

butt from blade (Figs. 50–51). Easter Island, Marquesas.

E. Distinguished from 4-A by lack of tang.

Type 5: *Axes and side-hafted adzes. These are supposed to have been hafted with edge and haft in the same plane. Axes are distinguished by a symmetrical edge and adzes by a single bevel.*

A. Adzes with tang produced by reduction usually of right and rarely of left side. Cross-section is triangular with a vertex opposite the haft-receiving side (Fig. 61 a–b). Pitcairn.

B. Tangless axes with a tendency toward lenticular cross-section, and with haft-receiving side flattened (Fig. 63 a). Mangareva.

C. Adzes with tang similar to 5-A and cross-section trapezoidal to triangular with vertex opposite the front. Type defined by writers* (Fig. 61 c–e). Pitcairn, Tubuai (?).

Type 6: *Tangless gouges with circular cross-section* (Fig. 62 c–f). Easter Island, Pitcairn, Marquesas.

EASTER ISLAND ADZES

The only previous systematic study of Easter Island adzes has been published by Métraux (1940, pp. 272–278). He defined two types among the 113 adzes and fragments in the Bernice P. Bishop Museum collection. The larger number of specimens included in the present study, 489 from the Kon-Tiki Museum and 186 from other museums, reveals a greater range and more types. Unfinished specimens permit insights into manufacturing processes. Comparison of adzes of undoubted provenience with others obtained from local people disclosed only two counterfeits among the latter. Counterfeit adzes are rare because they are time consuming to make and genuine specimens are relatively easy to find. Unless otherwise indicated, type descriptions are based on the Kon-Tiki Museum collection which comprises most of the Easter Island materials studied. The quantities of specimens in the various collections examined are listed at the end of each sub-type discussion and summarized in Appendix B. Noteworthy features of all specimens are discussed in the text.

* Duff (1950, pp. 194–195) formerly used Type 5-C for a different type of side-hafted adze. In his later work he proposes to use a definition similar to that given here (Personal communication to the writers, June 24, 1959).

Type 2-A: (310 specimens, or 45.9 %; Fig. 45) This is the largest group, and corresponds closely to Métraux's Type 1 (1940, pp. 273–274). The Easter Island specimens have in general a quadrangular or irregular cross-section with front always wider than back. They are thin (width thickness index based on 68 finished Kon-Tiki Museum specimens is 59, and ranges from 36 to 92).[†] The edge is wider than the poll. Shaping by rough chipping is followed by grinding, but never sufficiently to obliterate chip scars completely. The front is usually more thoroughly ground than the back, which often is ground only on, and in the vicinity of, the bevel. Occasional specimens are thoroughly ground on the back. Pecking is rare.

The front is slightly convex longitudinally, tending to be flatter in longer specimens. Transversely it is flat or occasionally slightly convex. Side-front junctions are sharply defined, and straight or slightly convex in front view. The back is also longitudinally slightly convex. Extensively ground specimens have arris removed from back-side junctions to different degrees, in extreme cases resulting in a continuous curved surface including sides and back. On others rough chipping has produced an irregular convex or angular surface on which sides and back are not defined. The inward sloping chipped sides sometimes reduce the back to a ridge and produce an irregularly triangular cross-section. On well ground specimens bevel merges into back and on others forms an irregular chin. Transversely the bevel is slightly convex, rarely flat. Except for two specimens, the poll is left unground. Edge is slightly convex. Size is most frequently medium to small, though there are a few large specimens.

Three small finished specimens and one fragment differ in that edge and poll are equal and maximum width is at the midpoint. They are unusually narrow, and probably are chisels, as may also be other small examples of this sub-type.

Two complete specimens and four fragments tend to have straight and well marked back-side junctions and bevel margins (Fig. 45 h). All surfaces of one fragment are unusually well ground. One is medium size, while the others are large.

One finished, unusually long and narrow example is made of a suitable block only slightly changed by chipping and grinding (Fig. 45 g). Seven unfinished specimens

[†] This index, which is calculated for larger samples, or when otherwise significant, is obtained by multiplying thickness at mid-length over width at mid-length by 100. In the case of this sub-type the width at mid-length is calculated from measured terminal widths.

and one fragmentary finished example have similar characteristics.

Manufacturing technique: Usually a stone with a flat surface which, with little or no chipping, could form the adze front was selected. Back, sides, poll, and bevel were formed by chipping, with suitable natural surfaces in some cases remaining on the back. Rarely some pecking obscured chip scars on the back and served to regularize the bevel. It was used much less than on Types 2-B and 4-D. The front was ground before the back, and the edge was finished last. On some specimens the edge was ground flat in a narrow transverse plane (Fig. 45 c, f, i). Regular and minute transverse chipping sometimes prepared for this grinding (Fig. 45 e). The system was probably employed to produce a regular line to serve as a guide for grinding original edges and resharpening damaged ones. Some specimens of Type 2-B and 4-D are treated similarly.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	68	43	115	226
Musée de l'Homme	10	—	2	12
British Museum	4	3	2	9
Pitt Rivers Museum	7	1	6	14
Museo Histórico	5	5	14	24
Museo de Historia Natural	4	2	2	8
Museo Arqueológico	8	2	7	17
Total	106	56	148	310

Type 2-B: (88 specimens, or 13 %; Fig. 45) Essentially these differ from Type 2-A in being thicker (width-thickness index based on 13 finished Kon-Tiki Museum specimens is 84, and ranges from 58 to 113).[‡] They also differ from Type 2-A in having markedly rounded longitudinal front-side-back junctions, which produce cross-sections varying from rounded quadrangular to rounded lenticular. Some specimens grouped by Métraux (1940, p. 274) in his Type 1 which "differ slightly from the type in having markedly round edges", are probably of this variety. The increased thickness makes possible the characteristically greater use of pecking. The Easter Island specimens differ from Duff's characterization (1950, p. 165) of the type as highly ground, in that grinding generally does not cover the poll, and although present on the faces, fails to obscure many chip scars. On some finished specimens pecked surfaces have been

[‡] In the case of this sub-type, the width at mid-length is calculated from measured terminal widths.

left partially unground and on two the whole back, excepting the bevel, has no grinding. The symmetrical edge of Duff's characterization (*Loc. cit.*) is clearly present on five specimens, while on the rest a pronounced back bevel leaves the edge close to the plane of the front. Transversely, the back is more convex than the front. On several samples the front-side junctions are only slightly rounded and the front tends toward flatness. These appear to be intergrades with Type 2-A. As in Type 2-A, edge is slightly convex, and wider than the poll. Bevel generally merges with back and, transversely, is slightly convex. An obsidian specimen, worked by chipping and pecking, conforms to the type but has an irregular edge (Fig. 46 d). Size varies from medium to fairly large.

Manufacturing technique: Roughing out was done by chipping, though often the front follows a natural surface. Final surfaces were approximated with coarse chipping and large chip scars remain on all finished specimens. Pecking and grinding never were so thorough as to produce the highly regular surfaces characteristic of Type 4-D. Amounts of pecking vary and a few small specimens show no trace of the technique. On most it was an important process, more extensive on the back than on the front, the latter sometimes being pecked only along front-side junctions for the purpose of rounding them. Pecking also reduced the bevel and sometimes even the poll, though the latter was usually coarsely treated. Grinding sequence and transverse flattening of edge was similar to Type 2-A. Four unfinished specimens lacking bevel and back grinding have edges ground transversely flat. In these cases the technique clearly served as a guide for sharpening the original edge. Grinding is always present on the front and is more thoroughly carried out than on the back, which sometimes lacks it. Thirteen specimens, including some finished fragments, are ground on all surfaces but the poll, which is ground in only two cases. All have visible flake scars. The unfinished specimen in Figure 46 e illustrates manufacturing processes.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	13	18	36	67
Musée de l'Homme	1	—	—	1
British Museum	2	—	—	2
Pitt Rivers Museum	—	—	2	2
Museo Histórico	4	2	6	12
Museo de Historia Natural	—	2	—	2
Museo Arqueológico	—	—	2	2
Total	20	22	46	88

Variant: (42 specimens, or 6.2 %; Fig. 47) Other specimens may belong to Type 2-B, but are sufficiently distinctive to be considered separately. Their proportionately greater thickness suggests intergrading with Type 4-D (width-thickness index based on 7 finished Kon-Tiki Museum specimens is 97, and ranges from 81 to 111).⁶ They are quadrangular or rounded quadrangular in cross-section, and front and back tend to be of equal width in larger specimens. Transversely, sides are convex, back varies from rarely flat to usually convex, and back-side junctions are nearly always rounded, but to different degrees, sometimes producing a continuous curved surface including back and sides. Transversely, front varies from flat to slightly convex and front-side junctions from well defined to slightly rounded. Pecking is more extensively used than on the Type 2-B specimens described above and, on unfinished examples, appears on all surfaces, in most cases even on the poll. The chin tends to be defined and transversely curved. Transversely, bevel is usually flat or slightly convex. A few are concave. Size ranges from medium to very large.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	7	10	13	30
Musée de l'Homme	—	1	—	1
British Museum	1	1	—	2
Pitt Rivers Museum	2	—	1	3
Museo Histórico	2	—	3	5
Museo Arqueológico	1	—	—	1
Total	13	12	17	42

Type 2-C: (5 specimens, or 0.7 %; Fig. 49 a-c) The Kon-Tiki Museum collection includes three finished, complete specimens and that of the Musée de l'Homme two broken distal ends which, because the front is wider than the back, have been classified here. Their small size, equivocal characteristics, and rarity suggest that they may be aberrant forms of Type 2-A or 2-E.

Type 2-E: (29 specimens, or 4.3 %; Fig. 48) Specimens of this group, although rounded in cross-section, tend to be flat or at least less convex posteriorly than anteriorly. Front and sides coalesce to form a transversely convex surface. Similar specimens in the Marquesas (Fig. 74 a-d) and others in Western Polynesia (Buck, 1930, pp. 346-347) suggest they belong to a distinct sub-type. Although Duff's (1950, Fig. 44)

⁶ In the case of this sub-type the width at mid-length is calculated from measured terminal widths.

illustrated specimen of Type 4-C resembles these, the total evidence suggests greater relationship to Type 2, especially B and C. Similarity to Type 2-C is apparent on the front-side junctions of several specimens which, although rounded, are distinguishable. On nine Kon-Tiki Museum specimens a rather flat natural and/or chipped surface forms the back. On the finished specimen, and on four fragments, the back, although ground, is left flat or slightly convex transversely. This clearly shows intention to produce this feature. Though traces of pecking are seldom apparent, it may have been employed on medium and large size specimens to obtain the regular convex front surface, prior to its grinding. Because of marked transverse convexity of the front, the edge is decidedly curved. Generally, bevel merges into back and is transversely somewhat convex.

Of the fifteen examples in the Kon-Tiki Museum collection, eight specimens are medium to large and seven fragments represent small sizes. On the medium and large size specimens sides converge toward the edge in only two fragments. The blade of others is slightly flaring. Sides converge toward the edge of all small specimens. These latter seem to belong to a somewhat distinctive variety of small chisel or gouge of which only one whole specimen of atypical cross-section has been examined. (Fig. 48 c). Three others with similar characteristics are in the Chilean Museums (Museo Histórico, 4223; Museo de Historia Natural, 13218, 13220). The broken specimens illustrated in Figure 48 a-b suggest that maximum width was probably near midlength, with sides tapering toward edge and poll.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	1	1	13	15
Musée de l'Homme	3	—	1	4
Pitt Rivers Museum	—	—	2	2
Museo Histórico	—	—	3	3
Museo de Historia Natural	—	—	3	3
Museo Arqueológico	1	—	1	2
Total	5	1	23	29

Type 3-D: (5 specimens, or 0.7 %; Fig. 49 d-f) Only one specimen demonstrates clearly the characteristics of this variety (Fig. 49 e). Although smaller, it is very similar to the type specimen from South Island, New Zealand (Duff, 1950, Fig. 40). It has a triangular cross-section with rounded corners, and is long and narrow. Sides taper toward poll and edge. Except for the poll it is ground all over, though many large chip

scars are unobscured. The edge, although damaged, seems to have been curved. A complete specimen at the Museo Histórico (Fig. 49 d) and a blade end are similar in outline, but in cross-section and manufacturing technique resemble Type 2-A. Fronts are ground with well marked front-side junctions. Sides and backs are roughly chipped and cross-sections are quadrangular or irregularly triangular. The complete specimen is unusual in having both extremities reduced to edges with bevels on the same face. None of the latter three examples show pecking marks, and bevels are slightly convex transversely.

An unusual large specimen is similar in shape to this sub-type, though its form results almost entirely from the natural shape of the stone used (Fig. 49 f). It has been reduced by grinding of the front and bevel. Bevel is slightly convex transversely and edge is strongly convex, forming a gouge. An unusual trait is its slight flare towards the edge.

A specimen in the Museo Arqueológico is fragmentary and may belong here, or in Type 4-C.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	2	—	1	3
Museo Histórico	1	—	—	1
Museo Arqueológico	—	—	1	1
Total	3	—	2	5

Type 3-E: (11 specimens, or 1.6 %; Fig. 49 g-j) Four complete unground, obsidian specimens with triangular or trapezoidal butt cross-section and widely flaring blade are of typical shape. They are made of wide and thick flakes. The longitudinally concave sides are formed by chipping. The rest of the surface is that of the original flake with a few modifications by secondary chipping. One has a single face skillfully chipped (Fig. 49 i). The edge, tending toward symmetry, is produced by the original surfaces of the flake and thus front and back are indistinguishable. Four additional obsidian implements at the Museo Histórico and one obsidian and two basalt ones at the Museo de Historia Natural have similar characteristics.

Though shape, blade thickness, and excellent lashing retainers provided by the concavity of the inward sloping sides suggest that these were used as adzes, the brittle material, in most cases obsidian, would permit easy edge damage if used this way on wood. The two basalt blades of the Museo de Historia Natural were found at Punapau crater, where soft red scoria topknots

for statues were quarried. The edge of one specimen is irregular, and shows signs of use on a soft but abrasive substance (Fig. 49 j). It is thus possible that these, as well as the obsidian ones of similar form, were hafted as adzes and used for carving scoria or similar stone. Another possibility is that the obsidian blades were driven by direct hand pressure as chisels or planes for wood working.

Differences in material and edge treatment between the tools described above and others of Type 3-E occurring elsewhere, make it likely that functions were different, though forms may be related. Because of the thinness of its blade and strong convexity of its edge the specimen figured by Métraux (1940, Fig. 49 d), on which Duff (1950, Fig. 41) bases the Easter Island incidence of the type, is probably a flaring knife of a type common on the island (Heyerdahl, Vol. 1, pp. 408-410, figs. 100 b, e-h). Such specimens, which are usually made of thin basalt plates, may also be related ultimately to the adzes.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	4	—	—	4
Museo Histórico	4	—	—	4
Museo de Historia Natural	3	—	—	3
Total	11	—	—	11

Type 4-D: (168 specimens, or 24.9 %; Figs. 50, 51, 52 a-c) This sub-type corresponds in general to Métraux's (1940, p. 274) Type 2. Included are tangless and transversely grooved adzes which are usually of greater thickness than width (width-thickness index based on 10 finished Kon-Tiki Museum specimens is 121 and ranges from 93 to 159). Size varies from medium to very large. Rounded cross-sections result from much pecking, though front and back are flattened to different degrees. Back may be wider, equal to, or narrower than front, and cross-sections vary accordingly. In the first case the cross-section is usually oblate ovoid, the broader end coinciding with the back (Fig. 50). In the second case cross-sections range from oblate circular to oblate elliptical (Fig. 51 a-c). In the third case cross-sections are again oblate ovoid, the broader end coinciding with the front (Fig. 51 d-e). Some specimens in the latter category are greatly flattened. Due to inward sloping rough chipping employed to form their sides, two fragments have the back reduced to a ridge, resulting in an irregularly triangular cross-section.

A narrow transverse groove produced by pecking is

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present on the front of nearly 50 % of the specimens. This lashing depression is usually so shallow and narrow that it can doubtfully be regarded as a tang. Thus, the two basic criteria employed by Duff (1959, p. 122) to define most Polynesian adze types — shape of cross-section and presence or absence of tang — do not serve to characterize this most typical class of Easter Island adzes.

Below are grouped all collections studied according to cross-section shape and presence or absence of groove. Grouping by cross-section is arbitrary as range of variation is continuous. Excluded are 22 unclassifiable fragments.

	Front narrower than back	Front equal to back	Front wider than back	Total
Grooved	21	25	1	47
Ungrooved	19	22	11	52
Groove undeterminable	19	20	8	47
Total	59	67	20	146

Adzes with front narrower than back make up 40 % of the total. Only these fit strictly into the "cross-section rounded triangular" description of Duff (1950, p. 188). Nevertheless, the whole group demonstrates in most of its features an obvious continuous range of variation. It has thus been included in a single sub-type which, in this context, departs somewhat from the general criteria.

The groove occurs in about 50 % of the first two cross-section groups, and is rare in the third. The characteristics of the third group are diffuse, less well defined than those of the others, and intergrade with the variant of Type 2-B.

In all finished specimens the front has been flattened by pecking and grinding which has been more intensively applied near the edge, so that a flattish surface and front-side junctions are better defined near the blade end. One specimen exhibits a perfectly oval section with front reduced to flatness only near the edge (Fig. 50 e). A fragment and the Museo Arqueológico specimen in Figure 52 c are without front flattening. These differ from the others in having an almost circular cross-section and a symmetrical edge. The front is convex longitudinally except for some specimens of the third cross-section group, where a greatly flattened front produces a straight surface.

The back is in general transversely convex while back-side junctions are always less pronounced than those

opposite, and even in some cases are not apparent. Longitudinally the back is generally straight, though in a few cases it is concave or convex. Concavity is sometimes emphasized by a slight projection of chin, present in five finished and a few unfinished specimens. The bevel usually has a well marked transversely curved chin and is transversely flat or slightly convex. One medium size specimen, the bevel of which is transversely slightly concave or hollow ground, provides an exception (Fig. 51 e).

Sides are transversely and longitudinally convex, and taper to poll and edge. Edges are thus narrowed, an effect which is intensified by the ovoid cross-sections of the first group, and is especially marked on the thick specimen in Figure 50 e.

Some specimens have groove reduction only on front-side junctions, and one unfinished adze shows the exceptional feature of groove reduction on sides instead of front. Another is slightly grooved on front and sides. One has an exceptionally wide groove which merges proximally into the butt front, giving the false impression of a complete anterior reduction of the butt. It seems to be a fortuitous variant (Fig. 51 c).

Manufacturing technique: As most chip scars are obscured by pecking, chipping characteristics are difficult to determine. Most identifiable scars remain about the poll. However, four partially pecked unfinished specimens demonstrate rough chipping that left deep scars. Judging by these, a large amount of pecking was ordinarily required. Presence of some waterworn surfaces suggests that advantage was taken of fortuitous rounded surfaces. In some of these cases perhaps pecking and grinding would have sufficed to produce the final shape. Unfinished specimens demonstrating only chipping are absent. They may have been so unattractive as to escape native attention.

Pecking is an important technique, and covers all surfaces of most unfinished specimens. It is thus difficult to reconstruct pecking sequence. However, the evidence extant suggests that a nearly round cross-section was first produced with a sometimes slightly flattened back. In some cases the bevel and the poll were also pecked. The groove was produced before the front was flattened and grinding begun (Fig. 52 a). The last and only step, the sequence position of which could be determined with reasonable accuracy, was the flattening of the front, which is most apparent toward the edge and less so toward the poll. Based on these observations, unfinished specimens have been considered as grooveless when the front has been flattened and no groove is yet apparent. On some specimens the pecking process produced an unusually smooth surface.

ADZES FROM CERTAIN ISLANDS OF EASTERN POLYNESIA

SUMMARY TABLE
(Easter Island)

	Type 2-A	Type 2-B	Type 2-B Variant	Type 2-C	Type 2-E	Type 3-D	Type 3-E	Type 4-D	Type 4-D Variant	Type 6	Total
Kon-Tiki Museum	226	67	30	3	15	3	4	130	11	—	489
Musée de l'Homme	12	1	1	2	4	—	—	1	—	1	22
British Museum	9	2	2	—	—	—	—	7	1	1	22
Pitt Rivers Museum	14	2	3	—	2	—	—	7	1	1	30
Museo Histórico	24	12	5	—	3	1	4	9	—	—	58
Museo de Historia Natural	8	2	—	—	3	—	3	1	—	—	17
Museo Arqueológico	17	2	1	—	2	1	—	13	1	—	37
Total	310	88	42	5	29	5	11	168	14	3	675
Percentage	45.9	13.0	6.2	0.7	4.3	0.7	1.6	24.9	2.1	0.4	99.8

Front and bevel were well ground, while on sides and back, grinding was employed less extensively or not at all. Here previous pecking remains visible. One specimen has been well ground all over including the poll (Fig. 51 a). Two others, and some fragments, were well ground on both faces and sides. The last grinding apparently prepared the edge, and the grinding of a transverse plane as a guide was employed here as with Types 2-A and B. Similar fine chipping was also used. Two ground adzes, apparently finished, have been re-pecked on the front, and one also on the bevel, with the probable intention of resharpening them. The Type 4-D butt fragment illustrated in Figure 52 b, the ends of which have been somewhat flattened by secondary use, probably represents a pecking hammer.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	10	24	96	130
Musée de l'Homme	—	1	—	1
British Museum	4	2	1	7
Pitt Rivers Museum	—	—	7	7
Museo Histórico	4	2	3	9
Museo de Historia Natural	1	—	—	1
Museo Arqueológico	4	—	9	13
Total	23	29	116	168

Variant: (14 specimens, or 2.1 %; Fig. 52 d, e) These specimens, from various collections, have not been included in the above category because they possess special characteristics. They are coarsely manufactured and material selected approximates the shape desired. Chipping is rough, and some pecking and grinding appear, especially to smooth the front, bevel, and distal portions of sides. Many natural surfaces and chip scars

remain. Cross-section is roughly rectangular or irregular. Usually front is wider than back which sometimes tends to be reduced to a ridge. In most cases the front is longitudinally convex and the back concave, the whole tool thus being curved. Most are thick and narrow. Front and bevel sometimes form an unusually obtuse angle at the edge.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	3	2	6	11
British Museum	—	—	1	1
Pitt Rivers Museum	1	—	—	1
Museo Arqueológico	—	—	1	1
Total	4	2	8	14

Type 6: (3 specimens, or 0.4 %; Fig. 52 f-g) Though adzes with rounded cross-sections are frequent, especially in Type 4-D, circular cross-sectioned gouges and chisels are rare and crudely made. The Musée de l'Homme example in Figure 52 f is the clearest representative of the type. Cross-section is roughly elliptical, and the tool tapers slightly toward poll and edge. No pecking scars are apparent, and grinding has been applied to all surfaces except a few natural depressions. Grinding is in several planes, producing longitudinal junction lines. The bevel is slightly convex transversely, and the longitudinally convex front converges sharply toward the edge.

The other two specimens are irregular with many unreduced natural surfaces, chip scars, and without evidence of pecking (Fig. 52 g). Métraux (1940, Fig. 47 d) includes in his Type 2 a fragment apparently belonging to this type.

	Finished	Unfinished	Broken	Total
Musée de l'Homme	1	—	—	1
British Museum	—	—	1 (?)	1
Pitt Rivers Museum	—	—	1 (?)	1
Total	1	—	2 (?)	3

PITCAIRN ADZES

Previous studies of Pitcairn adzes are published by Brown (1900) and Emory (1928 a). The present analysis includes, in addition to the expedition material, some unpublished museum collections, and is thus based on a larger number of specimens, 141 in all, than was available to previous investigators. Our study reveals an unusual range of forms (Pl. 2, Figs. 53–62). All of Duff's six types are represented, as well as most of their subtypes. Variations within the stylized features make it necessary to describe many individual specimens. Pitcairn is indeed remarkable for the variety of its adzes, for the frequent excellence of their chipping, and for the almost complete lack of pecking in their manufacture, a peculiarity which has been noted elsewhere (Emory, 1928 a, p. 127; Stokes in Aitken, 1930, p. 139). In most finished specimens bevels merge into back and are transversely flat or convex.

Type 1-A: (20 specimens, or 14.2 %; Fig. 53) The Pitcairn form of these tanged adzes with quadrangular cross-section has already been designated by Emory (1928 a, p. 128) as a representative of the "Hawaiian Type". His classification differs from the present in that specimens with only an incipient tang have here been included in Type 2-A.

The examples are of uniform and distinctive shape. They are relatively thin, with back generally markedly narrower than front. Blade flares toward the edge, and bevel merges into back with an irregular proximal margin. The tang of four specimens inclines decidedly backwards. The back is longitudinally concave or flat, while the front of the blade is longitudinally and transversely convex, with two exceptions in which a projecting front shoulder produces a longitudinal concavity (Fig. 53 d). Size varies from medium to large. Initial preparation was by coarse chipping, and grinding usually covers only the distal portion of the blade.

One specimen has incipient lugs which project diagonally from the proximal corners of the front of the

tang (Fig. 53 d). Two are unusual in that they show some traces of pecking. They were obtained by Routledge, so that their provenience can be relied upon. One has been pecked only over two chip scars, one at each side of the front of the tang (Fig. 53 a). The other shows slight evidence of similar treatment in a narrow zone along the front-side junctions of the tang (Fig. 53 b). They are otherwise typical except for their especially well ground bevel and sides. This pecking may reflect limited local use of the process, or indicate that the specimens were imported. Though the adze illustrated in Figure 53 a, is somewhat similar to the Society Island variant of the same sub-type, the latter apparently had been replaced in Tahiti by Type 3 when the Bounty mutineers and their Tahitian companions left for Pitcairn (Emory, 1928 a, p. 126). Thus, if importation took place it was more likely in prehistoric times.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	—	—	5	5
British Museum	7	2	—	9
Pitt Rivers Museum	1	3	2	6
Total	8	5	7	20

Type 1-B: (3 specimens, or 2.1 %; Fig. 54 a) The adze figured is typical, being thin bladed and quadrangular in cross-section with the tang reduced laterally. Except for sides of tang and poll, it is ground all over, though with large depressions unobscured on all surfaces. Another complete specimen differs in being slightly smaller and having more pronounced blade flare. A fragment is of a larger and thicker adze with sides almost parallel.

	Finished	Unfinished	Broken	Total
Pitt Rivers Museum	2	—	1	3

Type 1-C: (9 specimens, or 6.4 %; Fig. 54 b–d) Some are similar to Type 1-B, but are thicker and have fronto-lateral tang reduction. Cross-section is trapezoidal with front markedly wider than back. Though lateral shoulder lugs are considered by Duff (1959, p. 130) as characteristic of the Pitcairn form of this type, in this collection they do not occur on small and medium size specimens, and are present in an incipient form on only two of the larger and thicker examples (Fig. 54 d). On

these same two specimens, and on a medium size fragment, incipient lateral prominences also appear at the poll. Sides are roughly parallel with one exception on which they diverge markedly toward the edge (Fig. 54 b). Light grinding covers all surfaces of blade and is less evident on tang. Three have slight backward inclination of the tang producing longitudinal concavity of the back. Back of others is flat or slightly convex. A fragment (Pitt Rivers Museum) shows a markedly raised front shoulder, and a single lateral prominence on the left side of the poll.

	Finished	Unfinished	Broken	Total
Musée de l'Homme	1	—	—	1
British Museum	—	1	1	2
Pitt Rivers Museum	1	2	3	6
Total	2	3	4	9

Type 2-A: (43 specimens, or 30.5 %; Fig. 55 a–e) The local examples are thin, and typical is the marked flare of sides towards the edge present in most specimens. A few demonstrate only moderate flare, while others flare to an extent that suggests intergrading with Type 3-E. Size varies from medium to small. Front and sides of most butts have deep unground scars suggesting an incipient tang. Front is wider than back, and cross-sections are trapezoidal or irregular. Front and back are usually convex longitudinally. Grinding is present in varying degrees over the surfaces, and there are many unobscured chip scars. Bevel merges into back, and one specimen has a transversely convex chin. Poll is irregular.

A few specimens with butt more strongly reduced laterally seem to intergrade with Type 1-B. A fragment (Kon-Tiki Museum No. 589), well ground on all surfaces, has marked transverse convexity of front and back, and approaches in finish and cross-section Type 2-B.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	6	5	6	17
Musée de l'Homme	2	—	—	2
British Museum	7	2	—	9
Pitt Rivers Museum	11	—	4	15
Total	26	7	10	43

Type 2-B: (1 specimen, or 0.7 %; Fig. 55 f) The single specimen here included, because of its small size, irregular section, and coarse manufacture is atypical. Grinding covers all surfaces except the poll without obliterating many chip scars. The specimen is reminiscent of others from Mangareva, and does not provide sufficient evidence to establish the presence of the sub-type.

Type 2-C: (1 specimen, or 0.7 %; Fig. 55 h) Only one unfinished and atypical adze may belong to this type. It is rather large, trapezoidal in cross-section, and has a profile reminiscent of Type 4. Back is longitudinally concave and front convex. All faces are chipped except the front which is principally a single fracture surface. Some chip scars at the proximal end of the front give, in profile, the appearance of a tang.

A typical Pitcairn example of this sub-type is illustrated by Duff (1950, Fig. 37).

Type 2-E: (2 specimens, or 1.4 %; Fig. 55 g) One small specimen is especially well ground all over including the poll. Grinding is applied in different planes to produce several longitudinal junction lines. Back is nearly flat, and front is markedly convex transversely. Consequently the edge is also convex.

A blade fragment (Pitt Rivers Museum) with an irregular lenticular cross-section produced by rough chipping coincides in outline with this sub-type. Edge is similarly convex. Small portions of front and back are ground.

Type 3-A: (10 specimens, or 7.1 %; Fig. 56) Five large, relatively thin, adzes are all unfinished and worked only by skillful chipping which has produced regular shapes and well marked surface junctions. Cross-sections are clearly triangular. Blades flare moderately and on one specimen the tang forms a slight angle with the blade, the back median ridge being concave longitudinally (Fig. 56 d). A Pitt Rivers Museum specimen has a slightly raised front shoulder with consequent longitudinal concavity of the front of the blade.

An exceptional specimen, also unground and skillfully chipped, is long, narrow, and relatively thick (Fig. 56 e). Its tang, which is proportionately short, is formed by lateral reduction so that blade and tang fronts remain in the same plane. It is more than sufficiently thick to have been reduced frontally. Sides converge slightly towards the edge. These unusual proportions occur occasionally in Pitcairn adzes of Type 1-C and 4-A.

Two finished adzes are small, roughly chipped, and rather irregular. One has a plano-convex section (Fig. 56 b). The other, of irregular triangular section, is broad bladed, thick, and has a tang reduced fronto-laterally. Blade front is markedly convex transversely and edge

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is convex. It has some characteristics of Type 3-H (Fig. 56 a).

Two blade fragments may belong here, unless they were originally tangless. One is exceptionally thick with marked transversely convex front and with sides converging toward the edge (Fig. 56 c).

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	—	2	1	3
Musée de l'Homme	—	2	—	2
British Museum	—	1	—	1
Pitt Rivers Museum	2	1	1	4
Total	2	6	2	10

Type 3-C: (2 specimens, or 1.4 %; Fig. 57 a-b) These are relatively thin, and maximum width is at the shoulder. Tang is produced by lateral reduction. Grinding covers the front of blade and is less extensive on back. Tang is unground and there are deep chip scars, especially on front. The medium size specimen (Fig. 57 b) has sides and back that merge forming, transversely, a strongly convex surface, while front is also convex. Both faces are longitudinally convex and the edge tends toward symmetry. Grinding on back in different planes has left several longitudinal junctions. The small specimen is irregular and carelessly worked (Fig. 57 a). Cross-section is irregularly quadrangular. Front is markedly convex transversely and, consequently, the edge is curved.

Type 3-D: (1 specimen, or 0.7 %; Fig. 57 c) A typical small chisel has a trapezoidal cross-section, the smaller side corresponding to the back. All surfaces are ground, though numerous chip scars are unobscured.

Emory (1928 a, Pl. 1, No. 5) illustrates a specimen similar to ours but larger and with a clearly triangular cross-section.

Type 3-E: (17 specimens, or 12.1 %; Figs. 58, 59) The local variant is numerous, and demonstrates an unusual range of forms from simple and small to large and highly stylized specimens, probably for ceremonial purpose. All increase greatly in width from poll to edge. With one rectangular exception, all have trapezoidal cross-section with back narrower than front. On the tangless specimen illustrated in Figure 59 d, which has an almost symmetrical edge, the narrower face might be the front.

Six unusually large specimens, (Brown, 1900, Pl. IV, Nos. 1, 2, [two specimens]) ranging from 31.3 to 49.5 cm. in length, of which three are finished, two unfinished,

and one fragmentary (Pitt Rivers Museum — 4 unnumbered, British Museum — Nos. 1904. 7-1.1 and 1904. 7-1.2) are so similar and stylized that they could have been produced by a single craftsman (Fig. 58 b-c). Sides are sharply concave longitudinally, and butt is separated from blade by a raised front and lateral shoulder protruding in the form of a transverse ridge. On the sides this ridge diminishes in height towards the back. All but one have laterally expanded polls. Expansion is sometimes greater on the left side. Front of blade increases in transverse convexity toward the shoulder, with a transverse cross-section sometimes approaching angularity and resulting in a tendency toward a median longitudinal ridge on the proximal part of the blade. On the distal part of the blade is a triangular, flattened surface reduced on this convex foundation. Three distinct facets resulting from this division of the front are apparent on two finished and one unfinished specimen. Sides converge to join a transversely flat back, the proximal end of which is reduced to a narrow band. Longitudinally, the front is convex and intersects the bevel to produce an almost symmetrical edge. The three finished specimens are ground all over, even at the poll, though extent of reduction of chip scars varies. On one specimen the top of the raised shoulder, and the edge, have been ground flat (Fig. 58 b).

Another smaller, finished specimen has little grinding and its sides are roughly straight longitudinally. It is otherwise similar to those above (Fig. 58 a).

A unique specimen is exceptionally well made (Fig. 59 b). Cross-section is rectangular with a front increasingly convex toward the tang, which is reduced fronto-laterally. As the adze is thin, such frontal reduction is unusual. The poll is laterally flaring to form a lug on each side of the tang. These lugs represent a fully developed form of similar lateral projections incipient in an adze of Type 2-A (Fig. 55 d), and more clearly developed in specimens of Type 1-C and in the above described large adzes. All surfaces intersect in well defined, unusually regular junctions, and are extensively ground, though the back exhibits some unreddened depressions. Because this specimen is thin and fragile, it seems likely that initial chipping was confined principally to producing the outline on a slab and that the finishing was done with an unusual amount of grinding.¹¹

Another, with fronto-lateral reduction of tang, resembles the above, but is more crudely made (Fig. 59 a). This fronto-lateral tang reduction suggests intergrading

¹¹ Found by Henry Young at Tapau Water, north of the present village, at a depth of about one-half meter together with a stone ball measuring ca. 5 cm. in diameter (Pl. 2, top center).

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with Type 1-C. Emory (1928 a, Pl. 3, No. 15) illustrates a third which is similar in outline to that illustrated in Figure 59 b but has lateral tang reduction only.

Others are medium or small. They may be considered to represent extreme examples of the tendency toward flare manifest in Type 2-A, which they also resemble in other features. They are thin, usually have an incipient tang, and have little grinding. An exception is the specimen illustrated in Figure 59 c, which is well ground except for the poll.

One specimen is chipped, and unique in that its width at the edge exceeds the length of the tool. Distal corners of the blade are so thin as to suggest that it may be a knife. (Fig. 59 e).

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	3	—	—	3
Musée de l'Homme	1	—	—	1
British Museum	2	1	—	3
Pitt Rivers Museum	5	4	1	10
Total	11	5	1	17

Type 3-G: (2 specimens, or 1.4 %; Fig. 57 d) One is a partially ground adze in the process of being reshaped by subsequent chipping (Pitt Rivers Museum). There is no evidence as to whether or not a tang existed before reworking, nor as to whether there was intention to produce a tang on the reworked specimen. The other is unfinished and worked by chipping. No tang is apparent, though one might have been intended (Fig. 57 d). This doubtful evidence does not establish the presence of the type on Pitcairn.

Type 4-A: (11 specimens, or 7.8 %; Fig. 60 a-f) As a whole this group, predominantly of large adzes, demonstrates a wide range of variation. Seven approach closely the basic characteristics of the type (Fig. 60 a-b). At the tang the front is a longitudinal ridge and cross-section is triangular. Toward the edge the ridge gradually disappears and the cross-section becomes trapezoidal. On two specimens the front of the tang is greatly concave longitudinally, resulting in a frontal projection at the poll and a marked front shoulder (Fig. 60 a). On two specimens the back is longitudinally concave, and on others straight or convex. Adzes with a concave back have the chin marked. Bevels are transversely flat or convex. Grinding is always light and sometimes limited to the distal end of the blade. In other cases it extends to the poll which is always unground. A

relatively small specimen, 12.6 cm. long, is tangless. In this sub-type the variation is probably functional, as the frontal ridge produces such an excellent lashing retainer that tangs would be less necessary on small specimens than on large ones (Fig. 60 c). A long narrow chipped adze (British Museum — 1920.5-6.202) is similar to one illustrated by Duff (1950, Fig. 42).

An unusual adze is long, narrow, and relatively large. It demonstrates an especially deep frontal tang reduction (Fig. 60 d). The longitudinally convex front and back converge almost equally to produce a symmetrical edge and a relatively thin distal end. In this latter feature it is similar to Type 4-B. The median ridge is reduced to a strongly convex surface toward the distal end of the blade. A partially ground specimen, probably originally similar to the one above, has been transformed into a pick-like tool by chipping which reduced the blade front and right side and produced a crude, narrow convex edge in the plane of the haft (Fig. 60 e). The right side of the poll has also been chipped to produce a similar edge. Only the distal edge shows traces of use in soft, abrasive material.¹² The median ridge is displaced toward the left, dividing the specimen longitudinally into two unequal parts. Though this trait is common on side-hafted adzes, similar asymmetry also appears on the previous specimen. Three other picks are also made from adzes too much altered to determine their original shape.

Two other long and narrow specimens are most unusual in shape and excellence of manufacture. One, illustrated by Brown (1900, Pl. IV, No. 3), is large and thoroughly ground all over (Fig. 60 f). At mid-length the cross-section is circular with a flattened back. Sides and front form a single convex surface with no trace of longitudinal ridge. Front and back are longitudinally convex, and converge to a relatively thin, almost symmetrical, edge. The tang is reduced moderately, and has a frontal projection at the poll in the form of a flattened transverse ridge. The specimen illustrated in Figure 50 d is, in many features, intermediate between this adze and typical Type 4-A specimens. The other (Pitt Rivers Museum) differs in its smaller size, i.e., 36.9 cm. in length, in having an almost circular cross-section at mid-length

¹² This specimen was found by Mr. Radley Christian together with other chipped picks in a cave in the cliffs of Jinsey Valley. The same cave was later visited by Skjölsvold and Figueroa who found three similar picks in the pulverized red scoria covering the floor. All of the specimens bear the same red stains. As shown by Skjölsvold (this volume, pp. 6-7) it is possible that the cave was a quarry for statues and that the picks were used in the work. Thus the likelihood exists that this adze type is contemporary with or earlier than the statue carving activity.

with the flattened back manifest only toward both ends, in its less reduced tang, and in lack of flattening of the frontal projection at the poll. Its edge has been ground flat.

In surface treatment and approach to circular cross-section the two above specimens are closely similar to Type 6. Duff (1959, p. 141) includes them in a Type 6-B. In the present analysis greater significance has been attached to the flattened back and tang features, and they are thus classified in Type 4.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	2	—	2	4
British Museum	2	1	1	4
Pitt Rivers Museum	2	1	—	3
Total	6	2	3	11

Type 4-B: (1 specimen, or 0.7 %; Fig. 60 g) This adze differs chiefly from specimens in Type 4-A in its relative thinness of blade, and irregularly straight back-side junctions which diverge from the poll to a comparatively broad edge. The specimen is roughly chipped and may be unfinished or a reject. It therefore does not supply sufficient evidence to establish the presence of the type.

Type 4-C: (3 specimens, or 2.1 %; Fig. 62 a) Pitcairn chisels or gouges with Type 4 cross-section are illustrated by Emory (1928 a, Pl. 2, No. 11; Pl. 3, No. 13) and Duff (1959, Fig. 6).

The illustrated blade end seems transitional to Type 6. It is ovate in cross-section with a somewhat flattened back. Bevel is transversely convex and chin is marked. Edge is damaged.

Two others may belong here also (Kon-Tiki Museum). They are flattened ovate in cross-section, but as blade ends are missing, identification is uncertain.

Type 5-A: (2 specimens, or 1.4 %; Fig. 61 a-b) Duff (1950, p. 195) and Skinner (1943 a, p. 66) mention Pitcairn examples of this type, but do not illustrate them. Both of our specimens are rather small. One is thin, has the characteristic cross-section of the type, and is ground only on the blade near the edge (Fig. 61 a). One side of the butt is deeply reduced to produce a concave tang which has a lateral projection at the poll. The other is flat to receive the haft. At the blade both sides are nearly straight and diverge slightly toward the edge. The poll is flat. In the above features this specimen fits the classification, while its symmetrical edge is characteristic of axes of Type 5-B.

The other specimen is roughly chipped, unground, and similar in outline, though lacking poll projection (Fig. 61 b). Cross-section is vaguely triangular with irregularly convex back and flat front. Bevel is indistinct and only slightly steeper than the portion of the front which intersects it to form the edge. The implement, though unfinished, comes close to having a symmetrical edge similar to that of the previous specimen.

Type 5-C: (6 specimens, or 4.3 %; Fig. 61 c-e) Cross-sections vary from triangular to trapezoidal with a vertex, or truncated vertex, opposite the front. One is of triangular cross-section with back vertex rounded (Fig. 61 e). Tangs are characteristically produced by considerable reduction of the right side and sometimes slight reduction of the front or right portion of the front. Poll prominence and concave lateral reduction of tang are clearly defined on one specimen (Fig. 61 d), and slightly defined on two others. An unfinished specimen exhibits a prominence on the lateral shoulder (Pitt Rivers Museum). Front-side junctions are usually more or less parallel but in two cases they flare toward the edge. Edges are perpendicular to the long axis, and bevels tend to merge with backs. Grinding always leaves many unreduced chip scars.

A variant illustrated by Duff (1950, Fig. 48) does not appear in the present collection. It has an oblique edge and a proportionately short tang produced by reduction of the left side, opposite which is a still shorter similar lateral reduction which probably fitted into a stepped seat in the haft. The specimen illustrates the tendency to flare, so common in Pitcairn adzes.

	Finished	Unfinished	Broken	Total
British Museum	2	—	1	3
Pitt Rivers Museum	—	2	1	3
Total	2	2	2	6

Type 6: (6 specimens, or 4.3 %; Fig. 62 c-f) These are extensively ground chisels or gouges with rounded cross-section and sides which taper toward both poll and edge. Three are wider than thick, one is thicker than wide, and two are circular or nearly circular in cross-section. On three, grinding is complete, and intersecting surfaces have left several longitudinal junctions. Others have numerous unreduced chip scars. In two cases bevel is transversely concave and in the others slightly convex. All but two are fragmentary. Of the complete specimens one is unusually well made. It is very slender and tapers equally toward a very narrow

SUMMARY TABLE
(Pitcairn)

	Type 1-A	Type 1-B	Type 1-C	Type 2-A	Type 2-B	Type 2-C	Type 2-E	Type 3-A	Type 3-C	Type 3-D	Type 3-E	Type 3-G	Type 4-A	Type 4-B	Type 4-C	Type 5-A	Type 5-C	Un- classified	Total
Kon-Tiki Museum	5	—	—	17	—	—	1	3	2	—	3	—	4	—	2	—	—	1	39
Musée de l'Homme	—	—	1	2	—	—	—	2	—	—	1	—	—	—	—	—	—	—	6
British Museum	9	—	2	9	—	—	1	—	—	3	—	4	—	—	1	3	4	—	36
Pitt Rivers Museum	6	3	6	15	1	1	1	4	—	1	10	2	3	1	1	3	1	—	60
Total	20	3	9	43	1	1	2	10	2	1	17	2	11	1	3	2	6	1	141
Percentage	14.2	2.1	6.4	30.5	0.7	0.7	1.4	7.1	1.4	0.7	12.1	1.4	7.8	0.7	2.1	1.4	4.3	0.7	100

poll and edge. Its surface is thoroughly ground and lacks flake scars. Many longitudinal surface junctions occur on all parts of the surface. Poll is flat and unground (Fig. 62 c).

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	—	—	1	1
British Museum	2	—	2	4
Pitt Rivers Museum	—	—	1	1
Total	2	—	4	6

Unclassified: (1 specimen, or 0.7 %; Fig. 62 b) This single specimen is small and has the outline and cross-section of Type 2-E, but has a laterally reduced tang. Front and sides, which are thoroughly ground, form a continuous transversely convex surface. Back is ground only at bevel, the rest shows the original surface of the flake. Poll and sides of tang are not ground. Edge is markedly curved.

A specimen illustrated by Emory (1928 a, Pl. 3, No. 14) would be typical of Type 2-B, both in finish and cross-section, but again a tang has been produced, in this case apparently by a moderate fronto-lateral reduction. Cross-section is elliptical, and edge is symmetrical. It is apparently well ground.

MANGAREVA ADZES

Adzes and axes from Mangareva have previously been studied by Buck (1938, pp. 258-277). In the Kon-Tiki Museum collection are three specimens consisting of two adzes and an axe. None shows evidence of pecking. All are both chipped and ground.

Type 2-B: (1 specimen; Fig. 63 b) This specimen is typical. Front-side junctions are rounded and, trans-

versely, back and sides form a single strongly convex surface. Front and back are longitudinally convex. Bevel merges with back. The poll is unground and some chip scars are left unreduced.

Type 3-E: (1 specimen; Fig. 63 c) Sides flare markedly from poll to edge. Cross-section is basically quadrangular, but with grinding applied in different planes to produce several longitudinal surface junctions. The resulting polygonal cross-section is especially noticeable at the narrow butt.

Type 5-B: (1 specimen; Fig. 63 a) This axe has a symmetrical edge and flat haft-receiving side. The opposite side is reduced to a ridge. Both faces are longitudinally and transversely convex. Grinding is largely confined to the distal end of blade, and leaves many unreduced chip scars.

RAPA ITI ADZES

Rapa Iti adzes are characterized by an unusual predominance of tanged forms of quadrangular cross-section, universally merging bevels, and frequent presence of a frontally projecting lug on tangs. The Kon-Tiki Museum collection includes six finished adzes and a chisel, apart from the 60 specimens excavated by Mulloy and described in his site report (Mulloy, this volume pp. 48-50).

Type 1-A: (3 specimens; Fig. 64 a-c) These are similar to an adze illustrated by Mulloy in Figure 18 i of this volume, and may represent a variant of Type 1-A. They are relatively wide, and with a moderate to slight frontal reduction of tang. Cross-section is trapezoidal, with front much wider than back. Front of blade slopes backward from shoulder to produce an almost symmetrical edge. Each has a single frontally projecting lug on the proximal half of the front of tang. Two lugs are truncated cones with tops in the same plane as blade

front. Their tops are ground as part of the front grinding process. The third lug is incipient, unground, and rises to slightly below the projected surface of the blade front. All specimens appear to have been extensively pecked, although the poll is pecked on one specimen only. Grinding is in one case intensive, and in the others light, leaving visible pecking scars on much of the surface. Front of tang and poll is unground. Bevel is transversely almost flat. Size varies from fairly large to medium.

Type 1-B: (1 specimen; Fig. 64 d) This specimen is small, thin, and has a laterally reduced tang. Cross-section is irregularly quadrangular. It appears to have been made from a thin basalt slab the original surface of which has been left unground at the tang front. Other surfaces, including the poll, are ground. Some unobscured natural surfaces remain on front and back. Edge is chipped, probably for resharpening.

Type 1-E: (2 specimens; Fig. 64 f-g) These are similar to an adze illustrated by Mulloy in Figure 18 h of this volume. They have some characteristics of the above Type 1-A specimens, that is, presence of a single tang lug, tendency toward a symmetrical edge, and transverse flatness of bevel. They differ in being much thicker and proportionately narrower, and in having marked frontal tang reduction resulting in a pronounced front shoulder. Lugs are unground and conical, with apex decidedly below the projected surface of the front of blade. One is pointed, and the other roughly flattened by pecking. Grinding covers blade front, bevel, and distal portions of sides. Back is lightly ground in one case and unground in the other. Size is large. One is made from a slightly

modified natural block shaped only to form bevel and front (Fig. 64 f). Cross-section is trapezoidal with front wider than back. Back and sides are transversely almost flat while front is markedly convex. Distal end of blade is broken. The other is sub-rectangular in cross-section, with back slightly wider than front (Fig. 64 g). It is thoroughly worked and well finished, but many pecked surfaces remain unobscured by grinding.

Unclassified: (1 specimen; Fig. 64 e) A small chisel is rectangular in cross-section and has a symmetrical edge. It is well ground on both faces and lightly so on sides. The poll is unground. Side-face junctions are chamfered by grinding. Its shape is probably largely determined by the natural stone employed.¹³

RAIVAVAE ADZES

The forty-five adzes examined are remarkably uniform. Forty are of Type 3, whereas only three are of Type 4, and two of Type 1.

Type 1-A: (1 specimen, or 2.2 %; Fig. 65 a) This very small specimen¹⁴ is typical. It is well ground over all but the poll, and no pecking is visible. All surface junctions are sharp, except the left front-side junction of the tang which is rounded. Back is slightly concave longitudinally, and bevel is somewhat concave transversely.

Type 1-B: (1 specimen¹⁵, or 2.2 %; Fig. 65 b) This has a quadrangular cross-section and a laterally reduced tang. It is exceptional in that back is wider than front.

and most specimens of his Type 7 (Fig. 18 h). Judging by Mulloy's evidence, the type description used here probably should be expanded to include a greater range of frontal tang reduction. One (Fig. 17 f) is unusual for Rapa Iti in having a longitudinally concave back and tang at an angle to blade. Mulloy's Type 2 (Fig. 17 c-e), and a Mulloy Type 7 specimen (Fig. 19 a), represent a thinner form with consequently less deeply reduced tang, and constitute a variant of our Type 1-E. This last specimen is exceptional in having a pair of lugs placed longitudinally at front of tang.

Mulloy's Type 1 (Fig. 17 a-b) may represent a special variety of wide and relatively thin adzes with clear lateral shoulders which would be included within Type 1 of this classification.

Type 2-D: This is Mulloy's Type 4 (Fig. 18 a-c).

Type 4-A and 4-B: These are included in Mulloy's Type 6. One of his illustrated specimens corresponds to Type 4-A (Fig. 18 f), and the other may represent Type 4-B (Fig. 18 g).

¹⁴ Found, according to Routledge, "near Marae Puripe", on the east side of the island.

¹⁵ Found, according to Routledge, "near Marae Unurau".

Blade surface junctions are clearly marked, but those of the tang have been rounded by pecking. Front and back are ground. Sides are ground at blade and pecked at tang. Edge is badly damaged, but remaining portion of bevel is concave transversely.

Type 3-A: (30 specimens, or 66.7 %; Figs. 65 c-h; 66) These generally have an unusually regular, uniform shape and excellent finish. They are tanged with a well defined triangular cross-section with a vertex opposite the front. Most surfaces intersect to produce sharp, regular junctions even on the tang. On a few small specimens the longitudinal junctions of the tang are not well marked. The tang is frontally reduced and the resulting front shoulder is of the type designated by Buck as a "dropped shoulder" (Buck, 1944, p. 139). Sides of tang are unreduced, except on one specimen where pecked reduction is very slight (Fig. 66 b). The back is reduced to a median, longitudinal ridge. Distally, this bifurcates to produce a triangular bevel. On ten of the larger examples a similar proximal triangular expansion engages the poll, which is thus reduced to a regular, transverse ridge. On two other large specimens this proximal flattened surface is less deeply reduced, and the poll remains as a trapezoidal surface (Fig. 66 c). Twelve out of seventeen of the larger adzes have this proximal flattening. Polls of smaller specimens are rounded or irregular.

Sides and front are slightly convex transversely. Front of blade is flat or slightly convex longitudinally, except on three large specimens where it is slightly concave proximally. The triangular, well defined bevel is slightly concave transversely in six cases and in others flat or slightly convex. Front-side junctions of blade are parallel, converge, or diverge toward the edge in approximately equal numbers. Size ranges from large to very small and most tend to be thick. Width-thickness index based on 20 finished Kon-Tiki Museum specimens is 89 and ranges from 72 to 110.¹⁶

The final shape of the one unfinished adze was approximated by chipping. On its blade little pecking would have been necessary before grinding. On the majority of other specimens pecking over most surfaces appears to have been important. It has been carefully applied to obtain clearly defined surface junctions, and has been used even on the smallest specimens. Grinding is especially thorough on blade front, bevel, and sides. In two-thirds of cases the front of tang is pecked and unground, and in several cases its sides are similarly treated. Poll is always unground though sometimes pecked.

¹⁶ This index is calculated at the shoulder for Raivavae adzes.

Three specimens, ground all over except for the pecked poll, have a pair of projecting lugs at the proximal corners of the front of the tang. They are similar to those found elsewhere on adzes of Type 1-A. One is smoothly and thoroughly ground. Its poll is a triangular surface at right angles to the posterior median ridge (Fig. 66 e). The lugs are hemispherical and sharply defined. They are ground in different planes. Apart from the two lugs, it also has five parallel transverse grooves at the distal end of the posterior median ridge. These are about 1 mm. deep and are V-shaped. They appear to have been ground by sawing with a triangular tool and do not seem to be functional. A ground depression on the posterior median ridge of another specimen may be a related feature (Fig. 65 h). Another adze has similar surface treatment (Fig. 66 c). Its lugs are truncated cones and merge into the tang. They are pecked but have a narrow, ground ring just below the flat top. This adze has the previously mentioned triangular flattened surface at the proximal end of the posterior median ridge, but its poll remains as a trapezoidal surface. The triangular flattened surface is pecked and unground.¹⁷ One lug has been broken from the third specimen (Fig. 66 d). The other is a cone with top rounded by grinding, or use, and a base that merges into the tang. The edge is rechipped to a point which is worn as if it had been used as a pick in soft stone. One of the surfaces joining the point appears to have been used as a hammer.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	20	1	2	23
Musée de l'Homme	1	—	—	1
British Museum	5	—	—	5
Pitt Rivers Museum	1	—	—	1
Total	27	1	2	30

Type 3-H: (4 specimens, or 8.9 %; Fig. 67 a-c) These are broad bladed and relatively thin. Width-thickness index of two Kon-Tiki Museum specimens is 45 and 56. In addition to a frontal reduction, tangs exhibit a lateral reduction that varies from slight to marked. Two are of medium size and two are small. With the exception of one specimen that has a triangular cross-section, sides and back form a single convex surface that merges with the bevel. One specimen has marked and almost parallel bevel margins. Its section is thus

¹⁷ According to a local informant, the two above lug bearing specimens were found in Marae Ahee, in the district of Raaterau.

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trapezoidal at the blade (Fig. 67 *a*). The front-side junctions, that are clear on the blade, are rounded on the tang, where the cross-section is elliptical or rounded triangular. Specimens usually show a transverse convexity of blade front that increases toward the shoulder. Sides of blade are nearly parallel or converge towards the edge. Bevels are transversely convex in two cases, and flat and concave respectively in two others. The poll is a transverse ridge of a somewhat irregular surface. Manufacture is as in Type 3-A, but finishing is generally inferior. One specimen, with triangular cross-section throughout, has front of tang and blade in the same plane and separated by a transverse ridge or raised front shoulder. This ridge also projects to the sides forming a slightly raised lateral shoulder (Fig. 67 *c*).

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	2	—	—	2
British Museum	—	1	—	1
Pitt Rivers Museum	1	—	—	1
Total	3	1	—	4

Unclassified Type 3 specimens: (6 specimens, or 13.3 %; Figs. 67 *d-e*; 68 *a-c*). These are small, and demonstrate some unusual features or blending of sub-type characteristics. They have in common a tang which is longer than the broad, short blade. Cross-sections at shoulder are trapezoidal or triangular with apex rounded, depending on the longitudinal extent of the bevel. With one exception, the front-side junctions of the tang are rounded so that the cross-section here is rounded triangular. On three specimens the tang is much reduced laterally while front reduction is slight and front shoulder only slightly apparent. Some may have been made from blades of larger adzes (Figs. 67 *e*; 68 *b*). A very small specimen has an asymmetrical laterally reduced tang, reduction being slight on the left and marked on the right (Fig. 67 *d*). The other two have only frontal reduction and the front shoulder is more sharply defined (Figs. 68 *a,c*). In three cases lateral edges flare, in one

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	5	—	—	5
British Museum	1	—	—	1
Total	6	—	—	6

they are parallel, and in two they converge toward the edge. Bevel is slightly convex transversely on four specimens, and slightly concave on two. In some specimens several chipping scars remain unobscured, their manufacture being cruder than that of the above sub-types.

Type 4: (3 specimens, or 6.7 %; Fig. 68 *d-f*) One adze (Fig. 68 *f*) is characteristic of Type 4-A, and another with a relatively broad edge (Fig. 68 *e*) may represent Type 4-B. Definition of sub-types would be premature in view of the small sample. The remaining adze is very small and somewhat equivocal in its characteristics (Fig. 68 *d*). Cross-section at blade is trapezoidal in two cases, and in the other it is triangular with apex rounded. Front and sides of tang are pecked and merge in a strongly convex surface. Front reduction of tang produces a front shoulder but no proximal frontal projection. Back of two specimens is longitudinally concave, and on the third it is convex. Bevel is slightly convex or flat transversely and merges into back. Grinding covers bevel, front, and sides of blade. Back is pecked in one case and in others lightly ground with many chip scars remaining unobscured.

SUMMARY TABLE
(Raivavae)

	Type 1-A	Type 1-B	Type 3-A	Type 3-H	Type 3	Unclassified	Type 4	Total
Kon-Tiki Museum	—	—	23	2	5	1	—	31
Musée de l'Homme	—	—	1	—	—	—	—	1
British Museum	—	—	5	1	1	1	—	8
Pitt Rivers Museum	1	1	1	1	—	1	—	5
Total	1	1	30	4	6	3	—	45
Percentage	2.2	2.2	66.7	8.9	13.3	6.7	—	100

TUBUAI ADZES

A previous study of Tubuai adzes has been presented by Stokes (In *Aitken*, 1930, pp. 130-159). His sample of 96 specimens is larger than ours of 53 examples, and his work is rich in observations on manufacturing process.

Type 1-A: (2 specimens, or 3.8 %; Fig. 69 *a-b*) One specimen differs greatly from all others from Tubuai (Fig. 69 *b*). It has an almost rectangular cross-section, with front slightly wider than back. All surface

junctions are well defined, except the front-side junctions of the tang which are rounded by pecking. The tang has only frontal reduction, and its right proximal corner is raised obliquely (fronto-laterally) in a lug which has been broken and re-pecked. From the opposite corner a similar lug has been broken off and the circular scar not repaired. The tang is pecked even at the poll. Grinding covers the blade but pecking is evident on its sides near the tang. Bevel is transversely flat. Another unfinished specimen possesses some characteristics of Type 3-H (Fig. 69 *a*). It has a trapezoidal cross-section throughout with front markedly wider than back. Back-side junctions are rounded. Back and bevel merge in a transversely slightly concave surface. Most surfaces are pecked.

Type 2-A: (3 specimens, or 5.7 %; Fig. 69 *c-e*) These are small and somewhat irregular in cross-section. Two have incipient tangs, one hardly more than an unground and rough butt. The other is formed by slight chipping of the sides, especially the left. On this last, front grinding extends over the tang (Fig. 69 *c-d*). The third specimen has back, and especially front, well ground, while sides and poll are only chipped (Fig. 69 *e*). Bevel merges with back and, transversely, it ranges from slightly concave to slightly convex. None shows evidence of pecking.

Type 3: This is the most common type on this island, and demonstrates a wide range of variation from adzes of clear triangular cross-section (Type 3-A) to both thick and narrow (Type 3-F) and wide and thin (Type 3-H) forms. In both of the latter the posterior median ridge tends to disappear. A specialized form with widely flaring blade (Type 3-E) extends this range. Save for a slightly pecked specimen of Type 3-E, common manufacturing characteristics appear throughout. Chipping, pecking, and grinding are universally used. Pecking is nearly always important. Grinding appears only on blade surfaces and usually is so light that part of the pecked surface remains visible. In a few cases grinding of blade sides extends over tang sides. With four pecked exceptions, the poll demonstrates only chipping.

Type 3-A: (5 specimens, or 9.4 %; Fig. 69 *f-h*) These are medium to medium-large in size and have a clear triangular cross-section with well marked surface junctions. Sides and front are transversely flat or slightly convex. Width-thickness index based on 4 finished Kon-Tiki Museum specimens is 84, and ranges from 79 to 90.¹⁸ They are very similar to the corresponding Raivavae specimens, but workmanship is poorer. There is less reduction by pecking, and deep chip scars appear on all specimens. Grinding covers a smaller proportion

¹⁸ This index is calculated at the shoulder for Tubuai adzes.

of blade surfaces and is more lightly applied. Poll is irregular and roughly treated. One specimen has a triangular flattening of the proximal end of the posterior median ridge, but this has been produced by a single chip and may be accidental (Fig. 69 *f*). Bevels of four specimens are transversely concave, the fifth being flat. Front-side junctions of two specimens converge slightly toward the edge, and on two they are parallel. One specimen (Fig. 69 *g*), which appears to intergrade with Type 3-H, has a flared blade, and its blade front shows a slight longitudinal concavity.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	4	—	1	5

Type 3-E: (6 specimens, or 11.3 %; Fig. 70) These are large or medium in size. They are triangular in outline with widely flaring blade. Blade cross-sections are trapezoidal in three cases, and in others they are plano-convex with sides merging to form a strongly convex surface. Front is transversely flat to convex. Tang is frontally reduced and front-side junctions of tang are rounded to different degrees. One unfinished adze is tangles, and another unfinished one has the tang reduced only at the front-side junctions. Bevels are transversely concave, or slightly so, and merge with backs. One specimen has been worked almost entirely by chipping and grinding, traces of pecking being evident only at front of tang near the shoulder (Fig. 70 *c*). On others, pecking is an important manufacturing technique, while grinding usually covers only the blade front and part of its back.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	2	—	—	2
Musée de l'Homme	1	—	—	1
British Museum	—	2	—	2
Pitt Rivers Museum	—	1	—	1
Total	3	3	—	6

Type 3-F: (22 specimens, or 41.5 %; Fig. 71) These are narrow and thick specimens of medium to large size. Width-thickness index based on five finished Kon-Tiki Museum specimens is 108, and ranges from 91 to 130. Sides merge to form a single strongly convex surface. Blade front is slightly convex transversely, and

ADZES FROM CERTAIN ISLANDS OF EASTERN POLYNESIA

front-side junctions are sometimes rounded. At tang these junctions almost disappear, and cross-section tends to be ovoid or circular. Tang is frontally reduced, sometimes deeply, and rounding of front of tang also contributes to its definition. Sides of tang of two specimens are slightly reduced by pecking below adjacent blade surfaces, while on another, a similar reduction extends all the way around the back. Front of blade is longitudinally slightly convex. On two specimens a slightly raised front shoulder produces a slight longitudinal concavity of the proximal end of blade front. This feature is the "raised-dropped shoulder" of Buck (1944, pp. 139-140). The tang tapers towards the poll by gradual reduction on all sides, but usually more on front and back than sides. The poll thus often appears as a transverse ridge or point. Bevel merges into back, and is usually transversely flat or convex. On a few unfinished specimens it is transversely concave. On one specimen the bevel is a clearly triangular flattened surface with apex engaging a defined posterior median ridge. On three specimens an unusually long bevel produces a rounded quadrangular or trapezoidal blade cross-section. Front-side junctions of blade are roughly parallel on half the specimens, and flare or taper on the others in approximately equal numbers.

These adzes show an unusually intensive use of pecking, and unobscured chip scars are less numerous than in Type 3-A. This is especially noticeable in two narrow and thick specimens (Fig. 71 d, f).

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	5	4	—	9
Musée de l'Homme	2	1	1	4
British Museum	1	3	—	4
Pitt Rivers Museum	3	2	—	5
Total	11	10	1	22

Type 3-H: (13 specimens, or 24.5 %; Fig. 72 a-e) These are principally of medium size, though one specimen is small. They are broad bladed and relatively thin. Width-thickness index based on five finished Kon-Tiki Museum specimens is 74, and ranges from 60 to 84. One Pitt Rivers Museum adze (Fig. 72 d) has an index of 41. Transversely, sides form a single convex surface, while front varies from flat to markedly convex. Front-side junctions are apparent and tend to disappear towards the tang. Two specimens have triangular cross-sections with distinct longitudinal junc-

tions. On these two the bevel is triangular in outline. On others it tends to be long and to merge into the back, or tends to be triangular with ill-defined margins. Among the finished specimens the bevel is transversely concave or slightly so in six cases, and convex or slightly so in five.

The frontal reduction of tang extends part way around the sides and results in lateral constriction. Two unfinished, tangless specimens were probably to be tanged as above. Two tangs have only lateral reduction. Blade front is longitudinally flat or convex, save in one case where a raised front shoulder produces slight concavity toward the proximal end of the blade (Fig. 72 b). Except for a specimen on which front-side junctions are roughly parallel, there is slight to marked flare toward the edge. Some appear to intergrade with Type 3-E. Poll is often a transverse ridge or small irregular surface. Manufacture and finishing are as in Type 3-E.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	5	1	—	6
Musée de l'Homme	1	—	—	1
British Museum	1	1	—	2
Pitt Rivers Museum	4	—	—	4
Total	11	2	—	13

Abberant form of Type 3: (1 specimen, or 1.9 %; Fig. 69 i) One specimen is very small and irregularly shaped, the tang being reduced laterally only at the left side. In front view the right side is strongly convex. Front of blade and tang are separated by a raised shoulder. Front-side junctions converge toward edge and bevel is transversely concave.

Type 5-C: (1 specimen, or 1.9 %; Fig. 72 f) The specimen¹⁰ may be a side-hafted adze. It is small, and has tang reduction on right side and front. Frontal reduction becomes progressively less deep toward the left. Cross-section is rounded quadrangular. Right side is transversely and longitudinally convex, while the left, or haft receiving, side is transversely and longitudinally flat. Bevel merges with back, and is slightly concave transversely. Poll is a transverse ridge. Unreduced chip scars remain all over, especially at the tang. Most grinding is on the blade, and a few possible pecking scars are apparent.

¹⁰ Found, according to Routledge, at "Marae Harii".

ADZES FROM CERTAIN ISLANDS OF EASTERN POLYNESIA

SUMMARY TABLE
(Tubuai)

	Type 1-A	Type 2-A	Type 3-A	Type 3-E	Type 3-F	Type 3-H	Type 3-Unclassified	Type 5-C	Total
Kon-Tiki Museum	1	—	5	2	9	6	1	—	24
Musée de l'Homme	—	2	—	1	4	1	—	—	8
British Museum	1	1	—	2	4	2	—	—	10
Pitt Rivers Museum	—	—	—	1	5	4	—	1	11
Total	2	3	5	6	22	13	1	1	53
Percentage	3.8	5.7	9.4	11.3	41.5	24.5	1.9	1.9	100

MARQUESAS ADZES

Marquesas adzes have been studied by Linton (1923, pp. 320-330). The Kon-Tiki Museum collection of 42 adzes includes 31 specimens from Nukuhiva and 11 from Hivaoa. As no stylistic inter-island differences between the two samples are apparent, they are described together. From the large collection of Marquesas adzes at the Musée de l'Homme, five specimens, which appear similar to Easter Island types, are included in the present study.¹¹ Their specific provenience within the island group is not known. Of the total collection, only one specimen shows evidence of pecking. Grinding in general covers only a small proportion of surfaces, but on some types is more extensively used.

Types 1-A and 2-A: (15 specimens, or 35.7 %; Fig. 73 a-e) It is almost impossible to regard as two categories the tanged and tangless specimens of quadrangular cross-section in this collection, there being a continuous range of variation in this feature, from marked presence to absence, as size diminishes. Furthermore, as even the extreme cases are alike in all other features, these specimens may be described together, even though the apparent continuity of tang features may be exceptionally apparent in this sample.

Front, except for two thin irregular fragments, is wider than back. Sides slope markedly inward toward back and the rough chipping produces a trapezoidal, irregular, or almost triangular cross-section. Sides flare slightly toward the edge. Grinding covers bevel and extends to different degrees over back and sides. In some cases unobscured deep chip scars cover much of the front, which is ground only on the distal portion. Occasionally these scars produce a decided reduction.

¹¹ They are excluded from the summary table on page 191 and from percentage calculations, as they were deliberately selected from a group of about 90 probably genuine Marquesas adzes.

Front is transversely flat at the ground portion, and convex on the proximal chipped surface. Longitudinally, front and back are convex with two exceptions on which back is slightly concave. In some cases marked convexity of front produces a symmetrical edge. With one slightly concave exception, the bevel is transversely flat. It has a defined chin, or merges into back. Edge is almost straight. Size is medium to small, with the exception of one large specimen. Small specimens tend to be thick.

On two small specimens chipping has reduced sides, front, and back to ridges, and rendered the cross-section lozenge shaped. These may represent a different type (Fig. 73 c).

If the above specimens were to be divided arbitrarily into tanged (Type 1-A) and tangless (Type 2-A) groups, probably six would be regarded as tanged and seven as tangless. Evidence is lacking for two blade fragments. One specimen (Fig. 73 e) was obtained at Hivaoa, all others at Nukuhiva.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	11	—	4	15

Type 2-B: (4 specimens, or 9.5 %; Fig. 73 f-g) Two complete specimens and two butt fragments appear to represent a variant of Type 2-B. Except at the poll they are ground throughout, leaving only a few unobscured chip scars. Cross-section is lenticular, with sides reduced to a ridge on one fragment, and ground flat on others to produce narrow lateral surfaces. Poll is irregular. Edge is convex and, transversely, bevel is slightly so. Chin is curved in one case and irregular in the other. The complete specimens were obtained at Hivaoa, and the fragmentary ones at Nukuhiva.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	2	—	2	4

Type 2-E: (4 specimens; Fig. 74 a—d)²¹ Front and sides merge to form, transversely, a markedly convex surface. Back is transversely flat, angular, or moderately convex. Front-side surface is well ground, while back is less so and has numerous chip and other scars unobscured. Back-side junctions are visible, with one exception on which they are thoroughly rounded, and which may be an intergrade with Type 2-B. Longitudinally, front is convex and back generally straight, with one concave exception. Edge is convex, and bevel ranges from transversely concave to slightly convex. These could have served as gouges. In one case chin tends to be defined and convex transversely, and in others bevel merges with back. Poll is irregular. Three specimens are medium to large, and one is small. Sides of large specimens flare moderately from poll to edge. Maximum width of the small specimen is at mid-length, with sides tapering toward poll and edge.

Type 4-A: (11 specimens, or 26.2 %; Fig. 75 a—f) Three large and two small specimens are typical (Fig. 75 d—f). They are long and thick with the front of tang characteristically concave longitudinally, tending to produce a frontal prominence at poll, and a marked front shoulder. In side view they are curved, with front and back respectively convex and concave longitudinally. Back-side junctions are convex, and converge toward poll and narrow edge. The front appears as a median ridge at the tang and is ground flat or convex on a varying portion of the blade to produce a narrow front surface which expands toward the edge. Bevel merges into back. Chipping, especially of larger specimens, is excellent. The front surface is ground, while on the back only the bevel is so treated. On sides grinding varies, but usually is intensive only in the vicinity of the edge. Bevel of the three large specimens is markedly concave transversely, and on the small ones it is transversely slightly concave in one case and flat in the other. With the exception of one small specimen obtained at Nukuhiva, the others were obtained at Hivaoa. Three additional

blade fragments collected at Nukuhiva are probably from similar specimens.

Three others are unusual. One is reworked from the blade of a larger adze. A new tang has been made and the resulting tool is short and wide, and has a proportionately long tang. Bevel is slightly concave transversely. This specimen was obtained at Nukuhiva (Fig. 75 b). Another example is small (Fig. 75 c). The proximal portion is long, of triangular cross-section, and has no tang reduction. The front is an irregular median ridge, the distal end of which has been modified into a short triangular surface sloping sharply toward the edge. Said ridge probably efficiently replaced as a lashing retainer the concave tang reduction present on the larger specimens. Edge is convex and bevel is convex transversely. This specimen was obtained at Nukuhiva. The third specimen is also tangless, and has probably been made from the blade of a long narrow adze (Fig. 75 a). Front and sides are intensively ground, and intersect in sharp, parallel junctions. Back is roughly chipped and ground only at bevel, which is transversely flat. The rough chipping of the back contrasts sharply with the other ground surfaces, which suggests that in reworking, thickness was reduced by additional chipping of the back. The large scar noticeable at the butt front may represent an incipient tang. Poll is a single fracture surface. This specimen was obtained at Hivaoa.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	8	—	3	11

Type 4-B: (5 specimens, or 11.9 %; Fig. 75 g—i) These differ from those above only in having a comparatively broad edge, and a bevel which meets the front at a more acute angle. Both groups represent a continuous range of variation, and are here arbitrarily separated. On the two most typical specimens, back-side junctions are straight and flare slightly toward the edge (Fig. 75 g, i). Another specimen, which is transitional to Type 4-A, has longitudinally convex back-side junctions (Fig. 75 h). The remaining complete specimen is very small and irregular. Transversely, bevels are straight or convex. Three specimens were obtained at Nukuhiva (Fig. 75 g) and two at Hivaoa (Fig. 75 h—i).

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	4	—	1	5

Type 4-D: (1 specimen; Fig. 74 e) A Musée de l'Homme specimen has cross-section basically trapezoidal, with convex sides. Flattening of front results in marked front-side junctions toward distal end of blade. At butt, front transverse convexity is pronounced, and front-side junctions are rounded. Front is longitudinally convex and back concave. Bevel is slightly convex transversely and has a transversely convex chin. Edge is damaged. The specimen has been thoroughly pecked all over, even at the poll. Front of blade is ground, as are distal portions of back and sides. Only very few chip scars remain.

Type 6: (1 specimen, or 2.4 %; Fig. 74 f) This somewhat atypical specimen has been ground in different planes producing many longitudinal surface junctions. Cross-section is thus polygonal. Bevel is transversely slightly concave, and edge is damaged. The poll is a ridge. This specimen was obtained at Nukuhiva.

Unclassified specimens: (6 specimens, or 14.3 %; Fig. 74 g) Five fragmentary adzes have irregular triangular cross-sections with a vertex opposite the front. In two cases chipping of sides is so irregular that they may represent extreme cases within Type 1-A or 2-A in which rough work has reduced the back to a ridge. Triangular cross-section of the others seems deliberate and they may belong to Type 3-A or 3-G. Three fragments of finished specimens are ground only on front and bevel, which is transversely more or less straight. The other two are only chipped. A small specimen has been made by grinding a bevel on a waterworn pebble of triangular cross-section. Five specimens were obtained at Nukuhiva and one at Hivaoa.

	Finished	Unfinished	Broken	Total
Kon-Tiki Museum	1	—	5	6

SUMMARY TABLE
(Marquesas)

	Types 1-A & 2-A	Type 2-B	Type 4-A	Type 4-B	Type 6	Unclassified	Total
Kon-Tiki Museum	15	4	11	5	1	6	42
Percentage	35.7	9.5	26.2	11.9	2.4	14.3	100

DISTRIBUTION AND COMPARISONS

The following observations are based on the materials described above, on other collections in the Musée de l'Homme, the British and Pitt Rivers Museums, and on data from available literature. Our discussions of types are prefaced by a distribution list largely taken from that compiled by Duff (1959) for Eastern Polynesia, with additions from our own studies. Where the type under consideration is numerically well represented, the island name is italicized. Some points fully discussed by Duff are not further dealt with here.

Type 1-A

Chatham, South Island, N. Z., North Island, N. Z., Northern Cooks, Southern Cooks, Societies, Tuamotu, Tubuai, Raivavae, Rapa Iti, Flint's Island, Pitcairn, Marquesas, Hawaii, Tokelau.

Two basic variants of this type are distinguished principally by manufacturing technique. One, almost exclusively chipped-ground, includes the Type 1-A examples from Pitcairn and the Marquesas, as well as most of the adzes from Hawaii. Another, chipped-pecked-ground, includes most specimens of Type 1-A from the Chatham, South Island, N. Z., and Rapa Iti, as well as most, or all, of the less numerous examples from North Island, N. Z., Northern and Southern Cooks, the Societies, and Tubuai.

There are at least two chipped-ground forms: 1) the Hawaiian, characterized by tendency toward rectangular cross-section, tang generally set at an angle to blade, and only slight lateral tang taper towards poll (Brigham, 1902, pp. 72–86; Emory, 1928 a, p. 128; 1928 b, pp. 40–42, 92–95, 112–113), and 2), the Pitcairn form, with front usually much wider than back and tang tapering laterally towards poll. Within the chipped-pecked-ground group, characterized by more regular surfaces resulting from extensive pecking prior to grinding, is a lug-bearing variant with a distribution generally similar to the lugless form. The Rapa Iti specimens have some peculiar traits, including merging bevels, backs much narrower than fronts, and frequent single, and occasionally double, tang lugs. An Aitutaki specimen with double lugs illustrated by Skinner (1940, Fig. 5) is the closest parallel known to the writers.

The idea that the Rapa Iti preference for single lugs is a variation of the widespread device of double lugs, probably conditioned by application to narrow specimens

²¹ Dr. Robert C. Suggs kindly studied sketches of these Musée de l'Homme specimens and compared them with his own excavated materials. In his opinion they are genuine Marquesas adzes. (Personal communication to the writers, August 7, 1959.)

(Duff, 1959, p. 131), is strengthened by present evidence. Mulloy illustrates a relatively wide specimen with double transversely placed lugs, and a narrower one with double longitudinal lugs (this volume, Fig. 17 b; Fig. 19 a). This last could represent an application of a double lug tradition to narrow, thick adzes (e.g. Type 1-E), and a logical step in the evolution of the predominant single lug.

Two chipped-pecked-ground adzes from Tubuai, one of which has double tang lugs, and one small specimen from Raivavae, confirm the presence of this type in the Australs, though with low incidence in the present sample. The typical lug bearing variant occurs in Tubuai, while in Raivavae similar lugs appear in Type 3-A adzes. One of the Tubuai specimens possesses several local Type 3 characteristics.

Skinner (1940, Fig. 2) illustrates a similar quadrangular, lug-bearing adze which he suggests is from Mangaia, although it is catalogued as from Tubuai. The recurrence on Tubuai of the lug-bearing variant of Type 1-A, and the rarity of the type with or without lugs in the Cooks, cast doubts on the suggested Manganian provenience. Thus, of the two specimens of Type 1-A in a Southern Cook sample of 120 studied by Buck (1944, pp. 133-176), one broken specimen bears lugs. Of 47 British Museum specimens of the same provenience examined by the writers only three are Type 1-A, none having tang lugs. The two lug-bearing adzes from Tubuai may be considered as of local manufacture just as logically as the Cook Islands occurrences are accepted as authentic. In both localities this type is scarce and differs sharply from prevailing forms.

Type 1-B

South Island, N. Z., Raivavae (?), Rapa Iti, Pitcairn. In addition to a few Pitcairn examples, the present collection includes one typical Rapa Iti specimen and another from Raivavae. Another good example from Rapa Iti is in the Pitt Rivers Museum.

This sub-type may be interpreted as the result of an attempt to produce a tanged adze with material so thin that front reduction would be impracticable (Duff, 1950, pp. 156-157). It should thus be expected on islands where Type 1-A is well represented. This is true of South Island, N. Z., Rapa Iti, and Pitcairn where Type 1-B is much less frequent than 1-A. According to this view the specimen obtained at Raivavae would probably have been made elsewhere. However, scanty available data suggest absence of the sub-type in the Marquesas and Hawaii. The latter is specially noteworthy as Type 1-A

is virtually the sole form present. Perhaps the Hawaiian technique of setting the tang at an angle to the blade replaces the requirement of a Type 1-B tang. This fact, as well as distribution restricted to southerly marginal islands, might indicate limited diffusion. Perhaps because of the thinness and small size, pecking is often absent.

Type 1-C

South Island, N. Z., Pitcairn.

A front markedly wider than back is, according to Duff (1950, p. 159), a primary defining characteristic. It may be a distinguishing feature in South Island, N. Z., but does not separate the Pitcairn specimens from other local sub-types, this trait being almost universal among Pitcairn Type 1 adzes. Comparison of the Pitcairn examples and Duff's South Island, N. Z. specimen (1950, Fig. 34), suggests weak morphological similarity. Nevertheless, incipient shoulder lugs of two of the nine Pitcairn specimens are reminiscent of South Island (Fig. 54 d).

Several Pitcairn specimens of this type seem to be transitional forms within a range extending from relatively thick forms with frontally reduced tangs (Type 1-A) to thin ones with laterally reduced tangs (Type 1-B).

Type 1-D

Southland (South Island, N. Z.)

According to Duff (1959, p. 130) this type, peculiar to Southland, "may be regarded as an offshoot of Type 1. Variety A rendered in a resistant stone which must be bruised (pecked) rather than flaked into shape so that the section becomes a rounded rectangle". The front shoulder and chin are frequently raised. A Southland specimen, with several characteristics of this group, resembles an Easter Island type, and is discussed below (see Type 4-D).

Type 1-E

Rapa Iti.

Type 1-E quite probably developed from the widespread pecked variant of Type 1-A, and may represent a specialized and functionally parallel variant of the thick and narrow form of Type 3 from Tubuai (Type 3-F). Wide and thin Rapa Iti varieties (Mulloy's Morongo Uta,

Types 1 and 4) are parallel to triangular cross-sectioned adzes of Raivavae and Tubuai (Type 3-H). A broad and thin, as well as a narrow and thick, variety of a single type are likely to occur on islands where, as on Rapa Iti, one basic type excludes almost every other. A possible origin of the single tang lug, frequently found on this sub-type, has been discussed with Rapa Iti variants of Type 1-A.

Type 2-A

Chathams, South Island, N. Z., North Island, N. Z., Tubuai, Pitcairn, Marquesas, Hawaii, Mangareva, Easter.

Type 2-A appears usually unpecked, although data are insufficient for New Zealand and the Chathams. Frequent small size and thinness could explain this, although an historic explanation will be suggested below. Lack of available information prohibits the establishment of variants, as under Type 1-A, but some contrasting features of Easter Island and Pitcairn specimens are worthy of note. Pitcairn examples usually have decided flares, and Easter Island ones moderate flares. Pitcairn specimens generally have an incipient tang, and might be considered as part of a range within Type 1. In Easter Island Type 1 is absent, and even the large adzes of Type 2-A are completely tangless. The few specimens from Tubuai examined by the writers approach the Pitcairn form. The present Easter Island sample demonstrates an incidence, i.e., 46 %, not equalled elsewhere in Polynesia.

Type 2-B

Chathams, South Island, N. Z., North Island, N. Z., Marquesas, Mangareva, Easter.

This sub-type is also present in Western Polynesia, where it contrasts with the prevailing chipped-ground adzes of sharply angular cross-section and back wider than front. While possibly absent in Samoa, it occurs in Rotuma (Duff, 1959, p. 133), Uvea,²⁵ Futuna (Burrrows, 1936, Pl. 5 B), Lau (Duff, 1950, Fig. 36), and Tongatabu (*Ibid.*), a distribution suggesting dispersal from Fiji. Regular, convex surfaces were produced by intensive pecking. This technique is important in the manufacture of adzes in Melanesia, including Fiji.

Type 2-B may have spread to North Island, N. Z., and thence to the Chathams and South Island, or, as Duff

(1959, p. 133) suggests, its occurrence may be due to convergence resulting from the use of coarse grained stones more easily worked by pecking than by chipping.

Finally, among the eastern marginal islands, the sub-type is well represented on Easter Island, where the prevailing pecking technique, which tends toward the rounding of edges, could account for its importance. The sporadic occurrence of Type 2-B in Mangareva, and its presence in the Marquesas, though in a different and unpecked form, suggest that a prototype may have been diffused in this area. However, this simple form could have developed independently on Easter Island, conditioned by the importance of Type 2-A, and the technique of pecking in adze manufacturing.

Type 2-C

South Island, N. Z., Mauke, Huahine (?), Rapa Iti, Pitcairn, Fanning, Mangareva, Easter (?).

The rarity in Eastern Polynesia of this essentially Western Polynesian type is again revealed in the present collection. It is absent in the collections from Rapa Iti, Raivavae, Tubuai, and Marquesas, while the few specimens from Easter Island and Pitcairn may well be aberrant forms of other types. Two typical specimens from Mangareva²⁶ were examined. There, according to Duff (1959, p. 133), the sub-type is more frequent than elsewhere in Eastern Polynesia. As Mangarevan adzes are tangless, generally crudely worked, and characterized by an appreciable range in cross-section, the fact is not very significant culturally.

Caillot (1909, Pl. LXXX, No. 30) illustrates a typical medium sized specimen from Huahine found in the collections of the Musée de l'Homme. It is regular in shape, ground all over except on the poll, and has clear longitudinal back-front-side junctions. Further finds in the Society Islands would require revision of the above interpretation of the Eastern Polynesian occurrence. This type is generally unpecked.

Type 2-D

South Island, N. Z., Rapa Iti.

Mulloy's evidence (Morongo Uta, Type 4) suggests that, in the case of Rapa Iti, this sub-type is inappropriately included in Type 2. Morongo Uta specimens show distinct tang reduction, principally at the sides, as

²⁵ Adze No. 33.51.24 in the Musée de l'Homme examined by writers.

²⁶ British Museum No. 1925. 10-19. 74 and 1925. 10-19. 83.

well as transverse paired grooves at the distal end of the tang. Tang reduction and other traits appear to be related to other local varieties of adzes. In general the form appears to be a small, thin variant of Type 1. Butt grooves are not always "sawn" as Duff states (1959, p. 133). In three out of six cases, they are the result of careful chipping.

Type 2-E

Pitcairn (?), Marquesas, Easter.

In the Marquesas and Easter Island this sub-type is infrequently encountered (4 % in Easter Island and 3 % in the Marquesas, Musée de l'Homme collection from the Marquesas included). Low incidence of the sub-type may be the result of specialized use, as its curved edge suggests a gouge. Possibly the form is archaic and was replaced in later times. Striking similarity between some Marquesas and Easter Island specimens is noteworthy. In the Marquesas the form seems to be related to the local Type 2-B variant of lenticular cross-section, absent on Easter Island, and perhaps a later Marquesas development.

In addition to the Pitcairn example in the present collection (Fig. 55 g), a Mangarevan adze examined at the Pitt Rivers Museum approaches the type. It is atypical in having one defined front-side junction.

In Western Polynesia Type 2-E is clearly present, and in Samoa it is apparently Buck's (1930, p. 347) Type V. A few Samoan specimens,²⁴ one from Tonga,²⁵ and one from Uvea,²⁶ have been examined. Though the type is little stylized, its distribution suggests antiquity. Except for a few Easter Island specimens, and the one from Uvea, none has apparent pecking scars.

Type 2-F

Tuamotu, Marquesas, Easter (?).

These are characteristic of the Marquesas where they are known as *toki aa* (Linton, 1923, p. 322). Duff (1959, Fig. 2) illustrates a specimen from Takapoto, Northern Tuamotu, which was probably imported from the Marquesas.

Large Easter Island adzes included in Type 2-B variant resemble the above in several traits, and may be a local form. They differ from the Marquesas quad-

angular cross-sectioned form in that they generally show rounded back-side junctions and a tendency toward transverse back-side convexity. Marquesas incidence is low (about 4 % - Musée de l'Homme collection included). Easter Island incidence is even lower. Though the Marquesas adze complex differs in important aspects from that of Easter Island, presence of similar or related forms of the rare Types 2-E, 2-F, and 4-D (see below) is noteworthy. This sub-type is generally pecked.

Type 3-A

Chatham, South Island, N. Z., North Island, N. Z., Southern Cooks, Societies, Tuamotu, Australs, Pitcairn, Marquesas, Hawaii.

Tanged adzes with triangular cross-section are predominant in the central area including the Society, Southern Cook, and Austral groups (Rapa Iti excluded). They are also present but in low incidence in the marginal islands in the above list. In the central area Type 3-A has some distinctive characteristics, including thick cross-section and intensive pecking, which contrast with those of the marginal island specimens which are often thinner and worked by chipping-grinding. In view of the similarity of some New Zealand, Pitcairn, and Marquesas specimens,²⁷ the writers do not interpret marginal distribution as a result of parallelism, as does Duff (1959, p. 135) in his recent formulation, but rather consider it to suggest early diffusion. According to this hypothesis, the type restricted to Central Polynesia probably would be a later development from a prototype similar to the marginal form, as pointed out by Duff (1950, p. 172) in an earlier work.

It appears that Type 3 forms of the central area were locally adopted to the exclusion of almost every other form at the time of the first European contacts. The many apparently genuine hafted adzes from the Society Islands examined at the Musée de l'Homme, the British Museum, and the Pitt Rivers Museum, were all of this type (Emory, 1928 a, p. 126, also makes this observation). The only different hafted adze known to the writers is a Tahitian Type 4-A specimen (Buck, 1938, Fig. 45). The same seems to apply to the hafted adzes from the Cooks (Mangaia) studied by Buck (1944, pp. 443-44). Though no hafted adzes collected in that period in the Australs have been recorded, it seems likely that

a similar situation occurred in this group. This may explain variations of the type in the Austral and Cook groups, as several functional requirements had to be fulfilled. These variations are typologically expressed in the distinction of three sub-types. Narrow and thick specimens constitute Type 3-F, broad and thin ones Type 3-H. Between these extremes, Type 3-A is a well defined group. All three occur in the Southern Cooks and Tubuai, while in Raivavae Type 3-F is absent in the collections examined.

Type 3-A is predominant in Raivavae, where it is also outstanding for excellence of manufacture and strongly defined and uniform traits. In Tubuai the type is outnumbered by its variants (Types 3-F and H). Though the Tubuai sample is small, some differences from Raivavae specimens might be noted. Tubuai specimens are cruder, have a higher proportion of transversely concave bevels, and lack regular triangular flattening of proximal end of posterior median ridge. This latter trait seems incipient in some specimens illustrated by Stokes (in Aitken, 1930, Fig. 15).

Double lugs on the tang front, a feature of a few Type 3 specimens from the Cooks (Duff, 1959, p. 135; Buck, 1944, Fig. 113), also occur on three Raivavae specimens. This constitutes another similarity between the closely related adze complexes of the Australs and Southern Cooks, and further suggests a chronological relationship in this area between the pecked, thick form of Type 3-A and the lug-bearing similarly pecked variant of Type 1-A already pointed out by Duff (1950, p. 149). The latter has a wider distribution, and quite likely represents the type on which the feature originally developed.

Type 3-B

Society Islands.

These are well finished and have a long bevel with a characteristically projecting chin. The length of the bevel probably permitted the chin to lie against the distal end of the haft foot, thus helping to prevent the adze head from being forced backward. Cross-section is triangular or trapezoidal. In the latter case, back is a narrow longitudinal surface. Back of others is rounded by pecking. The difference between this type and local adzes of Type 3-A is not merely morphological. The latter are usually cruder and, unlike Type 3-B, show many irregularities of chipping unreduced by pecking.

Most of the examined hafted adzes from the Societies are of Type 3-A. This may imply that Type 3-B was obsolescent at the time of European contact.

Type 3-C

South Island, N. Z., Tahaa (?), Pitcairn.

In South Island, N. Z., this sub-type stands out as a distinct class, and includes over 50 % of the Wairau adzes of Type 3 (Duff, 1950, p. 139). Elsewhere it is rare, and the blade tapering from shoulder to edge, which is the main characteristic of the group, is present in different forms of Type 3 as part of their range, and apparently is not associated with a particular sub-type. However, on Pitcairn, with its parallels to so many South Island types, the occurrence of Type 3-C specimens similar in shape and workmanship to those of New Zealand,²⁸ makes plausible the suggestion that this sub-type was diffused early from a single center. Incidentally, a specimen from Tahaa, at the Musée de l'Homme,²⁹ was examined, which shows characteristics of the Pitcairn specimens, although proportionately somewhat thicker. It is rather small, of sub-triangular cross-section, and worked by chipping-grinding. The latter feature is noteworthy, as it comes from an area where pecking was important. In this sub-type pecking seems to have been generally absent or unimportant.

Type 3-D

South Island, N. Z., Pitcairn, Easter (?).

Like Type 3-C, this sub-type occurs in South Island, N. Z. and Pitcairn (Duff, 1950, pp. 175-176), and is probably also principally chipped-ground. A typical example was obtained on Easter Island (Fig. 49 e). Absence of adzes of triangular cross-section in this locality suggests an aberrant form of another type. As the sub-type is rare wherever found, it is likely to appear only in large collections.

Type 3-E

Societies (?), Tubuai, Pitcairn, Mangareva, Easter (?).

These have an expanding blade and wide edge. This simple trait, which probably reflects a practical requirement, may have developed independently in several places.

²⁴ Musée de l'Homme No. 80.59.15 and an unnumbered Pitt Rivers Museum specimen.

²⁵ Musée de l'Homme No. 49.41.126.

²⁶ Musée de l'Homme No. 33.51.19.

²⁷ For example compare the Hurunui adze figured by Duff (1950, Fig. 38) with the Pitcairn specimen in our Fig. 56 d.

²⁸ Remarks on South Island, N.Z. adze manufacture techniques are here and elsewhere based mostly on Duff's illustrations (1950).

²⁹ No. 49.41.89. Illustrated by Caillot, 1909, Pl. 81, No. 35.

Knives and chipped adze-like tools with widely flaring blades are found on Easter Island, while adzes with the same characteristic, but differing among themselves in cross-section and presence or absence of tang, constitute about 10 % of specimens from Pitcairn, Mangareva, and Tubuai. If these implements are considered to have a common ancestry, it is significant that the most common cross-section is trapezoidal. Since, in the above islands, except Tubuai, triangular cross-sectioned adzes of Type 3 are absent, or uncommon, the prototype might be quadrangular. The specimens from Tubuai, which appear in general closely related to the prevailing Type 3, especially Type 3-H, could be regarded as modifications conditioned by the presumably late local fashion of triangular or sub-triangular cross-sections. A Society Islands specimen,²⁰ if genuine, could represent the ancestral form. It is large, trapezoidal in cross-section, chipped-ground, and has an incipient tang. Though larger, it strongly resembles the Pitcairn simple form of the type (Fig. 59 c-d). A similar Tubuai specimen is figured by Stokes (in *Aitken*, 1930, Fig. 23 b).

Excepting most specimens from Tubuai which are pecked, the sub-type is chipped or chipped-ground. It is tangless at Mangareva and Easter Island, generally tanged at Tubuai, and both tanged and tangless at Pitcairn. Usual among Mangarevan specimens are polygonal cross-sections with medial lateral surface junctions (*Buck*, 1938, Fig. 33-35). The sub-type is most fully developed at Pitcairn, where it is unusually diversified and includes highly stylized specimens. Lateral lugs on the poll of one of these have no known parallel in the rest of Polynesia, while the raised front shoulder of some is reminiscent of Cook Islands adzes as well as of a few from Raivavae and Tubuai.

Type 3-F

Tubuai, Southern Cooks.

This is probably a modification of the pecked variant of Type 3-A, resulting from the need to produce a narrow, thick tool with greater power of penetration. The relation between intensive pecking and cross-section form is clear, as pecking tends to produce convex surfaces. This is the predominant Tubuai type (41.5 %). Elsewhere, specimens have been noted only in the Cooks (*Buck*, 1944, Figs. 76, 90). A fine large Mangaian specimen differs only in having an exceptionally well

ground blade and well marked tang front-side junctions,²¹ a trait also present on the tiny Mangaian specimen figured by *Buck* (1944, Fig. 90). In addition to considerable frontal tang reduction, sides and back of tang are reduced by pecking below the adjacent blade surfaces. Limited distribution suggests a relatively late invention.

Type 3-G

New Zealand, Aitutaki, Raivavae, Marquesas, Fanning, Hawaii.

Tangless adzes with triangular cross-section, according to *Duff* (1959, p. 137), "... appear as a type only in Raivavae and Marquesas and sporadically in early New Zealand, Aitutaki and Hawaii." In the Marquesas collection of about 90 probably genuine adzes at the Musée de l'Homme, there are three finished and one unfinished examples of the sub-type.²² None was found among the 45 Raivavae adzes studied. *Buck* (1930, Fig. 199), illustrates one from Samoa, and of four Fanning Island adzes recorded by *Emory* (1939, p. 186, Fig. 4) two, are of this sub-type. The other two are typical of Western Polynesia (Types 2-C and 4-E respectively).

The wide distribution of the type, including localities where other forms of Type 3 are numerically unimportant or absent (New Zealand, Marquesas, Hawaii, Samoa, Fanning), demonstrates that it is not a random variation of the tanged triangular forms, and suggests antiquity similar to, if not greater than that of Type 3 marginal forms.

Of the six adzes examined,²³ one from the Marquesas shows limited pecking. Others are apparently unpecked. Judging from this scanty evidence and from illustrations (*Duff*, 1950, Fig. 38; Pl. 30, Nos. 13, 14, 15; *Duff*, 1959, Fig. 5; *Buck*, 1930, Fig. 199; *Emory*, 1939, Fig. 4) it would seem likely that this sub-type was manufactured with little or no pecking. Possible chronological and cultural significance of this point will be considered later.

Type 3-H

Chatham (N.Z.), New Zealand (N.Z.), Southern Cooks, Tubuai, Raivavae.

Like Type 3-F, this is also probably a modification of the pecked variant of Type 3-A, in this case designed to

²⁰ The four Marquesan specimens referred to above and one finished and one unfinished specimen catalogued as from North Island, N.Z. (British Museum No. 95-870 and 95-871).

produce a short, broad edged tool. It is frequent in Tubuai (24.5 %) and the Cooks, while in Raivavae the incidence is lower (8.9 %). In the above localities the sub-type is intensively pecked. At least in Raivavae and Tubuai, this usually results in convex, merging back and sides. A raised front shoulder is rare in Raivavae and Tubuai specimens, and more frequent in the Cooks. One Raivavae specimen (Fig. 67 c) has a raised front shoulder projecting laterally beyond blade front-side junctions in a manner reminiscent of some Type 3-E Pitcairn adzes. Since, according to *Skinner* (1943 a, p. 65), lateral shoulder lugs are present on Southern Cook Islands adzes, this specimen might come from that group. On the other hand, this trait is not referred to by *Buck* (1944), nor was it noted among the 47 Cook Islands adzes examined at the British Museum.

Skinner (1928, p. 351, Pl. 56 B) illustrates an apparently typical Chatham specimen of Type 3-H, and states that in New Zealand and the Chathams "the short variety" of his Type V (*Duff's* Type 3) appears in equal numbers to "the long variety" of the Society Islands.

A center of diffusion in the Cooks seems likely, while limited distribution, excluding most marginal islands, suggests a relatively late appearance.

Type 4-A

Chatham, South Island, N.Z., North Island, N.Z., Kermadec, Southern Cooks, Societies, Tuamotu, Tubuai (?), Raivavae, Rapa Iti, Pitcairn, Marquesas.

Present evidence indicates low incidence in Raivavae and Rapa Iti (6.7 % and 4.5 % respectively, the comparatively broad edged Type 4-B included). None is present in the Tubuai collections, but *Stokes* (in *Aitken*, 1930, Fig. 33 b) illustrates a Type 4-B specimen. Its Tubuai provenience, not accepted by *Stokes*, may be correct, since Type 4 is present in the Societies, Southern Cooks, Rapa Iti, and neighboring Raivavae.

From the almost universal distribution of the sub-type, peculiar to, and characteristic of, Eastern Polynesia, early local evolution and diffusion is suggested (*Duff*, 1959, p. 137). Incidence is always lower than, for example, Type 1 in Rapa Iti and Hawaii, or Type 3 in the Societies, Australs, and Cooks. This, together with specialized shape, concentrating weight in a narrow edge, may indicate a special purpose tool (*Duff*, 1950, pp. 176-178).

Similarity of specimens from the Marquesas, and especially South Island, N.Z. and Pitcairn, suggests close resemblance to the Eastern Polynesian prototype. The Pitcairn examples are unpecked, and those of the

Marquesas rarely have front of tang pecked. In South Island, N.Z., pecking usually seems unimportant, though it is sometimes extensive. In the above localities, chipping scars are usually conspicuous on most surfaces. On the other hand, in the Societies, Cooks, Australs, and Rapa Iti, extensive pecking often produces smoother surfaces and is present at least on the tang front of most, or all, specimens.

A Society Islands variant with a long bevel and raised chin is illustrated by *Duff* (1950, Fig. 42; and 1959, Fig. 6). Shape and technique are related to a local Type 3 variant (3-B). Here also, chin probably rested against distal end of haft foot.

Marquesas incidence is high, amounting to about 30 % of *Linton's* (1923, p. 323) sample. Many specimens are unusually large, excellently chipped, and have marked longitudinal back concavity. A long, narrow Pitcairn variant has a flattened-circular cross-section. It is perfectly ground and exhibits a blend of Types 4 and 6 traits.

Type 4-B

South Island, N.Z., Southern Cooks (?), Tubuai (?), Raivavae (?), Rapa Iti (?), Marquesas.

This sub-type differs from Type 4-A only in greater blade breadth and thinness, and probably is part of its range. Type 4 Marquesan adzes exhibit considerable variation in edge width and categorical distinctions can be established only arbitrarily. *Duff* (1950, p. 183) reports that Type 4-B is restricted in New Zealand to Nelson Province, South Island. Possibly it occurs as part of Type 4-A range. This is probably true of the few comparatively broad bladed specimens from Raivavae, Tubuai, and Rapa Iti considered above, and of some Cook Islands adzes illustrated by *Buck* (1944, Figs. 99-100). The distinction of Type 4-B is, however, justified as a way of expressing this range of the edge width, the possible significance of which lies in the fact that it does not occur wherever Type 4-A is present. This simple variation may have arisen independently in different localities, and is probably a comparatively late development.

Type 4-C

Chatham, South Island, N.Z., North Island, N.Z., Tahaa (?), Pitcairn, Marquesas (?), Hawaii, Mangareva (?), Easter (?).

Duff (1959, p. 137) reports the small, flat-backed

²¹ British Museum, No. 4999.

²² British Museum, 1944, Oc. 2.736.

²³ Nos. 30.51.46; 32.97.20; 39.3.9; 32.97.26.

gouge from Hawaii, Pitcairn, Chatham, and North and South Islands, N. Z., and large specimens from the Marquesas, and Pitcairn. The writers have seen no Type 4-C specimens from the Marquesas. Possibly Duff is referring to specimens identified as Type 2-E in the present work, which includes small and large gouges sometimes differing from Type 4-C only in thinner cross-section.

A rather heavy chisel from Tahaa,⁵⁵ and a short, crude and atypical one from Mangareva,⁵⁶ corresponding to this rare type, were examined. Both are apparently unpecked. In Easter Island, as in the Marquesas, Type 4-C might be considered to be represented by some small gouges or chisels here classified within Type 2-E.

Type 4-D

Marquesas, Easter.

The peculiar Easter Island butt-grooved adzes of this type have no close parallel elsewhere in Polynesia, but may indicate that the basic Eastern Polynesian tang idea was locally known. Métraux's (1940, p. 274) proposal that these tools may have been used directly in the hand, and that the groove served as a hand grip, seems unreasonable. Sufficient force to make them effective could not have been exerted in this manner, and flattened backs strongly suggest adze hafting. On all specimens examined (47) the groove was produced by pecking, and there was no indication of the "sawn scarf" of Duff's (1959, p. 137) description. The characteristically rounded cross-section of the type might be a local modification of triangular and/or quadrangular cross-sectioned prototypes conditioned by intensive pecking, or, more likely, it may be an imported trait. The intensive pecking might have resulted from lack of adaptability of the local basalt to precise chipping, though nothing in its appearance suggests this.

Though these tools appeared to be unique to Easter Island, a grooveless Marquesan specimen, strikingly similar in shape and technique, has been described (Fig. 74 e).⁵⁷ Apparent relationship of the adze complexes of Easter Island and the Marquesas, though weak because of differences in technique and because of the absence on Easter Island of important Marquesan types, is strengthened by this correspondence. All of the most characteristic Easter Island forms now appear to be matched by Marquesan types. The pecking technique,

which, according to Linton (1923, pp. 321-322) was restricted to the Marquesan *toki aa* (Type 2-F), now appears to have been intensively applied to Marquesan adzes of Type 4-D, which is precisely the most extensively pecked type on Easter Island. The relative simplicity of the Easter Island adze complex could be explained, as does Métraux (1940, p. 276), by regarding it as an early stage prior to the development of characteristic Eastern Polynesian tanged forms such as Type 1-A, 3-A, and 4-A. Even though the Easter Island butt groove may indicate knowledge of the basic tang idea, total absence of fully developed tangs among the specimens of Type 4-D, and lack of even incipient tangs among other types in the collection of 675 Easter Island adzes examined, is probably significant, and favors this view. However, distributional evidence indicates that fully tanged forms have considerable antiquity in Eastern Polynesia.

A South Island, N. Z., specimen also resembles the Easter Island type, but differs in its entire front tang reduction, slightly projecting front shoulder, and marked transverse bevel concavity.⁵⁷ Thickness is greater than width, the back is wider than the front, and the sides are decidedly convex transversely. The chin is projecting. It is unfinished and pecked all over except poll and proximal portion of right side, which is an original waterworn surface. According to its label, it comes from Southland. As it has several characteristics of Type 1-D, a local variant of Type 1, it may represent an atypical specimen. Type 1-D is different from the Easter Island form. Its rounded quadrangular cross-section probably results from use of resistant stones better pecked than chipped (Duff, 1959, p. 130). Similarity of the specimen in question with the Easter Island form may be coincidental and determined by similar manufacture technique.

Type 4-E

Mangareva (?).

This widespread and typically Western Polynesian form differs from its Eastern equivalent (Type 4-A) in the absence of a tang. A few tangless Eastern Polynesian specimens examined were classified under Type 4-A, as they are small and tang would probably have been functionally superfluous. Apparently only at Mangareva

stated, "(This is) a Marquesan type. A similar specimen in our collection has a large amount of pecking also" (personal communication to the writers, August 7, 1959).

⁵⁷ British Museum No. 1912.5-25.12.

somewhat larger specimens of the sub-type occur (Buck, 1938, Figs. 36-37). These are so crude that they might equally well represent degeneration of a tanged or tangless form of Type 4. Though the Mangarevan adzes are generally tangless, some incipient tangs occur on British Museum specimens, and suggest that the idea was not unknown. Manufacturing technique was apparently chipping-grinding.

Type 5-A and 5-B

Type 5-A side-hafted adzes are found in New Zealand and Pitcairn, where their incidence is low. Axes (Type 5-B) are restricted to, and numerous on, Mangareva. Both forms have a flat haft-receiving side and an opposite ridge. They thus resemble Type 4-A and may be specialized forms derived from it (Duff, 1950, pp. 188, 194). The marked tang reduction of Type 5-A, sometimes with poll projection, strengthens this similarity, while the name coincidence pointed out by Buck (1938, p. 260) between Mangarevan axes and Marquesan adzes of Type 4 also suggests relationship. Both are called *koma*. New Zealand and Pitcairn forms are sufficiently similar to suggest common origin, though the latter is represented only by two small, thin specimens with indistinct bevel characteristics. They might be either axes or side-hafted adzes. Mangarevan axes and Pitcairn side-hafted adzes are chipped-ground. Data on manufacturing techniques are insufficient for New Zealand.

Type 5-C

Societies (?), Tubuai (?), Pitcairn.

A Pitcairn adze form discussed by Duff (1950, p. 195) and Emory (1928 a, p. 129) has a trapezoidal to triangular cross-section with the vertex opposite the front and an asymmetrical tang reduced from the right side. It is here regarded as a special type of side-hafted adze (Type 5-C). The unilateral shape of the tang, and the fact that all specimens have tang reduction at the right, suggests this function. When hafted, the bevelled face would be to the right of the user, a relationship advantageous to a right handed workman. Among New Zealand Type 5-A side-hafted adzes, tangs are so reduced as to produce, in all but a few cases, a bevel to the right of the user (Duff, 1950, p. 188). If this form were side-hafted, the haft receiving side would be obliquely placed so as to require an asymmetrical excavation in the foot of the haft. Sagittal asymmetry of the

whole tang assembly would certainly make more difficult the maintenance of rigid head-haft joint.

Including a specimen studied by Emory (1928 a, p. 129), and one illustrated by Seurat (1904, Fig. 14), the writers know of eight Pitcairn specimens forming a homogeneous group. Those examined are unpecked. A Tubuai specimen (Fig. 72 f) and two from the Societies illustrated by Emory (1928 a, Pl. 5, No. 24-25), are probably of this sub-type. These appear to have been pecked.

While Type 5-A may be a modification of only the blade of adzes of Type 4-A, Type 5-C may be a modification of only the tang of adzes of Type 1-A or 3-A. The requirement of an edge in the plane of the haft was solved in a third way, as in North Island, N. Z., the Societies, and Hawaii (Duff, 1959, p. 141). Here an unmodified adze head was used with rotating socket so that the edge could be turned to the desired angle.

Type 6

Chatham, South Island, N. Z., North Island, N. Z., Southern Cooks, Australs, Pitcairn, Marquesas, Mangareva (?), Easter Island.

Tangless chisels or gouges with circular cross-section are widespread in Eastern Polynesia, and probably represent an early form (Duff, 1959, p. 143). Marquesas and Mangareva have been included in the above list on the basis of a typical blade end examined by us from each of these localities.⁵⁸ The present collection also includes a less typical Marquesan specimen (Fig. 74 f).

The twelve specimens examined are generally extensively ground. None seems to have been pecked. Ground longitudinal planes are present on three Pitcairn, one Marquesas, and one Easter Island specimen. The six Pitcairn specimens constitute the highest number and percentage (4.3 %), and include the finest examples.

Duff (1959, p. 141) defines a Type 6-B for the Pitcairn long tanged adzes with rounded cross-section and flattened back. They are here considered as a variant of Type 4-A (See page 182).

DISCUSSION

The possible culture-historical significance of the distribution of two different adze manufacturing techniques

⁵⁵ Musée de l'Homme, No. 49.41.95. Illustrated by Caillot, 1909, Pl. 76, No. 9.

⁵⁶ Pitt Rivers Museum, Routledge Collection, No. 183.

⁵⁷ Dr. Robert C. Suggs studied sketches of this specimen and

⁵⁸ Musée de l'Homme, No. 30.51.69; Pitt Rivers Museum, Routledge Collection, No. 246.

has been mentioned. Several years ago Stokes (in *Aitken*, 1930, pp. 139-143) considered the problem and set forth the basis for an inference which seems useful as a possible working hypothesis. According to it, an adze manufacturing technique based essentially upon chipping and grinding was early in Polynesia, while in later times, pecking became important in some localities. This assumption, however, needs to be tested by much systematic field work. Because of current insufficient data, and correlations merely based on inter-island distribution of adzes largely obtained out of context, it still cannot be considered as more than a working hypothesis.

With the exception of the continental rocks of New Zealand, Polynesia offers little variety for adze material. Thus, the nature of the stone employed does not seem to have been important in determining the distribution of the two basic adze manufacturing techniques. Rather, this distribution apparently is the result of complex cultural and historical causes.

In Western Polynesia pecking is rare and probably diffused from Fiji (See Type 2-B, above). It is usually associated with Type 2-B which, in technique and rounded cross-section, contrasts with the prevailing chipped-ground angular cross-sectioned types, such as Types 2-C and 4-E. These latter are widespread and probably have considerable antiquity. Duff (1950, pp. 169-171, 188) notes one or both of these related forms in Pukapuka, Samoa, Niue, Tonga, Lau, Uvea, Ellice, and Tokelau. Musée de l'Homme specimens of both subtypes from Futuna have been examined. It is thus likely that the earlier Western Polynesian technique was chipping-grinding. It is not clear whether the adze manufacturing technique of which pecking is an important component reached Eastern Polynesia from Fiji, or had some other origin.

In Eastern Polynesia³⁹ pecking is very important in New Zealand, Chathams, Cooks, Societies, Australs, Rapa Iti, and Easter Island, rare in the Marquesas and absent or very rare in Pitcairn, Mangareva, and Hawaii.⁴⁰ Were it not for its importance in the marginal islands of New Zealand, Chathams, and Easter Island, one would suggest, considering also the Western Polynesian

evidence, that the earlier adze culture made little or no use of this technique.

In the Society, Cook, and Austral groups pecked forms are usually variants of Type 3, namely 3-B, 3-F, 3-H, and the thick form of 3-A, the restricted distribution of which points to a late date. However, here the technique is also associated with a more widely distributed earlier form, the pecked form of Type 1-A and its lug bearing variant. These diffused south before Type 3 had become dominant in the central area, and reached New Zealand in Moa Hunter times (Duff, 1950, pp. 146-156), and also the Chathams and Rapa Iti. Rare occurrences are also reported for the Northern Cook Islands of Rakahanga (Buck, 1932, Fig. 52) and Nassau (Skinner, 1940, Fig. 1), and for Uvea (Burrows, 1937, Fig. 3, No. 2). In the central area the type survived long enough to influence some adzes of the Type 3-A thick, pecked variant with double lugs (See Type 3-A, above).

Together with the pecked form of Type 1-A of the central area, other types reached New Zealand in Moa Hunter times, and Duff's illustrations (1950, Fig. 35 and Pls. 30-32, 34-35) would seem to show that these are usually fashioned with restricted pecking. Significantly, these forms are matched by unpecked Pitcairn types and generally unpecked Marquesan types, namely 2-A, 3-A, 3-G (?), 4-A, and 6. Some intensively pecked New Zealand forms, such as Type 1-D and 2-B, seem later than those above, the former being a local variant of Type 1-A restricted to Southland (Duff, 1950, p. 159), and the latter a North Island form lacking in the Moa Hunter complex (Duff, 1950, pp. 163-164). Similar arguments may apply to the closely related Chathams, but data on manufacturing processes are too scanty to develop them.

The restricted distribution of each of the intensively pecked types (1-D, 2-B, 3-B, 3-F, 3-H), which, in their often more or less rounded cross-section contrast with the widely distributed angular cross-sectioned types, suggests that this technique became important enough to modify considerably the adze forms in certain localities in comparatively recent times. On the other hand, though

intensive pecking often produces rounded cross-sections, not all rounded types result from pecking. Thus, Type 6, with a distribution indicating an old form, is usually chipped and intensively ground. Types 2-E and 4-C, which are partly rounded and probably also represent old forms, seem to be in general chipped-ground.

From the above considerations the following hypothetical sequence for Eastern Polynesia might be inferred:

The earlier adze manufacturing technique used little or no pecking. The types produced in this manner were 1-A, 2-A, 3-A, 3-G, 4-A, and 6. Distributional evidence would also indicate that the rare types 2-E and 4-C probably date from this period. Occasional chipped-ground specimens similar to the marginal ones occur in the Society Islands collections. The geographical position of this group suggests that it may have been the dispersal center for these early forms, before pecking became locally important. However, data are insufficient for the Society Islands, lacking the study of large well authenticated collections and especially of material obtained in a specific cultural context.

In the course of time pecking began to be used more frequently in the central area, one of the first thoroughly pecked forms probably being Type 1-A, thus resulting in the lug bearing variant which reached South Island, N. Z. The earliest New Zealand evidence seems to suggest that other types were usually fashioned with limited pecking. These central area developments did not diffuse to Hawaii, Mangareva, and Pitcairn. The existence in the Marquesas of pecked specimens of Type 2-F and 4-D, though not the lug bearing variant of Type 1-A, may indicate possible contacts at this stage, or perhaps in somewhat earlier times, with the central area.

Later on, pecking became predominant in the Societies, Cooks, and Australs where a rare early type, 3-A, was made almost exclusively. It was then that the local variants 3-B, 3-F, and 3-H appeared. Similar increase of pecking occurred, possibly independently, in New Zealand, where in earlier times its use had been limited. This resulted in development of Types 1-D and 2-B, this last having passed to the Chathams.

Easter Island is hard to include in the sequence, both for the simplicity of its adze forms, and the technique employed in their manufacture. The local predominance of Type 2-A indicates Eastern Polynesian relationships, but the Easter Island adze complex as a whole cannot be compared satisfactorily with that of any particular locality. At present, only the Marquesas demonstrate enough similarities to suggest a specific relationship (See Types 2-E, 2-F, and 4-D above). Why is it, then, that pecking is so important in Easter Island and rare in the Marquesas? The existence in the Marquesas of the most characteristic and intensively pecked Easter Island type may indicate that this rare Marquesan type was introduced into Easter Island, where it persisted as an important adze form, while the technique associated with it became gradually more generalized. The lack of a functional substitute in Easter Island for the thick narrow edged adzes of this type, suggests that the form is old in this locality. Were future investigation to show that Type 4-D, and the Easter Island adze complex in general, correspond to a very early stage in the Eastern Polynesian cultural history, the above tentative inferences would require considerable revision.

³⁹ Editors' Note: The geographically oriented editors of this volume cannot resist the temptation to point out the confusing and illogical application of the term "Eastern Polynesia" to describe a sub-culture area within Polynesia which includes in its distribution the extreme southwesternmost islands of the Polynesian culture area i.e., New Zealand and the Chathams. The continued use of the term in this paper is by Figueroa's request and justified by him on the basis of its previous use in certain archaeological publications. Such justification, however,

does nothing to validate its continued use in the literature. The sub-area involved is believed by some to exhibit a cultural homogeneity differing in certain aspects from the other sub-area of Polynesia generally termed "Western Polynesia". Since the distributional patterns of these two cultural groupings represent cultural, rather than geographic, areas, it is to be hoped that Polynesian anthropologists can soon agree upon a more logical and clarifying culture-based terminology.

⁴⁰ Principally based on Stokes (in *Aitken*, 1930, pp. 139-140).