THE EVOLUTION OF MAORI CLOTHING.

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Amplified from a paper read before the Australasian Association for the Advancement of Science, at Wellington, New Zealand, in 1923.

INTRODUCTION.

THE Maori people, by virtue of long residence in a temperate climate, diverged considerably from the other branches of the Polynesian Race in their arts and crafts. This divergence is particularly marked in the manufacture of clothing, for the Maori has evolved a variety of garments which are peculiar to New Zealand. A different environment with different material stimulated entirely new inventions or led to the adaptation of a known technique to new requirements or to a combination of both. An enquiry into what processes were introduced and what were developed locally forms an interesting and useful study. The data contained in the writings of travellers is rendered dangerous by the incorrect use of the term *weaving* and the lack of correct detail as regards manufacture. Superficial resemblances cannot be accepted as proof that *woven* garments existed in Polynesia. There is only one sure criterion and that is the technique of the strokes used in the manufacture of the garments. In order that the origin of the strokes used may be determined, it is necessary to consider the strokes used in the allied crafts and with them as a working basis, subject the clothing made in the Polynesian and New Zealand areas to a careful analysis as regards technique. Lack of published detail, properly illustrated, from the Polynesian area constitutes a difficulty to our study, but the details of Maori technique may assist other field workers in remedying this defect in our knowledge.

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DISTRIBUTION OF CLOTHING MATERIAL.

The distribution of the various materials, from which clothing is made is largely dependent upon climate. Besides providing clothing material, climate has influenced the actual quantity of clothing with which man desired to clad himself. This statement, however, is not without exception as the Tierra del Fuegians are an instance of a people very meagrely clad for the cold climate in which they live. The material provided by Nature has in turn influenced the processes of human invention and the types of clothing evolved. Thus in the frigid zone, the Eskimo seeks his clothing from the skin of the seal and the reindeer. He evolved skin clothing to protect himself from the intense cold. He reacted to his environment, and Nature having provided animals suitable to his needs, he exploited them to the fullest extent of which he was capable. Skin clothing belongs to the cold regions.

In the temperate regions, skin clothing in its entirety was not so suitable. Nature here provided an infinite number of plants whose fibres run straight and parallel. These fibres are easily separated, and with the wool and hair of animals, provided man with ample material upon which to test his powers of invention in providing suitable covering to protect his body from the climate and his modesty from criticism. Here the art of weaving was born and developed. Textile clothing became characteristic of the temperate regions of the earth.

If ornamentation preceeded clothing and modesty developed as a result of the wearing of clothing, we can readily understand that in the torrid zone little was required beyond ornamentation. Many races inhabiting this area stopped at ornamentation. Climate did not demand more, and modesty as we now understand it, had not been developed. The Polynesians, however, developed modesty to a great extent. The *malo* consisting of a strip of cloth wound round the loins and passed between the legs, was worn by the men, and a short skirt was worn by the women. Other garments were used on certain occasions. The quantity of material required was not great. Of the material provided by Nature, the barks of available trees had their fibres interlaced inextricably. Their fibrous strands do not lie parallel as in the textile plants of the temperate regions. Thus Nature herself, besides providing the material, gave - 27 the hint. It was easier to beat out the suitable part of the bark and join strips together than to attempt to separate the fibres, and spin them into yarn for the weaving of textile garments. Nature had already done the weaving. Hence we find bark cloth characteristic of the tropical regions.

DISTRIBUTION OF BARK CLOTH.

Bark cloth was found in Central and South America. It occurred in Central Africa and Madagascar. The bark cloth of Uganda has received a somewhat undeserved reputation for quality. On the continent of Asia it was found in south-eastern Asia and the Malay Peninsula. Passing further east, it appears in Indonesia as in the Celebes, Borneo, etc. The distribution passes on to New Guinea and its outlying islands. It is found in Micronesia, Melanesia and throughout the Islands of Polynesia to its most eastern outpost, Easter Island.

OVERLAPPING OF KINDS OF CLOTHING.

But though the three kinds of clothing are characteristic of the three climatic zones, there has always been a certain amount of overlapping. Garments made of skin are to be found in temperate regions. Cloaks composed entirely of dog-skins were found in New Zealand. Even in the tropical climate of the Society group, tradition states that the Maori Ancestor Turi bought the Aotea canoe for his voyage to New Zealand with a cloak made of twelve dog-skins. The tradition even gives the names of the dogs whose skins composed that historic garment. As dogs were very scarce and valuable, this cloak was used more as a sign of wealth and chieftainship than as an ordinary article of clothing. Throughout Polynesia, garments made of other material than bark cloth were used on occasion. In New Guinea, the poorness of the bark cloth is explained by the unsettled state of the races, due to constant warfare, interfering with the proper cultivation of the plants used for cloth. In that region there are few traces of carefully tended cultivations of the paper mulberry, which supplied the best material for cloth. In Micronesia (Carolines, Marshalls and Gilberts), according to Brigham, 1 bark cloth is not a successful competitor with the Native loom. In Melanesia - 28 the loom is found in some parts, and the bark cloth is correspondingly inferior. In Fiji, where there has been Polynesian influence, the quality of the bark cloth improves. Thus amongst the neighbours of the Polynesians, we find in spite of their lower culture, the apparently curious fact that loom weaving existed. It had probably come to them by diffusion of culture, and by continued use was not allowed to be forgotten.

POLYNESIAN BARK CLOTH.

The *tapa, kapa, gatu*or *siapo* of Polynesia is the best made of all bark cloth. Cook remarked on its excellence throughout the parts visited by him, and held that that of Tahiti was the finest. Brigham 2

considers that Hawaian cloth was superior, but admits that some forms of Tongan were equal to the best Hawaian. Samoan *siapo* was not so good. Niue Island *hiapo* was well made. Rurutu, in the Austral Group, was famous at one time for its varnished cloth. In the Marquesas, colour designs were not developed as more pride was taken in body-tatooing. Foster remarked that Easter Island, though not fertile, produced a fair quantity of bark cloth.

To understand the excellence of Polynesian *tapa*, it is necessary to stress a few points. The usual trees from which the bast, or inner bark was obtained, were the paper mulberry (Broussonetia papyrifera), the bread-fruit (Artocarpus incisa), and the fig tree (Ficus prolixa). These, especially the paper mulberry, were cultivated for cloth making. The missionaries who arrived in Tahiti by the "Duff" in 1796 remarked that the cultivations of paper mulberry had deep wide ditches dug round them to keep out the pigs and goats. The bark was stripped from young saplings, soaked in water, the outer bark scraped off and the bast beaten out on wooden anvils with iron-wood beaters. The beaters were four-sided and carefully carved in longitudinal lines or in various geometrical designs. The strips of cloth were joined together in the process of manufacture so that enormous rolls of cloth could be produced. Dyes of red, yellow, brown and black, some of them brilliant, were used for colouring the cloth. Some of the coloured patterns and designs were exceedingly artistic. The colour designs were - 29 put on by dipping flowers or ferns in the dye and placing them on the cloth. In other cases, specially prepared wooden implements were used for drawing parallel lines. Stamps, carefully carved in geometrical figures on bamboo, were also used. Some varieties of cloth were varnished with a Native preparation to turn the rain. The cloth was made in large quantities, and was valuable as a means of exchange. The wealth of a person was often estimated by the number of bales of cloth that he possessed. The cloth was beaten by women, and the aristocracy took part in the manufacture.

LOSS OF THE ART OF WEAVING.

Some authorities hold that the proto-Polynesians were probably derived from a mixture of long-headed Caucasians from Eastern India, and broad-headed Mongoloids from South-eastern Asia. It is further suggested that the Polynesians have not been in Polynesia for more than 1500 years. When we consider the early date at which woven textiles appear in Egyptian tombs, and the early diffusion of Egyptian culture, it is not unreasonable to suppose that the ancestors of the Polynesians may have been acquainted with weaving, and, perhaps the loom, before they took up their residence in Polynesia. In Polynesia, however, they developed the manufacture of bark cloth to such a high standard that weaving ceased to be necessary. Ratzel 3 in speaking of the clothing of the Polynesians says, "Tapa, a material which can be provided in quantities without much trouble, naturally represses the weaver's art, which can only have proceeded by a long and toilsome road from plaiting." Ratzel speaks as an apostle of the theory of the independent evolution of material culture. We will go a step further and say that not only could *tapa* repress weaving and prevent it being invented, but it could account for weaving being deliberately abandoned by the Polynesians if, as seems possible, the knowledge of it accompanied their early ancestors into the Pacific. Supporters of the school of continuity and diffusion of culture may regard this as an excellent example of degredation. Just as the lack of suitable clay, the use of the earth oven and the abundant supply of coconut shells and gourds for water containers - 30 must have led to the abandonment of the art of pottery in Polynesia, so a similar chain of circumstances may have led to the abandonment of the art of weaving in the same area. In the first place, lack of suitable textile material may have been an incentive to change. Then the idea of using the available bark material, if not already known, could be borrowed from the lower cultures with which the Polynesians came in contact or

passed through. The ease of manufacture and suitability to their needs led to the high development of bark cloth that was in keeping with the higher mentality of the Polynesians. A cloth was produced excellently suited to the climate, amply sufficient to protect modesty and a credit to the human vanity that seeks expresion in artistic adornment. Thus they freed themselves from the drudgery of another unnecessary art, whilst their neighbours of lesser mentality remained slaves to the loom.

THE MAORI AND BARK CLOTH.

The work of the late S. Percy Smith and others leaves no doubt that the Maori section of the Polynesians dwelt in and about the Society Group ere migrating to New Zealand. Whilst inhabiting that region, they must naturally have been makers of bark cloth. In Tahiti the paper mulberry was and is called *aute.* The people of the first migration to New Zealand were, according to traditional evidence, driven away by storm from an island in the west and landed in Taranaki. They were supposed to have marked Melanesian characteristics, and to be the ancestors of the people usually alluded to as Maruiwi. They were a drift migration, and so could not have brought any seeds or plants. Toi and Whatonga, who arrived from Tahiti about 1150 A.D., did not come with the intention of settling down, and so brought neither seeds nor plants. In fact, Toi was known as Toi kai-rakau, Toi the wood eater, from his not having any cultivated food. The great Hawaiki migration of 1350, however, was a definite colonising expedition, and brought seeds and plants which would be useful to them in their new home. Of the former, the kumara, taro and gourd were acclimatized, and flourished under the great care and attention devoted to them. Of the plants, the paper mulberry survived to the period of European occupation.

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Sir Joseph Banks 4 who accompanied Cook on his first voyage in 1769, states, “After this they showed us a great rarity, six plants of what they called *aouto* (aute), from whence they make cloth like that of Otaheiti. The plant proved exactly the same, as the name is the same, Morus papyrifera, Linn (the paper mulberry) The same plant is used by the Chinese to make paper. Whether the climate does not well agree with it I do not know, but they seem to value it very much; that it was scarce among them I am inclined to believe, as we have not yet seen among them pieces large enough for any use, but only bits sticking into holes in their ears.”

Parkinson 5 in his journal, noted seeing “plantations of aute or cloth trees.” The wearing of bits in holes in their ears, he figured in his drawings. Colenso 6 wrote, “I once saw this plant growing in an old plantation at the head of the Kawakawa River in the Bay of Islands—that was in 1835. There was, however, but one small tree left, which was about six feet high, with few branches, and not many leaves on them, it appeared both aged and unhealthy, and it soon after died. On my finally leaving the Bay of Islands in 1844, to reside in Hawke's Bay, I heard of some aute trees still living at Hokianga. I wrote to a chief of my acquaintance there (E. M. Patuone), who kindly sent me several good cuttings; saying (in a letter) that the plant there was nearly totally destroyed by the cattle of the Europeans. Unfortunately, my removing was so greatly hindered, in not meeting readily with a vessel, and the summer also advancing, that I lost them all.” The plant is now extinct in New Zealand.

Besides this definite proof of the importation of the paper mulberry plant, the name aute is preserved in a few sayings. Colenso 7 put the following on record:—

He manu aute e taea te whakahoro.
A paper mulberry kite can be made to fly fast.
Haeremai ki Hauraki, te aute te awhea.
- 32
Come hither to Hauraki, where the prepared aute bark cannot be blown away. (i.e., where the people cannot be dispersed by the storms of war.)

Williams' Maori Dictionary, quoting from page 242 of Gray's “Nga Moteatea,” gives another version, “Ka paneke ki Hauraki, ki te papa no Rotu, ki te aute te whawhenga.” This is an amplification with the same meaning.

The two following Hauraki variations were supplied by Mr. George Graham:—

Te pai o Hauraki, he aute te awhea.
The peace of Hauraki, undisturbed by the slightest breath (of trouble).
He rongo whakamau, me he aute te awhea.
An enduring peace, as the *aute* undisturbed.

The late Percy Smith gave the following version in a letter to Dr. Brigham 8 of the Bishop Museum:—

Te aute te whawhea.

Whawhea is a form of *awhea* with a similar meaning. It also means “to gird on” as with a war belt. Percy Smith said the above saying was applied to the chiefs of the famous Otakanini Pa in Southern Kaipara, and meant “girded with aute.” In the phrase, the second *te* is a strong negative. If the meaning of girded on is used for whawhea, it would mean “the aute which was not or could not be girded on.” Hence the previous meaning given seems the more applicable.

Archdeacon Walsh 9 worked out details of the paper mulberry kite, and figured a model now in the Auckland Museum. It was made for Sir George Grey by East Coast Maoris. *Raupo* (Typha latifolia) took the place of the then unprocurable *aute.* A specimen in the British Museum was also figured, but no mention is made of the material used.

References to the *aute* occur in various songs. *Taku manu aute* (my *aute* bird or kite) occurs as a term of endearment for a chief or loved one. Percy Smith records the saying of Pokere, a high-chief from Hauraki, who when - 33 about to be slain by the Ngati-Whatua of Kaipara, uttered these words:—

He aha koa au ka mate, tena te aute i whakatokia e au ki te tara o taku whare.
Although I die, there is an aute tree that has been planted by me beside the wall of my house.

After his death, the victors asked some of the prisoners who was the greatest chief in Hauraki. On being told that it was Hauauru, they knew that he was the *aute* tree re ferred to. Thus Pokere used the term *aute* to denote his successor. As these death-bed sayings were greatly admired and quickly spread, it is more probable that Pokere besides confirming his successor sent out a dying message to the Aute Tree to avenge the death of the Planter.

In Polynesia, a strip of bark cloth was passed through between the legs and wound round the loins. It was worn by the men and called a *maro* or *malo*. The term *maro* was retained by the Maori with the same usage, but the material was changed. A memory of the Polynesian *maro* occurs in the traditions of Whakatau, son of Tuhuruhuru, who lived before the migration to New Zealand. His *maro* was said to be a *maro aute.* That a *maro aute* was used in New Zealand, the following extract from an incantation by Te Aratukutuku 10 would seem to indicate:—

Hurua, hurua te maro,
Whawhea, whawhea te maro.
He maro aute to koutou,
He maro raurekau to kopi ai—wherahia.
Gird on, gird on the *maro,*
Belt on, belt on the *maro.*
Your *maro* is of *aute,*
A *maro* of leaves will cover you—open out.

Aute cloth was also used to wrap round the material representations of the Gods in wood or stone. It even entered into the material construction of a god, for Gudgeon 11 relates that the god Ihungaru fell into the hands of the Ngapuhi at the storming of Mokoia in 1823, and was - 34 destroyed by them. "Ihungaru (was) formed of a lock of human hair twisted with rope of *aute* (paper mulberry bark)." As Ihungaru was one of five gods brought from Hawaiki by Kuiwai and Hangaroa in the fourteenth century, the cloth would perhaps have come from the Islands. For the above three references I am again in debted to Mr. George Graham.

Ear ornaments of rolls of *aute* cloth have been mentioned as being drawn by Parkinson. Williams' Maori Dictionary gives the names of *aute* ear ornaments as *kope* and *turuki*. Bands of *aute* cloth were also used as fillets for the head.

The word occurs in proper names as Te Potae Aute, a chief of Ngati-Porou, and father of Henare Potae of Toko-maru Bay. It occurs as the name of a sub-tribe in Hauraki, Ngati-Aute. As a place name, it occurs in Te Aute in Hawke's Bay, where the well-known Maori Boys' College is situated. The name, however, has been transferred from its original locality.

John White 12 records that amongst the material brought in the Tainui canoe from Hawaiki in 1350 A.D. was the *aute* plant.

In the kites of more recent times, Walsh says that strips of the inner bark were used. Percy Smith in the letter to Dr. Brigham quoted above says, "I have no knowledge as to how the bark was prepared, but, coming as the Maoris did from Eastern Polynesia, where the manufacture was in daily practice when they left, no doubt the operation would be the same as in their fatherland." This deduction by the late President of the Polynesian Society has fortunately been recently verified in a conclusive manner. Towards the end of last year (1923) I was looking over some wooden implements collected by Mr. W. M. Fraser, Harbour Board Engineer at Whangarei, when he drew my attention to two wooden "pounders" of curious shape. Maori pounders belonged to two well defined classes; stone pounders (*pati muka*) for beating flax fibre to render it soft for certain garments, and wooden pounders (*paoi*) for

beating fern root. They both have rounded ends, and both the beating part and the handle are rounded in section. The beating part in both is smooth. In Mr. Fraser's implements, the

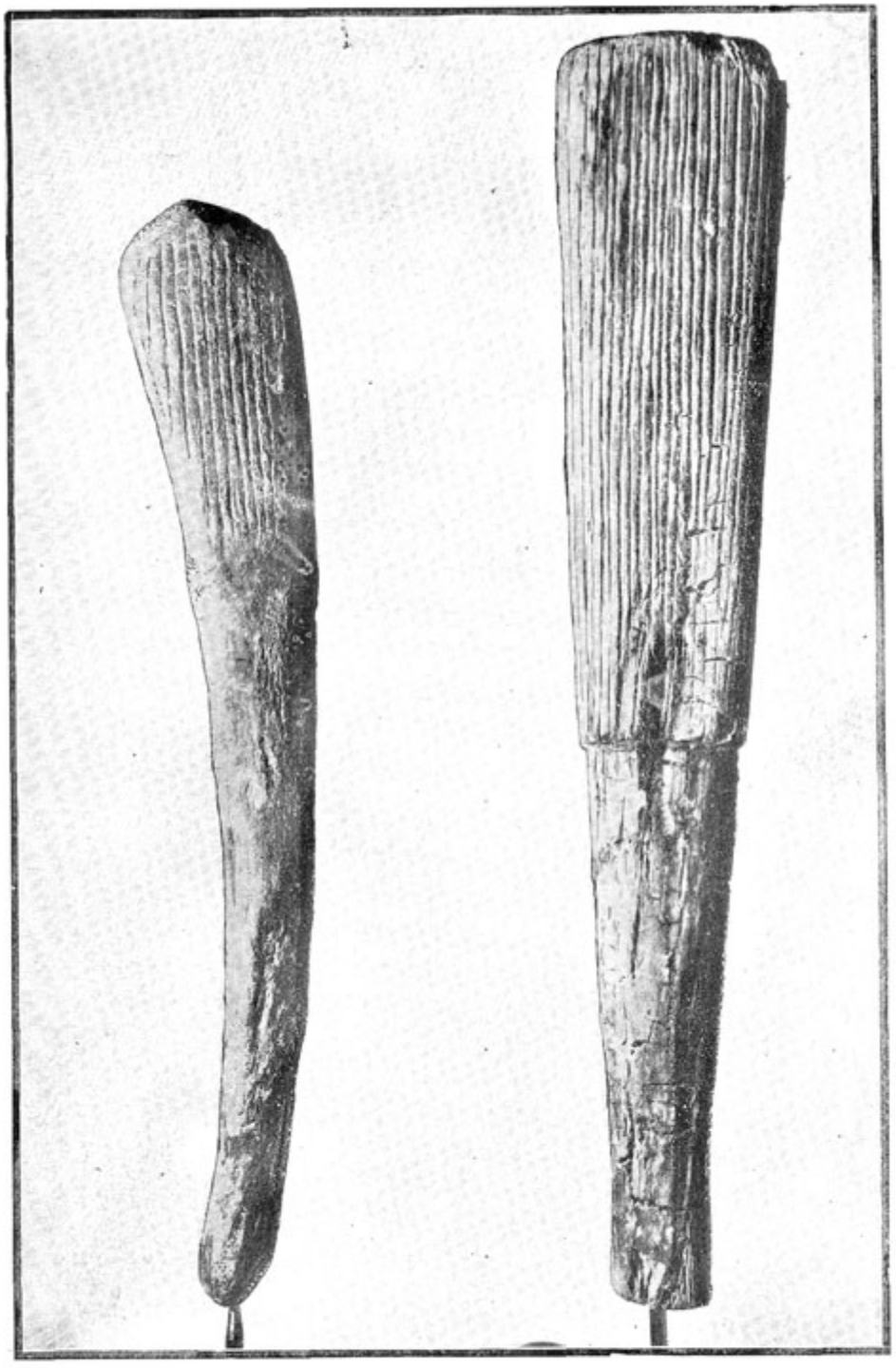

Photo by H. Hamilton, Dominion Museum.

PLATE 1.

Left Club—Side view, with well grooved surface.
Right Club, well carved wider surface.

PLATE 1.

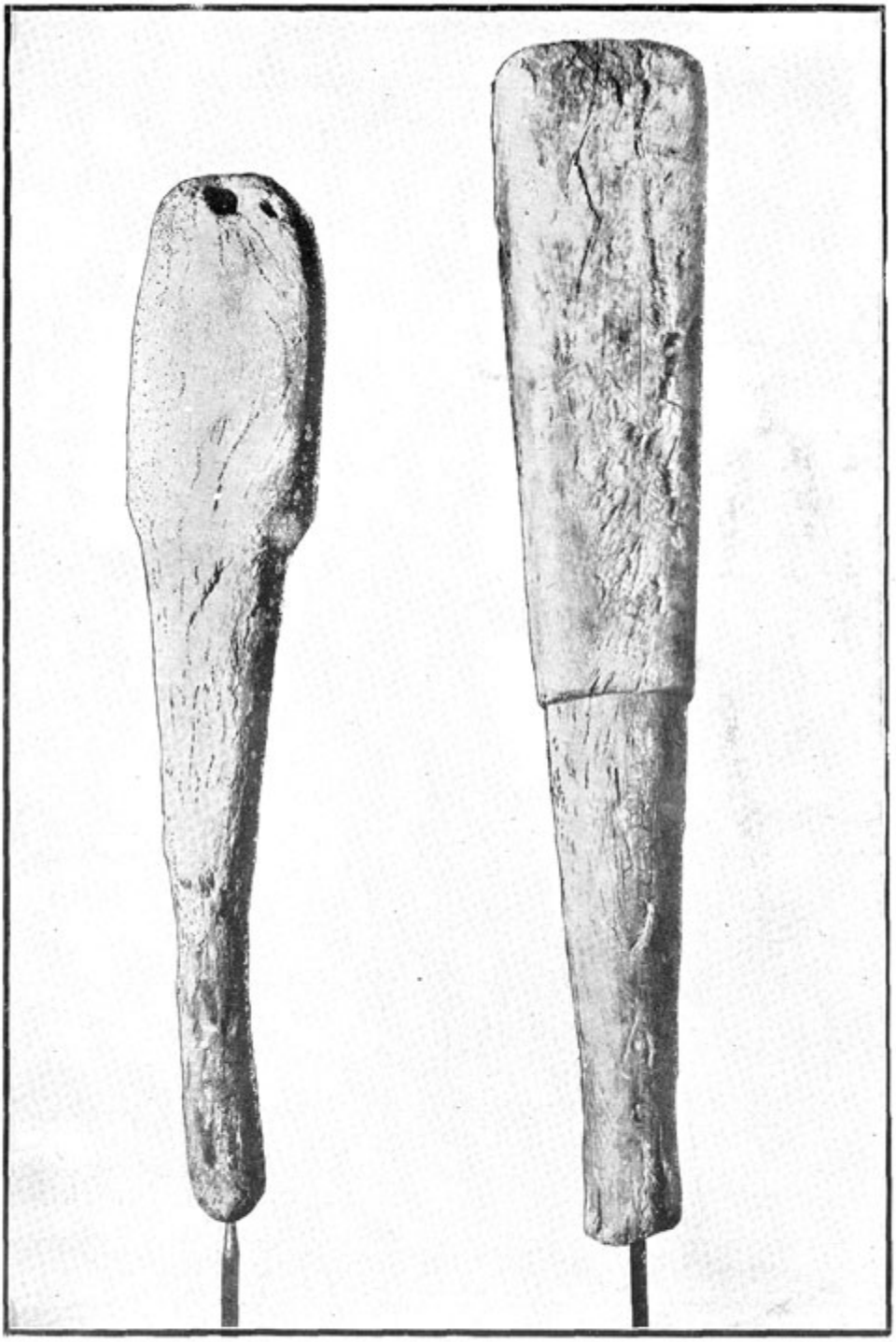

Photo by H. Hamilton, Dominion Museum.

PLATE 2.
Showing smooth surfaces in both Clubs.

PLATE 2.

beating part was four-sided, whilst some of the surfaces were incised with longitudinal parallel grooves set close together. They are figured in the Plates 1 and 2. As they are, so far as I know, the first discovered, the following details are given.

The left smaller one in both Plates is dark in colour and has a hole through the distal end, and a groove on one surface made by some boring grub. The wood looks like manuka (Leptospermum scoparium). It is 27.3 cm. in length, and the long thin handle is curved from the grain of the wood. The beating surfaces are somewhat short, being about 7.5 cm. in length. The surfaces corresponding with the convex (Plate 2) and concave curves of the handle are 4.3 cm. in width and perfectly smooth. The side surfaces (Plate 1) are narrower, being 3.5 cm. at the distal end and 2.5 at the proximal. They are closely covered with incised longitudinal lines or grooves, of which there are 4.5 to 1 cm. They are well cut and parallel so that at the distal wider part some extra short lines fill in the surface. The distal end of the club is slightly rounded off. At the junction of the beating surfaces with the handle there is a sloping shoulder. The handle is round in section. Near the shoulder it is 10.4 cm. in circumference, from which it diminishes to 6.3 at the end. Though the curve in the handle makes the club look clumsy, it is really nicely balanced.

The right larger club in both Plates is 31 cm. in length The beating part is 17 cm. from the shoulder to the distal end. Besides being rectangular in section, the surfaces are slightly narrower at the shoulder. Three of the surfaces have been incised with longitudinal grooves, whilst the fourth is perfectly smooth. The smooth surface is opposite the one on which the grooves show up best. These two surfaces are 5 cm. in width at the broader distal end and 4 cm. at the shoulder. The other two surfaces are 4 cm. and 3 cm. for the similar measurements. The grooves on the best preserved surface, whilst well and distinctly cut are not quite parallel in places. On the right part, as figured in Plate 1, the lines commence parallel with the border. Then two or three from the wider end stop short before reaching the shoulder so as to allow the mesial grooves to run parallel with the long axis of the implement from end to end of the surface. This is continued down to the left border, so that - 36 here the extra lines from the wider end run out on the margin. The grooves are five to the centimetre. The distal end of the implement is sharply squared off. The two narrower surfaces have both been grooved, but they have been worn down evidently by friction with the gravel in which they were found. However, the traces of parallel grooves can be distinctly seen. On one surface, the grooves are five to the centimetre, and on the other they are more widely spaced with four to the centimetre. There is no sloping between the beating surface and the handle, but the junction is cut down sharply. The handle is round in section, being 11.5 cm. at the junction, and 7.3 cm. at the end. The club is well preserved, but there is a bit of pith at the junction of the well grooved surface with the handle. The end of this canal of pith is seen on the square end of the beater. The presence of this small central pith canal led an experienced bushman like Hone Wepiha of Hokianga, to feel fairly sure that the beater had been made from a small branch of *kauri* (Agathis australis). *Kauri* branches are heavy, and the even whiter colour confirmed his diagnosis. The proximal end of this surface and the handle show the cracking of the surface typical of water-logged wood that has subsequently dried. The wood is lighter in colour than the other, and is heavy and well balanced to the feel.

From the description and the Plates it will be seen that these implements are not for pounding fern root, but for beating bark. They are New Zealand representatives of the *tapa* beaters of Polynesia. Whilst all sorts of designs were cut on the Polynesian *tapa* beaters, Brigham 13 points out that only two forms can be claimed to be especially adapted to their use—"the finely ruled parallel lines *hoopai* and the smooth, uncarved surface *mole*." The former is used to disintegrate the bundles of fibre in the bark, and the latter

to produce the smooth surface fitted for very thin *tapa*. Another form with longitudinal lines, called *pepehi*, varies from the *hoopai* in the size and shape of the ridges, the former having them rounded and the latter sharp angled. The wearing in the Maori implements prevents this feature from being distinguished, but as Brigham - 37 goes on to say that "when there are more than fourteen ridges on an average side, the *pepehi* becomes *hoopai*," we can diagnose our Maori beaters as having the latter. In the large beater, the worn side with the wider spacing was probably *pepehi* and it would thus conform to the usual Polynesian usage of having both forms on the one beater. The combination with a *mole* or smooth surface was also usual. A local peculiarity of the Maori implements is the long, somewhat thin handles. In the larger beater, the broader distal end of the beating surfaces seems unusual, as in the Polynesian beaters the sides are parallel. The straight cut down at the junction with the handle is also peculiar, as they are usually sloped in Polynesia. It is interesting to note that this straight cut down is shown in some beaters from the Solomon Islands figured by Brigham (Plate 7), but the similarity ends there. On the same Plate is shown a beater from Tonga in which the sides are not parallel, but inclined towards the handle as in the New Zealand one, and the junction on one face seems fairly abrupt. The handle however, is short and expanded at the proximal end.

Mr. W. M. Fraser supplies the following notes about the finding of the New Zealand beaters:—

"The two *tapa* beaters were recovered during dredging operations in the Hatea River (headwaters of Whangarei Harbour) in May, 1923. They were found close together, about six feet deep, in an old gravel bed which is covered by the tide at high water.

"From a geological view point, I should say that these relics had been carried down by floods from one of the upper valleys not less than 400 years ago.

"The extensive ancient earth works to be seen in this district, some of which are now under heavy forest, proves that the place was inhabited many centuries ago, and the fact that Whangarei was named as one of the few starting places of the old-time navigators on their return voyages to Hawaiki or Polynesia, should strengthen your theory as to the manufacture in the locality of 'aute' cloth by the early Polynesian immigrants and their descendants."

The small size of the beating surface on the smaller beater can be easily understood from the limited supply of bark material available, and the correspondingly small amount of beating to be done in the manufacture of the smaller sizes of cloth for kites and ornamental purposes. - 38 The presence of smooth surfaces on each beater argues that their users made the most of their limited bark material by beating the cloth very thin. This is supported by the above quoted proverbs, which are based on the effect of wind in blowing the light cloth about. This was more likely to occur with the smaller strips of thin *aute* cloth than with the large rolls of thicker Polynesian *tapa*. There seems no doubt that the proverbs referred to beaten cloth rather than to thin strips of inner bark, for besides the presence of beaters in New Zealand, we have the statement of Banks and Parkinson that the ear ornaments they saw were small rolls of actual cloth. They were in the position to distinguish clearly between cloth and strips of bark. The thin character of the Maori *aute* cloth fortunately has material support from Brigham (p. 71), who says, "I have from New Zealand a single specimen of Maori-made *kapa* (*tapa*), which I greatly value, for we have seen that the *aute* has been extinct in New Zealand now many years. It is white, thin, and fairly well beaten, quite suited to the use our authorities tell us it served."

In 1894, Mr. Matthewson, in a rock shelter near Hyde, Central Otago, found amongst other things, a piece of *tapa* cloth. Hamilton 14 thus describes it, “Next was a piece of very soft, white tappa-cloth, six feet long and eighteen inches wide at one end, tapering to a point; also an irregular strand of lace bark about five feet long.” The dimensions of the strip of cloth would seem to show that it was beaten from the bast of one sapling. Hamilton considered that it was foreign and had been obtained from an early whaling ship. If it was made of *aute* bark, it must have been imported from the North Island or elsewhere, for the *aute* plant which grew but poorly in the warm climate of the North Auckland Peninsula could not grow in the southern latitude of Otago.

It is significant that a strip of lace bark, about five feet long was found associated with the *tapa*. Elsdon Best obtained information from old men that their traditions say that lace bark (Hoheria populnea) was experimented with as a substitute for the bark of the *aute*. Mr. H. D.

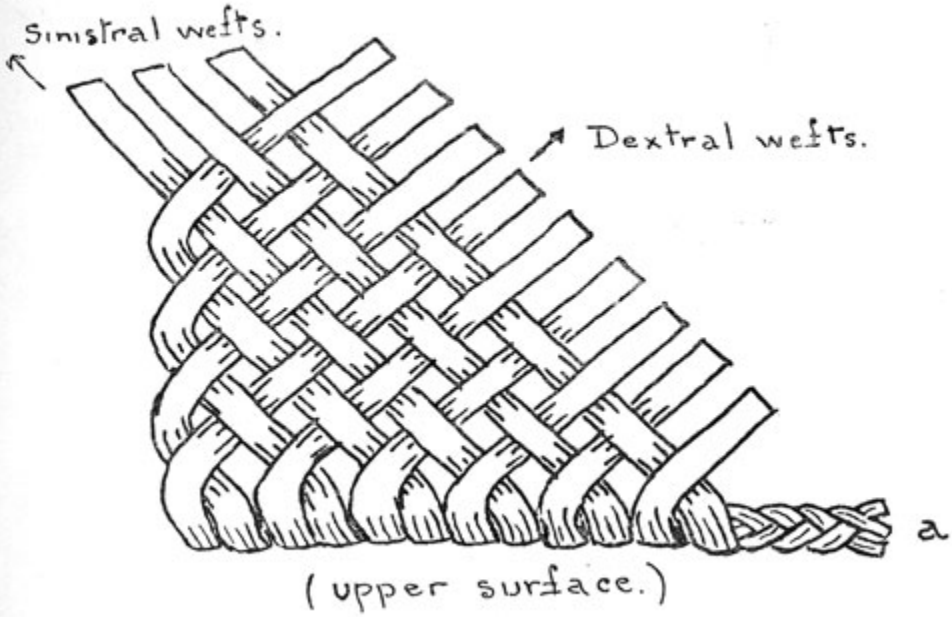

FIG. 1.—CHECK.

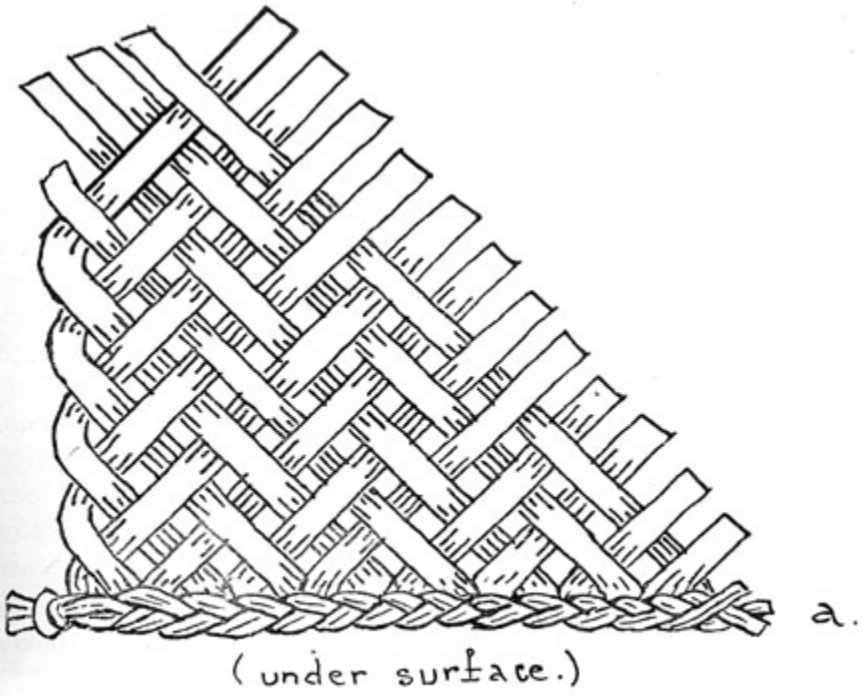

FIG. 2.—TWILL.

(a). Three-strand Braid at lower commencing border.

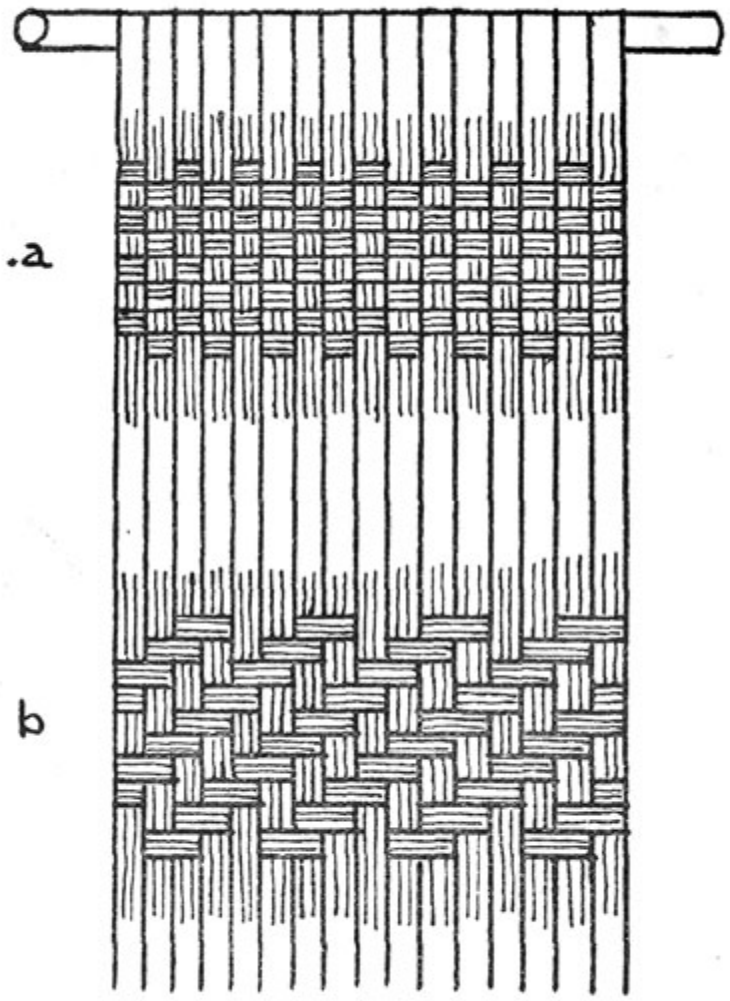

FIG. 3.
(a). Check. (b). Twill.

WEAVING.

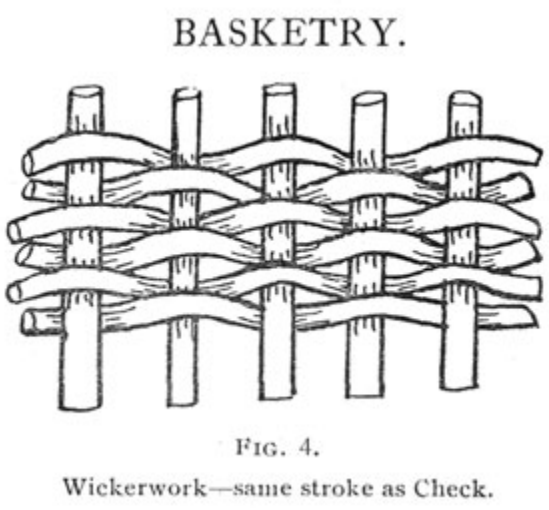

FIG. 4.

Wickerwork—same stroke as Check.

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Skinner of Otago University supplied the following important note, which I quote in full.

TAPA CLOTH IN OTAGO UNIVERSITY MUSEUM.

Locality.—Cave, Upper Taieri River, Central Otago.

Measurements.—Length about 55 inches, breadth about 27 inches.

Colour.—Creamy brown.

Material.—Probably *hohere* (lace bark).

Texture.—Extremely poor—worse even than the samples of tapa brought back from Easter Island by Dr. Macmillan Brown. Only here and there has the sheet the texture of Central Polynesian tapa. A good deal of it has the texture of coarse muslin. There are many large holes and the felting is everywhere poor.

Method of Manufacture.—This appears to be the same as in Polynesia. There are, however, no recognisable beaters from Otago in this Museum. The Whangarei examples are the only New Zealand ones I have ever heard of.

The above description of the texture of the cloth is in marked distinction to that of Dr. Brigham for the Maori *tapa* in the Bishop Museum, and must be due to the difference in material.

Strips of the inner bark of the *hoheria* were also used for making fillet bands, satchels and kilts. With regard to fillet bands, Hamilton 15 records learning from the Rev. T. G. Hammond that he had seen a carved bone *patu* (club) used to give a fancy pattern to these bands, in the Hokianga district. This sounds like an echo of the technique of *tapa* beating. The club may have had parallel lines carved on it or if of a more fancy pattern, it would have affinity with some of the more elaborately carved beaters of Hawaii that Brigham 16 describes as being used to give a local “water mark” to their cloth. The Maori club, being made of bone would be unique amongst the *tapa*beaters even of Polynesia. In this connection, H.

D. Skinner's 17 suggestion that the four-sided, richly carved Maori *potuki* clubs had evolved from *tapa* beaters, seems to have material support.

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Thus the Maori brought plants of the paper mulberry, besides the *kumara*, the *taro* and the gourd, from his tropical homeland to New Zealand in order to provide himself with clothing as well as food. Owing to insufficiency of material, he experimented with the barks of indigeneous trees, and found lace bark to be the nearest substitute. But the *aute* trees did badly in the colder climate, and bark cloth proved inadequate both in supply and as protection against the cold and wet of his new home. Still he cultivated the *aute* and manufactured a limited supply of cloth by the old technique with grooved, four-sided beaters. Sentiment and scarcity increased the value of the prepared article, and he used it as wrappings for the emblems of his Gods and the ornamental adornment of his chiefs. For clothing, he had to seek a more plentiful, a warmer, and a more durable material. He had not far to seek for the Phormium tenax was waiting to yield up its treasure of fibre to the inventor. But the parallel fibres of the temperate plant could not be beaten out like the already woven fibres of tropical bast, and the Maori had to face the problem of all migrating peoples—the adaptation of past experience and knowledge to a new environment with changed material. To follow that adaptation, we must consider what knowledge and technique he brought with him that would assist in solving his problem.

THE SISTER ARTS OF PLAITING, WEAVING AND BASKETRY.

In order that Polynesian and Maori clothing, other than bark cloth, may be properly studied, it is necessary to consider the technique and strokes used, not only in weaving, but in the sister arts of plaiting and basketry.

Though plaiting is usually included under basketry, it is such an important and useful art in Polynesia and New Zealand that it seems worthy of being placed in an independent position. It is also confusing to apply the term basketry to flat mats of pliable material used as floor coverings, sleeping mats, covers for earth ovens, sails and clothing. Plaited basketry should be confined to baskets plaited from friable material. It is straight out plaiting in check or twill. Checks and twills in stiffer material usually come under basketry as wicker work. Basketry, therefore, is here confined to wicker, wrapped and twined work done in stiffer material. Likewise - 41 weaving should not be confused with plaiting as is so often done in writings referring to the clothing of the Polynesians. A Maori mat should signify an article for covering the floor or some inanimate object. It is plaited from strips of undressed flax. If the term is applied to clothing it should clearly indicate an article made with this technique. It should never be applied to a cloak made of dressed fibre. Plaiting, Weaving, and Basketry are the three Graces of the lower cultures. In these three arts, some of the movements or strokes are identical, but they are made with different material and with a modified technique.

PLAITING.

In plaiting, the elements all start and end parallel. After being fixed to form a continuous beginning edge for the length of the proposed article, the elements are interlaced by bending one set to the right and the other to the left. To avoid the confusion of the terms warp and weft, the best authorities term them all wefts, those going to the right being called dextrals, and those to the left sinistrals. Though the elements

cross one another at right angles, they move *diagonally* across the surface of the article. At the side edges, in mats, they are turned back into the body, and function in the opposite direction. At the end they finish parallel with the beginning, and are fixed in a variety of ways. This is a general principal to which there may be exceptions owing to shape.

The material consists of even strips of a friable material, which may be coarse or very fine as desired by the plaiter. The strokes or movements used are:—

- (a) Check or Chequer.—Each crossing weft passes over one and under one, Fig. 1.
- (b) Twill.—Each crossing weft crosses over and under more than one. Thus where it crosses over and under two wefts, the plait is called a twilled two; where three, a twilled three, etc. Combinations of these strokes may be used as twos and ones, threes and ones, etc., to add variety to the pattern, Fig. 2.

WEAVING.

In weaving, *two* series of friable elements are interlaced at right angles to form a fabric more or less dense or close according to material and method. This usually necessitated - 42 a loom in which a set of vertical or longitudinal elements are fixed to beams. These fixed elements are called warps. The crossing element, called the weft, is carried across on a shuttle. The warps are separated into two sets, and diverged by a mechanical appliance called a heddle. The shuttle passes between the two sets. In simple weaving, there may be no heddle and the weft may be carried across by hand.

The material consists usually of spun thread or yarn; sometimes of narrow strips of unspun fibre. The former necessitates some form of spindle to spin the yarn. In the more primitive forms of weaving, the thread may be formed by rolling the fibre between the palms of the hands or by rolling upon the bare thigh.

The strokes used are similar to those in plaiting.

- (a) Check.—The weft passes alternately over and under one warp element. With a loom this is done by the two series of alternate warps being separated by the heddle and the weft pasing through. For the next *pick* or weft row, the depressed warps are raised and the others lowered. See Fig. 3a.
- (b) Twill.—As in plaiting, the weft passes over and under more than one warp element. Owing to the finer nature of the elements and the use of a unmber of heddles, more elaborate twills can be done in weaving than in plaiting. Thus we have *diagonal* twills and *sateen* twills, with a number of sub-varieties, according to the number of heddles used. Fig. 3b.

BASKETRY.

Basketry, as we are considering it, consists of two sets of elements in which the warps are inflexible and the bending is done in the weft. It is made by hand without a frame. The material is stiffer and coarser than in plaiting. It may consist of splints or vines, split or whole.

The strokes are of greater variety than in plaiting or weaving. The main varieties, as described by Otis Mason in “Aboriginal American Basketry,” are as follows:—

- (a) Wicker Work.—This consists of working the bending weft round the inflexible rods or warps with a check or twill stroke as in plaiting or weaving, Fig. 4. As the bending is done only by the weft elements, the surface is not smooth or level as with the same strokes in the

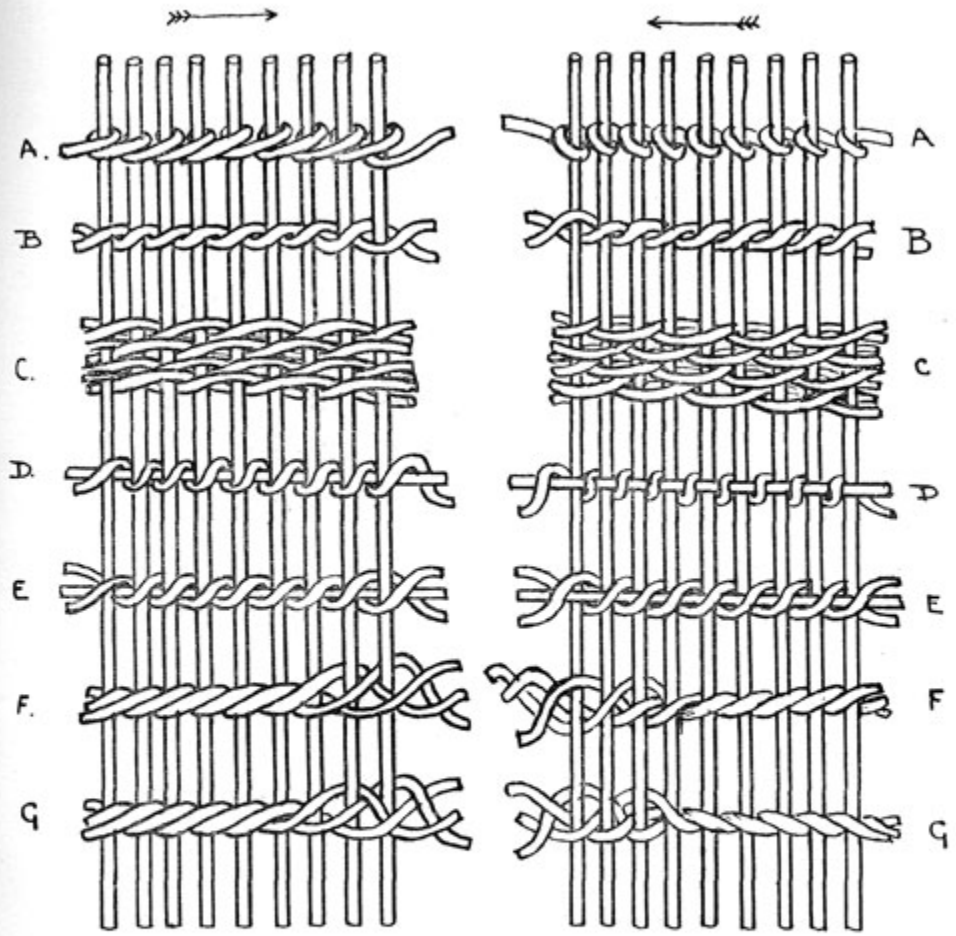

Fig. 5.—Front. Fig. 6.—Back.

(a) Wrapped work.
(b) Plain twined weaving.
(c) Twill and diagonal twined weaving.
(d) Wrapped twined weaving.
(e) Lattice twined weaving.
(f) Three-strand twine.
(g) Three-strand braid.

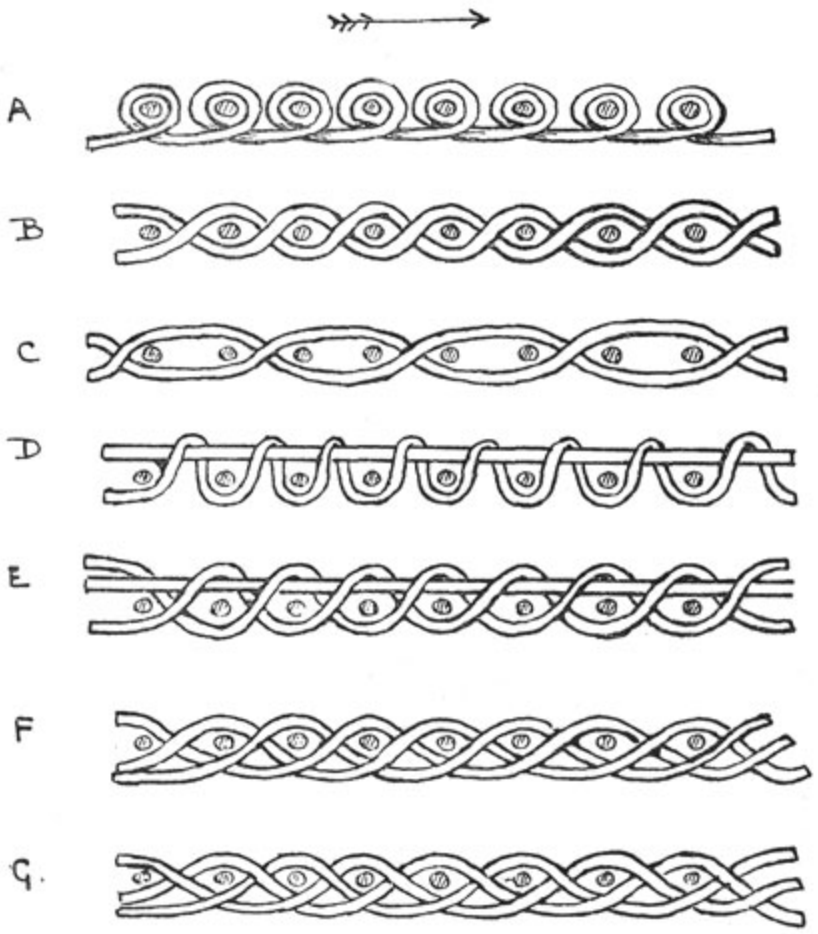

FIG. 7.

Looking down on vertical rods, marked in cross section with shaded circles. The lettering is the same as in Figs. 5 and 6.

- preceeding arts. Downes 18 figures a Maori eel trap made of split supple jack (Rhipogonum scandens) with this technique.
- (b) Wrapped Work.—The weft in passing a warp element is wrapped once round it, Fig. 5A. The appearance on the outside is that of a number of turns over two warps and on the inside of turns round each individual warp. Stokes of the Bishop Museum discovered this stroke used with friable material in the island of Rapa, but his details are not yet available. In New Zealand Basketry, it is found in eel traps, where some of the warps are wrapped round the hoops or ribs which lie on the inner side to strengthen and keep the traps in shape. This is mentioned by Downes in the article quoted above, p. 315. The stroke is also used with strips of flax or kiekie

(Freycinetia banksii), in the overlapping wrapped stitch 19 in decorative Maori panels and in fly-flaps. 20

- (c) Twined Work.—This variety contains many styles, and is most important to our subject. The warps as in wicker work consist of rods or rigid elements. The weft elements are administered in pairs, sometimes in threes. The styles of twined work are:—

1. Plain Twined Weaving.—The wefts are two in number. The two wefts in passing from warp to warp are twisted in half turns on each other to form a two strand twine, each half turn enclosing one warp. See B in Figs. 5, 6 and 7. A variety of this is formed by splitting the warps and enclosing the two halves of two neighbouring warps in each half turn of the twine. This makes an open zigzag pattern as in Aleutian basketry. A similar pattern is seen in some of the koaro traps from Lake Rotoaira at the base of Mt. Tongariro, where two rushes are treated as a single warp element. Another variety is formed by crossing the warps as in some Maori eel traps. In these varieties, the changes are made in the warps, but the weft stroke remains a plain twine.

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2. Twill and Diagonal Twined Weaving.—In twill weaving as the name implies, each half turn of the two strand weft encloses two or more warps, C in Figs. 5, 6 and 7. If the same pairs of warps are taken in successive rows, the ridges on the outside will run vertically as in plain weaving. In diagonal weaving, the same pairs are not taken throughout but in the next row a warp from two pairs above are combined into a different series. This changing of warp pairs in continuous work, as in a circular basket, is effected by having an odd number of warps. The result is that the ridges on the outside run diagonally, C in Figs. 5 and 6.

3. Wrapped Twined Weaving or Bird-Cage Twine.—One weft element passes horizontally across the warp stems usually on the inside of the article, forming a lattice. The other weft element is wrapped round the crossings of the horizontal element with the vertical warp, usually crossing from below upwards on the front of a basket as the work proceeds from the left, Fig. 5D. Thus on the outside of the work, the turns of the wrapping are oblique; on the inside they are vertical, Fig. 6D. See also Fig. 7D.

Otis Mason says that this technique, though simple, is not known excepting in Washington and the ocean side of Vancouver Island. He probably meant in America, for Ling Roth 21 figures it from Santa Cruz, and says it was formerly very common in Tahiti, and is no doubt to be found elsewhere in the Pacific.

4. Lattice Twined Weaving, Tee or Hudson Stitch.—In this as in wrapped twined weaving, a horizontal element crosses the vertical warps at right angles to form a lattice. Instead of a single wrapping element, however, the weft contains two elements, which by a regular plain twined weave binds the crossing elements together, E in Figs. 5, 6 and 7. In America, it is found amongst the Pomo Indians of California, but in their baskets the horizontal element is on the outside of the warps. Geometrical figures were worked in two colours by twisting the weft splints to show the outer bark of the inner wood as required. Ling Roth 22 figures the same technique in the binding of a Samoan comb.

5. Three-strand Twined Weaving.—Three active weft elements are used, unlike the lattice-twine where one - 45 horizontal element remains passive throughout. Otis Mason mentions four ways of administering the weft, but only two of them need interest us.

- (a) Three-strand Twine.—The three-strand twine is simply a plain twist with three weft elements. This is done in front of the warps, but each strand in turn passes round the back of one warp in the course of the twine. There being three strands, it takes three warps for each strand to complete a twine. As in this complete twine, each strand passes over one warp at the back, it follows that the front half turn of the twine passes over two warps instead of one as in plain twined weaving with two strands. Thus each strand crosses obliquely *upwards* in front over two warps, passes back *above* the other two strands in the interval, crosses obliquely *downwards* behind the next warp and then comes forward *below* the other two strands in the interspace. If the strands are crossed obliquely *downwards* in front then they must be crossed obliquely *upwards* at the back. This is done successively by each strand and repeated to the end of the row. Fig. 5F shows the twining in front over two warps, and Fig. 6F shows the twining at the back over single warps. It will be noted that the direction of the twining at the back is *opposite* to that in front, and in appearance is similar to simple two-strand twining. Fig. 7F, looking down from above shows the twist with two strands in front and one behind each warp.
- (b) Three-strand Braid.—This is an ordinary three-ply plait or braid made in front of the warps, except that each strand in turn passes behind one warp. Thus if we start on the first warp, there must be two strands in front and one behind. The upper of the two front strands is passed back in the first interval. There are now two strands at the back. The rear strand is brought *over* the other and passed to the front through the same interval, namely, the first. Of the two strands now in front, the rear one is brought *over* the other, crosses the second warp and passes back in the second interval

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- to make two strands at the back. The rear one crosses the warp and passes *over* the other strand in the second interval on its way to the front. This simple braiding is continued throughout. Each strand passes over two warps in front and one at the back. The rear warp of two always passes *above* the other in the interval, whether going back or coming forward. When beaten close, the effect is exactly the same as in three-strand twining, except that at the back the crossings over the warps are in the *same* direction, viz., obliquely upwards. If the strands cross the warps obliquely downwards, then the rear strands of the twos must cross *under* the other in the interval whether going back or coming forward. Fig 5G shows the front, and Fig. 6G the back, which again is similar in appearance to plain twining with two strands, except for direction. Fig. 7G shows up the braid with the relative position of the warps.

This technique has been somewhat stressed because Otis Mason in “Aboriginal American Basketry,” Figs. 28 and 29, p. 239, shows the strands at the back in a three-strand braid as running in the opposite direction to those in front or with the same direction back and front, as in three-strand twining, which he shows in the same figures. This is obviously an error.

THE DIAGNOSTIC IMPORTANCE OF TECHNICAL DETAIL.

The importance of the stroke used in working the weft elements across the vertical warps will be very evident from Figs. 5 and 6. In Fig. 5, wrapped work, A, three-strand twining, F, and three-strand braiding, G, are all similar in appearance. Every two warps are crossed from below upwards and to the right by a weft element, and as the last warp of a pair forms also the first one of the next pair, each warp is crossed twice by the single weft element in A and by two different weft elements in F and G. Where one weft element crosses diagonally over one warp, the number of ways of getting a similar effect is increased. Plain twine B, wrapped twine D, and lattice twine E, all give the same effect in a front view in Fig. 5, whilst in a back view in Fig. 6, wrapped work A, plain twine B, lattice twine E, three-strand twine F, and three-strand braid G, all give a similar - 47 effect. The diagonal crossing over each warp may be upwards or downwards, but either direction can be worked. When close twining is done by running the weft rows close together, it is imposible to tell what technique has been used merely from observation of the surface. The number of weft elements in a row, and the stroke used must be considered before we can diagnose what technique has been employed, and whether the article under consideration bears affinity to the art of plaiting, weaving or basketry.

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