, 168km from Sepik R mouth.
- E and F. SEP 7, 300, DM O 737, North New Guinea.
- G and H. SEP 8, 382, CM E163.1127, Mowi, Sepik R.



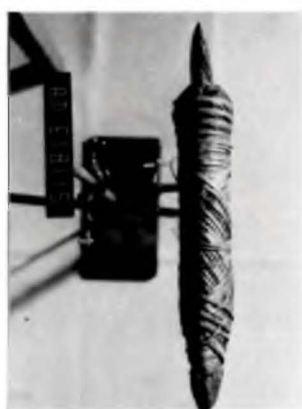
A



B



C



D



E



F



G



H

specimen was possibly also used to chop pith as the tip is slightly glossy (cf. comments).

Manufacturing tradition. T2.

Comments. This may not be a traditional example of the form as its handle appears, from the sharpness of the carvings, to have been artificially aged. Same locality as SEP 6.

SEPIK 2

No.	Repository	Reg. No.	Locality	Date	Collector
826	PNGM	E3988	Yambon	1969	-

SEPIK 3

Locality. Malinkam, south of Torricelli Range, inland of Matapau, Berlin Harbour.

Number. 1.

Collector. G.A.V. Stanley.

Date. 1931.

References. Parkinson, 1900:36, Pl. 19, fig. 3; Lewis, 1923: fig. 7.

Figure. Not figured.

Hafting features. A1, B3, C18, D14.

Handle. Plain shaft with high heel and short toe.

Hafting. The two-piece separate socket is ledged to take the lashing of four twisted cane rings, with a plait ring in the centre which holds the blade. The separate socket-handle lashing is a wide plait band made with fine strips. There is also a skimpy, split vine lashing.

Blade. 'Dimpled' ended blade finely finished, and worked from a mottled 'diorite' rock. The edges of the nearly circular rim of the hollow are battered, although the chips are almost obliterated by the very high gloss.

Function. Sago pith chopping.

Manufacturing tradition. T2.

Comments. 1. This blade appears to have been traded from the Humboldt Bay area (cf. NIJ 2).

2. The sago pith chopper figured by Parkinson (1900: Pl. XIX, fig. 3) appears to have a flaked core-like blade similar to those which are hafted very differently among the Sepik hill people (WI 7). Parkinson gives no location, but the paper concerns the Aitape area (Berlinhafen).

Statistics. Too few implements.

SEPIK 3

No.	Repository	Reg. No.	Locality	Date	Collector
589	AM	E34369	Malinkam	1931	G.A.V. Stanley

SEPIK 4

Localities. Sepik River to west of the Korewori confluence. The Torricelli mountains and an undetermined distance up the southern tributaries of the lower Sepik. The coast at Dallman Harbour.

Number. 22.

Collectors. For the Sepik itself, E. Schmidt; the Torricelli hinterland of Matapau, G.A.V. Stanley.

Dates. 1909 - 1965.

References. Finsch, 1888: Pl. 1, fig. 7; Parkinson, 1900:36, Pl. 19, figs. 1 and 2; Schultze Jena, 1914: Pl. XXXVII, figs. p, q and r; Haddon, 1920: map; Behrmann, 1922:54, 125-6, 258; Mead, 1938:315-6, fig. 93; Hinderling, 1949:62; Koch, 1968: fig. 206.

Figure. Plate A13, figs. C and D, (no. 615).

Hafting features. A1, B3, C18, D4 = nos. 310, 313, 537, 518, 575, 576, 613, 615, 616, 670, 732, 734, 737, 781, and 782; A1, B3, C18, D17 = no. 209; A1, B3, C19, D4 = no. 239; A1, B3, C21, D4 = nos. 397, 579, 735, 779, and 780.

Handle. Generally light, small foot and heel, terminal of shaft often ornamented.

Hafting. Blade set in a two-piece separate socket usually without

lashing modification. Eighteen have a knobbed top. The blade-separate socket lashings are usually 2-5 rings twisted from split cane, but the implements from Siauti, Rintepiu, Aitape and the Torricelli area tend to have plaited rings. No. 209 has a bark strip blade-separate socket lashing. Separate socket-handle lashings are all long strip whippings; no. 209 is of bark, the rest are of split vine, while no. 780 has a partly interwoven whipping.

Blades. Small, tapered to butt, usually with rounded-out sides, oval section with relatively high curvature. All are metamorphic rocks such as 'schist', or 'greywacke', but one each of 'diorite' and 'granite', and two of shell were distinguished. The shell blades are hafted in implements no. 780 and 209. The cutting edge varies considerably in width, one very narrow blade having natural cleavage faces forming a squared section.

Function. No evidence of sago chopping; probably ordinary adzes, possibly used in sculpture. The range of sizes suggests a range of tasks (cf. SC 1).

Manufacturing tradition. T2.

Comments. 1. SEP 4 and SEP 6 have a range of localities extending up the river to 187 km and shown by Haddon in the map of the Sepik (1920). Schultze Jena records one from village 28 which appears to have been about 10 m west of Ambunti near the Amer Lagoon. I have made the following tentative correlation of his and Schmidt's localities. Schultze Jena Village 4 = Sigrin, V5 = Mangot, V6 (Imbando) = village at 60 km, V7 (Angoram, Walem) = Dolem, V10 (Kambrinum, Kambringi) = Gambrium, V13 or V14 (Kanduaru or Kapokapi) = Radia, (V16, Moangri, is represented by Schultze Jena, 1914: Pl. XXXVII, figs. q and r), V17 (Timbunke) = Matembe, V18 (Angerman) = village at 168 km, and V20 (Kararau) = Faunda. Schmidt's collection was originally housed in the Australian Museum.

2. Mead's description (1938:315-6) of Mountain Arapesh use of adzes is interesting:

They can re-string a bow and re-haft an adze, even cutting a new haft, but this is the limit of their skill. If a celt breaks they reappropriate it to sago cutting. They obtain their adzes and axes, already hafted, from the interior and also from the coast. The celts from both directions are somewhat triangular in shape, but those said to come from the interior, have a pronounced ridge and a more widely flaring base. But as stone tools are no longer used, and many intermediate forms were found, the evidence on this subject is poor. The haft of a

large adze, a small carving adze, an axe, and sago cutting tool with its tube-shaped stone, all follow the same pattern. A shaft is cut from the branch of a tree in such a way that part of the trunk can be used to form the foot. Against the foot of the shaft there is then lashed what I shall term the blade support, a round branch which is fastened at near right angles to the shaft, in the split end of which the stone blade is inserted. The foot of the blade support sometimes juts out and may be carved in full relief. The hafting fastening consists of an interlocking rattan lash and a series of rattan rings which are plaited tightly at the narrowest point and forced down over the part which holds the stone by blows from a wooden tool shaped like an adze and made for this purpose.

I cannot tell from the figure (93) whether the separate socket-blade lashing is plaited, but the Mountain Arapesh implements would seem to support the suggestion made above that plait rings are a feature of the hills rather than the river basin.

3. No. 209 is an unusual implement which is most like SEP 4. It and no. 239 appear to be wrongly located.

4. Hinderling does not subdivide SEP 4 and SEP 8.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A23, A24) and the distributions are remarkably near normal. It is obvious that the occasional large measurement is skewing V7, V9 and V20. Blade variability is confirmed by table A24.

SEPIK 4

No.	Repository	Reg. No.	Locality	Date	Collector
209	AIM	2845	?Solomon Is.?	1928	H. Kinder
239	AIM	9172	?New Britain?	1922	B.J. Boulter
310	OM	D23.1072	Matembe, 145 km	1909	E. Schmidt
313	OM	D22.720	Sepik	1922	Tost & Rohu
397	CM	E170.29	Gambrium, 92 km	1909	E. Schmidt
437	NMV	X70501	Sepik	1965	J. Waterhouse
518	SAM	A42767	Siauti	1951	G. Blythe
575	AM	E34366	S. of Torricelli	1931	G.A.V. Stanley
576	AM	E34368	" "	"	" "
579	AM	E18118	Village at 60 km	1909	E. Schmidt
613	AM	E34367	S. of Torricelli	1931	G.A.V. Stanley
615	AM	E18115	Village at 168 km	1909	E. Schmidt
616	AM	E18116	Faunda, 187 km	"	"
670	AM	E34364	S. of Torricelli	1931	G.A.V. Stanley
732	AM	E34365	" "	"	" "
734	AM	E34361	" "	"	" "
735	AM	E24553	Sepik	1917	J. Stacey
737	AM	E38247	Aitape district	1935	Oil Search Ltd.
779	AM	E18117	Dolem, 71 km	1909	E. Schmidt
780	AM	E18126	Rintepiu (Rintejao)	"	"
781	AM	E18122	Sigrin, 35 km	"	"
782	AM	E18124	Rintepiu (Rintejao)	"	"

TABLE A23: Distribution of ratio scale features. Sepik (SEP4). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	22	69.09	25.88	26	140	0.847	1.046
8	WIDTH OF BLADE - HAFT	22	50.05	15.59	15	75	-0.357	-0.453
9	THICKNESS OF BLADE	22	24.45	8.88	14	50	0.970	1.311
10	WIDTH OF BLADE - EDGE	22	55.23	19.33	16	92	0.218	-0.399
11	LENGTH - CUTTING EDGE	22	63.59	25.22	17	112	0.303	-0.658
12	ANGLE - CUTTING EDGE	22	65.14	5.51	55	75	0.161	-0.383
13	LENGTH OF HANDLE	22	522.59	99.00	378	755	0.506	-0.164
14	SHAFT DIAMETER	22	32.45	7.76	18	44	-0.212	-0.931
15	LENGTH OF FOOT	22	147.18	35.56	100	227	0.791	-0.085
16	TOTAL LENGTH OF FOOT	22	354.27	70.57	240	526	0.465	-0.003
17	POINT OF BALANCE	22	95.77	36.43	20	170	0.209	0.017
18	ANGLE - B/FOOT - SIDE	22	67.05	7.51	55	85	0.583	-0.032
19	ANGLE - B/HANDLE - BELOW	22	63.64	39.16	-10	115	-0.948	-0.586
20	WEIGHT	22	852.91	534.83	232	2349	0.918	0.875
21	SPRT SOCKET LENGTH	22	285.64	60.96	162	390	0.151	-0.424
22	SPRT SOCKET WIDTH	22	57.77	16.32	26	84	-0.209	-0.878
34	% 10 ON 11 WC/LC	22	88.82	9.26	69	106	-0.570	0.055

TABLE A24: Distribution of nominal scale features. Sepik (SEP4).

VARIABLE NUMBER	23	POLL OF BLADE	N=22			
CODE VALUE:	1	2	3			
FREQUENCY:	1	20	1			
PERCENTAGES:	4.5	90.9	4.5			
VARIABLE NUMBER	24	PLAN OF BLADE	N=22			
CODE VALUE:	1	2				
FREQUENCY:	3	19				
PERCENTAGES:	13.6	86.4				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=22			
CODE VALUE:	1	2				
FREQUENCY:	17	5				
PERCENTAGES:	77.3	22.7				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=22			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	14	4	1	1	2	
PERCENTAGES:	63.6	18.2	4.5	4.5	9.1	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=22			
CODE VALUE:	1	2	3			
FREQUENCY:	2	19	1			
PERCENTAGES:	9.1	86.4	4.5			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=22			
CODE VALUE:	1	2				
FREQUENCY:	20	2				
PERCENTAGES:	90.9	9.1				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=22			
CODE VALUE:	2	3	4	5	6	7
FREQUENCY:	18	2	1	0	0	1
PERCENTAGES:	81.8	9.1	4.5	0.0	0.0	4.5
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=22			
CODE VALUE:	0					
FREQUENCY:	22					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=22			
CODE VALUE:	1	2	3	4		
FREQUENCY:	3	5	9	5		
PERCENTAGES:	13.6	22.7	40.9	22.7		
VARIABLE NUMBER	32	USE-WEAR	N=22			
CODE VALUE:	1	2	3	4		
FREQUENCY:	4	7	5	6		
PERCENTAGES:	18.2	31.8	22.7	27.3		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=22			
CODE VALUE:	1	2	3	4	5	7
FREQUENCY:	6	14	0	0	0	2
PERCENTAGES:	27.3	63.6	0.0	0.0	0.0	9.1

SEPIK 5

Locality. Jambon, Sepik River.

References. Lewis, 1923: fig. 10.

Hafting features. As SEP 4 and SEP 6.

Style. As SEP 4 and SEP 6.

Function. Sago palm fellers. The blades appear to be of the common bullet shape.

Comments. 1. Unrecorded, possibly because of disappearance as a result of the introduction of metal axes.

2. Lewis records his item as a pith chopper but this may be a post-metal phenomenon as a modern Arapesh sago pounder photographed by D. Tuzin (pers. comm.), has a round sectioned blade, perhaps a broken version of the bullet blades.

3. From the same locality as SEP 2, which implements may also have been used as pith choppers.

SEPIK 6

Localities. As SEP 4.

Number. 6.

Collectors. Schmidt is the most important.

Dates. 1909 - 1971.

References. Koch, 1968: fig. 205.

Figure. Not figured.

Hafting features. A1, B3, C18, D4 = nos. 311, 314, 322, 517, and 987; A1, B3, C21, D4 = no. 578.

Handle. As SEP 4.

Hafting. As SEP 4.

Blades. As SEP 4, but very blunt. Old adze blades. Compare tables A24 and A26.

Function. Sago pith choppers. The gloss is never very high.

TABLE A25: Distribution of ratio scale features. Sepik (SEP6). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	6	48.50	27.25	21	100	1.373	1.642
8	WIDTH OF BLADE - HAFT	6	49.83	8.80	36	61	-0.427	-0.007
9	THICKNESS OF BLADE	6	24.50	9.07	14	40	0.829	0.499
10	WIDTH OF BLADE - EDGE	6	53.17	10.46	35	66	-0.807	0.828
11	LENGTH - CUTTING EDGE	6	59.00	11.22	39	73	-0.907	1.180
12	ANGLE - CUTTING EDGE	6	72.50	9.35	60	85	0.0	-0.595
13	LENGTH OF HANDLE	6	537.33	72.58	422	624	-0.510	-0.046
14	SHAFT DIAMETER	6	31.67	10.54	22	50	0.995	0.476
15	LENGTH OF FOOT	6	159.83	30.48	125	216	1.161	1.432
16	TOTAL LENGTH OF FOOT	6	342.50	126.06	207	538	0.422	-0.287
17	POINT OF BALANCE	6	92.17	23.41	45	105	-1.927	2.570
18	ANGLE - B/FOOT - SIDE	6	75.00	10.00	60	90	0.0	0.417
19	ANGLE - B/HANDLE - BELOW	6	60.83	46.74	-5	100	-0.664	-0.841
20	WEIGHT	6	793.50	529.63	261	1512	0.546	-0.846
21	SPRT SOCKET LENGTH	6	292.67	99.30	175	430	0.120	-0.755
22	SPRT SOCKET WIDTH	6	59.50	15.40	46	87	1.201	0.689
34	% 10 ON 11 WC/LC	6	90.00	4.15	82	93	-1.577	1.813

TABLE A26: Distribution of nominal scale features. Sepik (SEP6).

VARIABLE NUMBER	23	POLL OF BLADE	N=6		
CODE VALUE:	2				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	24	PLAN OF BLADE	N=6		
CODE VALUE:	1	2			
FREQUENCY:	1	5			
PERCENTAGES:	16.7	83.3			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=6		
CODE VALUE:	1				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=6		
CODE VALUE:	1	2	3	4	5
FREQUENCY:	4	1	0	0	1
PERCENTAGES:	66.7	16.7	0.0	0.0	16.7
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=6		
CODE VALUE:	1	2			
FREQUENCY:	1	5			
PERCENTAGES:	16.7	83.3			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=6		
CODE VALUE:	1	2			
FREQUENCY:	5	1			
PERCENTAGES:	83.3	16.7			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=6		
CODE VALUE:	2	3	4		
FREQUENCY:	5	0	1		
PERCENTAGES:	83.3	0.0	16.7		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=6		
CODE VALUE:	0				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=6		
CODE VALUE:	1	2	3	4	
FREQUENCY:	1	0	3	2	
PERCENTAGES:	16.7	0.0	50.0	33.3	
VARIABLE NUMBER	32	USE-WEAR	N=6		
CODE VALUE:	3	4	5		
FREQUENCY:	1	0	5		
PERCENTAGES:	16.7	0.0	83.3		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=6		
CODE VALUE:	1	2			
FREQUENCY:	2	4			
PERCENTAGES:	33.3	66.7			

Manufacturing tradition. T2.

Comments. 1. Compare Mead's statement that blades which lose their edges are relegated to pith choppers (SEP 4). No 'tube-shaped' blades were recorded, but D. Tuzin showed me a photograph of an Arapesh sago pounder which has a broken ended round sectioned blade. This may be a broken dimple ended or bullet shaped blade, or simply a conveniently shaped pebble.

2. No. 987 is very unusual and may perhaps be non-utilitarian. It has an elaborate cane collar and a wide flat face on the top of the separate socket. It may, in some respects, be intermediate between the Sepik basin and the Central Interior populations.

3. In view of SEP 15, a specialised sago pith chopper, this may be a post-metal use.

Statistics. All implements are included in the statistical descriptions (tables A25, A26). Variables 7, 15, 17, 22 and 34 are all skewed, V7 and V34 by no. 987, V15 and V22 by no. 314, and V17 by no. 311. Without these the ranges are: V7, 2.1 - 4.8 cm; V15, 12.5 - 16.3 cm; V17, 9.5 - 10.5 cm; V22, 4.6 - 6.8 cm; and V34, 90 - 93.

SEPIK 6

No.	Repository	Reg. No.	Locality	Date	Collector
311	OM	D65.385	Bainyik	1965	L.R. Neville-Burgin
314	OM	D24.1044	Sepik	1924	Tost & Rohu
322	OM	D19.325	Radia, 120 km	1909	E. Schmidt
517	SAM	A42766	Siauti	1951	G. Blythe
578	AM	E18119	Mangot, 45 km	1909	E. Schmidt
987	DL	-	Erem?, Yuat R.	*1971	D. Laycock

SEPIK 7

Localities. Probably lower Sepik, perhaps the estuary area.

Number. 2.

Collectors.

Dates. Probably before 1900.

References.

Figure. Plate A13, figs. E and F, (no. 300).

Hafting features. A1, B3, C21, D9.

Handle. A very small, almost vestigial foot. End of shaft knobbed.

Hafting. Blade held in a two-piece separate socket by three twisted (no. 300) or three plaited (no. 395) rings. The top of the separate socket is carved into front and back facing masks (no. 395 has holes in the noses, one with a tag through it). The separate socket-handle lashings are very similar, split vine interwoven covers which extend a short way down the shaft. No. 300 has a two-ply, twisted cord attached to both ends of the separate socket, perhaps for carrying. It could also be a tensioned cord (cf. SC 1, NIJ 1). Its separate socket is ornamented with two rows of chevrons at the lower end.

Blade. Small and neat, sides bulge, section oval, verging on a lens shape but with rounded sides. Mottled metamorphic stone.

Function. Possibly non-utilitarian.

Manufacturing tradition. T2.

Comments. 1. The lashing is closer to Blackwood's Awar style (RH 7) but the blade-separate socket lashing is like SEP 4 - SEP 6. Compare also the items from Rintepiu, especially no. 780 (SEP 4), which has a partly interwoven (plaited) lashing. Once again the presence of plaited rings on no. 395's blade-separate socket lashings suggest a coastal or coastal hill provenance.

2. No. 395 is covered with a smoky grime which overlies a red colouring.

Statistics. Too few implements.

SEPIK 7

No.	Repository	Reg. No.	Locality	Date	Collector
300	DM	O 737	N. New Guinea	-	Oldman Coll
395	CM	E118.15	New Guinea	pre-1900	B.M. Moorehouse

SEPIK 8

Localities. Yellow River to May River.

Number. 16.

Collectors. Mainly from P. Temple.

Dates. 1958 - 70.

References. Schultze Jena, 1914: Pl. XXXVII, fig. h; Le Roux, 1948: Pl. XC, fig. II 9.

Figure. Plate A13, figs. G and H, (no. 382).

Hafting features. A1, B3, C18, D9 = nos. 514, 515, 997, and 820; A1, B3, C20, D9 = nos. 156, 372, 373, 374, 380, 381, 382, 384, 733, 807, and 998.

Handle. Handles usually heel-less or with a very short heel. Generally heavier overall than SEP 4, 5, or 6, with a thicker shaft and foot.

Hafting. The blade is set in a two-piece, separate socket which is usually not knobbed at the top. It is very solid. In all cases except one (no. 514) the blade-separate socket lashing is a simple split vine whipping. No. 514 has a wide plait band like some of SEP 1. The separate socket-handle lashing is very distinctive. It is a plaited cover over the toe, heel and upper shaft which is knotted up the sides and along the back to make a rib. The edges around the wood are finished with thicker rings.

Blades. Essentially similar to those from the lower reaches, but the cross section seems to be a lower oval, and the blades appear to be generally larger - longer, thicker, and less tapered. Apart from two which appear 'nephrite-like' the rest are made from metamorphic rocks, one of which was distinguished as 'schist'. No. 820 has a blade like those in WI 10.

Function. Probably multi-purpose. The use-wear is of grades 1 or 2. No traces of the fluted use-wear (3) were noted so possibly they were not used consistently for specialised tasks.

Manufacturing tradition. T2.

Comments. 1. No. 515 has a very narrow blade. Mr. Downes' comments: "A doctor boy from Sepik said it belonged to his father and that it was a

fighting pick" (see below, statistics).

2. Schultze Jena's specimen comes from village 30 west of the Yellow River confluence, and was collected with a specimen of SEP 1.

3. Nos. 514, 515 and 820 appear, on present evidence, to have been collected too far down the river as this hafting is concentrated above Ambunti. I would expect their original provenances to have been further up river.

Statistics. All implements are included in the statistical comparisons and descriptions (tables A27, A28). Two variables have skewed distributions all attributable to no. 515, the fighting pick. Separating this the ranges become: V8, 4.9 - 6.3 cm; and V10, 4.8 - 6.8 cm. The distribution of V7 shows a possible division between short (5.1 - 7.9 cm) and long blades (9.1 - 11.8 cm) with one long blade (no. 382) at 13.5 cm. A different group (nos. 384, 820, 515, 374, 380, and 733) have a large total foot length (V16) at 40.6 - 45.8 cm, while the others range from 29.5 - 35.4 cm.

SEPIK 8

No.	Repository	Reg. No.	Locality	Date	Collector
156	UQ	7074	mid-Sepik	-	-
372	CM	E163.1109	May River	*1963	P. Temple
373	CM	E163.1111	Wanamowi	*1963	"
374	CM	E163.1119	Mowi	*1963	"
380	CM	E163.1038	"	*1963	"
381	CM	E163.1131	"	*1963	"
382	CM	E163.1127	"	*1963	"
383	CM	E163.1118	"	*1963	"
384	CM	E163.1122	"	*1963	"
514	SAM	A58639	?Angoram	1966	C.K. Downes
515	SAM	A58640	? "	"	"
733	AM	E59297	May River	1958	P. Conroy
807	PNGM	E4792	Walio	1970	A. Perey
820	PNGM	E1040	?Keram Valley, Angoram	1963	J.A. Forge
997	SM	S82	Oum	-	S. Moriarty
998	SM	S84	Oum	-	"

SEPIK 9

Localities. Yellow River to May River.

Number. 8.

TABLE A27: Distribution of ratio scale features. Sepik (SEP8). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	16	90.38	26.45	51	135	-0.089	-1.124
8	WIDTH OF BLADE - HAFT	16	55.63	8.13	29	63	-2.400	6.045
9	THICKNESS OF BLADE	16	26.37	7.68	15	41	0.490	-0.710
10	WIDTH OF BLADE - EDGE	16	56.75	15.61	10	90	-1.202	4.817
11	LENGTH - CUTTING EDGE	16	69.31	25.51	10	137	0.403	3.131
12	ANGLE - CUTTING EDGE	16	61.44	7.24	50	80	0.915	1.211
13	LENGTH OF HANDLE	16	580.44	39.37	530	675	0.998	0.392
14	SHAFT DIAMETER	15	32.87	4.41	26	39	-0.061	-0.950
15	LENGTH OF FOOT	16	176.50	21.95	136	225	0.496	0.490
16	TOTAL LENGTH OF FOOT	16	372.62	58.22	295	459	0.232	-1.443
17	POINT OF BALANCE	16	128.75	22.18	93	170	0.194	-0.440
18	ANGLE - B/FOOT - SIDE	16	63.25	5.26	55	75	0.615	0.023
19	ANGLE - B/HANDLE - BELOW	15	63.33	39.26	0	105	-0.911	-0.806
20	WEIGHT	16	986.44	471.80	156	1761	0.313	-0.624
21	SPRT SOCKET LENGTH	16	286.81	42.89	183	359	-0.556	0.667
22	SPRT SOCKET WIDTH	16	58.75	8.64	44	79	0.283	0.536
34	% 10 ON 11 WC/LC	16	85.06	11.00	66	102	0.085	-0.944

TABLE A28: Distribution of nominal scale features. Sepik (SEP8).

VARIABLE NUMBER	23	POLL OF BLADE					N=16
CODE VALUE:	0	1	2	3			
FREQUENCY:	2	0	13	1			
PERCENTAGES:	12.5	0.0	81.3	6.2			
VARIABLE NUMBER	24	PLAN OF BLADE					N=16
CODE VALUE:	1	2	3				
FREQUENCY:	7	8	1				
PERCENTAGES:	43.8	50.0	6.2				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE					N=16
CODE VALUE:	1	2					
FREQUENCY:	15	1					
PERCENTAGES:	93.8	6.2					
VARIABLE NUMBER	26	PROFILE OF BLADE					N=16
CODE VALUE:	0	1	2	3	4	5	
FREQUENCY:	1	6	3	0	1	5	
PERCENTAGES:	6.2	37.5	18.8	0.0	6.2	31.3	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE					N=16
CODE VALUE:	0	1	2				
FREQUENCY:	1	7	8				
PERCENTAGES:	6.2	43.8	50.0				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW					N=16
CODE VALUE:	0	1	2				
FREQUENCY:	10	5	1				
PERCENTAGES:	62.5	31.3	6.2				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT					N=16
CODE VALUE:	2	3	4				
FREQUENCY:	12	3	1				
PERCENTAGES:	75.0	18.8	6.2				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE					N=16
CODE VALUE:	0						
FREQUENCY:	16						
PERCENTAGES:	100.0						
VARIABLE NUMBER	31	FINISH ON BLADE					N=16
CODE VALUE:	1	2	3	4	5		
FREQUENCY:	5	0	2	7	2		
PERCENTAGES:	31.5	0.0	12.5	43.8	12.5		
VARIABLE NUMBER	32	USE-WEAR					N=16
CODE VALUE:	1	2	3	4	5	6	
FREQUENCY:	7	6	0	0	2	1	
PERCENTAGES:	43.8	37.5	0.0	0.0	12.5	6.2	
VARIABLE NUMBER	33	MATERIAL OF BLADE					N=16
CODE VALUE:	1	2	3				
FREQUENCY:	2	12	2				
PERCENTAGES:	12.5	75.0	12.5				

Collector. Mainly P. Temple.

Dates. *1963.

References.

Figure. Plate A14, figs. A and B, (no. 376).

Hafting features. A1, B3, C20, D9.

Handle. As SEP 8.

Hafting. As SEP 8. All the blade-separate socket lashings are simple strip whippings.

Blades. Bullet shaped blades of metamorphic rocks, hammer dressed to shape. End smoothed but not glossy.

Function. Sago palm felling.

Manufacturing tradition. T2.

Comments. Blades as used in SEP 2 and WI 7, both in adjacent areas.

Statistics. All implements are included in the statistical descriptions (tables A29, A30). One very thin shafted implement (no. 386) is responsible for skewing the distribution of V14 which otherwise reads 3.4 - 4.0 cm. A general relationship between length of foot and of handle is indicated as the three longest handled (nos. 375, 376, and 378) have the longest feet, but, although these variables are platykurtic, the division cannot be made entirely on these lines as V13 divides 51.6 - 53.0 cm/56.0 - 62.5 cm with nos. 377, 387 and 389 in the first group while V15 divides into 15.5 - 18.2/21.5 - 22.0 cm with the three largest making the second group. The blades are skewed by no. 377 for V9 (range otherwise 4.7 - 5.1 cm).

SEPIK 9

No.	Repository	Reg. No.	Locality	Date	Collector
375	CM	E163.1126	Mowi	*1963	P. Temple
376	CM	E163.1129	"	*1963	"
377	CM	E163.1120	"	*1963	"
378	CM	E163.1125	"	*1963	"
386	CM	E163.1123	"	*1963	"
387	CM	E163.1121	"	*1963	"
388	CM	E163.1128	"	*1963	"
389	CM	E163.1130	"	*1963	"

TABLE A29: Distribution of ratio scale features. Sepik (SEP9). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	8	98.88	24.16	59	128	-0.562	-0.585
8	WIDTH OF BLADE - HAFT	8	46.00	4.72	37	52	-0.722	0.339
9	THICKNESS OF BLADE	8	47.88	3.64	41	51	-1.042	0.060
10	WIDTH OF BLADE - EDGE	8	16.37	5.34	8	23	-0.394	-0.690
11	LENGTH - CUTTING EDGE	0	N TOO SMALL; COUNT <=3					
12	ANGLE - CUTTING EDGE	0	N TOO SMALL; COUNT <=3					
13	LENGTH OF HANDLE	8	569.88	41.51	516	625	-0.237	-1.181
14	SHAFT DIAMETER	7	35.43	3.82	28	40	-1.060	1.136
15	LENGTH OF FOOT	8	188.75	24.70	155	220	0.215	-1.145
16	TOTAL LENGTH OF FOOT	8	433.25	42.82	351	485	-0.901	0.397
17	POINT OF BALANCE	8	138.37	28.15	95	178	-0.395	-0.435
18	ANGLE - B/FOOT - SIDE	8	61.00	7.03	50	70	-0.026	-0.594
19	ANGLE - B/HANDLE - BELOW	0	N TOO SMALL; COUNT <=3					
20	WEIGHT	8	1389.50	244.16	948	1754	-0.446	0.313
21	SPRT SOCKET LENGTH	8	321.87	36.65	262	378	-0.215	-0.229
22	SPRT SOCKET WIDTH	8	63.13	7.06	52	73	0.007	-0.581
34	% 10 ON 11 WC/LC	0	N TOO SMALL; COUNT <=3					

TABLE A30: Distribution of nominal scale features. Sepik (SEP9).

VARIABLE NUMBER	23	POLL OF BLADE	N=8			
CODE VALUE:	2					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	24	PLAN OF BLADE	N=8			
CODE VALUE:	1					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=8			
CODE VALUE:	0					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	26	PROFILE OF BLADE	N=8			
CODE VALUE:	0					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=8			
CODE VALUE:	0					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=8			
CODE VALUE:	0					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=8			
CODE VALUE:	2	3				
FREQUENCY:	1	7				
PERCENTAGES:	12.5	87.5				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=8			
CODE VALUE:	0					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=8			
CODE VALUE:	0	1	2	3	4	5
FREQUENCY:	1	0	0	0	5	2
PERCENTAGES:	12.5	0.0	0.0	0.0	62.5	25.0
VARIABLE NUMBER	32	USE-WEAR	N=8			
CODE VALUE:	7					
FREQUENCY:	8					
PERCENTAGES:	100.0					
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=8			
CODE VALUE:	1	2				
FREQUENCY:	2	6				
PERCENTAGES:	25.0	75.0				

SEPIK 10

Localities. Yellow River to May River.

Number. 3.

Collectors. P. Temple, S. Moriarty.

Dates. *1963.

References.

Figure. Not figured.

Hafting features. A1, B3, C20, D9.

Handle. As SEP 8.

Hafting. As SEP 9.

Blades. Two are worn out adze blades, one (no. 996) is a broken, diamond sectioned pebble.

Function. Sago pith chopping. All edges are very glossy.

Comments. The use of the old adze blades may be a post-metal phenomenon, cf. SEP 6 and SEP 15.

Statistics. Too few implements.

SEPIK 10

No.	Repository	Reg. No.	Locality	Date	Collector
379	CM	E163.1117	Mowi	*1963	P. Temple
385	CM	E163.1124	"	*1963	"
996	SM	M2254	May River	-	S. Moriarty

SEPIK 11

Locality. Maprik (Abelam).

Number. 1.

Collectors. Miles and Cameron.

Date. *1964.

References.

PLATE A14.

- A and B. SEP 9, 376, CM E163.1129, Mowi, Sepik R.
- C and D. MAS 1, 303, DM FE543, New Guinea.
- E and F. MAS 4, 629, AM E24838, D'Entrecasteaux Is.
- G and H. MAS 4, 108, QM E9067, No locality.



A



B



C



D



E



F



G



H

Figure. Not figured.

Hafting features. A1, B2, C9, D3.

Handle. Small implement, short heel.

Hafting. Blade set against toe below a tapered cover-piece, and held by a long vine whipping which is knotted round the shaft top.

Blade. Probably a gneissic rock, small, tapering, adze bevel, very blunt and shiny.

Function. Sago chopper.

Manufacturing tradition. A local variant of T1.

Comments. 1. This is the only T1 implement from the Sepik below the October River. It is not very like this WI 7 population.

2. A number of people have commented on the distinctiveness of the Maprik area, particularly in art (Bühler, 1962:114-5), so that a difference in utilitarian material culture is not unexpected.

Statistics. Too few implements.

SEPIK 11

No.	Repository	Reg. No.	Locality	Date	Collector
988	AM	E63447	Abelam (Maprik)	*1964	Miles & Cameron

SEPIK 12

Locality. Ilahita Arapesh.

References. D. Tuzin, pers. comm.

A large stone blade set in what appears to be a five foot long version of a separate socket but never hafted as an adze. It is "used for making drums and slit-gongs" and is a "ritual secret associated with the 2nd grade of the Tambaran Cult ... This grade entered between 5 and 15 years of age. (4 grades in all in Tambaran Cult.)" Non-initiates are told that the drums and slit gongs are "made from chewing of Lefin Tambaran spirit."

A number of sources comment on the use of very long toed implements to hollow large slit gongs, particularly Blackwood (1951:268 - RH 8), and this extension of the idea appears perfectly acceptable.

SEPIK 13

Locality. Lesson Island, one of the Schouten Islands.

Reference. Comrie, 1877:111.

Style. "At Lesson Island, adzes were obtained similar to those in use at Ualan and some of the Line Islands." This suggests that they have Garanger B-1 blades, and that they are simple T1 adzes.

Function.

Manufacturing tradition. T1?

Comments. Moresby (1876:286) gives Lesson Island as 3° 35'S and 144° 47'E.

SEPIK 14

Locality. Kiniambu, between Turingi and Poma.

Number. 2.

Collector Catholic Mission, Wewak

Date.

Reference.

Figure. Not figured.

Hafting features. Carved from a single piece of wood.

Handle. Both are quite roughly carved, and no. 823 has a markedly bent shaft.

Hafting. The hafting is apparently meant to simulate a separate socket and both have the top carved, that of no. 822 into a sort of curved E shape vaguely resembling Korewari carving, while that of no. 823 has two 'wings' at the sides. The separate socket-handle lashing is not carved; presumably it would have been a long, split vine lashing. The

blade-separate socket lashing is marked by four carved grooves representing three twisted vine rings on no. 823. No. 822 has one twisted and one plaited ring attached.

Blade. The wooden part, carved to represent the blade, is the correct length but instead of being tapered to the butt, is given parallel sides.

Function. No direct evidence, but they appear unused.

Manufacturing tradition. A simulated T2?

Comments. The specimens may have been buried in mud, and neither bears evidence of really careful treatment. I have given them a population number so that I can refer to them in the text. They may be pseudo-SEP 4 implements.

SEPIK 14

No.	Repository	Reg. No.	Locality	Date	Collector
822	PNGM	E3987	Kiniambu	-	C. Mission
823	PNGM	E3986	"	-	"

SEPIK 15

Locality. Mabuk, near mouth of Sepik River.

Reference. Lewis, 1923:19, fig. 4.

Hafting features. A1, B3, C?, D3.

Handle. Typical of the lower Sepik, particularly the small foot.

Hafting. The wooden piece which is equivalent to the separate socket is carved into a knob at the upper end, and is lashed to the handle in typical lower Sepik fashion.

Blade. This is a long wooden stick with a hollow burned into the lower end.

Function. Sago pith chopper.

Manufacturing tradition. A T2 variant.

Comments. This may have been more common before the SEP 6 idea of using worn out adze blades became more practical after the introduction

of metal. Alternatively, this could have been a substitute where stone was uncommon. The dimple end of the wooden striker is very like the stone ones of SEP 3, and NIJ 2.

MASSIM 1

Locality. South Cape, D'Entrecasteaux, Louisiades, Trobriands.

Number. 16

Collectors. Various.

Dates. 1876 - 1969.

References. Labillardière, 1800; Moresby, 1876; Chalmers and Gill, 1885; Edge Partington, 1890-98: Series I, Pl. 299, fig. 1, Series II, Pl. 185, fig. 2; Malinowski, 1915; Malinkowski, 1934; Le Roux, 1948: Pl. XC, fig. III 7; Hinderling, 1949:52; Cranstone, 1964: Pl. 14a, bottom left.

Figure. Plate A14, figs. C and D, (no. 303).

Hafting features. A3, B2, C9, D3.

Handle. Flat, axe hafting, very high heel swept back into a hook. There may be tag holes along the outer edge. The right side of the foot often has a snake with its head pointing to the blade, while the upper half of the handle may also have a raised design on the right side. The shaft terminal commonly has a bird's head carved in relief on both sides.

Hafting The blade is set against a step on the right side of the toe and is held by a neatly made half cover. A simple or cross-over split vine lashing covers the toe as far as the step.

Blade. Thirteen of the blades are large size *beku*, usually finely striped. They have square or rounded polls, a squarish or slightly tapering plan, a low lenticular section, occasionally with small flat sides, a facet which is sometimes continued around the 'cutting edge'. The edge is usually adze shaped, and sometimes very battered. Three have the bevel on the right, one is an axe, and the rest have the bevel on the left. Two have slight use-wear, three slightly more, one is battered and the rest are unused. No. 800 has a very small stone blade and an unusual handle; no. 887 has the usual handle but a Highlands blade, and no. 398 has a whalebone blade. The one figured by Edge Partington from Moresby Island (Series II, Pl. 185, fig. 2) has a turtle bone blade.

Function. Largely non-utilitarian; *vaygu'a* betokening considerable

wealth (Malinowski, 1934:193-6).

Manufacturing tradition. A local derivative of T1.

Comments. 1. The handles of MAS 1 and MAS 2 are easily distinguished even though they have the same hafting features, and Malinowski applies the same name, *kaylavala*, to both.

2. MAS 1 is the most widely distributed Massim percussive cutting implement, occasionally reaching to Mailu Island in a hafted form (Malinowski, 1915:627).

Statistics. The two latest ones (nos. 800 and 887) are clearly anomalous. All but nos. 800 and 887 are included in the statistical descriptions and comparisons (tables A31, A32). However four variables are skewed. This variation seems to be caused by no. 198, which is the largest, for V10, V11, and V17. Without this Louisiades implement the ranges are: V10, 6.9 - 9.3 cm; V11, 7.0 - 12.0 cm; and V17, 12.0 - 19.0 cm. V 14 is skewed by the one from South Cape (no. 628). Without this the range is 3.2 - 2.7 cm. MAS 1 is generally smaller than MAS 2 although it has a slightly higher cutting edge angle and more protruding edge (tables A31 and A32). MAS 1 blades are somewhat more variable than MAS 2 (tables A33 and A34).

MASSIM 1

No.	Repository	Reg. No.	Locality	Date	Collector
111	QM	E8850	-	1886	- (T12)
112	QM	E8623	-	1888	-
113	QM	E8854	-	1889	- (T28)
114	QM	E4666	-	-	-
151	QM	E9070	Teste Is. (Wari)	1885	Cruise of Victoria
165	AIM	1536	Goodenough Is.	1928	M. Ballantyne
198	AIM	12772	Louisiades	1913	Ausley Coll.
303	DM	F.E. 543	-	1876	H.E. the Governor
308	OM	D20 478	-	1894	J. Chalmers?
334	OM	D66.11	-	1947	W.H. Skinner
335	OM	D66.12	-	1947	"
398	CM	E170.30	Trobriand Is.	pre-1900	-
627	AM	E6480	?Apulolo	1894	MacGregor (11927)
628	AM	E371	South Cape	1887	W.W. Gill
800	PNGM	E4328	Trobriands	1969	T. Artefact shop
887	PNGM	E2764.3	Losula, Kiriwina	1968	G. Gerrits

TABLE A31: Distribution of ratio scale features. Massim (MAS1). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	14	103.36	38.55	39	168	0.078	-0.854
8	WIDTH OF BLADE - HAFT	14	70.29	8.69	52	88	0.179	0.857
9	THICKNESS OF BLADE	14	15.50	3.46	9	22	0.218	-0.059
10	WIDTH OF BLADE - EDGE	14	81.07	10.59	69	110	1.584	2.494
11	LENGTH - CUTTING EDGE	14	93.43	15.87	70	130	1.051	0.835
12	ANGLE - CUTTING EDGE	14	48.00	11.14	30	68	0.273	-0.459
13	LENGTH OF HANDLE	13	610.31	95.83	423	723	-0.400	-0.669
14	SHAFT DIAMETER	5	36.20	5.26	32	45	1.291	1.195
15	LENGTH OF FOOT	14	370.36	39.41	280	436	-0.619	0.490
16	TOTAL LENGTH OF FOOT	14	473.86	54.51	375	561	-0.458	-0.473
17	POINT OF BALANCE	13	162.77	33.71	120	250	1.292	2.047
18	ANGLE - B/FOOT - SIDE	14	49.21	9.07	35	68	0.756	0.226
19	ANGLE - B/HANDLE - BELOW	14	11.71	6.66	0	20	-0.787	-0.382
20	WEIGHT	14	696.07	215.66	339	1174	0.511	0.332
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	14	87.57	7.65	73	99	-0.202	-0.333

TABLE A32: Distribution of nominal scale features. Massim (MAS1).

VARIABLE NUMBER	23	POLL OF BLADE	N=14			
CODE VALUE:	2	3				
FREQUENCY:	12	2				
PERCENTAGES:	85.7	14.3				
VARIABLE NUMBER	24	PLAN OF BLADE	N=14			
CODE VALUE:	2					
FREQUENCY:	14					
PERCENTAGES:	100.0					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=14			
CODE VALUE:	1	2				
FREQUENCY:	13	1				
PERCENTAGES:	92.9	7.1				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=14			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	10	0	2	1	1	
PERCENTAGES:	71.4	0.0	14.3	7.1	7.1	
VARIABLE NUMBER	26	PROFILE OF CUTTING EDGE	N=14			
CODE VALUE:	2	3	4			
FREQUENCY:	7	3	4			
PERCENTAGES:	50.0	21.4	28.6			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=14			
CODE VALUE:	1	2				
FREQUENCY:	12	2				
PERCENTAGES:	85.7	14.3				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=14			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	12	0	0	0	2	
PERCENTAGES:	85.7	0.0	0.0	0.0	14.3	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=14			
CODE VALUE:	0					
FREQUENCY:	14					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=14			
CODE VALUE:	2	3	4			
FREQUENCY:	2	0	12			
PERCENTAGES:	14.3	0.0	85.7			
VARIABLE NUMBER	32	USE-WEAR	N=14			
CODE VALUE:	0	1	2	3	4	
FREQUENCY:	8	2	3	0	1	
PERCENTAGES:	57.1	14.3	21.4	0.0	7.1	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=14			
CODE VALUE:	4	5	6	7	8	
FREQUENCY:	13	0	0	0	1	
PERCENTAGES:	92.9	0.0	0.0	0.0	7.1	

MASSIM 2

Localities. Normanby Island and D'Entrecasteaux group generally.

Number. 10.

Collectors. Various.

Dates. 1887 - 1963.

References. As MAS 1, with Edge Partington, 1890-98: Series I, Pl. 300, fig. 1; Parkinson, 1907:230; Le Roux, 1948: Pl. XC, fig. III 9.

Figure. Plate A14, figs. E and F, (no. 629).

Hafting features. A3, B2, C9, D3.

Handle. Much heavier than MAS 1, with wider foot, and heel formed into a flattened cap, which may be coloured red. It is slightly wider than the toe or shaft. The terminal flares into a circle, below which is a semi-circle which sometimes has tag holes in it.

Hafting. As MAS 1, but the whipping may be at the toe only (547), on the foot up to the ankle (152, 548), or all along the shaft (153, 209, 309, 455, 523, 629). No. 285 originally had a vine whipping for this has left marks, but it now has an elaborately patterned, openwork lashing formed by three-ply plait coir cords.

Blade. No. 523 is an adze blade similar to those on SP 5, but the rest are large *beku*, of the same general shape as the MAS 1 Suloga blades but heavier. Only one blade, no. 523, has a battered edge, the rest are unused, and no. 455 has a flat facet at the edge. One blade has an axe bevel, for the rest the higher curve occurs on the right five times and on the left four.

Function. These handles are even larger and less likely to be used. The different range of use-wear on the blades shows that it is uncommon for 'ordinary' blades to be hafted in the heavier handles. The usually greater size of blades also confirms this supposition. See Malinowski, 1934:193-6.

Manufacturing tradition. A local derivative of T1.

Comments. 1. Malinowski gives the name *kaylavala* to both MAS 1 and MAS 2. In his collection one small handle, which is like a less exaggerated version of MAS 2, is called *kema*. I do not know if this is a traditional form or a late one.

TABLE A33: Distribution of ratio scale features. Massim (MAS2). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	10	159.50	40.00	97	231	0.220	-0.347
8	WIDTH OF BLADE - HAFT	10	93.10	16.84	66	122	0.148	-0.376
9	THICKNESS OF BLADE	10	18.70	4.16	10	24	-0.779	0.414
10	WIDTH OF BLADE - EDGE	10	115.10	25.64	86	164	0.776	-0.319
11	LENGTH - CUTTING EDGE	10	132.50	25.02	100	172	0.333	-0.871
12	ANGLE - CUTTING EDGE	10	42.30	9.58	25	55	-0.207	-0.435
13	LENGTH OF HANDLE	10	714.60	68.58	613	832	0.218	-0.578
14	SHAFT DIAMETER	8	44.75	4.10	37	51	-0.533	0.721
15	LENGTH OF FOOT	10	395.30	56.14	299	482	-0.550	-0.034
16	TOTAL LENGTH OF FOOT	10	554.80	76.98	396	673	-0.594	0.660
17	POINT OF BALANCE	9	214.33	78.20	130	380	1.103	0.822
18	ANGLE - B/FOOT - SIDE	10	58.10	11.04	40	83	0.857	1.795
19	ANGLE - B/HANDLE - BELOW	10	0.50	1.58	0	5	2.846	6.386
20	WEIGHT	8	2123.50	1092.01	1088	4047	0.907	-0.339
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	10	86.50	4.55	81	95	0.668	-0.405

TABLE A34: Distribution of nominal scale features. Massim (MAS2).

VARIABLE NUMBER	23	POLL OF BLADE	N=10		
CODE VALUE:	2				
FREQUENCY:	10				
PERCENTAGES:	100.0				
VARIABLE NUMBER	24	PLAN OF BLADE	N=10		
CODE VALUE:	1	2			
FREQUENCY:	2	8			
PERCENTAGES:	20.0	80.0			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=10		
CODE VALUE:	1				
FREQUENCY:	10				
PERCENTAGES:	100.0				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=10		
CODE VALUE:	1	2	3	4	5
FREQUENCY:	7	0	1	0	2
PERCENTAGES:	70.0	0.0	10.0	0.0	20.0
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=10		
CODE VALUE:	1	2	3	4	
FREQUENCY:	2	1	2	5	
PERCENTAGES:	20.0	10.0	20.0	50.0	
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=10		
CODE VALUE:	1	2	3		
FREQUENCY:	9	0	1		
PERCENTAGES:	90.0	0.0	10.0		
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=10		
CODE VALUE:	1				
FREQUENCY:	10				
PERCENTAGES:	100.0				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=10		
CODE VALUE:	0				
FREQUENCY:	10				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=10		
CODE VALUE:	4				
FREQUENCY:	10				
PERCENTAGES:	100.0				
VARIABLE NUMBER	32	USE-WEAR	N=10		
CODE VALUE:	0	1	2	3	4
FREQUENCY:	8	1	0	0	1
PERCENTAGES:	80.0	10.0	0.0	0.0	10.0
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=10		
CODE VALUE:	4				
FREQUENCY:	10				
PERCENTAGES:	100.0				

2. No. 547 has a band of ornamentally interwoven plait on the upper shaft.

3. The ones figured by Parkinson and Edge Partington come from Normanby and D'Entrecasteaux respectively.

Statistics. All implements are included in the statistical descriptions (tables A33, A34). Of the two variables which are skewed, V17 is biased by no. 207 which without this reads 13.0 - 28.0 cm, and V19 is biased by no. 153 the only implement not reading 0°. Comparison of tables A31 and A33 indicates that MAS 2 is considerably larger, particularly in the blades. MAS 2 blades have narrower cutting edge angles and less protruding cutting edges. Tables A32 and A34 indicate that the blades of MAS 2 are less variable than those of MAS 1.

MASSIM 2

No.	Repository	Reg. No.	Locality	Date	Collector
152	QM	-	-	1889	-
153	QM	M5956	Kadigawa, Normanby	1894	MacGregor (11932)
207	AIM	15621	D'Entrecasteaux	1899	Edge Partington
285	DM	F E3204	Normanby Is.?	1939	L. Kronfeld
309	DM	D23.1070	-	1887	Capt. Farrell
455	NMV	X4022	D'Entrecasteaux	-	-
523	SAM	A7576	"	pre-1900	Old Coll
547	SAM	A7577	"	" "	" "
548	SAM	A7578	"	" "	" "
629	AM	E24838	"	1917	J.J. Brennan

MASSIM 3

Locality. Massim, mainly Trobriands?

References. Labillardière, 1800:242; Comrie, 1877; Edge Partington, 1890-98: Series I, Pl. 298, fig. 4; Malinowski, 1934, 1935.

Hafting features. No information, but possibly A3, B2, C?, D?.

Handle. Possibly most like a simplified version of MAS 1.

Hafting. This would have to be sturdier than MAS 1 or MAS 2 if it was to be used as suggested.

Blade. Utuviya tree felling blades, or *utukema* scrub cutting blades (Malinowski, 1934:191-2). See Chapter 13 for a description.

Function. The larger *utuviya* were tree felling blades and this function is also mentioned by Comrie (for Normanby Island?) (1877:111), while the smaller *utukema* were the blades used for the least skilled tasks and were hafted as adzes or as axes according to need. Both sorts of blade had an adze bevel to the cutting edge.

Manufacturing tradition. Appears to be derived from T1.

Comments. 1. Malinowski applies the term *kema* (axe) to an implement in the Robert Mond Collection in the National Museum of Victoria. This handle (no. 457) appears to be a small version of the MAS 2 *kaylavala* handles. Labillardière (Louiadiades) and Edge Partington also figure less exaggeratedly ornamental axes similar to MAS 1.

2. These 'ordinary' axes would have been easily replaced by European technology as they fill essentially the same roles as a hatchet.

3. The smaller *kema* were used in gardening "to cut the roots found in the soil" (Malinowski, 1935:132).

MASSIM 4

Locality. Trobriands.

Number. 8.

Collectors. Various.

Dates. 1886 - 1969.

References. Malinowski, 1934.

Figure. Plate A14, figs. G and H, (no. 108).

Hafting features. A1, B2, C9, D3.

Handle. Three handles are made from a naturally curved piece of wood (nos. 108, 815, 816), which may have a fin or a raised crest behind the place where the heel would come, and a bird head carving on the terminal. The rest of the handles are made on the usual trunk-and-branch piece of wood. They usually have high heels which are laterally flattened but have a crest, which is a continuation of the top of the shaft, at right angles to the heel over the top and front of the heel. Most have a knob at the shaft terminal decorated with incised patterns. The handles are called *ligogu* (Malinowski, 1934:192).

Hafting. All the blades are set on a step and held between the toe and the cover. The earlier ones are lashed with vine strips but those collected in 1969 all use copper wire as the lashing.

Blades. All the blades are thin iron, ranging from 2.9 cm wide at the cutting edge to 6.7 cm. Use-wear codes have been used in the statistical description (table A36) but it seems a little unreasonable to apply the standards for stone to iron.

Function. Previously this depended upon the blade which was set in, either a planing blade (*kasivi*), or an ordinary blade (*utukema*). Perhaps more multi-purpose since iron was introduced.

Manufacturing tradition. A local variant of T1.

Comments. Three of the *ligogu* in Malinowski's collection in NMV are like this, but one is of clean wood and has a face, which is picked out in red and black, carved on the front of the heel. It may be a transitional form between MAS 4 and MAS 6.

Statistics. All implements are included in the statistical descriptions (tables A35, A36). A number of the variables are skewed, V10 and V11 by no. 816 which is the widest blade, V13 and V16 by no. 817, the smallest and also lightest implement. Apart from these the ranges are: V10, 2.9 - 5.1 cm; V11, 3.2 - 5.4 cm; V13, 44 - 51.7 cm; and V16, 23.8 - 31.2 cm. Both the point of balance (V17) and angle of foot and shaft (V18) have markedly platykurtic distributions. V17 may be divided into two: 4.2 - 5.5 cm/6.0 - 7.0 cm, and V18 into two groups 50 - 53° and 60 - 63°. Both the smaller groups have 4 implements but only nos. 815 and 816 are common to both.

MASSIM 4

No.	Repository	Reg. No.	Locality	Date	Collector
108	QM	E9067	-	1886	- (T12)
546	SAM	E19701	Kiriwina	*1910-17	E.M. Prisk
611	AM	E20902	SE BNG	1912	Sir W. Dixson
813	PNGM	E4333	Trobriands	1969	Trob. Artefact shop
814	PNGM	E4332	"	"	" " "
815	PNGM	E4329	"	"	" " "
816	PNGM	E4331	"	"	" " "
817	PNGM	E4334	"	"	" " "

TABLE A35: Distribution of ratio scale features, Massim (MAS4). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	8	77.13	25.01	35	115	-0.016	0.064
8	WIDTH OF BLADE - HAFT	8	38.62	11.84	17	55	-0.404	0.223
9	THICKNESS OF BLADE	8	3.37	0.74	2	4	-0.721	-0.230
10	WIDTH OF BLADE - EDGE	8	42.25	12.09	29	67	1.150	0.967
11	LENGTH - CUTTING EDGE	8	47.38	15.60	32	82	1.590	2.106
12	ANGLE - CUTTING EDGE	8	23.75	3.54	20	30	0.354	-0.275
13	LENGTH OF HANDLE	8	459.50	59.85	323	517	-1.762	2.643
14	SHAFT DIAMETER	7	26.00	3.92	20	30	-0.480	-0.988
15	LENGTH OF FOOT	8	175.12	30.18	118	203	-0.937	0.020
16	TOTAL LENGTH OF FOOT	8	252.25	46.34	153	312	-1.241	1.789
17	POINT OF BALANCE	7	55.57	11.59	42	70	0.229	-1.075
18	ANGLE - B/FOOT - SIDE	8	56.12	5.94	50	63	0.037	-1.515
19	ANGLE - B/HANDLE - BELOW	8	87.50	4.63	80	95	0.0	-0.143
20	WEIGHT	7	330.29	117.39	135	476	-0.448	-0.283
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	8	90.00	4.34	82	95	-0.733	-0.012

TABLE A36: Distribution of nominal scale features. Massim (MAS4).

VARIABLE NUMBER	23	POLL OF BLADE	N=8
CODE VALUE:	3		
FREQUENCY:	8		
PERCENTAGES:	100.0		
VARIABLE NUMBER	24	PLAN OF BLADE	N=8
CODE VALUE:	1	2	
FREQUENCY:	6	2	
PERCENTAGES:	75.0	25.0	
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=8
CODE VALUE:	1	2	
FREQUENCY:	7	1	
PERCENTAGES:	87.5	12.5	
VARIABLE NUMBER	26	PROFILE OF BLADE	N=8
CODE VALUE:	1		
FREQUENCY:	8		
PERCENTAGES:	100.0		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=8
CODE VALUE:	2	3	
FREQUENCY:	5	3	
PERCENTAGES:	62.5	37.5	
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=8
CODE VALUE:	1		
FREQUENCY:	8		
PERCENTAGES:	100.0		
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=8
CODE VALUE:	5		
FREQUENCY:	8		
PERCENTAGES:	100.0		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=8
CODE VALUE:	0		
FREQUENCY:	8		
PERCENTAGES:	100.0		
VARIABLE NUMBER	31	FINISH ON BLADE	N=8
CODE VALUE:	1		
FREQUENCY:	8		
PERCENTAGES:	100.0		
VARIABLE NUMBER	32	USE-WEAR	N=8
CODE VALUE:	2	3	
FREQUENCY:	7	1	
PERCENTAGES:	87.5	12.5	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=8
CODE VALUE:	9		
FREQUENCY:	8		
PERCENTAGES:	100.0		

MASSIM 5

Locality. Probably Trobriands.

Number. 2.

Collectors. Various.

Date. 1883, 1897.

References. Malinowski, 1934.

Figure. Plate A15, figs. A and B, (no. 786).

Hafting features. A1, B2, C9, D3.

Handle. Either very elaborately carved, or as MAS 4.

Hafting. As MAS 4.

Blade. No. 786 has a very beautiful, striped, Suloga stone *kasivi* planing blade, quite small and very thin. No. 2 has no cover or lashing and is currently associated with a small nephrite blade like those from the southern area of Northeast Papua. It may be a wrong blade as the De Vis number is not readable.

Function. No. 786 is clearly valuable (Malinowski, 1934), and would not have been used for utilitarian purposes.

Manufacturing tradition. A local variant of T1.

Comments. Malinowski, after discussing the utilitarian uses of these implements (1934:192, see Chapter 13), goes on to discuss their function as ornaments (1934:193):

One seldom sees a man of rank and influence, especially during feasts and ceremonies, without a *ligogu* over his shoulder. Nowadays a steel blade takes the place of the ancient greenstone.

The handle of an adze is worked out with great care; it is polished all over and often decorated with carvings. In olden days, men of rank would have fine, streaked, well-polished blades of the planing type (*kasivi*) inserted in their handles. Thus, even ordinary working tools were and are used as ornaments.

In addition to the polish given to the handles, they appear to have been blackened.

Statistics. Too few implements.

MASSIM 5

No.	Repository	Reg. No.	Locality	Date	Collector
2	QM	M4000	-	1897	MacGregor (16219)
786	AM	A15452	-	1883	Mason Bros.

MASSIM 6

Locality. Trobriand Islands.

Number. 1.

Collector. Oldman Collection.

Date. Not known.

References. Edge Partington, 1890-98: Series II, Pl. 161, fig. 7.

Figure. Plate A15, figs. C and D, (no. 301).

Hafting features. A1, B1, C3, D12.

Handle. Very elaborate, but where the designs of the others tend to be two-dimensional, this has a large-headed version of the squatting figure motif on the front of the heel, with a fin running along the top of the shaft and a knob at the terminal. The one figured by Edge Partington is not quite so elaborate.

Hafting. The blade is set on a step but is not held in with the customary Massim cover piece. The lashings are two overlapping bands of fine, split vine plait very like those from the northern area of Northeast Papua.

Blade. These blades are thicker than those held in with a cover and are clearly adze blades, probably much used, as the one recorded has pleated-battered use-wear.

Function. Non-utilitarian hafting but apparently utilitarian blades. This may be an ornamental hafting for the *kavilali* hollowing blades, or for *utuviya* blades.

Manufacturing tradition. T1.

Comments.

Statistics. Too few implements.

PLATE A15.

- A and B. MAS 5, 786, AM A15452, No locality.
C and D. MAS 6, 301, DM O 736, Trobriand Is.
F. MAS 11, 98, QM M4044, Kakama village, Misima I.
G and H. MAS 18, 787, AM E16469, Boianai, Goodenough Bay.



A



B



C



D



E



F



G



H

MASSIM 6

No.	Repository	Reg. No.	Locality	Date	Collector
301	DM	O 736	Trobriand Is.	-	Oldman Coll

MASSIM 7

Locality. Trobriand Islands.

Reference. Edge Partington, 1890-98: Series II, Pl. 181, figs. 1-3.

Hafting features. A1, B1, C2, D12.

Handle. The handles appear to be a larger version of the crested style described for MAS 4.

Hafting. The poll of the blades is set in a small, tapered hollow and held by a single band of fine strip, split vine plait. One appears to have a slot cut in the back of the toe to accommodate the plait band.

Blade. Two of the blades would appear to be closest in form to the *utuviya* tree felling blades as they are long, wide and fairly thick. The third is a rough-out of some sort.

Function. Malinowski makes no mention of hafting *utuviya* as adzes, nor does the hafting appear particularly robust. Another non-utilitarian hafting?

Manufacturing tradition. T1.

Comments. Possibly the Trobriands version of the D'Entrecasteaux adzes MAS 13.

MASSIM 8

Locality. Trobriands.

Number. 1 handle.

Collector. Malinowski.

Date. 1919.

References. Malinowski, 1934; Le Roux, 1948: Pl. C, fig. III 6; Hinderling, 1949:54.

Hafting features. A1, B3, C12, D6.

Handle. Robust shaft, high heel, front of foot flat.

Hafting. The blade is set in a one-piece, separate socket which is hollowed into a trough open at the front. It is held by a whipping of two-ply, twisted fibre cord. The separate socket-handle lashing is a ring of cane looped round by a long whipping of split vine. The top of the socket is held to the heel by an extra lashing of two-ply cord below the knobs at the top of the socket and heel.

Blade. Not present, but should be a *kavilali* hollowing blade.

Function. For hollowing canoes. See Chapter 13.

Manufacturing tradition. T2.

Comments. 1. The handle is called *valapata* (NMV register), although in his draft for the 1934 paper Malinowski calls it *kaylalari*.

2. The rarity of this T2 tradition outside New Guinea north of the central ranges and the fact that when it does occur it is usually a specialised hollowing implement, calls for an explanation.

3. The one figured by Le Roux has a narrow, long blade (1948: Pl. CIV, figs. 10 and 10a). Its lashings are composed of three plaited rings, one at the heel, two on the toe. The blade-separate socket lashings are a fine strip plaited band.

MASSIM 9

Locality. Trobriands.

Number. 2 blades.

Collector. Malinowski.

Date. 1919.

Reference. Malinowski, 1934.

Hafting features. No information.

Handle. Perhaps like the D'Entrecasteaux chisel described as MAS 14.

Hafting. "Fixed rather firmly into its handle" (Malinowski, 1934:192).

Blade. Small, narrow, flattish cutting edge (index 95, 100), "usually polished along a wider surface than the bigger blades", so that it could be lashed tightly (Malinowski, 1934:192). Called *ginesosu*.

Function. "For cutting out holes and grooves" (Malinowski, 1934:191-2).

Manufacturing tradition. No information.

Comments. Compare RH 9, MAS 14 and WI 15.

MASSIM 10

Locality. Murua (Woodlark Island).

Reference. MacGregor, 1890f:150.

Hafting features. No information.

Style. No information.

Function. Sago making, named *kirekiri*.

Manufacturing tradition. T1, or T1 with wooden cover?

Comments.

MASSIM 11

Locality. Kakama village, St. Aignan (Misima Island).

Number. 1, and one doubtful.

Collector. MacGregor.

Date. 1892.

References.

Figure. Plate A15, fig. F, (no. 98).

Hafting features. A1, B3, C11, D24.

Handle. Heel high but not ornamented, toe rounded, shaft thin.

Hafting. Blade set in a two-piece, tubular separate socket in the top of which the toe of the handle is set. The whole is held by a long whipping of three-ply, bark fibre plait cord.

Blade. The blade is small with an oval section made from a grey (?tuff) stone having black and pink grains. It has been slightly used.

Function.

Manufacturing tradition. T2.

Comments. 1. Compare the Nakanai implements (EB 11) which are the only others to have this tubular socket form. Chowning (pers. comm.) has found linguistic parallels between the two areas.

2. The doubtful specimen (no. 299) has an undoubted small Massim *ligogu* handle similar to those of MAS 4, but has a separate socket and blade unit with hafting of multiple cane rings like the New Britain implements.

Statistics. Too few implements.

MASSIM 11

No.	Repository	Reg. No.	Locality	Date	Collector
98	QM	M4044	Kakama, St. Aignan	1892	MacGregor (9436)
299	DM	F E3768	-	-	-

MASSIM 12

Locality. Louisiade Archipelago.

Reference. Edge Partington, 1890-98: Series II, Pl. 182, fig. 4.

Hafting features. A1, B1 or B2, C3 or C9, D3.

Handle. Small implement, thin shaft, high heel with knob on top, foot not differentiated from the shaft as are MAS 4, 5, 6, terminal appears to be ornamented.

Hafting. The blade is set on a step with or without a cover (the sketch is not very clear) and held with a long strip whipping.

Blade. It appears to be an adze blade.

Function. No information, but probably utilitarian.

Manufacturing tradition. Simple T1, or the local T1 variant with cover.

Comments.

MASSIM 13

Locality. D'Entrecasteaux Islands.

References. Edge Partington, 1890-98: Series I, Pl. 300, fig. 2;
Le Roux, 1948: Pl. C, fig. III 8; Hinderling, 1949:52-3.

Hafting features. A1, B1, C2?, D12 or D14.

Handle. This is the adze equivalent to the large axe MAS 2. The terminal has a similar disc but does not have the vertically placed semi-circle behind it, only a horizontally flattened tip. The shaft appears to change from circular through oval to vertically flattened, just like the MAS 2 axes. However, where the axes usually continue the shape of the shaft over the foot, in this case the foot, although made in one with the handle, looks as if it were slotted into the shaft. The heel thus has a crested shape.

Hafting. The blade appears to be set directly on the foot, perhaps into a tapered hollow, and is held by a single band of fine or coarse, split vine, plaiting.

Blade. A wide, adze shape.

Function. Not known, possibly non-utilitarian.

Manufacturing tradition. T1.

Comments. Clearly the D'Entrecasteaux equivalent of the smaller and more elegant Trobriands adzes MAS 7. Saville (1926:162-3) reports that occasionally elaborately hafted adzes were traded to the Mailu people although none are represented in the collections studied. This MAS 13 form may have been used in such exchanges.

MASSIM 14

Locality. D'Entrecasteaux Islands.

Reference. Edge Partington, 1890-98: Series I, Pl. 300, fig. 4.

Hafting features. Chisel hafting.

Handle. A small straight stick, about 15 cm long.

Hafting. Blade held to one face by a plait band made from fine, split vine strips, and by a split vine whipping.

Blade. Very small and narrow, apparently about 12 cm long.

Function. Perhaps the D'Entrecasteaux equivalent of the Trobriands *ginesosu* hole and groove making blade.

Manufacturing tradition. Chisel, not within the present system.

Comments. This does not look like a blade and separate socket unit.
Cf. MAS 9, RH 9, and WI 15.

MASSIM 15

Locality. Dobu, perhaps the other D'Entrecasteaux Island.

References. Moresby, 1876:253-4; Jenness and Ballantyne, 1920:184; Fortune, 1932:207; Hinderling, 1949:54.

Hafting features. No information, query A1, B1 or B2, C2, C3, or C9, D3.

Handle. Small.

Hafting. No data.

Blade. Small. When Moresby observed the practice on Fergusson they were probably worn out adze blades, later probably any available blade, whether it still had a keen edge or not.

Function. Sago pith cutting.

Manufacturing tradition. T1 or a local variant of T2.

Comments.

MASSIM 16

Locality. Skelton Island, Engineer group, and 'southeast district'.

References. Edge Partington, 1890-98: Series II, Pl. 182, figs. 5 and 6; Hinderling, 1949:53.

Hafting features. A1, B1, C3?, D3.

Handle. Long, relatively thin shaft, solid foot which has a flattened front, and high pointed heel.

Hafting. The blade is set on the toe, perhaps in a trough or on a step. No covers appear to be sketched. The lashing is a simple, split vine, strip whipping.

Blade. Large adze blades.

Function. "Used in canoe building in S.E. District; also on Teste, Stacey Is. etc." (Edge Partington's note to fig. 6.) Amongst the most practical looking Massim implements besides MAS 4, and MAS 18.

Manufacturing tradition. T1.

Comments. Quite similar to SP 1 in robustness of construction, particularly the treatment of the foot.

MASSIM 17

Locality. Tubetube, Engineer Group.

Reference. Seligmann, 1910:533n.

Hafting features. A1, B1 or B2, C3 or C9, D3?.

Handle. "Long almost straight handles" (Seligmann, 1910:533n).
(Perhaps like SP 3.)

Hafting. No information but if like SP 3 would have a step against which the blade, often wrapped in palm spathe, was held, either with or without a cover, by a long, split vine whipping.

Blade. "Unpolished adze-heads called *wekuta*".

Function. "Used to extract sago."

Manufacturing tradition. T1 or a local variant with a cover.

Comments. Compare with SP 3. Cf. also Saville, 1926:21.

MASSIM 18

Locality. Goodenough Bay, D'Entrecasteaux Islands perhaps.

Number. 3.

Collectors. Anglican Missionaries.

Dates. 1906, 1940.

References. Edge Partington, 1890-98: Series I, Pl. 299, figs. 2 and 3; Seligmann, 1910:592-3; Chowning, 1960:34.

Figure. Plate A15, figs. G and H, (no. 787).

Hafting features. A1, B2, C9, D3.

Handle. Small implements with high heels, rounded or squared at the top, sides may be rounded out. Foot not marked off from shaft.

Hafting. Blade held in by cover, long split cane whipping.

Blade. All hoop iron.

Function. Probably 'ordinary' adzes.

Manufacturing tradition. A local variant of T1.

Comments. 1. Chowning (1960:34) has a photograph of a Molima man making a canoe paddle with a small iron bladed adze which looks not unlike these except that it has a more elaborate handle with a knob at the terminal like the Trobriand ones. It may be an intermediate form.

2. Seligmann (1910:592-3) mentions two uses for stone adzes which appear to be 'ordinary' adzes reappropriated, with special handles, to ceremonial purposes. The comments are interesting:

One of the fasting men cuts down the tree; no spells are recited but a stone adze is used, and this adze must not be used for anything else. Concerning this adze Mr Newton says: 'The stone adze need not necessarily be a new one The handle is of wood called *koirepa*, used only for the *walaga* and *torela* adzes. The Bartle Bay people get all their stone adze blades and such like implements from Fergusson Island, but that is a matter of commercial convenience, for they might also be got from the head of Goodenough Bay, though as a matter of fact they come from Fergusson to these parts.' After being used for the *walaga* the adze is not used for ordinary purposes, but is stored away with other things connected with the *walaga*. Although at the present day there are plenty of iron tools in the Bartle Bay district, an iron adze should never be used for this purpose, for although no one knew for certain that disaster would follow the use of an iron adze, it was agreed that it would be most unwise to use one.

3. The name of the two adzes from Boianai is given by Money as *kirama*.

4. The ones figured by Edge Partington are tentatively suggested to fit into a population such as this.

5. No. 524 is slightly different from the other two, but the period elapsed between collections may account for this. Alternatively, the

implement may have been made at Collingwood Bay by people influenced by the Mission. (It had enough power to move the whole village from 'old Wanigela' (Makimaki?) to the present site in 1898.)

Statistics. Too few implements.

MASSIM 18

No.	Repository	Reg. No.	Locality	Date	Collector
524	SAM	A19802	Wanigela	1940	C. Graham
665	AM	E16470	Boianai, Goodenough Bay	1906	P.J. Money
787	AM	E16469	" " "	1906	" "

MASSIM 19

Locality. Logea Island.

Reference. Loria, 1896:52.

Hafting features. Unclear.

Style. "A special tomahawk called *baewatena* used for cutting the enemies heads off."

Function. Beheading 'knife'?

Manufacturing tradition. A local variant of T1?

Comments. This reference occurs in a discussion of the "ancient war customs of the natives of Logea and neighbourhood".

MASSIM 20

Locality. New Guinea, probably Massim.

Number. 3.

Collectors. Not known.

Dates. 1888, 1903.

References.

Figure. Not figured.

Hafting features. A1, B1, C3, D27 = no. 444; A1, B2, C9, D3 = no. 446; A1, B2, C9, D17 = no. 445.

Handle. The handle resembles a version of MAS 1. It is large, wide footed, has a slight hook at the heel.

Hafting. The blade is set on the side of the foot and in two cases held with a cover. The lashing is split cane whipping, a split vine whipping and a coir cord whipping, and this last may be compared with no. 285 (MAS 2, Normanby).

Blade. Two of the blades are hornfels, one is nephrite-like. All are very large. The hornfels blade in no. 445 has a flat facet ground around the cutting edge. The blades are set intermediate between axe and adze at 55° to 60°.

Function. No information.

Manufacturing tradition. Blades set in intermediate axe-adze position either with or without a cover. T1.

Comments. These implements might qualify as working axes, but a good deal of corroboration is required. They may be compared with MAS 3 and SP 1 as they are intermediate to both.

Statistics. Too few implements.

MASSIM 20

No.	Repository	Reg. No.	Locality	Date	Collector
444	NMV	X4048	New Guinea	1888	-
445	NMV	X4065	" "	1888	-
446	NMV	X12242	" "	1903	G. McArthur

MASSIM 21

Locality. Samarai.

References. Powell, 1888:14; Hinderling, 1949:54.

Hafting features.

Handle. Right angled foot and shaft.

Hafting. Blade set in a separate socket.

Blade. Round sectioned stone blade.

Function. If like MAS 8 then probably specialised hollowing.

Manufacturing tradition. T2.

Comments. Hinderling has some doubts about the separate existence of this possible population. May be like MAS 8.

SOUTHERN PAPUA 1

Locality. Domara - Mailu.

Number. 7.

Collectors. Various.

Dates. 1877 - 1903.

References. Edge Partington, 1890-98: Series III, Pl. 86, fig. 8; Malinowski, 1915:622, 625, 627, 646; Saville, 1926:21, 40; Hinderling, 1949:50-1.

Figure. Plate Al6, figs. A and B, (no. 620).

Hafting features. Al, Bl, C3, D3 = no. 76; Al, B2, C9, D3 = nos. 75, 264, 620, 648, and 790.

Handle. Robust implements with small heel and wide foot with flat face.

Hafting. Blade set against step, usually with cover, although the blade of no. 76 is merely wrapped in palm spathe. The simple, split vine whipping covers the toe and is finished off round the top of the shaft.

Blade. Five blades are Suloga hornfels, the other two are nephrite-like rocks.

Function. Probably multi-purpose; all but no. 264 are robust enough to be tree-felling or plank-making implements. Cf. MAS 16. All but nos. 392 and 648 with the blades set at 60°, are adzes.

Manufacturing tradition. T1 or a local derivative.

Comments. 1. Malinowski comments on Mailu adzes (1915:646):

U'a. Stone adzes for felling trees and scooping out canoes. The stone blades, made of dark-green volcanic tuff, were imported from the east and those used for the first named work were very large and strong, and were permanently fixed to their handles.

2. The one figured by Edge Partington does not have the finishing loop round the shaft.

3. Saville (1926:40) describes the plank-making process:

TABLE A37: Distribution of ratio scale features. S Papua (SP1). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	7	91.14	31.21	46	133	-0.089	-0.679
8	WIDTH OF BLADE - HAFT	7	63.43	16.64	35	82	-0.477	-0.129
9	THICKNESS OF BLADE	7	22.57	6.27	9	27	-1.866	2.631
10	WIDTH OF BLADE - EDGE	7	65.14	17.73	39	91	0.150	-0.313
11	LENGTH - CUTTING EDGE	7	77.00	21.98	42	105	-0.109	-0.211
12	ANGLE - CUTTING EDGE	7	58.29	7.43	50	70	0.313	-0.594
13	LENGTH OF HANDLE	6	536.83	89.41	390	670	-0.278	1.067
14	SHAFT DIAMETER	7	30.14	6.64	17	38	-1.202	1.348
15	LENGTH OF FOOT	7	227.14	65.34	119	327	-0.181	0.297
16	TOTAL LENGTH OF FOOT	7	318.29	92.49	165	460	-0.190	0.336
17	POINT OF BALANCE	6	115.17	40.78	54	180	0.154	0.826
18	ANGLE - B/FOOT - SIDE	7	58.57	8.02	45	70	-0.321	0.208
19	ANGLE - B/HANDLE - BELOW	7	80.71	14.27	60	90	-0.998	-0.597
20	WEIGHT	6	681.50	389.56	106	1240	-0.021	0.080
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	7	85.29	4.89	80	93	0.378	-0.649

TABLE A38: Distribution of nominal scale features. S Papua (SP1).

VARIABLE NUMBER	23	POLL OF BLADE	N=7		
CODE VALUE:	2				
FREQUENCY:	7				
PERCENTAGES:	100.0				
VARIABLE NUMBER	24	PLAN OF BLADE	N=7		
CODE VALUE:	1	2			
FREQUENCY:	4	3			
PERCENTAGES:	57.1	42.9			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=7		
CODE VALUE:	1				
FREQUENCY:	7				
PERCENTAGES:	100.0				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=7		
CODE VALUE:	1	2	3	4	5
FREQUENCY:	3	0	1	1	2
PERCENTAGES:	42.9	0.0	14.3	14.3	28.6
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=7		
CODE VALUE:	2	3			
FREQUENCY:	6	1			
PERCENTAGES:	85.7	14.3			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=7		
CODE VALUE:	0	1	2		
FREQUENCY:	1	2	4		
PERCENTAGES:	14.3	28.6	57.1		
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=7		
CODE VALUE:	1	2	3	4	
FREQUENCY:	2	2	0	3	
PERCENTAGES:	28.6	28.6	0.0	42.9	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=7		
CODE VALUE:	0				
FREQUENCY:	7				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=7		
CODE VALUE:	1	2	3	4	
FREQUENCY:	4	0	0	3	
PERCENTAGES:	57.1	0.0	0.0	42.9	
VARIABLE NUMBER	32	USE-WEAR	N=7		
CODE VALUE:	1	2	3	4	
FREQUENCY:	3	2	0	2	
PERCENTAGES:	42.9	28.6	0.0	28.6	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=7		
CODE VALUE:	3	4			
FREQUENCY:	2	5			
PERCENTAGES:	28.6	71.4			

From a big log they will get three or even four planks. They adze out longitudinally one or two deep grooves along the upper surface of the log, turn it over and make similar deep grooves opposite the former ones, and then with two or three pairs of tough sharpened poles, driven well home in the bottom of one of the grooves, they pull in opposite directions and prise off each plank. After the surfaces are adzed smooth, and to as even a thickness as possible throughout, carving operations begin with small adzes, formerly made from stone or shell, but nowadays of hoop-iron, old chisel heads, or plane irons.

These were made on the mainland, not on Mailu Island.

4. I have been unable to locate Apulolo, a provenance which is a later addition to the QM registers (see also MAS 1, no. 627 and EI 3, no. 145).

Statistics. All implements are included in the statistical descriptions (tables A37 and A38). Two variables are markedly skewed — V9 and V14. In both instances no. 264, the smallest implement, is responsible. Without this the readings are: V9, 2.2 - 2.7 cm, and V14, 2.7 - 3.8 cm.

SOUTHERN PAPUA 1

No.	Repository	Reg. No.	Locality	Date	Collector
75	QM	M4085	?Apulolo	1894	MacGregor (11925)
76	QM	M5929	Tobuara, Cloudy Bay	"	" (11917)
264	AIM	11497	BNG	1877	Capt. Lamb
392	AIM	E155.197	SE NG	1955	Webster
620	AM	E6464	Aroma	1894	MacGregor (14236)
648	AM	B9688	?Cape Vogel	1885	Dr Lutter
790	AM	B6245	Mailu	1885	Capt. Liljeblad

SOUTHERN PAPUA 2

Locality. Mailu, Southeast Papua.

Number. 5.

Collector. MacGregor, Lawes.

Dates. 1892, 1893.

References.

Figure. Plate A16, figs. C and D, (no. 622).

Hafting features. A1, B2, C9, D3.

PLATE A16.

- A and B. SP 1, 620, AM E6464, Aroma.
C and D. SP 2, 622, AM E3854, Southeast Papua.
E and F. SP 3, 9, QM M 4018, ?Morehead River (Robinson R).
G and H. SP 4, 22, QM M4105, Rigo.



B



D



F



H



A



C



E



G

Handle. Very similar to those of SP 1, without the marked step on the front and with a thicker foot.

Hafting. Blade held against shaped foot by a half cover and a long, split vine whipping which goes around the top of the shaft.

Blade. Four are crystalline rock, bruised to shape with a high rounded section. The fifth is a black pebble with an almost triangular section. All have blunt edges but none are shiny.

Function. Probably sago palm felling.

Manufacturing tradition. T1 with a cover. This is possibly stronger than a simple T1 form.

Comments. Neither Malinowski (1915) nor Saville (1926) mention this form of implement, but both discuss SP 3 however. If, as very tentatively canvassed, they were for felling sago palms, then it is possible that they went out of use quite early and before any substitute for chopping up the pith was found, for unlike these the SP 3 implements' blades are usually highly glossed.

Statistics. Too few implements.

SOUTHERN PAPUA 2

No.	Repository	Reg. No.	Locality	Date	Collector
35	QM	M5933	Mailu	1892	MacGregor (9325)
36	QM	M5940	"	"	" (9322)
80	QM	M4086	"	"	" (9304)
81	QM	M4081	"	"	" (9303)
622	AM	E3854	SE Papua	1893	W.G. Lawes

SOUTHERN PAPUA 3

Locality. Cloudy Bay to Mailu, possibly elsewhere along the coast.

Number. 9.

Collector. MacGregor and others.

Dates. 1888 - 1911.

References. MacGregor, 1890c:35-6, 1892e:58; Edge Partington, 1890-98: Series II, Pl. 182, fig. 1; Malinowski, 1915:589, 600, 646;

Saville, 1926:21, 89-90.

Figure. Plate A16, figs. E and F, (no. 9).

Hafting features. A1, B1, C1, D3 = nos. 240, 420, 592, and 671;
A1, B1, C3, D3 = nos. 8, 9, 115, and 284; A1, B2, C9, D3 = no. 140.

Handle. Long shaft, curved to foot, forming angles between 115° and 145°, with no. 140 at 95°. The heel is not marked by a branch-trunk junction, except for the one in which the foot is at 95°, but is simply a suitably curved piece of wood. All have a hook where the heel might be. In the unusual one (no. 140) this hook is extended into a quite high heel.

Hafting. The blade is set against a toe which may or may not be stepped and it may be wrapped in palm spathe. Only no. 140 has a cover. The lashing is a long split cane whipping which is finished off by a couple of turns around the top of the shaft.

Blade. One of the blades is of the distinctive Suloga hornfels, and two others are nephrite-like. These three are worn out cutting blades. Five of the others are listed only as 'metamorphic' rocks and may be from a more local source, the last is 'basalt'. I am not sure whether these originally had cutting edges. All the blades are very highly glossed.

Function. Sago pith chopping.

Manufacturing tradition. T1, either a simple adze or with a cover.

Comments. 1. MacGregor (1890c:35) notes that certain villages on the Riguina river spoke a different language from the one common to the Domara-Mailu coast. In 1892e:57 he specifies these villages as Vinibo, Naminadobu, Inimari, and Aromari. Of Vinibo he comments (1892e:58):

They have plenty of iron tools for ordinary use, but for manufacturing sago they employ, as being the most suitable for the purpose, a small stone adze in a curved handle. These stone adzes were almost all made of jade, which they say they obtain from tribes living in the interior.

These adzes were evidently used in other places also for Malinowski and Saville both mention them when discussing the Mailu. Malinowski (1915: 646) says that the name given to the small blade used in the sago pounder and manufactured locally is *ota* (cf. with NEP 5, the wood working adze of the Orokaiva, = *oto*). Malinowski's figures 25 and 26 show a curved implement, with a blunt stone blade set in a trough wrapped in a palm spathe and lashed under a wooden cover. Saville (1926:90) also figures two sago chopping implements, one with a reappropriated blade, the other with a flaked blade. Neither of these authors indicate the characteristic

hook on the heel of the implements in this population. Saville (1926:21) notes that the stone for the flaked blades was imported from Abau Island. The sago was obtained on the mainland and Malinowski notes (1915:598): "Mailu islanders had sago swamp at Magaubo Pt, and they had to be on the watch for the Magori people."

2. A number of these implements are provenanced to the St. Joseph's River. I suspect this may be a misreading for Robinson or Riguina River. Not only does MacGregor never mention these very distinctive implements in his numerous reports on the Mekeo area (nor are they mentioned in the reports of the various Government Agents), but so far as I can determine the Mekeo and Roro peoples of the St. Joseph River-Yule Island areas were not sago makers, living rather on bananas (Hau'ofa, pers. comm.).

3. I wonder if this may be the same implement as Seligmann mentions for Tubetube (MAS 17).

4. These implements were made and used on Mailu Island until at least the 1920's (Saville, 1926:89-90).

Statistics. All implements are included in the statistical descriptions (tables A39 and A40). In table A49, V17 and V19 are markedly skewed. Nos. 420 and 671 have a central point of balance while the others are either 2.0 or 2.5 cm along the toe. For V19 one implement (no. 140) is set at 115°, the others are 85° or 90°. Two of the blade measurements appear to be very variable; V7 runs 1.7 - 2.0, 2.5, 3.2 - 4.0 cm, and V9 goes 1.3 - 1.5, 1.8, 2.0 - 2.4 cm. The same implements are not always in one part of the range. Table A40 shows the variability of the blades.

SOUTHERN PAPUA 3

No.	Repository	Reg. No.	Locality	Date	Collector
8	QM	M4094	?St. Joseph's R.	1892	MacGregor (9038)
9	QM	M4018	?Morehead R.	1892	" (8701)
115	QM	M4096	?St. Joseph's R.	1892	" (9039)
140	QM	M4020	?St. Joseph's R.	1892	" (9326)
240	AIM	11496	?Admiralty Is."	1888	G. Stuart
284	DM	FE102	-	1911	Tost & Rohu
420	NMV	X485	-	-	MacGregor no. lost
592	AM	E6460	Vinibo	1892	" (10889)
671	AM	E6441	"	1892	" (8888)

TABLE A39: Distribution of ratio scale features. S Papua (SP3). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	9	27.11	9.20	17	40	0.247	-1.362
8	WIDTH OF BLADE - HAFT	9	54.89	10.20	40	70	0.299	-0.414
9	THICKNESS OF BLADE	9	18.67	3.61	13	23	-0.368	-1.029
10	WIDTH OF BLADE - EDGE	9	53.78	12.59	30	70	-0.466	0.173
11	LENGTH - CUTTING EDGE	9	62.22	16.89	33	85	-0.318	-0.537
12	ANGLE - CUTTING EDGE	9	65.33	12.96	45	85	-0.032	-0.561
13	LENGTH OF HANDLE	9	746.33	157.04	449	908	-0.853	-0.140
14	SHAFT DIAMETER	9	35.89	4.11	29	42	-0.268	-0.590
15	LENGTH OF FOOT	9	155.89	40.94	85	205	-0.575	-0.380
16	TOTAL LENGTH OF FOOT	9	183.00	40.10	120	237	-0.601	-0.366
17	POINT OF BALANCE	8	16.87	10.67	0	25	-1.085	-0.291
18	ANGLE - B/FOOT - SIDE	9	121.67	13.46	95	145	-1.361	1.115
19	ANGLE - B/HANDLE - BELOW	9	91.67	9.01	85	115	2.357	4.584
20	WEIGHT	9	670.22	194.54	389	969	0.331	-0.820
21	SPRT SOCKET LENGTH	0	N TOO SMALL; COUNT <=3					
22	SPRT SOCKET WIDTH	0	N TOO SMALL; COUNT <=3					
34	% 10 ON 11 WC/LC	9	87.56	7.70	72	100	-0.566	1.009

TABLE A40: Distribution of nominal scale features. S Papua (SP3).

VARIABLE NUMBER	23	POLL OF BLADE	N=9		
CODE VALUE:	2	3	4		
FREQUENCY:	7	1	1		
PERCENTAGES:	77.8	11.1	11.1		
VARIABLE NUMBER	24	PLAN OF BLADE	N=9		
CODE VALUE:	1	2			
FREQUENCY:	4	5			
PERCENTAGES:	44.4	55.6			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=9		
CODE VALUE:	1	2	3		
FREQUENCY:	8	0	1		
PERCENTAGES:	88.9	0.0	11.1		
VARIABLE NUMBER	26	PROFILE OF BLADE	N=9		
CODE VALUE:	1	2	3		
FREQUENCY:	4	1	4		
PERCENTAGES:	44.4	11.1	44.4		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=9		
CODE VALUE:	0	1	2	3	
FREQUENCY:	1	1	5	2	
PERCENTAGES:	11.1	11.1	55.6	22.2	
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=9		
CODE VALUE:	1	2			
FREQUENCY:	7	2			
PERCENTAGES:	77.8	22.2			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=9		
CODE VALUE:	2	3	4	5	
FREQUENCY:	5	0	3	1	
PERCENTAGES:	55.6	0.0	33.3	11.1	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=9		
CODE VALUE:	0				
FREQUENCY:	9				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=9		
CODE VALUE:	1	2	3	4	
FREQUENCY:	5	0	2	2	
PERCENTAGES:	55.6	0.0	22.2	22.2	
VARIABLE NUMBER	32	USE-WEAR	N=9		
CODE VALUE:	5				
FREQUENCY:	9				
PERCENTAGES:	100.0				
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=9		
CODE VALUE:	1	2	3	4	
FREQUENCY:	3	3	2	1	
PERCENTAGES:	33.3	33.3	22.2	11.1	

SOUTHERN PAPUA 4

Locality. Kerepunu, Hood Bay.

Number. 6.

Collectors. Various.

Dates. 1883, 1892.

References. Turner, 1878:490; Chalmers and Gill, 1885:295; MacGregor, 1894b:3; Haddon, 1901:220-1; King, 1909:88; Malinowski, 1915:646; Hinderling, 1949:50.

Figure. Plate A16, figs. G and H, (no. 22).

Hafting features. A1, B3, C12, D12.

Handle. Usually very long shaft, very short toe but heel size ranges from very short to quite high, though mostly very small.

Hafting. The toe may be sloped or slightly hollowed to take the one-piece separate socket which is rather small by Northeast Papua or Sepik standards. The hollow in the separate socket is made with a slot down the back to take up the excess width and the blade may be wrapped. The top of the separate socket is pointed to round. The blade is held in by a twill patterned plait band set on a cut away part, and is like a less complex, or thicker stranded version of the lashings of SP 5. The separate socket-handle lashing is a wide strip plait band made in a simple pattern, unlike the twill patterns of NEP 1-3.

Blade. None of the blades are of Suloga hornfels, and all appear to be metamorphic or 'diorite'. Their plan is tapering but narrow, with a thin to deep oval section and usually a symmetrical cutting edge. They have adze bevels and, considering the consistency with which they are reported as canoe hollowing tools, it is interesting that only one has the characteristic fluted use-wear marks. The others are usually considerably used although one is only slightly used. All are set as adzes between 85° and 95°.

Function. Canoe or bowl hollowing.

Manufacturing tradition. T2.

Comments. 1. Gill, discussing the fishing villages of fugitives at Kerepunu, remarks (Chalmers and Gill, 1885:295):

These Kerepunu natives purchase the right of felling timber for canoes of the inhabitants of the interior near the streams; they then transport the logs to their canoe building yard opposite the anchorage, and dig them out with their jade adzes. Just now a quarrel is raging, the carpenters asserting that they have paid sufficient armlets for this season, the interior natives denying this, and refusing to allow the shore natives to get new timber until more valuables are forthcoming.

Turner describes the process (1878:490):

At Hood Bay where there is a large supply of timber, ship-building is vigorously prosecuted. While there we saw two men hollowing out a large trunk for a canoe. Standing opposite to each other, they swung their long stone adzes over their shoulders, dealing blow after blow in regular succession, as riveters do their hammers, the one cutting the wood with the grain, the other chopping across the grain what the first had cut, thus making the chips fly apace. The adzes were of stone, with wooden handles two and a half feet long, and when used in the way indicated by two tall powerful men, did their work most effectually.

Haddon (1901:220) gives a long description of canoe making at Keapara, which is very similar to that described by Gill:

The trees of which the canoes are made grow up the Vanigela River; they are cut down, and their trunks are floated down the stream to its mouth. The Kalo men sell the lumber to the Keapara men, who tow it to their village. The outside of the canoe is cut with steel tomahawks obtained from the white man, but the logs are hollowed out with stone adzes, the stone blade of which can be shifted round to any angle by turning the holder on the shaft After the canoes are dug out and trimmed down they are charred by fires lit outside and inside them; the effect of this is to harden the wood, and I suppose to somewhat fill up the pores so as to make the craft more seaworthy. I believe that one result of applying fire to the canoes is to make them open out more widely.

His Plate XV, top, shows three men using stone adzes at Keapara. On 12 July 1892 MacGregor saw six canoes "in progress of manufacture at Kerepunu" (1894b:3), and Lawes, for 5 April 1876, remarks "One canoe, nearly finished, must have been an enormous tree; it measured forty-eight feet long by ten feet round, and for making it only stone hatchets had been used" (King, 1909:88 quoting Lawes' journal).

2. Haddon also observed at Keapara (1901:220-1):

Sitting on the sand beach was a man chipping out a wooden bowl from a piece of the same kind of wood as that of which the canoes were made. He employed a small adze, constructed on the same principle as that of the large adzes used in canoe making. In this instance the blade was made of iron, but so fashioned as precisely to resemble the original stone blade.

3. Malinowski (1915:646) discusses a second kind of Mailu cutting

TABLE A41: Distribution of ratio scale features. S Papua (SP4). Descriptive Statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	6	61.17	13.20	39	76	-0.822	0.282
8	WIDTH OF BLADE - HAFT	6	50.33	6.83	44	62	1.023	0.232
9	THICKNESS OF BLADE	6	22.17	5.12	16	30	0.216	-0.110
10	WIDTH OF BLADE - EDGE	6	55.17	7.55	45	67	0.305	0.207
11	LENGTH - CUTTING EDGE	6	63.00	13.49	45	86	0.629	0.888
12	ANGLE - CUTTING EDGE	6	57.17	5.78	52	65	0.710	-0.880
13	LENGTH OF HANDLE	6	754.83	155.13	527	905	-0.661	-0.681
14	SHAFT DIAMETER	6	29.67	3.44	25	33	-0.455	-0.857
15	LENGTH OF FOOT	6	211.00	33.17	168	267	0.649	0.674
16	TOTAL LENGTH OF FOOT	6	403.00	43.70	361	461	0.301	-1.111
17	POINT OF BALANCE	6	143.83	20.60	120	170	0.432	-0.822
18	ANGLE - B/FOOT - SIDE	6	60.83	7.36	55	75	1.533	1.839
19	ANGLE - B/HANDLE - BELOW	6	88.33	5.16	80	95	-0.555	0.254
20	WEIGHT	6	810.67	186.01	589	1111	0.502	0.103
21	SPRT SOCKET LENGTH	6	289.33	28.50	259	328	0.402	-0.791
22	SPRT SOCKET WIDTH	6	62.50	6.83	55	74	0.733	0.309
34	% 10 ON 11 WC/LC	6	88.83	7.00	78	100	0.089	1.077

TABLE A42: Distribution of nominal scale features. S Papua (SP4).

VARIABLE NUMBER	23	POLL OF BLADE	N=6
CODE VALUE:	2	3	
FREQUENCY:	4	2	
PERCENTAGES:	66.7	33.3	
VARIABLE NUMBER	24	PLAN OF BLADE	N=6
CODE VALUE:	2		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=6
CODE VALUE:	1	2	
FREQUENCY:	5	1	
PERCENTAGES:	83.3	16.7	
VARIABLE NUMBER	26	PROFILE OF BLADE	N=6
CODE VALUE:	1	2	
FREQUENCY:	5	1	
PERCENTAGES:	83.3	16.7	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=6
CODE VALUE:	2		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=6
CODE VALUE:	1	2	
FREQUENCY:	2	4	
PERCENTAGES:	33.3	66.7	
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=6
CODE VALUE:	2	3 4	
FREQUENCY:	5	0 1	
PERCENTAGES:	83.3	0.0 16.7	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=6
CODE VALUE:	0		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	31	FINISH ON BLADE	N=6
CODE VALUE:	1	2 3 4	
FREQUENCY:	2	0 0 4	
PERCENTAGES:	33.3	0.0 0.0 66.7	
VARIABLE NUMBER	32	USE-WEAR	N=6
CODE VALUE:	1	2 3	
FREQUENCY:	1	4 1	
PERCENTAGES:	16.7	66.7 16.7	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=6
CODE VALUE:	1	2	
FREQUENCY:	3	3	
PERCENTAGES:	50.0	50.0	

adze called *u'a*, like the SP 1 implements:

For scooping out canoes smaller blades were used, which could be turned in their sockets and thus fixed at any angle to the striking plane. This adjustment permitted them to be used for hollowing out canoes through a fairly narrow opening.

Whether these would have had one-piece (C 12) separate sockets like SP 4 or cutaway two-piece sockets like NEP 1-3 I do not know. Both Cloudy Bay and the Kerepunu area were connected to Mailu by trade, but Mailu speakers are spread all along the coast from Domara eastwards. One example of NEP 1 comes from Mailu, and NEP 1 and NEP 3 are represented on the coast by implements from Aroma, so the presence of NEP 1-3 at Mailu Island may be more likely than that of SP 4.

Statistics. All implements are included in the statistical descriptions (tables A41 and A42). Two variables are markedly skewed, V8 by no. 607 and V18 by no. 120. Without these, the ranges read V8, 4.4-5.5 cm, and V18, 55-60°. Two groups of total foot length (V16) are indicated by the present small samples: nos. 605, 22 and 120 fall between 36.1 and 37.1 cm, the others between 41.7 and 46.1.

SOUTHERN PAPUA 4

No.	Repository	Reg. No.	Locality	Date	Collector
22	QM	M4105	Rigo	1892	MacGregor (8704)
120	QM	M4078	Kerepunu	1892	" (9331)
605	AM	A15375	"	1883	Mason Bros.
606	AM	A15378	"	1883	" "
607	AM	E21582	"	-	-
731	AM	A15370	"	1883	Mason Bros.

SOUTHERN PAPUA 5

Locality. Mainly Sinaugoro, around Rigo and Kapakapa, but apparently collected from a very wide area of Southern Papua.

Number. 35.

Collectors. Various.

Dates. 1883-19.

References. Lindt, 1887:61-2; Thompson, 1892:62; Edge Partington, 1890-98: Series I, Pl. 298, fig. 5, Series III, Pl. 86, fig. 5; Le Roux,

1948: Pl. C, fig. III 2; Hinderling, 1949:48-9.

Figure. Plate Al7, figs. A and B, (no. 79), figs. C and D, (no. 40).

Hafting features. Al, Bl, C6, D3 = nos. 37, 40, 72, and 73;
Al, Bl, C6, D15 = all the rest.

Handle. Robust implements, solid shaft, high pointed heel, wide foot with sharp corners. The heel may be marked off by various ledges. A considerable range in size and handle length.

Hafting. In both versions the blade is set in a socket hollowed out in the toe and having a slot at the back. The simpler lashing is a long, split vine whipping covering the toe and heel (Pl. Al7, figs. C and D), while the commoner form is a very elaborate, split vine plaiting which has patterns, as shown in the plates, rather like those in Aran knitting (Pl. Al7, figs. A and B).

Blade. Of the thirty-five implements only four do not have blades of Suloga hornfels (nephrite-like, 'basalt', 'schistose', and 'spotty'). They are wide, not markedly tapering adze blades, all of which show considerable use-wear. Two are glossy and may have been used for sago chopping.

Function. The width of the blades suggests a planing or tree-felling task, but they may well be multi-purpose.

Manufacturing tradition. T1.

Comments. 1. Lindt remarks about Kapakapa (1887:61-2), "They value their stone adzes and clubs very highly, and will rarely part with them except in exchange for a good tomahawk." Thompson (1892:62) also notes the same reluctance in the Rigo area (Manukoro, Veiburi), but suggests this is because they prefer to use stone adzes for canoe hollowing.

2. Stone (1880:58) figures one of these adzes which he found "in vogue throughout the whole country" of Southern Papua. As he appears to have originated the notion that the stone was brought from the interior by the Koiari (1880:57) the rare occurrence of stones other than Suloga hornfels should counteract this. Other kinds of blades or implements (EI 1) may have come from the Koiari.

3. No. 282 was owned by Maru Imara. It is not a traditional style.

4. No. 647 was sent to the Australian Museum by mistake as part of the MacGregor collection transferred from the Queensland Museum in 1897 (T 62 out, 30/7/1897).

PLATE A17.

A and B. SP 5, 79, QM M6144, ?Milne Bay.

C and D. SP 5, 40, QM M4463, Maru.

E and F. EI 1, 283, DM FE557, Port Moresby.

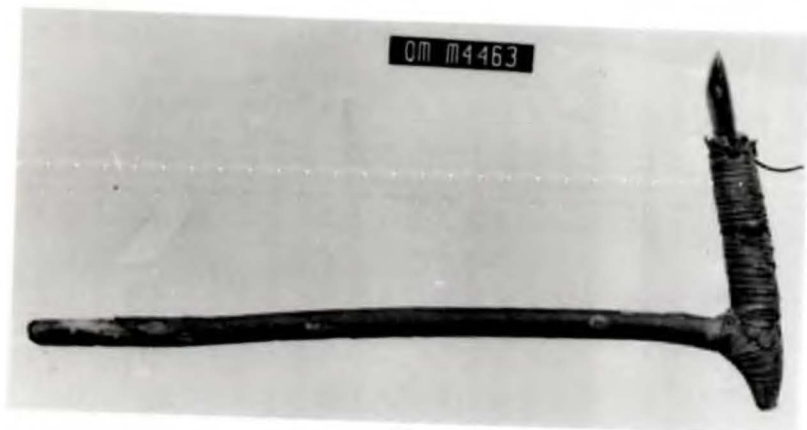
G and H. EI 2, 29, QM M203, Neneba, Mt. Scratchley.



A



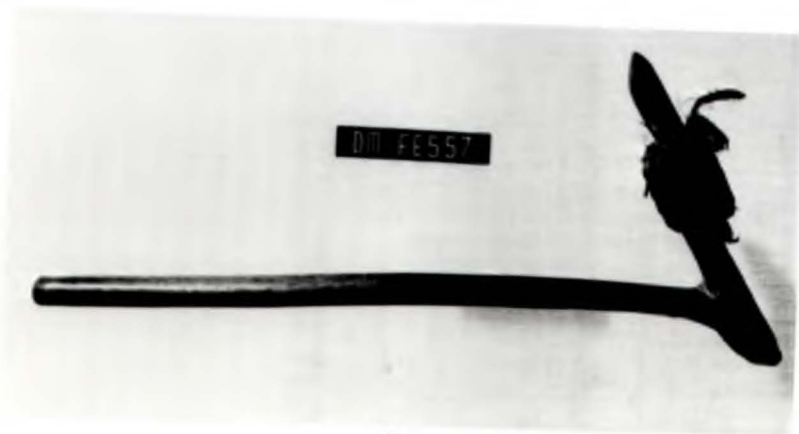
B



C



D



E



F



G



H

TABLE A43: Distribution of ratio scale features. S Papua (SP5). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	32	97.66	40.87	36	195	0.638	-0.163
8	WIDTH OF BLADE - HAFT	32	82.69	20.41	45	126	0.317	-0.317
9	THICKNESS OF BLADE	32	24.94	6.68	11	37	-0.495	-0.223
10	WIDTH OF BLADE - EDGE	32	88.88	21.19	50	130	-0.005	-0.490
11	LENGTH - CUTTING EDGE	32	105.28	22.83	60	140	-0.389	-0.695
12	ANGLE - CUTTING EDGE	31	61.42	9.38	40	76	-0.768	0.031
13	LENGTH OF HANDLE	32	533.03	93.54	235	735	-0.518	2.242
14	SHAFT DIAMETER	26	27.88	4.79	19	42	0.571	1.655
15	LENGTH OF FOOT	32	296.50	57.42	184	469	0.603	1.637
16	TOTAL LENGTH OF FOOT	32	394.78	84.57	231	610	0.322	0.338
17	POINT OF BALANCE	25	135.00	37.36	78	220	0.109	-0.497
18	ANGLE - B/FOOT - SIDE	32	66.81	6.79	55	80	0.420	-0.629
19	ANGLE - B/HANDLE - BELOW	32	89.00	5.74	80	105	0.544	1.123
20	WEIGHT	25	1190.88	522.48	319	2517	0.340	0.094
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	32	83.97	6.89	72	101	0.340	-0.093

TABLE A44: Distribution of nominal scale features. S Papua (SP5).

VARIABLE NUMBER	23	POLL OF BLADE	N=32			
CODE VALUE:	0	1	2	3		
FREQUENCY:	5	0	25	2		
PERCENTAGES:	15.6	0.0	78.1	6.2		
VARIABLE NUMBER	24	PLAN OF BLADE	N=32			
CODE VALUE:	0	1	2			
FREQUENCY:	7	5	20			
PERCENTAGES:	21.9	15.6	62.5			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=32			
CODE VALUE:	0	1	2			
FREQUENCY:	7	22	3			
PERCENTAGES:	21.9	68.8	9.4			
VARIABLE NUMBER	26	PROFILE OF BLADE	N=32			
CODE VALUE:	0	1	2	3	4	5
FREQUENCY:	6	18	1	4	0	3
PERCENTAGES:	18.8	56.3	3.1	12.5	0.0	9.4
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=32			
CODE VALUE:	2	3				
FREQUENCY:	29	3				
PERCENTAGES:	90.6	9.4				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=32			
CODE VALUE:	1	2				
FREQUENCY:	11	21				
PERCENTAGES:	34.4	65.6				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=32			
CODE VALUE:	0	1	2	3	4	5
FREQUENCY:	7	12	5	0	6	2
PERCENTAGES:	21.9	37.5	15.6	0.0	18.8	6.2
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=32			
CODE VALUE:	0					
FREQUENCY:	32					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=32			
CODE VALUE:	1	2	3	4		
FREQUENCY:	2	0	1	29		
PERCENTAGES:	6.2	0.0	3.1	90.6		
VARIABLE NUMBER	32	USE-WEAR	N=32			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	6	19	0	6	1	
PERCENTAGES:	18.8	59.4	0.0	18.8	3.1	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=32			
CODE VALUE:	1	2	3	4		
FREQUENCY:	1	2	1	28		
PERCENTAGES:	3.1	6.2	3.1	87.5		

Statistics. All but nos. 197 (very small), and 282 and 321 (late, non-functional) are included in the statistical descriptions and comparisons (tables A43 and A44). The measurements indicate a very homogeneous group despite the blade variability.

SOUTHERN PAPUA 5

No.	Repository	Reg. No.	Locality	Date	Collector
5	QM	E8962	Rigo	1888	- (T12)
12	QM	E8961	"	1888	- (T12)
37	QM	E8863	-	1888	- (T28)
38	QM	M4467	Rigo	1894	MacGregor (14292)
39	QM	E4656	-	-	No. lost
40	QM	E8964	Maru	1888	- (T28)
72	QM	E8851	-	1888	- (T28)
73	QM	M5941	-	1892	MacGregor 8076* [sic]
79	QM	M6144	?Milne Bay	1892	" (9549)
85	QM	E5022	-	1886	Musgrave Coll
122	QM	M204	Tugeri (?provenance)	1892	MacGregor (9551)
150	QM	M194	Rigo	*5.5.89	" (8702)
195	AIM	15356	Port Moresby	-	Edge Partington Coll
197	AIM	23331	Goodenough Is.	1937	Mrs Ballantyne
199	AIM	8566	New Guinea	1917	Northcroft Coll
200	AIM	12232	" "	-	Mr Campbell
280	DM	FE4421	" "	1963	Mr King
282	DM	FE4500	Iove, Manubaru dist.	1965	R. Bain
321	OM	D61.31	Papua	1910-19	J. Begg
447	NMV	X474	Rigo	1892	MacGregor (9044)
531	SAM	A7568	Sinaugolo tribe	-	English Coll
532	SAM	A7569	" "	-	" "
533	SAM	A7570	" "	-	" "
534	SAM	A7571	" "	-	" "
535	SAM	A7573	" "	-	" "
536	SAM	A7574	" "	-	" "
537	SAM	A7583	Port Moresby	-	Old Coll
612	AM	A15417	New Guinea	1883	Mason Bros.
647	AM	E7062	?Fly River?	1897	P. Hartmann (Pl46)
728	AM	B6234	New Guinea	1885	Capt. Liljeblad
729	AM	A15409	Roro, Yule Is.	1883	Mason Bros.
738	AM	E58153	South Cape	1955	Mus. App. Arts
776	AM	E6471	St. Joseph's R.	1892	MacGregor (9335)
788	AM	E3066	Domara, Cloudy Bay	1890	Capt. Liljeblad
789	AM	B6241	Port Moresby	1885	" "

SOUTHERN PAPUA 6

Locality. St. Joseph's River (?Robinson River).

Number. 1.

Collector. MacGregor.

Date. 1892.

References. Edge Partington, 1890-98: Series III, Pl. 86, fig. 2.

Figure. Not figured.

Hafting features. A1, B2, C3, D3.

Handle. Small implement, with high pointed heel.

Hafting. Blade set on step and held by cover. Long, split cane whipping finished off around top of shaft.

Blade. Hoop iron, nibbled edge.

Function.

Manufacturing tradition. A local variant of T1.

Comments. 1. Compare with MAS 18. However, has the typical Southern Papua finishing off technique of whipped lashings, and, like the SP 3 implements, may have come from the Robinson River area (see SP 3 comments).

2. A small implement figured by Edge Partington with a jade blade, wooden cover, and typically finished lashing may best be included here, although it is supposed to come from Holnicote Bay in Northeast Papua.

Statistics. Too few implements.

SOUTHERN PAPUA 6

No.	Repository	Reg. No.	Locality	Date	Collector
78	QM	M4121	?St. Joseph's R.	1892	Macgregor (8705)

SOUTHERN PAPUA 7

Locality. Aroa River, running into Redscar Bay.

References. Lindt, 1887:50; Lewis, 1923: fig. 5?

Hafting features. Not within the compass of this listing.

Style. Lindt observed that sago was cut "by means of a peculiar kind of adze, made of hard cane, attached to a handle at an angle of 45°".

Function. Sago pith chopping.

Manufacturing tradition. A local variant of T2?

Comments. 1. This seems to be like the adzes for chopping sago pith reported by Landtman (1933), for the Kiwai area (SNG 12). It is also known in other areas of the Gulf District. The Manumanu people of Redscar Bay were part of the *hiri* trade and may have copied this idea from parts of the Gulf.

2. The implement figured by Lewis as coming from east of the Purari delta has a fork, between the prongs of which the 'blade' is set. Lewis (1923:18) reports that the end may alternatively be split.

EASTERN INTERIOR 1

Locality. Port Moresby area, Astrolabe Range, probably Koita people.

Number. 5.

Collectors. J. Moresby, J. Chalmers, W. MacGregor.

Dates. 1873 - 1892.

References. Moresby, 1876; Turner, 1878; Lawes, 1879; Chalmers, 1890; MacGregor, 1890f:131, 132, 137; Edge Partington, 1890-98: Series I, Pl. 298, fig. 3.

Figure. Plate A17, figs. E and F, (no. 283).

Hafting features. A1, B1, C1, D14.

Handle. Long shaft, very high heel, long toe narrower than blade. Size varies in proportion to blade.

Hafting. The toe is sloped or, very occasionally, has a minimal step. The blade is usually not wrapped (although nos. 283 and 294 have a spathe cushioning in front) and is held to the toe by 1-4 overlapping plait bands made from fine vine strips and moulded to the shape of the blade and toe.

Blade. These blades are more nearly ground all over than EI 2 blades from further inland and are made from green-black schistose rocks. They have an oval section, adze bevel and a cutting edge asymmetrical in plan. Three of the five blades have fluted edges suggesting considerable use in cutting across the grain, and perhaps great care in usage.

Function. Probably multi-purpose.

Manufacturing tradition. T1.

Comments. 1. The inter-relationship of Motu, Koita and Koiari has been commented on by a number of people since it was first noticed by Moresby in 1873 (1876:152-7). Turner (1878) and Lawes (1879) both discuss this at length. Stone (1880:57) remarks on the trade of stone adzes from the interior to the coastal people. These blades appear to have been made in the interior but to have been used by both the Motu and Koita.

2. Moresby (1876:155) saw stone adzes which were "capable of penetration for about four inches" in use in gardening near a hill village in the Moresby area. It seems unlikely that any of the ones recorded here were used in such a way for the characteristic use-wear on a hoe (Semenov, 1964:133), is absent from these blades.

3. MacGregor (1890f:131, 132, 137) gives the Koita names for adze, axe, and stone axe as *gumaa*, *guma*, and *guma* (guttural), respectively.

4. EI 1 differs from EI 2 only in the blade. Cf. also the hafting of RH 12, EI 3, and WI 18 - WI 21.

Statistics. Too few implements.

EASTERN INTERIOR 1

No.	Repository	Reg. No.	Locality	Date	Collector
100	QM	M202	Wadiri, Astrolabe Ra.	1892	MacGregor (9332)
283	DM	FE557	Port Moresby	*12/9/73	J. Moresby
294	DM	FE556	? 'N. Queensland'?	1876	H.E. the Governor
331	OM	D20.485	Port Moresby?	-	J. Chalmers
394	CM	E116.10.2	New Guinea	-	B.M. Moorhouse

EASTERN INTERIOR 2

Localities. Koiari speaking areas of the Owen Stanley Ranges.

Number. 16.

Collectors. Mainly MacGregor Collection, some collected by

A. Guilianetti for the official collections.

Dates. 1889 - 1897.

References. Edge Partington, 1890-98: Series III, Pl. 86, fig. 6; MacGregor, 1890f:131, 132, 137; MacGregor, 1898b:10, 14, 15; MacGregor, 1899:27; Guilianetti, 1898a:68, 1898b:33; Monckton, 1922:35 and plate facing page 268.

Figure. Plate A17, figs. G and H, (no. 29).

Hafting features. A1, B1, C1, D14.

Handle. As EI 1.

Hafting. As EI 1, but blades are never wrapped or cushioned.

Blade. Oval blade, long protruding cutting edge, only edge polished, rest flaked, section roughly oval, cutting edge usually asymmetric in plan and adze bevelled in profile. Stone is dark, possibly a basalt, occasionally a chlorite schist.

Function. Probably multi-purpose. Specialised carving not a feature of the Koiari.

Manufacturing tradition. T1.

Comments. 1. MacGregor (1899:21-27) describes the Koiari area and notes that the people live at altitudes between 4 - 6000'. A number of tracks intersected the area. Guillianetti (1898b:33) remarks of Sikube (on the southern side) that "They use exactly the same type of stone axes as those of Neneba ..." (on the east side of the Ajibara River, a tributary of the Chirima on Mt. Scratchley) (MacGregor, 1898b:10).

2. A number of vocabularies have been scanned:
Koiari (MacGregor, 1890f:131, 132, 137) adze - *yavaka*, axe - *uma*, stone axe - *yavaka*;
Gosisi and Tobiri on Mt. Knutsford and Mt. Musgrave (MacGregor, 1898b:14) stone adze - *kuma*, *idihima*;
Neneba, Mt. Scratchley (MacGregor, 1898b:15) stone adze - *kuma*;

3. These adzes differ from EI 1 only in their blades, and from EI 3 in the blade and the extra hafting loop. Cf. also RH 12, and WI 18 to WI 21.

Statistics. All these implements are included in the statistical descriptions and comparisons (tables A45 and A46). The measurement distributions are skewed in two instances by no. 433 which has the lowest measurements for V12 and V34. Without this the ranges for these variables are: V12, 48 - 66°; and V34, 88 - 109. V7 is skewed by one very large blade no. 146, and the other range is 3.5 - 14.3 cm. The handle length (V13) is skewed by two small implements nos. 142 and 26. Without these two the range is 49.3 - 62.0. However, table A46 shows that this is quite a variable population, and it is probable that a larger sample is needed.

TABLE A45: Distribution of ratio scale features. E Interior (EI2). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	16	101.19	44.69	35	226	1.303	2.308
8	WIDTH OF BLADE - HAFT	16	69.56	17.21	41	99	-0.156	-0.845
9	THICKNESS OF BLADE	16	22.50	6.35	13	33	-0.116	-0.973
10	WIDTH OF BLADE - EDGE	15	65.87	16.67	38	95	0.048	-0.813
11	LENGTH - CUTTING EDGE	15	72.13	23.79	35	126	0.675	0.287
12	ANGLE - CUTTING EDGE	16	56.94	7.13	38	66	-1.163	1.555
13	LENGTH OF HANDLE	16	522.56	69.16	367	620	-1.059	0.878
14	SHAFT DIAMETER	16	19.00	4.20	11	26	-0.360	-0.610
15	LENGTH OF FOOT	16	215.12	37.41	133	280	-0.602	0.272
16	TOTAL LENGTH OF FOOT	16	316.31	65.54	188	441	0.138	0.050
17	POINT OF BALANCE	15	91.93	31.22	41	155	0.241	-0.195
18	ANGLE - B/FOOT - SIDE	16	69.56	6.20	60	80	0.187	-0.662
19	ANGLE - B/HANDLE - BELOW	16	93.94	8.00	80	110	0.794	0.319
20	WEIGHT	14	764.21	445.91	193	1718	0.592	-0.136
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	15	93.53	9.05	67	109	-1.506	3.949

TABLE A46: Distribution of nominal scale features. E. Interior (ET2).

VARIABLE NUMBER	23	POLL OF BLADE					N=16
CODE VALUE:	0	1	2	3	4		
FREQUENCY:	1	0	0	0	15		
PERCENTAGES:	6.2	0.0	0.0	0.0	93.8		
VARIABLE NUMBER	24	PLAN OF BLADE					N=16
CODE VALUE:	0	1					
FREQUENCY:	1	15					
PERCENTAGES:	6.2	93.8					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE					N=16
CODE VALUE:	0	1	2	3			
FREQUENCY:	1	11	3	1			
PERCENTAGES:	6.2	68.8	18.8	6.2			
VARIABLE NUMBER	26	PROFILE OF BLADE					N=16
CODE VALUE:	0	1	2	3	4	5	
FREQUENCY:	1	4	2	0	8	1	
PERCENTAGES:	6.2	25.0	12.5	0.0	50.0	6.2	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE					N=16
CODE VALUE:	2	3					
FREQUENCY:	13	3					
PERCENTAGES:	81.3	18.8					
VARIABLE NUMBER	28	CUTTING EDGE - BELOW					N=16
CODE VALUE:	0	1	2				
FREQUENCY:	1	14	1				
PERCENTAGES:	6.2	87.5	6.2				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT					N=16
CODE VALUE:	0	1	2	3	4		
FREQUENCY:	1	0	13	0	2		
PERCENTAGES:	6.2	0.0	81.3	0.0	12.5		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE					N=16
CODE VALUE:	0						
FREQUENCY:	16						
PERCENTAGES:	100.0						
VARIABLE NUMBER	31	FINISH ON BLADE					N=16
CODE VALUE:	1	2	3				
FREQUENCY:	11	4	1				
PERCENTAGES:	68.8	25.0	6.2				
VARIABLE NUMBER	32	USE-WEAR					N=16
CODE VALUE:	1	2	3	4			
FREQUENCY:	3	10	0	3			
PERCENTAGES:	18.8	62.5	0.0	18.8			
VARIABLE NUMBER	33	MATERIAL OF BLADE					N=16
CODE VALUE:	1	2					
FREQUENCY:	14	2					
PERCENTAGES:	87.5	12.5					

EASTERN INTERIOR 2

No.	Repository	Reg. No.	Locality	Date	Collector
18	QM	M4103	Goromani	1897	MacGregor (19065)
26	QM	M6090	" , Sikube or Neneba	1897	" (19066)
27	QM	M6091	" "	1897	" (19064)
28	QM	M4106	Neneba	1897	" (16181)
29	QM	M203	"	1897	" (16185)
30	QM	M5943	"	1897	" (16144)
123	QM	M4030	"	1897	" (16142)
142	QM	M4037	Goromani, Sikube or Neneba	1897	" (19067)
143	QM	M4111	" "	1897	" (19063)
146	QM	M200	" "	1897	" (19062)
433	NMV	X43136	Kukukuku	1936	E.P. Chinnery
442	NMV	X476	Neneba	1897	MacGregor (16186)
529	SAM	A7581	Mt. Scratchley	-	English Coll
539	SAM	A7584	" " (Neneba)	-	" "
778	AM	E6452	Neneba	1897	MacGregor (16188)
920	QM	M4116	"	1897	" (16179)

EASTERN INTERIOR 3

Locality. 'Goilala' area.

Number. 6.

Collectors. Various.

Dates. 1894 - 1936.

References. Chalmers and Gill, 1885:162; MacGregor, 1891:157; Haddon, 1901:272; Seligmann, 1910:313; Williamson, 1912:185; Chinnery, 1924:63-4; Dupeyrat, 1935: facing page 273; Le Roux, 1948: Pl. C, fig. III3; Hinderling, 1949:47-48.

Figure. Plate A18, figs. A and B, (no. 932).

Hafting features. A1, B1, C1, D14 plus loop.

Handle. As EI 1.

Hafting. As EI 2, but four implements have a cord loop which goes in front of the blade, below the plait band and over the top of the shaft. The sides of the loop are brought together behind the toe by smaller loops twisted to increase the tension of the side strands.

Blade. The blades are long, very thin, narrow with a protruding cutting edge and made from a shaley, slatey, possibly schistose rock utilising natural cleavages. The laminations can be seen in the slides of the blades. The material appears to be quite soft and evidently the cutting edges are easily battered (4 of the 6 have use-wear 4).

Function. Probably multi-purpose.

Manufacturing tradition. T1.

Comments. 1. MacGregor (1891:157) reports for the Mekeo "There are regular market places where they meet at stated times to barter", and Seligmann notes (1910:313) "The mountains behind Mekeo support a scattered population, rich only in feather ornaments, stone adzes and clubs, all of which were brought for barter to the Mekeo villages." Haddon reports finding stone adzes at Inawi in the Mekeo district. "The stone heads were ruder than any I had previously seen from New Guinea ... These implements were roughly hewn and polished only at the cutting edge." Chalmers (Chalmers and Gill, 1885:162) reports a slightly different procedure among people belonging to a district on the Yule range:

At certain seasons they come down to the sago swamps and visit Kabadi, to get salt and make sago, and then return to the mountains They use adzes, roughly made from slate; certainly the poorest I have seen ... Several of the men at Iduna had shell ornaments that I knew could not be got anywhere on this coast, and, on inquiring, found they came from the other side.

Haddon's description may seem to favour EI 2 implements as the ones in question, while Chalmers' description is probably EI 3. Williamson (1929, Pl. 75, fig. 4) figures a Mafulu adze which is like EI 3. Hinderling (1949: abb. 17,18) figures an EI 3 adze collected from the Roro people, while Le Roux figures one collected at Yule Island.

2. Williamson (1912:185) says there were two forms of handle, one with a right angle bend, the other "with the angle of the head set obliquely". All the ones I recorded have the usual acute angle of around 60°.

3. Guilianetti (1898b:34) gives *iata* for stone adzes of the Suku and Amaseba of Mt. Cameron.

4. No. 824 is glossed "Obtained through trade with the mountain people, Name *kilawa*" (PNGM register).

TABLE A47: Distribution of ratio scale features. Eastern Interior (EI3). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	6	151.00	24.13	123	186	0.052	-0.382
8	WIDTH OF BLADE - HAFT	6	67.50	9.16	60	85	1.508	1.679
9	THICKNESS OF BLADE	6	13.00	3.74	8	17	-0.430	-0.901
10	WIDTH OF BLADE - EDGE	6	65.83	10.72	55	83	0.741	-0.226
11	LENGTH - CUTTING EDGE	6	87.50	17.69	67	117	0.679	0.277
12	ANGLE - CUTTING EDGE	6	45.50	10.93	30	63	0.299	0.567
13	LENGTH OF HANDLE	6	558.00	50.46	469	607	-0.985	0.718
14	SHAFT DIAMETER	6	23.17	1.83	20	25	-1.030	0.387
15	LENGTH OF FOOT	6	239.67	55.83	175	330	0.604	0.043
16	TOTAL LENGTH OF FOOT	6	392.33	46.83	345	464	0.613	-0.514
17	POINT OF BALANCE	6	102.00	14.51	84	120	-0.330	-0.735
18	ANGLE - B/FOOT - SIDE	6	72.00	7.75	65	85	0.871	0.150
19	ANGLE - B/HANDLE - BELOW	6	89.17	4.92	80	95	-1.198	1.691
20	WEIGHT	6	756.50	117.08	633	935	0.675	-0.473
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	6	77.50	17.66	51	104	0.022	0.415

TABLE A48: Distribution of nominal scale features. E. Interior (EI3).

VARIABLE NUMBER	23	POLL OF BLADE	N=6
CODE VALUE:	2	3 4	
FREQUENCY:	1	4 1	
PERCENTAGES:	16.7	66.7 16.7	
VARIABLE NUMBER	24	PLAN OF BLADE	N=6
CODE VALUE:	1		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=6
CODE VALUE:	1		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	26	PROFILE OF BLADE	N=6
CODE VALUE:	1		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=6
CODE VALUE:	2	3	
FREQUENCY:	2	4	
PERCENTAGES:	33.3	66.7	
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=6
CODE VALUE:	1		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=6
CODE VALUE:	2		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=6
CODE VALUE:	0		
FREQUENCY:	6		
PERCENTAGES:	100.0		
VARIABLE NUMBER	31	FINISH ON BLADE	N=6
CODE VALUE:	1	2 3	
FREQUENCY:	5	0 1	
PERCENTAGES:	83.3	0.0 16.7	
VARIABLE NUMBER	32	USE-WEAR	N=6
CODE VALUE:	2	3 4	
FREQUENCY:	2	0 4	
PERCENTAGES:	33.3	0.0 66.7	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=6
CODE VALUE:	2		
FREQUENCY:	6		
PERCENTAGES:	100.0		

Statistics. All implements are included in the statistical descriptions (tables A47 and A48). This is a small sample and a number of variables are skewed although none are markedly platykurtic. V8 is skewed by no. 439 which has a very wide blade; without it the range is 6.0 - 6.9 cm. The handle diameter (V14) is skewed by no. 145 and without it the range is 2.2 - 2.5 cm. One implement, no. 439, has a blade set at 80° (V19) and the others are set at 90 - 95°. The blades are, morphologically, relatively unvarying (table A48).

EASTERN INTERIOR 3

No.	Repository	Reg. No.	Locality	Date	Collector
145	QM	M199	?Apulolo	1894	MacGregor (11924)
438	NMV	X40297	Morobe dist.	1932	G.J. Leveen
439	NMV	X40298	" "	1932	" "
454	NMV	X4046	-	-	-
824	PNGM	E241	Torube & Soroa	1955	-
932	UQM	3706	-	-	Mr Biggs

EASTERN INTERIOR 4

Localities. 'Kukukuku', approximately the Kodama Range to the southern part of the Kratke Range, and on the upper Tauri and Vailala Rivers skirting the Nabo Range, while on the north east Hinderling refers to a similar implement (1949: abb. 30-31) from the upper Waria River.

Number. 37.

Collectors. Gold miners or Patrol Officers.

Dates. 1892 - 1967.

References. MacGregor, 1894d:24-26; Chinnery, 1924³¹⁴:63-4; Hinderling, 1949:55; Blackwood, 1939, 1940, 1950; Fischer, 1968.

Figure. Plate A18, figs. C and D, (no. 650).

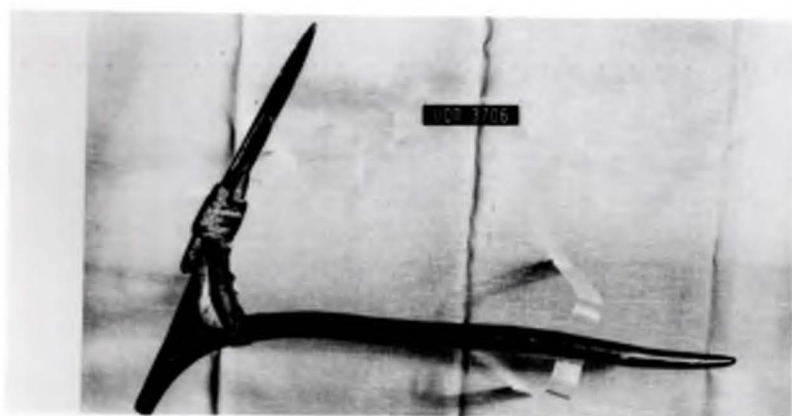
Hafting features. A1, B1, C4, D6.

Handle. Long shaft, wide foot, short wide heel.

Hafting. Blade set in trough which is either of the same diameter or curves over the front of the blade. The poll is occasionally cushioned and is held in by a long, split vine whipping, the front turns of which

PLATE A18.

- A and B. EI 3, 932, UQM 3706, No locality.
C and D. EI 4, 650, AM E24312, Mai-Heari, Nabo Ranges.
E. CI 16, 194, AIM 39147, Huli, Tari Valley.
F. EI 5, 869, PNGM E2044, Wonenara.
G and H. CI 1, 688, AM E48234, Gafuku valley village.



A



B



C



D



E



F



G



H

are looped together by vine strips.

Blade. The blades are apparently a variety of metamorphic rocks — mainly mottled or streaky, occasionally schistose. The one collected by MacGregor is labelled aphanite. The blades are long with sides slightly rounded out and often wider at the haft than at the cutting edge. The cutting edge may be convex from below and is occasionally hollow ground. It is fairly flat and usually asymmetrical in plan. Adze bevel. The finish varies but usually better finished than EI 2.

Function. See Blackwood, 1950:23. Multi-purpose implements. No really complicated tasks are undertaken.

Manufacturing tradition. T1.

Comments. 1. The first EI 4 implement was collected by MacGregor at Mobiabi on the left bank of the Tauri River about $1\frac{1}{2}$ miles above its junction with the Tavaviri. It has been used, probably for sago chopping, and may be a by-product of the sort of expedition of mountain people to Iduna for salt and sago that Chalmers described (Chalmers and Gill, 1885: 162). MacGregor later mentions that in Kerema Bay, "on the north side there is a high range called Nabo, reaching to probably 4,000 feet in altitude, forest clad and said to be inhabited by a tribe or tribes called Kukukuku, of whom the usual cannibal stores are told" (MacGregor, 1894d:24-26).

2. Blackwood (1950:13-27) contains a comprehensive account of Ekuti Kukukuku manufacture and use of adzes. I shall not attempt to summarise this here but note only that my information agrees with hers as far as morphological details are concerned. A more detailed comparison is given in Chapter 17. I have relied heavily on this monograph.

3. Blackwood (1950:20-21) describes long, thin, narrow ceremonial blades which were never hafted. A similar phenomenon is known among the Dani (Western Interior). Because they were not hafted no separate population has been distinguished here.

4. EI 4 adzes mark a complete break from the EI 1-3 group. However, it differs from EI 5 mainly in having a lighter handle.

5. No. 529. Collector was a pilot on the goldfields flights.

6. No. 866. The stone comes from a river bed, Its name is *hika-munga* (PNGM register).

Statistics. All implements except no. 521 which has a metal blade and wooden cover (cf. Blackwood, 1950:22-3), are included in the statistical descriptions and comparisons (tables A49 and A50). Table A50 demonstrates that the blades have a variety of shapes, which confirms Blackwood's observations, yet the blade variables are relatively normally distributed, for if we take the smallest bladed implement, no. 432, out of the ranges for V10 and V11 we are left with V10, 3.8 - 5.5 cm and V11, 3.8 - 6.5 cm. However V12 has a relatively high platykurtosis score dividing the implements into low angled 50° - 65° and wider angled 70° - 78° groups. The high angled group contains nos. 74, 436, 541, 649, 650, 866, 933, 937, 939, 942, and 1000. In the other measurements which are skewed, V15, V16 and V20, no. 866 is responsible for the skew in V15 and V20 and no. 866 and no. 421 are the largest in V16. Without these the ranges are: V15, 13.0 - 20.2 cm, V16, 17.0 - 32.3 cm, and V20, 313 - 906 cm.

EASTERN INTERIOR 4

No.	Repository	Reg. No.	Locality	Date	Collector
74	QM	M4053	Mobiabi	1894	MacGregor (11613)
166	AIM	19909	Morobe Dist.	1934	J.L. Maxwell
421	NMV	X43039	Upper Watut	1936	A.E. Dredge
422	NMV	X42936	" "	1936	" "
423	NMV	X43043	" "	1936	" "
424	NMV	X43038	" "	1936	" "
425	NMV	X43035	" "	1936	" "
426	NMV	X43042	" "	1936	" "
427	NMV	X43045	" "	1936	" "
428	NMV	X43040	" "	1936	" "
429	NMV	X43037	" "	1936	" "
430	NMV	X43036	" "	1936	" "
431	NMV	X43041	" "	1936	" "
432	NMV	X42937	" "	1935	" "
434	NMV	X43137	Kukukuku	1936	E.P. Chinnery
435	NMV	X49068	" , U Tauri R.	1954	O.D. Altus
436	NMV	X46905	Vaitala Goldfields	*1916-20	W.G. Landford
521	SAM	A19929	Kukukuku, inland from Wau	1939	A.G. Schroeder
522	SAM	A51882	?Ramu Valley	*1930	A.W. Mullins
540	SAM	A9041	Albert Mtns	-	Hill Coll
541	SAM	A9042	" "	-	" "
649	AM	E52233	?Wahgi Valley	1947	E. Clarke
650	AM	E24312	Mai-heari, Nabo Ra.	1917	Admin. BNG Pl331
651	AM	E55434	?Bougainville?	1954	L.D. Brennan
666	AM	E36418	Iwa, Kukukuku	1934	Liet. Gov., Papua
866	PNGM	E62.1	Arifogo, Menyamya	1954	-
933	IA	M TA31	Mai-heari, Nabo Ra.	*1916	Fitzgerald Pl332
934	IA	M TA29	" " "	*1916	" Pl330
935	IA	M TA46	" " "	*1916	" Pl326
936	IA	M TA45	" " "	*1922	W.J.L. Pl688

TABLE A49: Distribution of ratio scale features. E. Interior (EI4). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	36	84.19	25.76	42	150	0.521	-0.031
8	WIDTH OF BLADE - HAFT	36	48.03	5.04	38	60	0.023	-0.042
9	THICKNESS OF BLADE	36	22.67	3.84	16	29	-0.386	-0.795
10	WIDTH OF BLADE - EDGE	36	44.58	5.99	22	55	-1.226	4.096
11	LENGTH - CUTTING EDGE	36	51.64	8.72	22	65	-1.047	2.099
12	ANGLE - CUTTING EDGE	36	63.94	7.99	50	78	-0.005	-0.980
13	LENGTH OF HANDLE	36	505.44	48.66	405	627	-0.098	0.503
14	SHAFT DIAMETER	36	20.67	3.16	13	27	-0.120	-0.397
15	LENGTH OF FOOT	36	166.53	24.38	130	258	1.593	3.823
16	TOTAL LENGTH OF FOOT	36	253.44	47.73	170	396	1.121	1.501
17	POINT OF BALANCE	36	79.50	19.04	44	121	0.251	-0.652
18	ANGLE - B/FOOT - SIDE	36	70.92	8.70	50	85	-0.154	-0.666
19	ANGLE - B/HANDLE - BELOW	36	88.83	9.99	70	110	0.519	-0.124
20	WEIGHT	33	609.09	234.04	313	1655	2.778	10.693
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	36	87.44	9.58	67	105	-0.152	-0.461

TABLE A50: Distribution of nominal scale features. E. Interior (EI4).

VARIABLE NUMBER	23	POLL OF BLADE	N=36			
CODE VALUE:	1	2	3			
FREQUENCY:	1	33	2			
PERCENTAGES:	2.8	91.7	5.6			
VARIABLE NUMBER	24	PLAN OF BLADE	N=36			
CODE VALUE:	1	2				
FREQUENCY:	33	3				
PERCENTAGES:	91.7	8.3				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=36			
CODE VALUE:	1	2				
FREQUENCY:	30	6				
PERCENTAGES:	83.3	16.7				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=36			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	21	3	5	4	3	
PERCENTAGES:	58.3	8.3	13.9	11.1	8.3	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=36			
CODE VALUE:	2	3				
FREQUENCY:	30	6				
PERCENTAGES:	83.3	16.7				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=36			
CODE VALUE:	1	2	3			
FREQUENCY:	5	30	1			
PERCENTAGES:	13.9	83.3	2.8			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=36			
CODE VALUE:	2	3	4			
FREQUENCY:	31	1	4			
PERCENTAGES:	86.1	2.8	11.1			
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=36			
CODE VALUE:	0					
FREQUENCY:	36					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=36			
CODE VALUE:	1	2	3	4		
FREQUENCY:	7	4	15	10		
PERCENTAGES:	19.4	11.1	41.7	27.8		
VARIABLE NUMBER	32	USE-WEAR	N=36			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	5	24	1	4	2	
PERCENTAGES:	13.9	66.7	2.8	11.1	5.6	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=36			
CODE VALUE:	1	2	3			
FREQUENCY:	2	32	2			
PERCENTAGES:	5.6	88.9	5.6			

No.	Repository	Reg. No.	Locality	Date	Collector
937	IA	M TA58	Mai-heari, Nabo Ra.	*1916	Fitzgerald P1325
938	IA	M TA48	Arabi, R.	*1913	Chisholm P215
939	IA	M TA53	Ivori R., Mai-heari	1923	- P1685
940	IA	M TA59	" "	1923	- P1687
941	IA	M TA33	" "	1923	- P1684
942	IA	M TA56	Nabo Ra., Mai-heari	*1916	Fitzgerald P1328
1000	SM	M2079	Marawaka	-	S. Moriarty

EASTERN INTERIOR 5

Locality. Wonenara - Okapa area, mainly in the Lamari valley.

Number. 7.

Collectors. Various.

Dates. 1964 - 1967.

References.

Figure. Plate A18, fig. F, (no. 869).

Hafting features. A1, B1, C4, D6.

Handle. Long shaft, heel higher and often pointed, junction of foot and shaft thicker and longer than EI 4. Whole implement heavier.

Hafting. Blade set in a trough or on a hollowed toe and held by a version of the neat and tightly lashed EI 4 adzes which has fewer turns, is looser, and is not looped.

Blade. Blades like a clumsier version of the EI 4 oval sectioned blades, usually less well finished and material appears grainier.

Function.

Manufacturing tradition. T1.

Comments. Very probably a 'fringe' Kukukuku style. The shape of the heel is perhaps rather like the CI 1 handles, but the general shape of handle, lashing, and blade is closer to EI 4.

Statistics. All implements are included in the statistical descriptions (tables A51 and A52). This must rank as one of the most variable samples. Four of the six blade measurements are skewed. V8 and

TABLE A51: Distribution of ratio scale features. E. Interior (EI5). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	7	88.71	41.65	50	162	0.763	-0.112
8	WIDTH OF BLADE - HAFT	7	65.29	13.24	53	88	1.023	-0.195
9	THICKNESS OF BLADE	7	29.00	7.77	15	36	-1.024	0.092
10	WIDTH OF BLADE - EDGE	7	63.00	12.49	49	88	1.261	1.459
11	LENGTH - CUTTING EDGE	7	75.43	15.93	48	95	-0.412	0.160
12	ANGLE - CUTTING EDGE	7	62.86	8.86	45	70	-1.435	1.375
13	LENGTH OF HANDLE **	6	531.33	42.31	488	602	0.833	0.130
14	SHAFT DIAMETER	7	28.00	5.42	23	39	1.412	1.538
15	LENGTH OF FOOT	7	292.71	83.63	203	412	0.206	-1.054
16	TOTAL LENGTH OF FOOT	7	381.43	113.84	255	531	0.416	-0.985
17	POINT OF BALANCE	6	111.33	30.86	77	162	0.777	0.063
18	ANGLE - B/FOOT - SIDE	7	64.57	4.24	60	70	0.295	-0.943
19	ANGLE - B/HANDLE - BELOW	7	86.43	6.27	80	95	-0.025	-1.217
20	WEIGHT	6	1444.67	933.34	717	3124	1.255	0.743
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	7	84.57	11.21	69	102	0.178	-0.395

TABLE A52: Distribution of nominal scale features. E. Interior (EI5).

VARIABLE NUMBER	23	POLL OF BLADE	N=7			
CODE VALUE:	2					
FREQUENCY:	7					
PERCENTAGES:	100.0					
VARIABLE NUMBER	24	PLAN OF BLADE	N=7			
CODE VALUE:	1	2	3			
FREQUENCY:	6	0	1			
PERCENTAGES:	85.7	0.0	14.3			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=7			
CODE VALUE:	1	2				
FREQUENCY:	6	1				
PERCENTAGES:	85.7	14.3				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=7			
CODE VALUE:	1	2	3			
FREQUENCY:	3	3	1			
PERCENTAGES:	42.9	42.9	14.3			
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=7			
CODE VALUE:	2					
FREQUENCY:	7					
PERCENTAGES:	100.0					
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=7			
CODE VALUE:	1					
FREQUENCY:	7					
PERCENTAGES:	100.0					
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=7			
CODE VALUE:	2	3	4			
FREQUENCY:	5	0	2			
PERCENTAGES:	71.4	0.0	28.6			
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=7			
CODE VALUE:	0					
FREQUENCY:	7					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=7			
CODE VALUE:	1	2	3	4		
FREQUENCY:	1	0	0	6		
PERCENTAGES:	14.3	0.0	0.0	85.7		
VARIABLE NUMBER	32	USE-WEAR	N=7			
CODE VALUE:	1	2	3	4	5	6
FREQUENCY:	1	1	0	1	2	2
PERCENTAGES:	14.3	14.3	0.0	14.3	28.6	28.6
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=7			
CODE VALUE:	1	2				
FREQUENCY:	5	2				
PERCENTAGES:	71.4	28.6				

V10 by the largest implement, no. 867 (remaining ranges: V8, 5.3-6.1 cm with no. 868 on 8.0 cm, and V10, 4.9-6.7 cm). V9 and V12 are skewed by the thinnest and most acutely edged blade, no. 999 (remaining ranges: V9, 2.2-3.6 cm, and V12, 58°-70°). Of the other measurements V14 and V20 are skewed by no. 867 (remaining ranges: V14, 2.3-3.0 cm, and V20, 717-1953 gm), while V15 and V19 are markedly platykurtic. They appear to divide: V15, 20.3-29.0 cm/34.0-41.2 cm, and V19, 80°/90°-95°. This does not divide the sample consistently.

EASTERN INTERIOR 5

No.	Repository	Reg. No.	Locality	Date	Collector
624	AM	E63351	Barabuna	*1964	J.P. White
867	PNGM	E1721	Okapa	*1966	Lady Cleland
868	PNGM	E2043.2	Wonenara	*1967	E H Dist. Comm.
869	PNGM	E2044	"	*1967	" "
870	PNGM	E2045	"	*1967	" "
882	PNGM	E2043.1	"	*1967	" "
999	SM	M1478	Warenara	-	S. Moriarty

CENTRAL INTERIOR 1

Locality. Asaro Valley to Okapa, possibly Kainantu.

Number. 14.

Collectors. Various, including S. Moriarty.

Dates. 1940 - 1969.

References. Chinnery, 1934; Vicedom and Tischner, 1943-48:I, abb. 95; Adam, 1953; Read, 1954; Bulmer, 1964.

Figure. Plate A18, figs. G and H, (no. 688).

Hafting features. A1, B1, C8, D3 = no. 990; A1, B1, C8, D9 = no. 685; A1, B1, C8, D20 = nos. 625, 626, 683, 687, 688, 821, 989, 991, 992, 993, and 994.

Handle. Short shaft, oval section, high peg-like heel (? whole sapling), long toe split at an angle.

Hafting. Blade set in slot formed by splitting the toe. Side of foot may be used as cover if split away. Long fibre or split cane whipping, which may go over the heel in an ornamental pattern. One has a plaited split vine cover. The blades are wider than the toe, and filler sticks are common at the sides to help give a better purchase for the lashing.

Blade. Four of the blades in these hafts have rounded sections (table A54), the others have flat sides but only one has the four corners of the section marked. The front faces are usually high rounded, and the blades are not markedly tapered except the cornered one which must have come from one of the central quarries (see Chapter 18). In most the cutting edge is markedly asymmetrical in plan, and two of the oval sectioned ones are very small and uneven. The blades have been considerably used (one = 0, five = 1, six = 2, and two = 4) and are hafted at a variety of angles from -30° to $+50^{\circ}$ with an average deviation from 0° to about 25° . Only one has been set with the inner edge to the left thus causing the skewing of V19 in table A53. Despite the morphological variation, blade measurements are fairly normally distributed, except for V34 which is skewed by no. 625. Without this the range is 76 - 94.

Function. Probably multi-purpose.

Manufacturing tradition. T1, but similar T2 tools are a possibility.

Comments. 1. If the provenances are to be believed these implements do not appear to be commonly mixed with EI 5 implements but may, on the western and northern boundaries, be mixed with CI 2 adzes and CI 4 or CI 7 axes. My sample suggests that they may not spread as far as Goroka, although most of the blades seem to be from the Kafetu quarry which is near the Asaro River (Chappell, 1966), or occasionally from further west. Adam (1953) comments on this population. See Chapter 16.

2. White's Aibura site (1972:51-74) may be on the southernmost fringe of the main area of this CI 1 population. Batari, although only a few kilometres further south seems to be within the EI 5 area (White, 1972: 11-31). For a discussion of both sites see Chapter 15. The Kafiavana site which is on the Fayantina River, 1.6 m south of its junction with the Dunantina (White, 1972:83-109), provided a large number of axe-adze blades but none of them is certainly flat sided. They were present in all horizons. Interestingly two of the pieces were identified as stone from Kafetu quarry (about 50 km away). The site appears to have gone out of use before flat sided blades became popular, although White collected an implement of this CI 1 form from the Yagarua people of the Legaiyu village which is close to the Kafiavana site.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A53 and A54). A possible dichotomy is indicated by V17 which appears to divide 3.3-7.6 cm/ 10.3-13.0 cm. All the higher readings (7.6 - 13.0) come from implements collected in the south of the area by S. Moriarty, those from northern provenances having points of balance closer to the centre of the foot, more like those from other Central Interior provenances.

CENTRAL INTERIOR 1

No.	Repository	Reg. No.	Locality	Date	Collector
625	AM	E63352	Legaiyu	*1965	J.P. White
626	AM	E63355	Hapugamate	*1965	" "
683	AM	E48231	Benebena area	1940	N.D. McWilliam
685	AM	E48226	" "	1940	" "
687	AM	E48232	Gahuka V. villages	1940	" "
688	AM	E48234	" "	1940	" "
705	AM	E48229	" "	1940	" "
821	PNGM	E4349	Asaro R.	1969	-
989	SM	M1136	Okapa	-	S. Moriarty
990	SM	M1140	"	-	"

TABLE A53: Distribution of ratio scale features. Central Interior (CI1). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	14	103.14	31.58	45	147	-0.242	-0.977
8	WIDTH OF BLADE - HAFT	14	55.07	11.36	37	75	0.262	-0.581
9	THICKNESS OF BLADE	14	25.71	8.58	15	42	0.306	-0.862
10	WIDTH OF BLADE - EDGE	14	72.29	16.68	42	96	-0.319	-0.643
11	LENGTH - CUTTING EDGE	14	84.29	19.32	43	108	-0.839	-0.043
12	ANGLE - CUTTING EDGE	14	67.36	8.74	50	83	-0.280	-0.031
13	LENGTH OF HANDLE	14	485.36	54.62	366	576	-0.271	0.326
14	SHAFT DIAMETER	13	23.31	5.75	13	32	-0.214	-0.829
15	LENGTH OF FOOT	14	315.43	71.52	165	415	-0.610	-0.178
16	TOTAL LENGTH OF FOOT	14	431.29	78.14	270	546	-0.864	0.080
17	POINT OF BALANCE	14	79.21	33.82	33	130	0.402	-1.228
18	ANGLE - B/FOOT - SIDE	14	65.57	9.80	45	87	0.356	1.337
19	ANGLE - B/HANDLE - BELOW	14	21.50	19.79	-30	50	-1.038	1.874
20	WEIGHT	14	896.07	419.20	286	1726	0.318	-0.417
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	14	86.29	8.61	76	109	1.304	1.886

TABLE A54: Distribution of nominal scale features. Central Interior (CI1).

VARIABLE NUMBER	23	POLL OF BLADE	N=14			
CODE VALUE:	2	3	4			
FREQUENCY:	5	5	4			
PERCENTAGES:	35.7	35.7	28.6			
VARIABLE NUMBER	24	PLAN OF BLADE	N=14			
CODE VALUE:	2					
FREQUENCY:	14					
PERCENTAGES:	100.0					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=14			
CODE VALUE:	1	2	3			
FREQUENCY:	13	0	1			
PERCENTAGES:	92.9	0.0	7.1			
VARIABLE NUMBER	26	PROFILE OF BLADE	N=14			
CODE VALUE:	1	2	3			
FREQUENCY:	8	3	3			
PERCENTAGES:	57.1	21.4	21.4			
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=14			
CODE VALUE:	2	3	4			
FREQUENCY:	9	2	3			
PERCENTAGES:	64.3	14.3	21.4			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=14			
CODE VALUE:	1	2	3			
FREQUENCY:	12	0	2			
PERCENTAGES:	85.7	0.0	14.3			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=14			
CODE VALUE:	2	3	4	5	6	
FREQUENCY:	4	0	2	7	1	
PERCENTAGES:	28.6	0.0	14.3	50.0	7.1	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=14			
CODE VALUE:	0					
FREQUENCY:	14					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=14			
CODE VALUE:	1	2	3	4		
FREQUENCY:	2	1	2	9		
PERCENTAGES:	14.3	7.1	14.3	64.3		
VARIABLE NUMBER	32	USE-WEAR	N=14			
CODE VALUE:	0	1	2	3	4	
FREQUENCY:	1	5	6	0	2	
PERCENTAGES:	7.1	35.7	42.9	0.0	14.3	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=14			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	3	2	0	0	9	
PERCENTAGES:	21.4	14.3	0.0	0.0	64.3	

No.	Repository	Reg. No.	Locality	Date	Collector
991	SM	M1138	Okapa	-	S. Moriarty
992	SM	M1139	"	-	"
993	SM	M1137	"	-	"
994	SM	M1135	"	-	"

CENTRAL INTERIOR 2

Locality. Kamano (between Ramu (Kainantu) and Benabena), 'Upper Ramu'.

Number. 4.

Collectors. Fortune, Godden.

Dates. 1936, 1959.

References.

Figure. Plate A19, figs. A and B, (no. 572).

Hafting features. A1, B3, C24, D20.

Handle. Short shaft terminal, pointed, round section, high heel, short toe, foot relatively wide for highlands implements.

Hafting. Blade held in two-piece, pointed, separate socket and pushed in, so holding the outer vertical bark strips in place.

Blade. All four blades have oval sections, and apart from one which appears to have been made from a pebble they are of a black stone and are small with adze bevels.

Function. Used for less skilled ordinary tasks? Compare CI 8 (Strathern, 1969).

Manufacturing tradition. T2.

Comments. The separate sockets are notably small and plain like the CI 11 ones, and in contrast with CI 3, 4, 9, and 10.

Statistics. Too few implements.

CENTRAL INTERIOR 2

No.	Repository	Reg. No.	Locality	Date	Collector
320	OM	D36.907	tribe between Ramu & Benabena police posts (Kamano)	1936	R. Fortune
339	OM	D36.906	" "	1936	"
572	AM	E59573a	Upper Ramu	1959	F.W.R. Godden
573	AM	E59573b	" "	1959	"

CENTRAL INTERIOR 3

Locality. Kundiawa, Sina Sina, Dumana, near Chuave.

Number. 4.

Collectors. Various.

Dates. 1963 - 1968.

References. Tischner, 1939: figs. 31 and 32; Vial, 1940/1.

Figure. Plate A19, figs. C and D, (no. 497).

Hafting features. A1, B3, C25, D9 = nos. 496 and 497;
A1, B3, C25, D20 = no. 799; A1, B3, C25, D22 = no. 715.

Handle. Long shaft, long thin foot.

Hafting. Blade held in an extremely large separate socket which flares at the terminal. The lashings vary.

Blade. Pale green blades from the Dom quarry. Very large and often sewn along the sides.

Function. 'Bride-price axes'.

Manufacturing tradition. T2.

Comments. 1. The following description is taken from Vial (1940):

In May 1939 the quarry where blades are obtained for the bride-price axes (*gaima* or *kundun*) was found in previously unvisited country some miles south of Chimbu post [Kundiawa], at an altitude of 6500 feet on a spur above the Wahgi River. The geological formation was interesting — Mr. L.C. Noakes, Assistant Government Geologist, later visited the quarry and commented as follows: "Shales partly calcareous, gently dipping, have been intruded by a sill of diorite, and neighbouring sediments have been altered to fine grey silicified

slates and hornfelses." The natives were working jointed beds immediately underlying the sill, which had almost completely weathered to a brownish overburden through which in places the natives had sunk shafts The stones are distributed among men of the Dom Gondigu and neighbouring tribes and are polished (161) ... The bride-price blade may be 45 cm long and 15 cm wide; it is polished and sharpened but not with the care used in making ceremonial axes. As far as I know it is never used for cutting. The blade is mounted in a crude wooden handle of great size which is usually black and shiny from being stored in smoky huts. The whole axe is so big that when it is being taken to a wedding often one man carries the handle and another the blade (162) ... The third type of axe [after ceremonial axes and work axes] which the Kuman use, the bride-price axe, is kept in the men's club houses and taken out only for payments. Though used principally for bride payments, ... it is also seen at times as part of the payment made after killing a man (163).

It is evident that the Kuman Chimbu had possibly three kinds of axes of which CI 3 and CI 7 were largely non-utilitarian but the work axe has not been identified. They also had adzes (CI 5).

2. Hughes (1971:267) reports that *kundun* stone was not available from the Dom quarry, and that Vial was mistaken on this point.

Statistics. Too few implements.

CENTRAL INTERIOR 3

No.	Repository	Reg. No.	Locality	Date	Collector
496	SAM	A55117	Kundiawa	1963	M. Dahl
497	SAM	A58628	Sina Sina (Dom quarry)	1966	C.K. Downes
715	AM	E63837	Dumana, upper Kwi R.	1968	J.P. White
799	PNGM	E2521	near Chuave	1968	Sir A. Mann

CENTRAL INTERIOR 4

Locality. Bismarck Falls from Bundi (Gende) to east end of Schrader Range. North side of Jimi Valley. Occasionally in Wahgi Valley, probably exchanged via Chimbu people from Gende.

Number. 54.

Collectors. Neuendettelsau Mission, others.

Dates. 1933 - 1969.

References. Moyne, 1936; Moyne and Haddon, 1936; Tischner, 1939:

PLATE A19.

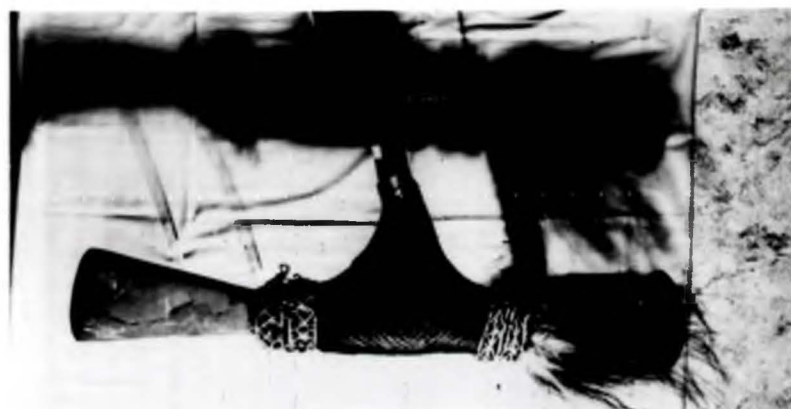
- A and B. CI 2, 572, AM E59573a, Upper Ramu R.
C and D. CI 3, 497, SAM A58628, Sini-sina, vicinity of
Dom quarry, Koge-Kumono area, Chimbu.
E and F. CI 4, 176, AIM 20407, Faita, Ramu R.
G and H. CI 7, 928, QM E2290, Wahgi tribe, Mt Hagen.



A



B



C



D



E



F



G



H

abb. 37, 38, 43, 45, 46; Aufenanger and Höltker, 1940; Vicedom and Tischner, 1943-8:I; Le Roux, 1948: Pl. C, fig. III 5; Hinderling, 1949: 63, abb. 37; Aufenanger, 1964; Dominion Museum and Papua New Guinea Museum supplementary notes.

Figure. Plate Al9, figs. E and F, (no. 176).

Hafting features. Al, B3, C25, D10 = nos. 184, 185, and 188;
Al, B3, C25, D20 = nos. 182 and 186; Al, B3, C26, D9 = nos. 170, 172, 174, 181, 316, 317, 411, 412, 511, 512, 513, 699, 923, 961 and 962; Al, B3, C26, D10 = nos. 169, 171, 173, 175, 176, 177, 178, 179, 180, 189, 190, 191, 192, 295, 296, 417, 505, 556, 681, 686, 689, 690, 697, 698, 709, 785, 828, 829, 830, 925, 927, 956, and 957; Al, B3, C27, D20 = no. 193.

Handle. Long, thin, round shaft, long, narrow foot, usually at right angle.

Hafting. Separate socket, thick at terminal with a flared or occasionally splayed end. Occasional thinner terminal sockets were recorded (C27). The lashing is usually a part plaited cover which leaves the vine strips over the outer edge of the socket not joined together. The occasional fully plaited cover or bark fibre strip whipping was recorded. The terminal of the separate socket may be plaited over on the westernmost implements especially those from the Jimi and Schrader Range areas, while those from near Chimbu may have incised patterns on the terminals, or even cut out patterns. Most implements do not have a blade -separate socket lashing, but sometimes a fibre strip from round the shaft to round the toe is present over the plait cover of the outer lashing.

Blades. Fifty four per cent of the blades are dark stone, perhaps most like the Tsenga quarry *Epaldi* (Chappell, 1966:107) but 31% are of pale rocks (Tsenga *Tingri*?) and 15% are a bright green. All have flat sides but on some the corners are more marked than on others. The blades tend to be relatively thin, but not as thin as those of CI 7. A large number have a concave curve on the inner side, and the cutting edge is usually asymmetrical in plan, although it does not look so when the implement is considered as a whole. The bevel is usually on the left side but two are symmetrically bevelled and nine (16%) have the bevel set on the right. Fewer of these blades have a chin to the bevel like that which is common on CI 7 blades.

Function. The typical hafting (D10) seems to have been used for work

axes as well as for ceremonial 'battle' axes. Work axes seem to have shorter and less elaborate separate sockets, but any subdivision of the range is impossible as the statistics show (tables A55 and A56). No. 179 is markedly heavier than the others. Without this the range is 580 - 1811 gm.

Manufacturing tradition. T2.

Comments. 1. The Gende. Aufenanger and Hölzker (1940:6) give names for axes *tu ngaima* (*tu kangoi*) for Nombri at Bundi, and *tu kangoi* for Guyebi. A work axe figured (Plate 2a) has the combination of basic features A1, B3, C25, D20 without a blade-separate socket lashing. Ceremonial axes are more elaborately lashed (1940:155). Axes are used in bride price (1940:91). A general description is given in 1940:34-6. Hinderling (1949: abb. 37) figures one of the Gende axes.

2. Alome. Moyne and Haddon contrast the axes they bought at Atemble with those from Mt Hagen and with the ones from further up the Ramu (1936:271):

The cross pieces of the Alome axes [separate sockets] are almost straight and the wooden end is much stouter and less finely fashioned. Whereas the wooden blades in the Mount Hagen axes were covered with wicker work, and, in the case of wooden blades from the higher reaches of the Ramu River, with wood carving, the Alome blades are quite plain. Another difference between the two types is that the pygmy cross piece is at right angles to the haft, whereas the Mount Hagen double heads are at an angle obtuse towards the stone blade and acute towards the wooden end.

Moyne (1936:170) supplements this distinction:

The binding is rather simple in the Alome axes as compared with the Mt. Hagen type. In some Mt. Hagen specimens the counter-weight is covered with fine plaiting in two colours and the neck is usually surrounded by a ring of fur or by finely plaited chains. The stone blade is thicker in the Alome type, but in both types the lateral edges are squared so that they are a flattened oblong in section ...

3. Jablonko supplies the following information for three implements collected among the Maring in 1968:

15 [No. 830]. The stone axe called *gaima*. (The general term for axes — which also includes knives — is *kenang*.) This type of stone blade is called *gaima*. The wooden handle and counter-balance are made of *tangan* wood. The binding, *antipa*, is made of the vine *ngro*. This axe is of the working type.

16 [No. 829]. Stone working axe of the blade type *dangwnt'* (taro leaf). The handle and counterbalance made of *bor* wood. The binding made of *ngro* vine.

Nos. 829 and 830 were made by a man of the Bomagai clan named Gimgoia.

55 [No. 828]. Hafted axe called *kenang*, bought from Ngomunggo of Bomagai clan.

4. Biggs and Bulmer supplied the following comments with axes collected from the Karam in 1960 (R. Bulmer, n.d., DM documentation):

W63 [no. 295]. Working axe. The light coloured blade is a *tu maraw*.

W64 [no. 296]. Ceremonial axe. The dark coloured blade is a *tu jinge bang* [I cannot reproduce the symbols], the most frequent type of stone blade in this region. All axe blades which we collected, of both types had been obtained by the Karam from the peoples of the Jimi Valley. They both used these blades themselves and transmitted them via the Simbai and Asai Valleys to the Ramu plain. They have been replaced by steel since 1954 ... Even the largest blades were described as working axe blades, for wood-chopping, though it was not clear if blades hafted as W64 is were ever used for work, or only for display, dancing, and possibly fighting. Unhafted blades were also used as hand-choppers and scrapers.

5. Tischner figures one from Bundi (1939: fig. 46), one from Korugu, and two from Mount Hagen (1939: figs. 43, 37, 38).

6. Voyce's items were exchanged with a Lutheran missionary for artefacts from Bougainville in 1931 or 1932. They constitute, therefore, the earliest group in the sample of this population, and were evidently collected slightly earlier than this and well before the CI 7, Mt Hagen, axes were brought to the attention of ethnographers.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A55 and A56). Apart from the skewing of V20 caused by no. 179 the measurements are near normally distributed.

CENTRAL INTERIOR 4

No.	Repository	Reg. No.	Locality	Date	Collector
169	AIM	21594	Hofa		Voyce (V1594)
170	AIM	21590.1	Ene		" (V1599)
171	AIM	20421	Hofa		" (V1591)
172	AIM	20409	Faita		" (V1588)
173	AIM	21590.3	Ene		" (V1598)
174	AIM	21590.2	Ene		" (V1597)
175	AIM	25329.4	Upper Ramu		"
176	AIM	20407	Faita		" (V1590)
177	AIM	20419	Ene		" (V1600)
178	AIM	20420	Faita		" (V1587)
179	AIM	21629	Nobonob hinterland		" (V1143)
180	AIM	21588.2	Madang hinterland		" (V1296)

TABLE A55: Distribution of ratio scale features. Central Interior (CI4). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	54	162.69	33.34	76	234	-0.248	0.344
8	WIDTH OF BLADE - HAFT	54	52.63	6.31	33	67	-0.365	0.992
9	THICKNESS OF BLADE	54	17.91	5.12	11	30	0.747	-0.496
10	WIDTH OF BLADE - EDGE	54	97.26	18.42	53	133	-0.118	-0.449
11	LENGTH - CUTTING EDGE	54	115.74	23.76	62	167	0.085	-0.375
12	ANGLE - CUTTING EDGE	54	53.13	6.94	38	70	-0.037	-0.307
13	LENGTH OF HANDLE	54	496.81	49.18	342	605	-0.392	1.060
14	SHAFT DIAMETER	53	22.11	2.42	18	28	0.775	0.469
15	LENGTH OF FOOT	53	203.34	29.23	135	268	-0.495	0.044
16	TOTAL LENGTH OF FOOT	53	572.94	68.80	360	729	-0.664	1.372
17	POINT OF BALANCE	31	48.58	23.16	20	100	0.582	-0.441
18	ANGLE - B/FOOT - SIDE	54	83.63	7.95	65	105	-0.073	0.503
19	ANGLE - B/HANDLE - BELOW	50	9.18	7.18	-10	30	0.167	0.680
20	WEIGHT	52	1061.04	329.74	580	2038	1.036	0.733
21	SPRT SOCKET LENGTH	53	410.64	44.02	284	515	-0.543	1.379
22	SPRT SOCKET WIDTH	54	59.04	9.31	41	80	0.215	-0.247
34	% 10 ON 11 WC/LC	54	84.33	5.17	69	97	-0.084	1.101

TABLE A56: Distribution of nominal scale features. Central Interior (CI4).

VARIABLE NUMBER	23	POLL OF BLADE	N=54				
CODE VALUE:	1	2	3	4			
FREQUENCY:	1	2	33	18			
PERCENTAGES:	1.9	3.7	61.1	33.3			
VARIABLE NUMBER	24	PLAN OF BLADE	N=54				
CODE VALUE:	2						
FREQUENCY:	54						
PERCENTAGES:	100.0						
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=54				
CODE VALUE:	1						
FREQUENCY:	54						
PERCENTAGES:	100.0						
VARIABLE NUMBER	26	PROFILE OF BLADE	N=54				
CODE VALUE:	0	1	2	3	4	5	
FREQUENCY:	1	31	20	0	1	1	
PERCENTAGES:	1.9	57.4	37.0	0.0	1.9	1.9	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=54				
CODE VALUE:	2	3	4				
FREQUENCY:	1	4	49				
PERCENTAGES:	1.9	7.4	90.7				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=54				
CODE VALUE:	0	1	2	3			
FREQUENCY:	2	50	1	1			
PERCENTAGES:	3.7	92.6	1.9	1.9			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=54				
CODE VALUE:	2	3	4	5			
FREQUENCY:	2	0	0	52			
PERCENTAGES:	3.7	0.0	0.0	96.3			
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=54				
CODE VALUE:	0						
FREQUENCY:	54						
PERCENTAGES:	100.0						
VARIABLE NUMBER	31	FINISH ON BLADE	N=54				
CODE VALUE:	0	1	2	3	4		
FREQUENCY:	1	4	0	0	49		
PERCENTAGES:	1.9	7.4	0.0	0.0	90.7		
VARIABLE NUMBER	32	USE-WEAR	N=54				
CODE VALUE:	0	1	2	3	4		
FREQUENCY:	19	27	7	0	1		
PERCENTAGES:	35.2	50.0	13.0	0.0	1.9		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=54				
CODE VALUE:	5						
FREQUENCY:	54						
PERCENTAGES:	100.0						

No.	Repository	Reg. No.	Locality	Date	Collector
181	AIM	21626	Madang hinterland		Voyce (V1297)
182	AIM	20418	" "		" (V1300)
184	AIM	20412	" "	*1931	" (V658)
185	AIM	21587	Faita		" (V1589)
186	AIM	20413	Madang hinterland		" (V1299)
188	AIM	20411	" "		" (V1295)
189	AIM	21586.3	Nobonob hinterland		"
190	AIM	20408	Hofa		" (V1596)
191	AIM	20414	Nobonob hinterland	*1932	" (V1141)
192	AIM	20410	Madang hinterland		" (V1294)
193	AIM	21588.1	" "		" (V1298)
295	DM	F E3486	Karam people, Kaironk Valley	*1960	B. Biggs, R. Bulmer
296	DM	F E3487	" " "	*1960	" "
316	OM	D38.759	Upper Ramu		Voyce (V1422)
317	OM	D38.762	" "		" (V96)
411	NMV	X46656	Benabena-Mt Hagen	*1943	J.B. McPherson
412	NMV	X42279	Mt Hagen	1935	A.E. Dredge
417	NMV	X46954	"	1950	-
505	SAM	A39815	Atemble, Ramu	1949	A.J. Hunter
511	SAM	A52631	Foot of Bismarck Ra.	1959	P.R.S. Gouldhurst
512	SAM	A48550	Jimi Valley	1955	J.S. Womersley
513	SAM	A48551	" "	1955	"
556	SAM	A37639	Lower Ramu R.	-	-
681	AM	E49746	Mt Hagen	1941	Administrator
686	AM	E48228	Benabena area	1940	N.D. McWilliam
689	AM	E48398	" "	1940	R.I. Skinner
690	AM	E49745	Mt Hagen	1941	Administrator
697	AM	E52232	"	1947	E. Clarke
698	AM	E52234	"	1947	"
699	AM	E52235	"	1947	"
709	AM	E61099	Wahgi Valley	1964	Mrs Ross
785	AM	E36328	Upper Ramu	1934	H.W. Forrester
828	PNGM	E3969	Maring people, Simbai	*1968	J. & M. Jablonko (55)
829	PNGM	E3971	" " "	*1968	" " (16)
830	PNGM	E3972	" " "	*1968	" " (15)
923	QM	E6134	Inland from Finschhaven	1951	A.J. Kohnke
925	QM	E8951	Madang hinterland	1931	G.A. Obst
927	QM	E9074	" "	1931	"
956	IA	M TA147	Chimbu	*1956	R.M. Glasse
957	IA	M TA149	"	*1956	"
961	IA	M TA150	"	*1956	"
962	IA	M TA151	"	*1956	"

CENTRAL INTERIOR 5

Locality. Yomika, Tauya Valley, east of Bundi.

Reference. Hughes, 1971:262, Pl. 27, figs. a and b.

Hafting features. A1, B1, C1 or C3, D3.

Handle. Long round shaft, small heel, longish toe.

Hafting. The modification of the foot for seating the blade is not clear but it appears to be either sloped or stepped. A bark facing is placed over the blade and the lashing is a long split vine, strip whipping, which in the one with a stone blade ends with a couple of turns round the heel.

Blade. In two of the three seen by Hughes, the stone blade was roughly finished, only the edge being polished. The section is rounded, sides are more or less parallel, and the stone is dark. The other implement has an iron blade.

Function. Originally multi-purpose, but now restricted (see below).

Manufacturing tradition. T1.

Comments. 1. Hughes' description is as follows (1971:262):

... there were said to be quite a number still in use. One was in an isolated garden house, and a number in the hamlet of Yomika, the second being accompanied by a small adze made from a rusty piece of broken bush-knife. Small stone adzes persisted here because in local opinion they were the best tool for removing the pith from the long fruit of *Pandanus conoideus*. Hard, flat river pebbles were selected and ground on the edge only, and if scrap metal was available (plane-blades, broken knives or hoop-iron) it was hafted in the same way. Wooden dishes were also carved.

2. This form is clearly not related to the Ramu valley below Atemble. I have no information about the upper Markham valley. On balance the closest resemblance discovered appears to be with the Kuman (Chimbu) adzes described by Father Nilles (CI 6). It is possible that all the Bismarck Falls area had these simple adzes. However, as the recorded adzes from the Central Interior (CI 2 and CI 8) all have short handles, the similarity cannot be called marked.

CENTRAL INTERIOR 6

Locality. Kuman, upper Chimbu River.

References. Nilles, 1942-5:211-2; Hinderling, 1949:64.

Hafting features. A1, B1 or B2, C?, D20?.

Handle. Judging by the tiny sketch the handle has no heel, only a forward projection at the ankle. The toe is long, the shaft round.

Hafting. Blade held on toe either with or without cover by bamboo, rattan, or banana leaf strips.

Blade. Smaller and shorter but otherwise the same shapes as in the axes (CI 4, CI 7).

Function. "Lesser wood work".

Manufacturing tradition. T1 or a local variation with a wooden cover.

Comments. Nilles describes this form as follows (1942-5:211-2):

The haft of the adze is shorter and better polished than that of the hoe. It is only through its shortness and polish that it likens to the handles of the axes, but not as regards its shape; for as is well known, the axes of all these tribes have T-shaped handles with a long transverse "tang", whereas the adzes are elbow-shaped.

The stone blades (fig. 3a) of the adzes, however, are mostly of the same shape as those of the axes, only smaller and shorter.

As with regard to the binding of the stone blade of the adzes to the knee-shaped shaft there are two ways of doing it: the blade is placed with its broad side on the elbow piece and then bound together (fig. 3b), — similarly as the binding of the wooden blade to the hoe — or the broad side of the stone blade is placed on the flat part of the knee piece (as in the first case); but then another piece of wood, which is flattened towards its lower end, is laid on it (the blade), as though inserted in a tang, and is tightly bound together with some of the previously mentioned binding material.

Nilles remarks that the adze "is used and known to not only the Kuman but also all other tribes of the Bismarck and Mt Hagen Ranges." (1942-45:211). A possible relationship with the simple adzes of the Tauya River (CI 5) has been suggested.

CENTRAL INTERIOR 7

Locality. Wahgi Valley, Chimbu, south side of Jimi Valley. Not west of Hagen Range nor south of Kaugel River.

Number. 51.

Collectors. M. Leahy and others.

Dates. 1933 - 1970.

References. References to hafting or use: Leahy, 1936; Ross, 1936; Moyne, 1936; Moyne and Haddon, 1936; Tischner, 1939; Vial, 1940-1; Höltker, 1942; Nilles, 1942-45; Vicedom and Tischner, 1943-48; Gilliard, 1953; Le Roux, 1948: Pl. C, fig. III 1; Germer, 1964; Strathern, 1969. References to collections of blades: Bulmer, 1963-4, 1966; Strathern, 1965; Chappell, 1966; Hughes, 1971; Lampert, 1972.

Figure. Plate A19, figs. G and H, (no. 928).

Hafting features. A1, B3, C27, D9 = all but no. 399 which apparently has an underlashing only thus giving the combination A1, B3, C27, D20.

Handle. Long thin round shaft, very long narrow foot, toe much longer than CI 4 and set at a wider angle.

Hafting. The separate socket has a very large flared terminal springing from a very narrow neck. It is very thin compared with the CI 4 separate sockets which are much heavier but somewhat shorter. The more recent, tourist, axes show a tendency towards exaggeration of the thinness and flare. Most implements have a blade-separate socket lashing of a wide plait band made from very fine fibre strips. The blade may also be partly held by a cord which fits just below the socket end and goes under the lashing. A cross-over fine bark strip may also be present over the blade-separate socket lashing and held in place by the butt of the blade. The separate socket and blade unit is held to the foot by a bark strip underlashing which is several layers thick. Over this is a finely worked plait cover, often with a patterned weave (Wahgi, Chimbu) or with a two-colour weave (Jimi). The two-colour weave has persisted on the modern Hagen axes. The plait cover may extend over the flare of the socket. Where this is not the case the flare may be incised, a feature which may have been more a characteristic of the Chimbu area than of the Wahgi Valley. Over the outside of the plait cover an extra bandage of bark strips may be added round the shaft and toe, presumably for strength. Very ornate specimens may have festoons of chains made from small rings of cane, collars of fur (?cuscus, *Phalanger* spp.) round the neck of the socket. Occasionally small finger or toe bones may be hung in the chains. The separate socket appears to have been shaped before a small piece was split off one side (usually the left) so that the space for the butt of the blade could be shaped. According to Vial (1940-1:160) the blade was cushioned with chewed sugar cane. There appears to be no detailed description of how the hafting was done. In comparison with other parts of Melanesia a very small proportion of the blade is within the haft.

Blade. Forty-one percent of the blades are 'pale' stone, 34% are dark grey-black stones, 14% are 'green', and 11% are slatey grey stone. These last are all hafted in the tourist Hagen axes a few of which were recorded for contrast with the other, more traditional implements. All the blades are thin, flaring, with a squared cross-section, protruding cutting edge and small bevel which is usually set on the left of the implement. Even the modern ones confirm to this requirement although the flare may be greatly exaggerated. While the sizes of the blades vary, the finish is uniformly fine. The edges of most blades are chipped but this may be a result of careless handling rather than use.

Function. At one end of its range this implement may be more exclusively a 'ceremonial' artefact, and this may be emphasised further away from the quarry areas (cf. Strathern, 1969) because of its relative rarity. In areas nearer the stone sources, blades which might have been non-utilitarian in distant places, might be used for a greater range of utilitarian as well as 'ceremonial' purposes. Strathern (1965) has discussed the problem of attributing function to blade form. So far as the hafting is concerned the work axe-ceremonial axe distinction appears to be indicated mainly by an elaboration of the ordinary haft of the area (this holds for CI 4 and CI 10 Highlands areas as well) usually, but not always, accompanied by a larger or more beautiful than usual blade. In the Wahgi area this blade may be in the same size range as the work axe blades. Some, if not all, the implements could also be used as fighting weapons.

Manufacturing tradition. T2.

Comments. 1. In February 1933, after two trips in the Eastern Highlands, during the first of which (having come up from the Ramu) they went down the Dunantina, along the Asaro, down the Tua and eventually down the Purari into the Gulf of Papua, M. Leahy and others became the first Europeans to cross the Asaro/Mai divide. They noted stone axes at several places during these first two trips (Leahy, 1936:232, 233, 234, 238) but the first mention of the characteristic Hagen type axes is at the camp at Mt Elimbari, just west of the Asaro/Mai divide:

There is also a flat stone tomahawk here which I have never seen before in shape or thickness. It's a work of art ... We brought back to our base at Bina Bina five of the stone battle-axe blades, and also saw a green stone working axe traded down from the Wahgi River west from here (1936:246).

This appears to define the eastwards spread of CI 7, and probably the east boundary of the squared sectioned blades as a common artefact.

Leahy also noted a change in house types and notes the "bark belts, the axes and spears, the Kina shell and the feathered head-dresses" of different people west of the Asaro divide (quoted in Willis, 1969:34). Such features have been commented on by Chinnery (1934), Read (1934), and S. and R. Bulmer (1964). Anyone travelling along the Highlands Highway today may also observe the change in gardening patterns. The divide also marks a major linguistic boundary (Wurm, 1964).

2. Discussions of particular ranges of percussive cutting implements may be found in the following sources: Kuman - Nilles, 1942-5; Vial, 1940-1; Korugu - Hölter, 1942; Mbowamb - Vicedom and Tischner, 1943-8; Strathern, 1965; Mogei - Ross, 1936. Discussions of blades, function, and quarries, without mentioning hafting are given in Bulmer, 1963-4 (Baiyer River, Karam, Chuave), Chappell, 1966 (the major quarries, and analysis for stone sources of collections from Baiyer River, Karam, Tsembaga (Maring, Simbai), Buk (Wahgi), Womanka (Upper Chimbu), and Chuave), Strathern, 1965 (the Buk collection), and Lampert, 1972 (Wahgi Valley, Nebilyer Valley, and Alipe on the upper Kaugel River). A summary of these is given in Hughes (1971:259-315) together with an analysis of a small collection from the cross section of the Highlands he studied, and a discussion of the trade in stone blades.

3. Given very little evidence Moyne (1936:170) remarked on a number of differences in the hafting of Aiome (CI 4) and Mt Hagen (CI 7) axes which appear to be valid (quoted with CI 4 comments).

4. Nos. 407, 416, 506 and 507 appear to have localities which are wrong as original provenances, and I am also doubtful of the date of the two collected by Mullins.

Statistics. No. 714 which was the largest and nastiest, tourist style, Hagen axe I could find has been omitted from the statistical analysis. It is too big to fit the distribution. The other tourist axes with slate blades are nos. 304, 500, 501, 549, and 708. They are included in the statistical description and comparisons, with the rest of the implements, and as table A57 shows do not skew the measurements appreciably. Table A58 indicates less blade variability for CI 7 than for CI 4 (table A56).

TABLE A57: Distribution of ratio scale features. Central Interior (CI7). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	50	197.00	35.02	142	314	0.794	1.217
8	WIDTH OF BLADE - HAFT	50	62.08	7.87	44	77	-0.027	-0.575
9	THICKNESS OF BLADE	50	14.58	2.29	11	20	0.428	-0.294
10	WIDTH OF BLADE - EDGE	50	121.88	22.64	72	180	0.540	0.282
11	LENGTH - CUTTING EDGE	50	147.72	30.43	89	240	0.960	0.938
12	ANGLE - CUTTING EDGE	50	44.44	7.69	30	60	0.387	-0.325
13	LENGTH OF HANDLE	50	578.50	53.89	462	725	0.431	0.365
14	SHAFT DIAMETER	48	22.69	1.93	19	27	-0.000	-0.415
15	LENGTH OF FOOT	50	235.20	35.82	160	310	0.073	-0.271
16	TOTAL LENGTH OF FOOT	50	682.10	86.32	504	878	0.116	-0.485
17	POINT OF BALANCE	42	45.29	21.74	0	103	0.753	0.477
18	ANGLE - B/FOOT - SIDE	50	95.34	6.28	80	110	-0.206	0.271
19	ANGLE - B/HANDLE - BELOW	49	7.04	8.00	-10	28	0.665	0.293
20	WEIGHT	43	1304.72	291.88	764	1944	0.247	-0.395
21	SPRT SOCKET LENGTH	50	487.74	61.61	362	612	0.139	-0.767
22	SPRT SOCKET WIDTH	50	69.20	9.30	50	90	-0.060	-0.723
34	% 10 ON 11 WC/LC	50	82.80	4.58	73	98	0.880	2.801

TABLE A58: Distribution of nominal scale features. Central Interior (CI7).

VARIABLE NUMBER	23	POLL OF BLADE	N=49			
CODE VALUE:	0	1	2	3	4	
FREQUENCY:	1	2	7	25	14	
PERCENTAGES:	2.0	4.1	14.3	51.0	28.6	
VARIABLE NUMBER	24	PLAN OF BLADE	N=49			
CODE VALUE:	2					
FREQUENCY:	49					
PERCENTAGES:	100.0					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=49			
CODE VALUE:	1					
FREQUENCY:	49					
PERCENTAGES:	100.0					
VARIABLE NUMBER	26	PROFILE OF BLADE	N=49			
CODE VALUE:	0	1	2			
FREQUENCY:	5	14	30			
PERCENTAGES:	10.2	28.6	61.2			
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=49			
CODE VALUE:	4					
FREQUENCY:	49					
PERCENTAGES:	100.0					
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=49			
CODE VALUE:	1					
FREQUENCY:	49					
PERCENTAGES:	100.0					
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=49			
CODE VALUE:	0	1	2	3	4	5
FREQUENCY:	4	0	0	0	0	45
PERCENTAGES:	8.2	0.0	0.0	0.0	0.0	91.8
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=49			
CODE VALUE:	0					
FREQUENCY:	49					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=49			
CODE VALUE:	4					
FREQUENCY:	49					
PERCENTAGES:	100.0					
VARIABLE NUMBER	32	USE-WEAR	N=49			
CODE VALUE:	0	1	2			
FREQUENCY:	38	10	1			
PERCENTAGES:	77.6	20.4	2.0			
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=49			
CODE VALUE:	2	3	4	5		
FREQUENCY:	5	0	0	44		
PERCENTAGES:	10.2	0.0	0.0	89.8		

CENTRAL INTERIOR 7

No.	Repository	Reg. No.	Locality	Date	Collector
304	DM	FE 5522	Mt Hagen	*1969	Mr Shand
305	DM	FE 3275	-	1960	Neville
306	DM	F E2932A	Mt Hagen	1955	J. Horne
307	DM	F E2932B	"	1955	"
315	OM	D65.444	"	*1960	Neville-Burgin
318	OM	D41.370	Mt Hagen district	1941	E. Henry
399	CM	E155.264	" "	1955	G. Desnem
400	CM	E151.245	Mt Hagen	1951	P.W. Glover
401	CM	E153.93	"	1936-9	Guinea Airways
402	CM	E161.108	-	1961	Mr Scott
406	NMV	X48112	Mt Hagen	1952	A.B. Creightmore
407	NMV	X70265	?Sepik R. area?	1963	Mrs Dickson
409	NMV	X46660	a Chimbu aerodrome	*1936	R.H. Allen
416	NMV	X70266	?Sepik R. area?	1963	Mrs Dickson
418	NMV	X42278	Mt Hagen	1935	A.E. Dredge
498	SAM	A58629	Sina Sina (Dom quarry)	*1966	C.K. Downes
499	SAM	A54092	Baiyer R. area	*1962	J. Wesley-Smith
500	SAM	A59263	Mt Hagen	1964	G.T. Ellis
501	SAM	A60492	"	1970	M.R. Baker
506	SAM	A51880	?Ramu Valley?	*1930?	A.W. Mullins
507	SAM	A51879	?Ramu Valley?	*1930?	"
549	SAM	A39449	Mt Hagen	1949	E. Were
550	SAM	A40572	"	1946	B. Heath
551	SAM	A40574	"	1946	"
552	SAM	A40575	"	1946	"
553	SAM	A32741	"	1948	L. Methsieden
554	SAM	A35918	"	1937	G.L. Richards
555	SAM	A40573	"	1946	B. Heath
674	AM	E49743	"	1941	Administrator
675	AM	E53709	"	1950	R.S. Hayter
676	AM	E53862	Wahgi Valley	1950	Administrator
677	AM	E51495	Mt Hagen	1945	A.J. McKillop
678	AM	E49744	"	1941	Administrator
679	AM	E6013a	"	1961	Mrs Tillyard
680	AM	E6013b	"	1961	"
684	AM	E59863	Otomonaro, Asaro V.	1955	S. Int. Films
706	AM	E48497	Benabena area	1940	R.I. Skinner
707	AM	E50601a	Wahgi Valley	1940	J.H.L. Waterhouse
708	AM	E50601b	" "	1943	" "
710	AM	E52535	" "	1948	J.C. Roy
711	AM	E53639	Mt Hagen	1950	Mrs Jolby
712	AM	E54737	Wahgi Valley	*1940	T. Small
713	AM	E51027	" "	1944	F.L. Abrander
714	AM	E62468	Jimi River	*1965	Miles & Cameron
716	AM	E63487	-	1968	-
717	AM	E50601c	Wahgi Valley	1943	J.H.L. Waterhouse
924	QM	E5020	Mt Hagen	1939	R. Harding
926	QM	E8725	"	*pre-1941	L.C. Dobbs
928	QM	E2290	Wahgi tribe, Mt Hagen	1934	M.J. & D.J. Leahy
929	QM	E6135	Mt Hagen	1949	A. Ohman
930	QM	E6972	"	1963	I. Roberts

CENTRAL INTERIOR 8

Locality. Wahgi Valley.

Number. 1.

Collector. R.S. Hayter.

Date. 1950.

Reference. Strathern, 1965, 1969.

Figure. Plate A20, figs. A and B.

Hafting features. A1, B3, C26, D20.

Handle. Short round shaft, longish toe.

Hafting. Separate socket, short, thick, neck not marked but top flared. Long, split fibre whipping not like either CI 2 or CI 8.

Blade. Blade of greenish stone (Abiamp quarry?) 11.1 cm long, not flared but slightly tapered to butt, faces rather uneven, and sides with a very small flat face, corners not particularly marked.

Function. "Adzes were used for planing work, for cutting sugar cane, and for shaving down such articles as spear shafts or axe balancers" (Strathern, 1965:185). Grass-cutting (Vicedom and Tischner, 1943-8:I, 185).

Manufacturing tradition. T2.

Comments. Adzes seem to have been less important than axes in the Hagen area. Strathern reports that only 23 of 130 blades collected at Buk were classed by her informants as *rui onka*, or adze blades (1965:186). She notes "Vicedom (1943-8:I, 223) mentions that although in his time (1930's) everyone owned adzes in Hagen, no one but the poorest persons and youths carried them about on their person" (1969:322n).

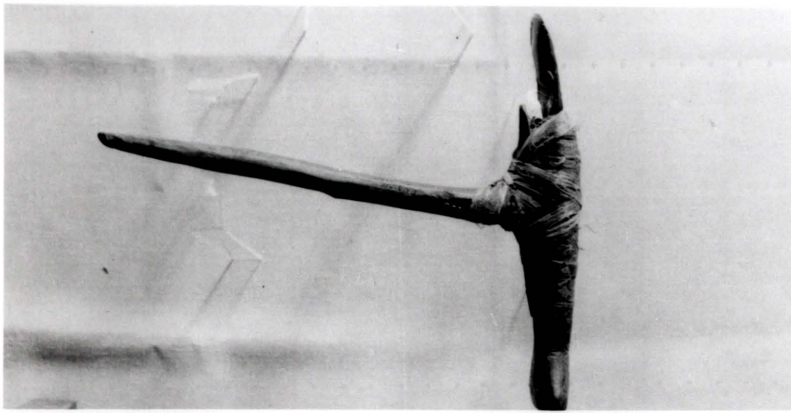
Statistics. Too few implements.

CENTRAL INTERIOR 8

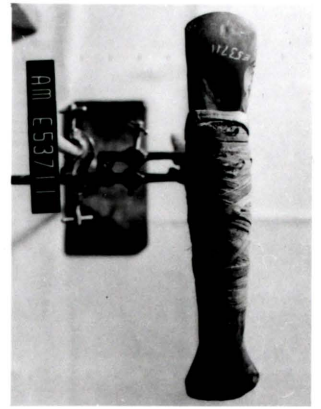
No.	Repository	Reg. No.	Locality	Date	Collector
574	AM	E53711	Mt Hagen	1950	R.S. Hayter

PLATE A20.

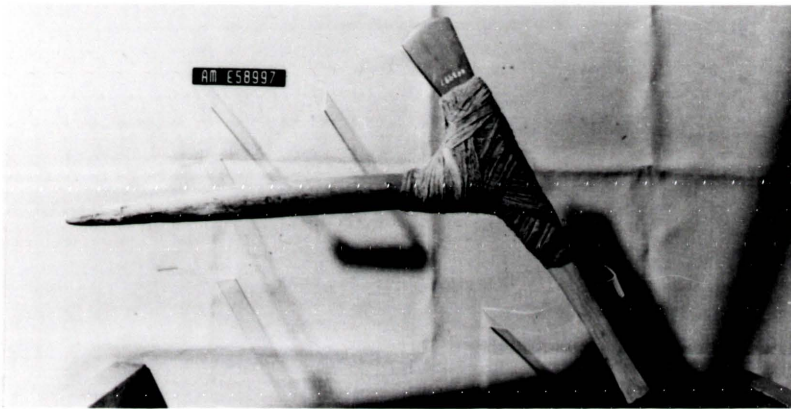
- A and B. CI 8, 574, AM E53711, Mt Hagen.
- C and D. CI 9, 701, AM E58997, Mae-Enga, between
Wabag and Laiagam.
- E and F. CI 10, 510, SAM A59715, Oba, beyond Mulim,
Mendi.
- G and H. CI 11, 118, QM M3993, Biroi R.



A



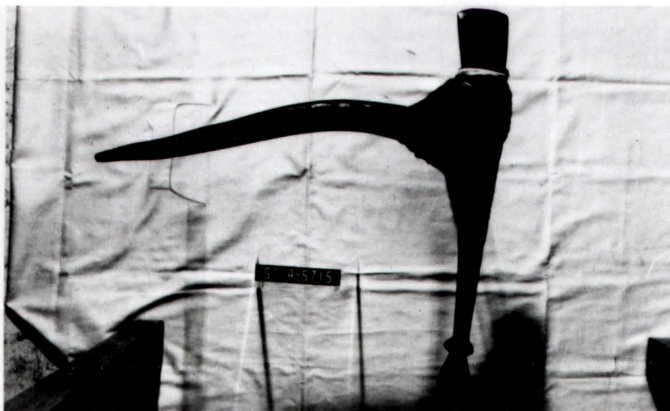
B



C



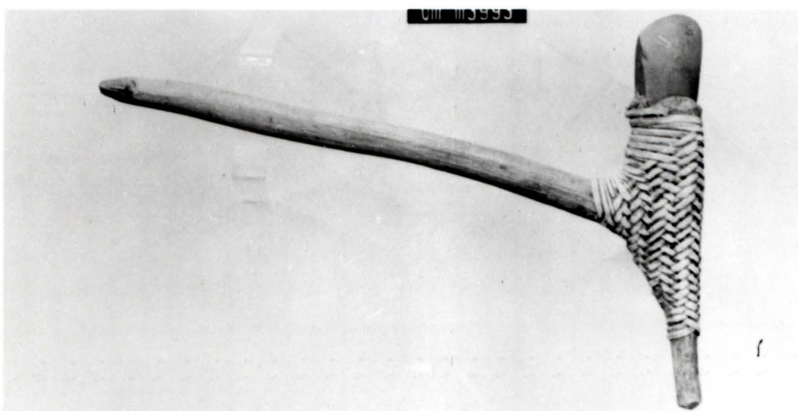
D



E



F



G



H

CENTRAL INTERIOR 9

Locality. Enga area generally (Kyaka, Mae and Ipili-Paiela speaking areas), west and north of the Hagen range.

Number. 31.

Collectors. R. and S. Bulmer for Kyaka-Enga; others various; Meggitt for Mae-Enga.

Dates. 1936 - 1969.

References. Wirz, 1952:18-20; Meggitt, 1956-7:120-1, 1957-8:140; Bulmer, 1966.

Figure. Plate A20, figs. C and D, (no. 701).

Hafting features. A1, B3, C25, D9 = nos. 270, 271, 272, 403, and 693; A1, B3, C25, D20 = nos. 183, 187, 266-269, 273-274, 287, 410, 502-504, 508-509, 682, 701-704, and 958-960; A1, B3, C25, D21 = no. 692.

Handle. Oval sectioned shaft and short foot which is usually wider than CI 7. Shaft may curve up to heel.

Hafting. Separate socket, smaller than CI 7, end splayed but not flared into the wide fish tail form of the Hagen axes. Some are hardly splayed at all but merely thinned at the terminal. Apart from a few of the Kyaka-Enga axes hafted for the Bulmers in 1959 which have a plait cover of wide split vine strips — perhaps a copy of the CI 7 Jimi bindings — the haftings are made of bark fibre strips. These are usually a continuous wrapping, but occasionally part of the outer layer may be interwoven. No separate blade-socket lashings appear to be present.

Blades. Two forms of blades are present. One, the most common, has a thick, narrow, squared cross section, while the other (represented by nos. 502, 504) has a thinner, wider section. Variables V8, V10 and V11 are skewed by these two blades (Table A59). Most blades appear to be Abiamp stone. The thicker blades have a marked adze bevel and are hafted with the back of the blade to the left.

Function. "All purpose tools and weapons" (Meggitt, 1956-7:120).

Manufacturing tradition. T2.

Comments. 1. Meggitt has an explanation for the occurrence of the two kinds of blade (1956-7:120) among the people of the Upper Wage (Waka people):

Stone axes (not adzes) have the typical Enga shape, and are all-purpose tools and weapons. Few men now retain the heavy work axe, but more carry the finer stone decorative axes. They are bound with cane strips (in the Mendi style), covered with tapa strips.

2. Meggitt notes that the Waka are middle men in trade passing stone axe blades west from Laiagam (via Wapenamunda and Mt Hagen) for oil from Lake Kutubu. The Karintu, on the range between the Wage and Lai Rivers obtain stone blades from Kandep (via Kauwel Valley) and the Aruni people extend this chain a little further west via Kauwel from Mendi ([956-7: 120-1). The westernmost people to use these axes are the Ipili of the Porgera Valley. Their trading chain was with Enga (1957-8:40):

Hand-drums (of an excellent cedar growing only at lower altitudes), pigs and plumes are sent east to Enga in exchange for stone axe blades (from the Hagen area) ... Only the worst and smallest axe blades reached the Ipili after Enga had made their choice; and for these, the price was a drum, a set of plumes, or a pig each. Because so few blades filtered through, Ipili had to use inferior river stones as substitutes. They make true axes, not Huli-type adzes.

3. The trading chain from Abiamp quarry appears to have run south of the Wahgi Valley through Wurup to Wabag. O. Christensen (pers. comm.) reports that the old men of Wurup say they traded blades for salt with Wabag people. His collection of blades from Wurup contains a number of the thick sectioned blades typical of Enga axes together with blades more typical of the Wahgi Valley contexts. The Wurup hafting appears to have been of split vine, not bark fibre and more like the Wahgi hafting of CI 7, to which Wurup axes were probably most similar.

4. Meggitt and Wirz give a number of names for Enga axes, and Wirz (1952:18) lists names of stone colours. The generic term for Enga axes appears to be *ua* or *wa*. No. 701, work implement = *karai-ua*, no. 702 = *jari-ua*, no. 704 (with a hoop-iron blade) = *ua-nggirini* (Meggitt, AM register). No. 502 has a stone called *morokea*, no. 504 has a *gaima* blade, and no. 503, a work axe used for cutting and splitting wood, is a *kundine* (Howie, SAM register). Wirz' names for blades are:

<i>wa gama</i>	greenish stone
<i>wa mongaro</i>	grey-green stone
<i>wa abin</i>	black stone
<i>wa kombong</i>	grey-black stone
<i>wa kundin</i>	dark green stone
<i>wa tjambe</i>	marbled green and white stone
<i>wa pakenana</i>	greenish-grey stone
<i>wa kambibala</i>	white stone.

In this series it may be suggested that *gama* = *gaima*?, *kundin* = *kundine*?,

TABLE A59: Distribution of ratio scale features. Central Interior (CI9). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	30	124.43	46.90	40	221	0.012	-0.790
8	WIDTH OF BLADE - HAFT	30	55.37	10.89	38	90	1.223	2.440
9	THICKNESS OF BLADE	30	24.73	6.81	13	36	-0.077	-0.890
10	WIDTH OF BLADE - EDGE	30	77.17	22.19	44	136	1.100	1.191
11	LENGTH - CUTTING EDGE	30	85.07	26.57	44	158	1.101	1.399
12	ANGLE - CUTTING EDGE	30	59.87	8.71	43	77	-0.160	-0.288
13	LENGTH OF HANDLE	30	505.50	36.06	427	593	-0.000	0.199
14	SHAFT DIAMETER	30	29.30	5.40	17	39	-0.455	-0.143
15	LENGTH OF FOOT	30	191.57	34.21	135	243	0.035	-1.253
16	TOTAL LENGTH OF FOOT	30	521.40	106.46	342	785	0.362	-0.203
17	POINT OF BALANCE	28	47.18	25.41	0	90	-0.330	-0.665
18	ANGLE - B/FOOT - SIDE	30	80.50	7.04	65	93	-0.050	-0.613
19	ANGLE - B/HANDLE - BELOW	30	6.57	6.44	0	20	0.627	-0.552
20	WEIGHT	30	1174.03	551.29	353	2687	0.802	0.829
21	SPRT SOCKET LENGTH	30	396.93	65.44	295	564	0.505	-0.129
22	SPRT SOCKET WIDTH	30	65.67	13.67	32	98	0.284	1.088
34	% 10 ON 11 WC/LC	30	91.50	4.82	79	100	-0.357	0.197

TABLE A60: Distribution of nominal scale features. C. Interior (CI9).

VARIABLE NUMBER	23	POLL OF BLADE	N=30
CODE VALUE:	2	3 4	
FREQUENCY:	4	20 6	
PERCENTAGES:	13.3	66.7 20.0	
VARIABLE NUMBER	24	PLAN OF BLADE	N=30
CODE VALUE:	2		
FREQUENCY:	30		
PERCENTAGES:	100.0		
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=30
CODE VALUE:	1		
FREQUENCY:	30		
PERCENTAGES:	100.0		
VARIABLE NUMBER	26	PROFILE OF BLADE	N=30
CODE VALUE:	1	2 3 4	
FREQUENCY:	15	13 0 2	
PERCENTAGES:	50.0	43.3 0.0 6.7	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=30
CODE VALUE:	2	3 4	
FREQUENCY:	5	0 25	
PERCENTAGES:	16.7	0.0 83.3	
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=30
CODE VALUE:	1	2 3	
FREQUENCY:	29	0 1	
PERCENTAGES:	96.7	0.0 3.3	
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=30
CODE VALUE:	2	3 4 5	
FREQUENCY:	1	0 0 29	
PERCENTAGES:	3.3	0.0 0.0 96.7	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=30
CODE VALUE:	0		
FREQUENCY:	30		
PERCENTAGES:	100.0		
VARIABLE NUMBER	31	FINISH ON BLADE	N=30
CODE VALUE:	1	2 3 4	
FREQUENCY:	8	0 0 22	
PERCENTAGES:	26.7	0.0 0.0 73.3	
VARIABLE NUMBER	32	USE-WEAR	N=30
CODE VALUE:	0	1 2 3 4	
FREQUENCY:	6	17 2 0 5	
PERCENTAGES:	20.0	56.7 6.7 0.0 16.7	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=30
CODE VALUE:	5		
FREQUENCY:	30		
PERCENTAGES:	100.0		

but no equivalent for *morokea* appears to be forthcoming. Meggitt's names apparently refer to function. The stone in the Bulmers' axes from Kyaka-Enga was identified by Chappell as: Ganz-Tsenga *Kataboora-epaldi* = nos. 266, 269, 270, 272, and 274; Mbukl = nos. 268 and 273; Abiamp *kujn* = no. 271; and unknown = no. 267 (S. Bulmer, pers. comm.).

Statistics. All implements are included in the statistical descriptions and comparisons except no. 704 which has a metal blade. Table A59 indicates the presence of the two wide flat blades. Without them the skewed variables would read: V8, 3.8 - 6.6 cm, V10, 4.4 - 11.4 cm, and V11, 4.4 - 13.1 cm. Variable 15 indicates a considerable diversity of foot length with concentrations on 15 cm, 18 cm, and 23 - 24 cm.

CENTRAL INTERIOR 9

No.	Repository	Reg. No.	Locality	Date	Collector
183	AIM	35500	Wabag	1958	M. Young
187	AIM	35499	"	1958	"
266	AIM	43077	Pinyapas	1959	S. & R. Bulmer (B454)
267	AIM	43076	Yaramanda	1959	" " (B453)
268	AIM	43074	"	1959	" " (B449)
269	AIM	43078	"	1959	" " (B456)
270	AIM	43073	"	1959	" " (B455)
271	AIM	43075	"	1959	" " (B446)
272	AIM	43079	"	1959	" " (B461)
273	AIM	43072	"	1959	" " (B450)
274	AIM	43071/80	"	1959	" " (B451)
287	DM	F E420	Wabaga tribe	1969	J. Roberts
403	RS	-	Yuku	1959	S. & R. Bulmer
410	NMV	X72478	Wapi area, Yuat R.	1968	M. Meyers
502	SAM	X43126	4 m W of Wapenamunda	1951	L. Howie
503	SAM	A43125	" "	1951	"
504	SAM	A43127	" "	1951	"
508	SAM	A44620	Wapenamunda	1953	G.A. Bus
509	SAM	A44621	"	1953	"
682	AM	E41111	Mt Hagen	1945	A.J. Bearup
691	AM	E53710	"	1950	R.S. Hayter
692	AM	E53863	Wahgi Valley	1950	Administrator
693	AM	E41632	Mt Hagen	1936	L.V. Waterhouse
696	AM	E52231	"	1947	E. Clarke
701	AM	E58997	Mae-Enga	1957	M. Meggitt
702	AM	E58979	"	1957	"
703	AM	E51496	Mt Hagen	1945	A.J. McKillop
704	AM	E59003	Mae-Enga	1957	M. Meggitt
958	IA	M TA 3	Mt Hagen area	*1936	R. Milne-Wishart
959	IA	M TA91	Baiyer River	*1955-6	R. Bulmer
960	IA	M TA130	" "	*1955-6	"

CENTRAL INTERIOR 10

Locality. Mendi area, eastern part of Southern Highlands District, Kaugel Valley, Karimui Plateau.

Number. 23.

Collectors. Various.

Dates. 1935 - 1970.

References. Beaver, 1920:258; Strathern, 1969.

Figure. Plate A20, figs. E and F, (no. 510).

Hafting features. A1, B3, C23, D9 = no. 809; A1, B3, C23, D20 = nos. 875, and 876; A1, B3, C24, D9 = nos. 617, and 967; A1, B3, C24, D20 = no. 888; A1, B3, C25, D5 = nos. 877, and 878; A1, B3, C25, D9 = nos. 404, 408, 414, 510, 694, 700, 827, 847, 848, 964, and 965; A1, B3, C25, D20 = no. 405; A1, B3, C25, D21 = nos. 695, and 846; A1, B3, C28, D20 = no. 845.

Handle. Shaft may curve up to heel, short foot. Oval sectioned shaft.

Hafting. Separate socket of lighter construction than CI 9, with the same splayed top, but many of CI 10 have additional lateral knobs or points at the neck. The top of the separate socket is quite long but relatively straight and without the elaborate fish-tail flare of CI 7. The lashing is usually fibre whipping or coarse strip, split vine, plait cover characteristically bunched up round the foot, unlike CI 7 lashing which is much flatter and is long enough to cover the larger CI 7 foot. No blade-separate socket lashings were recorded as a separate feature.

Blade. The implements from provenances closer to the main Enga areas occasionally have the thick squared blades of ?Abiamp stone common among the Enga. In the Mendi area the blades appear to be mainly of stones from other identifiable Central Interior quarry sources and are very thin for their width. However as the lower reaches of the rivers, towards their junctions with the Purari, are reached blades made from apparently local stones, softer perhaps, but still with flat sides were occasionally noted. The blades are black (?Ganz-Tsenga) and green (?Abiamp) in equal numbers, only three being pale rocks.

Function. Strathern reports for the Wiru, who appear to belong to this group, that because axe blades were difficult to come by their use was, by and large, restricted to the utilitarian tasks which could not be accomplished by any other implement, and to their roles in the exchange

TABLE A61: Distribution of ratio scale features. Central Interior (CI10). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	23	118.04	40.43	60	202	0.552	-0.371
8	WIDTH OF BLADE - HAFT	23	60.91	13.01	39	96	0.697	0.853
9	THICKNESS OF BLADE	23	17.39	5.31	12	28	0.924	-0.579
10	WIDTH OF BLADE - EDGE	23	90.09	27.17	44	155	0.462	0.004
11	LENGTH - CUTTING EDGE	23	103.52	33.88	49	173	0.361	-0.469
12	ANGLE - CUTTING EDGE	23	53.83	11.94	30	78	-0.005	-0.472
13	LENGTH OF HANDLE	23	507.91	37.77	425	578	-0.205	-0.327
14	SHAFT DIAMETER	21	31.86	3.94	24	40	-0.404	-0.091
15	LENGTH OF FOOT	22	160.64	33.85	115	237	0.473	-0.508
16	TOTAL LENGTH OF FOOT	23	452.30	86.41	345	650	0.555	-0.520
17	POINT OF BALANCE	23	60.39	22.30	25	95	-0.103	-1.165
18	ANGLE - B/FOOT - SIDE	23	83.83	6.51	65	95	-0.715	1.762
19	ANGLE - B/HANDLE - BELOW	23	3.04	7.82	-15	20	0.243	1.128
20	WEIGHT	23	842.04	258.87	496	1598	1.373	1.787
21	SPRT SOCKET LENGTH	23	330.35	63.14	215	454	0.146	-0.738
22	SPRT SOCKET WIDTH	23	59.30	14.04	35	94	0.542	0.298
34	% 10 ON 11 WC/LC	23	88.17	6.00	76	98	-0.072	-0.703

TABLE A62: Distribution of nominal scale features. C. Interior (CI10).

VARIABLE NUMBER	23	POLL OF BLADE	N=23		
CODE VALUE:	2	3	4		
FREQUENCY:	1	21	1		
PERCENTAGES:	4.3	91.3	4.3		
VARIABLE NUMBER	24	PLAN OF BLADE	N=23		
CODE VALUE:	1	2			
FREQUENCY:	1	22			
PERCENTAGES:	4.3	95.7			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=23		
CODE VALUE:	1				
FREQUENCY:	23				
PERCENTAGES:	100.0				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=23		
CODE VALUE:	1	2			
FREQUENCY:	13	10			
PERCENTAGES:	56.5	43.5			
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=23		
CODE VALUE:	2	3	4		
FREQUENCY:	9	0	14		
PERCENTAGES:	39.1	0.0	60.9		
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=23		
CODE VALUE:	1	2	3		
FREQUENCY:	22	0	1		
PERCENTAGES:	95.7	0.0	4.3		
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=23		
CODE VALUE:	5				
FREQUENCY:	23				
PERCENTAGES:	100.0				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=23		
CODE VALUE:	0				
FREQUENCY:	23				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=23		
CODE VALUE:	4				
FREQUENCY:	23				
PERCENTAGES:	100.0				
VARIABLE NUMBER	32	USE-WEAR	N=23		
CODE VALUE:	0	1	2		
FREQUENCY:	8	12	3		
PERCENTAGES:	34.8	52.2	13.0		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=23		
CODE VALUE:	2	3	4	5	
FREQUENCY:	1	0	0	22	
PERCENTAGES:	4.3	0.0	0.0	95.7	

system. The extreme thinness of the cutting edge, often without the characteristic chin bevel of the CI 4, CI 7, and CI 9 implements, suggests that they would be easily broken by a blow of any force.

Manufacturing tradition. T2.

Comments. 1. Meggitt (1956-7:120) distinguishes the Mendi style from Enga axes. A brief mention of the fine finish of axes near Mt Murray, without mentioning the squared section is given by Beaver (1920:258).

2. Strathern (1969) does not discuss the hafting of Wiru axes.

3. The collectors give the name *kombamonk* to nos. 510, 809, 845, and 847. No. 846 is *hwisank*. No. 888 is *tuni*.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A61 and A62). Despite the variation in hafting, the blades and measurements are generally near normally distributed, the exceptions being V20 which ranges from 496 - 1190 gm with no. 846 weighing 1314 gm and no. 700 weighing 1598 gm, and V17. The point of balance falls into three divisions; four implements balance between 2.5 - 3.3 cm, 10 fall between 4.0 - 6.4 cm and nine fall between 8.0 - 9.5 cm from the shaft-foot junction. The two heaviest implements are within the largest V17 division.

CENTRAL INTERIOR 10

No.	Repository	Reg. No.	Locality	Date	Collector
404	NMV	X71087	Mt Hagen	1966	Lord Casey
405	NMV	X72554	Baiyer R. area	1969	" "
408	NMV	X72379	Pangia area	1968	M. Fisher
414	NMV	X42254	Puddidie (Purari?) V.	1935	I. Westhovan
510	SAM	A59715	Oba beyond Mulim	1969	Pretty & Crawford
617	AM	E63892	Ialibu	1969	A. Wildforster
694	AM	E58475a	"	1955	P.C.A. Conroy
695	AM	E58475b	"	1955	" "
700	AM	E41631	Mt Hagen	1936	L.V. Waterhouse
809	PNGM	E3689	Hlep	1969	Pretty & Crawford
827	PNGM	E1958	Tari	1953	Lady Cleland
845	PNGM	E3688	Bela	1969	Pretty & Crawford
846	PNGM	E3684	Mulim	1969	" "
847	PNGM	E3687	Bela	1969	" "
848	PNGM	E2954	Alipe, S of Tambul	1969	J.S. Womersley
875	PNGM	E5824	Nembi V., 6 mi. above Erave headwaters	1970	L. Johnson
876	PNGM	E5825	" "	1970	"
877	PNGM	E5818	" "	1970	"
878	PNGM	E5819	" "	1970	"
888	PNGM	E5826	Iuro, Karimui	1970	S. Whiting

No.	Repository	Reg. No.	Locality	Date	Collector
964	IA	M TA146	Mendi	1956	R.M. Glasse
965	IA	M TA80	Kagole (Kaugel?) V.	-	-
967	IA	M TA228	Samberigi V.	-	-

CENTRAL INTERIOR 11

Locality. Purari River, upstream of Aure junction.

Number. 4.

Collector. MacGregor and others.

Dates. January 1894, 1935.

References. MacGregor, 1894h:24-25; De Vis, 1894:99; Hughes, 1971: 262.

Figure. Plate A20, figs. G and H, (no. 118).

Hafting features. A1, B3, C24, D9 = nos. 118, and 931;
A1, B3, C23, D21 = no. 413; A1, B3, C24, D9 = no. 144.

Handle. All but no. 413 have round shafts, no. 413 has an oval shaft and its handle may be closer to CI 10.

Hafting. The separate sockets are short and usually end in a peg-like terminal. No. 144 has a pointed terminal. The socket terminal does not extend very far above the heel, quite unlike those of CI 10. In two instances the lashings are a plait cover made from coarse split vine strips, one has a cover of finer split vine strips, and one has a cover plaited from bark fibre strips. No blade-separate socket lashings were noted but no. 144 has a bark fibre strip around the blade and shaft.

Blades. No. 118 has a grey stone blade (almost mauve) which is 2.4 cm thick. It has flat sides but the corners are not marked. The cutting edge is asymmetrical in plan, and almost axe-bevelled in profile. This is possibly Kafetu quarry *lwawo* stone (Chappell, 1966:108). No. 931 is grey-green, quite thick, with marked corners and tapered. Nos. 144 and 413 are both of blackish stone, cornered, and thin (1.5 - 1. cm). No. 144 has the adze bevel on the right, the others have bevels on the left. These three appear to be blades traded down the Erave River. No. 118 was possibly traded down the Tua River. All are set as axes and appear to

belong to the CI 10 group as a fringe variant.

Function. No information, but probably restricted uses as reported for Wiru (Strathern, 1969). Use-wear of none (1), slight (2) and marked (1) qualities were noted.

Manufacturing tradition. T2.

Comments. 1. On 22nd January, 1894, MacGregor was exploring the Purari River and came to a new kind of village called Biroi, which was different from those near the Aure River junction (1894h:24):

and several stone axes of a peculiar kind. At least some of these axes had been sawn into shape. They were of a very fine-grained basalt, neatly and cleverly fastened into a wooden handle by strong cane work ...

None of those collected (in exchange for white cowrie shells (1894h:25)) have sawn edges. It is possible that MacGregor was misled by the flat sides. These must be the earliest of the planilateral blades collected. De Vis describes them (1894:99) as "two very beautiful little axes with blades squared on the lateral edges and very neatly mounted from Biroi."

2. Hughes' comment (1971:262) about an Abiamp bladed axe near Lake Tebera may refer to this population.

Statistics. Too few implements.

CENTRAL INTERIOR 11

No.	Repository	Reg. No.	Locality	Date	Collector
118	QM	M3993	Biroi R.	*1894	MacGregor (11911)
144	QM	NGE423	-	1939	A. Wienholt
413	NMV	X42283	Puddidie (Purari?)	1935	T. McCabe
931	QM	M5895	Biroi R.	*1894	MacGregor (11910)

CENTRAL INTERIOR 12

Locality. Tari area, including Huliduna, Huli, probably Kutubu, possibly Kaibu and Fasu but these may be transitional with Mt Bosavi.

Number. 30.

Collectors. R.M. Glasse, J.P. White, and others.

Dates. 1956 - 1969.

References. Hides, 1936:102-4; Williams, 1940-41, 1941-42:145-6; Hinderling, 1949:64; Glasse, 1968-69.

Figure. Plate A21, figs. A and B, (no. 657).

Hafting features. A1, B3, C23, D8 = all but nos. 196 and 659 which have the combination A1, B3, C23, D8.

Handle. Sturdy handle, with oval shaft, high heel and short toe, more robust than CI 9.

Hafting. Oval separate socket, usually with a peg-like terminal which does not project very far above the heel. Both the back of the heel and the top of the separate socket may be knobbed to assist the lashing. The blade-separate socket lashing is a neat cross-over split vine whipping, while the separate socket-handle lashing is an elaborately whipped split vine whipping which leaves a triangle or triple triangle on the right side. It usually covers the join between the separate socket-blade lashing, the upper lashing giving the impression that the lashing is all one piece. Glasse (1968-9) illustrates the process.

Blades. The general shape and the mean thickness of the blades of $2.0 \text{ cm} \pm 0.4 \text{ cm}$ reinforces the impression that many of them are worn down versions of the CI 9 squared, thick blades. The greatest number are of the ?Abiamp green stone, a number are darker, but only one is pale. About one-third are made from grey, presumably local, rocks. Two of the blades (nos. 819 and 855) which are of local rocks have oval sections.

Function. For Huli: "It was used mainly to fell saplings and trees, to carve planks for house walls and shields, to make stakes for garden fences, and for planing the surface of bows, arrows, and spears. It was also used as a weapon in hand-to-hand fighting" (Glasse, 1968-9:573). For Lake Kutubu, Williams records the additional use of canoe hollowing (1940-41, 1941-42:145).

Manufacturing tradition. T2.

Comments. 1. The following extracts are taken from Glasse (1968-9):

The Huli possess only one type of stone axe (*ayu*), a working tool. The ceremonial type, used for adornment and prestations, is not found here (571).

The blade is mounted in a swivel socket which is hafted with rattan cane to a wooden handle at an angle of about 75 degrees (the so-called 7 shape), as shown in the figure. The socket allows the blade to be rotated to suit the preference of the user and the job at hand. The blade is never aligned in the same plane as the handle but always at an angle to it. A

right-handed man positions the blade so that an acute angle is formed to the left by the axis of the blade and the horizontal when viewed head on. The left-hander reverses this position. Most men prefer to set their blades at an angle of 60 to 70 degrees from the horizontal. A few prefer a more upright position of 80 to 85 degrees. There is a Huli word for a blade set at a perpendicular or adze position (*hondogia*), but I never observed or heard accounts of the axe used this way (572).

According to Huli taxonomy, nine named varieties of stone are used for axe blades. (*Warobia*, *kundina*, *abina*, *mugaro*, *komoga*, *kombi*, *pungorali*, and *tamabu* are imported, *dindi* is the local river stone.) A small number of local river stones are made into blades by the Huli; these produce edges that are brittle and readily lose their sharpness. Huli consider them to be markedly inferior to imported blades (572, 572n 3).

Up till the late 1950's Huli acquired blades by trading with their Ipili and Wage neighbours (572).

To chop down a tree, the axe-man employed a two-handed, overhead stroke, at such an angle that the cutting edge landed perpendicular to the axis of the trunk. He rotated the blade slightly from time to time to adjust the cutting angle to the task at hand. For scraping or planing, the blade is removed from the socket and used as a chisel (573).

2. Glasse gives the names *ayu kundina* to nos. 656, 657, 658, and 66, *ayu abina* to no. 659, and *dindi ayu* to no. 663 (AM register). White gives *ayu* as the name for no. 581 (AM register), and Pretty transcribes as *adju* the names for nos. 801, 808, 849, and 850.

3. White observed nos. 585 and 586 being used for making arrows.

4. Williams' description of Lake Kutubu percussive cutting implements sounds most like these Tari ones, but as none were recorded I cannot be certain of this point (1940-1, 1941-2:145-6):

The [stone axes] which, I understand, used to be carried habitually by almost every adult male (as they still are in the Grasslands) are now seen mostly in the men's house. Nevertheless the native does not part with his stone axe very readily; he still uses it in hollowing his canoe because of its convenient set ...

The blades (*hibu*) are imported from the Grasslands. They are often very well made, with squared sides, i.e. oblong in section. They taper towards the butt end, where they are inserted in a tang (*kou*) consisting of two pieces of wood appropriately shaped, which are tightly bound together with cane. The tang itself tapers towards the distal end. It is bound on to an elbow-shaped haft (*fia*) with cane, often criss-crossed in an attractive manner. It should be remarked, however, that the Kutubu axes are rough utility implements. One does not see any specimens to compare with the beautifully shaped axes of the Grasslands; the cane binding is not of the same finely finished character, and there are none of the delicate pale green celts.

TABLE A63: Distribution of ratio scale features. Central Interior (CI12). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	30	45.07	15.09	20	90	0.636	1.078
8	WIDTH OF BLADE - HAFT	30	44.60	5.79	31	54	-0.515	-0.100
9	THICKNESS OF BLADE	30	20.23	4.33	13	28	-0.215	-0.603
10	WIDTH OF BLADE - EDGE	30	50.30	7.68	33	64	-0.000	-0.382
11	LENGTH - CUTTING EDGE	30	58.30	9.66	39	78	0.342	-0.245
12	ANGLE - CUTTING EDGE	30	64.00	5.39	55	75	0.111	-0.575
13	LENGTH OF HANDLE	30	533.03	97.50	413	760	0.578	-0.758
14	SHAFT DIAMETER	29	36.66	3.78	26	45	-0.540	1.295
15	LENGTH OF FOOT	30	171.47	13.24	136	197	-0.517	0.485
16	TOTAL LENGTH OF FOOT	30	350.60	58.66	187	447	-0.684	0.645
17	POINT OF BALANCE	30	43.30	12.93	20	67	-0.187	-0.570
18	ANGLE - B/FOOT - SIDE	30	73.33	5.62	60	80	-0.659	0.156
19	ANGLE - B/HANDLE - BELOW	29	41.24	25.57	0	90	0.225	-0.809
20	WEIGHT	30	689.17	182.41	334	1069	0.283	-0.263
21	SPRT SOCKET LENGTH	30	312.03	46.05	189	403	-0.637	0.364
22	SPRT SOCKET WIDTH	30	46.73	7.03	25	60	-0.880	1.578
34	% 10 ON 11 WC/LC	30	86.67	6.48	72	96	-0.672	-0.185

TABLE A64: Distribution of nominal scale features. C. Interior (CI12)

VARIABLE NUMBER	23	POLL OF BLADE	N=30			
CODE VALUE:	2	3	4			
FREQUENCY:	9	20	1			
PERCENTAGES:	30.0	66.7	3.3			
VARIABLE NUMBER	24	PLAN OF BLADE	N=30			
CODE VALUE:	1	2				
FREQUENCY:	7	23				
PERCENTAGES:	23.3	76.7				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=30			
CODE VALUE:	1	2	3			
FREQUENCY:	29	0	1			
PERCENTAGES:	96.7	0.0	3.3			
VARIABLE NUMBER	26	PROFILE OF BLADE	N=30			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	8	16	2	0	4	
PERCENTAGES:	26.7	53.3	6.7	0.0	13.3	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=30			
CODE VALUE:	1	2	3			
FREQUENCY:	2	23	5			
PERCENTAGES:	6.7	76.7	16.7			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=30			
CODE VALUE:	1	2				
FREQUENCY:	29	1				
PERCENTAGES:	96.7	3.3				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=30			
CODE VALUE:	2	3	4	5		
FREQUENCY:	2	0	1	27		
PERCENTAGES:	6.7	0.0	3.3	90.0		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=30			
CODE VALUE:	0					
FREQUENCY:	30					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=30			
CODE VALUE:	4					
FREQUENCY:	30					
PERCENTAGES:	100.0					
VARIABLE NUMBER	32	USE-WEAR	N=30			
CODE VALUE:	1	2	3	4		
FREQUENCY:	14	12	1	3		
PERCENTAGES:	46.7	40.0	3.3	10.0		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=30			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	1	8	0	0	21	
PERCENTAGES:	3.3	26.7	0.0	0.0	70.0	

The tang can be turned in its socket of cane so that the tool may be used as an axe or adze. To attack a tree it is twisted slightly so as to give the blade a half-and-half oblique set. A man does not make a "scarf" in chopping timber: he uses a downward stroke all the time, and with a good sharp stone makes pretty fair progress.

5. A note in the PNGM Museum register (about an artefact I was not able to locate) reports that the stone axes

are now only used for two purposes: (a) as an adze for the building of canoes, (b) for cutting the hole in the tree from which '*tigaso*' oil is obtained. The blades '*hibu*' are imported from the Auge and Wage valley areas.

6. The name of the Kutubu implements is *gagabo* (Williams, 1940-1, 1941-2:146).

7. Compare the sago making implements from Kutubu CI 14 and CI 15.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A63 and A64). In spite of considerable morphological variability in the blades (table A64) the measurements (A63) are all near normally distributed. However, in view of Glasse' statement about the hafting angle the distribution of V19 is interesting. The readings are: 0° (1), 5° (2), 10° (1), 15° (1), 18° (1), 20° (4), 30° (2), 40° (3), 45° (2), 50° (3), 60° (4), 73° (1), 75° (2), and 90° (2), giving a mean different from Glasse' observations. Handle lengths do not show the marked division which CI 13 does as five implements fit between the CI 13 divisions, but do show concentrations from 41.3 - 50.2 cm and 66.3 - 68.2 cm.

CENTRAL INTERIOR 12

No.	Repository	Reg. No.	Locality	Date	Collector
196	AIM	39i51	Huli, Tari	-	N. Quigg, J. Young
360	CM	E164,1044	Tari	*1964	P. Temple
361	CM	E164.1031	"	*1964	"
362	CM	E164.1027	"	*1964	"
368	CM	E164.1034	"	*1964	"
369	CM	E164.1033	"	*1964	"
390	CM	E164.1038	"	*1964	"
391	CM	E164.1026	"	*1964	"
415	NMV	X72015	Huli, Tari	*1966	J. Meade
581	AM	E62785	Kelabo, near Koroba	*1967	J.P. White
585	AM	E62880	Baranda, L. Kopiago	*1967	"
586	AM	E62881	" "	*1967	"
656	AM	E59954	Diera, Tari	1960	R.M. Glasse
657	AM	E59955	" "	1960	"
658	AM	E59956	" "	1960	"
659	AM	E59959	" "	1960	"

No.	Repository	Reg. No.	Locality	Date	Collector
661	AM	E59957	Diera, Tari	1960	R.M. Glasse
662	AM	E59958	" "	1960	"
663	AM	E59961	" "	1960	"
801	PNGM	E3686	Yarube, Ialibu	*1969	Pretty & Crawford
808	PNGM	E3677	Pawanda	*1969	" "
819	PNGM	E3675	Paijaka	*1969	" "
849	PNGM	E3674	Wabia	*1969	" "
850	PNGM	E3676	Tari	*1969	" "
851	PNGM	E1252.1	Tari Valley	1965	United Field Mission
852	PNGM	E1252.2	" "	1965	" " "
853	PNGM	E1252.3	" "	1965	" " "
855	PNGM	E2215.2	Pureni	*1967	R.D. McKay
856	PNGM	E2365.1	L. Kapiago	*1967	J.P. White
963	IA	M TA135	Huli, Tari	*1956	R.M. Glasse

CENTRAL INTERIOR 13

Locality. Mainly in the Duna speaking areas, but occasionally traded into Huli areas.

Number. 31.

Collectors. L. and S. Steadman, J.P. White, and others.

Dates. 1956 - 1967.

References.

Figure. Plate A21, figs. C and D, (no. 803).

Hafting features. A1, B3, C23, D4 = all but nos. 854 and 855 which are A1, B3, C23, D8.

Handle. As CI 12.

Hafting. As CI 12.

Blades. All the CI 13 blades are oval sectioned. All but one (no. 854 which has a nephrite-like blade, presumably a local rock) have blades of crystalline metamorphic rocks. Most of these are dark, but one appears to be schistose, and one is a green streaky rock. The blades are longer than the CI 12 blades which appear in the main to be the stubs of CI 9 blades, although the measurement (V7) is skewed by two extremely long blades nos. 862 (14.9) and 854 (17.3 cm). Without these the range is 2.9 - 10.7 cm. The cutting edge is convex in plan and in profile,

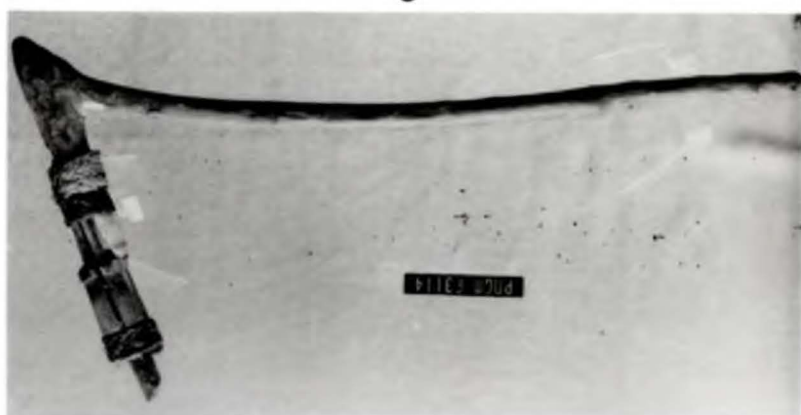
PLATE A21.

- A and B. CI 12, 657, AM E59955, Diera, Tari.
C and D. CI 13, 803, PNGM E2365.7, Lake Koplago.
E and F. CI 17, 811, PNGM E3113, Mt Bosavi.
G and H. CI 18, 872, PNGM E3114, Mt Bosavi.

H



G



F



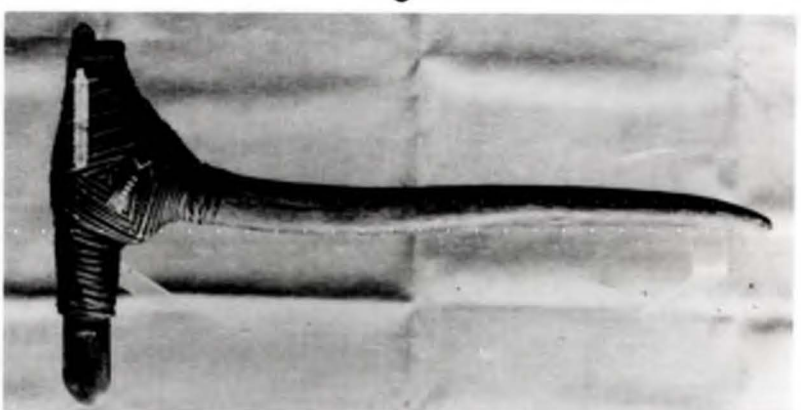
E



D



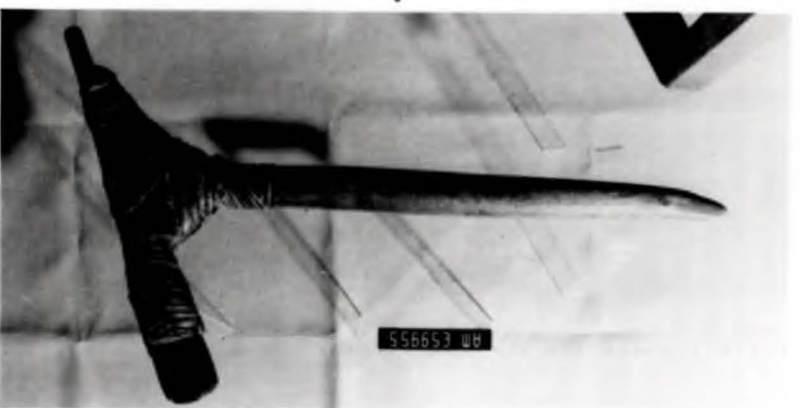
C



B



A



although both faces curve to the edge, the back (inner) tends to be flatter, but to take longer to slope out to the full width of the blade. The blades thus conform to the usual pattern of oval sectioned blades in Melanesia, unlike those from the central quarries which tend to have a flatter front face (a feature which may be a concomitant of the squared section, and which also occurs on squared Polynesian blades).

Function. Probably multi-purpose, but handle length may mark a division into one- and two-handed tasks as those collected by White in the Lake Kopiago area have short handles if used for arrow making, long ones if used for tree felling. This difference is not apparently reflected in the blades, with the exception that the squared section blades (nos. 585 and 586 of CI 12) were used for arrow making and are smaller than the oval sectioned ones. (But see comment 4.)

Manufacturing tradition. T2.

Comments. 1. White records that the stone is called *ebo* at Lake Kopiago, and is traded in from the Strickland and beyond. The Hewa apparently act as middlemen in this trade and the blades come from the north across the Central Range and are traded to Oksapmin, Kopiago, and the eastern Hewa (Steadman, 1971:16). The stone is supposed to come from the Leonard Schultze River or nearby areas (see discussion in Hughes, 1971:290). An implement with a similar blade was collected by Glasse in 1956 at Diera, Tari, where it was said to have been imported from the Duna, and was called *ayu warabia* (Glasse, 1968-9:572).

2. The Duna name for 'axe' is apparently *ayu* (White, AM register), but two collected by S. Steadman (nos. 803 and 804) are given as *towani* axe, *kaguena*. Nos. 860 - 863 have *katamon* on the handle.

3. White recorded that no. 582 was used to cut down a 14 cm diameter tree in 3 minutes, and that no. 583 was used to fell a 12 cm diameter sapling in 4 minutes. Nos. 587 and 588 were used for cutting wood for arrows, and no. 587 was subsequently used for cutting bone for the points.

4. According to Steadman (pers. comm.) the people at Lake Kopiago, apparently both Duna and Hewa, say that recent axes have long handles like European axes.

5. Nos. 971 - 980 were collected by Steadman, studied by Hughes (1971:290), and reassembled by Steadman and Crosby in 1971. These reconstructions are probably correct because the separate sockets appear, as usual, to have been manufactured for individual blades.

TABLE A65: Distribution of ratio scale features. Central Interior (CI13). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	31	74.81	30.71	29	173	1.372	2.562
8	WIDTH OF BLADE - HAFT	31	45.68	6.35	34	59	-0.034	-0.549
9	THICKNESS OF BLADE	31	23.58	3.80	15	30	-0.305	-0.224
10	WIDTH OF BLADE - EDGE	31	51.94	6.30	38	63	-0.476	-0.412
11	LENGTH - CUTTING EDGE	31	66.34	9.19	47	82	-0.410	-0.379
12	ANGLE - CUTTING EDGE	31	62.65	6.50	49	75	-0.071	-0.167
13	LENGTH OF HANDLE	31	648.23	125.03	400	822	-0.246	-1.114
14	SHAFT DIAMETER	31	32.16	3.49	27	42	0.715	0.884
15	LENGTH OF FOOT	31	161.23	14.94	125	192	0.132	0.154
16	TOTAL LENGTH OF FOOT	31	331.45	47.61	264	526	2.325	7.633
17	POINT OF BALANCE	31	52.81	16.03	30	100	1.099	2.115
18	ANGLE - B/FOOT - SIDE	31	78.00	7.63	60	90	-0.040	-0.399
19	ANGLE - B/HANDLE - BELOW	31	40.06	19.99	-25	70	-0.944	2.030
20	WEIGHT	31	807.68	197.65	415	1351	0.823	1.042
21	SPRT SOCKET LENGTH	31	254.19	29.44	202	353	1.217	2.859
22	SPRT SOCKET WIDTH	31	49.06	5.82	38	61	0.061	-0.357
34	% 10 ON 11 WC/LC	31	78.71	6.58	67	92	0.558	-0.330

TABLE A66: Distribution of nominal scale features. C. Interior (CI13).

VARIABLE NUMBER	23	POLL OF BLADE	N=31			
CODE VALUE:	1	2	3			
FREQUENCY:	5	13	13			
PERCENTAGES:	16.1	41.9	41.9			
VARIABLE NUMBER	24	PLAN OF BLADE	N=31			
CODE VALUE:	1	2				
FREQUENCY:	7	24				
PERCENTAGES:	22.6	77.4				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=31			
CODE VALUE:	1					
FREQUENCY:	31					
PERCENTAGES:	100.0					
VARIABLE NUMBER	26	PROFILE OF BLADE	N=31			
CODE VALUE:	1	2	3			
FREQUENCY:	21	7	3			
PERCENTAGES:	67.7	22.6	9.7			
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=31			
CODE VALUE:	2	3				
FREQUENCY:	29	2				
PERCENTAGES:	93.5	6.5				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=31			
CODE VALUE:	1	2				
FREQUENCY:	17	14				
PERCENTAGES:	54.8	45.2				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=31			
CODE VALUE:	1	2	3	4		
FREQUENCY:	2	27	0	2		
PERCENTAGES:	6.5	87.1	0.0	6.5		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=31			
CODE VALUE:	0					
FREQUENCY:	31					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE	N=31			
CODE VALUE:	1	2	3	4		
FREQUENCY:	1	1	12	17		
PERCENTAGES:	3.2	3.2	38.7	54.8		
VARIABLE NUMBER	32	USE-WEAR	N=31			
CODE VALUE:	1	2	3	4	5	6
FREQUENCY:	9	8	4	8	1	1
PERCENTAGES:	29.0	25.8	12.9	25.8	3.2	3.2
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=31			
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	10	19	1	0	1	
PERCENTAGES:	32.3	61.3	3.2	0.0	3.2	

Statistics. All implements are included in the statistical descriptions and comparisons (tables A65 and A66). V16, like V7, is skewed by nos. 862 and 854. Without them the range for V16 is 26.4 - 37.9 cm. The point of balance is generally close to the ankle at 3.0 - 7.0. The two implements causing the skew are 862 and 802. V21 is also skewed by one large implement, no. 854. Without it the range of V21 is 20.2 - 30.5 cm. As suggested, the handle length (V13) has a platykurtic distribution, a small group ranging from 40.0 - 58.7 cm, a longer handled group from 66.0 - 86.2. (Implements in order in the short handled group are nos. 588, 370, 868, 580, 473, 587, 660, 980, 803, 857, and 879.)

CENTRAL INTERIOR 13

No.	Repository	Reg. No.	Locality	Date	Collector
370	CM	E164.1039	Tari	*1964	P. Temple
580	AM	E62874	Aluni, L. Kapiago	*1967	J.P. White
582	AM	E62877	Hararege, L. Kapiago	*1967	"
583	AM	E62878	" "	*1967	"
587	AM	E62882	Aluni, L. Kapiago	*1967	"
588	AM	E64512	" "	*1967	"
660	AM	E59960	Diera	1960	R.M. Glasse
802	PNGM	E2449.3	L. Kapiago	*1967	S. Steadman
803	PNGM	E2365.7	"	*1967	J.P. White
804	PNGM	E2365.8	"	*1967	"
854	PNGM	E2215.1	Pureni	*1967	R.D. McKay
857	PNGM	E2365.2	L. Kapiago	*1967	J.P. White
858	PNGM	E2365.4	"	*1967	"
859	PNGM	E2365.6	"	*1967	"
860	PNGM	E2449.1	"	*1967	S. Steadman
861	PNGM	E2449.2	"	*1967	"
862	PNGM	E2449.4	"	*1967	"
863	PNGM	E2449.5	"	*1967	"
864	PNGM	E2904.1	Oksapmin	1968	R. Traub
879	PNGM	E2904.2	"	1968	"
883	PNGM	E2365.5	L. Kapiago	*1967	J.P. White
971	LS	1	L. Kapiago	*1969	L. Steadman
972	LS	2	"	*1969	"
973	LS	3	"	*1969	"
974	LS	4	"	*1969	"
975	LS	5	"	*1969	"
976	LS	6	"	*1969	"
977	LS	7	"	*1969	"
978	LS	8	"	*1969	"
979	LS	9	"	*1969	"
980	LS	10	"	*1969	"

CENTRAL INTERIOR 14

Locality. Lake Kutubu.

Reference. Williams, 1940-1, 1941-2:146.

Hafting features. A1, B3, C23, D4?.

Handle. As CI 12?

Hafting. As CI 12?

Blade. 'Hammer stone'.

Function. Sago felling implement.

Manufacturing tradition. T2.

Comments. The imported stone blades are too valuable to use (when new) on sago bark, for it is so hard as to chip them. The substitute is a locally made hammer-stone, *toio* (Fimaga: *amaga taua*). This is a long pebble worked down by "pecking" towards a point at each end and then hafted in the same way as an ordinary celt. It thus constitutes a hammer, or very blunt sort of pick which is not likely to break and is no great loss if it does. I presume that the proper *gagebo* [axe] is used to cut through the bark when it has been more or less reduced to a pulp (Williams, 1940-1, 1941-2:146).

CENTRAL INTERIOR 15

Locality. Lake Kutubu.

Reference. Williams, 1940-1, 1941-2:146.

Hafting features. A1, B3, C23, D4?.

Handle. As CI 12?

Hafting. As CI 12?

Blade. "A pebble, or a piece of flinty stone, snapped off sharp".

Function. Chopping up sago pith.

Manufacturing tradition. T2.

Comments. The sago scraper (*wasu*) is hafted in the same way, but the working edge is provided by a pebble, or a piece of flinty stone, snapped off sharp (Williams, 1940-1, 1941-2:146).

CENTRAL INTERIOR 16

Locality. Tari area.

Number. 1.

Collectors. N. Quigg and J. Young.

Date. -

Reference.

Figure. Plate A18, fig. E.

Hafting features. A1, B3, C?, D4.

Handle. Long thin shaft, very small foot, generally light.

Hafting. The blade is fitted over a stick-like holder not more than 2 cm in diameter and in all those seen is decorated with incised designs and ochre paints. It is about the same length as the separate sockets of CI 12. The blade is held on by a very neat band of plait made from extremely fine strips of fibre, and the tang is held to the foot by an elaborately patterned whipping of fine split vine strips.

Blade. A Cassowary claw.

Function. Fighting pick.

Manufacturing tradition. T2.

Comments. This may be a Huli version of the elaborate fighting axes of the areas near the major quarries. It is certainly elaborate and the fine plait band may perhaps be a copy of some on CI 7 implements. However, the whole implement is much lighter than the CI 12 implements which are hafted similarly. It may thus have had less utility as a weapon than the larger CI 12 axes which were sometimes used in fighting (Glasse, 1968-9:573). Only one was recorded because of the marginality of this implement to the woodworking implements.

Statistics. Too few implements.

CENTRAL INTERIOR 16

No.	Repository	Reg. No.	Locality	Date	Collector
194	AIM	39147	Huli, Tari	-	N. Quigg, J. Young

CENTRAL INTERIOR 17

Locality. Mt Bosavi.

Number. 1.

Collector. E.L. Schieffelin.

Date. *1969.

Reference.

Figure. Plate A21, figs. E and F.

Hafting features. A1, B3, C15, D14.

Handle. Long round shaft curving up to junction with foot. Almost heel-less, long toe.

Hafting. The toe has a tapered hollow in which the separate socket is set. The separate socket reaches only to the ankle, and is made in two halves with a pointed top and a 'collar' above the blade-separate socket lashing. The blade-separate socket and separate socket-handle lashings are multiple bands of fine split vine plait. A leaf strip, perhaps for cushioning, is held at the back of the toe.

Blade. The blade is an old adze blade with an oval section and a blunted, slightly glossy, cutting edge. The material is 'schistose'. The cutting edge is set at 110°.

Function. Sago palm felling, name *mosegof*.

Manufacturing tradition. T2.

Comments. 1. CI 17 and CI 18 fulfill the same roles as CI 14 and CI 15 for Lake Kutubu, but the blade, hafting, separate socket form, and especially the heel-less handle, are unlike those CI implements I have seen. The separate socket seems to be unique, but the lashing with plait bands is quite like the Nomad River (WI 21) lashing.

2. Voorhoeve (pers. comm.) puts the linguistic groups round Mt Bosavi intermediate between those of Fasu-Kewa-Foi (L. Kutubu) and the Nomad River area.

CENTRAL INTERIOR 17

No.	Repository	Reg. No.	Locality	Date	Collector
811	PNGM	E3113	Mt Bosavi	*1969	E.L. Schieffelin

CENTRAL INTERIOR 18

Locality. Mt Bosavi.

Number. 1.

Collector. E.L. Schieffelin.

Date. *1969.

Figure. Plate A21, figs. G and H.

Hafting features. A1, B3, C15, D14.

Handle. As CI 17.

Hafting. As CI 17 but the tang of the separate socket is markedly thinned above the 'collar' and the blade-separate socket lashing is a single plait band.

Blade. A snapped, 'tranchet' pebble, very blunt with some gloss. Appears to be volcanic rock.

Function. Sago pith chopper, *udo*.

Manufacturing tradition. T2.

Comments. See CI 17. Blade as described for CI 15.

CENTRAL INTERIOR 18

No.	Repository	Reg. No.	Locality	Date	Collector
872	PNGM	E3114	Mt Bosavi	*1969	E.L. Schieffelin

WESTERN INTERIOR 1

Locality. Hewa speaking areas, near Lake Kapiago, marginally the Telefomin area.

Number. 17.

Collectors. L. Steadman and others.

Dates. 1937 - 1970.

References. Steadman, 1971:15-57, 63.

Figure. Plate A22, figs. A and B, (no. 367).

Hafting features. A1, B1, C1, D3.

Handle. Long round shaft, medium high heel, usually rounded off, long toe, narrow flat face.

Hafting. Long split cane whipping of which a second part is lashed round the upper part of the toe and the top of the heel. The blade usually has a strip of light bark over the outer side of the blade, but one (illustrated) has a strip of towelling under the blade and another (no. 791) has a piece of fibrous material.

Blade. The blades are oval in section and made mainly of spotty rocks, one of which (no. 986) was identified by Hughes (1971) as Gufug gneiss from the upper Frieda, and Leonard Schultze rivers. One is made of a grey rock, another of a smooth dark rock. All have the same general shape, long, parallel sided - slightly tapering to the butt, protruding cutting edge, and the adze form bevel common to Melanesian blades with low oval sections (both faces curve into the cutting edge, but the back has a longer curve, though it may be less tight). These blades are largely the same as on the CI 13 implements used by the Duna.

Function. Multi-purpose. Probably very much as described by Townsend for WI 7.

Manufacturing tradition. T1.

Comments. 1. The blades in WI 1 are the same as in WI 7 and many in CI 13. Hewa appear to act as intermediaries in this trade, supplying both these areas (Townsend, 1969:200; Steadman, 1971:16).

TABLE A67: Distribution of ratio scale features. Western Interior (WI1). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	17	119.47	41.47	65	189	0.210	-1.115
8	WIDTH OF BLADE - HAFT	17	52.47	6.62	40	64	-0.375	-0.126
9	THICKNESS OF BLADE	17	28.24	4.66	20	36	-0.155	-0.619
10	WIDTH OF BLADE - EDGE	17	55.71	5.63	46	69	0.456	0.578
11	LENGTH - CUTTING EDGE	17	68.71	7.85	56	87	0.454	0.604
12	ANGLE - CUTTING EDGE	17	64.53	6.15	55	80	0.512	0.989
13	LENGTH OF HANDLE	17	582.65	70.26	502	733	0.622	-0.626
14	SHAFT DIAMETER	17	23.76	4.71	15	30	-0.397	-0.950
15	LENGTH OF FOOT	17	211.47	43.43	145	280	0.448	-0.696
16	TOTAL LENGTH OF FOOT	17	329.88	61.03	256	445	0.625	-0.649
17	POINT OF BALANCE	15	93.27	28.55	53	145	0.268	-1.013
18	ANGLE - B/FOOT - SIDE	17	72.06	14.37	40	95	-0.577	0.170
19	ANGLE - B/HANDLE - BELOW	17	91.18	7.19	70	100	-1.247	3.078
20	WEIGHT	17	986.71	317.08	560	1599	0.413	-0.704
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	17	81.41	6.06	74	96	0.858	0.128

TABLE A68: Distribution of nominal scale features. W. Interior (W11).

VARIABLE NUMBER	23	POLL OF BLADE	N=17				
CODE VALUE:	1	2					
FREQUENCY:	8	9					
PERCENTAGES:	47.1	52.9					
VARIABLE NUMBER	24	PLAN OF BLADE	N=17				
CODE VALUE:	1	2					
FREQUENCY:	2	15					
PERCENTAGES:	11.8	88.2					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=17				
CODE VALUE:	1	2					
FREQUENCY:	16	1					
PERCENTAGES:	94.1	5.9					
VARIABLE NUMBER	26	PROFILE OF BLADE	N=17				
CODE VALUE:	1	2	3	4	5		
FREQUENCY:	11	3	1	1	1		
PERCENTAGES:	64.7	17.6	5.9	5.9	5.9		
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=17				
CODE VALUE:	2						
FREQUENCY:	17						
PERCENTAGES:	100.0						
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=17				
CODE VALUE:	1	2	3				
FREQUENCY:	4	12	1				
PERCENTAGES:	23.5	70.6	5.9				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=17				
CODE VALUE:	2	3	4				
FREQUENCY:	13	1	3				
PERCENTAGES:	76.5	5.9	17.6				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=17				
CODE VALUE:	0						
FREQUENCY:	17						
PERCENTAGES:	100.0						
VARIABLE NUMBER	31	FINISH ON BLADE	N=17				
CODE VALUE:	3	4					
FREQUENCY:	11	6					
PERCENTAGES:	64.7	35.3					
VARIABLE NUMBER	32	USE-WEAR	N=17				
CODE VALUE:	1	2	3	4	5		
FREQUENCY:	1	8	5	1	2		
PERCENTAGES:	5.9	47.1	29.4	5.9	11.8		
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=17				
CODE VALUE:	1	2					
FREQUENCY:	6	11					
PERCENTAGES:	35.3	64.7					

2. Hewa do not make sago and thus do not have the three cutting implements of the Sepik Hill peoples (WI 7, WI 8, and WI 9).

3. Methods of lashing and assembly are very similar in a number of Western Interior implements, WI 1 - WI 9.

4. Craig gives the name *mok* to nos. 791, 794, and 796 (AM register).

5. No. 844 "belonged to Drundra, Abireg sharpened blade" (PNGM register).

Statistics. All implements are included in the statistical descriptions and comparisons (tables A67 and A68). Of the measurements, V19 is skewed by no. 796, and the range for the rest is 85° - 100°. V7 and V17 are markedly platykurtic; V7 dividing 6.5 - 8.4 cm/9.5 - 14.4 cm/15.5 - 18.9 cm, and V17 dividing 5.3 - 8.2/10.3 - 14.5 cm. Not all the five shorter bladed implements fall in the group with point of balance closer to the foot-shaft junction.

WESTERN INTERIOR 1

No.	Repository	Reg. No.	Locality	Date	Collector
367	CM	E164.1024	Feramin	*1964	P. Temple
584	AM	E62879	Wanakipi, L. Kopiago	*1967	J.P. White
667	AM	E44039	Upper Fly R.	1937	Fl. Lt. Stewart
668	AM	E44040	" "	1937	" "
791	AM	E61769	Telefomin	1965	B. Craig
793	AM	E62799	Oksapmin	1967	"
794	AM	E62798	"	1964	D. Miles
796	AM	E61770	Duramin	1965	B. Craig
843	PNGM	E4789	Nabnut	1970	A. Perey
844	PNGM	E4791	-	1970	"
865	PNGM	E2904.3	Oksapmin	1968	R. Traub
981	LS	11	Hewa area	*1969	L. Steadman
982	LS	12	" "	*1969	"
983	LS	13	" "	*1969	"
984	LS	14	" "	*1969	"
985	LS	15	" "	*1969	"
986	LS	16	" "	*1969	"

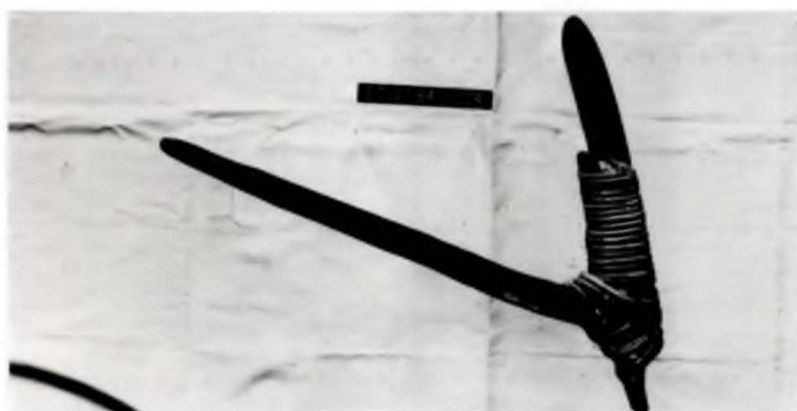
WESTERN INTERIOR 2

Locality. Telefomin, Upper Fly, Star Mountains, Ok Sibil, Pesegem, Goliath area.

Number. 20.

PLATE A22.

- A and B. WI 1, 367, CM E164.1024, Feramin.
C and D. WI 2, 516, SAM A42785, August River.
E and F. WI 7, 155, UQM 4744, Sepik.
G and H. WI 8, 371, CM E163.1114, Green River.



A



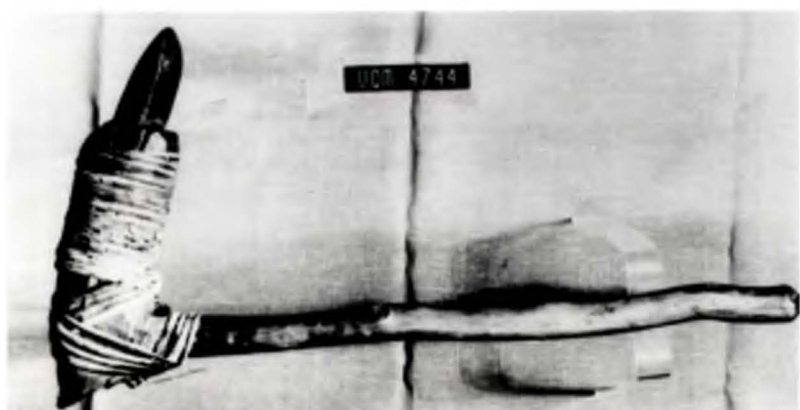
B



C



D



E



F



G



H

Collectors. P. Temple, R. Mitton.

Dates. 1938 - 1971.

References. MacGregor, 1890e:54; Haddon and Layard, 1916; Nouhuys, 1923; Austen, 1923:344; Wirz, 1922: Pl. 37, fig. 2; Karius, 1929; Champion, 1932; Kienzle and Campbell, 1937-8; Campbell, 1938; Archbold and Rand, 1940:49; Le Roux, 1948: Pl. XCIX, figs. I4 and I5; Hinderling, 1949:44, 75-6; Miller, 1950:168; Kooijman, 1962; Brongersma and Vanema, 1962; Saulnier, 1963:173-182; Mitton, 1972.

Figure. Plate A22, figs. C and D, (no. 516).

Hafting features. A1, B1, C1, D3 = all but no. 31 which has A1, B1, C1, D16, and nos. 621, 742, and 874 which have A1, B2, C10, D3.

Handle. High heel, long toe with flat narrow face. Shaft round.

Hafting. Lashing very similar to WI 1 but usually ornamentally wrapped round heel. Three of these implements have no cushioning for the blade (nos. 31, 154, 792), three have a light wooden cover over the whole foot (nos. 621, 742, 874) and the rest have a wrapping or facing of some light material, usually bark but in one case bark-cloth, and in one other a piece of woven cloth. No. 365 does not have a lashing round the heel, and the lashing of no. 880, which is the oldest in the collections seen from the Telefomin area, is skimpier than the rest, perhaps through shrinkage. No. 31 has a weak looking plait ring holding the blade to the foot. This may not be the original lashing. This implement does have the separate, ornamental heel lashing.

Blade. With one exception the blades in this population have high sub-triangular cross sections, with the rounded apex to the front. Only five are smoothed along the sides (nos. 31, 154, 366, 792, and 880), the rest show traces of the original flaking. They taper very slightly to the poll and have long protruding cutting edges, like Le Roux's types *e* and *f* (1948:I, 416). At least some of the stone from the Ok Sibil has been identified as a microdiorite (Mitton, 1972, see comments). One adze, from Bambleddiam has a blade of Abiamp stone, presumably traded via the Duna and Hewa. This is the only example of a CI 9 axe blade being used as an adze which I have seen.

Function. Multi-purpose (see comments).

Manufacturing tradition. T1.

Comments. 1. According to Karius (1929:305-6) the Fly River has no

permanent settlements on its banks between 70 and 320 miles from the mouth. At this point the Ok people begin. MacGregor remarks, at a point 390 miles up the Fly River (around Mabudauan), that:

For procuring tools for working wood they are in a most unhappy position; they are too far from the white man to procure iron, and there is no stone of any kind in their country. Hence they value very highly the most worthless remnant of a stone adze, and with these they will not part under any consideration (1890e:54).

At Muju River, Austen reported the name of stone tomahawks as *da*, their handles as *ig'ap* (Austen, 1923:340-45). North of the Ok Tedi the Awin people reach the Fly River and extend some distance east. In their area, unlike the lower Ok Tedi area, less sago is available, though pandanus is used (Austen, 1923:348). Almost two weeks further up the river after MacGregor made the comment quoted above he remarked on the "basalt stones selected for the manufacture of stone adzes" on the Palmer River between the Donaldson and Black tributaries (1890e:59). Archbold and Rand (1940:49) observed at the Palmer River junction:

As these adzes have a very blunt bevel they make little more than a dent in a palm tree so that the trunks are badly bruised and battered before they are felled.

This was called "chew-em down long stone axe". This seems to indicate, that if necessary carpentry tools might be used to fell palm trees, in the same fashion suggested for SNG 4 and 5, SNG 7 and 8, and SNG 19. Champion (1932:63) notes simple adzes with a bluish-green, very hard, stone blade at the Tungom River, near Mt Blucher. North of Bolivip he recorded the gathering of pandanus fruit: "with a few deft strokes of a stone tomahawk [he] brought the large ball to the ground" (1932:186). A description of Telefomin material culture is given by Campbell (1938) in which he notes the use of stone adzes to clear trees, build houses, tree houses, and stockades, make the huge doorway slabs, and shields, and to carve arrows. The decoration on the shields, arrows, doorway slabs and of 'cigarette holders' is incised with the upper jaw of a cuscus (*Phalanger* spp.) (1938:250-3).

2. The Ok Sibil-Pesegem part of the area received attention earlier than the Upper Fly-Telefomin area, the first report being Haddon and Layard (1916:10-11). Evidently a number of different varieties of stone was in use for blades. Nouhuys (1913:19-20) identifies the stone used by the Pesegem as "*Epidot-Glaucophan-und ein Aktinolith-Gestein*" probably coming from the Cyclops Range between Humboldt and Tanamerah Bays. Brongersma and Vanema (1962:85) say the people of the Sibil obtain their

stone blades by trade from the north-west. According to Kooijman (1962: 36-7) the stone blades come from the Tabi River (which flows to the Baliem) and are passed by the Sibil to the Kiwirok. These flaked blades of the Sibil, partly ground only, are less finely finished than the blades in use in the Muju area on the west Digul River, south-east of the Sibil valley, although the stone is not very different. According to Kooijman, the stone derived from the Muju area via Ariem is "composed of nephrite, quartz and oligoclase" (1962:25n). This would make it considerably different from the less well finished although similarly shaped Sibil blades, the material of which according to Mitton (1972:8) "is a microdiorite which occurs in a dyke form on the southern fall of the range between Koruppun and the Eilanden River. The stones would probably be taken from the river beds rather than from a specific quarry." Mitton puts the distribution of these adzes between Angguruk and the Papua New Guinea border but although they appear to occur exclusively there, occasional specimens have been recorded as far away as Feramin, August River, and one from Wamena, Baliem River. This last could have reached Wamena after establishment of Government and Mission. Stone blades of the Sibil are called *tum*, the handle *tagol* (Kooijman, 1962:23n). Hinderling notes that the Pesegem, Goliath, Timorini and Alice River areas used adzes like these (1949:44, 75-6).

3. Craig gives the name *mok* to no. 792, and *mok fobi* to no. 795. This is the same name as given to the WI 1 implements he collected in the same area. Hinderling (1949:75-6 gives *ije* as the Pesegem name, *tak* as the Timorini one.

4. As noted these WI 2 implements are one of a series of very similar forms.

5. Miller (1950:168) reported that a chief of the Upper Digul area took his stone axe on a head-hunting trip, which suggests their occasional use as weapons.

6. No. 880 was "last used about 20 years ago" (PNGM register).

Statistics. All implements are included in the statistical descriptions and comparisons (tables A69 and A70). Two different implements affect the markedly skewed variables. V13 is skewed by no. 363, without which the range is 48.7 - 67.3 cm, and V15 is skewed by no. 1012, without which the range is 21.0 - 34.0 cm.

TABLE A69: Distribution of ratio scale features. Western Interior (WI2). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	20	112.85	41.70	53	202	0.802	-0.263
8	WIDTH OF BLADE - HAFT	20	47.55	5.24	37	55	-0.255	-0.750
9	THICKNESS OF BLADE	20	34.45	4.52	26	42	0.222	-0.780
10	WIDTH OF BLADE - EDGE	20	51.80	5.70	41	59	-0.445	-0.854
11	LENGTH - CUTTING EDGE	20	64.35	8.71	46	81	-0.423	0.421
12	ANGLE - CUTTING EDGE	20	62.00	5.78	52	75	0.342	-0.094
13	LENGTH OF HANDLE	20	583.35	86.32	487	850	1.424	2.786
14	SHAFT DIAMETER	19	23.74	3.65	18	30	0.209	-0.661
15	LENGTH OF FOOT	20	282.75	53.07	210	440	1.111	2.193
16	TOTAL LENGTH OF FOOT	20	395.60	62.82	292	536	0.038	-0.099
17	POINT OF BALANCE	20	111.40	32.63	66	190	0.458	-0.082
18	ANGLE - B/FOOT - SIDE	20	65.15	8.55	45	80	-0.621	0.345
19	ANGLE - B/HANDLE - BELOW	20	90.25	9.10	70	110	-0.023	0.872
20	WEIGHT	20	1028.50	322.44	553	1684	0.390	-0.661
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	20	81.05	7.23	70	94	0.115	-0.965

TABLE A70: Distribution of nominal scale features. W. Interior (WI2).

VARIABLE NUMBER	23	POLL OF BLADE	N=20		
CODE VALUE:	0	1	2		
FREQUENCY:	3	10	7		
PERCENTAGES:	15.0	50.0	35.0		
VARIABLE NUMBER	24	PLAN OF BLADE	N=20		
CODE VALUE:	1	2			
FREQUENCY:	8	12			
PERCENTAGES:	40.0	60.0			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=20		
CODE VALUE:	1				
FREQUENCY:	20				
PERCENTAGES:	100.0				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=20		
CODE VALUE:	1	2	3	4	5
FREQUENCY:	14	2	3	0	1
PERCENTAGES:	70.0	10.0	15.0	0.0	5.0
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=20		
CODE VALUE:	2	3			
FREQUENCY:	19	1			
PERCENTAGES:	95.0	5.0			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=20		
CODE VALUE:	1	2			
FREQUENCY:	2	18			
PERCENTAGES:	10.0	90.0			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=20		
CODE VALUE:	4	5	6	7	
FREQUENCY:	17	1	0	2	
PERCENTAGES:	85.0	5.0	0.0	10.0	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=20		
CODE VALUE:	0				
FREQUENCY:	20				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=20		
CODE VALUE:	1	2	3	4	
FREQUENCY:	9	0	1	10	
PERCENTAGES:	45.0	0.0	5.0	50.0	
VARIABLE NUMBER	32	USE-WEAR	N=20		
CODE VALUE:	1	2	3	4	
FREQUENCY:	3	12	0	5	
PERCENTAGES:	15.0	60.0	0.0	25.0	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=20		
CODE VALUE:	1	2			
FREQUENCY:	2	18			
PERCENTAGES:	10.0	90.0			

WESTERN INTERIOR 2

No.	Repository	Reg. No.	Locality	Date	Collector
31	QM	E2648	Awin tribe, 560 mup Fly River	1938	N.H. Brewster
154	UQM	8308	Fly & Alice Rivers	-	-
160	AIM	37802	Wamena, Baliem V.	-	J.A. Savage
363	CM	E164.1021	Telefomin	*1964	P. Temple
364	CM	E164.1022	Tifalmin	*1964	"
365	CM	E164.1023	Feramin	*1964	"
366	CM	E164.1020	Telefomin	*1964	"
516	SAM	A42785	August River	1951	J. Womersley
621	AM	E43440	-	1937	S.C. Campbell
742	AM	E64242	Antibi, Idam Valley	1968	B. Craig
745	AM	E64245	Esyu, Upper Sepik	1968	"
792	AM	E62800	Oksapmin	1967	"
795	AM	E61771	Telefomin area	1965	"
805	PNGM	E1247	Olsobip	1965	W. Dutton
874	PNGM	E2605	Balblediam, U. Sepik	1968	B. Craig
880	PNGM	E1065	Telefomin	*1964	B.A.L. Cranstone
1010	RM	8	Nipsan	*1971	R. Mitton
1011	RM	9	Ok Sibil	*1971	"
1012	RM	10	Naltja	*1971	"
1013	RM	11	"	*1971	"

WESTERN INTERIOR 3

Locality. Ok Tedi area, south of Awin tribe on Fly River.

Reference. Austen, 1923:344.

Style. While mentioning the name for stone axes on the Muiau River, Austen observed that an implement of a different make was used to chop sago pith. I do not know the strength of this observation for no description is given. It is possible that this is like SNG 12.

WESTERN INTERIOR 4

Locality. Keerom River, Irian Jaya.

References. Le Roux, 1948: Pl. XCIX, fig. I18; Hinderling, 1949:66-70.

Hafting features. Al, Bl, Cl, D12.

Handle. As WI 2.

Hafting. The blade is held by a band of split vine plait, above which is a long split vine whipping. The high heel has the usual ornamental lashing.

Blade. Judging by the figure, the blade is the same as the flaked sided ones of WI 2.

Function. Probably multi-purpose.

Manufacturing tradition. T1.

Comments. 1. Clearly a part of the same overall pattern of implements as WI 1-2, and WI 7-13, despite the plaited lashing which is unique.

2. Hinderling records adzes from the Keerom River, Arso, Sogber River, Krau and the Idenburg River which may be like these.

WESTERN INTERIOR 5

Locality. Bewani Mountains south side, Kanakenschreck at the headwaters of the Keerom River.

Reference. Schultze-Jena, 1914:37-8, 42, Pl. XXVII, fig. i.

Hafting features. A1, B1, C1?, D3.

Handle. Shortish, round shaft, medium heel, rounded, not pointed.

Hafting. Blade set against foot, held with long split vine whipping in plain pattern, end looped round the shaft. Not over the heel.

Blade. Oval sectioned, perhaps thicker than Sepik ones.

Function. Probably multi-purpose. Schultze-Jena (1914:42) records their use to fell palm trees.

Manufacturing tradition. T1.

Comments. 1. This must be one of the northernmost outposts of the Western Interior.

2. Schultze-Jena describes them thus (1914:38):

Statt des geschnitzten, durchbohrten Stieles mit der durchgesteckten Klingenklammer der Sko-Bewohner (siehe Taf. XXXVII, f) bedienen sie sich wie die Männer in der Ebene südlich des Bewani-Gebirges (siehe Art i) zur Schäftung eines natürlichen Zweigstückes, dessen stärkerer und kürzerer Ast zum Klingenträger, dessen schwächerer, spitzwinkelig abgehender, längerer Ast zum Stiel wird. "Gewachsener Knieschaft" wollen

wir diesen Typus im Gegensatz zum "durchsteckten Knieschaft" der Beile von Sko nennen. Der Stiel bleibt meist bis auf ein kurzes Endstücken berindet; der Klingensträger wird grob zugeschnitten und das freie Ende der Oberseite zu einem Lager für den Stein zugestutzt. Die Befestigung der Steinklinge an den Klingenträger erfolgt derart, dass sie von oben und von der Seite, zuweilen auch im Lager selbst, direkt oder auf der Unterlage elastischen Bastgewebes mit einer Scheide schwacher, längsgelegter Holz- oder Bambusleistchen umlegt wird. Diese Hilfstücken seien, da sie der nun folgenden Rotang-Wickelung zum Halt dienen, als "Wickelhalt" bezeichnet; um ihn und den Klingenträger schlingt sich nun in engen Spiralen, die entweder gleichsinnig verlaufen oder über Kreuz geschlungen sind, straff ein fortlaufender Rotang-Streif, am Knie-Ende des Stiels selbst noch ein Stück herabreichend, wie an den Krissi- und Sekofro-Beilen.

WESTERN INTERIOR 6

Locality. As WI 5.

References. Schultze-Jena, 1914: Pl. XXXVII, fig. a; Hinderling, 1949:174.

Hafting features. Not within the present system.

Handle. Straight stick.

Hafting. 'Separate socket' held to the proximal end of the handle by a twisted ring of split cane. Blade-'separate socket' lashing a long split vine whipping. Tension string required.

Blade. Apparently has two stone blades.

Function. Sago pith chopper (cf. SNG 12).

Manufacturing tradition. A local variation of T2?

Comments. 1. This implement is clearly related both the the *oto* of Kiwai Island and areas east of this in the Papuan Gulf, as far as Redscar Bay, and also to the implements from the Meervlakte (NIJ 6). It appears to be made in the same way by twisting the lashing and holding the two pieces steady by a tensioned cord as Landtman describes for SNG 12. However, the presence of the stone blades suggests some link with the Sepik area.

2. Schultze-Jena's description of this implement collected at Kanakenschreck is (1914:42):

Der einzige Sago-Klopfer (siehe Taf. XXXVII, a), der gegen Stahlklingen einzutauschen war, weicht von den früher beschriebenen Küstenformen wie von denen des Sepik-Gebietes wesentlich darin ab, dass kein einheitlicher Stumpfbolzen, sondern zwei steinerne Schneiden das Mark zerreißen. Die beiden kleinen Klingen von 3 und 3½ cm Breite stehen, durch einen Keil getrennt, wie Ober- und Unterlippe übereinander. Sie ruhen gemeinsam in einer zweischenkeligen Holzklammer, deren klaffende Seitenspalten im Klingenbereich durch je eine Bambussplisse und Baststreifen geschlossen sind. Eine fortlaufende Rotang-Spirale umschnürt das Ganze. Die lange Klingenklammer ist in einen tiefen Längsspalt des oberen Stielendes geklemmt und mittels eines Hilfschölzchens durch einen Rotang-Ring in ihrer annähernd rechtwinkeligen Lage gegen den Stiel fixiert. Unteres Stielende und Klingenteil der Klammer sind, wie wir es vom Beile der Sko-Leute kennen, durch eine straffe Rotang-Schnur verbunden.

3. Hinderling gives this as his type 1d sago pith chopper. He appears to be doubtful of the identity of this implement. Further confirmation is required.

WESTERN INTERIOR 7

Locality. Sepik Hill people, October River.

Number. 1.

Collector. Dr Ackerman.

Date. -

References. Schultze-Jena, 1914: Pl. XXXVII, fig. k; Hinderling, 1949:66; Townsend, 1969.

Figure. Plate A22, figs. E and F.

Hafting features. A1, B2, C10, D3.

Handle. As WI 1, but may have slightly thicker foot.

Hafting. As WI 1 but instead of a bark facing piece the covering becomes solid wood.

Blade. A similar spotty rock to those in WI 1 and CI 13.

Function. "It is used for cutting house timbers, felling large trees for the manufacture of shields and canoes, and for clearing land for houses and gardens" (Townsend, 1969:200).

Manufacturing tradition. A local variant of T1.

Comments. The Heve call the blade hoe. Townsend describes

experiments to determine the relative efficiency of stone and steel among the Heve and comes to the conclusion that use of steel tools results in a time saving of 7% in building a house, and a general ratio of over 4:1 in favour of steel for clearing land, which compares very well with the figure derived by Salisbury for the Eastern Highlands (Townsend, 1969: 204). When cutting down trees the Heve hold their adzes with both hands close together, the left forward of the right, and chop overhead to make a scarf almost above head height. The method may range "from a precise well-organised style to a brutal sloppy one. In spite of individual differences the results of each man's performance are quite consistent with the results of the whole experiment" (Townsend, 1969:203).

Statistics. Too few implements.

WESTERN INTERIOR 7

No.	Repository	Reg. No.	Locality	Date	Collector
155	UQM	4744	Sepik	-	Dr Ackerman

WESTERN INTERIOR 8

Locality. Sepik Hill tribes, October River area, Green River area.

Number. 2.

Collectors. P. Temple, Miles and Cameron.

Dates. 1963 - 1965.

References. Schultze-Jena, 1914: Pl. XXXVII, fig. m; Townsend, 1969.

Figure. Plate A22, figs. G and H, (no. 371).

Hafting features. A1, B2, C10, D3.

Handle. As WI 7.

Hafting. As WI 7, although the separateness of the toe and heel lashings is perhaps more evident.

Blades. Bullet-shaped blades like those found in SEP 9.

Function. Sago felling.

Manufacturing tradition. A local variant of T1.

Comments. The Heve implements are described by Townsend (1969:201):

The *ipe* is a cylindrical ground tool of diorite with a blunt point. It is about seven inches long, weighs about sixteen ounces, and is symmetrical about all three planes. This tool is used to cut down the sago palm, which varies in diameter from 18 to 26 inches and has a tough rubbery bark about one inch thick with soft fibrous pulp inside. The *ipe* is about as efficient as a steel axe for this purpose, and both tools were observed being used alternately to fell the same log in 1967.

Statistics. Too few implements.

WESTERN INTERIOR 8

No.	Repository	Reg. No.	Locality	Date	Collector
371	CM	E163.1114	Green River	*1963	P. Temple
590	AM	E62117	" "	*1965	D. Miles, M. Cameron

WESTERN INTERIOR 9

Locality. Sepik Hills area.

References. Hinderling, 1949:174; Townsend, 1969:199-201.

Hafting features. A1, B2, C10, D3.

Handle. As WI 7.

Hafting. As WI 7.

Blade. A flaked core with a flat base, tapering to a narrow butt.

Function. Sago pith chopping.

Manufacturing tradition. A local variant of T1.

Comments. 1. Townsend comments (1969:201):

The *fiase* is an angular, crudely flaked basalt hammer about four inches in length and two and one-half inches in diameter at the large end. The small end tapers to a point. This tool is used to pulverise the pith of the sago palm. The Heve have no substitute for the *fiase*, although more acculturated peoples use an iron pipe in place of the stone tool.

2. Hinderling gives this as his type 1c sago pith chopper.

WESTERN INTERIOR 10

Locality. Bibium, August River, Buna.

Number. 3.

Collector. B. & B. Craig.

Date. *1968.

References.

Figure. Plate A23, figs. A and B, (no. 744).

Hafting features. A1, B2, C10, D3.

Handle. As WI 7.

Hafting. As WI 7. No. 818 lacks the heel lashing, and the cover is reduced to a facing piece of bark or soft wood.

Blade. Demonstration specimens made from roughly flaked river pebbles, sharpened with a hand-held grindstone, and looking more like edge-ground ?Acheulian hand axes than like other blades in the upper Sepik area. Craig made a comprehensive series of colour and black and white photographs of the process in 1968 (in the Australian Museum).

Function. The hafting angles are 0°, 30°, and 95°. I am not sure whether this represents the traditional situation or not, but the implements have an unusually clumsy appearance. Function, therefore, unclear.

Manufacturing tradition. A local variation of T1.

Comments. 1. No. 818 from Bune has the name *eiyei* given it.

2. Bibium is a village of the Yimnai people belonging to the Abau language group. Other people belonging to this same group use adzes of WI 2 form (e.g. no. 745, Euyu village).

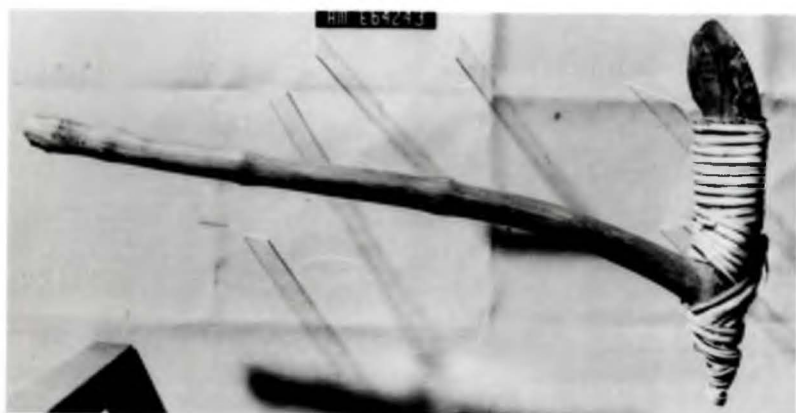
Statistics. Too few implements.

WESTERN INTERIOR 10

No.	Repository	Reg. No.	Locality	Date	Collector
743	AM	E64247	Bibium, August R.	*1968	B. Craig
744	AM	E64243	" "	*1968	"
818	PNGM	E2591	Buna, upper Sepik	*1968	B. Craig

PLATE A23.

- A and B. WI 10, 744, AM E64243, Yimnai people, Bibium,
August R.
- C and D. WI 11, 161, AIM 37803.1, Wamena, Baliem Valley.
- E and F. WI 13, 158, AIM 36851, Dani people, Baliem
Valley.
- G and H. WI 14, 157, AIM 36850, Dani people, Baliem
Valley.



A



B



C



D



E



F



G



H

WESTERN INTERIOR 11

Locality. Southern part of the Grand Valley of the Baliem, the Baliem Gorge.

Number. 7.

Collectors. J.A. Savage, R. Mitton.

Dates. 1962, 1971.

References. Le Roux, 1948: Pl. XCIX, fig. 13; Hinderling, 1949:73-75; Heider, 1970:277.

Figure. Plate A23, figs. C and D, (no. 161).

Hafting features. A1, B1, C1, D3.

Handle. Long shaft, may curve up to heel, heel short.

Hafting. Blade wrapped in or faced with banana trunk tissue (Heider, 1970:277) and lashed as WI 2.

Blade. Five of these blades are of a greenish metamorphic rock probably from the Jelime quarry (see WI 12), but two, having the same shape, are of a grey rock, perhaps like that in the Sibil blades of WI 2.

Function. All but the roughest tasks which were undertaken with the aid of axes — WI 14. See WI 12 comments.

Manufacturing tradition. T1.

Comments. 1. "In the southern Grand Valley there is rarely any butt [heel] behind the joining of the handle to the cross-piece" (Heider, 1970: 277). The short heel appears from these specimens to be a feature of the Dani area south of Wamena.

2. WI 11, WI 12, and WI 13 are all variants of implements used by people generally called Dani. These people used an axe form, WI 14, which appears to have the same eastwards distribution.

Statistics. All implements are included in the statistical descriptions (tables A71 and A72). Three of the variables with markedly non-normal distributions may be divided by separating out nos. 1003, 1007 and 1009. These have the following portions of the platykurtic ranges of: V8, 4.2-4.6, V10, 4.5-4.6, and V14, 2.1-2.4. This may be seen as separating the Baliem Gorge from the others on the present scanty evidence. V13 is affected by no. 1007 for without this the range is

TABLE A71: Distribution of ratio scale features. Western Interior (W111). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	7	91.43	52.02	37	164	0.354	-0.968
8	WIDTH OF BLADE - HAFT	7	58.00	14.82	42	79	0.302	-1.004
9	THICKNESS OF BLADE	7	28.00	8.33	19	41	0.451	-0.710
10	WIDTH OF BLADE - EDGE	7	55.57	10.98	45	71	0.296	-1.197
11	LENGTH - CUTTING EDGE	7	60.14	11.81	47	78	0.490	-0.778
12	ANGLE - CUTTING EDGE	7	60.14	6.99	50	70	-0.115	-0.680
13	LENGTH OF HANDLE	7	488.43	32.07	419	520	-1.814	2.757
14	SHAFT DIAMETER	7	28.29	5.77	21	35	-0.245	-1.306
15	LENGTH OF FOOT	7	261.57	21.52	227	283	-0.839	-0.465
16	TOTAL LENGTH OF FOOT	7	377.71	89.70	263	534	0.580	0.113
17	POINT OF BALANCE	7	98.71	30.60	53	148	0.165	0.038
18	ANGLE - B/FOOT - SIDE	7	66.29	7.45	56	75	-0.250	-1.179
19	ANGLE - B/HANDLE - BELOW	7	89.57	6.16	80	100	0.151	0.591
20	WEIGHT	7	1259.00	871.61	488	2745	0.771	-0.300
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	7	92.29	4.19	88	100	1.096	0.342

TABLE A72: Distribution of nominal scale features. W. Interior (Will).

VARIABLE NUMBER	23	POLL OF BLADE	N=7		
CODE VALUE:	0	1	2	3	
FREQUENCY:	2	3	1	1	
PERCENTAGES:	28.6	42.9	14.3	14.3	
VARIABLE NUMBER	24	PLAN OF BLADE	N=7		
CODE VALUE:	1	2			
FREQUENCY:	3	4			
PERCENTAGES:	42.9	57.1			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=7		
CODE VALUE:	1	2			
FREQUENCY:	6	1			
PERCENTAGES:	85.7	14.3			
VARIABLE NUMBER	26	PROFILE OF BLADE	N=7		
CODE VALUE:	1	2	3	4	5
FREQUENCY:	5	0	1	0	1
PERCENTAGES	71.4	0.0	14.3	0.0	14.3
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=7		
CODE VALUE:	1	2	3		
FREQUENCY:	1	4	2		
PERCENTAGES:	14.3	57.1	28.6		
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=7		
CODE VALUE:	1	2			
FREQUENCY:	3	4			
PERCENTAGES:	42.9	57.1			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=7		
CODE VALUE:	2	3	4		
FREQUENCY:	5	0	2		
PERCENTAGES:	71.4	0.0	28.6		
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=7		
CODE VALUE:	0				
FREQUENCY:	7				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=7		
CODE VALUE:	4				
FREQUENCY:	7				
PERCENTAGES:	100.0				
VARIABLE NUMBER	32	USE-WEAR	N=7		
CODE VALUE:	1	2	3	4	
FREQUENCY:	2	2	0	3	
PERCENTAGES:	28.6	28.6	0.0	42.9	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=7		
CODE VALUE:	2				
FREQUENCY:	7				
PERCENTAGES:	100.0				

49 - 52 cm, and V34 by no. 164 for without this the range is 88 - 96. V18 appears to divide 56° - 60°/70° - 75°, but this does not separate the same groups as do V8, V10 and V14.

WESTERN INTERIOR 11

No.	Repository	Reg. No.	Locality	Date	Collector
161	AIM	37803.1	Wamena, Baliem Valley	1962	J.A. Savage
162	AIM	37803.2	" " "	1962	"
164	AIM	37801	" " "	1962	"
1003	RM	1	Tangma, Baliem Gorge	*1971	R. Mitton
1007	RM	5	Pangema, Yali tribe	*1971	"
1008	RM	6	Mugui R. Baliem Valley	*1971	"
1009	RM	7	Tangma, Baliem Gorge	*1971	"

WESTERN INTERIOR 12

Locality. Central Grand Valley, and Western Dani (Heider, 1970:277), Dem peoples on the north.

Number. 3.

Collector. R. Mitton.

Date. *1971.

References. Brass, 1941:564; Le Roux, 1948: Pl. XCIX, fig. I2; Hinderling, 1949:73-75; Matthiesson, 1962, 127-8, 169, 175; O'Brien, 1966; Harrer, 1964:155-6; Heider, 1970:272-8; Mitton, 1972.

Figure. Not figured.

Hafting features. A1, B1, C1, D3.

Handle. As WI 11 but with much higher heel.

Hafting. As WI 11.

Blade. One of these blades is of a spotty rock, perhaps Jelime rock. The other two are of the black Tagi rock (see below).

Function. For all purposes except splitting wood which is done with an axe - WI 14.

Manufacturing tradition. T1.

Comments. 1. Harrer visited the Jelime quarry in 1962. The stone is

broken from the cliff where it edges the river bed by the use of heat and cold water (Harrer, 1964:155-6).

2. Heider (1970:273-6) comments on Dani adzes:

The general Dani term for adze stone, as well as the implement itself, is *jaka*. There are two major types of stone, *jaka gu* and *ebe jaka*. The *gu* is a dull black stone too soft to hold a good edge for long, and is described as *aik dlek* (*aik*, tooth; *dlek*, none). *Ebe jaka* is a term used for several kinds of stone, considerably harder than *gu* and appearing in a variety of colours: green, blue, mottled, streaked and plain ...

The stones are basically oval in cross-section, with a few samples squaring off to a near-rectangular cross-section. In outline they are generally elliptical, but the broader end, with the cutting edge may be nearly straight. Variations in shape are not considered significant to the Dani. They do distinguish between the *jaka* proper and the lighter, smaller stones which are called *huonge* and are used for such delicate tasks as finishing spears. The haft of a *huonge* may in fact be larger than that of the regular *jaka*.

3. According to Mitton (1972:6) the harder Jelime stones have been identified in hand specimen as "transitional from peridotite to serpentinite; other specimens are predominantly epidote and chlorite. A minority of blades are glaucophane schist." The:

softer black stone originates from a site in the Tagi area (between Pyramid and Kelila). The stone is an indurated mudstone (argillite) from the Kembelangan formation. Normally the mudstone of this formation is fissile and readily breaks down into the loose shaly rock which is very predominant in the Karabaga-Kelila area. However, there are pockets of the formation in which the fissile quality is lost where the rock is slightly calcareous (Visser and Hermes, 1962).

Mitton has seen specimens of both these stones in use among the Asmat of the south coast, as far east as Naltja, where they were in use as 'spirit stones'. Mitton suggests that they may spread as far west as Lake Paniai (Mitton, 1972:8). However, Le Roux (1948: Map III) reports the existence of another quarry west of the lakes. The Ekagi peoples of the Wissel Lakes area, moreover, used different stone bladed percussive cutting implements, WI 16 and WI 17, so that Mitton's suggestion must be regarded as unverified.

4. No. 1004 was purchased from Koboreak, no. 1005 from Pogorinki.

Statistics. Too few implements.

WESTERN INTERIOR 12

No.	Repository	Reg. No.	Locality	Date	Collector
1004	RM	2	Wumbararo, Grand Valley	*1971	R. Mitton
1005	RM	3	Pogorinki, " "	*1971	"
1006	RM	4	Wubarainma, Grand Valley	*1971	"

WESTERN INTERIOR 13

Locality. Western Dani, Central Grand Valley (Heider, 1970:277), Dem people of the Swart and Panara Valleys (Wirz, 1924:108).

Number. 3.

Collectors. Various.

Dates. 1962, 1971.

References. Heider, 1970; Wirz, 1924:107-8, Pl. II.

Figure. Plate A23, figs. E and F, (no. 158).

Hafting features. A1, B1, C1, D24.

Handle. As WI 12.

Hafting. As WI 12 except that in two cases the whole of the binding is of round braided cords, while in no. 1014 the toe binding is split vine whipping, the upper part only being of braided fibre cord.

Blades. The three blades are all of the Jelime stone, one green, one mottled and one grey.

Function. As WI 11 and WI 12.

Manufacturing tradition. T1.

Comments. Wirz (1924: Pl. II, fig. 8 caption) gives the names of the implements from the areas he reports on as *yara* = axe; *yao* = blade; *mōn* = split vine; and *kele* = plaited cord.

Statistics. Too few implements.

WESTERN INTERIOR 13

No.	Repository	Reg. No.	Locality	Date	Collector
158	AIM	36851	Dani people	1962	R. Bond
312	OM	D65.443	?Vogelkop?	1960	Neville-Burgin
1014	RM	12	Dani people	*1971	R. Mitton

WESTERN INTERIOR 14

Locality. Upper Utaqua (Tapiro), Dani areas, and Dem peoples on rivers flowing east and north from Carstensz.

Number. 8.

Collectors. R. Mitton and others.

Dates. 1962 - 1971.

References. As for WI 11 - WI 13; plus Haddon and Layard, 1916:10-11, Pl. 2, fig. 26; Le Roux, 1948: Pl. XCIX, fig. 11, Pl. CI, figs. 1 - 6, Pl. CII, figs. 4 - 6, Pl. CIII, figs. 1 and 2; Hinderling, 1949:67, 72, 73-5.

Figure. Plate A23, figs. G and H, (no. 157).

Hafting features. A2, B1, C7, D34.

Handle. Straight shaft tapering from a point to the deepest part immediately before the blade and thinning laterally to a blunt point at the proximal end. In contrast to most straight handles the shaft is progressively flattened from the tip, the proximal end may turn up.

Hafting. The blade is set in a hole in the shaft and held there, either by pressure or with the aid of gum resin (*Araucaria* pitch, Heider, 1970:277). The hole is made with a chisel set in a straight curved stick (WI 15).

Blade. Six of the eight blades are made of the black Tagi stone, the other two of the green Jelime stone. They appear to be slightly larger than those hafted in the adzes.

Function. Apparently used only for splitting wood (Brass, 1941:564; Heider, 1970:278).

Manufacturing tradition. T3.

TABLE A73: Distribution of ratio scale features. Western Interior (WI14). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	8	125.87	22.64	75	149	-1.630	2.390
8	WIDTH OF BLADE - HAFT	8	61.25	8.53	47	71	-0.455	-0.645
9	THICKNESS OF BLADE	8	35.50	4.57	29	42	-0.189	-0.815
10	WIDTH OF BLADE - EDGE	8	63.00	10.24	52	82	0.728	0.048
11	LENGTH - CUTTING EDGE	8	72.13	12.41	61	93	1.026	-0.290
12	ANGLE - CUTTING EDGE	8	69.88	9.14	48	75	-2.166	3.639
13	LENGTH OF HANDLE	8	701.00	47.21	643	780	0.249	-0.458
14	SHAFT DIAMETER	6	43.50	10.60	30	60	0.408	-0.058
15	LENGTH OF FOOT	8	106.12	26.63	80	152	0.734	-0.519
16	TOTAL LENGTH OF FOOT	8	237.62	41.49	155	282	-0.911	0.701
17	POINT OF BALANCE	7	40.29	14.14	18	65	0.275	0.891
18	ANGLE - B/FOOT - SIDE	8	70.88	7.95	55	80	-1.018	0.678
19	ANGLE - B/HANDLE - BELOW	8	5.00	7.56	0	20	1.158	0.369
20	WEIGHT	8	1866.12	490.10	1139	2431	-0.352	-1.122
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	8	87.63	6.82	79	100	0.478	0.037

TABLE A74: Distribution of nominal scale features. W. Interior (W114).

VARIABLE NUMBER	23	POLL OF BLADE					N=8
CODE VALUE:	0	1	2	3	4		
FREQUENCY:	1	3	0	2	2		
PERCENTAGES:	12.5	37.5	0.0	25.0	25.0		
VARIABLE NUMBER	24	PLAN OF BLADE					N=8
CODE VALUE:	1	2					
FREQUENCY:	4	4					
PERCENTAGES:	50.0	50.0					
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE					N=8
CODE VALUE:	1						
FREQUENCY:	8						
PERCENTAGES:	100.0						
VARIABLE NUMBER	26	PROFILE OF BLADE					N=8
CODE VALUE:	1	2	3	4			
FREQUENCY:	5	0	2	1			
PERCENTAGES:	62.5	0.0	25.0	12.5			
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE					N=8
CODE VALUE:	1	2	3				
FREQUENCY:	2	2	4				
PERCENTAGES:	25.0	25.0	50.0				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW					N=8
CODE VALUE:	1	2	3				
FREQUENCY:	6	0	2				
PERCENTAGES:	75.0	0.0	25.0				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT					N=8
CODE VALUE:	2	3	4				
FREQUENCY:	5	1	2				
PERCENTAGES:	62.5	12.5	25.0				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE					N=8
CODE VALUE:	0						
FREQUENCY:	8						
PERCENTAGES:	100.0						
VARIABLE NUMBER	31	FINISH ON BLADE					N=8
CODE VALUE:	2	3	4				
FREQUENCY:	1	0	7				
PERCENTAGES:	12.5	0.0	87.5				
VARIABLE NUMBER	32	USE-WEAR					N=8
CODE VALUE:	1	2	3	4	5		
FREQUENCY:	2	5	0	0	1		
PERCENTAGES:	25.0	62.5	0.0	0.0	12.5		
VARIABLE NUMBER	33	MATERIAL OF BLADE					N=8
CODE VALUE:	2						
FREQUENCY:	8						
PERCENTAGES:	100.0						

Comments. 1. Haddon and Layard comment upon the percussive cutting implements of the Uta kwa and Tapiro mountain people whom they met and seemingly imply that by contrast with the Pesegem, these groups had no adzes, just the axes, one of which they picture. They comment:

Axes occur only among the Tapiro and Uta kwa; among the Pesegem they are replaced by adzes with a shoulder similar to those in other parts of New Guinea ...

The handle of the Uta kwa axe is of wood, oval in section, with a broad laterally flattened head which inclines slightly backwards, and a tapering shaft. The hole for the blade is wedge-shaped and completely pierces the head. It is bored about 12 cm from the end of the head, which tapers to a blunt point.

The stone head is wedge-shaped, with approximately straight sides, and thin. It is highly polished, with frequent flaws. Although the hole pierces the shaft the blade does not project behind. Mr. R.H. Rastall has been kind enough to identify the stone used as a metamorphosed sediment, consisting of chlorite, epidote, actinolite, etc. ... (1916:10-11).

These must rank among the first such implements collected.

2. Wirz gives the names for the Swart and Pundaru Valleys (Dem people) as *jao*, the blade as *yao*, and calls them *Wiebersteinbeil* (1924: Pl. II, caption to fig. 7), a division repeated by Le Roux who distinguishes them according to size into men's, women's and children's axes. However, Heider (1970:268) specifically says that both axes and adzes among the Dani were used almost exclusively by men (because women have lost too many fingers, as signs of mourning, to be able to manipulate the tools well). The name among the Dani of the Dugum area is *jakabiliga* (Heider, 1970:272). Mitton recorded the names *jabilik*, and *jagawilik*, which are very similar, if not the same (RM Coll. notes). Le Roux gives the name *kiwi je bolawe* to the ones he describes for the Dem people at Nogolo on the upper reaches of the Rauffaer River.

3. No. 1015 was purchased from Karoba, no. 1017 from Otmi.

4. Hinderling extends the localities to Carstensch, Narfan, Swart Valley, Nassau Range, and possibly the upper Keerom River. Not enough detail is given to make all these identifications certain.

Statistics. All implements are included in the statistical descriptions (tables A73 and A74). The skewed distributions are caused by no. 495 for V7 (range otherwise 12.0 - 14.9 cm), by no. 163 for V12 (range otherwise 70° - 75°), and by no. 642 for V18 (range otherwise 65° - 80°) and V19 (range otherwise 0° - 10°). The weights divide into a

heavier group collected by R. Mitton (nos. 1015 - 1018) weighing 2209 - 2431 gm and a lighter group weighing 1139 - 1811 gm.

WESTERN INTERIOR 14

No.	Repository	Reg. No.	Locality	Date	Collector
157	AIM	36850	Dani people	1962	R. Bond
163	AIM	37808	-	1962	J.A. Savage
642	AM	E58680	Baliem Valley	1956	D. McMichael
945	IA	M TA145	Tiom, Baliem Valley	1959	Mrs Draper
1015	RM	14	Sagtnokma (nr Diwika)	*1971	R. Mitton
1016	RM	15	Wubarainma	*1971	"
1017	RM	16	Tsaima, Grand Valley	*1971	"
1018	RM	17	Kelila	*1971	"

WESTERN INTERIOR 15

Locality. Dani speaking areas, specifically Dugum Dani but also Swart Valley.

References. Hinderling, 1949:74; Heider, 1970:277, diagram 9.6.

Hafting features. Not within the present system.

Handle. A small straight or curved piece of wood in which the blade is set at the end.

Hafting. The blade appears to be set on a step or within prongs, and is held by a strip whipping.

Blade. The blade appears to be a very small ground blade, of the size called *huonge*, which may be as short as five centimetres.

Function. To carve the holes in the axe handles of WI 14, or to carve spears in which case it is hafted as an adze (Heider, 1970:277).

Manufacturing tradition. Not within the percussive cutting implements if hafted as a chisel, but T1 if hafted as an adze.

Comments. Compare especially RH 9, also MAS 9 and MAS 14.

WESTERN INTERIOR 16

Locality. Wissel Lakes Basin (Ekagi people).

References. Le Roux, 1948: Pl. CI, fig. 7; Hinderling, 1949:76.

Hafting features. A2, B1, C7, D32.

Handle. Long straight handle, round section, tapers evenly to proximal end. Unlike WI 14 in that the proximal end is not thinned laterally, and the proximal end turns down, rather than remaining straight or turning up as in the Dani area axes (WI 19).

Hafting. Blade set in hole. May be held by gum.

Blade. Oval sectioned, tapering blade. May be of a local stone (Le Roux' map III shows a quarry between the Mapia and Titinima Rivers).

Function. Not stated.

Manufacturing tradition. T3.

Comments. The people in this area appear to have only this T3 and a T4 implement (WI 17). The T1 adzes (WI 11-13) appear to be used in areas draining east and north of Carstensz, not in the areas draining west.

WESTERN INTERIOR 17

Locality. Wissel Lakes (Ekagi people).

References. Le Roux, 1948: Pl. C, figs. II 11, and II 12; Pospisil, 1963:17.

Hafting features. A2, B3, C18?, D32 or D33.

Handle. Of the two figured, one has a straight handle, while the handle of the other is quite bent.

Hafting. The blade is held in a two-piece separate socket by three rings of twisted split cane, set immediately below the hole in the handle, and thus rather far up to act as a method of holding the blade.

Blade. Oval in cross-section and tapering in plan.

Function. For cutting down trees and making planks and canoes the natives use petaloid-shaped stone axes, which are oval in cross-

section. They are inserted into a perforated hardwood handle and held in position with a rattan lashing (Pospisil, 1963:17).

Manufacturing tradition. T4.

Comments. In the area close to the Wissel Lakes these implements only may be in use. However, Hinderling does not distinguish the form.

WESTERN INTERIOR 18

Locality. Border Mountains-Fongwinam Village, Yuri census district, ?Keerom River.

Number. 1.

Collector. B. Craig.

Dates. 1968.

Reference. Hinderling, 1949:67.

Figure. Not figured, but cf. Plate A24, figs. A and B.

Hafting features. A1, B1, C2, D14.

Handle. Long round shaft, foot cut from a whole sapling and thus has a round flat, circular heel, and long round toe.

Hafting. Blade set in a slight hollow or groove on the toe and held by a band of fine split vine plait.

Blade. Oval sectioned, uneven blade of a black, veined stone.

Function. Probably general purpose.

Manufacturing tradition. T1.

Comments. 1. One of three similarly hafted implement forms. WI 19 and WI 20 are probably the functional equivalents of WI 8 and WI 9 while WI 18 is the functional equivalent of WI 7.

2. Compare with WI 21, RH 12 and EI 1 and EI 2 all of which are very similar simple adzes. The similarity resides mainly in the form of the hafting.

3. Hinderling (1949: abb. 43) figures an implement very like these from Kineh on the Keerom River, but it has a more pointed heel and may perhaps belong to an as yet otherwise unattested population.

Statistics. Too few implements.

WESTERN INTERIOR 18

No.	Repository	Reg. No.	Locality	Date	Collector
739	AM	E64244	Fongwinam, Border Mtns	*1968	B. Craig

WESTERN INTERIOR 19

Locality. As WI 18?

Style. This implement has not been recorded, but as implements for chopping up sago pith have been collected in the area I predict that a special sago felling implement is required and have left a space for it. Compare the section on sago production in Chapter 25 where two aspects of sago technology are distinguished. The Border Mountains seem to be within the ambit of the more eastern aspect which is characterised by identifiably different sago pith choppers and sago palm fellers.

WESTERN INTERIOR 20

Locality. Yuri ≠ 1 village, Kambelap, Border Mountains.

Number. 2.

Collector. B. Craig.

Date. *1968.

References.

Figure. Plate A24, figs. A and B, (no. 740).

Hafting features. A1, B1, C2, D14.

Handle. As WI 13. No. 740 has a rough sort of excrescence in crest-like form on the front of the heel.

Hafting. As WI 18.

Blade. One is a split volcanic pebble, the other is what appears to be a piece of an exfoliated slab of 'diorite'. Both are glossy.

PLATE A24.

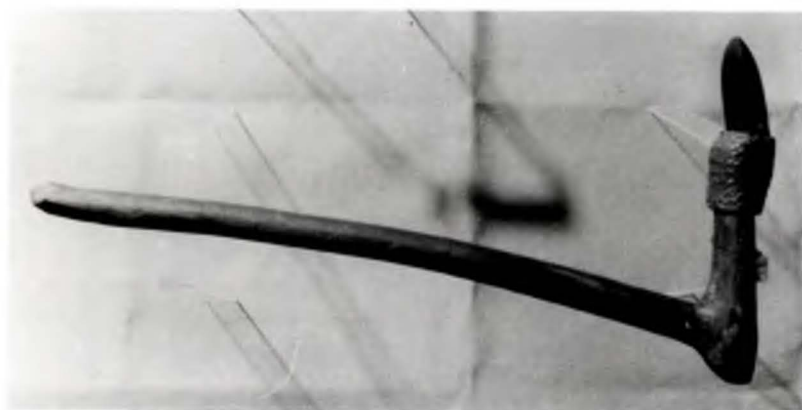
- A and B. WI 20, 740, AM E64246, Yuri ~~+~~ 1 village,
Border Mtns.
- C and D. WI 21, 664, AM E29, Fly River.
- E and F. SNG 1, 105, QM M4122, Mobiabi?
- G and H. SNG 2, 943, IA M TA32, 60 - 95m up Purari
River.



A



B



C



D



E



F



G



H

Function. Judging by the gloss, sago pith chopping.

Manufacturing tradition. T1.

Comments. 1. As comment 1 for WI 18.

2. These two populations (WI 18 and WI 20) are quite roughly made.

Statistics. Too few implements.

WESTERN INTERIOR 20

No.	Repository	Reg. No.	Locality	Date	Collector
740	AM	E64246	Yuri ≠ 1 village	*1968	B. Craig
741	AM	E64241	Kambelap	*1968	"

WESTERN INTERIOR 21

Locality. Nomad River area, east of Strickland River.

Number. 17.

Collectors. Royal Australasian Geographical Society's Expedition,
R.D. McKay.

Dates. *1885 - 1970.

References.

Figure. Plate A24, figs. C and D, (no. 664).

Hafting features. A1, B1, C2, D14.

Handle. Long, round sectioned shaft, heel short, rounded and tapered, toe thickish.

Hafting. The blade is set on a groove in the face of the toe, and held by one, or occasionally two overlapping, plait bands made with fine, split vine strips. In ten cases the back and sides of the toe are cut away to accommodate the lashing.

Blade. Nine of the blades have high rounded sections similar to those of the blades in WI 2 implements, three have more symmetrical high oval sections, and five have low oval sections, and may well be blades traded from WI 1 or CI 13 contexts. The blades, although shaped like those in WI 1 or WI 2 are usually smaller, perhaps suggesting an exchange

relationship like that between Enga and Huli (CI 9 and CI 12).

Function. Probably multi-purpose.

Manufacturing tradition. T1.

Comments. 1. The Strickland River seems to mark a cultural boundary (see Voorhoeve, forthcoming) for much of its length. Because of this, it is reasonable to suppose that imported stone may have come from the inland mountain areas, and might not have been traded across the stoneless Fly River basin.

2. McKay gives the native name of these implements as *hoi*.

Statistics. All implements are included in the statistical descriptions and comparisons (tables A75 and A76). V17 is skewed by no. 836, which has a very long blade (range otherwise 6.5 - 10.3) and V9 divides, with concentrations on 2.3 cm, 3.0 cm, and 3.4 - 3.5 cm thick. All but one of the oval sectioned blades (nos. 669, 831, 834, 838, and 842) fall between 2.0 and 2.6 but within this are included nos. 664 and 810 which have small asymmetrical high rounded (V29, attribute 4) sections. The sixth oval and the high rounded blades fall between 2.8 - 3.5 cm thick.

WESTERN INTERIOR 21

No.	Repository	Reg. No.	Locality	Date	Collector
664	AM	E29	Fly River (?Cecilia Junction)	*1885	R. Geog. Soc.
669	AM	E44041	Upper Fly River	1937	Fl. Lt. Stewart
810	PNGM	E2356.3	Muguru, Nomad River	*1967	R.D. McKay
831	PNGM	E1814	Honobi (Kubor clan)	*1966	"
832	PNGM	E1862.1	Gebusi clan	*1966	"
833	PNGM	E1851	Sugiabi-Supei	*1966	"
834	PNGM	E2535	Muguru	*1968	"
835	PNGM	E2356.4	"	*1967	"
836	PNGM	E2356.5	"	*1967	"
837	PNGM	E2356.6	"	*1967	"
838	PNGM	E2356.9	"	*1967	"
839	PNGM	E5802	Nomad River	*1970	Mr Sapper
840	PNGM	E5803	" "	*1970	"
841	PNGM	E5804	" "	*1970	"
842	PNGM	E5805	" "	*1970	"
881	PNGM	E2356.8	Muguru	*1967	R.D. McKay
968	IA	M TA223	Fly & Strickland R.	-	-

TABLE A75: Distribution of ratio scale features. Western Interior (WI21). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	17	83.82	36.46	30	175	0.997	0.809
8	WIDTH OF BLADE - HAFT	17	44.29	7.18	34	59	0.644	-0.207
9	THICKNESS OF BLADE	17	28.65	4.96	20	35	-0.132	-1.217
10	WIDTH OF BLADE - EDGE	17	47.35	9.45	30	64	-0.326	-0.308
11	LENGTH - CUTTING EDGE	17	62.47	13.33	40	92	0.340	-0.052
12	ANGLE - CUTTING EDGE	17	68.12	2.42	65	73	0.023	-0.692
13	LENGTH OF HANDLE	17	580.35	75.72	419	683	-0.553	-0.366
14	SHAFT DIAMETER	16	23.44	4.23	15	31	-0.157	-0.144
15	LENGTH OF FOOT	17	185.76	20.31	144	222	-0.299	-0.302
16	TOTAL LENGTH OF FOOT	17	269.59	45.96	192	384	0.556	0.821
17	POINT OF BALANCE	16	91.44	23.32	65	168	2.359	6.155
18	ANGLE -B/FOOT - SIDE	17	72.06	7.51	55	85	-0.409	0.028
19	ANGLE - B/HANDLE - BELOW	17	90.71	8.46	70	115	0.669	4.534
20	WEIGHT	17	730.24	263.82	292	1202	-0.026	-0.760
21	SPRT SOCKET LENGTH	0 N TOO SMALL; COUNT <=3						
22	SPRT SOCKET WIDTH	0 N TOO SMALL; COUNT <=3						
34	% 10 ON 11 WC/LC	17	76.82	12.12	55	98	-0.076	-0.543

TABLE A76: Distribution of nominal scale features. W. Interior (WI21).

VARIABLE NUMBER	23	POLL OF BLADE				N=17
CODE VALUE:	1	2				
FREQUENCY:	10	7				
PERCENTAGES:	58.8	41.2				
VARIABLE NUMBER	24	PLAN OF BLADE				N=17
CODE VALUE:	1	2				
FREQUENCY:	1	16				
PERCENTAGES:	5.9	94.1				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE				N=17
CODE VALUE:	1	2				
FREQUENCY:	16	1				
PERCENTAGES:	94.1	5.9				
VARIABLE NUMBER	26	PROFILE OF BLADE				N=17
CODE VALUE:	1	2	3	4	5	
FREQUENCY:	15	0	0	1	1	
PERCENTAGES:	88.2	0.0	0.0	5.9	5.9	
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE				N=17
CODE VALUE:	2	3				
FREQUENCY:	16	1				
PERCENTAGES:	94.1	5.9				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW				N=17
CODE VALUE:	1	2				
FREQUENCY:	5	12				
PERCENTAGES:	29.4	70.6				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT				N=17
CODE VALUE:	2	3	4			
FREQUENCY:	5	3	9			
PERCENTAGES:	29.4	17.6	52.9			
VARIABLE NUMBER	30	HAFT MOD. TO BLADE				N=17
CODE VALUE:	0					
FREQUENCY:	17					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE				N=17
CODE VALUE:	3	4				
FREQUENCY:	5	12				
PERCENTAGES:	29.4	70.6				
VARIABLE NUMBER	32	USE-WEAR				N=17
CODE VALUE:	1	2	3	4		
FREQUENCY:	7	4	2	4		
PERCENTAGES:	41.2	23.5	11.8	23.5		
VARIABLE NUMBER	33	MATERIAL OF BLADE				N=17
CODE VALUE:	1	2				
FREQUENCY:	11	6				
PERCENTAGES:	64.7	35.3				

WESTERN INTERIOR 22

Locality. Kiunga, mid-Fly.

Number. 1.

Collector. J. Finch.

Date. The SAM register reports that Finch was employed by the oil companies in the upper Fly area just before World War II.

Reference.

Figure. Not figured.

Hafting features. A1, B1, C1, D11.

Handle. Long shaft, round sectioned, medium to high heel, long flat toe.

Hafting. Blade held by an odd kind of plaited cover which is made from fairly coarse, split vine strips and which covers only the toe and heel.

Blade. The blade is a grey stone planilateral blade.

Function. Commercial, for sale to tourists?

Manufacturing tradition. T1.

Comments. This item is considered worthy of mention only because it has a blade made of stone from a Central Interior context.

Statistics. Too few implements.

WESTERN INTERIOR 22

No.	Repository	Reg. No.	Locality	Date	Collector
520	SAM	A56617	Kiunga	pre-1939	J. Finch

SOUTH NEW GUINEA 1

Locality. Lakekamu River, Mobiabi? (Moveave?).

Number. 1.

Collector. MacGregor.

Date. 1893.

Reference. MacGregor, 1894d:24-5.

Figure. Plate A24, figs. E and F.

Hafting features. A1, B3, C13, D13.

Handle. Short round shaft, no heel, long flat toe.

Hafting. Tapered two-piece separate socket. Blade-separate socket lashing three plait rings made from coarse split vine strips. Separate socket-handle lashing a wide plait band with some strips over the shaft top near the junction of shaft and foot.

Blade. A blunt edged piece of iron 6 mm thick, which is unusually thick for strip iron. Hafted at 20°.

Function. May have been collected with no. 74 which was clearly in use for felling sago palms (see EI 4).

Manufacturing tradition. T2.

Comments. 1. The first six miles up the Lakekamu River were occupied by Toaripi, thence the Mobiabi people occupied the east bank, the Toaripi the west, until around 12 miles when the Mobiabi people occupied both sides of the river. The EI 4 implement (no. 74) may have been traded down the Tauri River which joins the Lakekamu a little further up. The SNG 1 implement, because of its well worn iron blade, perhaps may best be considered to have originated from the coastal Toaripi people.

2. Occasional T2 implements are found in the eastern part of South New Guinea (SNG 2, 3, 10, and 11).

Statistics. Too few implements.

SOUTH NEW GUINEA 1

No.	Repository	Reg. No.	Locality	Date	Collector
105	QM	M4122	Mobiabi?	*1893	MacGregor (11614)

SOUTH NEW GUINEA 2

Locality. 60 - 95 miles up the Purari River.

Number. 1.

Collector. E.W. Zimmer.

Date. *1915.

References.

Figure. Plate A24, figs. G and H.

Hafting features. A1, B3, C22, D3.

Handle. Long thick shaft, very small heel, wide toe.

Hafting. Separate socket, short, thick (almost circular) section, blade held by semi-interwoven whipping. Separate socket held on to tapered hollow in foot by long strip whipping of split vine.

Blade. 2.5 cm thick, green stone, planilateral but not squared in cross-section, cutting edge asymmetrical in plan and in profile.

Function. Possibly specialised. Set as an adze.

Manufacturing tradition. T2.

Comments. The area of collection appears to indicate a Pawaia language area. These languages are part of the East New Guinea Highlands Phylum (Wurm, 1971:549-51) and this implement might be linked also to the Central Interior. However, although the blade has been traded from somewhere in this area (perhaps the Eastern Highlands) the separate socket is clearly a basically Papuan Gulf form.

Statistics. Too few implements.

SOUTH NEW GUINEA 2

No.	Repository	Reg. No.	Locality	Date	Collector
943	IA	M TA32	60 - 95 m up Purari	*1915	E.W. Zimmer P212

SOUTH NEW GUINEA 3

Locality. Koriki, Purari delta.

Number. 1.

Collector. MacGregor.

Date. *1894.

References. MacGregor, 1894h:26.

Figure. Plate A25, figs. A and B.

Hafting features. A1, B3, C22, D14.

Handle. Long round shaft which is quite thick, medium heel, wide toe.

Hafting. Separate socket neatly made, almost circular in section, trimmed down to blade so that the blade-socket join is a slope not an abrupt step. Blade held in by one ring of twisted split vine. Separate socket-handle lashing composed of two overlapping wide plait bands made of thin, split fibre strips, the outer one knotted to look like a trimmed mane. A lower ring of twisted fibre holds the toe to the separate socket.

Blade. Oval sectioned, slightly tapering blade with rounded poll. Hammer dressed and ground. Grey stone. Edge blunt but not glossy.

Function. The blunted edges suggest sago palm felling, but this may have been a post-metal use.

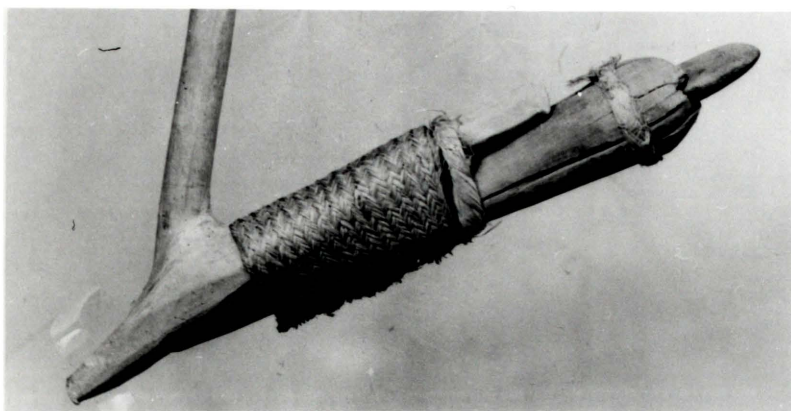
Manufacturing tradition. T2.

Comments. MacGregor (1894h:26) did not mention this form of hafting after his overnight at Koriki (4/2/1894) but this implement, and one other haft in the Queensland Museum were collected here (see also SNG 4).

Statistics. Too few implements.

PLATE A25.

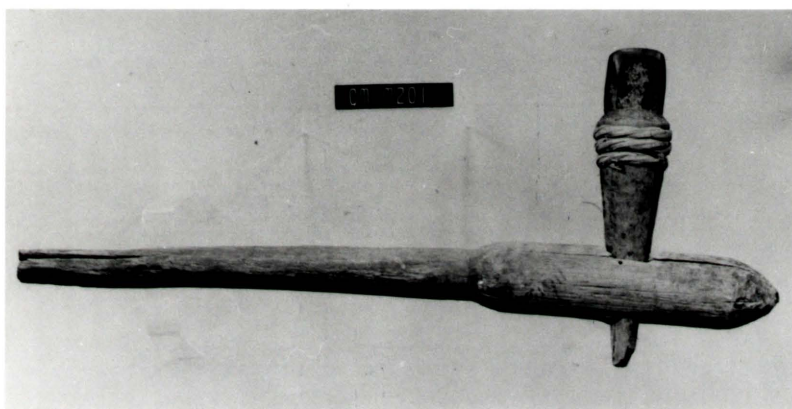
- A and B. SNG 3, 131, QM M4025, Koriki, Purari delta.
C and D. SNG 5, 148, QM M201, Hokeko, Vailala River.
E and F. SNG 8, 632, AM E26, Fly River.
G and H. SNG 10, 69, QM M4017, Vanu, Bamu River.



A



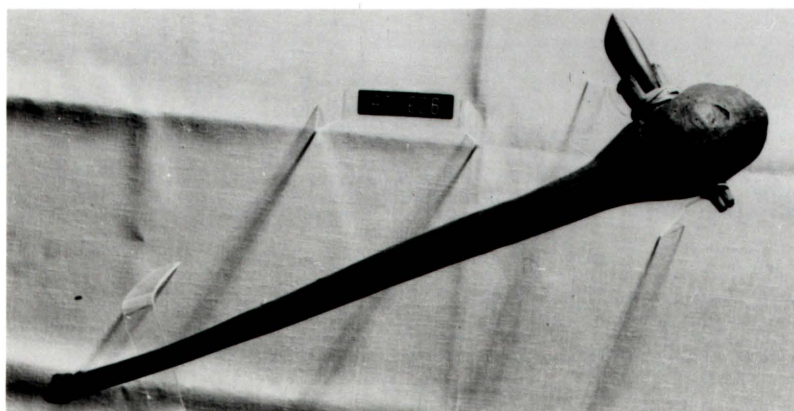
B



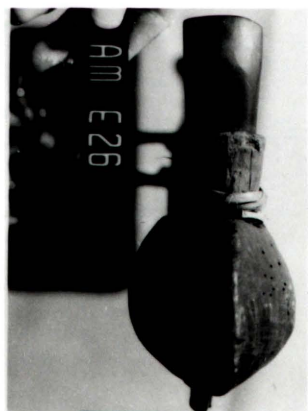
C



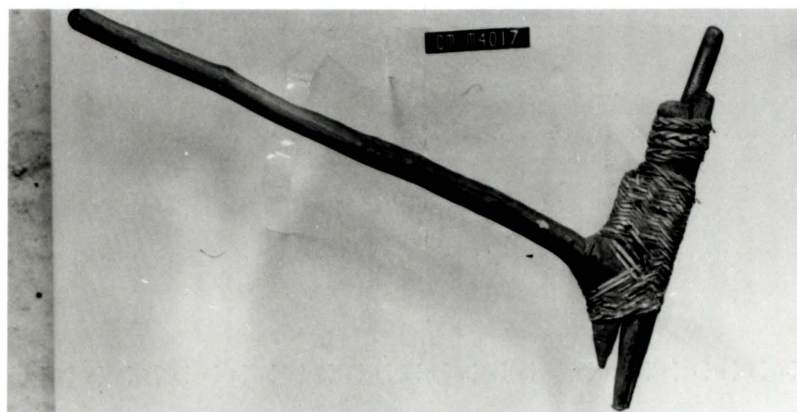
D



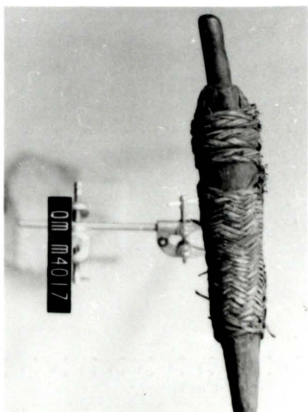
E



F



G



H

SOUTH NEW GUINEA 3

No.	Repository	Reg. No.	Locality	Date	Collector
131	QM	M4025	Koriki	*1894	MacGregor (11954)

SOUTH NEW GUINEA 4

Locality. Papuan Gulf from Vailala River to east bank of the lower Fly.

Number. 2.

Collector. MacGregor.

Dates. *1893, *1894.

References. MacGregor, 1894d:27-8, 1894h:22, 26; Edge Partington, 1890-98: Series II, Pl. 182, fig. 2, Series III, Pl. 86, fig. 3; Jukes, 1847:277, facing page 274; Williams, 1924:39; Lyons, 1926:347-52; Hinderling, 1949:46.

Figure. Not figured, see SNG 5.

Hafting features. A2, B3, C22, D32.

Handle. Long straight shaft, bulging at the head end into a larger but still circular sectioned head, which is rounded off at the proximal end. 'Head' and terminal may be marked by knobs or incised patterns.

Hafting. Blade is set in a separate socket which is almost circular in section and very smoothly finished. No. 921 has an incised oval design on the left side of the socket. The blade-socket lashings are two or three twisted rings. No method of fixing the socket into the hole in the shaft is needed.

Blade. One is like that of no. 131 (SNG 3) in shape but made of a schistose rock, the other is of a grey rock.

Function. Probably multi-purpose.

Manufacturing tradition. T4.

Comments. 1. SNG 4 and 5 are divided according to the sharpness of the cutting edges of their blades. This may in fact not truly represent the prehistoric situation and a division into woodworking and sago

felling implements may not be warranted, see Chapter 20.

2. Only the implements collected from Koriki have decorative features on the handles.

3. MacGregor first observed these T4 implements at Hokeko on the Vailala River. He described them thus (1894d:27):

The name of this bush tribe is Hakeko; ... They use stone adzes fitted into a piece of wood about six inches long, pointed, so that it enters at a right angle a strong, thick wooden handle, with a hole near its distal extremity to receive it ... They make some rude clay dishes.

Early in the next year MacGregor explored a distance up the Purari River, and recorded that near the Aure-Purari junction (1894h:22):

The Epai had come up the river to cut trees for canoes. They used the peculiar right-angled stone axe ... which was found in the possession of the inland tribe Hakeko on the Bailala River.

Towards the termination of this trip he spent a short time at Koriki, east of Maipua in the Purari delta. "They use a stone adze, the holder of which is fitted into a handle at right angles by means of a round hole in the handle" (1894h:26).

4. Williams (1924:39) discussing the *hiri* trade reports that Purari delta celts are mainly made with a minimum of grinding from waterworn pebbles obtained from "the creeks in the upper bush". Other blades brought by *lakatoi* in the *hiri* trade originated from points further east. He gives the name of the implement as *ukiravi*.

5. From somewhere east of the mouth of the Fly River, Jukes (1847:f. p.174) collected an implement belonging to this form of percussive cutting implement. This is figured in what appears to be an inaccurate sketch by Edge Partington.

6. This form of implement is found all over the Papuan Gulf from the Vailala to the east bank of the lower Fly River. Lyons (1926:347) describes the carpenters' adze of the Gogodara. He reports that the blade (as well as the implement) is called *bakeri* and is made of diorite, or quartz if small, and is cuneiform at one end and flat and tapering at the poll. The handle — *tiwi* — is a club-shaped piece of *gisiki* wood two to two and half feet long with a hole at one end and a knob at the other. The separate socket is five to eight inches long, made of *sereme* wood, slotted at one end for the blade and shaped to fit in the hole. The Gogodara planted trees for eventual use as canoes and each clan had its skilled canoe makers. In the old days these were hollowed out with the

bakeri and with a bone implement called *woigosa* (not described). Canoe paddles were made with the *bakeri* and with a bone chisel called *gosa*. The *gaimi* gouge made of cassowary bone, was "used extensively in carving and designing the prows of canoes, also for boring holes in wood".

Statistics. Too few implements.

SOUTH NEW GUINEA 4

No.	Repository	Reg. No.	Locality	Date	Collector
147	QM	M4082	Koriki	*1894	MacGregor (11953)
921	QM	M5961	"	*1894	" (11952)

SOUTH NEW GUINEA 5

Locality. Papuan Gulf from Vailala River to east bank of the lower Fly.

Number. 7.

Collectors. MacGregor, Hurley and McCulloch, McKay.

Dates. 1893 - 1968.

References. As SNG 4.

Figure. Plate A25, figs. C and D, (no. 148).

Hafting features. As SNG 4.

Handle. Those from the eastern localities have the long bullet-like proximal end of the handle, those from further west have a shorter, rounded proximal end, sometimes with a more marked break at the shaft-'head' junction.

Hafting. As SNG 4. One implement (no. 449) from close to the Fly River has a plait ring intermediate between four twisted rings. The separate sockets may be a little less finely finished and slightly less nearly circular in section towards the west.

Blades. One has a blunt iron bolt, the others are stone. All those from Hokeko have blades with parallel to slightly bulging sides and a rough oval cross section. They appear to have been obtained from nearby Kukukuku people and are identical to EI 4 blades. One of the others,

from Goaribari Island, has a large dark green flat sided and square cornered blade which is 2.9 cm thick. The others are oval sectioned, dark stones. All are quite blunt.

Function. Possibly sago felling exclusively, but likely to have been used for many ordinary tasks (cf. Chapter 20), especially where stone was scarce.

Manufacturing tradition. T4.

Comments. 1. As comment 1 for SNG 4.

2. As comments 3 to 6 for SNG 4. No names for palm felling implements have been recorded.

Statistics. All implements except no. 110 which has an iron blade, have been included in the statistical descriptions (tables A77 and A78). The case of V19, blade setting, is interesting. No. 637 is set at -20° , no. 449 at -10° , nos. 148, 889 and 922 at 0° and no. 640 at 130° . Apart from this the sample size seems to be affecting the distributions. V14 has two implements at 3.4, one at 3.5 and two at 3.8, while V18 has three from $80^{\circ} - 82^{\circ}$, and three from $85^{\circ} - 87^{\circ}$. Only no. 640 is in both smaller groups and only no. 637 is in both larger groups.

SOUTH NEW GUINEA 5

No.	Repository	Reg. No.	Locality	Date	Collector
110	QM	E1132	-	1920	C.F. Marks
148	QM	M201	Hokeko	*1893	MacGregor (11612)
449	NMV	X4037	Fly River	1887	-
637	AM	E6463	Hokeko	*1893	MacGregor (11611)
640	AM	E27630	Goaribari Is.	1923	Hurley & McCulloch
889	RDM		Bamu River	1968	R.D. McKay
922	QM	M5652	Hokeko	*1893	MacGregor (11610)

SOUTH NEW GUINEA 6

Locality. Larailarela village, and Goaribari Island.

Number. 2.

Collectors. Holmes, Hurley and McCulloch.

Dates. 1900, 1923.

TABLE A77: Distribution of ratio scale features. Papuan Gulf (SNG5). Descriptive statistics.
Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	6	94.83	40.96	44	145	-0.030	-0.821
8	WIDTH OF BLADE - HAFT	6	56.33	14.01	42	80	0.852	0.217
9	THICKNESS OF BLADE	6	28.83	6.88	22	39	0.546	-0.670
10	WIDTH OF BLADE - EDGE	6	65.00	24.49	44	101	0.717	-0.728
11	LENGTH - CUTTING EDGE	6	72.33	27.91	47	110	0.667	-0.898
12	ANGLE - CUTTING EDGE	6	69.83	4.26	65	75	-0.050	-0.876
13	LENGTH OF HANDLE	6	658.17	70.14	592	760	0.391	-0.865
14	SHAFT DIAMETER	5	35.80	2.05	34	38	0.353	-1.065
15	LENGTH OF FOOT	6	69.00	6.45	60	80	0.553	1.087
16	TOTAL LENGTH OF FOOT	6	326.33	64.90	248	410	-0.132	-0.794
17	POINT OF BALANCE	5	84.40	52.05	30	145	0.337	-0.939
18	ANGLE - B/FOOT - SIDE	6	83.17	2.93	80	87	0.035	-1.008
19	ANGLE - B/HANDLE - BELOW	6	16.67	56.10	-20	130	1.945	2.640
20	WEIGHT	6	1398.00	482.60	855	2037	0.395	-0.882
21	SPRT SOCKET LENGTH	6	231.50	29.10	201	275	0.482	-0.497
22	SPRT SOCKET WIDTH	6	68.33	13.31	57	91	1.062	0.160
34	% 10 ON 11 WC/LC	6	90.33	5.61	85	100	0.910	0.377

TABLE A78: Distribution of nominal scale features. Papuan Gulf (SNG5).

VARIABLE NUMBER	23	POLL OF BLADE	N=6		
CODE VALUE:	2				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	24	PLAN OF BLADE	N=6		
CODE VALUE:	1	2			
FREQUENCY:	3	3			
PERCENTAGES:	50.0	50.0			
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE	N=6		
CODE VALUE:	1				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	26	PROFILE OF BLADE	N=6		
CODE VALUE:	1				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE	N=6		
CODE VALUE:	2				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	28	CUTTING EDGE - BELOW	N=6		
CODE VALUE:	1				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT	N=6		
CODE VALUE:	2	3	4	5	
FREQUENCY:	4	0	1	1	
PERCENTAGES:	66.7	0.0	16.7	16.7	
VARIABLE NUMBER	30	HAFT MOD. TO BLADE	N=6		
CODE VALUE:	0				
FREQUENCY:	6				
PERCENTAGES:	100.0				
VARIABLE NUMBER	31	FINISH ON BLADE	N=6		
CODE VALUE:	2	3	4		
FREQUENCY:	1	1	4		
PERCENTAGES:	16.7	16.7	66.7		
VARIABLE NUMBER	32	USE-WEAR	N=6		
CODE VALUE:	2	3	4	5	
FREQUENCY:	4	0	0	2	
PERCENTAGES:	66.7	0.0	0.0	33.3	
VARIABLE NUMBER	33	MATERIAL OF BLADE	N=6		
CODE VALUE:	1	2	3	4	5
FREQUENCY:	3	2	0	0	1
PERCENTAGES:	50.0	33.3	0.0	0.0	16.7

References. As SNG 4.

Figure. Not figured, compare Plate A25, figs. C and D.

Hafting features. A2, B3, C22, D32.

Handle. As SNG 4. No. 638 has the longer, eastern, form of proximal end, no. 641 the shorter, western, form.

Hafting. As SNG 4. No. 638 has three twisted cane rings, no. 641 has 7.

Blade. No. 638 has an oval sectioned, parallel-sided black stone blade set at 45°. No. 641 has a large black stone blade with flat sides 3.5 cm thick. It is set at 90°. This may have originated in the Kafetu quarry in the Central Interior.

Function. Both blades have glossy cutting edges and are very blunt. This probably results from sago pith chopping but may be a post-metal use, for most pith chopping in this region seems to have been done with the wooden implement SNG 12.

Manufacturing tradition. T4.

Comments. 1. As for SNG 4.

2. No. 638 is listed as *ira* by its missionary donor.

Statistics. Too few implements.

SOUTH NEW GUINEA 6

No.	Repository	Reg. No.	Locality	Date	Collector
638	AM	E8895	Larailarela	1900	J.H. Holmes
641	AM	E27632	Goaribari 'Is.	1923	Hurley & McCulloch

SOUTH NEW GUINEA 7

Locality. East bank of the lower Strickland River, around Strickland-Fly junction, west as far as the Je-nan.

Number. 1.

Collector. T.J. Rothwell.

Date. 1929.

References. d'Albertis, 1880: V. II, f.p.132 and 378; Pulsford, 1885: 43, 65; Everill, 1888:178-185; Ramsay, 1888:207; Williams, 1936:429; Archbold and Rand, 1940:137; Nevermann, 1942:132; Miller, 1950:40-1,146.

Figure. Not figured, compare Plate A25, figs. E and F.

Hafting features. A2, B3, C13, D31.

Handle. Very massive 'head', round shaft, end knobbed. Head may be a root bulb, but hard wood, not bamboo root (cf. SNG 16 and 18). This implement is very small, only 33.5 cm long.

Hafting. Blade is held in a two-piece separate socket by a long split vine whipping over which at the lower end are two twisted split vine rings.

Blade. A small tapering pebble of grey stone with only the edge and other surfaces slightly ground. Most of the surface remains natural pebble cortex.

Function. Very small implement but the blade is larger than in no. 634 (SNG 8). Might be used in a task such as bowl making.

Manufacturing tradition. T4.

Comments. 1. SNG 7, 8, and 9 are all hafted in the same way. While SNG 7 may be more of a toy, SNG 8 may combine wood working and sago palm felling, and SNG 9 appears to have been used for sago pith chopping, although this may be a post-metal phenomenon (cf. SNG 11).

2. Williams, discussing the distribution of kinds of woodworking percussive cutting implements in the Trans-Fly area, reports this kind of tool for the Wiram, around Tidal Island on the south bank of the Fly (1936:429, fig. 24A).

3. At Daviumbu Lake, near Everill junction, Archbold and Rand describe canoe making, though they do not describe the implement so that it can be identified. If it can be assumed that an adjustable implement is probable then either T2, or T4 implements could be involved. SNG 11 (T2) was in use in the Kiwai area near the mouth of the Fly River, while SNG 7 or 8 (T4) were in use in the Fly basin. The quotation is given under SNG 11.

4. Comprehensive instructions were issued to the members of the Royal Australian Geographical Society's expedition to the Fly River in 1885. Among the instructions to the geologist were the following (Pulsford,

1885:43):

Collect samples of stone tomahawks (specially to show the different kinds of stone that they are composed of) and ascertain, if possible, where the natives originally obtained them, or where the stone came from.

Ascertain whether the natives of one tribe trade with other tribes for stone chips, tomahawks, etc., and whether the natives possess any metals.

The instructions to the botanist contained the following statement (Pulsford, 1885:65):

When from friendly natives wood implements, wood weapons, nets, cloths, fishing lines, etc., are obtained, an endeavour should be made to trace these articles to the trees, shrubs, bamboos, grasses, rushes, etc., affording the material and a corresponding label to be fixed both to the article in the ethnological collection, and to the explanatory botanic set of specimens.

Had it been possible to fulfill these conditions, which were considerably too ambitious for the length of the expedition proposed, a most remarkable set of information would have resulted. What actually happened is told by Everill, the leader of the expedition (1888:178-185). They saw very few people on the trip to the Strickland junction and few for many miles above there. The expedition's boat was grounded at Observatory Bend on the Strickland from 27 August to 21 October and in that time a smaller party went up the river as far as Cecilia junction, at the junction of the Strickland, Murray and Carrington rivers. On this trip they collected one implement of WI 21, simple adze form. On 28th October they began the descent of the Strickland "collecting a few ethnological specimens on the way down" (1888:185). In a comment Belgrave notes that about 3,000 specimens in all the collections were obtained. Ramsay (1888:207) sounds disappointed in the ethnological collection:

The ethnological collections, as you are doubtless aware, were examined and set out by one of the Society's employees at the old Art Gallery in the Domain, and a small portion only, containing such as we were desirous of obtaining (having already a large collection in the [Australian] Museum from the same portion of the island), were selected for the Museum, and the remainder of our share left to be divided between the two colonies of Victoria and Queensland. These implements show a very low type of delta living savages.

5. In 1876 the Italian explorer d'Albertis ascended the Fly River. On the descent at a village he first visited on 3 June he collected a number of celts, including two in separate sockets of the SNG 7-9 form (12 July, 1876) (d'Albertis, 1880: Vol. II, f.p.132). Later he figures

two complete and one blade and separate socket unit of this form from the Fly River.

6. Miller (1950:40) recorded men at Bupul (Je-nan area):

wearing down a teakwood tree with their stone hatchets. Each blow struck crushed a limited amount of wood. After so many blows the natives would stop to pull away the broken fibres, exposing new wood to be pounded at. On ebony I would have needed a microscopic camera to record the progress.

He later noted that "the [sago] tree is cut down by the men who attack it with their stone axes" (1950:146).

7. Nevermann describes Je-nan implements (1942:132):

Die Steinbeile bestehen aus einem oben verdickten und durchbohrten Stiel, in den man die in ein drehbares Futter aus zwei Holzstücken mit Rotanummwicklung eingebundenen Klingen (Er jawo, Dong jo) mit Hilfe dieses Futters steckt. Die Klingen sind oft sehr kurz und bestehen aus Steinen, die von oberen Digul auf Kopfjagden als Beutestücke mitgebracht wurden. Auch unbearbeitete Steine brachte man von dort mit und verstand es, sie zu Beilklingen und Keulenknäufen.

Statistics. Too few implements.

SOUTH NEW GUINEA 7

No.	Repository	Reg. No.	Locality	Date	Collector
32	QM	E1977	Lake Murray	1929	T.J. Rothwell

SOUTH NEW GUINEA 8

Locality. As SNG 7.

Number. 7.

Collector. Royal Geographical Society of Australasia.

Date. *1885.

References. As SNG 7.

Figure. Plate A25, figs. E and F, (no. 632).

Hafting features. A2, B3, C22, D31.

Handle. Massive versions of SNG 7, usually very well polished by use.

Hafting. A long strip whipping, a lower ring of twisted or plaited

split vine which continues into a simple whipping, or, in one case, four plait rings.

Blade. One of the implements has an oval sectioned, very large, black stone blade not unlike the blades found in the Dani axes made from Tago stone (WI 14). Two others appear to be much worn versions of the same kind of blade, and two more appear to be thinner versions made from a similar stone. One other has an oval section and parallel sides, unlike the rest which taper. The last has a blade like that of the SNG 7 specimen made from a pebble which may be a greywacke. The blade setting angles are -20° , $0^\circ \times 3$, $90^\circ \times 2$, 105° . All the edges are much used, none are sharp although most are smoothed and only the pebble blade is battered.

Function. May have been used for both carpentry work and for palm felling.

Manufacturing tradition. T4.

Comments. As for SNG 7.

Statistics. All implements are included in the statistical descriptions (tables A79 and A80). The population sample is very variable and does not consistently divide into groups. The platykurtic distributions divide into: V12, $60^\circ - 65^\circ/70^\circ - 77^\circ$; V16, 14.6 - 21.6 cm/36.2 - 44.1 cm; V19, $-20^\circ - 0^\circ/90^\circ - 105^\circ$; V21, 11.1 - 15.1 cm/24.3 - 29.2 cm; and V22, 2.2 - 2.5 cm/3.5 - 5.1 cm.

SOUTH NEW GUINEA 8

No.	Repository	Reg. No.	Locality	Date	Collector
448	NMV	X4084	Fly River	*1885	R. Geog. Soc.
631	AM	E25	" "	*1885	" "
632	AM	E26	" "	*1885	" "
633	AM	E27	" "	*1885	" "
634	AM	E28	" "	*1885	" "
635	AM	E27755	Lake Murray entrance	1923	Hurley & McCulloch
639	AM	E32643	Middle Fly	1929	R.S. Keesing

TABLE A79: Distribution of ratio scale features. Fly Basin (SNG8). Descriptive statistics. Unweighted.

VAR.	VARIABLE NAME	COUNT NO MD	MEAN	S.D.	MIN. CODE	MAX. CODE	SKEW. 3RD	KURT. 4TH
7	LENGTH OF BLADE	7	92.00	59.37	35	188	0.646	-0.658
8	WIDTH OF BLADE - HAFT	7	37.86	10.46	25	55	0.515	-0.440
9	THICKNESS OF BLADE	7	25.29	11.44	10	42	0.419	-0.496
10	WIDTH OF BLADE - EDGE	7	46.57	17.35	29	71	0.527	-0.964
11	LENGTH - CUTTING EDGE	7	52.57	24.07	33	92	0.926	-0.444
12	ANGLE - CUTTING EDGE	7	68.57	7.00	60	77	-0.205	-1.112
13	LENGTH OF HANDLE	7	545.14	169.78	358	805	0.513	-0.824
14	SHAFT DIAMETER	4	26.00	6.98	20	35	0.583	0.588
15	LENGTH OF FOOT	7	88.14	31.93	51	138	0.342	-0.679
16	TOTAL LENGTH OF FOOT	7	279.71	127.69	146	441	0.329	-1.293
17	POINT OF BALANCE	7	39.00	26.12	0	83	0.259	0.315
18	ANGLE - B/FOOT - SIDE	7	79.57	5.88	75	90	0.973	-0.070
19	ANGLE - B/HANDLE - BELOW	7	37.86	54.15	-20	105	0.289	-1.474
20	WEIGHT	7	1161.43	1155.98	174	3247	0.912	0.026
21	SPRT SOCKET LENGTH	6	194.50	75.95	111	292	0.085	-1.158
22	SPRT SOCKET WIDTH	6	34.33	12.96	22	51	0.459	-1.042
34	% 10 ON 11 WC/LC	7	91.14	9.81	74	106	-0.339	0.692

TABLE A80: Distribution of nominal scale features. Fly Basin (SNG8).

VARIABLE NUMBER	23	POLL OF BLADE				N=7
CODE VALUE:	1	2				
FREQUENCY:	1	6				
PERCENTAGES:	14.3	85.7				
VARIABLE NUMBER	24	PLAN OF BLADE				N=7
CODE VALUE:	1	2				
FREQUENCY:	1	6				
PERCENTAGES:	14.3	85.7				
VARIABLE NUMBER	25	PLAN OF CUTTING EDGE				N=7
CODE VALUE:	1	2				
FREQUENCY:	6	1				
PERCENTAGES:	85.7	14.3				
VARIABLE NUMBER	26	PROFILE OF BLADE				N=7
CODE VALUE:	1	2				
FREQUENCY:	6	1				
PERCENTAGES:	85.7	14.3				
VARIABLE NUMBER	27	PROFILE OF CUTTING EDGE				N=7
CODE VALUE:	1	2	3			
FREQUENCY:	1	5	1			
PERCENTAGES:	14.3	71.4	14.3			
VARIABLE NUMBER	28	CUTTING EDGE - BELOW				N=7
CODE VALUE:	1	2	3			
FREQUENCY:	4	2	1			
PERCENTAGES:	57.1	28.6	14.3			
VARIABLE NUMBER	29	X-SECTION OF BLADE-HAFT				N=7
CODE VALUE:	2	3				
FREQUENCY:	3	4				
PERCENTAGES:	42.9	57.1				
VARIABLE NUMBER	30	HAFT MOD. TO BLADE				N=7
CODE VALUE:	0					
FREQUENCY:	7					
PERCENTAGES:	100.0					
VARIABLE NUMBER	31	FINISH ON BLADE				N=7
CODE VALUE:	1	2	3	4		
FREQUENCY:	1	0	3	3		
PERCENTAGES:	14.3	0.0	42.9	42.9		
VARIABLE NUMBER	32	USE-WEAR				N=7
CODE VALUE:	0	1	2	3	4	5
FREQUENCY:	1	0	4	0	0	2
PERCENTAGES:	14.3	0.0	57.1	0.0	0.0	28.6
VARIABLE NUMBER	33	MATERIAL OF BLADE				N=7
CODE VALUE:	1	2				
FREQUENCY:	5	2				
PERCENTAGES:	71.4	28.6				

SOUTH NEW GUINEA 9

Locality. As SNG 7.

Number. 2.

Collectors. Murray, Royal Geog. Soc.

Dates. *1885, pre-1915.

Reference. As SNG 7.

Figure. Not figured, compare Plate A25, figs. E and F.

Hafting features. A2, B3, C13, D31.

Handle. As SNG 8.

Hafting. As SNG 8. No. 630's separate socket is fitted into a much too large handle and is held by resin.

Blade. No. 944 has a blade of the same stone as the large black blade commented on in SNG 8, but much smaller. It is set at 10°, and is slightly glossy. No. 630 has a mottled cylindrical stone blade of the form which appears to originate with the Humboldt Bay people (NIJ 2). This may be a mistaken association, or it may have been collected like this, although in this case the feature would surely have occasioned comment (see SNG 7).

Function. Sago pith chopping, because of the glossy edges.

Manufacturing tradition. T4.

Comments. 1. As SNG 7 comment 1.

2. No. 630 may have been wrongly reassembled by the Museum staff?

Statistics. Too few implements.

SOUTH NEW GUINEA 9

No.	Repository	Reg. No.	Locality	Date	Collector
630	AM	E24	Fly River	*1885	R. Geog. Soc.
944	IA	M TA60	Aird R. delta	pre-1915	Murray P204

SOUTH NEW GUINEA 10

Locality. Mouth of the Fly River and adjacent areas, probably mainly Kiwai Family languages.

References. Edge Partington, 1890-98: Series III, Pl. 86, fig. 3; Riley, 1920:108-112; Landtman, 1933:45-6; Williams, 1936:429; Archbold and Rand, 1940:137; Hinderling, 1949:46.

Figure. Not figured, compare Plate A25, figs. G and H.

Hafting features. A1, B3, C13, D13.

Handle. Round shaft, medium height heel, short toe.

Hafting. Blade held in separate socket by one or more plait rings made from coarse split vine strips.

Blade. Oval sectioned blades (but apparently not the very large ones — see Chapter 20) of various stones. The implement figured by Edge Partington is identified as having a basalt blade.

Function. Canoe making.

Manufacturing tradition. T2.

Comments. 1. This is the same hafting as the sago feller SNG 11.

2. Archbold and Rand (1940:137) report for Lake Daviumbu that:

Though they occasionally use steel tools in cutting the logs and roughly shaping the canoe, the old stone adzes are used for the final delicate finishing. One old man, perhaps a professional canoe maker, was reworking the bow of a canoe drawn up by our camp. He refused the offer of a steel axe and worked with an old stone adze, adjusting the angle of the blade by twisting it in its wrappings. No rush job this. After a few chips he stood back to judge the lines, a few more chips and he repeated the process, and so on. Even the chiefs stood by to watch his craftsmanship.

It is a pity that no better description is given of the implement and I cannot be sure that it was not in fact a tool of population SNG 7 which was used.

3. Further down the Fly River, Williams states (1936:429), "The Aram and Anima on the Fly River use an entirely different hafting, viz. the elbow-shaped branch which is the Kiwai fashion."

4. Landtman's (1933:45-6) description of Kiwai stone tools seems to contain a mixture of hearsay about the large blades common in surface collection from the Trans-Fly area and those implements in current (or

rather traditional) use in the Kiwai area itself. His description of canoe making is very close to that given by Archbold and Rand. As noted, part of Landtman's information appears to relate to the Trans-Fly people not to Kiwai.

5. Riley (1920:112) describes how stone blades were sharpened in the Kiwai area:

They had no stones to grind the implement upon, and the banks of the river were nothing but mud ... The method adopted was as follows. When the tide was out a crowd of natives walked into the mud, took quantities into their hands, rubbed them together and took out all the grit. Each person produced a little, and in the end they had quite a decent handful of sand. This was put into a basket made of bark and the stone tomahawk head was rubbed in the sand in order to sharpen it. One man rubbed a little, soon got tired, and then passed on the stone to another person sitting near, and so in time all the assembled company took their turn. I examined the stone after about an hour's rubbing, but it did not seem to my untrained eye to be any sharper than it was when they started.

6. The implement recorded by Edge Partington from Vanu village (? = Aworra on Bamu River tributary) was not located in the MacGregor collection, but a number of handles are held in the QM collections.

7. This hafting is very like SNG 1 from the Toaripi area (?).

SOUTH NEW GUINEA 11

Locality. Mouth of the Fly River and adjacent areas, probably mainly Kiwai Family language speakers.

Number. 1.

Collector. MacGregor.

Date. 31 March, 1891.

References. As SNG 10, d'Albertis, 1880: vol. II, 236, f.p.378; MacGregor, 1892d:53.

Figure. Plate A25, figs. G and H.

Hafting features. A1, B3, C13, D9 or D13.

Handle. As SNG 10.

Hafting. Blade-separate socket lashing as SNG 10. Separate socket-handle lashing similar but the strips over the shaft are partly plaited

together.

Blade. A piece of brass rod about 3/4" in diameter with a smoothed end.

Function. Probably sago felling.

Manufacturing tradition. T2.

Comments. 1. On 22 May, 1877, d'Albertis, somewhere in the islands up river from Kiwai Island, records, "I perceived that a man from a canoe had stolen a brass rowlock out of our boat" (1880:II, 236). During his visit to Aworra, MacGregor notes (1892d:53):

The Aworra had no iron as far as I saw when we visited them, but one of them had a piece of brass rod about five-sixths of an inch in diameter mounted in a handle like a stone hatchet. Of this curious instrument he was very proud.

Is it possible that these two incidents may be linked together?

MacGregor apparently collected the implement, which is figured in Plate A25, G and H.

2. d'Albertis figures a similar implement, though its handle has a very small heel, having a cylindrical blade of unspecified material. The locality is merely given as Fly River (1880:II, f.p.378).

3. Evidently hafted in the same as SNG 10.

4. Riley (1920:108-112) describes the preparations for felling a sago palm, cutting a section and removing the bark. "In olden times this was accomplished by using a *gubumutu* - that is, a stone tomahawk."

Statistics. Too few implements.

SOUTH NEW GUINEA 11

No.	Repository	Reg. No.	Locality	Date	Collector
69	QM	M4017	Aworra, Bamu R. area	*1891	MacGregor (10428)

SOUTH NEW GUINEA 12

Locality. Papuan Gulf to Fly River, probably in most parts of South New Guinea.

References. d'Albertis, 1880:II, f.p.378; Bevan, 1890:143;

MacGregor, 1890d:39, 1891:77, 1892d:53, 1894d:30; Riley, 1920⁵:60-61; Wirz, 1922: Pl. 28, fig. 5; Lewis, 1923: fig. 6; Landtman, 1933:23.

Hafting features. Not within compass of this listing.

Handle. A straight shaft about 70 cm long.

Hafting. See comment 1.

Blade. Usually no separate 'blade', although a minor variation may have a bamboo node fitted over the toe.

Function. Sago pith chopping.

Manufacturing tradition. A local variant of T2?

Comments. 1. According to Landtman, 1933:23:

The pounding is done with a special implement called *oto*, which consists of a shaft about 70 cm long with a somewhat shorter stick lashed to it. The latter is twisted round a couple of times like a hand on a clock dial, until the lashing is firm enough, and then is forced into a position of about 45° with the shaft and fixed there by means of a stay. The free end of the added piece of the *oto* is slightly hollowed out by burning with a glowing ember, which gives a fairly sharp edge to its periphery. The instrument is then used in the same way as an adze.

MacGregor describes wooden adzes with burned ends at Sumai (1890d:39, 1891:77).

2. Riley remarks (1920:61): "There is a great art in using the wood adze for chopping the sago ... The adze is aimed to fall on the side of the foot." In this area women chop the sago.

3. MacGregor reported (1892d:53) of his visit to Aworra village, on a tributary of the Bamu River:

Where stone is procurable the tree [sago palm] is broken up by small specially made stone axes; when stone is not available the pith is broken up by the end of a piece of hardwood made harder still by burning and fixed into a handle.

The stone bladed pith choppers have been recorded as SNG 13.

4. At Apiope on the right bank of the Aivei mouth of the Purari River MacGregor noted that "The women break up the [sago] trunk with the triangle wooden adze used on the Fly Estuary" (1894d:30).

5. Bevan (1890:143) notes for Motumotu that "A male native astride one end of the trunk, takes a wooden adze-shaped flail and, with successive blows, chops the pith away into a heap of chips."

6. This implement is probably the same as that observed by Lindt in

Redscar Bay (SP 7).

7. It may also be the same as that in use among the lower Tedi people on the Fly River (WI 3).

8. The idea is very similar to the sago choppers of parts of North Irian Jaya (NIJ 4 and NIJ 6).

9. The implement figured by Wirz as occasionally used among the Marind-Anim (1922: Pl. 28, fig. 5) appears to have an added piece of bamboo over the toe of the implement, the node giving the necessary hollow.

SOUTH NEW GUINEA 13

Locality. Mouth of the Fly River mouth and adjacent areas, probably mainly Kiwai Family language speakers.

Reference. MacGregor, 1892d:53.

Hafting features. A1, B3, C13, D9?

Handle. As SNG 11.

Hafting. As SNG 11.

Blade. Not described, perhaps worn-out adze blades.

Function. Sago pith chopping.

Manufacturing tradition. T2.

Comments. This population is based upon the following reference by MacGregor, "Where the stone is procurable the tree [sago palm] is broken up by specially made stone axes" (1892d:53). I have assumed that it may be similar, except for its blade, to SNG 10 and SNG 11.

SOUTH NEW GUINEA 14

Locality. West of the Fly River.

References. d'Albertis, 1880:II, f.p.378, fig. 8; Fischer, 19²13a:74, Pl. XIII, fig. 2 (no. 734); Wirz, 1922: Pl. 28, figs. 3 and 4; Nevermann, 1942:121; Hinderling, 1949:174.

Hafting features. Not within compass of this listing.

Handle. Various shapes from a naturally curved piece of wood to a trunk-and-branch handle.

Hafting. Toe shaped to fit inside pounder.

Blade. Short section of bamboo cut off to leave the upper side of the node as a hollow, rim-edged cutting tool. Appears to be 2 - 3 cm in diameter.

Function. Sago pith chopper.

Manufacturing tradition. T1?

Comments. 1. d'Albertis collected his specimen on the Fly River, possibly from the west bank.

2. Other localities are the Marind-Anim, the Je-Nan to their north inland from Merauke, and Lorentz River.

3. If I am correct in allocating Hinderling's type 3a and b sago pith choppers to this group the localities where it occurs also include the North River besides those mentioned in 2 above.

SOUTH NEW GUINEA 15

Locality. Lower Fly River, Murray Island, Torres Strait?.

References. d'Albertis, 1880:II f.p.378, fig. 11; Edge Partington, 1890-98: Series I, Pl. 346, fig. 6; Landtman, 1933:23.

Hafting features. A2, B1, C7, D35.

Handle. Rough wooden handle, slightly bulging to a squared or rounded proximal end.

Hafting. Blade set in a tapered hole.

Blade. Bailer shell.

Function. Hoe.

Manufacturing tradition. T3.

Comments. 1. Landtman's description (1933:23) is:

The shell-hoe (*wederemo*, from *wedere*, Melon-shell, *Melo diadema*, and *emo*, stone adze or axe) is made of a piece of shell wedged into a hole in a stout stick with pieces of wood.

The hole is made with a cutting-shell, the point of a boar's tusk or some other sharp instrument, or is burnt with glowing embers, which are kept alive by being blown on through a tube.

2. Edge Partington figures one collected by Haddon, but the form is not mentioned in vol. I (1935) or vol. IV (1912) of Haddon's Reports.

3. d'Albertis also collected shell hoes from the Fly River.

SOUTH NEW GUINEA 16

Locality. Jee-Anim and Fly River.

References. Wirz, 1922: Pl. 37, fig. 3; Hinderling, 1949:44, abb. 17.

Hafting features. A2, B3, C22, D31.

Handle. Long handle of bamboo root.

Hafting. Blade set in separate socket and held by a long split vine lashing. End of separate socket thrust through a narrow hole in the proximal end of the handle.

Blade. Appears to be of the usual oval sectioned form.

Function.

Manufacturing tradition. T4.

Comments. 1. The two kinds of root handles, those of wood and those of bamboo should be clearly distinguished. Bamboo root handles apparently do not occur east of the Fly River, nor in Torres Strait.

2. Wirz' description (1922: caption to fig. 3 of Plate 37) reads:

Steinbeil der Jee-Anim und der Eingeborenen vom Fly-river. Dieser Schafting entspricht die doppelseitig geschliffene Klinge, sie erlaubt eine Einstellung derselben in sagittaler und transversaler Richtung. An der Küste kommen beide Klingformen vor, doch ist die doppelseitig geschliffene am oberen Fly-river weitaus die häufigere. Länge des Bambusschaftes: 80 cm.

Hinderling repeats Wirz' figure (1949: abb. 17). He gives it the designation "Typ c: Einsteckbeil mit Mittelstückfassung" (1949:44).

SOUTH NEW GUINEA 17

Locality. Fly River.

Number. 1.

Date. *1885.

Collector. Royal Australasian Geographical Society.

Reference. See SNG 7.

Figure. Not figured.

Hafting features. A2, B1, C6, D31.

Handle. Massive head as SNG 8. Shaft partly split and neatly mended with a cane seizing.

Hafting. Blade set adze-wise into the hole in the handle.

Blade. Oval sectioned, blunted grey stone.

Function. Sago palm feller?

Manufacturing tradition. T3, but very unusual. Could the separate socket have been lost? May originally have been a T4 implement.

Comments. Clearly from the same area as SNG 7-9. This is the only T3 adze recorded.

Statistics. Too few implements.

SOUTH NEW GUINEA 17

No.	Repository	Reg. No.	Locality	Date	Collector
33	QM	E4706	Fly River	*1885	R. Geog. Soc.

SOUTH NEW GUINEA 18

Locality. Tugeri tribe, Merauke area.

Number. 3.

Collector. MacGregor.

Date. 1897.

Reference. MacGregor, 1898d: Pl. 24, fig. 41; Le Roux, 1948: Pl. XCIX, fig. I 10.

Figure. Plate A26, figs. A and B. (no. 109).

Hafting features. A2, B1, C6, D31 = no. 34; A2, B1, C7, D31 = nos. 109, 149.

Handle. Long root-ended handles, proximal end tilted up. May be some sort of cane, as the characteristic nodes of the larger bamboo handles are not present. Relatively light.

Hafting. One blade fitted part way through the proximal end, the other two driven through.

Blade. All pieces of iron, very long and narrow (width 1.4, 2.0, and 2.4 cm, thickness 0.7, 1.4, 1.6 cm). Not sharp.

Function. No information.

Manufacturing tradition. T3.

Comments. In MacGregor's picture no. 34 is on the far left, no. 109 second from left, and no. 149 second from right. The middle one is SNG 19, and the far right specimen was not recorded. It belongs to SNG 20. SNG 18 is evidently a local variant of the SNG 20 idea, perhaps in response to the small iron blades, but Le Roux figures a similar implement from Inaboeka having a very small stone blade, so it may be a well established variant in the area.

Statistics. Too few implements.

SOUTH NEW GUINEA 18

No.	Repository	Reg. No.	Locality	Date	Collector
34	QM	M4123	Tugeri tribe	1897	MacGregor (15291)
109	QM	M4124	" "	1897	" (15292)
149	QM	M4474	" "	1897	" (15293)

SOUTH NEW GUINEA 19

Locality. Tugeri tribe, Merauke area.

Number. 1.

PLATE A26.

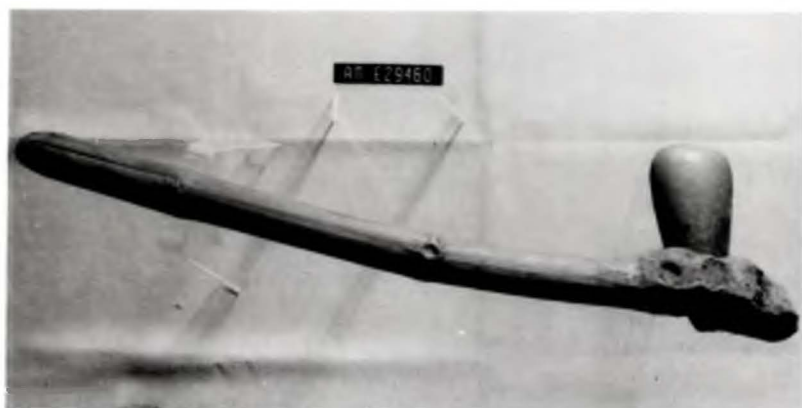
- A and B. SNG 18, 109, QM M4124, no locality.
- C and D. SNG 20, 643, AM E29460, North River, south
Irian Jaya.
- E and F. SNG 21, 746, AM E70488, Merauke.
- G and H. NIJ 1, 159, AIM 42823, Lake Sentani.



A



B



C



D



E



F



G



H

Collector. MacGregor.

Date. 1897.

Reference. MacGregor, 1898d: Pl. 24, fig. 41, centre.

Figure. Not figured.

Hafting features. A2, B1, C6, D35.

Handle. Short stick, proximal end not marked off.

Hafting. Blade set in slot.

Blade. Thin (0.3 cm) piece of hoop iron.

Function. No information.

Manufacturing tradition. T3.

Comments. SNG 19, SNG 18 and SNG 20 were probably all used for the same purposes.

Statistics. Too few implements.

SOUTH NEW GUINEA 19

No.	Repository	Reg. No.	Locality	Date	Collector
141	QM	M4057	Tugeri tribe	1897	MacGregor (15290)

SOUTH NEW GUINEA 20

Locality. Trans-Fly to Asmat area, excluding Kolepom (Frederik Hendrik) Island.

Number. 5.

Collectors. Various.

Dates. 1912 - 1917.

References. Koch, 1908:591, Pl. VI; Wollaston, 1912:54, 148, 150-1; Fischer, 1913a:74-5, 93-5, Pl. XIII, figs. 3 and 5, Pl. XVI, figs. 16, 17 and 18; Haddon and Layard, 1916:45, Pl. VI; Wirz, 1922:126-130, Pl. 37; Williams, 1936:428-429, fig. 21; Nevermann, 1940:178, 1952:72; Hinderling, 1949:42-44; Boelaars, 1957:24-6.

Figure. Plate A26, figs. C and D, (no. 643).

Hafting features. A2, B1, C6, D31 = nos. 569, and 969;
A2, B1, C7, D31 = nos. 168, 643, and 644.

Handle. Heavy bamboo root with hole or socket formed in the root bulb and cut off at a node.

Hafting. Blade held in by pressure.

Blade. Tapered, oval sectioned celts (cf. surface finds at Kiwai Island, Landtman, 1933:45-6) two quite large, the others smaller. Three of a black and one green stone. All set as axes, all rather blunt.

Function. Carpentry and tree felling implements, probably also used for sago felling.

Manufacturing tradition. T3.

Comments. 1. This method of hafting in the root bulb of a bamboo stem alternates in this area with the use of a true wooden handle.

2. Koch (1908) figures three of these axes from Inaboeka (Pl. VI, figs. 185, 186, and 187). One from Merauke has a wood handle (SNG 21).

3. Wollaston (1912:54) records "the whole business of canoe-making from the first felling of the tree to the final hollowing out of the inside was done with stone axes and the carving was done with sharpened shells." His observations relate to Wakatimi, near the mouth of the Mimika River:

The stone axes used in the Mimika district are all of the same type, though they vary greatly in size from about four inches to large ones of nearly twelve inches in length. The stone of which they are made is always the same, a quartzite. The shaft is about two feet long and is invariably made of the butt end of the bamboo. A hole is bored and burnt in the lower end of the bamboo, that is to say in the solid part of the wood below the first joint, and the pointed end of the stone is jammed into the hole. The stone is always fixed axe fashion, i.e. with its broad surface and cutting edge in the same plane with the long axis of the handle ... The axes quickly become blunt with use and they are sharpened by being rubbed upon another stone. At Wakatimi stones are very rare and one man appeared to be the stone-smith of the village. I remember seeing him one day sitting outside his hut sharpening an axe, with three or four others lying beside him waiting to be done, while a few yards away a woman was splitting a log of wood with a stone axe (1912:158, 160-1).

2

4. Fischer (1913a) figures four from the Lorentz River which have straight ends (nos. 570, 586, 589, 592) and one from Mimika in which the proximal end turns up. This feature appears to be controlled by the growth of the bamboo.

5. At the mouth of the Utakwa River, Haddon and Layard (1916:45) describe these axes with a haft 68 - 72 cm long, and a blade 22 - 35 cm long. This blade is:

carefully worked, probably chipped and then bruised, into shape, but not polished. It is wedge-shaped and well rounded with a maximum width of 6.4 - 12.8 cm, and thickness of 4.4 - 6.4 cm, and tapers with curved sides to a blunt point which projects about 2 cm behind the back of the shaft. The weights range between 1½ and 9 lb. The stone is probably a kind of chloromelanite.

These blades seem remarkably like the ones from the Kiwai and Trans-Fly areas (Landtman, 1933:45-6).

6. The axe figured by Wirz (1922: Pl. 37, fig. 1) comes from the Marind (or Tugeri) people.

7. Nevermann gives the name for the stone blade among the Sohur as *tingo* (1940:178), *jebu* or *jibu* among the Jabga, and *mate* among the Dibga (1952:72).

8. Le Roux (1948: Pl. XCIX, figs. I 6, 7, and 9) figures bamboo shafted axes from Mimika-Northwest River, Uta-Utakwa, and ?Trans-Digul.

9. Williams (1936:428-9) discusses the axes of the Keraki people of the Trans-Fly area:

The Axe. The celt *turika*, like the club, has to be imported into a stoneless country; some specimens come from the Wiram, others from Buji on the sea-coast ... All the examples of celts that I have seen are very inferior and appear to be merely pebbles ground down.

The axe among the Keraki and their neighbours certainly took an exceedingly primitive form, the base of the celt being fitted directly into the handle. The latter was sometimes made of a hard wood, but usually of bamboo, ...

When a demonstration specimen was used to fell a pawpaw tree "the celt fell out of its socket three times during the operation." This demonstration specimen may be no. 969.

10. Boelaars discusses sago making among the Mappi (1957:24-6).

Statistics. Too few implements.

SOUTH NEW GUINEA 20

No.	Repository	Reg. No.	Locality	Date	Collector
168	AIM	13051	-	1917	G. Graham
569	SAM	A50376	Mimika-Asmat	-	Exch. Tropfen Mus.
643	AM	E29460	North River	-	Exch. Kol. Inst.
644	AM	E20026	Utakwa River	1912	P.J. Black
969	IA	M TA232	Fly River?	-	-

SOUTH NEW GUINEA 21

Locality. As SNG 20.

Number. 1.

Collector. D. Allen.

Date. 1963.

References. As SNG 20.

Figure. Plate A26, figs. E and F.

Hafting features. A2, B1, C6, D32.

Handle. Long shaft, ornamental terminal, proximal end bulges vertically, incised on both sides. Wood.

Hafting. Butt of blade in socket.

Blade. Blunt edge, grey, oval, tapered stone.

Function. Woodworking, and sago felling?

Manufacturing tradition. T3.

Comments. 1. The carving looks more like Asmat than Merauke to my eye but the provenance may be correct, as Koch (1908: Pl. VI, no. 183) figures one of the same shape without ornamentation.

2. Williams (1936:429) mentions the occasional presence of wood hafts among the Keraki, Trans-Fly Papuans.

3. Le Roux (1948: Pl. XCIX, fig. I 8) figures a wood handled implement with a more rounded proximal end from Lorentz River.

4. Hinderling (1949:44) suggests that wood handles occur between the Digul and Fly Rivers rather than bamboo roots, although Williams (SNG 20) seems to contradict this.

Statistics. Too few implements.

SOUTH NEW GUINEA 21

No.	Repository	Reg. No.	Locality	Date	Collector
746	AM	E70488	Merauke	1963	D. Allen

SOUTH NEW GUINEA 22

Locality. Asmat people.

Reference. From a photograph supplied by C. Voorhoeve.

Hafting features. A2, B3, C?, D31?.

Handle. Long shafted handle, probably bamboo root.

Hafting. Blade set in separate socket which is jammed through the hole in the proximal end of the handle. Blade-separate socket lashing unclear from the picture.

Blade. Appears to be a plane iron.

Function. Canoe hollowing.

Manufacturing tradition. T4.

Comments. Voorhoeve tells me that the ordinary blades usually set in T3 axes may be rehafted into adjustable T4 implements when the need arises. The nearest area where T4 implements are commonly used is the Wissel Lakes basin. The idea appears to be very uncommon on the coastal belt, but if it was imported from elsewhere then the areas west and north appear more likely than the areas close to the Fly River.

SOUTH NEW GUINEA 23

Locality. Utakwa area.

Reference. Hinderling, 1949:174.

Hafting features. Like SNG 16?

Handle. As SNG 16 or 22?

Hafting. 'Separate socket'.

Blade. The end of the 'separate socket' functions as the blade.

Function. Sago pith chopper.

Manufacturing tradition. T4.

Comments. Hinderling gives this as his type 2b sago pith chopper, "Einsteckbeil mit Mittelstück". This is the only T4 sago pith chopper noted. It may be a variant on the SNG 12 form.

SOUTH NEW GUINEA 24

Locality. Torres Strait, specifically Mer (Murray Group).

References. Moresby, 1874:4; Haddon, 1912:125-6, 1935:302; Hinderling, 1949:41.

Hafting features. A2, B1, C6, D34 (Haddon, 1912: fig. 159).

Handle. The handles, *pes* (E), are about 60 cm (23½ in.) long, and made from *zom* (*Thespesia populnea*) [sic] or *kid* (?) wood. The handles are straight or slightly curved, with a marked stop below the grip; the latter is circular in section but the handle becomes flattened laterally towards the other end; the flattened tip is painted red, and a red ring surrounds the insertion of the blade. The axes weigh nearly two pounds (Haddon, 1912:125-6).

Hafting. The blade is set in a socket.

Blade. Mainly made from clam shell and apparently not very well finished.

Function. Probably multi-purpose.

Manufacturing tradition. T3.

Comments. 1. In Torres Strait the term for iron is *tulik* on the eastern islands, and *turik* on the west. Haddon (1912:125) gives the name *aga* to western islands axes, and *panigob* or *inigob* to eastern islands axes. In the central islands the old name was apparently *daumer-upi-kuia* (*daumer* = pigeon, *upi* = tail) (1935:302).

2. Haddon says that "I have never seen an original specimen [of an axe] and could obtain but two or three shell blades, and these only on Mer. In 1888 and again in 1889 I induced some elderly men to fit blades into handles as they were formerly made. On both occasions the handles were made alike, so that we can confidently assume that fig. 159 represents the old native axe" (1912:125).

3. The shell blades (fig. 160) vary in length from 83 to 113 mm, in breadth from 43 to 49 mm, and in thickness from 24 to 28 mm. They are made from the shell of the giant clam *miskor* (1912:129).

The only Western axe blade known to me was dug up at Badu (fig. 29), it is made of *Tridacna* shell, as were those from Mer. It seems probable that stone blades were also made. What may have been a factory for making axe blades in Yam is referred to on p.76 (1935:302).

The evidence from Yam consists of two slabs with grinding depressions in the upper surface. Haddon considers that Landtman's tale of stones

coming from Torres Strait (1933:45-6) may have a possible origin here. Alternatively, he suggests that stone clubs may have been made, for the Yam-Tutu people had a military superiority over other islands (1935:76). Yam is a granite based island (1935:19).

4. Despite the paucity of percussive cutting implements the Torres Strait islanders managed to outfit a variety of elaborate and efficient canoes (Haddon, 1912b). However, most of the dugouts may have come from the mainland, leaving the islanders only the tasks of adding outriggers and ornamentation.

NORTH IRIAN JAYA 1

Locality. Lake Sentani, Humboldt Bay, Sko phylum-level Stock area (Wurm, 1972:12).

Number. 3.

Collectors. Unknown.

Dates. Unknown.

References. Moseley, 18⁷⁹~~97~~:439; Pleyte, 1887: Pl. VII, fig. 1; Clercq and Schmeltz, 1893:64, Pl. XIV, fig. 13; Edge Partington, 1890-98: Series I, Pl. 298, fig. 1; Lorentz, 1905: f.p.54; Sande, 1907:174-5, Pl. XX, fig. 8; Schultze-Jena, 1914:9, Pl. XXXVII, fig. f; Wirz, 1929: Pl. 45; Le Roux, 1948: Pl. XCIX, fig. II 3; Hinderling, 1949:65-6; Gallis, 1955:118; Cranstone, 196¹~~4~~: Pl. 14a, Middle, upper and lower.

Figure. Plate A26, figs. G and H, (no. 159).

Hafting features. A2, B3, C19, D32.

Handle. Long straight shaft with only slight thickening towards the proximal end.

Hafting. Blade set in a tapering separate socket of the forms usually found in Sepik areas. The blade-separate socket lashing is formed of several plaited or twisted bands or rings. The top of the separate socket projects beyond the upper surface of the shaft. Where the hole is made the proximal end is usually slotted and in this slot, on either side of the hole, a number of bands of plait are fixed, perhaps to help prevent splitting. A tension cord between the lower end of the socket and the shaft may also help prevent splitting by spreading the force of any blow.

Blade. The blades are well finished, have a protruding cutting edge, an oval cross-section and taper to the butt. Sande identifies the rock as chloromelanite, amphibolite or gabbro (1907:174).

Function. Canoe making, and other woodworking activities. No mention is anywhere made (in English) of a sago felling implement.

Manufacturing tradition. T4.

Comments. 1. The sago pith chopper NIJ 2 is like NIJ 1 with a different blade.

2. One source for the stone blades used around Lake Sentani is in the Torare River, on the northern slopes of the Cyclops Mountains. Pieces up to around 30 kilos were carried back to the villages by two men who slung the rocks between them on a pole (Sande, 1907:174).

The stones having got their required form by flaking, the grinding and polishing, *tset jai*, *sese*, *sesai*, are done at the same time. This work appears of less importance at all events I saw it done by a boy on a big flat grinding stone, *sedere*, without sand, but with plenty of water ... The finest hatchets are somewhat translucent near the edge (Sande, 1907:175-6).

3. Schultze-Jena (1914:9) gives the name *elmul* for axe among the Tulem people of the Sko coast.

4. Hinderling (1949:67-69) extends the localities to the lower Keerom River, to Arso, and to Tanah Merah Bay.

Statistics. Too few implements.

NORTH IRIAN JAYA 1

No.	Repository	Reg. No.	Locality	Date	Collector
159	AIM	42823	Lake Sentani	-	-
265	AIM	43116	-	-	-
636	AM	E29461	North Irian Jaya	-	Exch. Kol. Inst.

NORTH IRIAN JAYA 2

Locality. As NIJ 1 but Hinderling suggests the distribution may extent to the Sachstro and Keerom Rivers and Anoes.

References. Clercq and Schmeltz, 1893: Pl. XVII, fig. 6; Moseley, 1897:444; Edge Partington, 1890-98: Series I, Pl. 298, fig. 2; Sande, 1907:172-4, Pl. XX, fig. 7; Schultze-Jena, 1914:10, Pl. XXXVII, fig. e, Lewis, 1923: fig. 8; Hinderling, 1949:174.

Hafting features. A2, B3, C19, D32.

Handle. As NIJ 1.

Hafting. As NIJ 1, but because the pressure on the blade-separate socket lashing is less this becomes a split vine whipping.

Blade. An elongated cone shape almost circular in section, and having a dimple leaving a circular rim in the cutting end. Usually made of mottled metamorphic rocks and having a very high gloss.

Function. Sago pith chopping.

Manufacturing tradition. T4.

Comments. 1. Hafted like NIJ 1.

2. Moseley, repeated by Edge Partington, calls this implement a hammer, and complains (not unexpectedly) that it is most inefficient for this purpose.

3. Sande's description (1907:105-6) of the manufacture is partially quoted here:

The manufacture of the stone head of the sago club and of the hatchet, is the work of the men, apparently only of old and experienced hands. At Ase the stone was held in the left hand (fig. 112), whilst the right with a piece of old hatchet, which served as a hammer, *tse weri*, constantly knocked off small flakes ... This knocking, *weri woi*, caused the *fema* to obtain during the operation, which lasts several weeks, a light, greyish white colour. I saw the concave hollow, called *ani*, *fime* or *owje*, made by a revolving friction with another stone of a pointed shape, called *obi*, obtained, it was said, from the Abe-Mountain, situated close to Jotefa Bay, but chloromelanite may be used for this purpose ...

4. Schultze-Jena (1914:9-10) discusses the manufacture of this implement. He gives the names for it among the Jamwoe and Sae-Lauter as *foe*; among the Tulem as *sil*; and among the Monumbo as *akomag*.

5. Sande (1907:173) gives the name *fema* to the blade around L. Sentani.

NORTH IRIAN JAYA 3

Locality. As NIJ 1.

Reference. Sande, 1907:174, 233-4, Pl. XXV, figs. 4-10.

Style. Strictly speaking this implement is as difficult to fit into the system as the sago choppers made entirely from wood. It is a wooden hammer made in the T4 fashion with a handle rather like a woman's hair brush, having a wooden blade set in the centre of the short, round proximal end, in an oval hole which prevents it turning. Sande's

description continues (1907:233-4):

Made entirely from heavy palmwood, this small instrument belongs to the stone period in as far as it serves exclusively, or principally, in manufacturing the two principal instruments of this period, viz. the stone sago club and the stone hatchet. It has to be used in driving the plaited or twisted lashings along the conical handle and stone-holder, from the thinner to the thicker part, until all the stretching has disappeared and the requisite degree of jamming has been obtained. By this use it has become an important, yea, indispensable tool, and in accordance with this is the beautiful manner in which all these objects are carved, the snake-like line and also the fish-ornament often occurring.

NORTH IRIAN JAYA 4

Locality. Tor River, 138° 55'W.

Reference. Osterwal, 1961:60.

Osterwal reports that the women use an implement called *djok* for removing sago pith. This may be like NIJ 2, NIJ 6 or WIJ 2 and I have no idea which, if any, is more probable. Hinderling's sago pith choppers 2d (1949:174) may cover this area.

NORTH IRIAN JAYA 5

Locality. Meervlakte, the central basin of the Rouffaer and Idenburg Rivers.

References. Le Roux, 1948: Pl. XCIX, fig. II 6, and II 7, Pl. CII, figs. 1 and 2; Hinderling, 1949:71.

Hafting features. A1, B3, C18, D10.

Handle. Round to oval shaft, high heel but without a toe.

Hafting. Blade held in a tapering, unmodified separate socket by a simple split vine whipping, or by a number of twisted cane rings. The separate socket-handle lashing appears to be a part plaited variation of the sort of plaited cover found on SEP 8-10 (see Pl. A13, figs. G and H). Only those areas round the separate socket and underside of the shaft are plaited.

Blade. The blades seem to vary in size but to be oval in section and

to taper to the butt. One of those figured by Le Roux (Pl. CII, fig. 1) has straight sides. The four figured are set as axes or as adzes, with no intermediate settings shown.

Function. Probably multi-purpose.

Manufacturing tradition. T2.

Comments. These implements are very like those from the middle Sepik area except that the handle has no toe, and the plaiting of the lashing is but partially filled in. These are the only toeless hafts recorded in Melanesia.

NORTH IRIAN JAYA 6

Locality. Ba Teru, Meervlakte.

References. Le Roux, 1948: Pl. CII, fig. 3; Hinderling, 1949:174.

Hafting features. Not within the present system.

Handle. Straight stick.

Hafting. The 'separate socket' is held to the handle by a twisted ring of split vine and held by a tensioned string.

Blade. Hardwood stick.

Function. Sago pith chopper.

Manufacturing tradition. A variant of T2?

Comments. 1. This is the sago pith chopper most similar to the SNG 12 *oto* from Kiwai and adjacent areas. It may also be compared to WI 6.

2. Hinderling's group 2d sago pith choppers may belong in this group. If so their distribution may extend to Arso, Beeuw, Chamma and the Macluer Gulf (1949:174).

NORTH IRIAN JAYA 7

Locality. Sawia, near Arso in the Humboldt Bay area.

Reference. Hinderling, 1949:68.

Hafting features. A1, B2, C?, D?.

Handle. Footed handle.

Hafting. Blade set in separate socket and held by cane lashing.

Blade. Stone.

Function.

Manufacturing tradition. T2.

Comments. This is described by Hinderling, and may be the same as

NIJ 5.

WEST IRIAN JAYA 1

Locality. Chenderawasih (Geelvink) Bay, Tandia, Saukorem, east to Mamberano estuary?

References. de Clercq and Schmeltz, 1893:65: Pl. XVII, figs. 5 and 22; Edge Partington, 1890-98: Series I, Pl. 260, fig. 5; Le Roux, 1948: Pl. XCIX, fig. II 2; Hinderling, 1949:70, 72, 73.

Hafting features. Al, B3, Cl8?, D unknown.

Handle. Long, round shaft, foot very deep with approximately the same length heel as toe. The handle may be carved from a flat piece of wood, not from a branch and trunk piece although it is definitely a footed handle (cf. Hinderling, 1949: abb. 45).

Hafting. Blade held in a two-piece separate socket by twisted cane rings. Separate socket-blade lashing is basically a long whipping threaded through holes on the foot and round the socket. Twisted rings may also be worked through these holes.

Blade. An oval sectioned stone blade is present in the one figured by Le Roux. The one complete implement figured by de Clercq and Schmeltz appears to have a shaped, thin blade, perhaps metal.

Function. Canoe making, probably multi-purpose.

Manufacturing tradition. T2.

Comments. 1. de Clercq and Schmeltz' descriptions are:

No. 293. *Kamanji-anji*. Pl. XVII f. 5. ¼. Dissel, zijnde een ijzeren beitel, door middel van rotanvezels in een opengesplaten, afgeknotten kegel bevestigd, die door een vlechtwerk van rotanreepen tegen het vooreinde van den steel wordt vastgehouden. Tandia. Dient om hout af te beitelen.

No. 289. *Mangkar war* (*mangkar* = heft; *war* = dissel). Pl. XVII. f. 23. (sic). 1/5. Steel van eenen dissel, het einde van het handvat in den vorm van een dierenkop, met oogen, uitgestoken tong en groote tanden en een rugje langs het midden der bovenkant. (Zie Fig. 19). Saoekorem.

Het hierin bevestigd geweest zijnde ijzer wilde de eigenaar, van wien het stuk ingeruild werd, leiver behouden.

Voor al gebruikt bij het vervaardigen van prauen. (Dit exemplaar is afkomstig van Papoeas van Dore.)

2. Le Roux' locality of Humboldt Bay seems to be wrong as all others

of this form come from Chenderawasih area. The Humboldt Bay area implements are NIJ 1 and 2.

3. Edge Partington mistakes the handle he figures for a boat tiller.

4. Hinderling records adzes from the Mamberano estuary and Doreh which are like this.

WEST IRIAN JAYA 2

Locality. Chenderawasih (Geelvink) Bay, Windesi and Sibü.

References. de Clercq and Schmeltz, 1893:64, Pl. XXI, fig. 8; Sande, 1907:172-3, fig. 110; Hinderling, 1949:71, abb. 45.

Hafting features. Not within the present system.

Handle. Footed handle like WIJ 1.

Hafting. The 'separate socket' is lashed to the handle as in WIJ 1.

Blade. Hardwood stick.

Function. Sago pith pounder.

Manufacturing tradition. A variant of T2?

Comments. 1. de Clercq and Schmeltz collected two of these implements. They comment (1893:64):

No. 290. *Amaoe*. Pl. XXI, f. 8. 1/6. Sagoeklopper, het heft gelinkende op het onder no. 289 beschrevene, maar ruwer bewerkt. Het uiteinde van het handvat plat bolvormig, het knievormig vooreinde aan den bovenkant van den steel hooger oplopende en aan den onderkant recht afgesneden. Door middle van drie, door twee gaten geregen rotanreepen wordt een ± 44.5 cm lange en aan het onderende ± 3.5 cm dikke houten cylinder vastgehouden, die als klopper dient en welks onderende van een uitholling is voorzien. Windesi.

No. 297. *Hahogre*. Sagoeklopper als no. 290, het heft echter veel ruwer bewerkt en over de geheele lengte ovaal op doorsnede. Lengte van het heft ± 48 , dikte 2.5×2.9 cm. Lengte van het vooreinde 13 cm, van den cilindrischen klopper ± 45.5 , dikte van diens onderende ± 3.8 cm. Sieboe (Jooer).

De wijze van het bereiding van sago-meel uit het merg der palmen komt in Nieuw-Guinea overeen met die welke in de Molukken wordt gevolgd.

2. In its use of a hardwood stick as the pith chopping element this form is like NIJ 6 and SNG 12.

3. Hinderling (1949:174) places this form in the type 2a sago pith pounders, and the distribution may be extended from Windesi to Priedorstamm and the Mamberano delta.

WEST IRIAN JAYA 3

Locality. Chenderawasih (Geelvink) Bay, ?Waropen.

Reference. Pleyte, 1887: Pl. VII, fig. 2; Held, 1957:15, 204, 328.

Hafting features. A1, B3, C18?, D3.

Handle. Long round shaft, small heel, long toe.

Hafting. Blade held in separate socket by a simple whipping. The socket-handle lashing is also a long whipping.

Blade. The blade is tapering and appears to be set axe-wise.

Function. No information.

Manufacturing tradition. T2.

Comments. 1. I would like further confirmation that the origin of this implement is indeed Geelvink Bay, as its conformation suggests that it could well have come from the Sepik coast. The sketch is unclear.

2. Held reports that the stone bladed 'axe' *bono* was used in the Waropen district on the east margin of Geelvink Bay for general purposes and fighting, although it was, in his time, used for felling sago palms, and then only occasionally.

3. It is possible that the implements Held refers to could have belonged to WIJ 1 if Hinderling is correct in extending that distribution to the Mamberano estuary (see WIJ 1).

IMPLEMENTS NOT INCLUDED IN THE ANALYSIS

1. Nos. 281 and 286 (DM FE2742A, FE2741) were acquired in 1954. They give an impression of having been carefully made but are clearly non-utilitarian and may have been produced for sale. No provenance is given but a Massim origin is the most likely.
2. No. 591 (AM E38162) from Yule Island has a blade of the early high fronted type (Vanderwal, 1971; Allen, 1972) apparently hafted in a modern handle. It was collected in 1933.
3. No. 608 (AM E37510) was collected in Wanigela in 1934. It has an old handle and a lashing rather like the NEP 4 plait band. However, this holds a shell blade directly against the foot. The lack of a separate socket suggests that the implement may have been assembled for sale.
4. No. 784 (AM E53865) is supposed to have come from the Wahgi Valley. However, it is a T3 axe with a shell blade, possibly originally from Manus (WB 3) and perhaps reached the Wahgi during World War II.
5. No. 825 (PNGM E1049) comes from Mararoum in the Rigo sub-district. It is possibly an attempt to reconstruct an implement like SP 5. Its native name is given as *dadeia*.
6. No. 966 (IA M TA92) is without further information. It is a long handled implement with the separate socket held onto the right side of the foot by a long split vine strip whipping. The blade is a typical rather large, flat-sided one from a Central Interior quarry. Possible provenances might be in the southern fringes of the Central Interior.

APPENDIX II

COMPARATIVE STATISTICS

INTRODUCTION

Twenty samples have been chosen for statistical comparisons. All have 14 or more specimens and all come from the New Guinea mainland. They include:

NEP 1 = 75 implements	CI 1 = 14 implements
NEP 2 = 15 "	CI 4 = 54 "
NEP 4 = 14 "	CI 7 = 51 "
NEP 5 = 26 "	CI 9 = 31 "
SEP 4 = 22 "	CI 10 = 23 "
SEP 8 = 15 "	CI 12 = 30 "
MAS 1 = 16 "	CI 13 = 31 "
SP 5 = 35 "	WI 1 = 17 "
EI 2 = 16 "	WI 2 = 20 "
EI 4 = 37 "	WI 21 = 17 "

Two of the MAS 1 implements, three of the SP 5, one of EI 4, one of CI 7, and one of CI 9 have been left out of the statistics, the MAS 1, SP 5 and CI 7 ones because of atypical blades or haftings, the others as they have metal blades. This leaves 552 implements in the statistically compared samples, against 918 implements which have been included in the total collection. The total collection used in the analysis (Chapter 27) includes all implements judged to be fully representative of the traditional repertoires of percussive cutting and similarly hafted implements, and excludes all implements with metal blades and all implements suspected of having been made for demonstration or sale.

Two sets of tests are represented: t-tests on the ratio scale variables V7 - V22, V34, and a percentage based difference statistic for the nominal scale variables V23 - V33.

The percentage based difference coefficient used is an adaptation of Robinson's 1951 similarity statistic which was developed by L.M. Groube (Groube and Chappell, 1973) and the formula has been given in Vol. I, Chapter 24. Ten tables are presented, one each for V23 - V29 and V31 - V33. V30, the hafting modification, is the same in all these samples and so does not warrant a table. In these tables (A81 - A90) the scores which were originally calculated to two decimal places have been rounded up or

down to the nearest whole number. One effect of this has been to increase the number of zero scores. Very few zeros in these tables indicate no difference at all in attribute distributions, whereas the complete difference score, 100, has never been affected by rounding up.

The significances of sample comparisons for the 17 ratio scale variables are given in tables A91 - A107. In all these tables HS (highly significant) indicates that the probability of rejecting the null hypothesis (which is that both groups are similar) in favour of the hypothesis that both groups are dissimilar is greater than 0.001 ($\alpha = > 0.001$), S (significant) indicates a rejection of the null hypothesis at $\alpha = > 0.01$, and PS (probably significant) indicates a rejection at $\alpha = > 0.05$. As each comparison is based upon a pair of differently sized samples the significance levels are different for each of the 190 entries in the matrix. Therefore, the actual scores have not been given, but are available in the Prehistory Department archives if required.

All these tables are discussed in Vol. I, Chapter 24.

TABLE A81: Differences of 20 populations for feature V23, poll of blade (5 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	20																			
NEP 4	10	27																		
NEP 5	17	39	4																	
SEP 4	12	30	1	4																
SEP 8	14	25	4	10	3															
MAS 1	11	17	5	13	5	1														
SP 5	14	25	4	10	3	0	1													
EI 2	79	100	100	100	100	100	100	2												
EI 4	12	28	1	5	0	2	3	0	100											
CI 1	14	17	38	49	41	36	29	36	56	40										
CI 4	45	36	77	90	82	79	70	80	50	80	17									
CI 7	29	25	58	69	63	62	53	62	56	62	8	4								
CI 9	35	20	64	77	68	63	53	63	67	66	11	5	4							
CI 10	56	25	78	92	83	78	67	73	92	81	33	15	19	9						
CI 12	26	4	43	55	46	41	32	41	94	45	15	24	16	9	12					
CI 13	15	9	22	30	27	29	22	30	100	30	23	40	25	25	35	14				
WI 1	30	50	22	15	25	33	35	33	100	28	57	90	70	78	92	62	29			
WI 2	38	56	32	25	35	43	44	43	100	38	62	90	71	80	92	65	33	1		
WI 21	38	56	32	25	35	43	44	43	100	38	62	90	71	80	92	65	33	1	0	

TABLE A82: Differences of 20 populations for feature V24, plan of blade (4 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	1																			
NEP 4	0	1																		
NEP 5	13	19	12																	
SEP 4	11	18	11	1																
SEP 8	4	4	4	20	16															
MAS 1	28	30	27	6	7	36														
SP 5	7	12	6	1	1	13	11													
EI 2	39	30	40	79	76	36	100	67												
EI 4	26	18	27	64	61	24	85	52	4											
CI 1	28	36	27	6	7	36	0	11	100	85										
CI 4	28	36	27	6	7	36	0	11	100	85	0									
CI 7	28	36	27	6	7	36	0	11	100	85	0	0								
CI 9	28	36	27	6	7	36	0	11	100	85	0	0	0							
CI 10	21	29	21	2	3	29	2	5	92	76	2	2	2	2						
CI 12	5	10	4	2	2	11	13	0	62	48	13	13	13	13	8					
CI 13	5	10	5	2	1	11	13	0	63	49	13	13	13	13	7	0				
WI 1	13	20	12	0	1	20	6	1	79	64	6	6	6	6	2	2	2			
WI 2	0	2	1	10	9	4	25	5	43	30	25	25	25	25	18	3	4	10		
WI 21	19	27	19	1	2	27	3	4	89	74	3	3	3	3	0	6	6	1	17	

TABLE A83: Differences of 20 populations for feature V25, plan of cutting edge (3 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	3																			
NEP 4	1	5																		
NEP 5	2	0	3																	
SEP 4	2	8	1	6																
SEP 8	4	3	2	2	5															
MAS 1	4	4	1	2	5	0														
SP 5	2	4	0	2	2	1	1													
EI 2	1	4	4	4	3	8	8	5												
EI 4	1	5	0	4	1	2	2	0	4											
CI 1	9	3	11	4	16	7	7	10	11	12										
CI 4	10	7	8	6	13	3	4	6	15	9	4									
CI 7	10	7	8	6	13	3	4	6	15	9	4	0								
CI 9	10	7	8	6	13	3	4	6	15	9	4	0	0							
CI 10	10	7	8	6	13	3	4	6	15	9	4	0	0	0						
CI 12	9	4	9	4	14	5	5	8	12	10	1	2	2	2	2					
CI 13	10	7	8	6	13	3	4	6	15	9	4	0	0	0	0	2				
WI 1	4	4	2	2	6	0	1	1	8	3	7	3	3	3	3	5	3			
WI 2	10	7	8	6	13	3	4	6	15	9	4	0	0	0	0	2	0	3		
WI 21	4	4	2	2	6	0	1	1	8	3	7	3	3	3	3	5	3	0	3	

TABLE A84: Differences for feature V26, profile of blade (5 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	11																			
NEP 4	6	15																		
NEP 5	10	23	21																	
SEP 4	9	19	13	8																
SEP 8	31	42	35	25	15															
MAS 1	8	6	19	11	12	33														
SP 5	10	4	13	16	10	29	6													
EI 2	37	55	47	18	31	29	42	47												
EI 4	4	12	13	5	6	21	5	7	27											
CI 1	6	15	0	21	13	35	19	13	47	13										
CI 4	19	35	15	20	9	22	30	26	37	22	15									
CI 7	39	54	28	41	26	30	53	46	46	41	27	9								
CI 9	21	43	18	20	13	23	34	35	33	24	18	3	9							
CI 10	24	39	14	26	14	26	37	31	43	29	14	2	7	4						
CI 12	33	42	23	37	19	19	43	33	43	30	23	16	8	17	16					
CI 13	8	19	3	17	8	31	20	13	45	45	3	9	24	13	9	22				
WI 1	6	18	11	6	1	18	11	10	30	4	11	9	27	13	15	21	7			
WI 2	5	7	5	13	7	30	9	3	44	7	6	18	36	25	21	28	6	16		
WI 21	19	18	31	12	14	33	8	15	42	15	31	24	51	30	31	51	23	32	17	

TABLE A85: Differences of 20 populations for feature V27, profile of cutting edge (4 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	3																			
NEP 4	2	0																		
NEP 5	3	5	3																	
SEP 4	11	21	18	9																
SEP 8	37	45	44	38	21															
MAS 1	18	18	17	18	29	50														
SP 5	7	13	10	2	5	36	23													
EI 2	3	5	4	0	9	38	18	2												
EI 4	3	7	9	0	8	38	19	1	1											
CI 1	14	17	15	12	19	44	2	13	12	12										
CI 4	85	84	84	86	91	96	42	88	86	86	52									
CI 7	100	100	100	100	100	100	56	100	100	100	65	5								
CI 9	73	74	74	72	72	75	32	72	72	72	40	10	9							
CI 10	50	53	51	47	46	56	17	45	47	47	20	24	24	6						
CI 12	2	9	7	3	4	28	21	5	3	3	15	86	100	73	48					
CI 13	10	16	13	4	5	35	25	0	9	8	15	89	100	72	45	6				
WI 1	18	25	22	11	7	33	33	5	10	9	22	96	100	71	44	13	3			
WI 2	11	18	15	5	5	34	26	1	5	4	16	90	100	72	45	7	0	3		
WI 21	10	16	14	4	5	35	25	0	4	3	15	90	100	72	45	7	0	3	0	

TABLE A86: Differences of 20 populations for feature V28, cutting edge from below (3 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	5																			
NEP 4	14	3																		
NEP 5	1	4	12																	
SEP 4	1	5	15	0																
SEP 8	6	15	27	6	5															
MAS 1	1	2	10	0	1	8														
SP 5	32	15	5	31	34	49	27													
EI 2	1	7	18	1	0	3	2	38												
EI 4	55	36	21	56	60	76	52	7	63											
CI 1	11	21	31	13	12	8	14	51	11	71										
CI 4	3	13	25	5	3	2	6	46	2	70	6									
CI 7	6	15	27	6	5	0	8	49	3	76	8	2								
CI 9	6	17	28	8	6	2	9	49	5	73	4	1	2							
CI 10	6	17	28	8	7	2	10	50	6	72	3	1	2	0						
CI 12	3	11	22	2	1	2	4	43	1	69	9	1	2	3	4					
CI 13	15	4	0	14	16	29	11	4	19	19	33	26	29	30	30	24				
WI 1	42	26	13	43	47	62	39	4	50	2	55	56	62	58	57	56	12			
WI 2	63	41	25	62	65	82	57	9	70	2	82	78	82	82	82	75	23	7		
WI 21	37	19	8	36	39	55	32	0	43	5	56	51	55	55	55	49	7	3	6	

TABLE A87: Differences of 20 populations for feature V29, crown-section of blade (7 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	3																			
NEP 4	5	1																		
NEP 5	11	6	3																	
SEP 4	9	9	12	14																
SEP 8	13	12	14	19	5															
MAS 1	93	100	100	100	100	100														
SP 5	49	50	45	43	60	5	28													
EI 2	3	0	1	6	9	12	100	50												
EI 4	4	1	3	8	5	8	100	52	1											
CI 1	42	43	41	41	51	50	78	45	43	45										
CI 4	88	93	93	93	93	93	75	79	93	93	28									
CI 7	95	100	100	100	100	100	75	85	100	100	33	2								
CI 9	88	94	94	94	94	94	75	80	94	94	28	0	2							
CI 10	95	100	100	100	100	100	75	85	100	100	33	2	0	2						
CI 12	78	83	82	82	84	83	75	69	82	83	20	2	5	2	5					
CI 13	2	6	9	14	12	15	83	42	6	7	42	87	94	87	94	77				
WI 1	7	4	3	6	7	6	100	48	4	2	43	93	100	94	100	82	11			
WI 2	82	77	66	52	85	88	93	56	77	80	66	90	90	90	90	84	84	71		
WI 21	42	35	27	22	36	27	100	43	35	33	49	93	100	94	100	83	45	22	35	

TABLE A88: Differences of 20 populations for feature V31, finish of blade (5 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	4																			
NEP 4	45	54																		
NEP 5	3	7	32																	
SEP 4	48	60	9	38																
SEP 8	32	31	22	23	39															
MAS 1	67	77	59	56	47	40														
SP 5	65	65	2	53	49	24	12													
EI 2	15	23	48	14	43	49	82	84												
EI 4	42	50	7	31	3	29	46	42	43											
CI 1	46	53	3	33	20	17	17	11	57	15										
CI 4	63	63	25	55	54	26	11	2	86	46	14									
CI 7	76	76	33	68	63	36	8	5	100	57	22	4								
CI 9	38	37	22	31	47	13	21	9	62	39	13	6	15							
CI 10	76	76	33	68	63	36	8	5	100	57	22	4	0	15						
CI 12	76	76	33	68	63	36	8	5	100	57	33	4	0	15	0					
CI 13	68	72	10	54	17	32	28	22	77	12	10	27	29	32	29	29				
WI 1	81	81	26	68	22	48	50	43	89	18	31	49	48	52	48	48	9			
WI 2	22	20	20	13	39	8	37	21	40	28	15	22	33	7	33	33	33	49		
WI 21	78	78	17	63	31	33	23	15	90	26	13	20	17	28	17	17	5	13	33	

TABLE A89: Difference of 20 populations for feature V32, use wear (9 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	18																			
NEP 4	3	19																		
NEP 5	2	22	5																	
SEP 4	7	17	6	4																
SEP 8	24	57	30	24	37															
MAS 1	11	37	15	10	17	17														
SP 5	8	32	10	5	18	21	4													
EI 2	10	31	13	7	17	24	3	2												
EI 4	7	28	8	1	20	23	10	3	6											
CI 1	12	39	17	12	18	15	0	6	5	12										
CI 4	35	67	44	40	41	15	20	35	35	41	16									
CI 7	53	86	61	59	56	24	37	54	54	61	32	4								
CI 9	38	70	41	45	34	30	22	36	36	47	18	9	12							
CI 10	40	72	48	44	46	14	24	40	39	43	20	1	3	13						
CI 12	11	39	18	13	18	13	4	12	11	15	3	1	24	16	14					
CI 13	8	31	7	14	6	24	15	16	19	20	15	30	43	23	35	13				
WI 1	11	14	9	12	18	38	33	23	28	16	35	57	75	66	61	33	24			
WI 2	11	30	12	8	16	29	5	2	1	7	7	40	60	38	45	15	19	29		
WI 21	11	34	13	19	7	27	12	20	19	25	10	20	31	14	24	7	4	32	20	

TABLE A90: Difference of 20 populations for feature V33, material (10 attributes).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	4																			
NEP 4	41	47																		
NEP 5	57	64	12																	
SEP 4	84	88	43	32																
SEP 8	65	64	48	43	18															
MAS 1	100	100	75	100	100	100														
SP 5	86	88	58	79	83	79	10													
EI 2	83	91	29	10	38	66	100	86												
EI 4	78	77	56	50	17	2	100	80	66											
CI 1	85	91	57	51	53	66	100	86	52	67										
CI 4	100	100	100	100	100	100	100	100	100	100	22									
CI 7	96	92	88	87	83	82	100	92	89	82	13	5								
CI 9	100	100	100	100	100	100	100	100	100	100	22	4	5							
CI 10	97	95	93	93	92	92	100	95	94	92	16	2	1	2						
CI 12	91	89	75	71	56	56	100	87	77	55	9	18	7	18	12					
CI 13	77	82	34	22	8	14	100	80	32	17	45	94	77	94	86	51				
WI 1	84	88	38	25	5	17	100	83	29	16	50	100	83	100	92	56	3			
WI 2	87	88	59	51	11	7	100	84	60	3	62	100	82	100	92	54	12	9		
WI 21	83	89	28	10	16	39	100	83	7	39	47	100	84	100	92	63	12	9	32	

TABLE A91: Significance levels for t-tests, V7 length of blade protruding.
HS $\alpha > .001$
S $\alpha > .01$
PS $\alpha > .05$

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	.																			
NEP 4	.	.																		
NEP 5	.	.	.																	
SEP 4	.	.	.	.																
SEP 8	PS	PS	PS	PS	PS															
MAS 1	HS	S	S	S	S	.														
SP 5	HS	S	PS	S	S	.	.	S												
EI 2	HS	S	PS	S	S	.	.	S												
EI 4	S	S	PS	PS	PS	.	PS	.	.		PS									
CI 1	HS	S	HS	HS	PS	.	.	.	.	PS										
CI 4	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS									
CI 7	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS								
CI 9	HS	HS	HS	HS	HS	S	.	PS	.	HS	.	HS	HS							
CI 10	HS	HS	HS	HS	HS	PS	.	.	.	HS	.	HS	HS	.						
CI 12	S	PS	S	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS					
CI 13	.	.	S	.	S	.	PS	PS	PS	.	S	HS	HS	HS	HS	HS				
WI 1	HS	HS	HS	HS	HS	PS	.	.	.	HS	.	HS	HS	.	.	HS	HS			
WI 2	HS	HS	S	HS	HS	.	.	.	.	S	.	HS	HS	.	.	HS	HS	.		
WI 21	.	.	.	.	.	.	.	.	.	.	.	HS	HS	S	S	HS	.	PS	PS	

TABLE A92: Significance levels for t-tests, V8 width of blade at haft.

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	PS																			
NEP 4	.	S																		
NEP 5	.	HS	.																	
SEP 4	.	PS	.	.																
SEP 8	.	HS	.	.	.															
MAS 1	HS	S	S	HS	HS	HS														
SP 5	HS	HS	HS	HS	HS	HS	PS													
EI 2	HS	HS	PS	HS	HS	S	.	PS												
EI 4	.	HS	PS	S	.	HS	HS	HS	HS											
CI 1	.	S	.	.	.	.	HS	HS	PS	S										
CI 4	PS	HS	.	.	.	.	HS	HS	HS	HS	.									
CI 7	HS	HS	S	HS	HS	S	S	HS	PS	HS	S	HS								
CI 9	PS	HS	.	.	.	.	HS	HS	HS	HS	.	.	S							
CI 10	HS	HS	.	PS	PS	.	S	HS	.	HS	.	HS	.	.						
CI 12	.	.	S	HS	.	HS	HS	HS	HS	PS	HS	HS	HS	HS	HS					
CI 13	.	PS	S	HS	.	HS	HS	HS	HS	.	HS	HS	HS	HS	HS	.				
WI 1	.	HS	.	.	.	.	HS	HS	HS	PS	.	.	HS	.	PS	HS	S			
WI 2	.	PS	S	PS	.	S	HS	HS	HS	.	PS	S	HS	S	HS	.	.	PS		
WI 21	.	.	S	S	.	HS	HS	HS	HS	PS	S	HS	HS	HS	HS	.	.	S	.	

TABLE A93: Significance levels of t-tests for V9, thickness of blade at haft.

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	.																			
NEP 4	S	PS																		
NEP 5	HS	S	.																	
SEP 4	HS	HS	.	PS																
SEP 8	HS	HS	PS	HS	.															
MAS 1	.	.	PS	PS	S	HS														
SP 5	HS	HS	PS	HS	.	.	HS													
EI 2	HS	HS	.	.	.	.	HS	.												
EI 4	HS	HS	.	S	.	.	HS	.	.											
CI 1	HS	HS	.	S	.	.	HS	.	.	.										
CI 4	S	PS	.	.	HS	HS	.	HS	S	HS	HS									
CI 7	.	.	HS	HS	HS	HS	.	HS	HS	HS	HS	HS								
CI 9	HS	HS	.	S	.	.	HS	.	.	.	.	HS	HS							
CI 10	.	.	.	.	S	HS	.	HS	S	HS	HS	.	S	HS						
CI 12	HS	HS	PS	.	PS	HS	HS	S	.	PS	S	PS	HS	S	PS					
CI 13	HS	HS	.	HS	.	.	HS	.	.	.	.	HS	HS	.	HS	S				
WI 1	HS	HS	S	HS	.	.	HS	.	S	HS	.	HS	HS	.	HS	HS	HS			
WI 2	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS		
WI 21	HS	HS	S	HS	.	.	HS	.	S	HS	.	HS	HS	.	HS	HS	HS	PS	HS	

TABLE A94: Significance levels of t-tests for V10, width of cutting edge.

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	PS																			
NEP 4	.	S																		
NEP 5	PS	HS	.																	
SEP 4	.	PS	.	.																
SEP 8	.	S	.	.	.															
MAS 1	HS	HS	S	HS	HS	HS														
SP 5	HS	HS	HS	HS	HS	HS	.													
EI 2	S	HS	.	.	.	PS	S	S												
EI 4	PS	.	HS	HS	S	HS	HS	HS	HS											
CI 1	HS	HS	.	S	S	S	.	PS	.	HS										
CI 4	HS	HS	HS	HS	HS	HS	S	.	HS	HS	HS									
CI 7	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS								
CI 9	HS	HS	PS	HS	HS	HS	.	PS	.	HS	.	HS	HS							
CI 10	HS	HS	S	HS	HS	HS	S	.	S	HS	PS	.	HS	.						
CI 12	.	S	S	S	.	.	HS	HS	HS	S	HS	HS	HS	HS	HS					
CI 13	.	HS	PS	S	.	.	HS	HS	HS	HS	HS	HS	HS	HS	HS	.				
WI 1	.	HS	.	.	.	.	HS	HS	PS	HS	HS	HS	HS	HS	HS	PS	PS			
WI 2	.	S	.	PS	.	.	HS	HS	S	HS	HS	HS	HS	HS	HS	.	.	PS		
WI 21	.	.	PS	S	.	.	HS	HS	HS	.	HS	HS	HS	HS	HS	.	.	S	.	

TABLE A95: Significance levels of t-tests for VII, length of cutting edge.

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	*																			
NEP 4	PS	S																		
NEP 5	*	S	*																	
SEP 4	*	PS	*	*																
SEP 8	*	PS	*	*	*															
MAS 1	HS	HS	PS	HS	HS	HS														
SP 5	HS	HS	HS	HS	HS	HS	*													
EI 2	PS	S	*	*	*	*	S	HS												
EI 4	PS	*	HS	HS	PS	S	HS	HS	HS											
CI 1	HS	HS	*	S	PS	PS	*	S	*	HS										
CI 4	HS	HS	HS	HS	HS	HS	S	*	HS	HS	HS									
CI 7	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS								
CI 9	HS	HS	*	S	S	S	*	S	*	HS	*	HS	HS							
CI 10	HS	HS	S	HS	HS	HS	*	*	S	HS	*	*	HS	PS						
CI 12	*	PS	S	PS	*	*	HS	HS	S	S	HS	HS	HS	HS	HS					
CI 13	*	HS	*	*	*	*	HS	HS	*	HS	HS	HS	HS	HS	HS	S				
WI 1	*	HS	*	*	*	*	HS	HS	*	HS	S	HS	HS	PS	HS	HS	*			
WI 2	*	HS	*	*	*	*	HS	HS	*	HS	HS	HS	HS	S	HS	PS	*	*		
WI 21	*	PS	*	*	*	*	HS	HS	*	HS	HS	HS	HS	S	HS	*	*	*	*	

TABLE A96: Significance levels of t-tests for V34, cutting edge index (V10 as X of VII).

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	*																			
NEP 4	*	*																		
NEP 5	*	*	PS																	
SEP 4	*	*	*	*																
SEP 8	*	*	*	*	*															
MAS 1	*	*	*	*	*	*														
SP 5	PS	PS	*	HS	PS	*	*													
EI 2	S	*	PS	*	*	PS	*	HS												
EI 4	*	*	*	*	*	*	*	*	PS											
CI 1	*	*	*	*	*	*	*	*	PS	*										
CI 4	PS	PS	*	HS	S	*	*	*	HS	*	*									
CI 7	HS	HS	*	HS	HS	*	S	*	HS	S	PS	*								
CI 9	S	*	S	*	*	*	PS	HS	*	PS	PS	HS	HS							
CI 10	*	*	*	*	*	*	*	PS	PS	*	*	S	HS	PS						
CI 12	*	*	*	PS	*	*	*	*	S	*	*	*	S	S	*					
CI 13	HS	HS	PS	HS	HS	S	HS	S	HS	HS	S	HS	S	HS	HS	HS				
WI 1	S	PS	*	HS	S	*	PS	*	HS	PS	*	*	*	HS	S	S	*	*		
WI 2	S	PS	*	HS	S	*	PS	*	HS	PS	*	PS	*	HS	S	S	*	*		
WI 21	HS	S	*	HS	S	PS	S	PS	HS	S	PS	HS	S	HS	HS	HS	*	*	*	

TABLE A97: Significance levels of t-tests for V12, angle of cutting edge.

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	*																			
NEP 4	*	*																		
NEP 5	*	*	*																	
SEP 4	HS	HS	S	S																
SEP 8	*	S	*	*	PS															
MAS 1	S	*	S	S	HS	HS														
SP 5	S	PS	*	*	*	*	HS													
EI 2	*	*	*	*	HS	*	PS	*												
EI 4	HS	S	PS	S	*	*	HS	*	S											
CI 1	HS	HS	S	S	*	PS	HS	*	S	*										
CI 4	PS	*	PS	PS	HS	HS	PS	HS	*	HS	HS	HS								
CI 7	HS	HS	HS	HS	HS	HS	*	HS	HS	HS	HS	HS								
CI 9	PS	*	*	*	PS	*	HS	*	*	*	PS	HS	HS							
CI 10	*	*	*	*	HS	*	HS	*	HS	HS	HS	*	HS	PS						
CI 12	HS	HS	S	S	*	PS	HS	*	HS	*	*	HS	HS	PS	HS					
CI 13	HS	S	*	PS	*	*	HS	*	S	*	PS	HS	HS	*	S	*				
WI 1	HS	HS	PS	PS	*	PS	HS	*	S	*	*	HS	HS	*	S	*	*			
WI 2	S	S	*	*	*	*	HS	*	PS	*	PS	HS	HS	*	S	*	*			
WI 21	HS	HS	HS	HS	PS	HS	HS	S	HS	PS	*	HS	HS	PS	HS	S	S	PS	HS	

TABLE A98: Significance levels of t-tests for V13, length of handle.

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	*																			
NEP 4	*	*																		
NEP 5	*	*	*																	
SEP 4	HS	HS	PS	HS																
SEP 8	*	S	*	HS	PS															
MAS 1	*	*	PS	PS	*	*														
SP 5	HS	HS	PS	HS	*	*	PS													
EI 2	HS	HS	PS	HS	*	PS	S	*												
EI 4	HS	HS	HS	HS	*	HS	HS	*	*											
EI 1	HS	HS	S	HS	*	HS	*	*	*	*										
CI 4	HS	HS	HS	HS	*	HS	*	PS	*	*	*									
CI 7	S	HS	*	HS	S	*	HS	S	S	HS	HS	HS								
CI 9	HS	HS	HS	HS	*	HS	HS	*	*	*	*	*	HS							
CI 10	HS	HS	HS	HS	*	HS	HS	*	*	*	*	*	HS	*						
CI 12	HS	HS	PS	HS	*	*	HS	*	*	*	*	S	S	*	*					
CI 13	*	*	*	*	HS	*	PS	HS	HS	HS	HS	HS	HS	HS	HS	HS				
WI 1	*	PS	*	HS	PS	*	*	*	PS	HS	HS	HS	*	HS	HS	*	*			
WI 2	*	PS	*	S	PS	*	*	*	PS	HS	HS	HS	*	HS	HS	*	PS	*		
WI 21	*	PS	*	HS	*	*	*	*	PS	HS	HS	HS	*	HS	HS	*	PS	*	*	

TABLE A99: Significance levels of t-tests for V14, shaft diameter.

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	S																			
NEP 4	.	.																		
NEP 5	HS	.	.																	
SEP 4	HS	HS	S	HS																
SEP 8	HS	HS	HS	HS	.															
MAS 1	HS	HS	HS	HS	.	.														
SP 5	PS	PS	.	HS	.	.	.													
EI 2	HS	.	.	.	HS	HS	HS	S												
EI 4	HS	.	.	.	HS	HS	HS	HS	.	PS	PS									
CI 1	.	.	.	PS	HS	HS	HS	.	PS	PS										
CI 4	HS	.	.	S	HS	HS	HS	HS	HS	PS	.									
CI 7	HS	.	.	HS	HS	HS	HS	HS	HS	HS	.	.								
CI 9	S	HS	PS	HS	.	.	PS	.	HS	HS	S	HS	HS							
CI 10	HS	HS	HS	HS	.	.	PS	.	HS	HS	HS	HS	HS	.						
CI 12	HS	HS	HS	HS	PS	S	.	S	HS	HS	HS	HS	HS	HS	HS					
CI 13	HS	HS	HS	HS	.	.	PS	.	HS	HS	HS	HS	HS	PS	.	HS				
WI 1	.	.	.	S	HS	HS	HS	.	S	S	.	.	.	S	HS	HS	HS			
WI 2	.	.	.	HS	HS	HS	HS	PS	S	S	.	PS	.	HS	HS	HS	HS	.		
WI 21	.	.	.	S	HS	HS	HS	PS	S	PS	.	.	.	HS	HS	HS	HS	.	.	

TABLE A100: Significance levels of t-tests for V15, length of handle foot.

	NEP 1	NEP 2	NEP 4	NEP 5	SEP 4	SEP 8	MAS 1	SP 5	EI 2	EI 4	CI 1	CI 4	CI 7	CI 9	CI 10	CI 12	CI 13	WI 1	WI 2	WI 21
NEP 1																				
NEP 2	S																			
NEP 4	.	PS																		
NEP 5	S	.	.																	
SEP 4	S	.	.	.																
SEP 8	.	S	.	S	S															
MAS 1	HS	HS	HS	HS	HS	HS														
SP 5	HS	HS	HS	HS	HS	HS	.													
EI 2	HS	HS	S	HS	HS	S	HS	S												
EI 4	.	PS	.	PS	PS	.	HS	HS	HS											
CI 1	HS	HS	HS	HS	HS	HS	PS	.	HS	HS										
CI 4	HS	HS	S	HS	HS	S	HS	HS	.	HS	HS									
CI 7	HS	HS	HS	HS	HS	HS	HS	HS	.	HS	HS	HS								
CI 9	.	HS	.	HS	HS	.	HS	HS	PS	HS	HS	.	HS							
CI 10	.	.	.	.	.	.	HS	HS	HS	.	HS	HS	HS	S						
CI 12	.	HS	.	HS	HS	.	HS	HS	HS	.	HS	HS	HS	S	.					
CI 13	.	PS	.	.	.	S	HS	HS	HS	.	HS	HS	HS	HS	.	PS				
WI 1	S	HS	PS	HS	HS	S	HS	S	.	HS	HS	.	HS	.	HS	HS	HS			
WI 2	HS	HS	HS	HS	HS	HS	HS	.	HS	HS	.	HS	HS	HS	HS	HS	HS	PS		
WI 21	.	HS	.	HS	HS	.	HS	HS	S	HS	HS	PS	HS	.	S	HS	HS	HS	HS	

