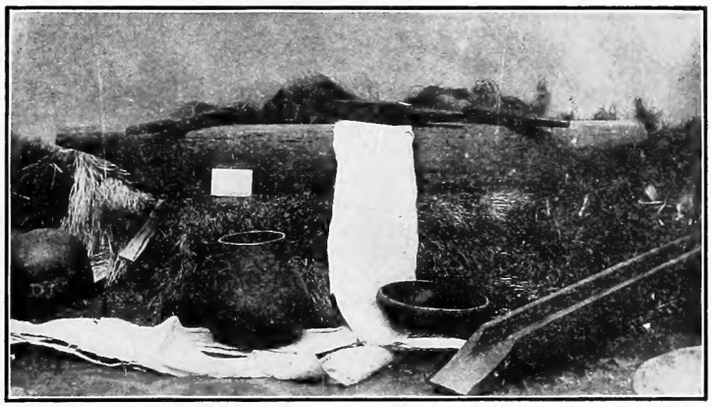
KA HANA KAPA

THE MAKING OF BARK-CLOTH IN HAWAII

BY WILLIAM T. BRIGHAM, A.M., Sc.D. (Columbia).



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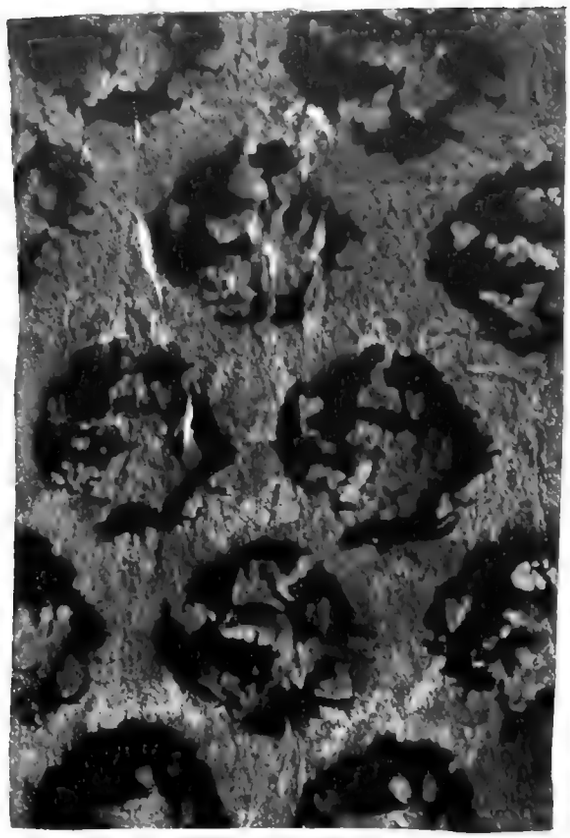
INDEX

The pagination of the illustrations is in italics.

LIST OF PLATES

The colored plates designated by letters of the alphabet are issued in carton.

ILLUSTRATIONS IN THE TEXT.



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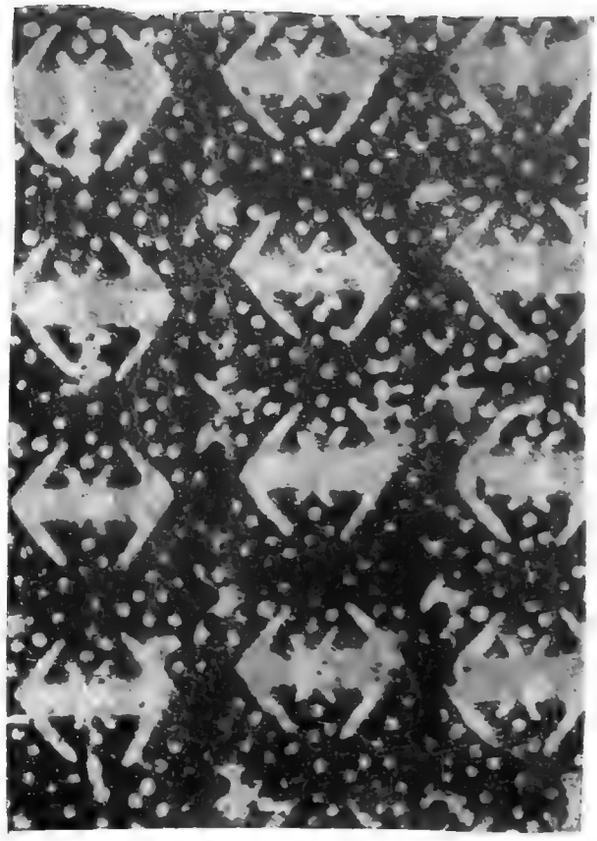

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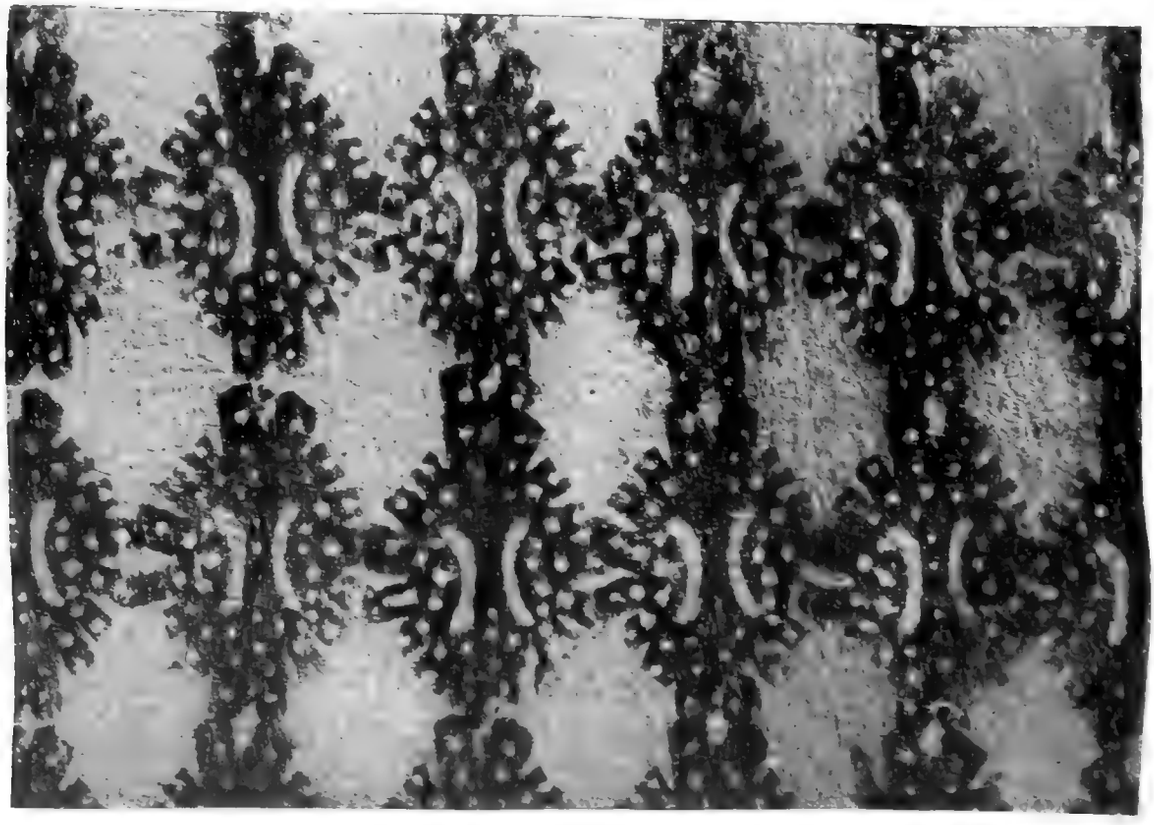

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HAWAIIAN KAPA.

KA HANA KAPA.

The Story of the Manufacture of Kapa (Tapa), or Bark-cloth, in Polynesia and elsewhere, but especially on the Hawaiian Islands. *By* WILLIAM T. BRIGHAM, Sc.D., Honorary Fellow of the Royal Anthropological Institute of Great Britain and Ireland, *Director of the Bernice Pauahi Bishop Museum.*

AS the chief matter of the following description is taken from the work of Hawaiians in their share of the tropical manufacture of cloth, or more properly paper, primarily intended for clothing but developed into many other uses, it will be illustrated largely from the collections of the Bishop Museum, which are rich in the choicest products of this industry as well as in the tools used, and the nomenclature will of necessity be largely Hawaiian. The Hawaiian orthography of the name *Kapa* (pronounced tapa) has been generally retained, although many of the Polynesian groups have called their bark-cloth by other names or other forms of this name. The etymology of the name is simply *ka* = the, and *pa* = beaten or the beaten thing.

While the Bishop Museum has a great number of kapa specimens derived from the beloved Alii in whose honor the Museum was founded, and to whom, as the last of the royal Kamehameha line, many had descended, the Director has added to these for the purpose of study specimens of nearly all that Cook's three expeditions collected, those of Vancouver and other early voyagers as well, and the generosity of other and older museums has placed at his disposal their chiefest treasures. May the pages that follow be in some measure a return for the kindness!

The illustrations of these have generally been photographed by the author, except those from the British Museum and the United States National Museum; while the colored plates have been made from the actual specimens by Löwy of Vienna, which should assure their fidelity to the originals.

It will not be forgotten that kapa-making is fast passing into oblivion all through the regions where it once flourished, and at present exact knowledge of some of the processes, simple as they usually were, is already lost. There is no living source whence we can make up our deficiencies, for even where the poor relics of the manufacture still exist, they are so affected by foreign additions, not to say corruptions, that they are of little help. Even the names of the tools are not always to be

obtained today from the few old natives who once practised the art. This is not told to excuse the author's shortcomings, which are many and lamentable, but to explain, in some measure, the absence of matters that might seem easy to bring together.

The tools with which this work was done were doubtless, in the beginning, simple and even rude. In the separation of the beautiful lace-bark of Jamaica from the stem a club of no greater artificiality than a convenient length of a round stick of hard wood was sufficient; and even to the present day in Africa, New Guinea and elsewhere, such an improvised club or beater answers well enough to the demands of a manufacture that has never risen above the primitive level. On the islands of the eastern Pacific, where the making of bark-cloth attained its highest development, the primitive tools were at some unknown time replaced by a more complicated apparatus (at least on the Hawaiian Islands), and this apparatus, which reached its zenith in the early part of the nineteenth century, we have in abundance in this Museum.

We may premise that early in the second half of the last century foreign textiles had largely replaced on these islands the choicer kapa, which was much more difficult to make than the common sorts, and was the chosen work of the higher female chiefs (*Alii*). Almost from the coming of the American Missionaries in 1820 these exalted dames had generally ceased to beat or rather decorate kapa for amusement, and betaken themselves to the more difficult task of learning to read and write with the new letters brought by these foreign teachers. The early chroniclers of the Mission tell most touching stories of the desire of the aged natives to master the mystery before they died. As is well known, the chiefs at first monopolized the new learning, and the commoners, the *makaainana*, still kept the echoes of the beating ringing in the remoter valleys; but the democratic invaders soon persuaded the chiefs to admit to the schools the whole people, over whom a wave of curiosity had flowed. We who learned our letters in childhood can hardly appreciate the feelings with which almost the entire Hawaiian people were imbued, nor the eagerness with which they threw themselves into the new studies and the consequent neglect of play and work alike,—except the necessary task of food gathering,—to conquer the new *palapala*. If the critics who unjustly blame the missionaries for discouraging the ancient athletic games only could have seen the devotion to study which exhausted not only the daylight but as well the desire to exertion beyond that of the school-room, they would have better understood the situation, and have spared the teachers the annoyance of unkind blame from their *Christian* brethren. Only the coarser kinds of kapa needed for the scant clothing then in vogue were made, and the enterprising merchants who came to these shores soon taught the superior durability of the foreign textiles.

When in 1864 the writer came to these islands kapa was worn only in the outlying districts, and only the plainer forms were made: in Honolulu, when only the *malo* (waist-cloth) was worn, it was of cotton cloth and not of kapa. The noise,—a rather pleasant one,—of the beating was common enough on Hawaii, in the valleys of Kauai, on Molokai and in a few other places, although on Oahu foreign cloth was almost universally worn. A few kapa makers could be found on the windward side of the island, for there was, and still is, a superstition that the ancient cloth makes the most suitable pall or even shroud for the dead while no longer fashionable for the living, but the old beaters were largely used by the native washerwomen to beat the clothes of the foreigners to a more or less pulpy condition on the flat stones by the brookside, and it was in this debased use that I first saw an Hawaiian kapa beater. This excited my curiosity, and it was not long before I had gathered the names of the various patterns cut on them, and had also seen their legitimate use. These beaters seemed at the time over-abundant and they could often be bought for a *hapaumi*, the Hawaiian dime.

In 1890, when the Bishop Museum was opened, the manufacture and use (with such exceptions as we shall find later) had ceased; kapa-making on Hawaii, where it had excelled, was taking its place with the lost arts, and this was true in many other Polynesian groups. Samoa still continues its rather coarse *siapo* making, but it is mainly for exportation as a curiosity. Everywhere the product of the loom (which the old Polynesians did not know) has driven out the product of the beater; only in museums can the relics now be studied, and as the products and tools of other groups have been added to the rich collections of Hawaiian origin in the Bishop Museum, it has seemed well to the Trustees of the Museum that such facts regarding kapa as may be gathered should now be put into permanent form. Recognizing the perishable nature of this delicate and beautiful fabric, they have made generous provision for *fac simile* representations of many of the rarest specimens, that the colors and their arrangement may testify to those who come after us to what remarkable perfection this art in the hands of the old Hawaiian Alii had attained. They have called on me to put into the following pages what I have learned about these specimens, which alone would place the Hawaiians high among their Polynesian brethren.

Imperfectly as I have done this work, I assure my readers that I have approached it with the deepest interest. I have tracked the remains in many museums of the world, and I had previously gathered what I then thought enough from the aged women who had made kapa on these islands, and also I had talked with the kapa makers of Samoa and Fiji. But the search began too late to save all, and when it began anthropology was more interested in the empty skulls of a race

than in the devices the living brain had thought out to improve the arts of living. If the scientific knowledge and methods of today had existed fifty years ago!

What I have done in this treatise is arranged as follows:

1. The history of the art and its geographical distribution: a chapter which should be very full, for it extends its view through the tropical Pacific, through the Indian Ocean to Madagascar (a Polynesian connection), into Africa. I have reason to believe that in Central America the art was known, but at the advent of the Spanish Conquistadores the looms were everywhere at work and the earlier fabric forgotten as clothing, although still used as paper on which to inscribe those brilliant hieroglyphic records, which were so generally destroyed by the invading priests. Japan is at present making fine paper (of which I have specimens) from the same material and in much the same way as the Polynesians made kapa.

2. The tools and their uses. Our museums have preserved a fairly complete series of almost all, and the use is without much difficulty interpreted by past experience with actual workers. This will be our largest and most important chapter.

3. The materials used: and here our path is not wholly clear, for we know only in a general way some of the trees used in Africa and elsewhere. Even the original home of the chief tree used through China, Japan and all Polynesia, the Paper-Mulberry, has not been determined; wherever it was used it is found cultivated, or escaped from cultivation. The dyes and other coloring matter are often disguised in native names now unidentifiable; and the known materials do not always under present treatment yield the results seen on old kapa. We know the substances at their command in the ancient days, but not always the exact treatment.

4. The uses of kapa as clothing and for the innumerable subsidiary uses.

5. Hawaiian ornamentation as shown on kapa, in which each reader may decide the provenance and interpretation of the designs laid before him.

6. A detailed catalogue of the Museum collection of kapa and of my private collection, that the reader may know that this treatise has not been compiled without due foundation.

In all this I shall endeavor to put the object or design as fully as possible before the reader by photograph. I shall avoid theorizing as far as may be, bearing always in mind that the main object of this volume is to preserve the fast vanishing art of kapa-making so far as it may prove possible.

CHAPTER I.

HISTORY AND GEOGRAPHY.

We can go back only in imagination to the time when naked man, having to some extent satisfied his hunger, made himself a shelter from the weather and a protection from his fellow man (in the days of the simple life), found to his annoyance that he was naked and had to devise something to remedy the supposed defect. We know that there are tribes that have not yet made that unpleasant discovery, but the missionary will sooner or later make them conscious of their needs, and his brother the trader will supply them with the loaded fabrics of the Christian countries, and they will not have to invent or use bark cloth for *clothing*.

China, the mother of so many arts, made paper from the same material and in essentially the same way as the Polynesians were found making it many centuries after. How the paper-mulberry came into the islands of the Pacific, we do not know and probably never shall. Have we yet learned how Chinese porcelain came into Egyptian tombs of the early dynasties? Their paper was easier to bring and might have suggested to the Egyptian traders who visited the interior of Africa before the days of Solomon, the way to utilize the barks of similar nature found there in abundance. All this gives exercise to the imagination but adds nothing to our knowledge, and we must come centuries later to the log-books of the voyagers, and the journals of the travelers by land who were beginning to learn that the habitable world did not revolve around Jerusalem, or even around the proud City of the Seven Hills.

It would be quite possible for one placed within reach of a great library to fill many quarto pages with references, more or less obscure, to garments made from tree-bark as well as leaves, that early voyagers found among the peoples they visited, but the value of such a gathering would be problematical and at best would seem an idle display of research such as would be more suitable for a candidate for an academic degree of Doctor of Philosophy. Unfortunately early voyagers did not trouble themselves to describe carefully domestic manufactures; their knowledge was limited and seldom extended to a critical understanding of the peoples among whom they made their discoveries. Hence they often misunderstood the supposed answers to misunderstood questions, a frequent occurrence as late as the time of Cook, with whom I propose to begin my account of kapa-making.

When we remember that the fig-leaf which appears in the charming Babylonian idyl given in the book of Genesis as the earliest dress of primitive man, still figures even in the Vatican and other galleries as the inappropriate garb of statues of

the same sex as Adam, who in the "Breeches Bible" was reported to have used this impossible leaf to fashion the garment which has given name to this rare edition of the Scriptures, we need not wonder at the mistakes of travelers even centuries after the Babylonian captivity. Captain Cook, it will be remembered, believed that the Hawaiians were cannibals, from a misunderstanding of what was told him by islanders of whose tongue he knew little or nothing. Hence, in all the early glimpses we shall get of this essentially Polynesian art we find our view clouded by statements incorrect if not impossible, and words or names no longer recognizable.

In the light of our present knowledge of things Polynesian we cannot read again the fascinating pages of Cook's observations without wonder at the general accuracy of his accounts of what he saw, and we must acknowledge the debt we owe to him and the scientific men who were with him on his three voyages. The Forsters, Banks, Sparrman, Solander and others, and we must not forget his Bernese artist (with him on his last voyage)[1] whose pictures were far more accurate than was usual at that time. I shall quote here in full what these discoverers have to tell us, and we can later compare all this with the Hawaiian manufacture which was doubtless the most complete technically and artistically.

The first of Cook's voyages was edited by the Reverend Dr. Hawkesworth, who had the great advantage of the journal of Mr. Banks, but the disadvantage of feeling obliged to correct and modify to suit his own clerical taste the rough but definite statements of the Commander (then Lieutenant) James Cook. He also saw fit (with the full permission of Mr. Banks) to shape his narrative as issuing from Cook. Fortunately the journals of both these distinguished men have in late years been published, the one verbatim,[2] the other edited by Sir Joseph D. Hooker.[3] I shall take my extracts from these later published journals as of course more authentic. And first comes that of Cook, crisp and sailor-like, nor is all the odd spelling to be laid to the gallant Captain's door, for his journal was written by a clerk in an age when orthography was even less grounded than at present.

[July, 1769, at Tahiti.] "I shall now describe their way of making Cloth, which, in my opinion, is the only Curious manufacture they have. All their Cloth is, I believe, made from the Bark of Trees; the finest is made from a plant which they

[1] Weber, whose drawings are preserved in the British Museum.

[2] Captain Cook's Journal during his first voyage round the World made in H. M. Bark "Endeavour," 1768-71. Edited by Capt. W. J. L. Wharton, R.N., F.R.S. London, 1893.

[3] Journal of the Right Hon. Sir Joseph Banks, Bart., K.B., P.R.S. Edited by Sir Joseph D. Hooker. London, 1896.

One should read the introduction to each of these publications to understand fully what Hawkesworth did to the combined journals, but I may quote here an extract from Prior's *Life of Malone:*—"Hawkesworth, the writer, was introduced by Garrick to Lord Sandwich, who, thinking to put a few hundred pounds into his pocket, appointed him to revise and publish Cook's Voyages. He scarcely did anything to the MSS., yet sold it to Cadell and Strahan, the printer and bookseller, for £6000."

Cultivate for no other purpose. Dr. Solander thinks it is the same plant the bark of which the Chinese make paper of. They let this plant grow till it is about 6 or 8 feet high, the Stem is then about as thick as one's Thum or thicker; after this they cut it down and lay it a Certain time in water. This makes the Bark strip off easy, the outside of which is scraped off with a rough Shell. After this is done it looks like long strips of ragged linnen; these they lay together, by means of a fine paist made of some sort of a root, to the Breadth of a yard more or less, and in length 6, 8 or 10 Yards or more according to the use it is for. After it is thus put together it is beat out to its proper breadth and fineness, upon a long square piece of wood, with wooden beaters, the Cloth being kept wet all the time. The beaters are made of hard wood with four square sides, are about 3 or 4 inches broad and cut into grooves of different fineness; this makes the Cloth look at first sight as if it was wove with thread, but I believe the principal use of the Groves is to facilitate the beating it out, in the doing of which they often beat holes in it, or one place thinner than another; but this is easily repair'd by pasting on small bits, and this they do in such a manner, that the Cloth is not the least injured. The finest sort when bleached is very white and comes nearest to fine Cotton. Thick cloth, especially fine, is made by pasting two or more thickness's of thin cloth, made for that Purpose, together. Coarse thick cloth and ordinary thin cloth is made of the Bark of Bread fruit Trees, and I think I have been told that it is sometimes made from the Bark of other trees. The making of Cloth is wholy the work of the women, in which all ranks are employ'd. Their common colours are red, brown and yellow, with which they dye some pieces just as their fancy leads them."[4]

This is all that Cook has to tell us, and though brief, the account is accurate. We turn to the journal of Sir Joseph Banks and we see where Dr. Hawkesworth got most of the story he puts into the mouth of the great navigator. Speaking of the Tahitians our journalist continues:[5]

"They show their greatest ingenuity in marking and dyeing cloth; in the description of these operations, especially the latter, I shall be rather diffuse, as I am not without hopes that my countrymen may receive some advantage, either from the articles themselves, or at least by hints derived from them. The material of which it is made is the internal bark or liber of three sorts of trees, the Chinese paper mulberry (*Morus papyrifera*) [*Broussonetia papyrifera*], the bread-fruit tree (*Sitodium utile*) [*Artocarpus incisa*], and a tree much resembling the wild fig-tree of the West Indies (*Ficus prolixa*). Of the first, which they name *oouta* [*aute*], they make the

[4] Journal, p. 99. [5] Banks' Journal, p. 145.

finest and whitest cloth, which is worn chiefly by the principal people; it is likewise the most suitable for dyeing, especially with red. Of the second, which they call *ooroo* [*ulu*], is made a cloth inferior to the former in whiteness and softness, worn chiefly by people of inferior degree. Of the third, which is by far the rarest, is made a coarse, harsh cloth of the colour of the deepest brown paper; it is the only one they have that at all resists water, and is much valued; most of it is perfumed and used by the very great people as a morning dress. These three trees are cultivated with much care, especially the former, which covers the largest part of their cultivated land. Young plants of one or two years' growth only are used; their great merit is that they are thin, straight, tall, and without branches; to prevent the growth of these last they pluck off with great care all the lower leaves and their germs, as often as there is any appearance of a tendency to produce branches.

"Their mode of manufacturing the bark is the same for all the sorts: one description of it will therefore be sufficient. The thin bark they make thus; when the trees have grown to a sufficient size they are drawn up, and the roots and tops cut off and stripped of their leaves; the best of the *aouta* are in this state about three or four feet long and as thick as a man's finger, but the *ooroo* are considerably larger. The bark of these rods is then slit up longitudinally, and in this manner drawn off the stick; when all are stripped, the bark is carried to some brook or running water, into which it is laid to soak with stones upon it, and in this situation it remains some days. When sufficiently soaked the women servants go down to the river, and stripping themselves, sit down in the water and scrape the pieces of bark, holding them against a flat smooth board, with the shell called by the English shell merchants Tiger's tongue (*Tellina gargadia*), dipping it continually in the water until all the outer green bark is rubbed and washed away, and nothing remains but the very fine fibres of the inner bark. This work is generally finished in the afternoon: in the evening the pieces are spread out upon plantain leaves, and in doing this I suppose there is some difficulty, as the mistress of the family generally presides over the operation. All that I could observe was that they laid them in two or three layers, and seemed very careful to make them everywhere of equal thickness, so that if any part of a piece of bark had been scraped too thin, another thin piece was laid over it, in order to render it of the same thickness as the rest. When laid out in this manner, a piece of cloth is eleven or twelve yards long, and not more than a foot broad, for as the longitudinal fibres are all laid lengthwise, they do not expect it to stretch in that direction, though they well know how considerably it will in the other.

"In this state they suffer it to remain till morning, by which time a large proportion of the water with which it was thoroughly soaked has drained off or evapo-

rated, and the fibres begin to adhere together, so that the whole may be lifted from the ground without dropping in pieces. It is then taken away by the women servants, who beat it in the following manner: they lay it upon a long piece of wood, one side of which is very even and flat, this side being put under the cloth: as many women then as they can muster, or as can work at the board together begin to beat it. Each is furnished with a baton made of the hard wood, *etoa* (*Casuarina equisetifolia*): it is

FIG. I. A MORE MODERN, BUT NOT DIFFERENT, TAPA BEATING.

about a foot long and square with a handle; on each of the four faces of the square are many small furrows, whose width differs on each face, and which cover the whole face. They begin with the coarsest side, keeping time with their strokes in the same manner as smiths, and continue until the cloth, which extends rapidly under these strokes, shows by the too great thinness of the groves which are made in it that a finer side of the beater is requisite. In this manner they proceed to the finest side, with which they finish; unless the cloth is to be of that very fine sort *hoboo*, which is almost as thin as muslin. In making this last they double the piece several times, and beat it out again and afterwards bleach it in the sun and air, which in these climates produces whiteness in a very short time. But I believe that the

finest of their *hoboo* does not attain either its whiteness or softness until it has been worn some time, then washed and beaten over again with the very finest beaters.

"Of this thin cloth they have almost as many different sorts as we have of linen, distinguishing it according to its fineness and the material of which it is made. Each piece is from nine to fifteen yards in length, and about two and a half broad. It serves them for clothes in the day and bedding at night. When, by use, it is sufficiently worn and becomes dirty, it is carried to the river and washed, chiefly by letting it soak in a gentle stream, fastened to the bottom by a stone, or, if it is very dirty, by wringing it and squeezing it gently. Several of the pieces of cloth so washed are then laid on each other, and being beaten with the coarsest side of the beater, adhere together,

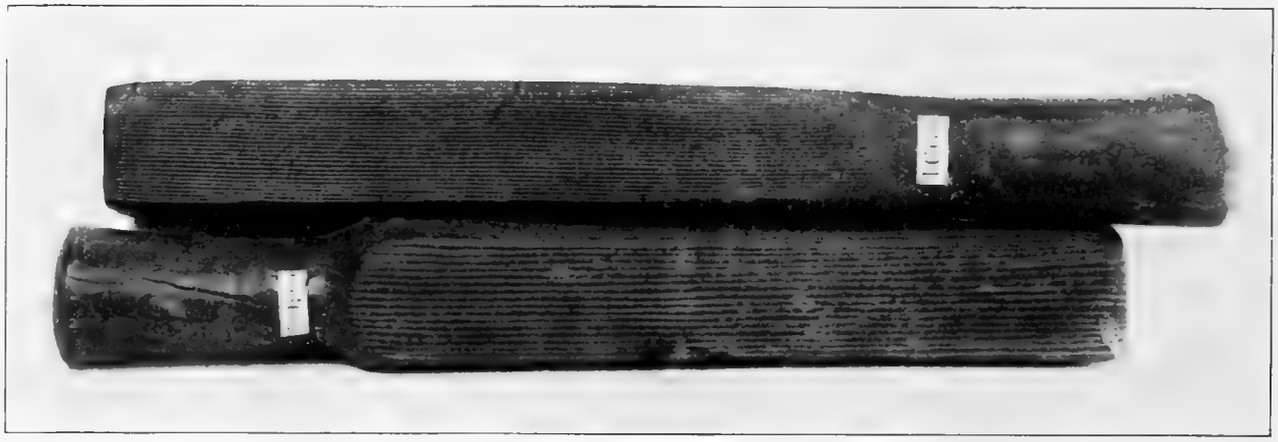

FIG. 2. TAHITIAN BEATERS IN THE BISHOP MUSEUM.

and become a cloth as thick as coarse broad-cloth, than which nothing can be more soft or delicious to the touch. This softness, however, is not produced immediately after the beating; it is at first stiff as if newly starched, and some parts not adhering together as well as others it looks ragged, and also varies in thickness according to any faults in the cloth from which it was made.

"To remedy this is the business of the mistress and the principal women of the family, who seem to amuse themselves with this, and with dyeing it, as our English women do with making caps, ruffles, etc. In this way they spend the greater part of their time. Each woman is furnished with a knife made of a piece of bamboo cane, to which they give an edge by splitting it diagonally with their nails. This is sufficient to cut any sort of cloth or soft substance with great ease. A certain quantity of a paste made of the root of a plant which serves them also for food, and is called by them Pea [*pia*] (*Chaitea tacca*) [*Tacca pinnatifida*], is also required. With the knife they cut off any ragged edges or ends which may not have been sufficiently fixed down

by the beating, and with the paste they fasten down others which are less ragged, and also put patches on any part which may be thinner than the rest, generally finishing their work, if intended to be of the best kind, by pasting a complete covering of the finest thin cloth or *hoboo* over the whole. They sometimes make a thick cloth also

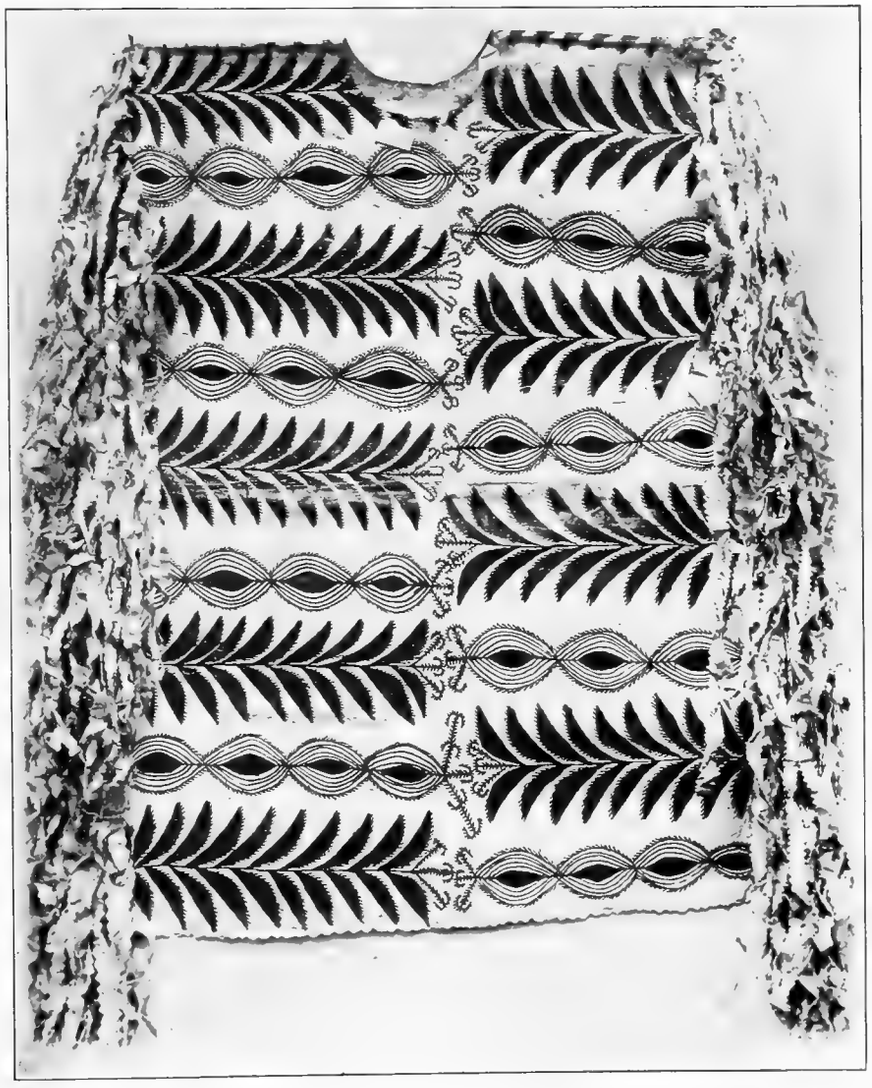

FIG. 3. A TAHITIAN TIPUTA (TEBUTA) IN THE BRITISH MUSEUM.

of only half-worn cloth, which, having been worn by cleanly people, is not soiled enough to require washing; the thick cloth made in either of these ways is used either for the garment called *maro*, which is a long piece passed between the legs and around the waist, and which serves instead of breeches, or as the *tebuta*, a garment used equally by both sexes instead of a coat or gown, which exactly resembles that worn by the inhabitants of Peru and Chili, and is called by the Spaniards *poncho*.

"The cloth itself, both thick and thin, resembles the finest cottons, in softness especially, in which property it even exceeds them; its delicacy (for it tears by the smallest accident) makes it impossible that it can ever be used in Europe, indeed it is properly adapted to a hot climate. I used it to sleep in very often in the islands, and always found it far cooler than any English cloth.

"Having thus described their manner of making the cloth, I shall proceed to their method of dyeing. They use principally two colours, red and yellow. The first of these is most beautiful, I might venture to say a more delicate colour than any we have in Europe, approaching, however, most nearly to scarlet. The second is a good bright colour, but of no particular excellence. They also on some occasions dye the cloth brown and black, but so seldom that I had no opportunity during my stay of seeing the method, or of learning the materials they make use of. I shall therefore say no more of these colours than that they were so indifferent in their qualities that they did not much raise my curiosity to inquire concerning them.

"To begin with the red, in favour of which I shall premise that I believe no voyager has passed through these seas but that he has said something in praise of this colour, the brightness and elegance of which is so great that it cannot avoid being taken notice of by the most superficial observer. This colour is made by the admixture of the juices of two vegetables neither of which in their separate state have the least tendency to the colour of red, nor, so far at least as I have been able to observe, are there any circumstances relating to them from whence any one would be led to conclude that the red colour was at all latent in them. The plants are *Ficus tinctoria*, called by them *matte* (the same name as the colour), and *Cordia Sebestena*,[6] called *etou;* of these, the fruits of the first, and the leaves of the second, are used in the following manner:

"The fruit, which is about as large as a rounceval pea, or very small gooseberry, produces, by breaking off the stalk close to it, one drop of a milky liquor resembling the juice of a fig tree in Europe. Indeed, the tree itself is a kind of wild fig. This liquor the women collect, breaking off the foot-stalk, and shaking the drop which hangs to the little fig into a small quantity of cocoanut water. To sufficiently prepare a gill of cocoanut water will require three or four quarts of the little figs, though I never could observe that they had any rule in deciding the proportion, except by observing the cocoanut water, which should be of the colour of whey, when a sufficient quantity of the juice of the little figs was mixed with it. When this liquor is ready, the leaves of the *etou* are brought and well wetted in it; they are then laid upon a plantain leaf, and the women begin, at first gently, to turn and shake them about; afterwards, as they grow more and more flaccid by this operation, to

[6] For illustrations of both of these see the chapter on Materials.

squeeze them a little, increasing the pressure gradually. All this is done merely to prevent the leaves from breaking. As they become more flaccid and spongy, they supply them with more of the juice, and in about five minutes the colour begins to appear on the veins of the *etou* leaves, and in ten, or a little more, all is finished and ready for straining, when they press and squeeze the leaves as hard as they possibly can. For straining they have a large quantity of the fibres of a kind of *Cyperus* grass (*Cyperus stupeus*) called by them *mooo*, which the boys prepare very nimbly by drawing the stalks of it through their teeth, or between two little sticks until all the green

FIG. 4. TAHITIAN FERN IN RED ON YELLOW.

bark and the bran-like substance which lies between them is gone. In a covering of these fibres, then, they envelop the leaves, and squeezing or wringing them strongly, express the dye, which turns out very little more in quantity than the liquor employed; this operation they repeat several times, as often soaking the leaves in the dye and squeezing them dry again, until they have sufficiently extracted all their virtue. They throw away the remaining leaves, keeping however the *mooo*, which serves them instead of a brush to lay the colour on the cloth. The receptacle used for the liquid dye is always a plantain leaf, whether from any property it may have suitable to the colour, or the great ease with which it is always obtained, and the facility of dividing it, and making of it many small cups, in which the dye may be

distributed to every one in the company, I do not know. In laying the dye upon the cloth, they take it up in the fibres of the *mooo*, and rubbing it gently over the cloth, spread the outside of it with a thin coat of dye. This applies to the thick cloth: of the thin they very seldon dye more than the edges; some indeed I have seen dyed through, as if it had been soaked in the dye, but it had not nearly so elegant a colour as that on which a thin coat only was laid on the outside.[7]

"Though the *etou* leaf is the most generally used, and I believe produces the finest colour, yet there are several more, which by being mixed with the juice of the little figs produce a red colour. Such are *Tournefortia sericea* (which they call *taheino*), *Convolvulus brasiliensis* [*Ipomœa Pes-caprœ*], *Solanum latifolium* (*ebooa*). By the use of these different plants or of different proportions of the materials many varieties of the colour are observable among their cloths, some of which are very conspicuously superior to others.....

"The painter whom I have with me tells me that the nearest imitation of the colour that he could make would be by mixing together vermilion and carmine, but even thus he could not equal the delicacy, though his would be a body colour, and the Indian's only a stain. In the way that the Indians use it, I cannot say much for its lasting; they commonly keep their cloth white up to the very time it is to be used, and then dye it, as if conscious that it would soon fade. I have, however, used cloth dyed with it myself for a fortnight or three weeks, in which time it has very little altered, and by that time the cloth itself was pretty well worn out. I have now also some in chests, which a month ago when I looked into them had very little changed their colour: the admixture of fixing drugs would, however, certainly not a little conduce to its keeping.

"Their yellow, though a good colour, has certainly no particular excellence to recommend it in which it is superior to our known yellows. It is made of the bark of a root of a shrub called *nono* (*Morinda umbellata*). This they scrape into water, and after it has soaked a sufficient time, strain the water and dip the cloth into it. The wood of the root is no doubt furnished in some degree with the same property as the bark, but not having any vessels in which they can boil it, it is useless to

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[7] I am surprised that our author does not mention the use of fern leaves as stamps with which to impress this red dye. I have in my collection some specimens brought home in the *Endeavour* in which these two colors are pleasingly combined, the red leaf on a rich yellow ground, and should have given a sample among the colored plates had not the tints greatly faded from what Mr. Banks describes. In Fig. 4 is given a sample of the pattern.

I have also the following description of the dye written for me by a Tahitian lady, Miss Teuira Henry. "The *Ficus tinctoria* (*mati*) sap is taken from the stem end of the fresh berry just as it is plucked, and sprinkled on to fresh young leaves of the *tou* (*Cordia subcordata*); they are then kneaded together in a little water, which when expressed from the mixture produces the red dye into which the fern is dipped for printing. The mati sap alone is yellow, and it is the tou that blends with it into a pleasing red color. The more mati there is, the brighter the red." It will be seen that the coconut water is not considered indispensable.

the inhabitants. The genus of *Morinda* seems worthy of being examined as to its properties for dyeing. Browne, in his *History of Jamaica*, mentions three species whose roots, he says, are used to dye a brown colour; and Rumphius says of his *Bancudus angustifolia* [*Morinda angustifolia*], which is very nearly allied to our *nono*, that it is used by the inhabitants of the East Indian Islands as a fixing drug for the colour of red, with which he says it particularly agrees.

"They also dye yellow with the fruit of a tree called *tamanu* (*Calophyllum Inophyllum*), but their method I never had the fortune to see. It seems, however, to be chiefly esteemed by them for the smell, more agreeable to an Indian than an European nose, which it gives to the cloth."

Because I am inclined to follow so interesting a narrator, I shall take my readers next to New Zealand, still quoting from Sir Joseph Banks:—

"After this they showed us a great rarity, six plants of what they called *aouto* [*aute*], from whence they make cloth like that of Otahite. 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 seemed to value it very much; that it was very 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 the holes of their ears."[8]

Now that we are at the extreme southwest end of Polynesia, we may add to this statement what little there is to be said about this *aute* so far from home. It is not merely a matter of manufacture, but a far wider interest that affects us just here —the whence of the Maori branch of the Polynesian race, and so slight are the records that we grasp each witness and wring from him any *scintilla* of evidence. The Maori came to New Zealand "from the northward" some time after another branch of the same family, the Moriori, of whom we unfortunately know little,[9] had colonized on the group. Did they bring the cloth plant with them (as they did other useful things), and from what group? The climate of New Zealand was too cold and windy for such frail material as bark cloth for clothing; the strong native flax was soon found more suitable, but the name and memory clung to the people, and remain to the present day when the plant has gone from New Zealand, and the bark is

[8] *Loc. cit.*, p. 206.

[9] The Bishop Museum has a fairly good collection of Moriori stone and bone implements from Chatham Island, where the tribe finally perished, driven before their more warlike cousins. They were purchased for us by a former member of our staff, Mr. Acland Wansey, now of Dungog, N. S. W., and they show good workmanship.

forgotten even as an ornament. Here are some of the proverbs among the people, collected by W. Colenso[10] which have preserved the name:—

"*He manu aute e taea te whakahoro.*
A flying-kite made of paper mulberry bark can be made to fly fast.
Te aute tee whawhea.
The paper mulberry bark is not blown away by the winds [that is, all is quiet].
Haere mai ki Hauraki, te aute tee awhea.
Come here to Hauraki where the aute is not disturbed [by winds]."

FIG. 5. A MAORI HEAD, COOK.

FIG. 6. A MAORI HEAD, PARKINSON.

The same author, well known for his researches in Maori lore, tells us still more of this perished immigrant to New Zealand:—

"I will first mention the *aute*, paper-mulberry, although, as far as I know, not a single vestige of this plant is now left in New Zealand! its name remains, and that is all. Few Maoris now living have ever seen it; and yet, in ancient days, it was commonly and largely cultivated throughout the country. At the time of Cook's visit it was very common, and seen by those early voyagers everywhere, both growing in their plantations and worn in fillets by the chiefs in their hair; the thin

[10] Transactions New Zealand Institute, xii, 144, 145.

white bleached paper-like bark contrasting excellently well with their ebon locks. Very many of the heads of Maoris in the plates in both Cook's voyages and Parkinson's journal are drawn thus ornamented with the *aute*." [I have given in Fig. 5 a Maori head from Cook showing the fibres spread out as a white fringe in the ear, and in Fig. 6 a head drawn by Parkinson showing the bark rolled up and stuck in the ear-hole, a more common device, judging by the illustrations given by both authors. When we return to the eastern Pacific region I shall ask a comparison with the ornamental head-wrap of white tapa there found.] "Yet though commonly cultivated, it was of small size, and never was used by the Maoris for clothing purposes, as it was by many other of the Polynesians. The chiefs also made ornamental paper kites of it." [11]

This account of the connection of tapa with the Maori history may well be extended by the information my friend S. Percy Smith, formerly Surveyor General of New Zealand, and always one of the best authorities on Maori history and antiquities, has written me: I may be pardoned for giving his letter in full:—

'Matai Moana'
New Plymouth, N. Z.
Aug. 17, 1909.

My Dear Dr. Brigham:

In reply to your letter of the 28th ult., I am indeed pleased to see that you are going to add to the many debts all Polynesian Scholars owe to you for what you have done in the way of Polynesian Ethnology, by publishing a work on the *Tapa* or, as you Hawaiians call it, *Kapa*.

There is, scattered about in Maori traditions a good deal about the *Aute*, which is the native name of the Broussonetia in many of the islands. Maoris do not know now of the name *tapa* for the manufactured article, but it is always called *aute*, which seems rather to imply that *tapa* is a name introduced after the Maoris left central Pacific. But of course this is not capable of proof. The Maoris were well acquainted with the *aute*, indeed their traditions are quite positive that they brought the plant here with them, and this is proved by the further fact that the manufactured article was in use here when the early settlers (missionaries and beach comers) arrived here. But it was never in common use, probably because the plant itself did not flourish without a great deal of care, and was consequently rare and therefore only used by the Chief, usually in the form of a fine gauze-like material, quite white, which was worn bound round the head in a turban form with flowing ends.

I only know of one expression that has been handed down that would seem to imply its use as a garment in days long ago. It is customary amongst Maoris to

[11] Transactions New Zealand Institute, xiii, 18.

apply what one may call honorific names to Chiefs, or groups of Chiefs, and their descendants of some particular Chief. These were in fact the aristocrats of the tribe, and they usually lived at some certain place where was the meeting place of the tribe on all important occasions,—where was the particular *marae* or meeting place where stood the *whare-kura*, *whare-maire*, or *whare-wananga* or Valhalla of the tribe. Now there was such a place in southern Kaipara, at O-taka-nini, which was the headquarters of the Ngati-whatua tribe, and the chiefs of that place were referred to as,

"Te aute te whawhea"

which may be translated as "girded with *aute*," on account, as the tradition says, of the chiefs being of so high a rank that they could afford to use *aute* garments.

There are several references in their old songs to the *aute*, always implying that it was very precious and only to be used by chiefs,—hence a departed one is compared to the *aute* as evidence of the value in which he (or she) was held.

The very large kites of former days were also made of *aute*, no doubt because its closeness of texture held the wind better. Hence we find a chief or beloved one referred to as

"Taku manu aute = My *aute* kite.

The *aute* was also used as a wrapper for articles of value, such as jadeite ornaments; and the same *aute* was twisted into a thong, which was passed through the handle of a *mere*, and thus secured to the owner's wrist.

The plant itself was still to be found in New Zealand as late as the "thirties" of last century, and was seen by the somewhat celebrated botanist, W. Colenso. But even then it was extremely rare, and for 70 or 80 years it has not been seen at all. 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 father-land. I never heard that they used patterns on their *aute*, in fact, the impression left on my mind is that it was always pure white and of a filmy texture.

Now that I know that you are engaged in this subject, I will, as I notice them, preserve some references that are to be found in Maori songs, but at this moment I do not know where to look for them the songs are so numerous.

I hope some day to see your work, and I have no doubt that it will be on an equality with the other work of the Museum, and the more so because your Hawaiian tapas are the best in Polynesia that I have seen.

With best wishes for your success, and kind regards,

I remain

faithfully yours,

S. Percy Smith.

It is curious to note that in Fiji and elsewhere the name of the plant was identical with that of the manufactured articles, not uncommon among the Polynesians, as in Tahiti the fig and the dye that its berry produced both bore the same name, *mati; malo* or *masi* were names in Fiji of the paper mulberry and the cloth made from the mulberry bark.

The books begotten by Cook's voyages were many, although most of them were soon forgotten, or became the spoils of the bibliophile. It was most unfortunate that the attempts of the Admiralty to meddle with the publication of the results led to much scandal, publication of unauthorized accounts and often untrue accounts of the voyages. We have seen how the Journal of Sir Joseph Banks was made to furnish Cook with interesting matter that great Navigator had neither time nor perhaps knowledge to gather for himself, but as this was with the full consent of the naturalist, and was well understood at the time, it matters little. On the second voyage in the *Resolution* and *Adventure* Dr. John Reinhold Forster and his son George were the naturalists and it is only necessary to read the introduction to the two portly quarto volumes in which the son narrates the genesis of this story of the voyage to see that there were shadows on the conduct of the voyage, and the arrangements for publishing the official Account most regrettable.[12] Because the elder Forster would not confine his account narrowly to scientific matters, nor allow his journal to be absorbed as that of Banks had been, the moiety of the £2000 or more which had been allotted to him for illustration of his story, was turned wholly to Cook's account and the naturalist left to publish at his own expense, which the son did without the illustrations. The previous year the senior had issued his account of the plants observed or collected,[13] and this, probably as beyond the governmental comprehension, was approved. The treatment of scientific men by the less educated persons in command of government expeditions has long been a matter of history, and even in our own country we have not forgotten the treatment of James Dwight Dana by the commander of the first American Exploring Expedition. This will perhaps account for much that we lose from the stores of knowledge these men doubtless collected. I shall quote from this Voyage of Forster:—(He is at Tahiti in August, 1773.)

"We had not walked far, when we heard a loud noise in the wood, which resembled the stroke of a carpenter's hammer. We followed the sound, and at last came to a small shed, where five or six women were sitting on both sides of a long square piece of timber, and beat the fibrous bark of the mulberry-tree here, in order to manufacture it into cloth. The instrument they used for this purpose was a square

[12] A Voyage round the World in His Britannic Majesty's Sloop, Resolution, commanded by Capt. James Cook, during the Years 1772, 3, 4 and 5. By George Forster, F.R.S. London, 1777.

[13] Characteres Generum Plantarum quas in Insulis maris australis colleg, &c. Joannes Reinoldus Forster, L.L.D., and Georgius Forster. 4to. London, 1776.

wooden club, with longitudinal and parallel furrows, which run smaller and closer together on the different sides. They ceased a little while to give us time to examine the bark, the mallet, and the timber on which they performed their operations. They also shewed us a kind of glutinous water in a coco-nut shell, which was made use of from time to time, to make the pieces of bark cohere together. This glue, which, as

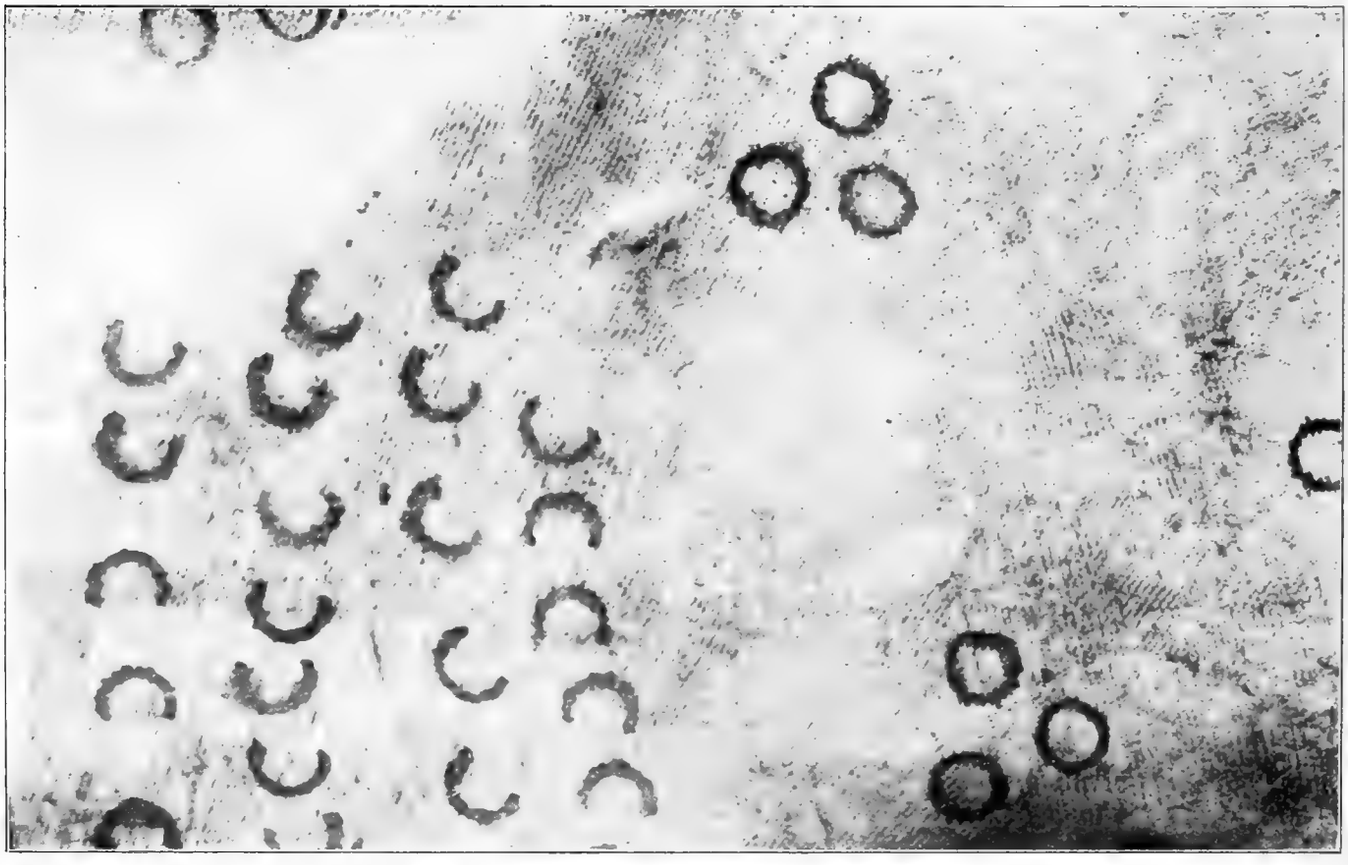


FIG. 7. TAHITIAN CLOTH BROUGHT HOME ON COOK'S SECOND VOYAGE.

we understood, was made of the *hibiscus esculentus*, is indispensibly necessary in the manufacture of those immense pieces of cloth, sometimes two or three yards wide, and fifty yards long, which are composed of little bits of bark, taken from trees never so thick as the wrist. We carefully examined their plantations of mulberry-trees, but never found a single old one among them; as soon as they are of two years growth they are cut down, and new ones spring up from the root, for fortunately this tree is one of the most prolific in nature, and if suffered to grow till it flowered and could bear fruits, might perhaps totally over-run the country. The bark must always be taken from young trees; and these are carefully drawn into long stems, without any

branches, except just at the top, so that the bark is as entire as possible. The method of preparing it before it comes under the mallet, we were not yet acquainted with at this time. The women employed in this manner were dressed in old and dirty rags of their cloth, and had very hard and callous hands."[14]

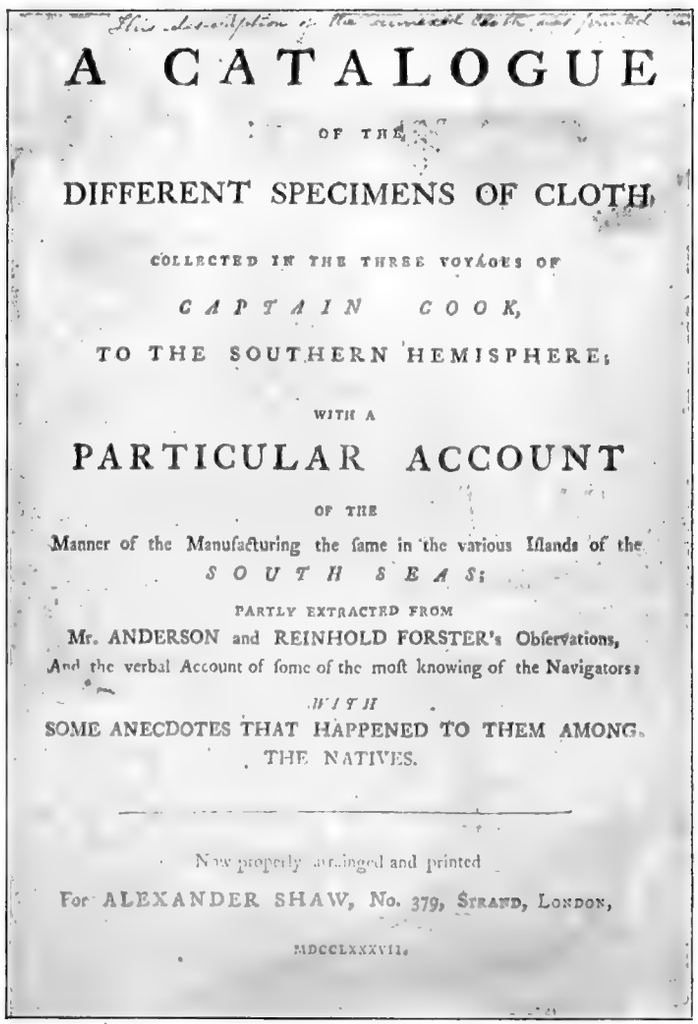
Again on page 354 Forster describes, in the course of his rambles on the same island, and during the same month, what he saw of the dyeing or stamping process of the natives, and I am able to present my readers with a photograph of a bit of the cloth, stamped as described brought home from Tahiti on this voyage. Originally of a bright crimson the stamped circles have sadly faded, but the fragment, which I have in my collection, seems to connect us more closely with the Forsters and their journey a hundred and thirty-seven years ago. We take up the story.

"In one of these houses we observed a man at work, in preparing a red dye, for some cloth made of the bark of the paper-mulberry, which we commonly called the cloth tree. Upon enquiring for the materials which he made use of, we found to our great surprise that the yellow juice of a small species of fig, which they call mattee, and the greenish juice of a sort of fern, or bind-weed, or of several other plants, by being simply mixed together, formed a bright crimson, which the women rubbed with their hands if the whole piece was to be uniformly of the same colour, or in which they dipped a bamboo reed if it was to be marked or sprinkled in different patterns. [Fig. 7.] This colour fades very soon and becomes of a dirty red, besides being liable to be spoiled by rain and other accidents; the cloth, however, which is dyed or rather stained with it, is highly valued by the Taheitians, and only worn by their principal people. We bought several pieces of cloth of different kinds for beads and small nails, and then walked on."

Differing from the account of Banks it indicates, as has since been found to be the truth, that these natives as well as those of the Hawaiian Islands had a number of ways of attaining the same end. I have farther remarks from Reinhold Forster, and as I have not access to the original publication I am compelled to have recourse to a very curious book in my possession in which his words are quoted. This book is so curious that it deserves a word here. I give the title-page and frontispiece slightly reduced (Figs. 8, 9). Who the maker of the book was I do not know, but my copy has various curious notes and additions and apparently belonged to T. A. F. Leith. The volume closes with the very strange verse:—

"But soon on deck the Captain stood,
Cook, for 'twas he! the great and good.
With his spy-glass he look'd to larboard,
Then gave the order "Your helm to starboard!"

[14] *Loc. cit.*, vol. 1, p. 276.



A CATALOGUE

OF THE

DIFFERENT SPECIMENS OF CLOTH,

COLLECTED IN THE THREE VOYAGES OF

CAPTAIN COOK,

TO THE SOUTHERN HEMISPHERE;

WITH A

PARTICULAR ACCOUNT

OF THE

Manner of the Manufacturing the ſame in the various Iſlands of the

SOUTH SEAS;

PARTLY EXTRACTED FROM

Mr. ANDERSON and REINHOLD FORSTER's Obſervations,

And the verbal Account of ſome of the moſt knowing of the Navigators:

WITH

SOME ANECDOTES THAT HAPPENED TO THEM AMONG THE NATIVES.

Now properly arranged and printed

For ALEXANDER SHAW, No. 379, STRAND, LONDON,

MDCCLXXXVII.

FIG. 8. TITLE PAGE.

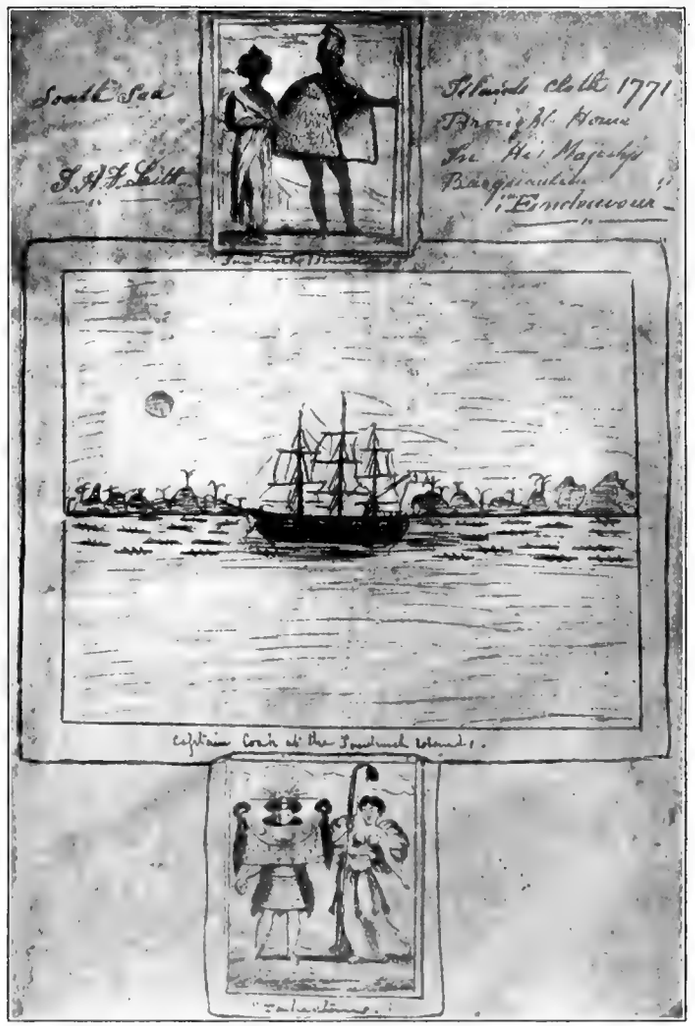


FIG. 9. FRONTISPIECE.

After giving extracts from Cook and Anderson, the author continues:—

"Some extracts from Observations of Reinhold Forster, made during a voyage in the year 1772, round the world in his Majesty's sloops the Resolution and Adventure; a book much neglected, upon account of Mr. Forster's adhering to that justly exploded system of making every thing tally with the ancient dreams of dead and rotten Jews.[15]

"The art of making cloth is comprehended under many branches, the materials of which they are manufactured are different. In general the cloths are made from the bark of trees. The best sort of cloth is from the bark Aouta, or Morus Papyrifera; this plant is carefully cultivated in good and rich soil, which the natives take care to manure and prepare for the better growth of these plants, by mixing with all kinds of shells: the ground which they destine for the nursery of the Aouta is commonly enclosed by deep trenches, in order to prevent men and animals from hurting the young trees. In this soil they plant the young shoots of the Aouta in regular rows, at the distance of about eighteen inches, or two feet; they lop off the leaves and branches that are sprouting out, which operation increases the main shoot, and invigorates its growth. As soon as the saplings have attained the size of an inch diameter, and height of six or eight feet, they are drawn up, the roots and tops are cut off, and such parts of the roots as have young shoots are carefully preserved and planted again, and the straight main shoot, the bark is slit up longitudinally, and put into a running stream, under a board loaded with stones. When the water has rendered the filamentous part of the bark more flexible, dissolved the gumonous substance which joins them, and softened the pulpy intermediate substance, then the women scrape the bark in or near the water, on a smooth board, set in an oblique direction; a thin bivalve the Tellina gargadia, is the instrument they make use of for this purpose, and frequently dip the bark in the water during the operation: the small narrow slips thus prepared, are carefully spread on plaintain leaves, to the breadth and length which the piece of cloth is intended to make, or which the quantity of bark will admit; and in this condition they remain a whole night, and from the residuous gummosity of the bark, the fine filaments are so closely joined, that the whole makes, next day, but one piece. After the water is drained or evaporated, great judgment is observed in spreading the slips of bark; for as they are not of equal thickness, they are often obliged to mend those places where the bark was too thin: these large pieces are carried to the sheds somewhat remote from their habitations, where the women join in working; one or more sit at a long smooth square piece of timber, on which they beat the cloth with a square instrument of heavy wood, called Toa; each of the sides of

[15] Forster's Remarks on the Human Species, p. 444.

this instrument is furrowed longitudinally by close grooves of different dimensions, and the side which has the coarsest grooves is applied first in beating gradually; the finer ones are used till the last operation, the cloth is reckoned fit for use; this beating joins the fibres so close together that the whole being dry, is really of good consistence; though the least moisture seems to dissolve the whole texture. Some pieces of the best sort of bark are beaten more than the common, which makes the cloth fine and extremely soft, not much unlike our muslin. During the beating they constantly sprinkle the stuff with water which stands near them in cups of the coco-nut shells: after this operation the cloth is bleached and washed, to make it whiter and softer: sometimes they make of such soft and fine cloth, called in Taheiteo, Habos, several large layers which they join by a kind of glue, prepared from the root of the Tacca pinnatifida: these layers are again consolidated by beating again, rubbed, washed and softened, which operation makes it downy, smooth, and warm.

"The bread-fruit tree yields likewise a material for cloth. The natives plant the young shoots, as the mulberry-tree, the bark is stripped off, soaked, scraped, laid out, and beaten in the same manner; and the cloth it affords is somewhat coarser, and called Tobeiro. A fig-tree, called Eaouwa, nearly related to the Ficus indica, and another kind, called by us Ficus aspera, is likewise employed for making a species of cloth from its bark, which is always brown or cinnamon colour; this cloth they call Ora; and the way of manufacturing it is not different from the method described before. As this cloth resists water more than the other two sorts, it is in request, and chiefly worn by the people of quality, after being previously perfumed; not only the difference of materials, but also the destination and colour causes various difference in the cloth. In general every kind of cloth is called Ahou; but a garment, chiefly of the sort called Naboo, intended for the women, is named Paroovai. If in the middle of a piece about six feet in length a longitudinal hole is cut, the natives call this dress Seepoote. It is a very common garment for both sexes, who put the head through the hole, and suffer it either to hang close upon both sides below the knees, or then inclose it by another piece of cloth coming up almost to the breast, and serving instead of a wrapper. Pieces of cloth are used by both sexes, as a sash, which covers their nudities. That which is worn by the men they call Maro; that by the women, Pareos. Red cloth is called Ewha-ais: the yellow kind named Haepae. There is a yellow cloth on which they make red figures, by dipping a bamboo reed in red dye, and stamping it upon the cloth: this is known by the name Apa, the sort which is not only brown but covered with a kind of varnish or gummosity they call Poowhirree; their dyes are very fine and bright, and would deserve more attention if they were lasting. The red dye requires a good deal of labour and care in preparing it. The

fruit of a small fig called Matte, Ficus tinctoria, affords a drop or two of milky juice when it is broken off from the tree. This juice is carefully gathered, in a clean cup of coconut shell, and after having sufficiency of it, they soak in it leaves of the E-tou or Cordia, which imbibe the milky juice, and soon tinge it of the finest crimson imaginable: the whole is gently squeezed out and strained through filaments of cocoanuts, and used to dye cloth with. Instead of the E-tou, sometimes the leaves of the Tahenno, Tournefortia sericea, are employed, or those of the Pahoda, Convolvulus brasiliensis, or even those of the E-pooa or Solanum repandum: the sole juice of the Mattee affords a yellow colour: but the best yellow dye is made of the juice dripping from the peduncles of the Hibiscus punctatus Populneus, or Emeera: the watry infusion of the root of the E-nono or Morinda citrifolia dyes a fine yellow. Another kind is extracted from the Tamannoo or the Calophyllum inophyllum, one of the spurges called Epirree Pierree affords a bay brown colour, and the soaked bark of the Tootooe or Aleurites triloba yields a gum or resinous substance used by these people for varnishing their brown cloth."

I shall again quote from this little book in the list of kapa specimens. I cannot, of course, assure my readers that these extracts are absolute copies of the original which I have never seen, but I have no doubt that they are essentially correct. When Dr. Forster was at Rapanui (Easter Island), he found the cultivation of the paper-mulberry attended to, as the source of the scanty clothing the natives possessed; his reference to this, found on page 568 of the first volume of his Observations, is as follows:—

"Being arrived at the shrubbery which we had in view, we found it was nothing but a small plantation of the paper mulberry, of which here, as well as at Taheitee, they make their cloth. Its stems were from two to four feet high, and planted in rows, among very high rocks, where the rains had washed a little soil together. In the neighborhood of these we saw some bushes of the *hibiscus populneus*, Linn, which is common also in the Society Isles, where it is one of the numerous plants made use of to dye yellow; and likewise a *mimosa* which is the only shrub that affords the natives sticks for their clubs and pattoo-pattoos, and wood sufficient to patch up a canoe."

Although Rapanui was by no means a fertile island, nor its then inhabitants a remarkably intelligent people, yet they had a fair quality of cloth. I have a specimen attributed to Rapanui brought back by the Expedition, but I am inclined to place it to the credit of the Pitcairn islanders, who of course learned the manufacture of tapa from the Tahitian women carried thither by the mutineers of the *Bounty*.

In the years 1796-98 a voyage was undertaken doubtless at the inspiration of the description of the interesting inhabitants of Tahiti in Cook's voyages. It was undertaken in the ship *Duff* under command of Captain James Wilson, and is known as the "Missionary Voyage" an expedition with far different motives from any of its predecessors. From this I shall quote some additional information gathered by a committee of the London Missionary Society, under whose authority this exploring voyage was made. On page 389 of this very interesting voyage, in the list of trees and shrubs, we find:—

"YOUTE, the morus papyrifera, the cloth-plant, or Chinese paper mulberry; there are two kinds in use, the one called MYERRE, the other POOROW. This they carefully cultivate, fencing the plantations with a ditch, to prevent the hogs and goats from having access to them, especially the latter, which do much mischief by barking them, and are therefore tied up or driven into the mountains. The plants of this tree shoot up like osiers, and when about ten or twelve feet in height, and three inches in circumference, they are cut down and carefully stripped of their bark: of this their finest white cloth is made. The rind being taken off, is carried to the water, the outer cuticle scraped off carefully, and well washed, till the sap and slime are separated from it; they wrap this in plantain leaves, and leave it for three days to digest, by which time it becomes clammy and fit for working into cloth. The bark is next spread of a regular thickness on the beam where it is to be beaten, about eight inches wide, and they begin with the grooved beetle to spread it out to a proper breadth and equal thickness in every part. A number of plantain leaves are laid on the ground, and on these the cloth is spread to bleach in the early morning dew for several days, removing it as the sun grows high: when perfectly bleached, it is dried, and rolled up in bundles for use. This cloth is called hooboo and parrawye: if they wish it to be clouded, they break the outer bark with a stone, and wrap the sticks in leaves for three or four days before they bark them.

"They mix also the inner bark of the tender branches of the bread-fruit tree with the cloth-plant, and prepare it in the same manner. If a chief, or man of property, has cloth to be made, he sends the mulberry-plants in bundles to his tenants, and they mix them with the bread fruit branches, and bring home the cloth when prepared. If he needs a piece of very large dimensions, he tells them when he shall set about it: on this day the women of the district assemble with their beetles, each bringing a quantity of materials; and the ground being covered with plantain-leaves, they place their work in a line, and set to it all together, beating time to a song given out by one of their principal helpers; and when they strike up, make a vast noise,

two hundred sometimes being employed on one piece of cloth four fathoms wide, and forty fathoms long.

"Their cloth is made of a variety of colors, black, white, and several shades of crimson, yellow, gray, and brown. The black is dyed with the sap of the mountain-plantain, or under the roots of such cocoa-nut trees as grow in wet and swampy grounds, where they lay the cloth to soak for a day or two, then dry it, repeating the process until it becomes a deep black, when it is washed in salt water to fix the colour. This is called oówery. The brown is dyed or tanned with the bark of several trees, especially the toa, which gives a fine bright colour, heightened by the sun. The bark is scraped with a shell, and after lying to infuse in water, and wrung out, the cloth is dipped in the infusion, and spread in the sun to dry, repeating the operation till it becomes a fine bright brown, called héere and powhéere. The yellow is extracted from turmeric or reya, which grows here in great abundance, the country being over-run with it, and capable of furnishing any quantity, as well as of póohey áva or ginger. The gray is the natural colour of the cloth when unbleached; after being half worn it may be dyed brown, and lined with white, by pasting two cloths together; this is called hópaa. The red is produced from the máttde berry.

"When the brown cloth is worn out they bark the branches of the bread-fruit, and mix the old brown cloth with the new bark, beating them together, which makes a mottled piece: this they dip in a light yellow prepared from the root of a shrub called nóno, which gives it a beautiful appearance; they line it also with white, and infusing perfumes in the yellow dye, call the cloth opotta potta: they have yet another kind of cloth called marra, made of the mulberry bark, half beaten: this consists of several layers of irregular thickness, for upper garments. At this the arreoies are peculiarly expert, though it is reckoned women's work, and requires skill and nicety in the joining, to prevent the part pasted on from stiffening the cloth: this they paint with a beautiful crimson called máttde, extracted from a berry growing on a tree of the same name. The expressed juice of the berry they mix with the leaves of another tree called tow, and imprint sprigs and leaves on the cloth by wetting them with this juice, and impressing them on the cloth according to their fancy. The berries of the máttde are brown when ripe, of the size of a sloe; and being gathered, they nip them between the thumb and finger, expressing a yellow drop or two, which they sprinkle on the leaf of the tow, by hitting one hand against the other: two or three drops suffice for a leaf. When the berries are all nipped, and the leaves wetted, they are worked with the hands in a wooden tray, sprinkling water on them till a beautiful crimson colour begins to appear, when they express the dye from the leaves, and

throw them away. They lay on the colour with a small brush of stringy fibres, made of a rush called móoo, like a camel's hair pencil.

"There are other trees from which cloth is made, but the process is the same in all. Sometimes they paste together pieces of different colours, cut into curious shapes, in which display of taste the erreoies excel.

"The women, with their feminine male associates, make the cloth; the men provide the materials. The beam on which the bark is spread, is about twelve feet long, made of a hard wood called marra, squared to six or eight inches, and finely smoothed on the upper side. The beetles are formed of toa, about fourteen inches long, and two and a half square. The sides are grooved of four different sizes, as the cloth is to be made of a finer or coarser thread; the handle is round; the beetle is called ayey; the beam, tdootdóoa."

Continuing the list of trees and shrubs our authors give some information about the qualities of each, but we will quote only those concerned with the cloth making. In speaking of the TAMANOO (*Calophyllum Inophyllum*), they refer to the nut as used to perfume the cloth but the chief fragrance is in the flower. TDOOTDOOA (tutui, *Aleurites sp.*), they note that the bark of the root affords a light brown dye. TOW (*Cordia sp.*) gives the crimson with the juice of the MATTDE (*Ficus sp.*), which also has a bark fit for cloth-making. NONO (*Morinda citrifolia*), gives with an infusion of the inner root bark a fine light yellow dye. EAWWA, a tree I cannot identify, unless it be a species of banian fig, yields when young from its inner bark a fine gray cloth called oraa, the most serviceable and valued of all their manufactures. I have not yet identified this among any of Cook's tapa specimens.

We have not yet done with the information to be obtained from Cook and his companions. At Ulietea Cook saw a large piece of cloth fifty yards long.[16] At Oheteroa = Rurutu of the Austral group, he reports,—"The cloth was of the same material as that which is worn in the other islands, and most of that which was seen by our people, was dyed of a bright but deep yellow, and covered on the outside with a composition like varnish, which was either red, or of a dark lead colour; over this ground it was again painted in stripes of many different patterns with wonderful regularity, in the manner of our striped silks in England; the cloth that was painted red was striped with black, and that which was painted lead colour with white."[17] This island long famous for its tapa, seems to have completely abandoned the work. The cloth described as varnished red and striped black was made also at Samoa, and I have a fine sheet of it given me by Lieut. Moses, U. S. N.

[16] Cook, 1769, II, p. 266. [17] Cook, 1769, II, p. 277.

Cook does not speak with great praise of the Tongan tapa, but the specimens that he brought home (he visited this group both in his first and second voyages) rival the best of Hawaii. We will see what he says:—"They make the same kind of cloth, and of the same materials, as at Otaheite; though they have not such a variety, nor do they make any so fine; but as they have a method of glazing it, it is more durable, and will resist rain for some time, which Otaheite cloth will not. Their colours are black, brown, purple, yellow and red; all made from vegetables."[18]

I have in my collection two specimens of this glazed cloth, one plain, the other figured, brought from New Amsterdam (Cook uses Tasman's name for Tongatabu) on his first voyage. Both remind one of the better kind of Samoan siapo. The cloth certainly is not so fine as the Tahitian or Hawaiian, but the glaze waterproofs and strengthens it to a considerable degree. It is the figured cloth, which perhaps Cook had not seen, that I would compare with the Samoan product, and have illustrated below under Samoan work. A visitor in June, 1850, tells us,—"One of the things that strikes a visitor most upon his arrival at Tongatabu, is the incessant hammering which commences at daybreak and continues without interruption until about noon. To satisfy ourselves as to the cause of this, we entered the first house in which we heard the noise, and found two women engaged in making tappa or native cloth. They were seated on the ground, one on each side of a log about 6 feet long and 6 inches square, which was raised just clear of the floor by means of short bits of stick placed under the ends of it. Each woman had a piece of the bark, of which the tapa is made, laid before her on the log, and was beating it with a wooden mallet about a foot in length, the handle being rounded, and the striking end square, with grooves in the sides. They wetted the bark from time to time, sprinkling water upon it from a large wooden bowl that stood upon the ground beside them."[19]

The only new thing he tells us is that each woman was beating a separate piece of bark; if he was correct a most unusual proceeding. He evidently saw nothing of the more curious process of stamping the cloth; a process not attended with sufficient noise to attract a casual traveler. We shall, however, learn the probable process when we come to Fiji and the still extant manufacture on Samoa. I cannot find much of importance recorded by later travelers to this interesting group.

On the Marquesas, Forster, the companion on Cook's second voyage, already quoted, found,—"All the women wore pieces of cloth of the mulberry bark, of different sorts; but the variety of these cloths was very trifling, compared with what it is at

[18] Cook, 1773, p. 219. [19] O. W Brierly, Journ. Roy. Geog. Soc., xxii, 102.

Taheitee; and it seemed the quantity was likewise inconsiderable, for, instead of being wrapped up in that number of pieces, so common among the luxurious chiefs of that island, they only wore a single *ahow* or cloak, which covered them from the shoulders to the knees."[20]

Judging from the drawings of Marquesan tatuing that are before me, these splendidly formed natives preferred the decoration on their actual bodies, rather than on the more perishable cloths they sometimes covered their bodies with. Their patterns thus applied were striking, and constitute a distinct class among Polynesian designs. On tapa they would have been as popular as on carved bowls, cups or paddles, but among the few Marquesan cloths in my collection, while all are well made, none are figured. It should be remembered that from the tedious, if not very difficult process of imprinting tapa, the use of this finer kind was confined to the chiefs, and these seem to have only displayed their fine feathers to strangers of another race with whom they were well acquainted, as in the case of the Tahitians with whom Cook tarried long and was very intimate, and also the Hawaiians, who looked upon him as their long absent god Lono, and in their worship offered him their choicest possessions. The absence from Cook's collections of the figured tapa does not prove that the groups or islands where he made short or unfriendly visits made nothing of the kind.

With all Cook's discoveries the wonderful Fijian or Vitian group was not explored: only a very small islet, Vatoa or Turtle Island, of the more than two hundred composing the group, was noticed.[21] No one of the early explorers of the Pacific has given us any details of the domestic manufactures of this fine race, composite in parentage as in language and manners. Strongly imbued with Tongan blood it was to Tongan influence that Thakombau, the Kamehameha of the southern group, gave up, with his strong taste for human flesh, his ancestral religion, and in place of Ndengei accepted the Trinity of the missionaries.

It would be vastly interesting to compare the early work of the Fijian tapa-makers with that of the Tongan and Tahitian, so well illustrated in Cook's collections still extant. The quality of bark-cloth made and used in recent years is so good that Tongan influence is suggested. But Fijian specimens are comparatively rare in collections, and confined to the delicate white material used as turbans, and the carefully stamped waist cloths or *liku*. Pl. 10.

[20] G. Forster, A Voyage round the World, II, 30.

[21] Captain Cook was by no means ignorant of the Fijian; he saw not a few at the Friendly Islands as he called the group now called Tongan. "It appeared to me," he writes, "that the Feejee men whom we now saw were much respected here: they seem to excel the inhabitants of Tongataboo in ingenuity, if we might judge from several specimens of their skill in workmanship which we saw; such as clubs and spears, which were carved in a masterly manner, variegated mats, earthen pots, and some other articles; all of which had a cast of superiority in their execution."

While I have seen the native cloth still in use in a visit to Suva, and have good specimens in my collection, I saw nothing of the manufacture, and will turn to a good authority on this matter, Dr. Berthold Seemann, whose observations while on a government mission fifty years ago (1860), are as follows:—"Materials for the scanty clothing worn by the Fijians are readily supplied by a variety of plants, foremost amongst which stands the Malo or Paper Mulberry (*Broussonetia papyrifera*, Vent.), a middle-sized tree, with rough trilobed leaves, cultivated all over Fiji. On the coast, the native cloth (Tapa) and plaitings are gradually displaced by cheap cotton prints introduced by foreign traders,—a fathom of which is considered enough for the entire dress of a man. In the inland heathen districts the boys are allowed to run naked

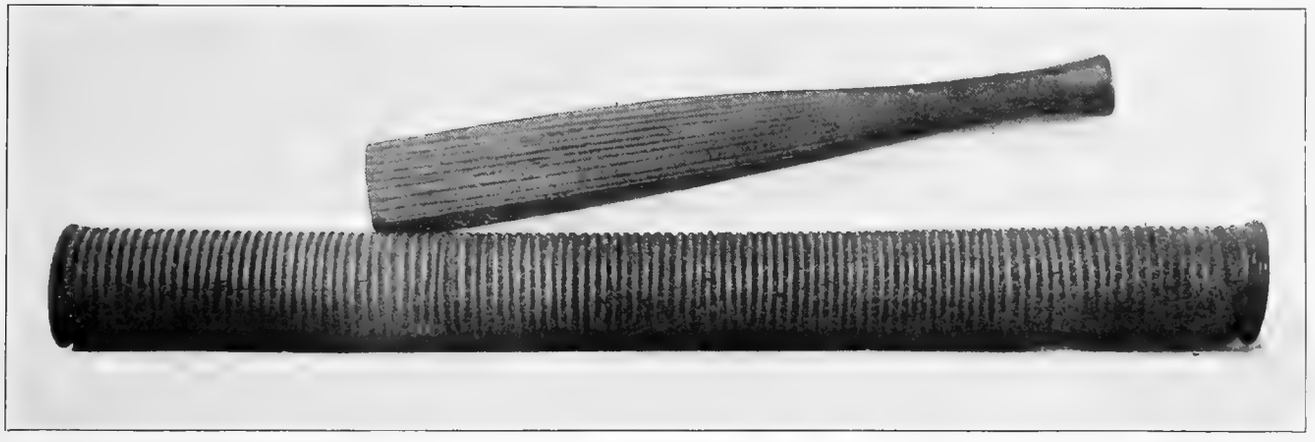


FIG. 10. A FIJIAN IKE AND BAMBU ROLL FOR LINING.

until they have attained the age of puberty, and publicly assumed what may be termed their *toga virilis*—a narrow strip of native cloth (Malo) passing between the legs, and fastened either to a waistband of string or to a girdle formed by one of the ends of the cloth itself. The length of the Tapa hanging down in front denotes the rank of the wearer; the lower classes not having it longer than is absolutely necessary for the purposes of securing it to the waistband, whilst the chiefs let it dangle on the ground, and when incommoded by it in walking, playfully swing it over their shoulder. In the christianized districts of the coast, a piece of Tapa, at least two yards long and one yard broad, is worn around the loins, and distinguished persons envelope their body in pieces many yards long, and allow long trains to drag after them on the ground. A fine kind of Tapa (Sala) is worn in the shape of a turban by those who still adhere to the old custom of letting their hair grow long.....The manufacture of native cloth is entirely left to women of places not inhabited by great chiefs, probably because the noise caused by the beating out of the cloth is disliked

by courtly ears. The rhythm of Tapa-beating imparts therefore as thoroughly a country air to a place in Fiji as that of threshing corn does to our European villages. The Masi tree is propagated by cuttings, and grown about two or three feet apart in plantations resembling nurseries. For the purposes of making cloth it is not allowed to become higher than about twelve feet, and about one inch in diameter. The bark, taken off in as long strips as possible, is steeped in water, scraped with a conch shell,

FIG. 11. THE FIRE CEREMONY: REMOVING THE EMBERS. LINDT.

and then macerated. In this state it is placed on a log of wood, and beaten with a mallet (Ike), three sides of which have longitudinal grooves, and the fourth a plain surface. Two strips of Tapa are always beaten into one with the view of strengthening the fibres—an operation increasing the width of the cloth at the expense of its length. It is easy to join pieces together, the sap of the fibres being slightly glutinous; and in order to make the junction as perfect and durable as possible, a paste is prepared of arrowroot, or a glue of the viscid berries of the Tou (*Cordia Sprengelii*,[22] De Cand.). I have seen pieces of native cloth, intended for mosquito curtains and screens,

[22] See figure in chapter on Material.

which were nearly one hundred feet long and thirty feet broad. Most of the cloth worn is pure white, being bleached in the sun as we bleach linen; but printed Tapa is also, though not so frequently seen, whilst that used for curtains is always coloured. Their mode of printing is by means of raised forms of little strips of bamboo, on which the colour is placed, and the top pressed; indeed, the fundamental principle is the same as that of our printing books, the little strips of bamboo standing in the place of our types. The chief dye employed is the juice of the Lauci (*Aleurites triloba*, Forst.), and the pattern, although rudely executed, often displays much taste. Pls. 24–27. It is stated that in times when the Malo plantations have failed to produce a sufficient quantity of raw material, recourse is had to the Baka (*Ficus* sp.); but this is only a makeshift, whilst the bark of the Breadfruit-tree seems never to be resorted to as in other parts of Polynesia.....The yellow colour is imparted with turmeric, the black with mud and the leaves of the Tavola (*Terminalia Catappa*, Linn.), and the red with the bark of the Kura (*Morinda citrifolia*, Lind.), and that of the Tiri (*Guttiferae ?*)."[23]

The graceful effect of the wraps of white tapa about the loins of the finely formed Fijian is well shown in the picture taken by my friend Mr. J. W. Lindt of Melbourne, Fig. 11. The scene is a part of the Fire-walking ceremony. I am almost inclined to take issue with Dr. Seemann when he calls the marking on the waist-cloths rude, but I will let my readers judge for themselves of the examples given in Fig. 12, or in Pls. 10–16. The bambu roll shown with the beater in a previous figure is an ingenious labor saving implement, if not so delicate as the ruling pen of the Hawaiian described in a subsequent chapter.

On consulting the authority from which Dr. Seemann seems to have obtained some of his information on the technique, I find he has omitted many of the interesting points which would not appeal to him as a botanist. The Rev. Thomas Williams, for thirteen years a missionary of the Wesleyan creed in Fiji, writes,—"The process of manufacturing the native cloth, or *masi*, has peculiar interest, inasmuch as in some parts—New Zealand, for instance—where it was once made, the art is now lost; and among the Fijians, also, the manufacture must inevitably cease, as the demand for the *masi* declines before the more durable textures of the English looms.

"The bark of the malo tree is taken off in strips as long as possible, and then steeped in water, to facilitate the separation of the epidermis, which is effected by a large volute shell. In this state the *masi* is kept for some time, although fit for immediate use. A log flattened on the top side is so fixed as to spring a little; and

[23] Viti: An Account of a Government Mission to the Vitian or Fijian Islands in the years 1860-61. Cambridge, 1862. p. 348.

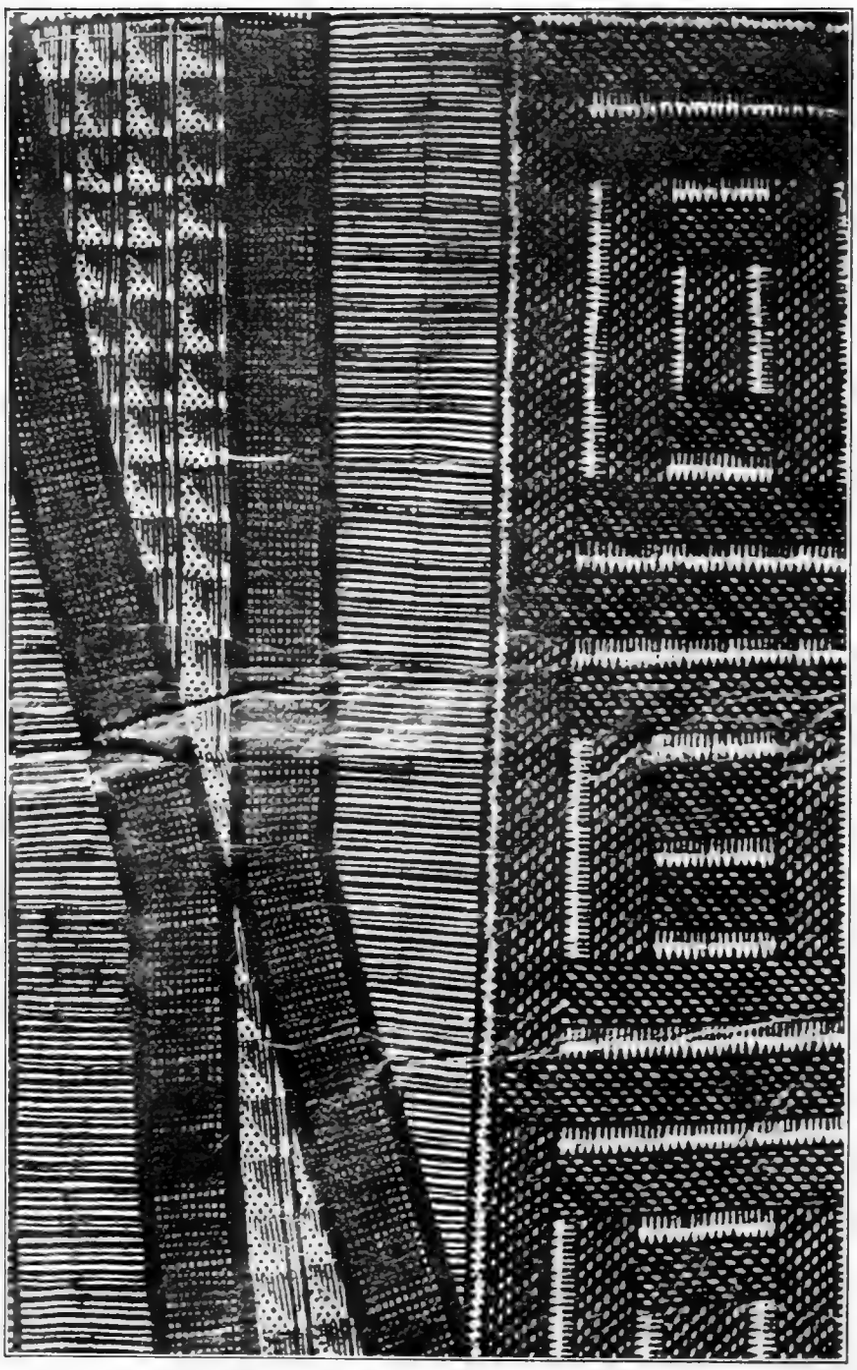


FIG. 12. FIJIAN CLOTH FROM MOALA. BRITISH MUSEUM.

on this the strips of *masi* are beaten with an *iki* or mallet, about two inches square, and grooved longitudinally on three of its sides. Two lengths of the wet *masi* are generally beaten together, in order to secure greater strength; the gluten which they contain being sufficient to keep their fibres united. A two inch strip can thus be

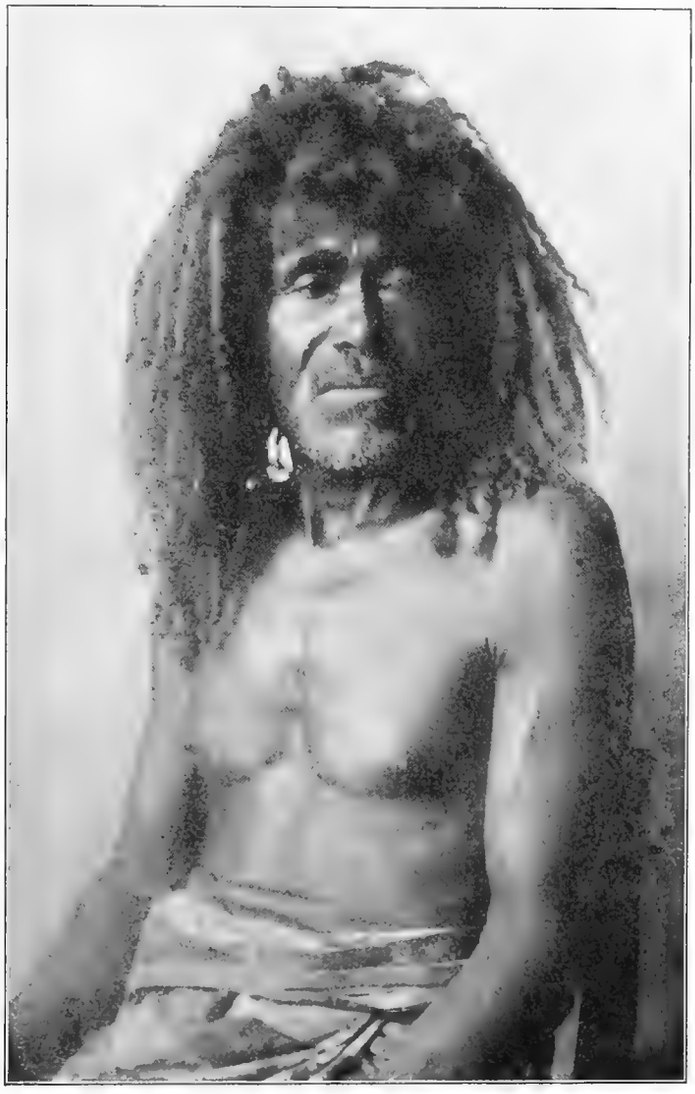


FIG. 13. AN OLD FIJIAN WITH SULA.

beaten out to the width of a foot and a half; but the length is at the same time reduced. The pieces are neatly lapped together with the starch of the taro, or arrowroot boiled whole, and thus reach a length of many yards. I measured a dress intended for a king on a festive day, and found its length to be one hundred and eighty yards. The "widths" are also joined by the same means laterally, so as to

form pieces of fifteen or thirty feet square; and upon these the ladies exhaust their ornamenting skill. The middle of the square is printed with a red brown, by the following process. Upon a convex board, several feet long, are arranged parallel, at about a finger-width apart, thin strips of bamboo, a quarter of an inch wide; by the side of these, curved pieces, formed of the mid-rib of cocoa-nut leaflets, are arranged. Upon the board thus prepared the cloth is laid, and rubbed over with a dye obtained from the *lauci* (*Aleurites triloba*). The cloth, of course, takes the dye upon those parts which receive pressure, being supported by the slips beneath, and thus shows the same patterns in the colour employed. A stronger preparation of the same dye, laid on with a sort of brush, is used to divide the square into oblong compartments, with large round or radiated dots in the centre. The *kesa*, or dye, when good, dries bright. Blank borders, two or three feet wide, are left on two sides of the square; and to elaborate the ornamentation of these, so as to excite applause, is the pride of every Fijian lady. There is now an entire change of apparatus. The operator works on a plain board; the red dye gives place to a jet black; her pattern is now formed by a strip of banana leaf placed on the upper surface of the cloth. Out of the leaf is cut the pattern—not more than an inch long—which she wishes to print upon the border, and holds by her first and middle finger, pressing it down with the thumb. Then taking a soft pad of cloth steeped in the dye in her right hand, she rubs it firmly over the stencil, and a fair, sharp figure is made. The practised fingers of the women move quickly, but it is, after all, a tedious process. When finished these large squares are used as mosquito curtains, a comfort which the Fijian enjoys, but of which his neighbors are ignorant [the Samoans had it]. In the work above described the Lakemba women excel. On the island of Matuku very pretty curtains are made; but the pattern is large, and covers the entire square, while the spaces between the black lines are filled in with red and yellow.

"On Kandavu a strong kind of *masi* is made, called *liti*, which is the work of men, who leave the women to do the garden labour. The becoming turban worn by Fijian men is a finely prepared *masi* of only one thickness, and of a gauze-like appearance."[24]

Samoa is a group where the manufacture is still carried on, but merely for the supply of curiosity dealers, and it may be supposed the work is not improving. Still we have little of the old art recorded. Wilkes was at the group in 1839, and we may suppose the siapo was still well made. He describes the cultivation as conducted in the same way as at the other islands, but the beating has some peculiarities. He says: "The mallet used for this purpose is about two inches square, and about fourteen

[24] Fiji and the Fijians. London, 1858. i, 65.

inches long, with a handle at one end; two of its faces are grooved and the other two smooth; the bark is laid on a board, and struck with the mallet in a direction at right angles with its fibres; the grooved sides are used to spread out the fibres, and the smooth ones to knit them together. The grooves also give a thready appearance to the surface.

"This method differs from that practised at Tahiti, where the bark is beaten with a smaller mallet, upon a spring board; and the tapa made here is of an inferior quality. The tapa is often printed with colours in patterns. This is performed in a

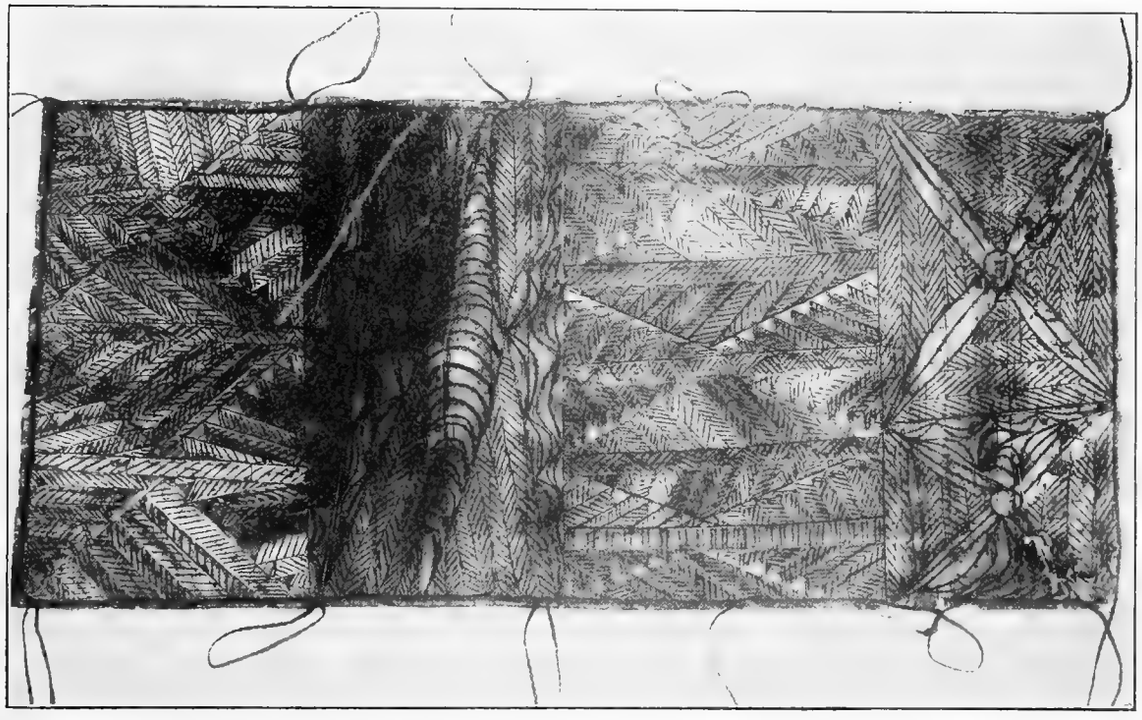


FIG. 14. TABLET SUCH AS MENTIONED BY WILKES.

mode similar to that practised in Europe before the introduction of copper rollers. Instead of engraved blocks, they form tablets, about as thick as binder's boards, of pieces of large cocoa-nut leaves, by sewing them together. One side of the tablet is kept smooth and even, and upon this cocoa-nut fibres are sewed so as to form the required pattern, which is of course raised upon the surface of the tablet. These tablets are wet with a piece of cloth well soaked in the dye, after which the tapa, which for this purpose is well bleached and beautifully white, is laid upon them and pressed into close contact. The dye is made from herbs and roots, and is of various colors."[25]

[25] Narrative of the United States Exploring Expedition. ii, 142.

It is most unfortunate the science of ethnology, at the time of the American Exploring Expedition, was so little developed that siapo-making, like so many things, was most superficially noted. How much, now lost, might have been saved if the Expedition had only one of the more modern trained observers! In the Narrative of the Expedition, to which we must turn for most of the quasi-ethnological information, the narrator is often grossly mistaken in his statements, and without corrections the authority is unreliable.

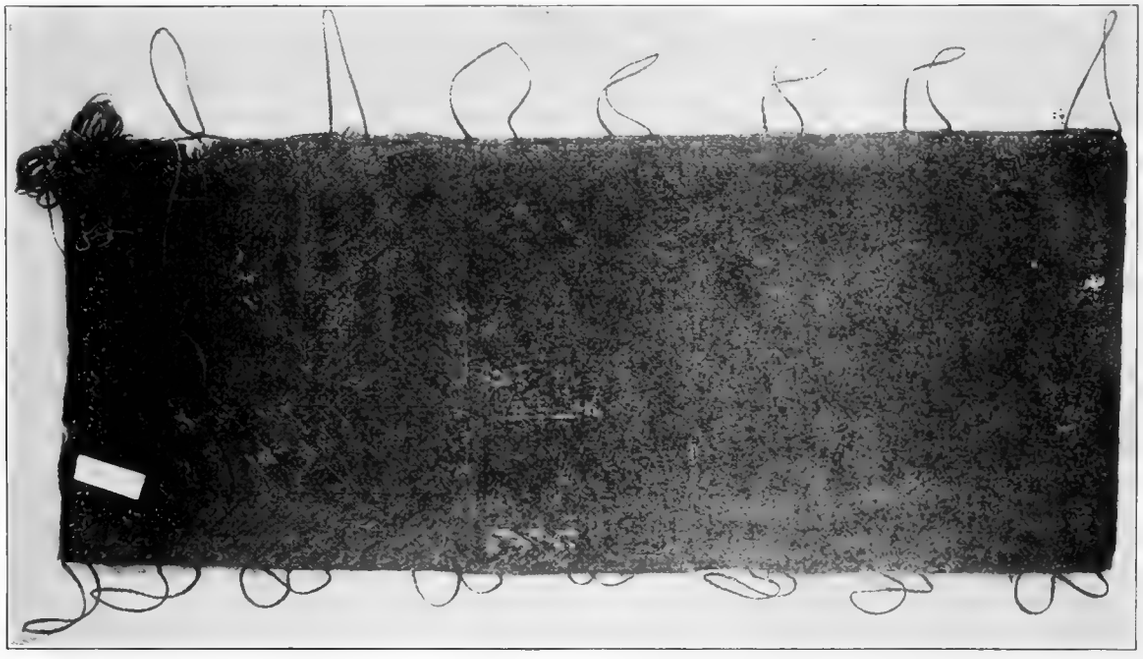


FIG. 15. AN OLD TABLET IN WHICH THE LEAF BASE IS WELL STAINED.

A carved wooden printing slab, far more durable than the rather flimsy leaf ones, was used here (Fig. 16), and also at Fiji. This method of printing, while cheapening the cost, certainly makes the work more slovenly and common, whole bales being printed in one pattern. Like the Tongan cloth, the Samoan, when printed this way, generally shows through on the reverse side.

It must not be supposed that the Samoans did not make any fine siapo. While the texture of the fabric was neither so fine or so well beaten as that made in Tahiti, Tonga, the southern islands and Hawaii, they made sheets of a striking color, well glazed, and another sort ruled in imitation of mat-work (Pl. 34), and the soft brown patterns shown in Pls. 24, 25 are not unpleasing.

Rev. John B. Stair, long a missionary in Samoa, gives us a little more information on the siapo of that group:—"Before the contact with Europeans, and indeed for

sometime after, the use of *siapo* as an article of dress was confined to a few unmarried females of the highest rank, *O Tausala*, titled ladies; all others being prohibited from wearing it upon pain of heavy chastisement. The privileged few only wore it in the house. For a long time past the rule has been broken through, and siapo is now worn by all persons of either sex." [26]

In regard to the colors used he tells us:—"A beautiful crimson was obtained by mixing the inner bark of the roots of the *nonu fi'afi'a*, Malay apple (*Eugenia malaccensis*), with sea-water and lime. Yellow was prepared from turmeric and oil. It was also obtained from the bark of the *nonu* previously mentioned. A fine purple was procured from the young shoots of the mountain plantain, *soa'a;* and a brown by mix-

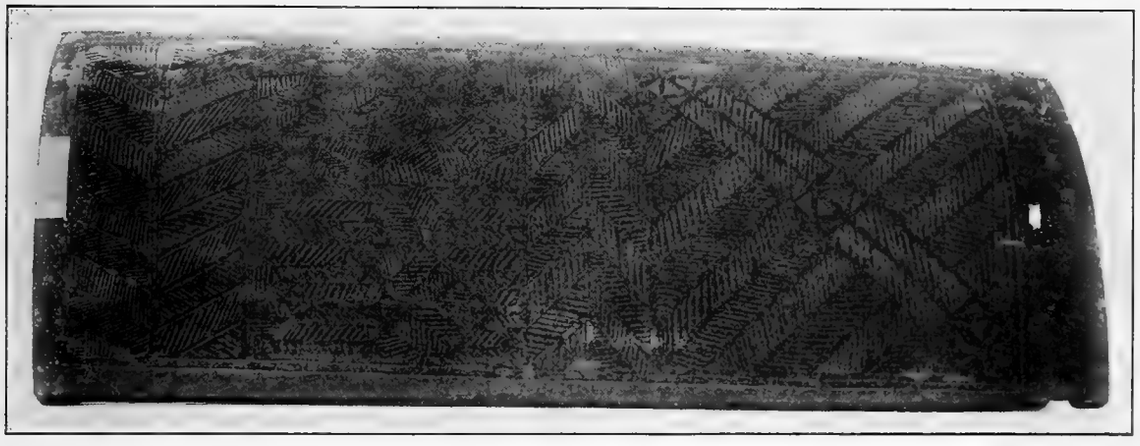


FIG. 16. A CARVED WOODEN SLAB FOR PRINTING SIAPO.

ing the inner bark of the *pani* with sea-water. A black colour was imparted to various articles by burying them in the soft mud of a taro patch." *Loc. cit.*, p. 145.

Mr. Mason Mitchel, the American Consul at Apia (German Samoa), was so obliging as to write me about the dyes now used by the Samoans. The brown (Pls. 24–27) is obtained from the *o'aa* (*Bischofia javanica*), a tree of some size. The red dye is now made from the seeds of the arnotto (*Bixa orellana*) in the usual way, and the black is from the burned candle-nut.

Samoan siapo is largely imported into the Hawaiian Islands and sold to tourists, often as Hawaiian. It is often decorated by having the edges cut into triangular dentils or into fringe, as shown in Pls. 23, 28. In former times in Samoa several guilds were engaged in the siapo-making, as the *Fafine fai siapo* = siapo-maker; *Fai lenga* = preparer of turmeric; *Tutu lama* = maker of lampblack, etc.

[26] Old Samoa, by Rev. John B. Stair. Oxford, 1897. p. 115.

There is a traveler from whom I am glad to quote, as he was in the Pacific at the very time that I was watching the last embers of the Hawaiian kapa manufacture, the late Julius L. Brenchley, a man who spent more than thirty years of his life in wandering among peoples who were supposed to be living the "simple life" and his observations have been published in part, but not to the extent that would have been desirable. As a guest on a British man-of-war he had cruised about the western Pacific and to the islands forming the southeastern portion of Polynesia, and in this latter region he notices the bark-cloth making. "The Tutuilans are less intelligent, industrious, and skilful in whatever they undertake than the people of Niüe, whose tapa cloths are certainly better finished."[27]

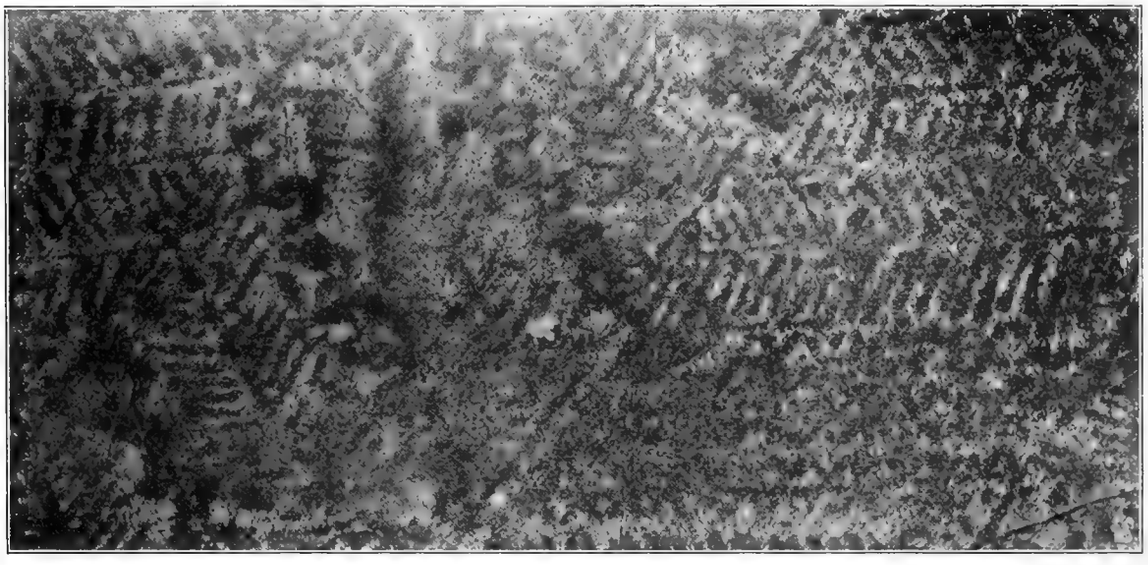


FIG. 17. A FRAGMENT OF TAPA BROUGHT BY COOK FROM TONGATABU.

While the Curaçoa was at Vavau of the Tongan group, among the makers of good cloth, he notes (*l. c.*, p. 92.):—"The people of Neifu and the neighborhood appeared to me very orderly and industrious. On all sides was to be heard the sound of the mallets used in making tapa, which, far from being disagreeable to me, had something as it were musical in its hollow tone. I obtained some particulars respecting the mode of preparing this fabric; the bark employed is never more than two inches wide; small, narrow strips are first manufactured and then glued together by means of arrow root, so as to form pieces of any length or width desired."

It is a little curious that while the advent of foreigners with their woven fabrics has driven the beautiful native work out of existence everywhere in eastern-Polynesia except on Samoa, there the foreign desire for curious things has kept alive a rather

[27] Brenchley, Cruise of H. M. S. Curaçoa among the South Sea Islands in 1865. London, 1873. p. 57.

debased sort of siapo-making. Before leaving this Tongan region, I would note the softness often seen in the printed cloths, due partly to the permeability of the fabric, and partly to the method of applying the dye which is pressed upon the cloth on the side opposite to the stamp which is in low relief. In this printing the dye is commonly pressed through on all the points of pressure, causing a more or less perfect *replica*, but reversed of the pattern. This is shown in Fig. 17. The slight spreading of the dye removes all the sharpness of the impression. In the specimen from which the illustrations were made one hundred and forty years have made little impression upon the color. The instruments and the dye are described on page 37 and the following, and

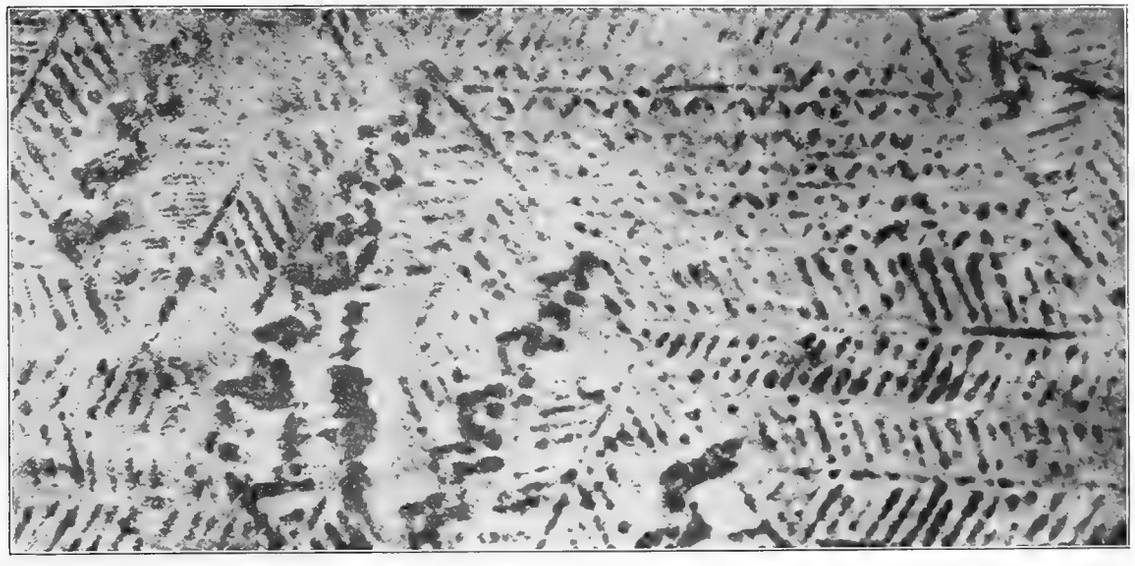


FIG. 18. THE UNDER SIDE OF TONGAN TAPA SHOWN IN FIG. 17.

are essentially the same all through the Samoan, Fijian and Tongan region: In the Hawaiian group they were unknown. We now turn to the early accounts of the product of this northern group.

On Sunday morning, January 18, 1778, Captain Cook, on his third voyage, discovered this group, which the Spaniards had visited two hundred and twenty-three years before. We pass over his descriptions of the people until he comes to the matter we are at present interested in:—

"They had no ornaments about their persons, nor did we observe that their ears were perforated; but some were punctured on the hands, or near the groin, though in a small degree; and the bits of cloth which they wore, were curiously stained with red, black and white colours.[28]

[28] Cook's Third Voyage. London, 1784. ii, 192.

"In every thing manufactured by these people, there appears to be an uncommon degree of neatness and ingenuity. Their cloth, which is the principal manufacture, is made from the *morus papyrifera;* and doubtless, in the same manner as at Otaheite and Tongataboo; for we bought some of the grooved sticks, with which it is beaten. Its texture, however, though thicker, is rather inferior to that of the cloth of either of the other places; but, in colouring or staining it, the people of Atooi [Kauai]

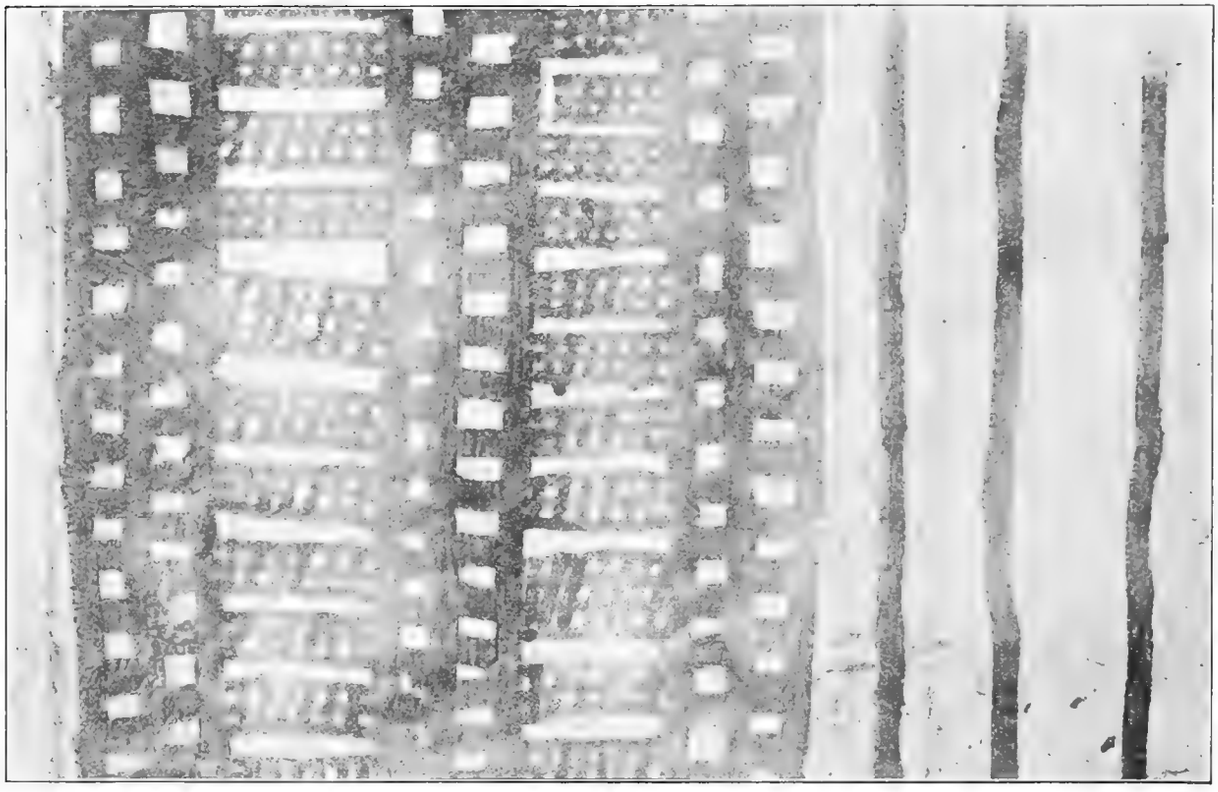


FIG. 19. KAPA BROUGHT BY COOK, FROM KAUAI.

display a superiority of taste, by the endless variation of figures which they execute. One would suppose, on seeing a number of their pieces, that they had borrowed their patterns from some mercer's shop, in which the most elegant productions of China and Europe are collected; besides some original patterns of their own. Their colours indeed, except the red, are not very bright; but the regularity of the figures and stripes is truly surprising; for, as far as we knew, they have nothing like stamps or prints to make the impressions.[29] In what manner they produce their colours, we had not opportunities of learning; but besides the party-coloured sorts, they have some pieces of plain white cloth, and others of a single colour, particularly dark brown

[29] We shall see in a later part of this work that they had stamps cut in bambu, as well as ruling pens.

and light blue. In general the pieces which they brought to us, were about two feet broad, and four or five yards long, being the form and quantity that they use for their common dress or *maro*,[30] and even these we sometimes found were composed of pieces sewed together; an art which we did not find to the Southward, but is strongly, though not very neatly, performed here. There is also a particular sort that is thin, much resembling oil-cloth; and which is actually either oiled, or soaked in some kind of varnish and seems to resist the action of water pretty well." (*L. c.*, p. 237.)

It is not strange that Cook was surprised at the accuracy of the drawing, and besides examples in Plates S, T, U and W, I am able to give in Fig. 19 a fragment collected on this voyage that is of a kind Cook may have had in mind. Death here interrupts the observations of the great Captain, and we must turn to the third volume of the account of this voyage, where Captain King continues the narrative, and we find he repeats much, but his story is worth quoting in full, so far as it relates to our study. It was in March, 1779, on the second visit to the group:—

"Their cloth is made of the same materials, and in the same manner, as at the Friendly and Society Islands. That which is designed to be painted, is of a thick and strong texture, several folds being beat and incorporated together; after which it is cut in breadths, about two or three feet wide, and is painted in a variety of patterns, with a comprehensiveness and regularity of design that bespeaks infinite taste and fancy. The exactness with which the most intricate patterns are continued, is the more surprising, when we consider, that they have no stamps, and that the whole is done by the eye, with pieces of bamboo cane dipped in paint, the hand being supported by another piece of the cane, in the manner practised by our painters. Their colours are extracted from the same berries and other vegetable substances, as at Otaheite, which have been already described by former voyagers.

"The business of painting belongs entirely to the women, and is called *kipparee* [*kiipalapala*]; and it is remarkable, that they always gave the same name to our writing. The young women would often take the pen out of our hands, and shew us, that they knew the use of it as well as we did; at the same time telling us, that our pens were not so good as theirs. They looked upon a sheet of written paper as a piece of cloth striped after the fashion of our country, and it was not without the utmost difficulty, that we could make them understand, that our figures had a meaning in them which theirs had not."[31]

It would hardly be worth while to quote from La Pérouse, he made so short a visit to the island of Maui, were it not that he thought the kapa inferior to all the

[30] This size was too large for the malo and more suitable for the pa'u of the women.

[31] Cook's Third Voyage. London, 1784. III, 148.

others. He records:—"Les étoffes, qu'ils ont en très-grand quantité, sont faites avec le mûrier à papier comme celles des autres insulaires; mais quoiqu'elles soient peintes avec beaucoup plus variété, leur fabrication m'a paru inférieure à toutes les autres."[32]

We cannot doubt that if the unfortunate French commander could have seen more of the Hawaiian kapa he would have recorded a very different opinion. His surgeon, M. Rollin, in his Dissertation on the inhabitants of Easter Island and the Island of Mowee, as published in the English translation of La Pérouse, London, 1779, II, 332, says:—"The stuffs, manufactured by these islanders from the bark of the paper-mulberry, are extremely beautiful, and of various kinds. They paint them with considerable taste, and the designs are so regular, that one might almost believe they had copied some of our chintz." In May of the same year came to the islands Captains Portlock and Dixon, and they were better pleased with the cloth they found. "Cloth is another article which gives these Indians equal scope for fancy and invention. It is made from the Chinese paper mulberry-tree, and when wet, (being of a soft, malleable substance) is beat out with small square pieces of wood to from twelve to eighteen inches wide and afterwards stamped with various colours and a diversity of patterns, the neatness and elegance of which would not disgrace the window of a London linen-draper.

"How the cloth is stamped I never could learn; the different colours are extracted from vegetables found in the woods. There is another kind of cloth much finer than the above and beat out to a greater extent: it is of a white colour, and frequently wore by the Aree women in addition to the ahou."[33]

In the early days of the American Mission to the Hawaiian Islands there came from the Society Islands a man on his way home to England, seeking health for himself and wife, and fortunately for us as for the Mission the Reverend William Ellis was persuaded to stay with the new teachers, to whose labors he gave great help, as he was already familiar with the cognate Tahitian language, and soon not only preached in Hawaiian, but wrote hymns, while the American missionaries were acquiring the Hawaiian tongue. He was an excellent missionary and pastor, and in addition a very observant man who did more than any else to preserve the manners and ways of the Hawaiians before foreign influence had utterly transformed them. In his Tour of Hawaii, and his Polynesian Researches he pictures the people of Kamehameha most faithfully and distinctly, and to him I now turn for a description of the kapa-making as he saw it in the early twenties of the last century.

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[32] Voyage de La Pérouse autour du monde. Paris, 1798. II, p. 144. He was there in May, 1786.

[33] A Voyage round the World. Capt. Geo. Dixon. London, 1789. p. 272.

He had the advantage of living in intimate association with the people he describes shared by none of the previous witnesses we have cited, all of whom were but birds of passage, here one week, gone the next. Ellis had seen the tapa-making in Tahiti, and it was no new or mysterious process he was investigating, so I have given space for all he had to say even though repetition may seem useless. It certainly serves to confirm or contradict the account of his forerunners.

"For several days past we have observed many of the people bringing home from their plantations bundles of young *wauti* (a variety of the *Morus papyrifera*), from which we infer that this is the season for the cloth-making in this part of the island. [July, 1823.]

"This morning, the 17th, we perceived Keoua, the governor's wife, and her female attendants, with about forty other women, under the pleasant shade of a beautiful clump of cordia or kou trees, employed in stripping off the bark from bundles of *wauti* sticks, for the purpose of making it into cloth. The sticks were generally from six to ten feet long, and about an inch in diameter at the thickest end. They first cut the bark, the whole length of the stick, with a sharp serrated shell, and having carefully peeled it off, rolled it into small coils, the inner bark being outside. In this state it is left some time, to make it flat and smooth. Keoua not only worked herself, but appeared to take the superintendence of the whole party. Whenever a fine piece of bark was found, it was shown to her, and put aside to be manufactured into *wairiirii*, or some other particular cloth. With lively chat and cheerful song, they appeared to beguile the hours of labor until noon, when having finished their work, they repaired to their dwellings.

"This wauti plant, of which the greater part of the cloths on this side of the island is made, is cultivated with much care in their gardens of sugar-cane, plantains etc., and whole plantations are sometimes appropriated exclusively to its growth. Slips about a foot long are planted nearly two feet apart, in long rows, four or six feet asunder. Two or three shoots rise from most of the slips, and grow till they are six or twelve feet high, according to the richness of the soil, or the kind of cloth for which they are intended. Any small branches that may sprout out from the side of the long shoot, are carefully plucked off, and sometimes the bud at the top of the plant is pulled out, to cause an increase in its size. Occasionally they are two years growing and seldom reach the size at which they are fit for use, in less than twelve or even eighteen months; when they are cut off near the ground, the old roots being left, to produce shoots another year.

"The bark when stripped off and rolled up, as described above, is left several days; when, on being unrolled, it appears flat. The outer bark is then taken off,

generally by scraping it with a large shell, and the inner bark, of which the cloth is made, is occasionally laid in water, to extract the resinous substances it may contain. Each piece of bark is then taken singly, and laid across a piece of wood, twelve or eighteen feet long, six inches square, smooth on the top, but having a groove on the under side, and is beaten with a square mallet of hard, heavy wood about a foot in length and two inches wide; three sides are carved in grooves or ribs, the other into squares, in order that one mallet may answer for the different kinds of cloth they are accustomed to manufacture.

"Various sorts of cloth are made with this plant, some remarkably fine and even; that which has been beaten with a mallet, carved in different patterns, much resembles muslin at first sight, while that made with a grooved mallet appears, until closely examined, something like dimity. There are other kinds very thick and tough, which look like wash-leather, but the most common sort is the paü, worn round the waists of the females. To make this a piece of bark is beaten until it is four yards long, and more than a yard wide, and of an equal texture throughout. Sometimes two or three pieces of bark are necessary to make one piece of cloth. Five of these pieces when finished, are spread out one upon the other, and fastened together at one end. These five pieces make one paü. The inside pieces are usually white, or yellow; but the outside piece is stained, or painted, with vegetable dyes. No gum is used in the manufacture of the paü, except that contained in the bark, yet the fibres adhere firmly together. Those painted red or yellow, &c., are sometimes rubbed over with a vegetable oil, in which chips of sandal wood, or the seeds of the *pandanus odoratissimus* have been steeped. This is designed to perfume the cloth, and render it impervious to wet; it is, however, less durable than the common paü.

"There is another kind of cloth called *tapa moe* (sleeping cloth), made principally for the chiefs, who use it to wrap themselves in at night, while they sleep. It is generally three or four yards square, very thick, being formed of several layers of common tapa, cemented with gum,[34] and beaten with a grooved mallet till they are closely interwoven. The colour is various, either white, yellow, brown or black according to the fancy of its owner. Nearly resembling the tapa moe is the kihei, only it is both thinner and smaller. It is made in the same manner, and is about the size of a large shawl or counterpane. Sometimes it is brown, but more frequently white or yellow, intermixed with red and black [see Pl. A]. It is generally worn by the men, thrown loosely over one shoulder, passed under the opposite arm, and tied in front or on the other shoulder.

[34] This was probably a local variety, and no specimen is in my collection which contains dozens of the kapa moe, but all these are of the usual five separate sheets, fastened together at one end only by a kapa tape or cord of other fibre as will be illustrated later.

"But the best kind of cloth made with the cultivated plant is the *wauwau*, which is made into paüs for the females, and maros for the men. The paüs are generally four yards long, and about one yard wide, very thick, beautifully painted with brilliant red, yellow, and black colours [see Pls. L, M, N], and covered over with a fine gum and resinous varnish, which not only preserves the colours, but renders the cloth impervious and durable. The maros are about a foot wide, and three or four yards long.

"The colours they employ are procured from the leaves, bark, berries or roots of indigenous plants, and require much skill in their preparation. One or two kinds of earth are also used in mixing the darker colours. Since foreigners have visited them they have found, upon trial, that our colours are better than theirs, and the paints they purchase from ships have superseded in a great degree the native colours, in the painting of the most valuable kinds of cloth.[35]

"Their manner of printing is ingenious. They cut the pattern they intend to stamp on their cloth on the inner side of a narrow piece of bamboo, spread their cloth before them on a board, and having their colours properly mixed, in a calabash by their side, dip the point of the bamboo, which they hold in their right hand, into the paint, strike it against the edge of the calabash, place on the right or left side of the cloth, and press it down with the fingers of the left hand. The pattern is dipped in the paint after every impression, which is repeated until the cloth is finished."[36]

We will cite one more witness, a native one, to tell us of Hawaiian kapa-making. It is noteworthy that while he is the only native from any of the kapa-making islands that we can call upon, and while he lived and wrote at a time when there was certainly a good assortment of the best kapa in existence (although the Alii had already largely given up the pleasing work of decorating the cloth), he tells us very little that Cook and Banks and Ellis have not already told, and he tells that little in a manner that shows he was by no means appreciative of his people's proficiency in this manufacture; to Davida Malo the Old, which he represents to a marked degree, was passing, and the New, which for us may be represented by foreign cloth, was now occupying his thought, and doubtless had his approval.

If we could have cross-examined Malo we might have learned a little more, but not much, for his information in such matters was largely hearsay, and the curious compilation which bears the name of Malo's Antiquities was mainly composed from contributions brought him by his pupils at Lahainaluna. He mentions casually one process not already noticed by his predecessors; indeed I owe to him the only information I have that the Hawaiians practised it,—the coloring of kapa by steaming in the *imu* or underground native oven. How or why this was done he either did not

[35] This matter of foreign colors will be treated more fully later.

[36] W. Ellis, Polynesian Researches, London, 1853, iv, 109. Figures of these bambu type are given in Pl. 8.

know or did not care to mention, and I have not been able to supply the deficiency by enquiries of the few old natives who might have heard of the process.

Malo's account of kapa-making is here given with the Hawaiian text and a free translation, omitting many of the repetitions of the Hawaiian, but holding strictly to the meaning of the original. The original text of Malo's work has never been published (beyond extracts), and it exists in several manuscript copies, and the one here quoted is from a transcription[37] I made more than forty years ago from the copy in possession of the Hawaiian Government (which has been lost for some years) collated with a copy in the library of this Museum. Four copies have been examined, and there is considerable variation in the text, though little that affects the meaning.

MOKUNA XVI.

1. O ke kapa ko Hawaii nei mea aahu, he ili noia no kekahi mau laau, he waoke, he mamaki, he maaloa, he poulu; o ka waoke ka laau kanu nuiia; o ka ili o ua waoke la ke hanaia i kapa penei, na ke kane e kua ka waoke, a na ka wahine e uhole a pau ka ili a hoopulu a pulu.

2. Alaila kuku ma ke kua me ka ie, a palahalaha i na la eha paha nui aku paha, a kaulai a maloo, alaila lole ia i kapa, kekahi ke palahalaha loa nae, ai pa'u no ka wahine kekahi, o ka mea ololi iho lilo ia i malo no ke kane.

3. O ka mamaki kahi laau hanaia i kapa, a i malo, i pa'u he laau ulu wale no ma ka nahelehele, e kii wale no ka wahine e uhole i ka ili oia laau, a lawe mai a kalua i ka imu me ka palaa, oia ke kapa ulaula, ina i kalua pu ole me ka palaa oia ke kapa kelewai.

4. E hoopulu no e like me ka waoke a pulu alaila, kuku ma ke kua me ka ie, a palahalaha ma na la ekolu paha, eha paha, a kaulai a maloo a lilo i kapa kekahi, a i malo, a i pau, he kapa paa ka mamaki, he liuliu ka aahu ana.

5. O ka maaloa a me ka poulu, he mau laau kukuia laua i kapa, ua like no nae me ko ka waoke: a me ko ka mamaki: ke kuku ana, a me ka hana ana. Ua nui nae ke ano o na kapa, me ka pa'u, a me ka malo, a na ka wahine no a hoolilo i ke kapa i ka malo i ka pa'u i mau ano e ma ka hooluu ana, i eleele, ulaula maomao, lenalena pela ia no.

CHAPTER XVI.

1. Kapa was the clothing in this Hawaii; it was made from the bark of certain trees [or shrubs] waoke, mamaki, maaloa and poulu. The waoke was much cultivated; the waoke bark was made into kapa in this way. The men got the sticks but the women peeled off the bark and soaked it until soft.

2. It was then beaten on the kua with the ie. This took four days, perhaps more, then it was hung up to dry. Then the cloth if wide was kapa or pa'u for women, if long and narrow, a malo for men.

3. The mamaki also was made into kapa, pa'u and malo. It grew wild in the woods and the women peeled off the bark and took it to the oven. With dark kapa palaa, red kapa was made, if baked without the palaa it was the brown kapa, kelewai.

4. This was soaked till soft like the waoke, then beaten on the kua with the ie, till it was spread out thin; three days perhaps, four perhaps was this work, and it was hung out to dry; then it was kapa, pa'u or malo. This mamaki was a strong cloth and durable to wear.

5. The maaloa and poulu were beaten into kapa like the waoke and mamaki; the beating was the same so was the work. Great was the variety in form and kinds of kapa, the pa'u and the malo, and the women greatly increased the variety by coloring the malo or the pa'u either black, red, green, yellow, etc.

[37] This I made on a Remington typewriter of the earliest pattern printing capital letters only.

6. Ina i hooluuia i ka hili a pau ia, alaila, hooluu hou ma ka lepo, a lilo ia i kapa eleele, ua kapaia he pulou kahi inoa, he ouholowai kahi inoa.

7. Ina i hooluuia i ka mao, ke kapa omaomao no io, ina hooluuia i ka holei he lenalena ia kapa, ina hooluu ole ia, he keokeo ia kapa, ina i kuku pu ia me ka welu ula, he paiula ia kapa.

8. He nui ka inoa o na kapa, ua kapaia ma ke ano o ka wahine hooluu ana, e like me ke ano o ia hooluu ana, pela no ke ano e kapa ia aku ai.

9. He nui ke ano o na pa'u ke hooluuia, ina i hooluuia i ka olena, he kamalena ia pa'u, ina hooluuia i ka niu, he halakea ia pa'u, pela no ka nui o na inoa ma ka hooluu ana a ka wahine.

10. Pela no ka nui o na malo ma ke ano o ka hooluu ana, ina hooluuia i ka noni, he kuaula ia malo, he pukohukohu, he puakai, o ka pa'u i hooluuia i ka olena, he pa'u palupalu ia, he uaua kahi pa'u, e like me ke hapalapala ana, pela i nui ai na inoa.

11. Pela no ko na malo mau inoa, he puali kahi malo, he kapeke kahi malo.

12. O keia mau mea ko Hawaii mau mea aahu, mau mea hume, a mea kakua oia na mea i pono ai ka poe kahiko o Hawaii nei.

6. If the kapa was dyed with kukui, it was dyed again with mud; then was the kapa black and it was called pulou or ouholowai.

7. If the dye-stuff was mao then the kapa was green; if holei the kapa was yellow; if no dye was used the kapa was white; if beaten together with red bits [of kapa] the kapa is called paiula.

8. Many were the names of kapa derived from the manner in which the women colored or stamped it.

9. Various were the tints the pa'u were dyed; when dyed with olena the pa'u was kamalena; when dyed with cocoanut, the pa'u was halakea. Many were the names from the dyeing of the women.

10. So the malo was named according to its coloring; dyed with noni the malo was kuaula, pukohukohu, or puakai. A pa'u dyed with olena was soft and was called uaua. Likewise the pattern printed on kapa gave names.

11. Some malos were called puali [girding], others kapeke or two-colored.

12. These things were the clothing of Hawaii tied or girded around the loins as seemed good to ancient Hawaiians.

The next record of importance to our study is by George Bennett, F. L. S. He writes,—"On the 10th Dec., 1829, I visited the district of Wouhala on Oahu. Among the specimens collected were,—A species of Cyathodes called *pokeawe* by the natives, bearing small red berries....A species of Phytolacca called *poporo lumai* by the natives. The berries....yield a reddish brown juice used for dyeing native cloth; the berries are internally of a purplish red colour....A species of Dianella named *uki* by the natives, bearing small berries of a mazarine blue, which are used by the natives in making a permanent blue dye....The turmeric plant (*Curcuma longa*) called *oreina* by the natives, is abundant, wild; the root, as well as that of the *noni* (*Morinda citrifolia*) is used for dyeing the native cloth of a bright yellow colour."[38]

In 1834 Frederick Debell Bennett, Esq., F. R. G. S., visited the Hawaiian Islands on a whaling voyage, undertaken, on the part of Dr. Bennett, to study the anatomy and habits of the southern whales. The information he gives us is interesting, if it

[38] An Account of the Sandal Wood tree, etc. Magazine of Nat. Hist. London, v, 255.

adds little to what former travelers have told. He had touched at Pitcairn and Tahiti on his voyage, and is now on Oahu.

"The primitive cloth, *kapa*, is yet very commonly manufactured at this island. It is here prepared from the bark of the *mamaki*, and from that of the *wauti*, or paper-mulberry tree. It is generally inferior to that prepared at the Society Islands, but no Polynesian nation surpasses the Sandwich Islanders in the gaudy colours and complicated patterns they communicate to this fabric. The colours they chiefly employ are red, derived from vegetables, as well as from an ochreous earth; yellow from the root of the Indian-mulberry [noni], and from a second vegetable dye which gives a peculiarly bright amber-colour; black, from the carbonaceous residue of burned candle-nuts; and a delicate green-yellow, from an infusion of the flowers of the cotton plant;[39] a peculiar dull-gray, or slate colour, is also produced, by immersing the cloth in the black mud of the taro fields. The mordants they use to fix these colours are the oil of the candle-nut, and the astringent water of the taro patches [?]. The more intricate patterns are impressed upon the cloth with carved bamboos, in a manner analogous to that in which European wood-cuts are executed."[40]

Before leaving the Ellis account of the Hawaiian kapa work I am inclined to turn to the same writer's account of the Tahitian Tapa making,—it will be remembered that Mr. Ellis was a missionary in the southern group before coming to Hawaii,—and compare, even at the cost of some repetition, the similar work of the Tahitians. A part of the account might properly be relegated to the chapter on the uses of Tapa, but it is perhaps best to give the story as the author told it, as the manufacture and use are so closely intertwined in his narrative.

"The dress of the sexes differed but little; both wore the *pareu*, or folds of cloth, round the waist. The men, however, wore the *malo* or girdle, and the *tiputa* or poncho, while the females wore over their shoulders the light *ahupu* or *ahutiapono*, in the form of a vest, or loose scarf or shawl.

"Next to those kinds of labour necessary to obtain their subsistence, and construct their dwellings, their apparel claimed attention. This, though light, required, from the simple methods by which it was fabricated, a considerable portion of their time. Cloth made with the bark of a tree, constituted a principal article of native dress, prior to the introduction of foreign cloth. It is manufactured chiefly by females, and was one of their most frequent employments. The name for cloth, among the Tahitians, is *ahu*. The Sandwich Island word *tapa* is, we believe, never used in this sense, but signifies a part of the human body. In the manufacture of their cloth, the

[39] Probably *mao* (*Abutilon incanum*); see chapter on the raw material used.

[40] Narrative of a Whaling Voyage round the globe, from the year 1833 to 1836. London, 1840. Vol. i, p. 216.

natives of the South Sea Islands use a greater variety of materials than their neighbours in the northern group: the bark of the different varieties of *wauti*, or paper mulberry, being almost the only article used by the latter; while the former employ not only the bark of the paper mulberry, which they call *auti*, but also that of the aoa and of the breadfruit.[41]

"The process of manufacture is much the same in all, though some kinds are sooner finished than others. When the bark from the branches of the breadfruit or auti is used, the outer green or brown rind is scraped off with a shell; it is then slightly beaten, and allowed to ferment, or is macerated in water. A stout piece of wood resembling a beam, twenty or thirty feet long, and from six to nine inches square *with a groove cut in the under side*, is placed on the ground; across this the bark is laid and beaten with a heavy mallet of casuarina or iron-wood. The mallet is usually fifteen or eighteen inches long, about two inches square, and round at one end for the purpose of being held firmly. The sides of the mallet are grooved; one side very coarse or large, the opposite side exceedingly fine. One of the remaining sides is generally cut in chequers or small squares, and the other is plain or ribbed. The bark is placed lengthwise across the long piece of wood, and beaten first with the rough side of the mallet, and then with those parts that are finer.....

"Vegetable gum is rarely employed; in general, the resinous matter in the bark is sufficiently adhesive. The fibres of the bark are completely interwoven by the frequent beating with the grooved or chequered side of the mallet; and when the piece is finished, the texture of the cloth is often fine and even; while the inequalities occasioned by the fine grooves, or small squares, give it the appearance of woven cloth. During the process of its manufacture, the cloth is kept saturated with moisture, and carefully wrapped in thick green leaves every time the work-women leave off; but as soon as it is finished, they spread it to dry in the sun, and bleach it according to the purpose for which it is designed. The *ore* or cloth made with the bark of the aoa, is usually thin and of a dark brown colour; that made with the bark of the bread-fruit and a mixture of the auti, is of a light brown or fawn colour, but the finest and most valuable kind is called *hobu*. It is made principally, and sometimes entirely, from the bark of the paper-mulberry, and is bleached till beautifully white. This is chiefly worn by the females.

"It is astonishing that they should be able, by a process so simple, to make bales, containing sometimes two hundred yards of cloth four yards wide; the whole in one single piece, made with strips of bark seldom above four or five feet long, and when spread open not more than an inch and a half broad—joined together simply

[41] It will be seen in the chapter on the raw material that the Hawaiians were not so limited in their resources as Mr. Ellis supposes.

by beating them with a grooved mallet. When sufficiently bleached and dried, the cloth is folded along the whole length, rolled up into a bale and covered with a piece of matting—this is called *ruru vehe.* The wealth of a chief is sometimes estimated by the number of these covered bales which he possesses. The more valuable kinds of cloth are rolled up in the same way, covered with matting or cloth of an inferior kind, and generally suspended from some part of the roof of the chief's house. The estimation in which it was held has been greatly diminished since they have become acquainted with European cloth and large quantities are now seldom made. It is, however, still an article in general use among the lower classes of society, and the mother yet continues to beat her parure, or native pareu, for herself and children.

"A number of smaller pieces are still made, among which the tiputa is one of the most valuable. It is prepared by beating a number of layers of cloth together, to render it thicker than the common cloth: for the outside layer they select a stout branch of the auti or bread-fruit, about an inch and a half in diameter: this they prepare with great attention, and, having beaten it to the usual width and length, which is about ten feet long and three feet wide, they fix it on the outside and attach it to the others by rubbing a small portion of arrow-root on the inner side before beating it together. The tiputa of the Tahitians corresponds exactly with the poncho of the South Americans. It is rather longer, but is worn in the same manner, having a hole cut in the centre, through which, when worn, the head is passed; while the garment hangs down over the shoulders, breast and back, usually reaching, both before and behind, as low as the knees. Next to the tiputa, the *ahufara* is a general article of dress.

"These are either square like a shawl, or resemble a scarf. They are sometimes larger and correspond with a counterpane more than a shawl, and are always exceedingly splendid and rich in their colours.

"The natives of the Society Islands have a variety of vegetable dyes, and display more taste in the variations and patterns of the cloth, than in any other use of colours. Much of the common cloth is dyed either with the bark of the aito, *casuarina*, or tiari, *aleurites.* This gives it a kind of dark red or chocolate colour, and is supposed to add to its durability. The leaves of the arum are sometimes used, but brilliant red and yellow are their favorite hues. The former which they call mati, is prepared by mixing the milky juice of the small berry of the mati, *ficus prolixa*, with the leaves of the tou, a species of *cordia.* When the dye is prepared by this combination, it is absorbed on the fibres of a kind of rush, and dried for use. It produces a most brilliant scarlet dye, which, when preserved with a varnish of gum, retains its brightness till the garment is worn out. The yellow is prepared from the inner bark of the root of the nono *morinda citrifolia*, and though far more fugitive than the scarlet of the mati, is an exceedingly bright colour. The yellow dye is prepared by infusing

the bark of the root in water in which the cloth is allowed to remain till completely saturated, when it is dried in the sun. The mati or scarlet dye, is moistened with water and laid on the dry cloth. Their patterns are fixed with the scarlet dye on a yellow ground, and were formerly altogether devoid of uniformity or regularity, yet still exhibiting considerable taste. They now fix a border round the ahufara and arrange the figures in different parts. Nature supplies the pattern. They select some of the most delicate and beautiful ferns, or the hibiscus flowers: when the dye is prepared, the leaf or flower is laid carefully on the dye; as soon as the surface is covered with the colouring matter, the stained leaf or flower, with its leaflets or petals correctly adjusted, is fixed on the cloth, and pressed gradually and regularly down. When it is removed, the impression is often beautiful and clear.

"The scarf or shawl and the tiputa, are the only dresses prepared in this way, and it is difficult to conceive of the dazzling and imposing appearance of such a dress, loosely folded round the person of a handsome chieftain of the South Sea Islands, who perfectly understands how to exhibit it to the best advantage. This kind of cloth is made better by the Tahitians than any other inhabitants of the Pacific. It is not, however, equal to the wairiirii of the Sandwich Islanders. Much of this cloth, beautifully painted, is now employed in their houses for bed and window curtains, &c. Several kinds of strong cloth are finished with a kind of gum or varnish, for the purpose of rendering them impervious.

"But in the fabrication of glazed cloth, the natives of the Austral Islands, especially those of Rurutu, excel all with whom I am acquainted. Some of their pieces of cloth are thirty or forty yards square, exceedingly thick, and glazed on both sides, resembling the upper side of the English oil-cloth table-covers. It must have required immense labour to prepare it, yet it was abundant when they were first discovered. It is usually red on one side and black on the other, the latter being highly varnished with a vegetable gum.

"In the manufacture of cloth the females of all ranks were employed; and the queen and wives of the chiefs of the highest rank, strove to excel in some department—in the elegance of the patterns or the brilliancy of the colour. They are fond of society, and worked in large parties, in open and temporary houses erected for the purpose. Visiting one of these houses at Eimeo, I saw sixteen or twenty females all employed. The queen sat in the midst, surrounded by several chief women, each with a mallet in her hand, beating the bark that was spread before her. The queen worked as diligently and cheerfully as any present.

"The spar or square piece of wood on which the bark is beaten, being hollow on the under side, every stroke produces a loud sound, and the noise occasioned by sixteen or twenty mallets going at one time, was to me almost deafening; while the

queen and her friends seemed not only insensible to any inconvenience from it, but quite amused at its apparent effect on us. The sound of the cloth-beating mallet is not disagreeable, where heard at a distance in some of the retired valleys, indicating the abode of industry and peace; but in the cloth-houses it is hardly possible to endure it.

"As the wives and daughters of the chiefs take a pride in manufacturing superior cloth, the queen would often have felt it derogatory to her rank, if any other

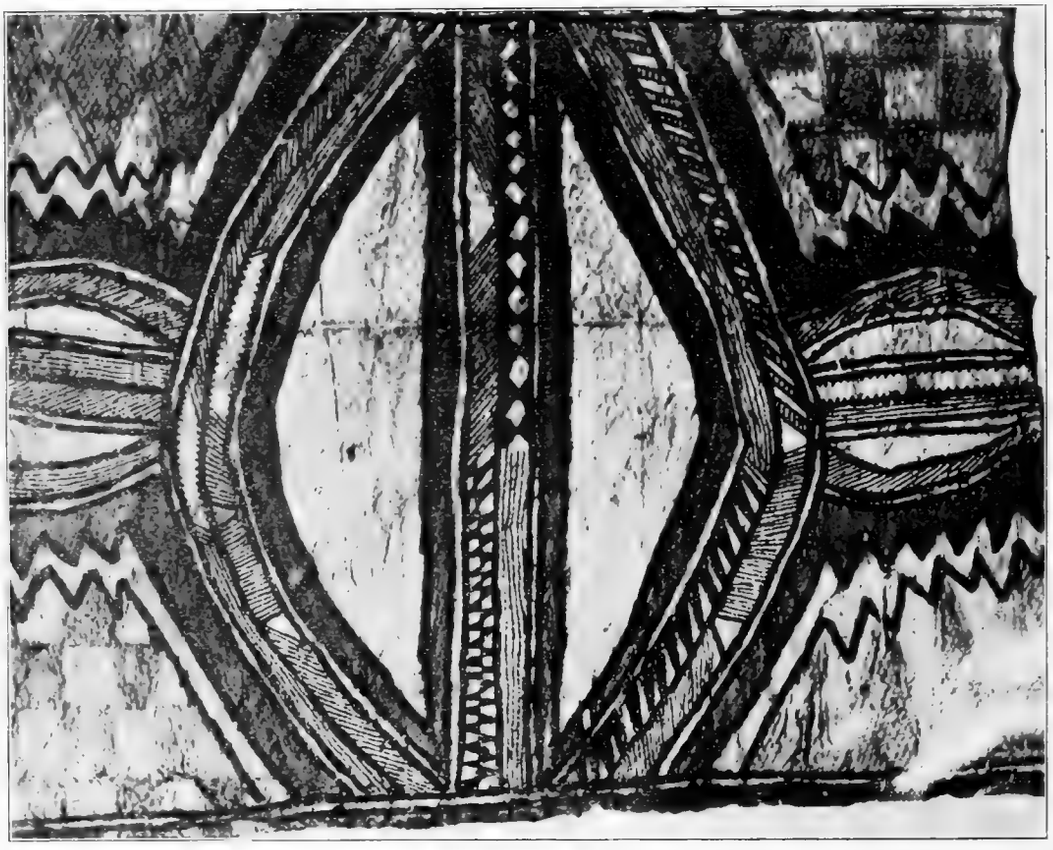

FIG. 20. A MELANESIAN KAPA. BROWN AND BLACK STAMPED ON BUFF. BRITISH MUSEUM.

females in the island could have finished a piece of cloth better than herself....The ahu or cloth made with the bark of a tree, although exceedingly perishable when compared with European woven cloth, yet furnished, while it lasted, a light and loose dress adapted to the climate and the habits of the people. The duration of a Tahitian dress depended upon the materials with which it was made, the aoa being considered the strongest. Only the highly varnished kinds were proof against wet. The beauty of the various kinds of painted cloth was soon marred, and the texture destroyed by the rain, as they were kept together simply by the adhesion of the interwoven fibres of the bark. Notwithstanding this, a tiputa, or a good strong pareu, when preserved

from wet, would last several months. Though the native cloth worn by the inhabitants was made by the women, there were some kinds used in the temples in the service of the idols, which were made by men, and which it was necessary, according to the declarations of the priests, should be beaten during the night."[42]

With this imperfect gleaning of the past history of Polynesian kapa-making, we may leave this part of our subject for the present and take up the story of the islanders beyond the Polynesian boundary. We shall have occasion to return to some of these histories when we take up, in the annotated list of Kapa, the products in hand from these different islands, and to that catalogue I have reserved such corrections or changes as later information may render needful rather than interrupt the narrative with obtrusive notes.

Turning westward we find in Micronesia a mixed race, shading from West to East, from the Caroline Islands to the Marshall and Gilbert groups; the Malay influence stronger at the West, the Polynesian at the East. Through this great extent of small island groups, while kapa was made here and there, it was not a successful competitor with the native loom. Where it was made the materials and procedure were the same as in the eastern islands already described, and the product was never, so far as known, remarkable. To this one exception should be noted from the Marshall Islands where most beautiful mats are made from the leaves of the Pandanus. This is a kapa in the U. S. National Museum, shown in Plate 28, representing the national mat so perfectly, and recalling the line work of the Samoans.

Melanesian Bark-cloth.

In the extreme western bounds of our Pacific region, the New Hebrides, Solomon Islands, Bismarck Archipelago and New Guinea, we find a rather coarse, but by no means uninteresting kind of kapa. As we approach the route by which the paper-mulberry seems to have entered the Pacific, we find less of it and of its cloth, but this seems explicable when we consider the need of careful cultivation for this shrub, and the comparatively unsettled, warring races we now have to deal with: few traces shall we find of the carefully tended ponds of taro or plantations of waoke. These people of darker skin, hair more or less curled, and lower civilization, could find, in the forests, trees whose bark could be used for cloth, and over whose cultivation they had neither care no control. Hence much of the tapa from the Melanesian region is harsh to the touch and coarsely made from the bark of figs and other trees of much less fineness in bark structure than those we have seen used hitherto. The designs are also quite distinct from the Polynesian, as may be seen in Fig. 20, which is fairly

[42] Polynesian Researches by William Ellis. Ed. London, 1853. I, 178.

typical of much of the design of New Guinea and the New Hebrides. Although the Loyalty and New Hebrides groups were nearest to the Fijian, nearly west, the cloth and its ornamentation seems quite distinct from that of the eastern groups.

We may quote Codrington, whose knowledge of these natives was most considerable for his time, although he gives us mainly the names, leaving us to other sources for the ways and means, and whether the travelers in these regions have cared less for the process now interesting us, or the natives were less willing to communicate to strangers their domestic and peaceful works, little is to be gathered from the printed story. He tells us:—

"Bark-cloth, *tapa*, hammered out from the bark of paper-mulberry is made, but roughly, in Ysabel, and worn in Florida; it was made till lately in Ulawa and San Cristoval; a rough kind, made perhaps always from the bark of banyan figs, is used in the New Hebrides. When such cloth was in use the name of it, e. g., *tivi* in Ysabel and Florida, *sala* in Ulawa, was ready for European cloth. In Aurora *gavu* and in the Banks Islands nearest to Aurora *gagavu*, is used for cloth, no doubt identical with the Maori *kahu* and *kakahu*. In Mota the word *siopa* was applied at once to European cloth, which as the natives knew nothing of tapa, was surprising. The native explanation is, that the Tongans, who for two years visited the Banks Islands and made a short settlement at Qakea, were clothed with *siopa*. They have in fact shifted the vowels in *siapo*, *hiapo* (the Maori *hiako*, bark), the name of bark-cloth in Tonga and Samoa. In Motlav, again, the word *malsam* was applied to cloth, of which the first syllable is no doubt the common *malo* of Fiji and elsewhere." [43]

So little is really known of the Flora of New Guinea, the Solomon Islands, the New Hebrides and the Bismarck Archipelago, and hardly more of their manufactures, that after gathering all that the explorers can tell us, we are compelled to turn to the specimens of the cloth in hand and question them. From two German doctors who have lately explored the little-known New Ireland (unfortunately renamed by the German Government Neu Mecklenberg), we get the following facts:—"Der Baum, von dem das Bastzeug gewonnen wird, ist der Brodfruchtbaum (*Artocarpus incisa*). Ein junger Stamm von Armesdicke wird in vollem Safte abgeschnitten und von einem etwa 1½ m langen Stücke wird mit den Schale einer Perlmuttermuschel die Rinde abgeschabt. Nun wird der Bast so lange geklopft, bis er sich von Stamme abstreifen lässt. Mann legt ihn zum Quellen'ins Wasser, zieht ihn möglichst weit auseinander und lässt ihn in dann an der Sonne trocknen. Die ganz Arbeit wird von Weibern besorgt, und von ihnen Sind auch die Stücke erworben. Das Bastzeug *malu* sieht gelblich-weiss bis bräunlich aus, ist schlauchförmig, und die Fasern sind stark ausein-

[43] Codrington, The Melanesians, p. 320.

ander gezertt. Zwei Stücke der Sammlung sind über 2 m lang....Die gewönlichen Farben sind gebrannter Korallenkalk, gebrannte rote Erde und verkohltes Holz. Diese Farben werden in Kokosschalen mit Wasser verrührt und mit dem Finger oder irgend einem Stäbchen aufgetragen. Zum gelbfärben dienen in King die frischen Wurzelknollen der Pflanze *eano* (*Curcuma longa*), in Pugusch die Rinde des Baumes *pakorr*. Die blaue Farbe ist Berliner Blau."[44]

It is certainly primitive to beat the bark off the tree instead of cutting the log; the appearance of Prussian Blue in place of indigo is interesting. I am not acquainted with the cloths from the different groups of this wild and little known archipelago. The only one seen was much like the fabric made generally in New Guinea, coarse and poorly beaten, but sufficient for clothing of which the natives of some parts of that great island have almost no use and the bark-cloth is made for dancing skirts principally. Of these the martyred apostle to New Guinea writes:—"Nowhere in New Guinea have I found spinning or weaving. They dye the petticoats and pieces of native cloth (which is made from the bark of a tree and used at dances), with mud, turmeric, mangrove bark, *ame*, *sosogoro* and other plants." Chalmers is speaking of the people of the extensive island of Kiwai at the mouth of the Fly River on the south coast of New Guinea. Here, as everywhere in the Pacific tapa region, we find turmeric used as a yellow dye. He continues:—

"In making petticoats, some of the fibre of the young fronds of the sago palm is steeped in a muddy hole and left there for a few days; when taken out and washed, it is quite a brown colour. To produce the yellow dye turmeric is scraped and mixed with water, and in that some of the fibre is steeped. The other dyes are procured in the same way. Having no pots of any kind in which to boil fibre and bark, or seeds, they are not able to secure the same distinct and fast colours as those employed east of Orokolo."[45]

Melanesian or Papuan the fabric is much the same. Owing to the scant fashion of clothing in vogue in these western Pacific islands the specimens that have reached museums are generally narrow strips, usually of a brown colour, but often decorated with figures of a darker hue. Indeed these figures are the best distinction they bear, for there is little variation in the quality of the cloth; one would think all had been hammered out on the tree stem, so coarse is the texture. There are some exceptions to this statement for I have seen and handled quite soft specimens, and we have some in this Museum from German New Guinea of considerable size.

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[44] Stephan, Dr. Emil und Graebner, Dr. Fritz, *Neu-Mecklenberg (Bismarck Archipel)*, Berlin, 1907, p. 53.

[45] Rev. J. Chalmers *On the Natives of Kiwai Island*. Journ. Royal Anthrop. Institute, 1903, p. 120. In other parts of New Guinea, pots were made or procured from the native traders.

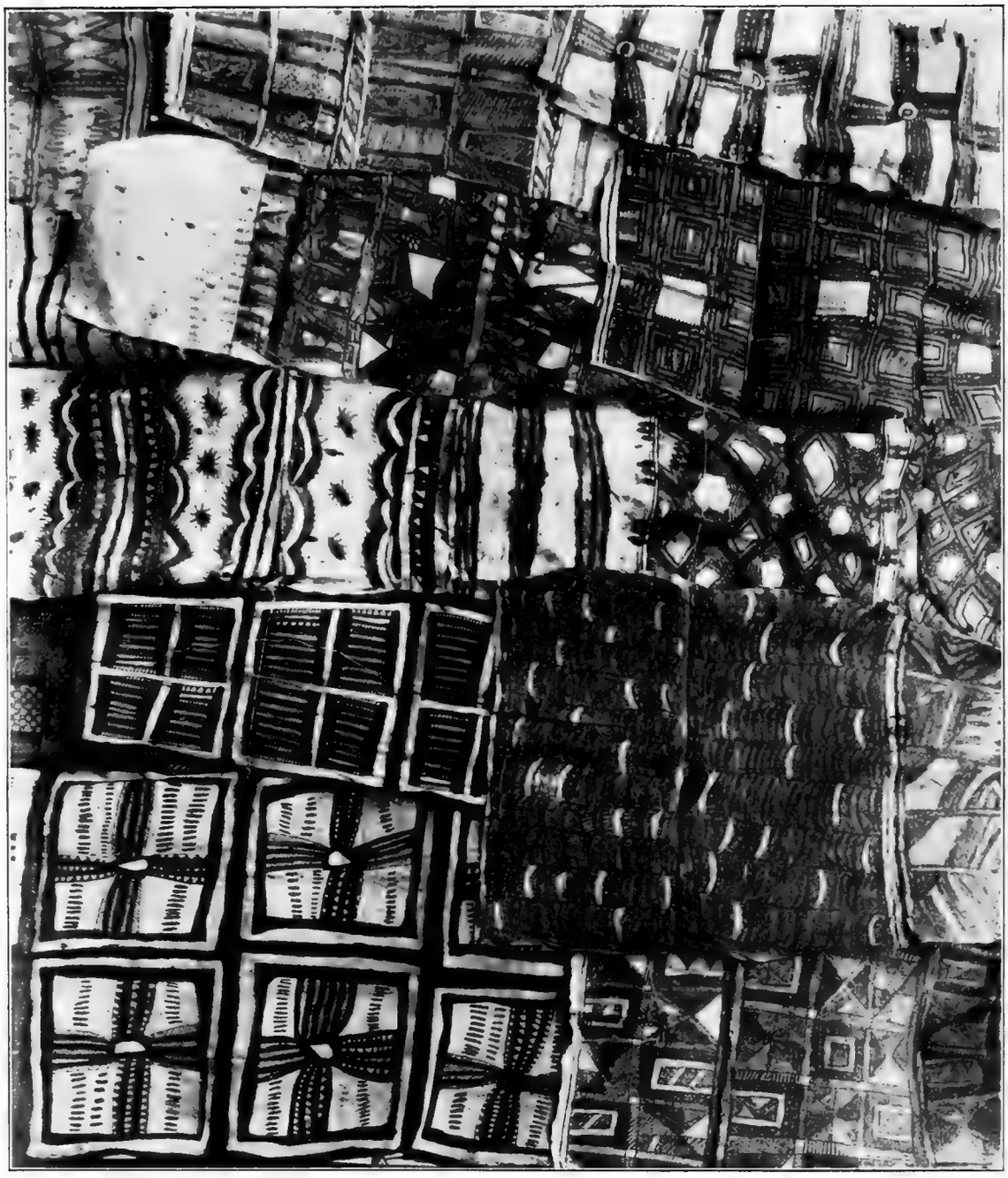


FIG. 21. PORTIONS OF KAPA FROM WESTERN PACIFIC.

The Dutch Expedition to New Guinea in 1903 under Dr. Arthur Wichmann, adds to our information considerably, and I shall quote from the volume on the Ethnographic results by Dr. G. A. J. Van der Sande (1907):—

"The preparation of bark is in Papua Talandjang a very common work, as here the bark forms almost exclusively the dress of the married women. Like everywhere, this preparation is done by the women. At Asé a piece of a sapling of ± 2 m. in length and 12–14 cm. in diameter, cut off transversely at both ends, probably brought by the women themselves from the forest or the garden in a boat, was lying on the ground. Evidently it had been taken entirely out of the stem part, for I saw no traces of newly cut-off branches, and knots were very rare. With a shell (*Cyrena*), obtained, it was said from Humboldt Bay, the top layer of greyish green bark was scraped off. A previous heating or even a slight superficial charring of the stem, as described by Schellong[46] of Finsch Harbour, had not taken place here. After the scraping, the tree as it was lying, was beaten on the outside with a short piece of wood, here called *fèma*, always taking care to beat neither transversely, nor lengthways, but in an angle of ± 45°. Small drops of moisture were issuing from the bark at each blow, and gradually this was beginning to lie loosely round the stem, as it became too wide for it. Near and round the knots, the connection between the wood and the bark here so much closer, was relieved by slight blows. Constantly turning the tree over, the whole surface was so treated, and after this the spot where most knots occurred in the same longitudinal line was carefully selected for cutting the bark open lengthways, in order to obtain a minimum of holes in the middle of the piece. The bark then dropped easily from the stem, except where, with a few knots the connection had still to be severed with a knife. From the inside of the flatly outstretched bark, a thin, but tough, white fleece was now removed by lengthwise scraping with the shell, and after this the beating proper began.

"By this beating the bark obtains a darker colour. All the time one or more large, flat, round stones, designated as gabbro, were lying under the spots where the beating occurred. As long as the bark was still hard, it was lying extended, after it had become more pliable under the beating, care was taken that the bark by a transverse folding was lying all the time in a four fold layer on the stone, carefully avoiding to beat on the folds themselves, by which the fibres might break transversely. During this preparation the bark lost plenty of moisture, it became thinner, broader and a little shorter, but also looser; the fibres were here and there so much parted from each other in a transverse direction, that it became possible to look through the piece. After this, the article was placed for a longer or shorter period in the water,

[46] Ueber die Herstellung einiger Ethnographica der Gegend Finschhafen's (Kaiser Wilhems-Land). Intern. Arch. f. Ethnogr. Leiden, vol. i, 221. (1888.)

wrung, *mara puję nugaáidi*, hard by two women, standing opposite each other, holding it lengthwise and then hung outside the house in the sun to dry. This entire manipulation took place in the village itself, presumably because there is no very great safety for the women in the forests, or because the men are not inclined to stay close by, as in Central Celebes,[47] till the work is finished.

FIG. 22. CHIEF'S CLOAK FROM JABIN, NEW GUINEA.

"I never saw the boiling in an earthenware pot with the addition of ashes, in order to obtain a white colour, or a fermentation of the moist bark wrapped in leaves of *Livistonia rotundifolia*, as is reported from Celebes. The bark is lighter or darker according to the kind of tree which supplied it; this also holds good, as I was told by missionaries, for Geelvink Bay; both kinds are worn, whilst in Kaiser Wilhelms Land only the lighter kind, supplied, according to Schellong [1888, 221] by two kinds of tree, is used. The common name of the material is in Humboldt Bay as well as on

[47] Adriani and Kruyt, 1900. Dr. M.- en Alb. C.-. Van Posso naar Mori. Mededeel, van wege het Nederl. Zend. genootsch. Rotterdam. Vol. xliv, p. 135.

Lake Sentáni *mara*, sometimes shortened to *mar;* the addition *chembau*, therefore *mara chembau* for the red brown kind, according to my interpreter, points to the species of tree.

"Not much attention was given in Asé to the nature of the beating instrument. Stones, as used on Celebes (Adriani and Kruyt, *loc. cit.*, p. 139) but also in New Guinea[48] (Schmeltz), or coral beaters (Schellong, *loc. cit.*, p. 221), as known of Finsch Harbour, carved on the striking surface, or wooden beaters with circular grooves as in the possession of the Utrecht collection from Geelvink Bay, and as illustrated by Uhle[49] from Doré, by Erdweg[50] from Kaiser Wilhelms Land, and by Edge-Partington (Album 1895, pl. 178) from British New Guinea, were not known here."[51] Fig. 23.

While the decorations on the Papuan bark-cloth are generally rude, and red and yellow appear to be the favorite colors, on the Solomon Islands, a peculiar blue is common in the specimens in hand, and the figures in this group are often of natural objects, as may be seen in Pls. 29 and 30. The figures often seen on the New Guinea cloth are regular and well drawn, and will be considered later with the subject of design.

A single example may, however, be given here to show the decoration of a chief's garment, his *Nakwin* or poncho. In Fig. 22 the material is a soft, rather coarse-fibred, buff-colored kapa with dull red figures generally bordered with a black ciliate line. The effect is not unpleasing in this specimen from German New Guinea. [B. P. B. M., No. 1769.]

Before turning to the Malay element in Borneo and the Malay Peninsula we may look at the tapa-making in Japan fifty years ago. Sir Rutherford Alcock was writing from this then new and little understood country. He was at Atami Bay. "The manufacture [of paper] here, at least, consists entirely of the produce of bark of trees, with coloring matter introduced in the process. I could not ascertain the botanical character of the trees, for only the bark already pulled off is brought from the surrounding hills. But more than one plant of the growth of shrubs is employed; some for the fibrous quality, others for glutinous properties. The process is very simple and requires no elaborate machinery. The bark is first steeped in water until thoroughly softened, it is then beaten with wooden mallets until reduced to a state of mash, it is then again macerated in water, and when finally brought into a pulpy and homogeneous state, any colouring matter desired is introduced, and the

[48] Intern. Arch. f. Ethnogr. I, 233. Steinerne Schlager für Tapabereitung von Ost Neu Guinea.

[49] Uhle, Dr. Max—Holz-und Bambusgeräthe aus Nord-West-Neu-Guinea. Publ. der Kön. Ethnogr. Museum zu Dresden. Leipzig, vol. vi, no. 4521, pl. vii, fig. 1.

[50] Die Bewohner der Insel Tumleo, Berlinhafen, Deutsch-Neu-Guinea. Von P. M. J. Erdweg. Mitt. d. Anthropologischem Gesellschaft in Wien. Bd. xxxii, p. 308.

[51] Nova Guinea. Resultats de L'Expédition Scientifique Néerlandaise à la Nouvelle Guinea, en 1903, sous les auspices de Arthur Wichman. Leyden, 1907, vol. iii, p 234.

pulp thus prepared, and in a very liquid state, is poured over wire frames, much as in England, and dried." [52]

Here we have paper-making pure and simple, a paper of which I have samples, and they are in no wise better than some made by the Hawaiians a hundred years ago. In both cases the material and the preliminary pulping process were alike, but with the Hawaiian the pulp was less watery and beaten into its thin and even texture by a skill not required in pouring pulp on the wires and leaving it to dry to the desired consistency.

From the New Hebrides many specimens are found in museums, but they are generally small and often decorated with lined and geometric patterns in black or

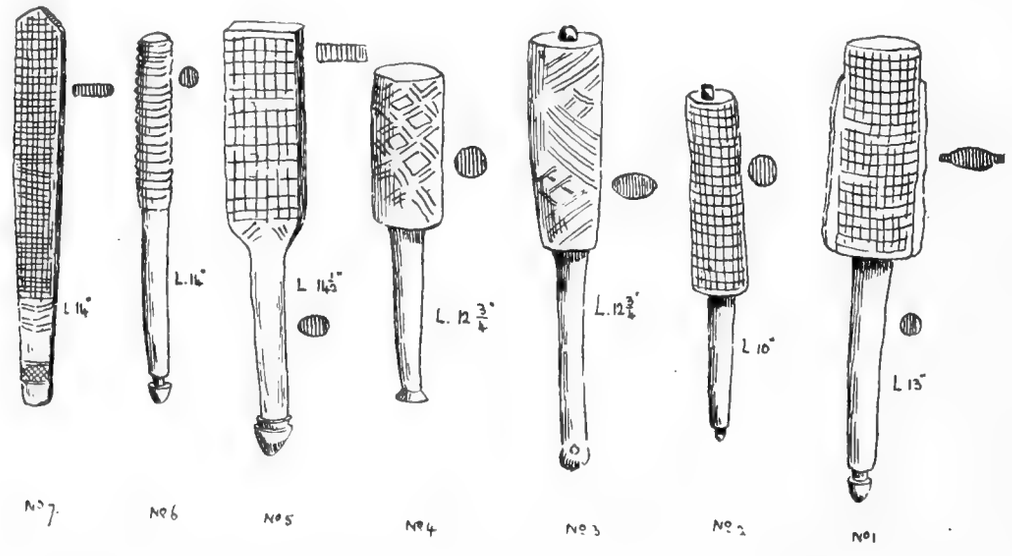


Fig. 23. TAPA BEATERS FROM BRITISH NEW GUINEA, BRITISH MUSEUM. EDGE-PARTINGTON.

dark brown on a buff ground, Fig. 21. In this Museum is a piece of tapa attributed to the New Hebrides, and collected some years ago, of a rough texture and stained with a blue similar to that of the Solomon Islands, over which are drawn with a bright red outline three forms many times repeated (Fig. 24), of which I do not understand the full significance, except the first which seems to represent the dugong; the second appears in many modifications. The piece measures 32×60 in. (B. P. B. M., 6982.)

North of the New Hebrides is the Santa Cruz group, the inhabitants belonging to the same race and having similar looms on which fine mats are woven. The bark-cloth is similar in structure and the decoration of which these people are capable is seen on Pl. 33, from a specimen in the U. S. National Museum from the Wilkes Expedition. Portions of the design are quite like some of the Hawaiian.

[52] Rutherford Alcock, Journ. Roy. Geog. Soc., xxxi, 347.

Without going far from the same neighborhood we visit a different race, and the bark-cloth is made much the same way. Quoting from the *Sarawak Gazette*, 1894, p. 121,—"There is the tree *Kulit Takâlong*, which the Dyaks pound until it becomes soft in texture and then manufacture into the *bajus* (jackets) and *chawats*, and very pleasing to the eye too are these garments, in hue reminding one of the colour of a new saddle whilst in length of time may wear quite as well, if not better than a garment of 'bazaar cloth'." Mr. Burbridge (*The Gardens of the Sun*, *1880*, p. 175) says that among the Muruts the Chawats are made of the bark of *Artocarpus elastica*. "The bark is pulled off a tree in broad strips and is very united and flexible; it is then hammered all over with a heavy wooden instrument, which has a flat surface on one

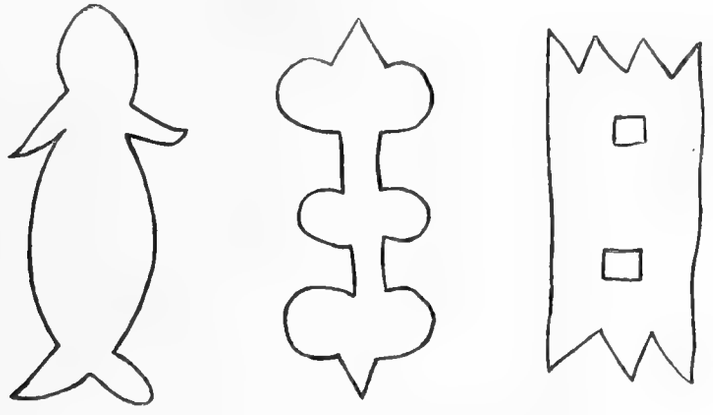


FIG. 24. DESIGNS ON NEW HEBRIDES TAPA.

side cut in deep cross lines like a file; this breaks up the harder tissues of the bark and reduces it to a very pliant, though by no means united, tissue. The bark being full of rents and holes this difficulty is overcome by transverse darning: one of these coats now before me has no fewer than 270 transverse strings on the back alone, each thread penetrating the outer surfaee only, and assists to work out a cross pattern for ornamentation. The size of a strip of bark for a *baju* is about 5 ft. x 18 in."[53]

When I turn to the Malay Peninsula I find not only the Malay race, but a far more primitive one, still in the exercise of pre-Malay customs, and about these still pagan races Messrs. Skeat and Blagden[54] have given us much information. I shall quote them as follows:—

"The girdle of bark-cloth is so well-known and so widely spread throughout S. E. Asia, the Malay Archipelago, and the Pacific Islands, that a very few words about it should here suffice. The finest and best known variety of this cloth is the 'tapa' cloth

[53] Exploration of Mount Kina Balu, North Borneo, by John Whitehead, 1893, p. 75.

[54] Pagan Races of the Malay Peninsula, by W. W. Skeat and C. O. Blagden. London, 1906.

of Polynesia. The cloth made by the tribes of the Malay Peninsula is, as a rule, more roughly manufactured, though some very good cloth, decorated with zigzag patterns, is made in Perak. An interesting point is that the grooving or toothing of the bark-cloth mallet used by some of the Jakun runs longitudinally instead of transversely as in specimens from Rotuma. [I, page 140.]

"The bark-cloth which forms the ordinary workaday wear of all the wilder branches of these tribes is usually made from the same material as the "tapa" cloth of Polynesia, though it is rarely, if ever, quite so finely worked up, and is generally, in fact, somewhat roughly made. When stripped from the tree it is beaten out by means of a wooden mallet, either round or toothed. A specimen of the latter, which was collected by the writer among the Blandas of Selangor, is now in the Cambridge Museum; this specimen is grooved or toothed transversely, as in Sakai specimens from Batang Padang (Perak), whereas in other districts, more under Semang influence, the flat under surface of the mallet is subdivided into a large number of small squares. The direction of the grooves or teeth must of course depend upon the position in which the operator sits or stands with respect to his work. The cloth when made is often decorated with designs, which again bear a curious family resemblance to the main designs sometimes seen on "tapa" cloth.

FIG. 25. SAKAI GIRL OF SOUTH PERAK.
Skeat & Blagden, I, 152.

"The tree from which the bark is generally taken is a kind of wild bread-fruit tree (*Artocarpus Kunstleri*, Hook.), which is called by the Malays "terap" or "t'rap". But the bark of other trees (even that of the Upas tree, *Antiaris toxicaria*, Bl., which furnishes the deadly dart-poison of these tribes) is also very generally used, the poisonous sap being merely well washed out of it with water. This particular kind of cloth seems generally to be recorded from districts under some degree of Semang (Negrito) influence." [I, page 375.] Fig. 26 shows a specimen of this cloth made by the Semang of Kedah with the club with which it was beaten out in the author's presence.

"According to De Morgan,[55] the Perak Sakai, when they wished to manufacture bark cloth, commenced by making incisions in the bark of a full-grown *Artocarpus*, so as to mark out a broad band or strip of bark, the size of which varied according to the object for which it was required, an average size being from three to four metres by from sixty to eighty centimetres.

"When the required strip had been thus marked out, the bark itself was hammered *in situ* until it was loosened and detached from the trunk. This strip was then taken and laid upon a tree-stump or anything else that might serve, and was then pounded with a wooden mallet, and (occasionally) decorated with designs in yellow paint (as among the Semang).

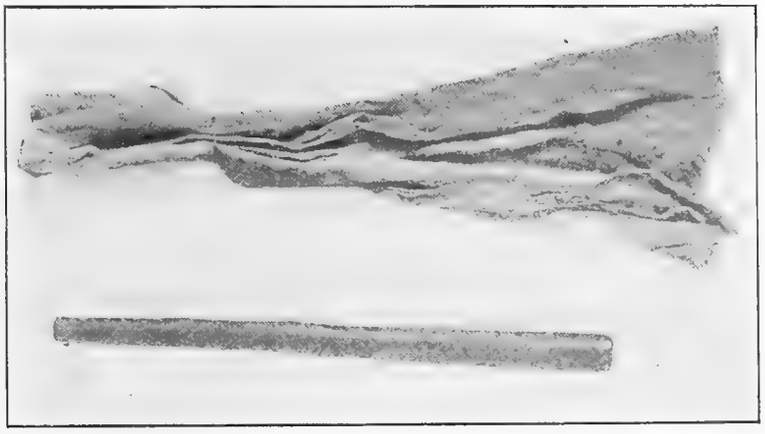


FIG. 26. CLOTH FROM UPAS BARK.

"The Sakai of Batang Padang (Mr. Wray informs me) employed mallets made of a piece of hard heavy wood about 13 in. (33 cm.) long, by 1½ in. (37 mm.) in diameter. The side of the mallet with which the bark is beaten is grooved transversely, the grooves extending about half-way round the stick. [I, p. 384.]

"I have seen the Semang of Kedah make cloth of Upas-bark by cutting down young saplings of the Upas tree (whose diameter was perhaps no more than 3 or 4 inches). These they 'ring-barked' a few feet from the root-end, and then loosened the bark *in situ* by hammering it with a mere rounded (hardwood) cudgel, and then turning it back by hand in the way that a sleeve is rolled back, or a stocking taken off, the process being continued until all the bark on each sapling has been similarly treated. As soon as the last of the bark has been thus stripped off it is thoroughly washed to remove the poisonous sap contained in it, dried for a short while in the sun, and is then ready for use without any further preparation. [I, p. 380.]

[55] Morgan, J. De.—Mœurs, coutumes, et languages des Négritos de l'intérior de la presqu'île Malaise. Bull. de la Société Normande de Géographie, tome vii, 411.

"The loin-cloth of the Negritos, which constitutes their sole garment, is made (according to De Morgan) from the bark of a tree (*Artocarpus*). The material is thick, but supple and soft to the feel, and is occasionally painted yellow with the sap of a plant, the patterns consisting simply of broken lines (*de lignes brisées*). Of the method of manufacture we are elsewhere told that the bark is either rendered supple by being pounded between two stones, or by being beaten upon a tree-trunk with a strong wooden mallet or cudgel.

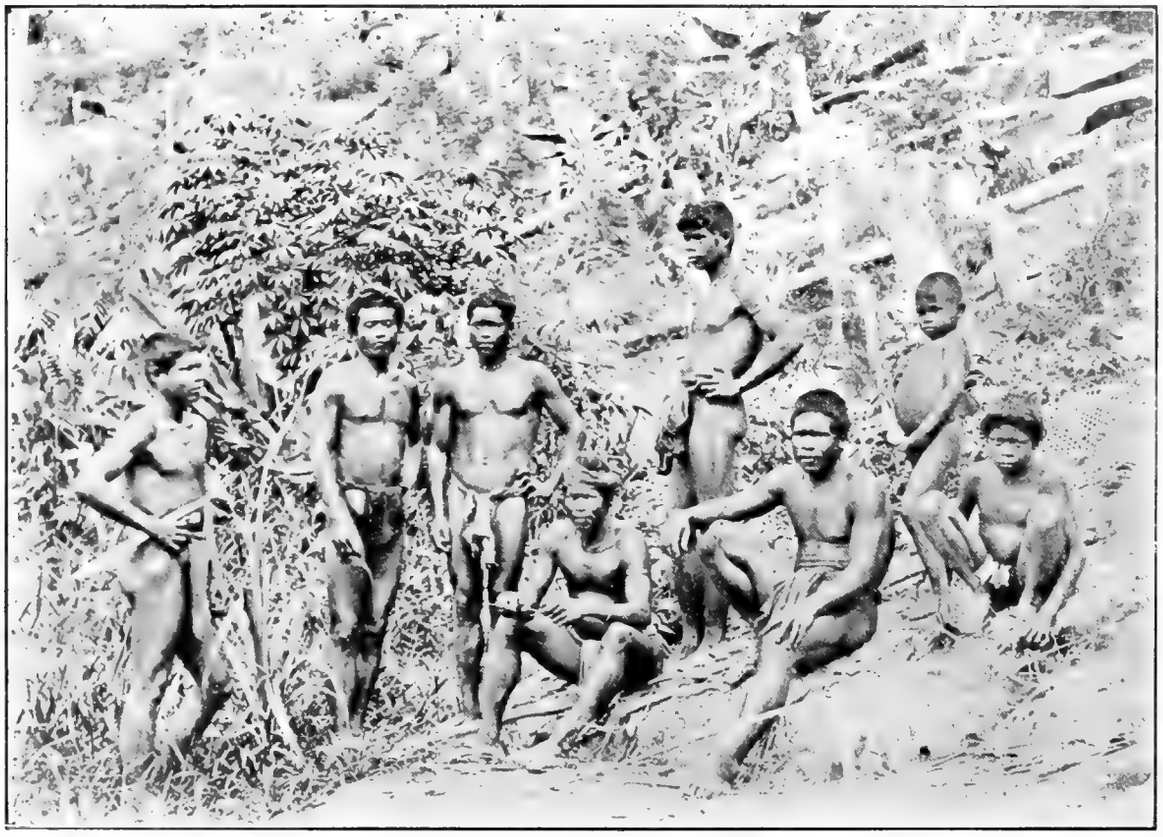


FIG. 27. GROUP OF ABORIGINES, ULU BATU, SELANGORE. MCGREGOR. (SKEAT & BLAGDEN.)

"In confirmation of the account given above of the Kedah Semang, I hear from Mr. Wray that the bark of the *Antiaris* was used by both the Semang of Perak and the Sakai as bark-cloth. It was prepared as follows: A young tree was felled and cut into pieces of suitable length. The outer portion of the bark was then shaved off with a knife and the inner bark was beaten with bat-shaped pieces of wood until it would slip off from the stem. The bark was then put into running water, in which it was allowed to remain for the space of one month to free it of the poison; then it was beaten with wooden bats, on one face of which furrows had been cut at right

angles to each other, to produce a grain on the finished cloth. In a recent communication Mr. Wray writes me that these mallets employed by the Semang of Perak to beat out the bark and give it the grain (which it retains even after considerable wear) are made of hard palm-wood. They are bat-shaped, with cylindrical handles, and have one surface of the blade of the bat scored with lines at right angles to each other, which leave projecting squares about a quarter of an inch across, divided by V-shaped grooves of the same width." [I, p. 381.]

"The methods used by the Blandas of Kuala Langat for manufacturing their bark-cloth are similar to those of the Sakai, the bark of the *Artocarpus* being detached and pounded in the same way. An interesting development of the wooden mallet used for pounding the cloth is, however, to be found among the Blandas, this mallet being furnished with transverse ridges or teeth cut into its under surface. These teeth facilitate the process of separating the fibres, and render the material softer and more flexible. As a rule the bark-cloth of the Blandas is quite undecorated, though when made from the bark of the *Artocarpus* it is stained by the sap of the tree to a sort of deep reddish tinge." [I, p. 389.]

In the old days when some ethnologists spoke of the Polynesians as "Malayo-Polynesians" one of the props of this theory of relationship was the similar bark-cloth made by the Malays and their supposed derivatives. For this reason I have gone more fully into the process used on the Malay Peninsula than I should otherwise have done, as bark-cloth seems an almost universal product of tropical peoples, and surely there is no close connection with the true Polynesian kapa-making, but the whole work reminds one more of the making or rather stripping the lace-bark of Jamaica, and no one has suggested a strain of Malay blood in the West Indians.

In the Nicobar Islands a rough cloth is made from the inner bark of a fig (*Ficus brevicuspis*) by the Shom Pen, a primitive Malay stock in the interior of Great Nicobar. Sheets of this bark-cloth are used as pillows and bed coverings, and among the hostile aborigines, it is said the women wear short petticoats of the material while the men go naked.[56] The Shom Pen brought several rolls of bark-cloth in pieces about 4 by 6 feet. (*Ibid*, p. 146.)[57] In common with the Andamanese (who are Negritos), clothing is of small account, and they were never impelled to beat the bark of trees to cover their nakedness.

Beyond the Indian Ocean the making of bark-cloth has passed to the great African island Madagascar, and as a strain of the "Malayo-Polynesian" race has here

[56] Kloss, C. Boden. — In the Andamans and Nicobars. London, 1903, p. 219.

[57] I have several specimens of the Shom Pen cloth made from the bark of *Celtis* (species unknown), a tree of the elm family (*Urticaceæ*); all are of the same brown color, and seem fairly strong; they were collected by E. H. Man, F. E. Tuson, in 1889, and Major R. C. Temple in 1895; all were sent to me by Prof. H. Balfour of Oxford.

made a home among the earlier inhabitants of the island, we should expect to find some trace of Polynesian customs, and in this we are not mistaken. In their burial customs the Hova have many points of contact with their brethren *outre mer;* nor this alone, but in other ways it is not necessary to mention here; the point of interest is,—did they make tapa? For a long time the people of Madagascar have had looms, rude indeed but capable of good results, and many of their *lambas* (a rectangular sheet worn somewhat in the manner of a Roman toga) show taste and good workmanship; they are also of considerable cost, from $25 to $50 each. With all their weaving they have not given up their bark-cloth, and I quote from the Rev. James Sibree, a well-known authority on Madagascar:—"The bark-cloth just mentioned, as used for girdles [malo], is made by the people of the south-east coast and the forest tribes; but in this branch of handicraft the Malagasy cannot compete with the delicate fabrics prepared from the bark of trees by many of the Polynesian races. The bark-cloth of the Taimòro, Tanála[58] and other tribes, is a coarse reddish-brown material, of little strength, except in the direction of the fibre; but its use, as well as the non-employment of skins for clothing, is one of the many links of connection between the Malagasy and the Malayo-Polynesian peoples, and serves (among many other peculiarities) to mark them off distinctly from the African tribes, who make such large use of the skins of animals as articles of dress."[59]

In Africa we reach perhaps the limit of our search for bark-cloth. Captain Richard F. Burton, whose travels made him familiar with so many people and their ways, tells us:—"At Ujiji the people are observed, for the first time, to make extensive use of the macerated tree-bark.....This article, technically called '*mbugu*', is made from the inner bark of various trees, especially the *mrimba* and the *mwale* [Raphia]. The trunk of the full-grown tree is stripped of its integument twice or thrice, and is bound with plantain leaves till a finer growth is judged fit for manipulation. The bark is carefully removed, steeped in water, macerated, kneaded, and pounded with clubs and battens to the consistency of a coarse cotton. Palm-oil is then spirted upon it from the mouth and it acquires the colour of chamois leather....They are fond of striping it with a black vegetable mud so as to resemble the spoils of leopards and wild cats.....Though durable, it is never washed."[60]

We have a later and somewhat fuller account from Baganda:—"Every man knows how to make bark cloths, and is expected to provide them for his wife and family, both for clothing and covering by night. The tree from which the bark is procured

[58] I have in my collection a specimen of cloth from the Tanala district, thanks to Prof. H. Balfour of Oxford; the color is shown in Pl. AA, No. 11; the texture is fairly even, thick and strong, but rough to the touch. It seems to be made as well as specimens from New Guinea, or the Papuan region at large.

[59] Madagascar before the Conquest. London, 1896, p. 330.

[60] Journ. Roy. Geog. Society, xxix, 222.

is a kind of fig which grows freely in every part of Uganda; the best kind, however, only grows in Sango, a part of Budu. The trees are at their best when about eight feet long in the trunk, and six inches in diameter. They bear one bark each year for six years, the third being the finest quality.

"The outer bark is scraped off the tree trunk, and the inner one, which is about three-eighths of an inch thick, is removed in one long strip, and left to harden all the night; the tree trunk is wrapped round with plantain leaves and a new bark grows; in the morning after its removal from the tree the inner side of the bark is scraped and the bark beaten on a log, having a flat surface made on it, with a round mallet in shape like a stone mason's, which has grooves running round it. The man goes over the bark three times using a different mallet each time in which the grooves are finer; after the third course of beating the bark is thin like a piece of coarse calico, all holes are patched, and the cloth is exposed to the sun by spreading it on the ground; the effect of the sun is to give the upper side a beautiful terra cotta tint whilst the under side is much lighter, almost yellow. [I have a specimen from Lake Mwero, British Central Africa, which I owe to the kindness of Professor Balfour of Oxford, which shows this variation of color.] The bark-cloth is cut so that the two pieces, when stitched together, form a square of about six or seven feet. Sometimes patterns in black from clay found in the swamps, or from a preparation made from charred wood and oil, are painted on the cloths to make them more valuable."[61]

Dr. Karl Weule, a recent traveler in central and eastern Africa, gives us some additional information as to the manufacture of tapa in the region east and north of Lake Tanganyika.[62] It seems that the active implements in the rude manufacture are a long, sharp and pointed knife, which is carried unsheathed in the belt, and a wooden hammer not unlike the primitive stone hammer, and like that lashed into the loop of a split bambu with a cunningly twisted strip of tapa. The stone hammer is to be found in all collections of the implements of undeveloped man, and this chiefly differs in the presence of a flatter head grooved with parallel cuts. In the more modern forms the handle is inserted into a hole in the head. It will be noticed that this is a marked departure from all the mallets we have seen hitherto.

Dr. Weule is not particular as to the kind of bark used, but it probably was one of the figs commonly used in central Africa; and a stem of about the thickness of a man's thigh is selected, and two circular cuts about ten feet apart are made through the bark and a longitudinal slit connecting these; the outer bark is then very carefully lifted by aid of the knife and wholly removed. The bast or inner bark

[61] Rev. J. Roscoe, Further Notes on the Manners and Customs of the Bagandas. Journ. Roy. Anthrop. Inst., 1902, p. 78.

[62] Dr. Karl Weule Negerleben in Ostafrica. Zweite Auflage, Leipzig, 1909, p. 355.

is then loosened at one end, seized by both hands and stripped off. This bast is carefully freed from any of the bark still adhering to it and soaked in water, after which it is folded into several layers and beaten on the smoothest portion of the stripped log until of a desired consistency when the soaking is renewed.

Pictures are given of a young man performing these several operations, but they are on so small a scale that they are of little value as explanatory of the process; they show, however, what he does not state, that the work is done not by women but by men. The cloth is very cheap, and soft enough to be comfortable for the scant garments into which it is made, but is by no means so good or fine as the famous cloth made at Uganda.

And this brings us to look for the "famous cloth"; perhaps no better authority on the Ugandan geography and natural history than Sir Harry Johnston[63] need be sought, and although, unfortunately, he tells us nothing of the manufacture, he gives us glimpses of the use of the fast vanishing cloth. Speaking of Uganda generally he says (p. 104): "The peasants, of course, when they are hard at work in the fields or making long journeys, will reduce their clothing to a tucked up bunch of bark-cloth covering the middle of their bodies between the knees and the armpits; but even the poor people, whenever they can, delight to cover themselves with loose sweeping garments made, if they are old-fashioned, out of the red-brown bark-cloth derived from a species of fig-tree. Since the country was opened up to the trade of the outer world, first by Arabs, and then by Europeans and Indians, it has been flooded with the white calico of England, India and America. There is scarcely any Muganda now so poor but that he can afford to wear a long trailing shirt of white cotton or linen, with long sleeves, and in addition a kind of rope of twisted white calico (like a halo) fastened round the head. Though it is considered the right thing in royal or aristocratic circles for the princesses or wives of the chiefs to wear bark-cloth rather than calico. The 'royal' bark-cloth is often covered with striking and tasteful designs, roughly stencilled on it with a black dye."

Again, speaking of the Banyoro, he said (p. 581): "They are *not a naked people*, but wear much the same amount of clothing as is worn in Uganda, though the *bark-cloth* manufactured is inferior in quality, and a much larger proportion of the people wear skins. Both skins and bark-cloth, however, are rapidly being replaced by the calico of India and America. It is, however, still the custom in Unyoro that a man and woman of whatever rank must, for at least four days after the marriage ceremony, wear native-made bark-cloths. In the north of Unyoro, however, especially amongst the Bachiope (Japalua), *absolute nudity* is the characteristic of both sexes."

[63] Sir Harry Johnson, The Uganda Protectorate. London, 1902.

Of the Bairo of Ankole he says (p. 607): "The Bairo used *dressed skins* or *bark-cloth.* However little they may have in the way of clothing, they generally so arrange it, as do the Baganda, to safeguard decency; whereas the men of their Bahima aristocracy, are more like the Masai, inasmuch as they rarely think it necessary to use their body coverings as *tegumenta pudendorum.*"

It seems almost rash to discuss the comparative value of the kapa of the various Polynesian groups with so little material before us, either of actual specimens or the contributions of careful observers; and if there were any hope of greatly extending our survey, now or at any future time, it would be unwise to sum up the old-time work which is no longer in vogue. Of the kapa itself there is perhaps here or there a specimen hidden in some private collection unnoticed; in museums some examples wrongly attributed; that is about all that remains outside. From the judgment of those who saw this primitive manufacture at its best on most of the Pacific groups, Hawaii and Tahiti certainly lead, and when we consider the material in hand, much of it brought home by Cook and the later explorers following in his wake, there can be little doubt that Hawaii leads in the variety and beauty of her design, while Tahiti seems to equal the northern group in fine quality of plain kapa.

From the Marquesas we have only plain kapa, good and useful, but not remarkable. From Fiji we have excellent design well executed, but the quality of the cloth is usually second-rate. Tonga has many fine specimens both of cloth and of decoration. Niuë was praised by some explorers for her work, but little of it has come into our collections, and the same is true of Mangaia, Rurutu and the southeast Pacific generally. Samoa seems to have been handicapped by the facility of production afforded by the *upete*, but the Samoans made finely ruled *siapo*, and also represented natural objects (Pls. 34, 23).

I have from New Zealand a single specimen of Maori-made kapa 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. Another single specimen from Lifu of the Loyalty group, is also made from the paper-mulberry, beaten with hoopai[64] beaters, and of tolerably even texture.

The Melanesian, Papuan, Malayan and African kapa certainly belongs to another class, and was generally made from very different material. The workmanship also is rude, often primitive; the dyes, where used (which was rarely), were not very skilfully applied and the decoration is largely symbolic and reminds one of the deerskin documents of the Amerind. Colors were few, although some of them seem very permanent, and it is not in evidence that the makers used carved stamps or type.

[64] Hoopai is described in the next chapter.

As we proceed we shall keep more strictly to the Polynesian industry, and especially the Hawaiian part of that, since it not only comprehends all the rest, except where we have already marked exceptions, but will probably be shown to be most complete in its technical *armamentarium*, and remarkably full in its artistic treatment. The Hawaiians had a far greater variety of implements; and their colors have proved far more durable than those of Tahiti, for example; and the variety of coloring matter at command was far beyond that of any other group.

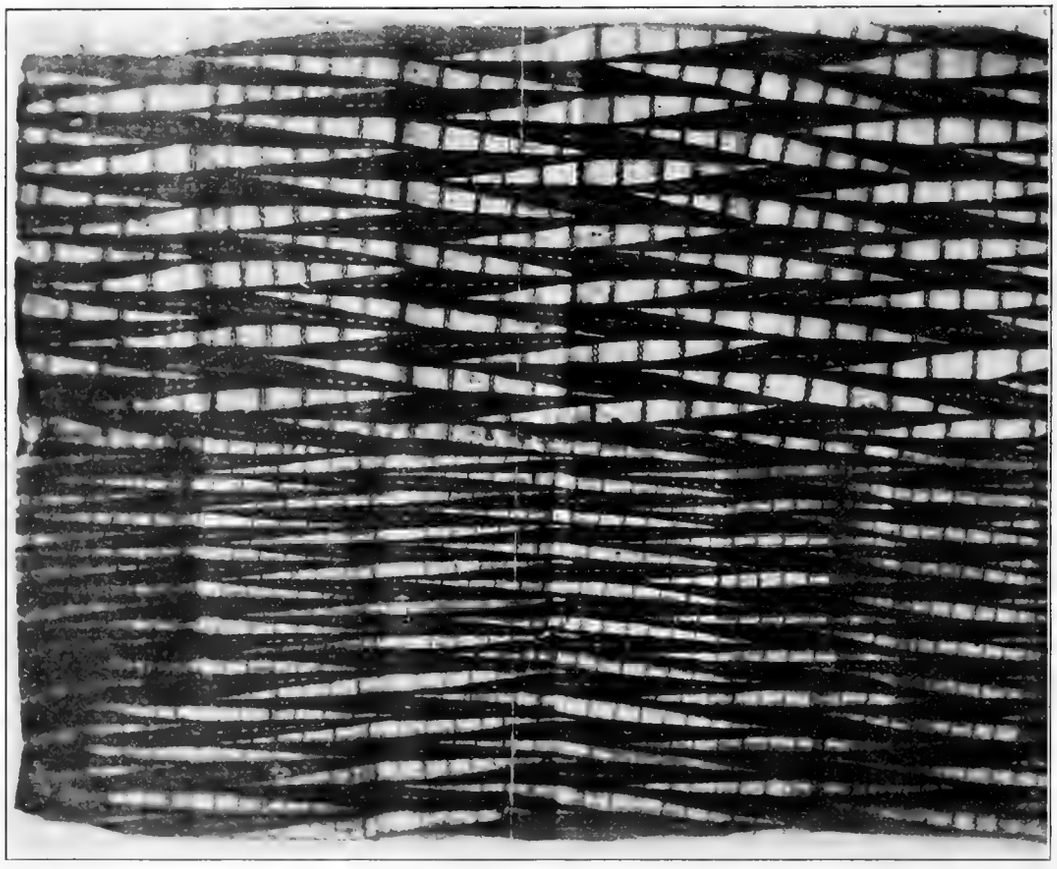


FIG. 28. SPECIMEN OF HAWAIIAN KAPA IN THE BRITISH MUSEUM.

I believe that Hawaii was the *fons et origo* of the Polynesian kapa-making, if not the point of distribution of the southern tribes from Samoa to New Zealand. This latter proposition I am not fully prepared to argue at present, and it may suffice to claim Hawaii as not only the chief maker of bark-cloth, but the teacher of many of the other groups. At this point may we not leave the historical matter and turn to the actual implements and processes of the Hawaiians? We shall then be on more solid ground.

FIG. 29. HAWAIIAN KAPA-MAKER AND HER ATTENDANT.

From a group in the Bishop Museum; the figures cast from life and colored by Allen Hutchinson; the background from a sketch by Weber, Cook's artist.

CHAPTER II.

THE TOOLS USED IN MAKING KAPA.

The geographical distribution, the history, even the use of a process must yield in interest to a study of the mechanical devices used in that process by a primitive people. Early methods of doing what we all as human beings have to do are full of interest, and although the earliest used by man as he emerged from the non-tool-using condition are beyond our ken, those used by the kapa-making people within the memory of those now alive, give us a clew to the earlier methods. We find to the very end of the kapa-making age a primitive simplicity. Nothing is complicated; there is no modern loom weaving tapestries with mechanism working as if the human brain which created it were still active in its midst. Indeed, the peoples making kapa almost without exception had no looms, even the simple ones that others, cotemporaries and equals in civilization, were using within their reach, almost within their sight. But while the tools were few and simple they still show ingenuity, adaptation and a development from simpler forms until the manufacture ceased with the acquisition of cheaper and more durable fabrics from the outer world, and the tools were thrown aside to grow no more; useless save in the cabinets of museums devoted to the study of the past in the onward march of human mechanical development.

While we wonder at and appreciate the mental exertions of the modern inventor, puzzling over the conversion of some circular motion to a reciprocal one, or the measure of power needed to actuate some more than usual delicate mechanism, we must not be blind to the toil expended, both mental and physical, by the primitive men whose brains, not yet developed by many generations of training, move slowly and painfully in the attempt to improve their tools, weapons or processes. Many years ago I was present at a meeting of the American Academy of Arts and Sciences when the Rumford Medal was given to the inventor of the Bigelow carpet loom, and I was deeply impressed with the account given of the history of this invention when it was stated that Mr. Bigelow rolled and writhed on the floor in the agony of search for a method of making metal do the work of human fingers driven by human brain. The mental strain was great, but the child born of that labor was worth the pain, and I have sometimes wondered why such a mechanical marvel is not (at least in part) brought into the curriculum of a nontechnical education to show the pupil how brain affects inanimate matter to achieve such results.

We honor inventors of new and useful tools or processes, and perhaps the Polynesian women appreciated those who made better tools for their kapa-making. Such improvements spread slowly, if at all, among the tribes, and we find a very few adopted over a wide range of territory; evidently the tool was thus far advanced before the dispersal of the tribes, if found far from home. There are none of the Pacific groups that have not some peculiar modification of a tool, and no one of the kapa-making groups whose arsenal was so full or so well developed as the Hawaiian, and for this reason it has been chosen as the norm with which all others may be compared. Taking up the tools in the order of their use, we shall find the earlier ones needed in the process, such as cutters for the twigs, or scrapers for the outer bark, show least

FIG. 30. HAWAIIAN SHELL AND BONE SCRAPERS.

variation throughout the kapa-making world. The stone adzes used for cutting the twigs were, it is true, used for so many more important works that their development had little to do with the present industry and they may be set aside.[38] The cutter to split the tube of bark longitudinally was almost universally a shell, for which many bivalves were adapted, and a shell it was (although usually of a thicker and firmer substance) that served as scraper to remove the outer bark from the fibrous portion before the beating began. In the Pacific the form varied little, and the Meleagrina was the favorite shell, although the Fijians used the Triton. On the Hawaiian group the tough bone of the carapace plates of the sea-turtle (*Chelonia virgata*) was used in common with the other, and it was more abundant, tougher and more easily worked; both are shown in the illustration, Fig. 30. As sea shells of the kinds used have outlines more or less curved, the first improvement was to grind an edge flat; then came

[38] This tool has been fully described in a former Memoir of this Museum on Hawaiian Stone Implements.

a sharpening (the original edge was sharp enough, but the new edge attained needed a bevel, and probably it was soon found that one angle was better than another); then came the rectangular form; and the last improvement that has been noticed was the addition of a strip of wood or fibre to the nearer edge to protect the hand of the operator. All this grinding and sharpening was a slow process, prolonged rubbing on a suitable stone surface, usually a block of phonolite.

FIG. 31. LAAU KAHI OLONA.

I have not been able to learn which, shell or bone, was preferred by the native workman, but as the scrapers in considerable number preserved in this Museum are about equally divided, there was probably no marked preference.

The anvil for these scrapers was, like the stone adz used in cutting the twigs, a tool by no means peculiar to the kapa-making. Primarily it was used for scraping oloná (*Touchardia latifolia*), a fibrous plant from which were spun the durable and much prized cords used for the best fishing lines and nets, and exclusively for the finer nets to which were attached the feathers of the Hawaiian feather cloaks. From this use the long smooth strips of wood shown in Fig. 31 were called *laau kahi oloná*, wood on which oloná is scraped; like so many of the primitive implements they had to serve various uses, and they never became specialized for the kapa-makers. Their length varied from 65 to 89 inches, their width from 2.5 to 10 inches. Only the upper face, which was slightly curved on its longitudinal axis, was finished to a smooth surface which use tended to keep fairly polished. It was usually wider at the base than at the distal end where the sides were sharply contracted for the attachment of a hank of fibre which was caught on the sharp point. The use of this board in the oloná manufacture has been figured in Pl. XV of Vol. II of these Memoirs: when serving for the decortication of waoke, mamaki or other bark in kapa-making, the position was varied to suit the length of bark.

Although the Hawaiians were not used to decorate, as did their kinsmen the Maori of New Zealand, their common tools, there are in this Museum some (as Nos. 735 and 739) showing slight ornamentation in the way of regular notches on the under edge. Such decorated laau kahi oloná were rare and belonged to the higher chiefs. Other peculiarities noticed are great width at the base, and a more than usual convex surface (No. 9413 is 7.5 inches wide at base, and 89 inches long, and

has a curvature of 8 inches radius; No. 7593 is 73 inches long, 9.7 inches wide at base, 5.7 at top, and has a radius of 145 inches), and a hole, round or square, at the smaller end for hanging on a peg or hook, or, it may be, for attaching the hank of fibrous material. Of course, hard, tough woods were essential, such as ohia (*Metrosideros polymorpha*), kauila (*Alphitonia excelsa*), or uhiuhi (*Cæsalpinia kauaiensis*).

The fibre, from whatever source, freed from its outer bark and well soaked (in running water by preference), was now to be beaten or felted, and with this process we take up tools peculiar to kapa-making. The earliest beaters used by a primitive people were simply round clubs such as are still used for the purpose by people who have not advanced far in this manufacture, as the blacks in central Africa. A modified and improved form of this rude beater was used by the Hawaiians for the

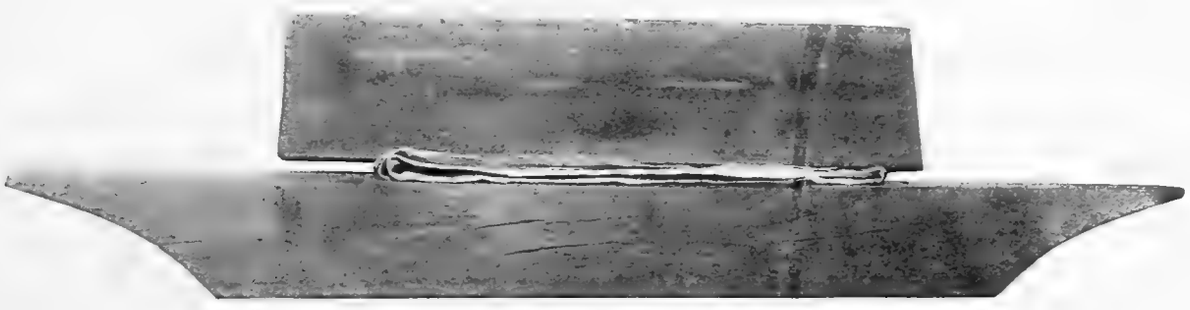


FIG. 32. KUA KUKU AND PAPA HOLE KUA ULA.

first beating of the fibre; sometimes a round club (No. 385), but generally grooved longitudinally (Nos. 367 and 372), and in all cases cut down at one end for a more convenient handle, and called *hohoa*. These three are shown in Plate I, and it will be noticed that one (372) is polyhedral, the others are round; they are represented about half size. The round was found better for separating the close fibre than the flat form used later in the manufacture. We have seen that other than Polynesians often with such round clubs beat the bark loose from the tree stems, as can easily be done in the case of some of the genus *Ficus*.

The Hawaiian, however, used an independent anvil made in a definite and little varying form after the primitive log had been discarded for something more convenient or efficient. I would not claim that the transition was immediate from the stem of a tree, or a rude log, to the complete anvil here figured. Doubtless there were many and various forms intervening, but the anvils in use at the time of the discontinuance of kapa-making were of this definite form, and none of the primitive ones had survived so far as known. It is noteworthy that the people of the other groups still held to the rectangular log, often (as in Tahiti) of considerable length, and so far as the ac-

counts of travellers or the collections in museums show us used no form so specialized as that on the Hawaiian group. Of those in this Museum the general dimensions and material are given in the following table:

NA KUA KUKU. ANVILS ON WHICH KAPA IS BEATEN.

Museum No.	Length.	Height.	Top Width.	Bottom Width.	
710	59.5 in.	4	2.7	5	
711	68.5	7.2	3	5.7	Old and in good condition.
712	70.7	6	2.7	5	Heavy dark wood.
713	61	5.7	3.7	6	
715	73.7	6.7	2.7	6.2	Kolea wood.
717	71.5	4.7	4	4.7	
718	73	4.7	4.2	4.2	
719	70	5	4.2	5.1	
720	69.5	7.7	3	7.7	
721	65.5	4	4.2	4.5	Kawau wood. (*Byronia sandwicensis.*)
722	68.5	6.7	3.2	5.7	Shown in Fig. 32.
723	66.2	3.5	3.7	4.7	
724	68.7	4.5	5	5	
726	59.2	3.5	2.5	4.2	
727	64.2	6.7	4.5	5.5	
6688	70.4	5.2	3.5	4.7	
6689	60.5	5.5	4	5	
6690	66.5	3.7	3.5	5	
9409	75	3.2	5	5	Kawau wood? Deverill coll.
9693	63.7	6.2	2.7	7	Dracaena aurea?

In use these *laau kui kapa* or *kua kapa* were supported on two stones. The under side was excavated longitudinally and the ends were bevelled as shown in Fig. 32. Supported thus these logs were quite resonant, and the old Hawaiians had a use for this beyond the titillation of the ear. The blows of the beater on this anvil could be heard at a considerable distance and were not unpleasing, damped as they were by the moist fibre between the opposed surfaces. Talking by means of a well understood code of signals (a sort of Morse alphabet), the old ladies beating kapa could disseminate the latest gossip telephonically through a long valley, and I have found the news of my coming had passed through the air long before I came in sight of a party of kapa-makers, as I rode up a valley trail. I was assured that when everyone was making kapa (usually during the forenoon) a message could be, and often was sent around an island by frequent relays. The signals used are now forgotten, but if my memory does not fail me, *aole* (no) was one blow, *ae* (yes) was two. The vocabulary

needed for primitive messages was scanty and its translation by a combination of blows and pauses of varying length was simple.

But all this telephony was done not with the hohoa but with the *ia* or *ie kuku*, a mallet differing from the former by having a section square instead of circular, and also in its most developed form having the four sides cut or carved with various devices. So, too, was the kapa beating done mainly with these ie kuku, and we shall find among them many fine specimens of carving done (let us bear in mind with a shark's tooth set in a wood or bone handle, or with a splinter of sharp stone), most of them, not necessarily any better for the work of beating, but merely fanciful designs for giving a "water-mark" to the product of a single maker, family or village; some seem to be

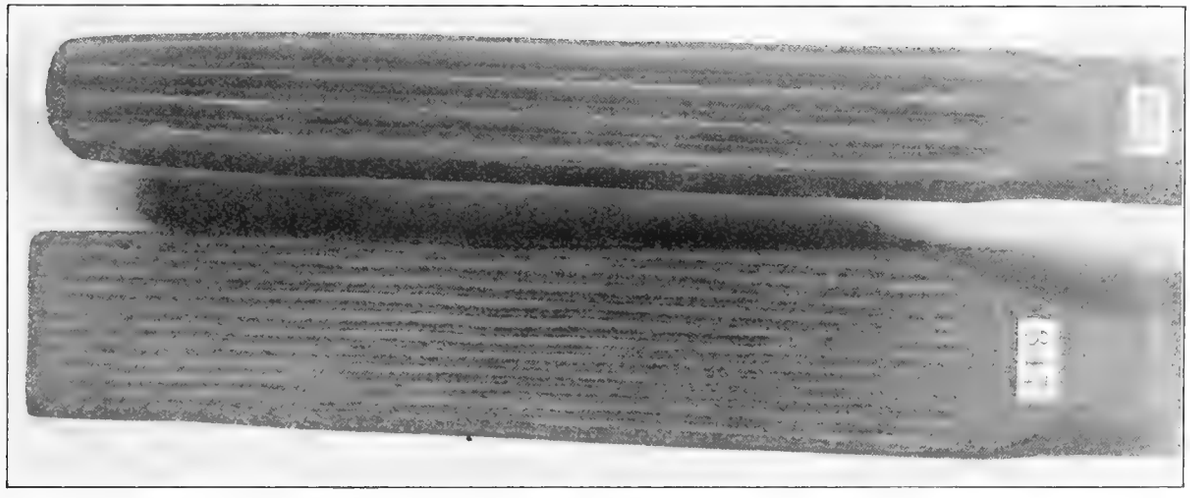


FIG. 33. FORMS OF PEPEHI.

confined to the island of Kauai, that rather odd member of the Hawaiian group. Of all these forms only two can be claimed as especially adapted to their use,—the finely ruled parallel lines *hoopai*, and the smooth, uncarved surface *mole;* the first best fitted to continue the work of the hohoa, the latter to produce the smooth surface fitted for very thin kapa, or a kapa to be printed.

While the *hoopai* is by far the most common, and almost always found on at least one side of a beater, the *pepehi* (= to beat hard) comes next and is used in the same way for disintegrating the bundles of fibre. The difference is in the size of the ridges separating the grooves and also in their shape, the former being sharp-angled, the latter rounded; in other words, the first has ridges resembling an inverted ∧, the second has them like an inverted ∩. In size of ridges and spacing they vary greatly as may be seen in the illustrations. Often they are alternate with the *hoopai*, *and when there are more than fourteen ridges on an average side the pepehi becomes hoopai.*

I have a photograph of a beater in the British Museum, apparently from the Society Islands, with the ridges not only rounded in transverse section, but neatly rounded to a point at the distal end. I am inclined to consider the *pepehi* the older form; it would be easier to make, and is found commonly on the beaters of other groups where the art had not reached the level of the Hawaiian. In the oldest the ridges are flat and rather wide, and there are seldom more than five on a side of the beater. Later the ridges became rounded and closer together until they could no longer be finished with a round top and were of the shape of, and, in fact were *hoopai*. In Fig. 31 may be seen several degrees of the *pepehi* form, while one of the finest specimens of the

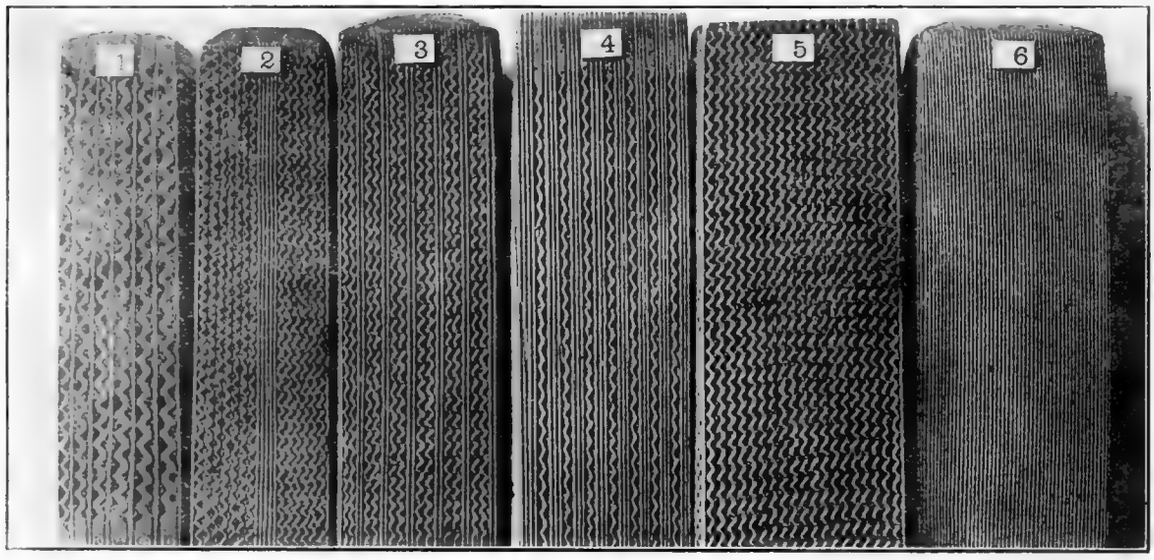
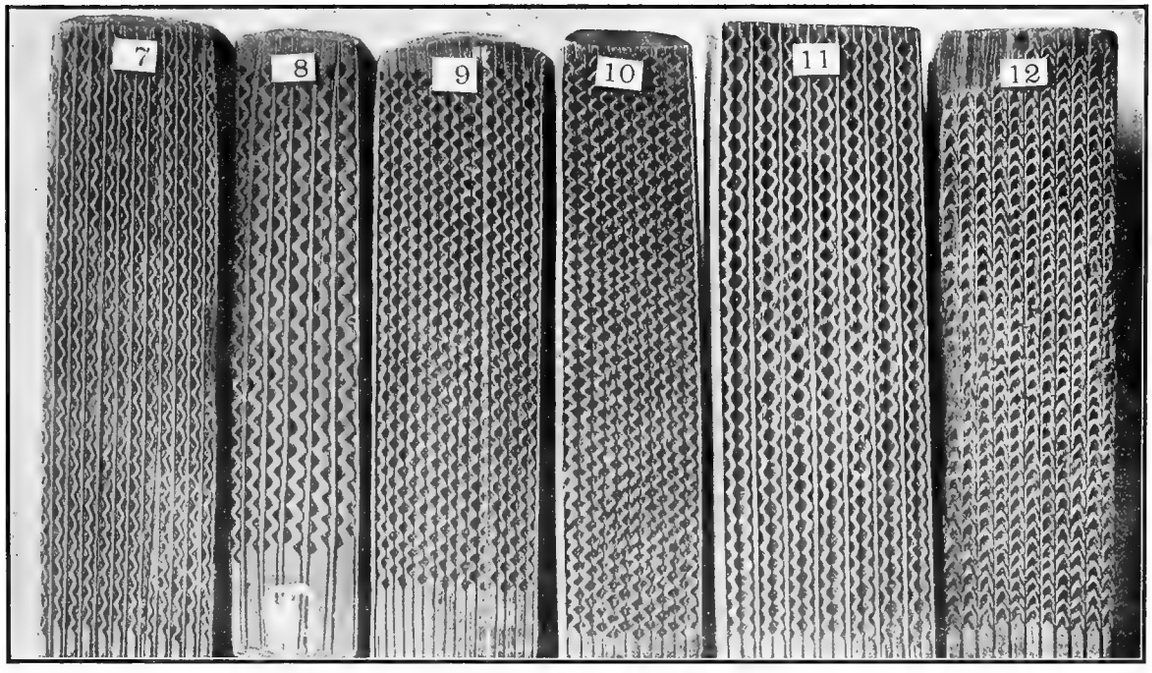


FIG. 34. FORMS OF IE KUKU.

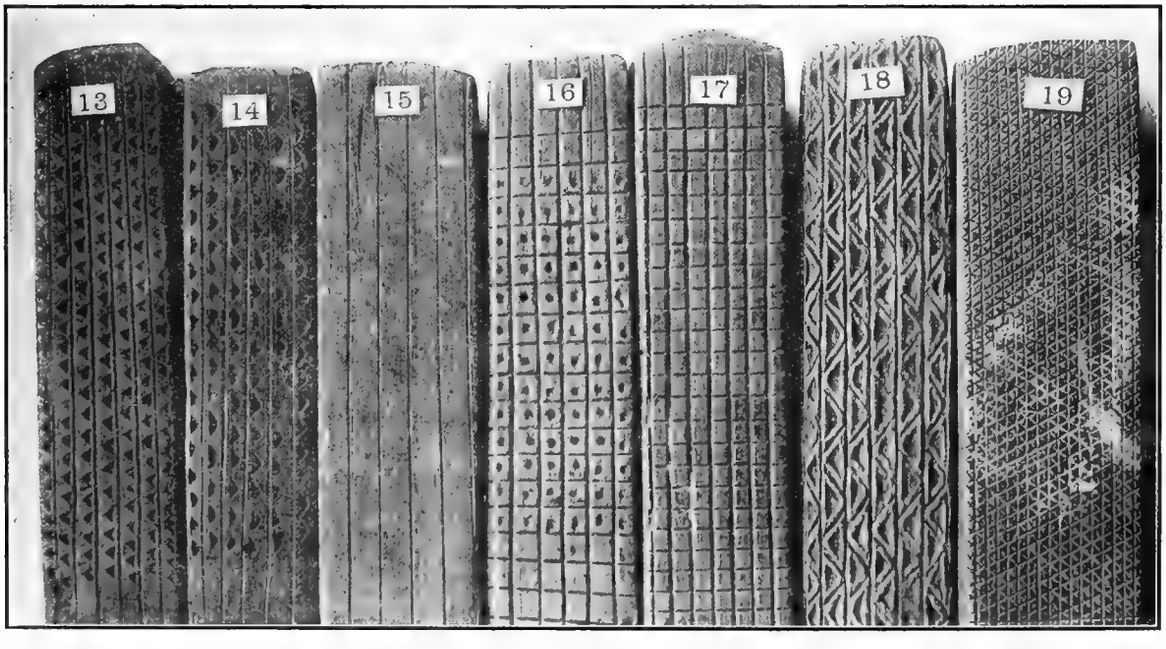
hoopai is shown in Fig. 34, No. 6. It will be remembered that all the markings on the preliminary beaters or *hohoa* were of the *hoopai* form, but generally coarser and deeper cut than in the specimen of beater just referred to. We will now turn to the less common and more elaborate designs.

All these had some significance, as shown in their names: thus *koeau* seems to come from *koe*, an earth-worm, and *au* signifying motion, Fig. 34, No. 5. This name applies when the undulating ridges are parallel, but when they are not so, but arranged as in Fig. 35, Nos. 9 and 10, the name is *puili* = a twining. The two are often combined in various ways as seen in Fig. 34, No. 2, and there is one specimen in this Museum (No. 205) where the two patterns alternate in sections a little more than an inch wide down the face of the beater. We will presently come to other modifications applying to all the patterns already mentioned, but we will first note the few other



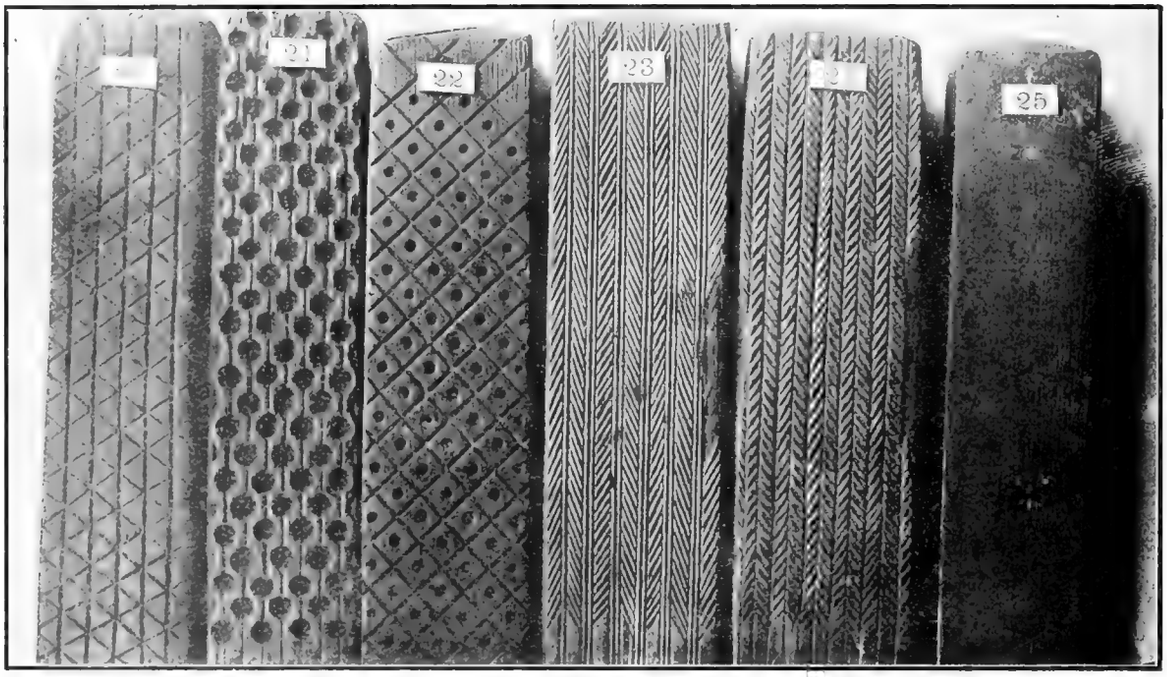
191 241 203 199 189 188

FIG. 35. FORMS OF IE KUKU.



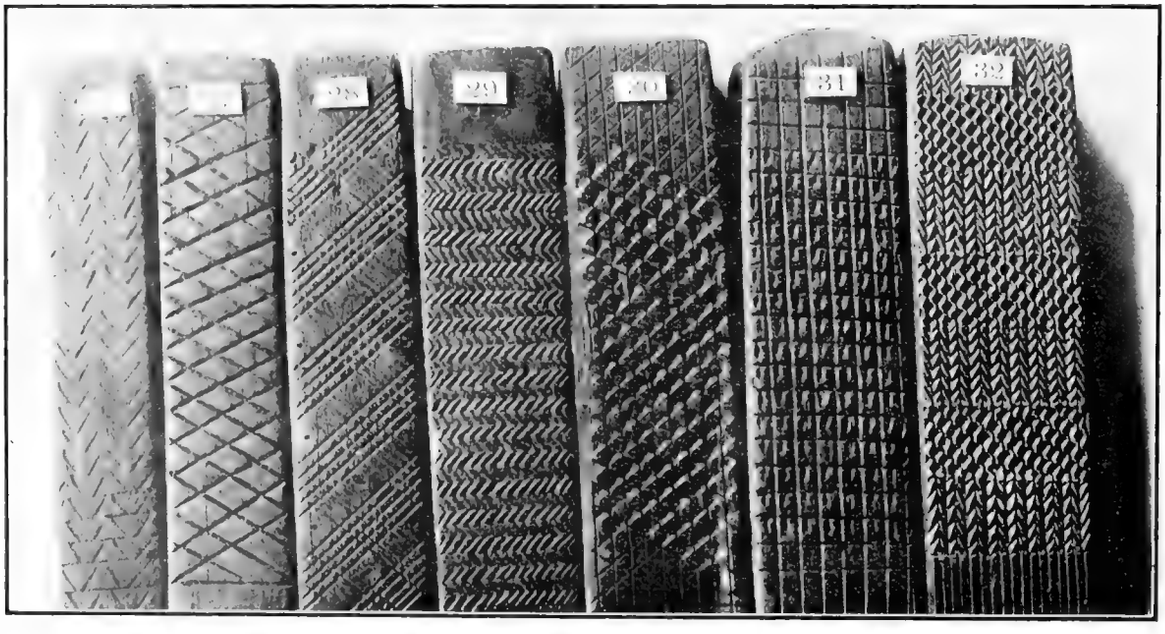
199 241 2920 210 209 2945 255

FIG. 36. FORMS OF IE KUKU.



209 2845 2920 188 191 364

FIG. 37. FORMS OF IE KUKU.



224 211 240 2927 2923 2930 205

FIG. 38. FORMS OF IE KUKU.

independent forms. The *iwipuhi* = back-bone of an eel, Fig. 37, No. 23; the *lauma'u* = pinnate leaf of a fern, and is hardly to be distinguished from *launiu* = coconut leaf; the *kapuai koloa* is supposed to resemble the track of a duck, Fig. 35, No. 12. *Halua leihala* was supposed to represent the favorite necklace of the ripe fruits of the Pandanus, Fig. 38, No. 26. Other less common forms will be found in the supplementary list of Hawaiian names of patterns given below.

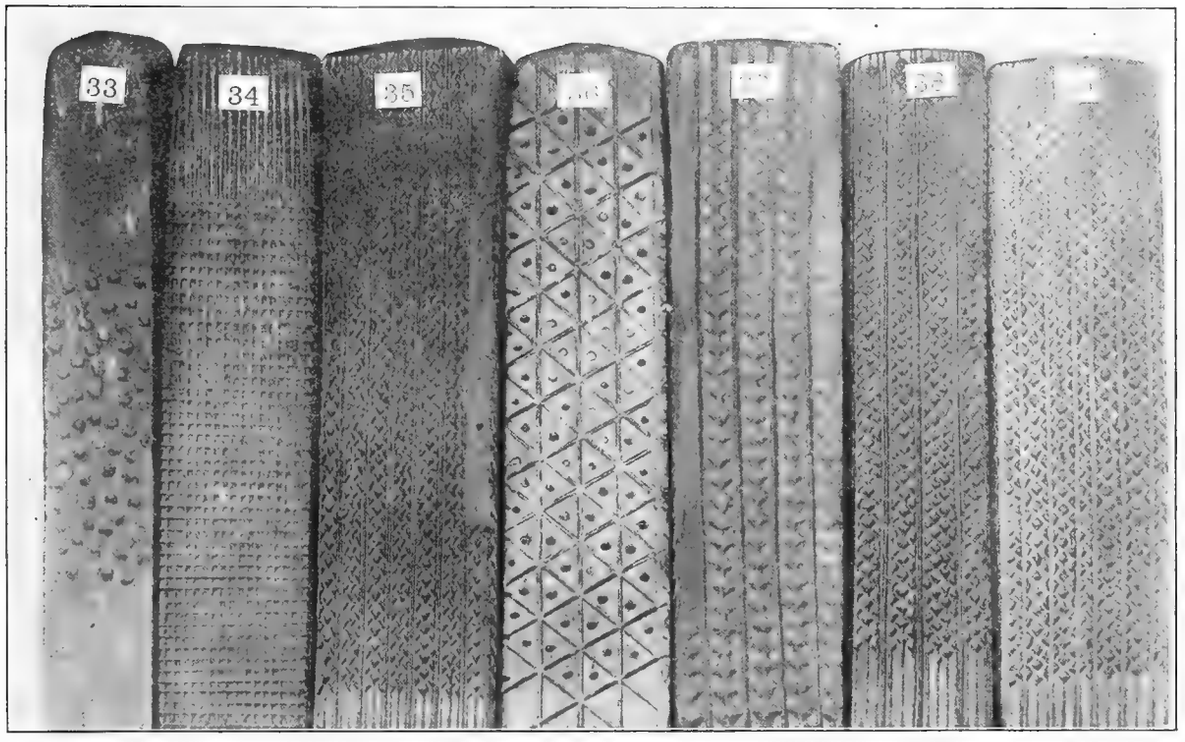


FIG. 39. FORMS OF IE KUKU.

To return to the modifications of the principal patterns: the *mole*, when marked by parallel, longitudinal lines (not deep enough to be *pepehi*, nor close enough to be *hoopai*) becomes *mole halua*, Fig. 36, No. 15; the same name applies if the lines are transverse; if the parallel lines are in two series crossing each other at less than a right angle the pattern becomes *mole halua maka upena*, or simple *maka upena* (meshes of a net) Fig. 38, No. 27. If any of these patterns, or the plain *mole*, have on their flat surfaces round holes the term *pupu* is added, Fig. 39, No. 33, Fig. 37, No. 22. If the indentations are triangular they become *niho mano* (shark's teeth), Fig. 36, Nos. 13 and 14; if rectangular, then *niho liilii* (little teeth), Fig. 38, No. 31. So *hoopai* crossed by lines at a right angle becomes *hoopai halua;* but when the crossing lines are at other angles it becomes *hoopai pawehe*, or *halua pawehe*, a term conveying some-

what the meaning of fanciful. All these variations apply as well to *pepehi*. The patterns *koeau* and *puili* often have the curved or zigzag lines separated by one or more straight lines; when one the term *halua* is added (Nos. 1, 7 and 8 of the series); when more, it is *halua pawehe*, Nos. 3 and 4. The stripe often includes two of the zigzags, as No. 3, and sometimes a number of stripes or *haluas* separate whole groups, as in No. 2.

A List of Patterns on the Ie Kuku.

The numbers refer to the series; if above 39, to the number on the plate.

Aha or Ahaana = Kapuai koloa, 12.
Ehe hoopii = Koeau, 5.
Haao = Koeau halua, 3.
Halua leihala, 26.
" koeau, better Koeau halua, 3.
" manama (branching) = Maka upena, 27.
" pawehe, 28.
" puili, better Puili halua, 1, 4, 7, 8, 11.
" pupu = Mole halua pupu, 16, 22.
Hoopai, 6.
" halua.
" puu.
Huelopoki = Iwipuhi, 23.
Iwipuhi, 23.
Kalukalu = Koeau (perhaps because this form is used for thin kapa).
Kapuai koloa, 12.
Koeau, 5.
" halua, 3.
" pawehe, 2, 3, 4.
Konane = Papa konane, 16, 17.
Laau niu.
Laukoa = Lauma'u, 24, 29, 32.
Lauma'u, 24, 29, 32.
Mole, 25.
" halua, 15,
" halua leihala, 26.
" halua pupu, 16.
" halua maka upena, 27.
" halua maka upena pupu, 22.
" pupu, 33.
Nanauahuki = Koeau halua.
Niho liilii, 31.
Oholupalupa, an angular puili, 1, 8.
Painiu = Lauma'u.
Papa konane, 16, 17.
Pawehe, 2, 18, 28, 30, 32.
Pepehi, Fig. 33.
" halua.
" halua maka upena, 19.
Puili, 9, 10, 21.
" halua, 1, 7, 8, 11.
" pawehe, 2, 32.
Pukapuka = Mole pupu, 33.
Uahaao = Halua pawehe.
Waieli or Waiali = Puili.

The proportion in which the more common forms occur in the collections of this Museum (including under the principal name all modifications) is as follows:—Whole number of sides, 1360. Hoopai, 497; Pepehi, 416; Puili, 53; Koeau, 48; all others 346.

Cutting the Patterns.—The process of cutting the designs on the *ie kuku* I have never seen, nor do I know certainly whether there were craftsmen whose especial work was in this line, although this is not improbable when we consider the specialization of work of this sort on the Polynesian islands. I believe such manu-

facture had already ceased when I first came to this group, and so great was the supply on hand that it fully sufficed for the needs of the rapidly disappearing industry. We have, however, certain specimens in this Museum partly made, or altered from an earlier pattern. These are shown in Fig. 43, and to this is referred the following description. The side of the *ie kuku* to be carved was first smoothed by polishing stones until a dead flat surface was obtained, the *mole* (abbreviated from *omolemole* = smooth). If the pattern desired was the most useful and common *hoopai* (*pai* a line and *hoo* the causative prefix), a straight edge made of a split bambu was held securely in place

FIG. 40. CUTTER WITH HUMAN BONE HANDLE.

while a V-shaped groove was cut by a sharp splinter of clinkstone, or more commonly in later times by a shark's tooth set in a suitable handle.[66] Examples of these are shown in Fig. 41, from models in this Museum carefully copied from originals in other collections. The various forms are well suited to hard wood carving, and are much more efficient than their rude form would promise. It would seem that the workman must have used some sort of gauge, so regular are the lines; in specimen 8673, each of the four faces measures 2.5 inches, and has fifty grooves or twenty to the inch: a good modern mechanic could hardly surpass this without machinery.

[66]A curious example of one of these cutters, a shark's tooth set in the end of a human clavicle, has been given on page 177 of the last volume of Memoirs, and is here reprinted in Fig. 40.

The form *pepehi* was probably cut in the same way, but the wider spacing and the rounded ridges required stone filing rather than cutting. The *hoopai* or *pepehi* on the *hohoa* could be ruled in the same way owing to the flexibility of the bambu straight edge: the grooves are usually deep and the ridges sharp. In some of the

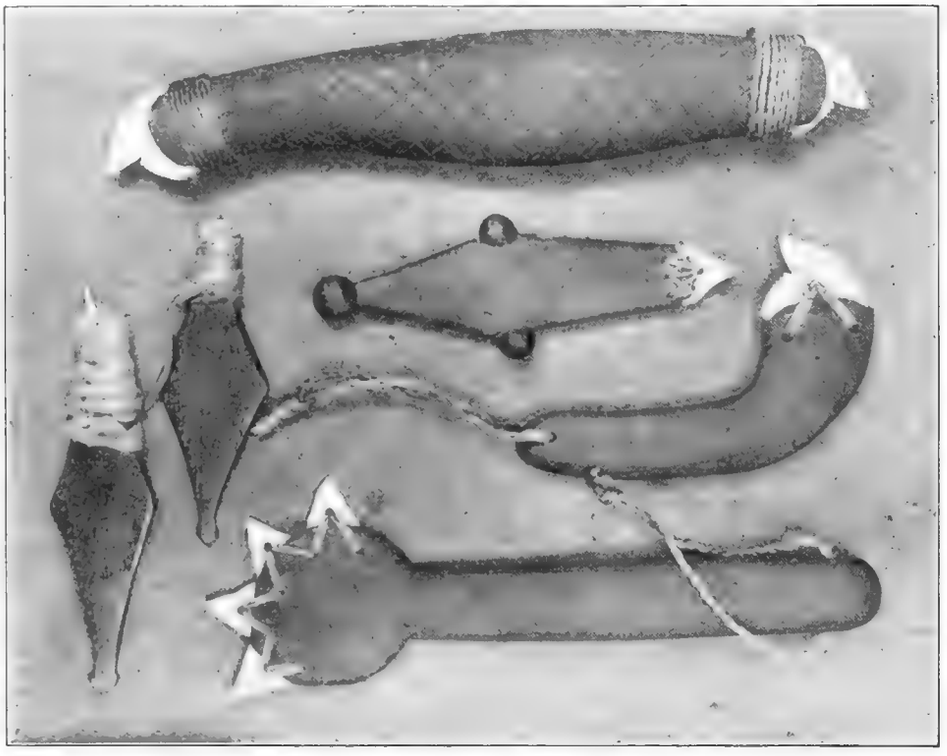


FIG. 41. HAWAIIAN CARVING TOOLS.

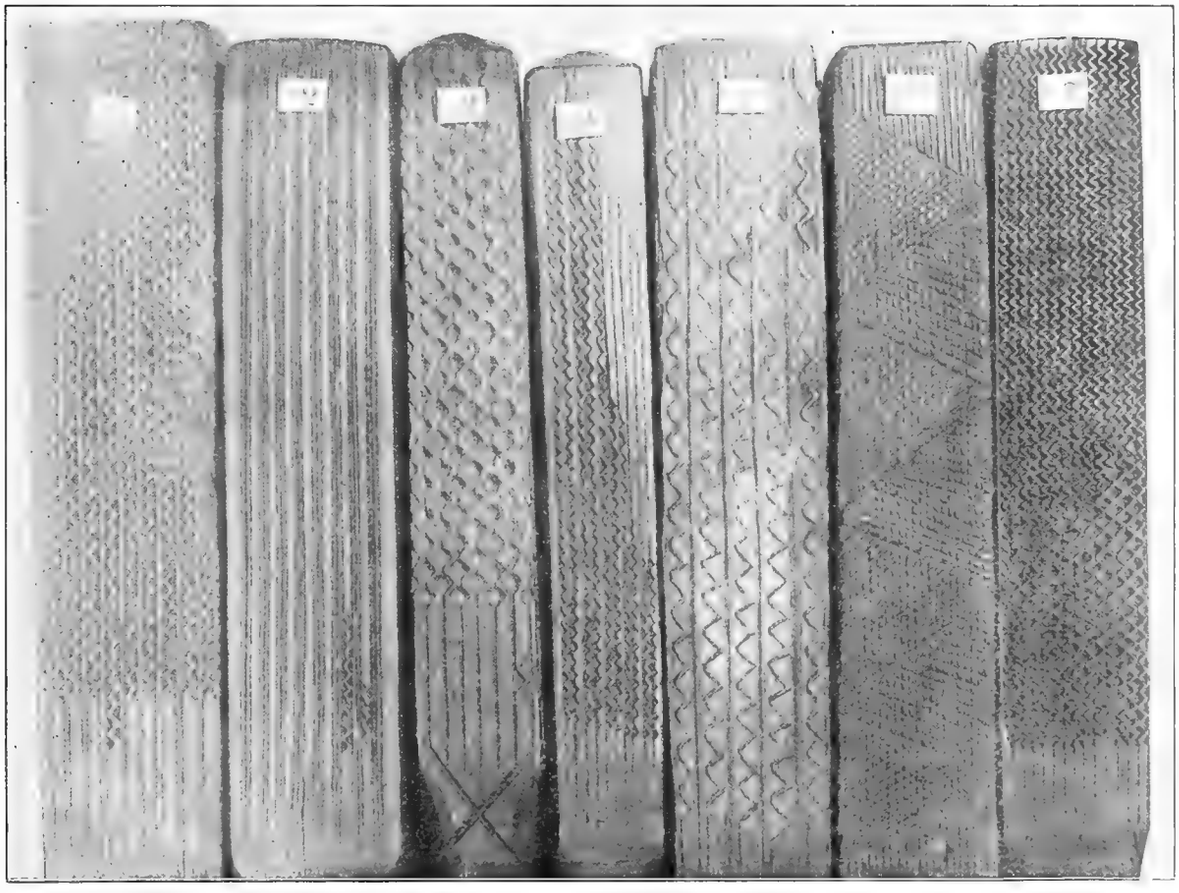
niho mano patterns (as on beater No. 2845, Plate II) the stone chisels seem to have been used, but it would be quite possible to cut this face with only the cutters described.

In the cutters there are several points to notice: the knobs on the middle figure are capital to steady the pressure of the grip, as I have found in experimenting with the tool; the lower tool has four teeth so that the worker may vary the angle of his cut, the teeth are of the common trianglar form with finely serrate edges; the cords by which the teeth are firmly attached to the handle are of the durable oloná. To these examples I may add one in the British Museum which differs from the others in the way of using; the bowl of the tobacco-pipe-shaped handle is the real handle which the worker firmly grasps, while the stem serves to keep the tooth "edge on". This tool is shown in Fig. 42. It is a much more

FIG. 42. CUTTER IN BRITISH MUSEUM.

practical tool than its odd outline would suggest, and from the number extant it would seem the most popular among the Hawaiian carvers.

It remains to be said that the *pupu* was usually made with the pump-drill, a tool universally known through the Pacific; rougher specimens of these shallow holes were made with the very useful tooth.



10077 364 247 3100 9376 9374 9996

FIG. 43. PARTLY CARVED AND UNUSUAL FORMS OF IE KUKU.

When we come to the more elaborate patterns, *koeau*, *puili*, etc., which, so far as I know, are distinctly Hawaiian, we see that the pattern was carefully marked from the handle end in parallel lines at intervals to suit the figures to be carved: Fig. 43, Nos. 1 and 2, will make this clearer. In No. 1, the workman evidently planned for a *koeau* with one *halua*, and he began, apparently at random, near the middle of the skeleton plan, but before cutting far he concluded that a shorter face would be better, and began again. Not being a first-class workman he suffered his zigzags to become irregular, and so in places made the pattern *puili*, returning gen-

erally to the *koeau*. In No. 2 there were two *halua* formed first and finished as in a moderately coarse *hoopai*, leaving rather narrow spaces for the "worms", two of which have been started. In No. 4 the spaces were but little wider and the *halua* were omitted, and we can see that one edge of the zigzag was cut first, leaving a serrated strip, and then the alternate strips were first finished. In No. 3 a different procedure was adopted and the zigzag was finished on both sides, forming a regular *puili;* this might have been made by drilling the shallow holes of the *pupu* in the proper places and then finishing, as seems more apparent in No. 3, of Fig. 43. The cleanest cutting is shown in No. 5; and the way in which the *koeau* was converted into *puili* and returned to the original pattern (from the regularity of the triangle of alteration evidently intentional) is well shown in No. 7.

List of Ie Kuku in the Bishop Museum.

The sides are described in order, beginning with the side directly beneath the number stamped on the end. On each side the longest face length is given. The material is kauila wood, unless mentioned. Measurements are in inches; weights in ounces.

Museum No.	Length.	Face.	Weight.	
188	16.6	8.6x2.1	31	Kapuai koloa; iwi puhi; hoopai 37; hoopai 37. Koaia wood.
189	15.9	7.8x2.4	43.5	Puili halua; koeau; hoopai 50; hoopai 41.
190	13.6	7.5x1.6	18	Puili; koeau; hoopai 23; hoopai halua 21.
191	15.7	7 x2	26.5	Lauma'u; koeau halua; puili; puili halua.
192	17	7.7x1.6	19.5	Puili halua pawehe; koeau; hoopai 21; hoopai 24.
193	15.2	7 x2.2	32	Koeau halua; puili; koeau; haao.
195	14.6	8 x1.4	14.5	Puili koeau, lauma'u; haao; hoopai 24; hoopai 19.
196	12.9	6.5x1.9	24	Koeau; hoopai 35; hoopai 33; puili.
197	15.5	7.2x1.5	16.5	Puili halua; puili halua; upena halua niho mano; koeau.
199	14.7	7 x1.6	20	Halua niho mano; puili koeau pawehe; puili; puili halua.
200	15.1	6.5x1.6	20.5	Halua puili; halua puili; koeau; halua puili.
201	15.5	8.3x1.4	15	Hoopai 19; hoopai 21; hoopai 19; puili halua.
202	15.2	6.5x1.5	19	Lauma'u; koeau; koeau halua; puili.
203	15.2	7.5x2	32	Koeau halua 2; koeau halua 2; hoopai 30; puili.
204	14.8	8.5x1.7	24	Puili pawehe; hoopai 17; puili pawehe; puili halua.
205	15	6.4x2	29.5	Lauma'u puili pawehe; puili halua; kapuai koloa; iwipuhi.
206	14.6	8.5x2	30	Hoopai 43; hoopai 28; hoopai 41; hoopai 23.
207	14.9	8.7x1.8	20	Halua upena; pepehi 10; pepehi 7; hoopai 30.
208	15.6	9 x1.9	23	Halua upena; hoopai 23; hoopai 31; hoopai 33. Nioi wood.
209	15	8 x1.9	18.5	Halua upena; □; pepehi 13; pepehi 6. Alani wood.
210	15	8.5x1.8	18	Halua pupu; pepehi 6; hoopai 17; hoopai 26. Alani wood.
211	14.6	8.5x1.5	16	Mole upena; pepehi 7; pepehi 10; mole halua. Koaia wood.
212	14.6	7.7x1.6	20	Pepehi halua 10; pepehi 7; mole halua; halua upena.
213	15.4	8 x2.2	39	Hoopai 50; hoopai 47; hoopai 45; hoopai 45.
214	15.4	8 x2	29	Mole upena pupu; halua upena; pepehi 12; pepehi 10.
215	14.5	8 x1.5	16.5	Koeau; hoopai 23; hoopai 24; puili pawehe. Koaia wood.
216	14.5	8.5x1.6	19	Hoopai halua 15; pepehi 10; hoopai 27; pepehi 6.
217	15	8.2x1.4	15	Mole pupu; mole pupu; pepehi 5; pepehi 6. Koaia wood.
218	15.8	9 x1.5	17	Halua pupu; pepehi 11; pepehi 7; pepehi 6.

Mus. No.	Length.	Face.	Weight.	
219	13	7 x1.4	14.5	Halua upena niho mano; pepehi 12; hoopai halua 19; hoopai 23.
220	13.7	7.5x1.7	21	Puili (oholapalapa); hoopai 26; hoopai 23; hoopai 25.
221	15.5	7.5x1.4	17.5	Lauma'u; koeau halua pawehe; puili; koeau.
222	16.2	9 x1.6	23	Pepehi 9; hoopai 20; hoopai 31; hoopai 37.
223	15.6	8.7x1.6	21.5	Upena halua pupu; pepehi 13; pepehi 9; pepehi 6.
224	15.2	9.5x1.2	13	Halua leihala; mole pupu; hoopai 26; upena pupu.
226	15	7.7x1.7		Hoopai halua 29; hoopai 26; hoopai 26; hoopai 26.
227	14.8	8.5x1.5	17	Kapuai koloa; hoopai 27; hoopai 27; hoopai halua 18.
229	15.4	8.3x1.9	28	Upena halua pupu; hoopai 19; pepehi halua 12; pepehi 13.
230	14	8 x1.7	23.5	Upena pupu; upena pupu; upena pupu; upena halua pupu.
231	15.2	8 x1.4	10	Pepehi halua 12; halua upena; mole; pepehi 9.
232	15	8 x1.8	25.5	Mole halua; hoopai 30; pepehi 11; pepehi 8.
233	14.6	8.2x1.7	20	Mole halua; pepehi 7; hoopai 15; pepehi 8.
233*a*	15.5	8 x2.1	33	Mole halua; hoopai 16; pepehi 11; pepehi 9.
234	14	7.7x1.6	18	Koeau halua; hoopai 19; puili; pepehi 8.
235	15.2	8.2x1.6	21	Pepehi 10; pepehi 9; pepehi 7; pepehi 8.
236	15.1	7.5x1.6	21	Iwipuhi; hoopai 32; hoopai 25; hoopai 16.
237	14.2	7 x2	27	Mole halua; pepehi 10; pepehi 9; hoopai 17.
238	13.7	7.3x1.5	14.5	Lauma'u; koeau halua; puili halua; koeau.
239	16.7	8.7x2	30.5	Mole halua; pepehi 10; pepehi 7; pepehi 7.
240	16.8	9.5x1.6	19	Halua pawehi pupu; halua upena pupu; halua upena; hoopai 30.
241	14	6.2x1.6	17	Haao; halua niho mano; halua puili; puili.
242	15	8 x1.5	21	Hoopai 26; hoopai 27; hoopai 35; hoopai 33.
243	14.9	7.5x1.4	18	Pepehi halua 10; pepehi 8; hoopai 17; mole. Koaia wood.
244	17.2	9.8x1.9	30	Pepehi halua 11; pepehi 15; pepehi 14; pepehi 10.
245	13.6	7.2x1.4	14.5	Koeau halua; koeau; hoopai 20; hoopai 26.
247	13	7.5x1.2	12	Puili; hoopai halua 15; hoopai 14; hoopai 22.
250	14.2	7.6x1.9	26	Hoopai 34; hoopai 37; hoopai 30; hoopai 27.
251	14.3	8.2x1.2	13	Pepehi 4; hoopai 20; pepehi 3; hoopai 21.
252	14.2	7.5x2	29	Mole halua; pepehi 9; pepehi 9; pepehi 13. Nioi wood.
253	15.6	7 x1.2	12.5	Koeau pawehe; hoopai 17; hoopai 14; puili halua.
254	15.2	8.2x1.5	19	Upena halua niho mano; puili halua; puili; koeau.
255	15	9.2x2	36	Halua maka upena; koeau pawehe 3; hoopai 53; hoopai 45. Koaia wood.
256	15.5	8.5x1.7	20	Pepehi halua 9; hoopai 24; hoopai 29; hoopai 26.
257	15.4	6.7x1.9	26.5	Haao; halua niho mano; puili; puili halua.
258	16.1	7 x1.6	21	Halua upena niho mano; puili halua; puili halua; puili halua pawehe.
259	13.5	6.7x2	27	Mole halua; mole halua; pepehi 7; pepehi 9.
260	14.5	7.2x1.3	15	Puili halua; hoopai 15; hoopai 20; hoopai 17.
261	16.2	8.2x1.8	27	Halua upena; mole halua; pepehi 10; pepehi 11.
262	14.6	7.2x1.8	24.5	Mole upena pupu; pepehi 11; hoopai 24; pepehi 11.
263	17	9 x2.2	43.5	Mole halua; pepehi 11; pepehi 12; pepehi 18.
264	14.5	8 x1.5	16	Pepehi halua 10; mole; pepehi 5; pepehi 7.
265	16	8.7x1.9	30.5	Puili halua pawehe; hoopai 22; hoopai 22; puili.
266	17	8.2x2	32	Mole halua; pepehi 7; pepehi 7; pepehi 9.
267	14.7	7.7x1.8	25	Hoopai halua; hoopai 18; hoopai 32; hoopai 30.
268	15.8	8.2x1.4	21	Hoopai 15; pepehi 10; pepehi 9; upena halua.
269	14.6	7.7x1.5	19	Hoopai 24; iwipuhi; puili; hoopai 20.
270	14.4	8.5x1.4	15	Mole; pepehi 7; pepehi 10; mole halua upena.

Mus. No.	Length.	Face.	Weight.	
271	14.5	8.5x1.2	12	Hoopai 17; hoopai 13; hoopai 21; hoopai 19.
272	15.6	8.5x1.6	22	Mole upena pupu; pepehi 9; pepehi 9; mole halua.
273	15.5	8.5x1.8	28	Pepehi 10; pepehi 10; hoopai 21; mole halua.
274	15.6	9 x1.5	18.5	Halua upena; halua upena niho mano; hoopai 13; pepehi 4.
275	17.5	9.5x1.3	15.5	Koeau; pepehi 9; pepehi 11; puili halua.
276	15	7.7x1.3	12	Hoopai 20; koeau; pepehi 8; puili.
279	13.7	7.3x1.7	20	Pepehi 5; hoopai 19; mole upena; hoopai halua 15.
280	15.2	8 x1.8	26	Puili; hoopai 30; hoopai 34; hoopai 37.
282	14.8	8 x1.8	26.5	Upena pupu; upena pupu; halua upena; upena pupu.
283	14.6	8.5x2	27	Mole halua □; hoopai 24; mole upena; mole upena.
284	14.7	7.5x1.9	25	Upena pupu; halua pupu □; halua upena pupu; upena pupu.
285	14	7.2x1.7	21.5	Mole upena pupu; mole upena pupu; hoopai halua 16; hoopai 16.
286	15.2	7.7x1.8	26.5	Upena halua pupu; mole upena pupu; pepehi 5; pepehi 8.
287	14.5	8 x1.5	17	Puili; hoopai 19; hoopai 22; pepehi 13.
288	14.5	6.1x1.6	18	Puili; puili halua; koeau; puili halua.
289	14.5	9 x1.4	14	Iwipuhi; hoopai halua 20; hoopai 22; puili.
291	15.1	9 x1.4	16	Pepehi 8; hoopai 17; mole halua; pepehi 8.
292	15	8.6x1.5	19	Pepehi 4; hoopai 24; pepehi 5; pepehi 8.
333	15.1	8.5x1.6	19	Hoopai pawehe 16; hoopai 22; hoopai 26; hoopai 27.
336	14	7.7x1.9	25	Pepehi 10; mole halua; pepehi 15; pepehi 7.
337	15.5	8 x1.7	25	Pepehi 12; hoopai 23; hoopai 20; pepehi 12.
339	13.5	7.5x1.6	18.5	Puili halua; hoopai 27; hoopai 21; pepehi 12.
340	13.8	7.7x1.7	18.5	Pepehi 5; mole halua; pepehi 9; pepehi 8.
341	15.2	8.7x1.9	32	Upena halua pupu; hoopai 46; hoopai 48; hoopai 27. Koaia wood.
342	16	8.7x1.6	20	Mole upena pupu; mole; mole upena pupu; mole upena pupu. Koaia wood.
343	14.2	8.5x1.4	17	Upena halua; hoopai 20; hoopai 22; hoopai 25. Koaia wood.
344	15.5	8 x1.6	23.5	Hoopai 25; hoopai 26; hoopai 25; hoopai 26.
345	15	8.6x1.4	16	Hoopai halua 15; hoopai upena 15; pepehi 10; pepehi 10.
347	14.9	7.7x1.7	23	Pepehi 11; pepehi 8; upena pupu; hoopai 17.
348	15.4	8.2x1.6	20	Puili halua; hoopai 30; hoopai 27; puili halua pawehe.
349	16.5	8.7x1.6	22	Pepehi 7; pepehi 5; halua upena; pepehi 11.
350	14.1	7.7x1.6	20	Pepehi halua 12; hoopai 27; mole halua; pepehi 9.
351	14.7	8.2x1.2	13	Pepehi halua 8; mole halua; mole; halua upena.
352	14.2	7.5x1.5	15	Pepehi 10; pepehi 14; hoopai 20; hoopai 19.
353	14.5	8.5x1.8	23.5	Hoopai 28; hoopai; 30; hoopai 35; hoopai 18.
354	16	8.5x1.9	28	Hoopai 25; hoopai 28; hoopai 30; hoopai 29.
355	14.2	7.5x1.4	17	Upena halua pupu; upena halua; pepehi 8; pepehi 13.
356	14.7	8 x1.7	19	Pepehi halua; hoopai 25; hoopai 21; pepehi halua.
357	16	9 x1.2	13	Halua pupu; pepehi 6; halua pupu; mole halua.
358	14	7.5x1.7	21	Halua puili; puili 5; hoopai 23; pepehi 4.
359	14.7	7.7x1.5	15	Hoopai 16; hoopai 21; hoopai 25; hoopai 24.
361	13.6	7.4x1.5	11	Hoopai 16; pepehi 6; halua upena pupu; pepehi 9.
362	15.4	7 x1.4	15	Lauma'u; puili halua; puili halua pawehe; kapuai koloa.
364	15.2	8.5x1.7	23.5	Mole halua; mole; mole; koeau halua pawehe.
386	16.5	8.7x1.5	20.5	Hoopai 20; hoopai 23; hoopai 21; hoopai 20.
387	15.5	7 x1.5	18	Niho liilii; puili; puili pawehe; hoopai halua.
387*a*	14.1	8.2x1.6	24	Pepehi 14; pepehi 9; hoopai 40; hoopai 39.
389	17	9.7x1.6	25	Upena halua pupu; upena halua; pepehi upena 11; hoopai 18.
390	14.5	8.7x1.6	18	Pepehi halua 10; pepehi 9; hoopai 30; hoopai 36.

Mus. No.	Length.	Face.	Weight.	
391	15.7	8.7x1.4	15	Hoopai halua; pepehi 12; mole upena pupu; hoopai 23.
392	14.6	9 x1.6	18.5	Mole halua; pepehi 6; pepehi 7; pepehi 11.
393	14.2	7.5x1.7	22	Hoopai 15; hoopai 21; hoopai 41; hoopai 35.
394	16	9.1x1.7	23.5	Pepehi 9; pepehi 12; hoopai 29; hoopai 36.
397	13	7 x1.7	19.5	Pepehi halua 14; pepehi 8; pepehi 7; mole upena halua.
398	16	8.7x1.7	23	Mole halua; hoopai 26; pepehi 10; pepehi 10.
399	14.2	8 x1.5	17	Mole upena pupu; mole upena pupu; pepehi 5; pepehi halua 10.
401	16.7	8.7x1.7	30	Upena halua pupu; pepehi 10; hoopai 25; hoopai 28.
403	17	10.6x1.3	18	Pepehi halua 7; pepehi 12; pepehi 12; pepehi 9.
404	14.2	9 x1.2	14	Mole halua; koeau halua; mole upena pupu; mole upena pupu.
405	17.3	10 x1.8	33	Halua maka upena; hoopai 40; hoopai 24; hoopai 34.
406	16.7	10.3x1.6	29	Pepehi 9; pepehi 11; pepehi 13; hoopai 17.
2845	14.5	8.5x1.8	22	Halua pawehe niho mano; halua pupu; hoopai 27; hoopai 22.
2846	16.2	8.5x2	29.5	Puili; hoopai 31; hoopai 30; puili halua koeau.
2847	14.5	7.5x1.7	21.5	Hoopai 17; hoopai 21; hoopai 24; pepehi 13.
2848	15.2	8.3x1.8	26.5	Pepehi 8; pepehi 9; halua upena; hoopai 18.
2849	15.2	7.5x2	28	Pepehi 9; mole halua; hoopai 19; pepehi 9.
2850	14.7	8 x1.6	19.5	Hoopai 39; pepehi 13; hoopai 28; hoopai 15.
2851	15.5	8 x1.9	21	Pepehi 8; mole halua; pepehi 12; pepehi 7.
2852	15.5	9 x1.2	11.5	Hoopai halua; pepehi 9; upena halua pupu; pepehi 13.
2853	14.5	8 x1.9	23	Pepehi 9; hoopai 23; halua upena; pepehi 9.
2854	14.4	7.5x1.6	18.5	Hoopai 15; pepehi 8; mole halua; hoopai 19.
2855	14.6	8.5x2	27.5	Pepehi 10; mole halua; hoopai 18; pepehi 11.
2856	12.5	6 x1.7	18	Haao; hoopai halua 18; hoopai 23; hoopai 33.
2857	13	7.7x1.3	14	Hoopai 15; hoopai 25; hoopai 23; hoopai 17.
2858	14	8 x1.3	12	Pepehi 7; koeau halua; hoopai 21; pepehi 12.
2859	15.5	9 x1.2	13	Pepehi 6; hoopai 21; hoopai 20; hoopai 15.
2860	14.5	8 x1.6	18	Hoopai halua; pepehi 10; hoopai 23; hoopai 26.
2861	14.7	8.4x1.5	20	Hoopai 14; hoopai 33; hoopai 21; hoopai 17.
2862	16.2	7.8x2.2	32	Pepehi 7; pepehi 6; hoopai 18; mole halua.
2863	15.5	8.5x1.8	26	Pepehi 8; halua upena; pepehi 9; pepehi 11.
2864	14.3	8.2x1.6	21	Hoopai 16; hoopai 25; hoopai 23; hoopai 19.
2865	14.2	7.7x1.5	18	Koeau; hoopai 35; hoopai 29; hoopai 30.
2866	15.8	9.5x1.7	26	Pepehi 9; hoopai 14; hoopai 33; hoopai 34.
2867	15.5	9.8x1.6	22	Pepehi 13; pepehi 10; hoopai 24; hoopai 18.
2868	16	10.5x1.4	16	Pepehi 8; pepehi 10; mole pupu; mole halua.
2869	15.2	8.7x1.8	25	Hoopai 15; hoopai 15; hoopai 30; hoopai 28.
2870	14	8 x1.6	19.5	Pepehi 9; hoopai 16; mole halua; hoopai 16.
2871	14.8	8.2x1.8	25.5	Hoopai 28; mole halua; pepehi 9; pepehi 14.
2872	15.1	8.5x1.8	29	Hoopai 36; hoopai 33; hoopai 33; hoopai 33.
2873	16	8.5x1.9	29	Pepehi 8; pepehi 9; mole halua; pepehi 10.
2874	13.5	7.7x1.6	16.5	Pepehi halua 14; upena pupu; upena pupu; upena pupu.
2875	13	7.6x1.5	15	Hoopai 20; hoopai 17; pepehi 7; pepehi 7. Koaia wood.
2876	14.7	8.7x1.6	22	Pepehi 14; hoopai 17; hoopai 30; hoopai 29.
2877	14.6	7.5x1.7	22	Hoopai 15; pepehi halua 7; hoopai 25; pepehi 13.
2878	15	8 x1.6		Pepehi 9; hoopai 24; pepehi 8; hoopai 20.
2879	16.7	9.9x1.4	20	Pepehi 7; hoopai 19; hoopai 28; hoopai 14.
2880	14	8.5x1.5	17	Hoopai 32; hoopai 35; hoopai 22; hoopai 16.
2881	15	8.2x1.5	17	Hoopai 24; hoopai 30; hoopai 30; hoopai 28.
2882	17	9.5x2	38	Pepehi 9; pepehi 12; hoopai 16; pepehi 6.

Mus. No.	Length.	Face.	Weight.	
2883	15.4	9.5x1.4	17	Pepehi 8; pepehi 11; hoopai 22; hoopai 22.
2884	16.2	8 x1.3	14	Pepehi halua 12; hoopai 26; hoopai 26; pepehi 10.
2885	14.8	8.5x1.6	21.5	Hoopai 15; hoopai 21; hoopai 27; hoopai 25.
2886	14	8.3x1.3	15	Pepehi halua 10; hoopai 20; pepehi 6; pepehi 12.
2887	14.5	8 x1.1	10.5	Pepehi 10; pepehi 7; pepehi 9; pepehi 11.
2888	14.5	7.5x1.6	20	Pepehi 10; hoopai 19; hoopai 32; hoopai 30.
2889	15.5	9.5x1.2	18	Pepehi 10; pepehi 7; hoopai 16; hoopai 16.
2890	15	8 x1.8	27	Hoopai 15; hoopai 32; hoopai 35; hoopai 35.
2891	15	8.5x1.5	20	Pepehi 12; pepehi 10; hoopai 25; hoopai 23.
2892	15	9 x1.3	18	Pepehi 10; pepehi 13; hoopai 34; hoopai 34.
2893	15.2	9 x1.6	21	Hoopai 32; hoopai 16; halua upena; hoopai 44.
2894	14.3	8 x1.5	18	Pepehi 8; pepehi 7; mole halua; pepehi 12.
2895	13.8	8 x1.5	14.5	Pepehi 7; mole; halua upena; pepehi 10.
2896	18.4	9.2x1.8	30	Hoopai 29; hoopai 23; halua niho liilii; pepehi 6.
2900	15.7	8.4x1.4	16	Hoopai 19; hoopai 20; hoopai 25; hoopai 25.
2901	15.4	9.1x1.6	29	Pepehi 12; halua upena; halua upena; pepehi 8.
2902	14.9	8.5x1.3	14	Pepehi 11; hoopai 16; hoopai 20; pepehi 14.
2903	15.1	8.5x1.4	14	Halua □; pepehi 7; pepehi 7; halua upena. Koaia wood.
2904	13.2	7 x1.5	16	Hoopai 16; hoopai 16; puili; hoopai 30.
2905	13.8	8.5x1.5	16	Hoopai 12; hoopai 21; hoopai 21; pepehi 14.
2906	15.7	9.2x1.7	21	Hoopai 32; pepehi 7; pepehi 12; hoopai 15.
2907	13	9.2x1.2	13	Pepehi 5; pepehi 5; pepehi 9; halua upena.
2908	15.5	8.8x1.6	20	Hoopai 30; hoopai 34; hoopai; hoopai 26.
2909	14.3	7.5x1.5	18	Pepehi 12; hoopai 16; hoopai 25; hoopai 30.
2910	15.2	7.7x1.8	21.5	Pepehi 7; mole halua; hoopai 27; pepehi 12.
2911	14.5	8.7x1.4	18	Puili halua; hoopai 27; pepehi 6; pepehi 12.
2912	14.6	8.4x1.6	27	Hoopai 14; hoopai 34; hoopai 20; hoopai 21.
2913	15.7	9.7x1.6	21	Pepehi 9; pepehi 11; hoopai 16; hoopai 25.
2914	12.6	6.7x1.2	11.5	Pepehi 6; hoopai halua 14; mole upena pupu; pepehi halua 8.
2915	14.7	8 x1.6	19	Hoopai 20; mole halua; pepehi 8; pepehi 9.
2916	13.8	7.4x1.5	18	Pepehi 9; pepehi halua 13; mole halua; mole upena pupu.
2917	13.2	8 x1.7	23	Hoopai 15; hoopai 33; hoopai 33; hoopai 23.
2918	14.6	8.2x1.6	21.5	Pepehi 13; hoopai 27; hoopai 27; hoopai 16.
2920	14.8	9 x1.9	25	Upena pupu; upena pupu; mole halua; pepehi 7.
2921	14.7	8.2x1.7	22	Hoopai 17; hoopai 20; hoopai 25; hoopai 30.
2922	14.5	8 x1.3	14	Pepehi 7; pepehi 8; halua upena; mole halua. Koaia wood.
2923	15.2	9.2x1.8	28	Niho mano; hoopai 47; hoopai 43; hoopai 18.
2924	15	4.5x1.7	15	Upena halua pupu; upena pupu; upena pupu; halua pupu □. Koaia wood.
2925	16.2	8 x1.9	29	Koeau halua; painiu; hoopai 26; hoopai 26.
2926	16.2	8.2x1.9	25	Halua niho mano; koeau; kapuai koloa; puili.
2927	16.2	7 x1.7	25.5	Lauma'u; kapuai koloa; lauma'u; lauma'u.
2928	13.6	8 x1.2	12.5	Halua leihala; hoopai 19; hoopai 20; mole pupu.
2930	14.6	8.2x1.9	21.5	Mole halua niho liilii; pepehi 7; pepehi 6; hoopai 23. Nioi wood.
2931	17.4	10.7x2.2	40	Hoopai 30; hoopai 21; halua pawehe; pepehi 14.
2932	16	9 x1.7	26	Lauma'u; hoopai 15; hoopai 28; hoopai 28.
2933	15.6	9 x1.7	24	Mole upena pupu; pepehi 10; hoopai 16; hoopai 26.
3073	14.2	8.2x1.5	14.6	Mole pupu; pepehi halua 8; pepehi halua 8; pepehi 6.
3074	15	9 x1.6	19	Pepehi 6; hoopai 18; pepehi 9; pepehi 12.
3075	14.4	8 x1	9.5	Pepehi halua 7; mole; halua upena; pepehi 7. Decayed.

Mus. No.	Length.	Face.	Weight.	
3076	15.4	8.7x1.5	18	Pepehi 12; pepehi 6; pepehi 7; pepehi 8.
3077	15.2	8.5x1.2	17	Hoopai 21; upena pupu; hoopai 21; hoopai 19.
3078	14.6	8 x1.4	14	Koeau halua; puili; pepehi 10; mole upena pupu.
3079	15.6	8.5x1.7	21	Pepehi 7; hoopai 25; hoopai 15; pepehi 6.
3080	14.2	7.6x1.5	16	Mole upena pupu; mole; pepehi 12; mole upena.
3081	14.5	8.5x1.1	10	Halua upena; mole pupu; pepehi halua 7; pepehi halua 10.
3082	15.4	9.5x1.1	8	Pepehi 4; upena pupu; upena pupu; pepehi 3.
3083	18	11.1x1.6	22	Upena halua pupu; hoopai 30; hoopai 29; mole halua.
3084	15.2	8.5x1.2	15	Pepehi 8; mole halua; mole; pepehi 11.
3085	14.2	7.2x1.8	25	Hoopai 40; hoopai 31; hoopai 36; hoopai 35.
3086	17.2	9.9x1.2	16.5	Pepehi 13; pepehi 9; hoopai 17; hoopai 22.
3087	14.5	8.5x1.6	20.5	Pepehi 8; pepehi 9; hoopai halua 21; pepehi 9.
3088	14.5	8.5x1.3	14	Pepehi 9; pepehi 10; hoopai 16; hoopai 16.
3089	14.6	8 x2	30	Pepehi 10; hoopai 15; mole halua; hoopai 35.
3090	14.2	8 x1.6	19.5	Pepehi 6; pepehi 8; pepehi 13; pepehi 10.
3091	17.5	10.8x1.6	24.5	Pepehi 7; pepehi 9; hoopai 18; halua upena.
3093	15.7	8.5x1.3	16	Pepehi 6; pepehi 9; hoopai 21; mole halua.
3094	16.8	10 x1.8	26	Upena halua; mole halua pupu; mole halua; pepehi 11.
3095	14.2	9 x1.9	28	Hoopai halua 29; hoopai 29; pepehi 13; pepehi 11.
3096	15.5	8.7x1.5	20	Puili halua; iwipuhi; hoopai 23; hoopai 26.
3098	13.2	7.7x1.7	20	Pepehi 9; pepehi 14; hoopai 23; hoopai 22.
3099	15	8.5x1.8	21.5	Upena pupu; pepehi 6; pepehi halua 10; upena pupu.
3100	13.5	6.5x1.2	11	Koeau; koeau; puili; hoopai rubbed off.
6861	13.2	7.5x1.5	16	Pepehi 8; pepehi 9; hoopai 17; mole halua.
6862	15.2	6.5x1.4	16	Halua koeau; puili; koeau; laau niu.
6863	15.2	7.5x1.6	21	Halua upena pupu; halua upena pupu; hoopai 15; pepehi 10.
7754	15.7	9.7x1.7	24	Mole upena; upena pupu; pepehi 8; hoopai 25.
8672	16.9	8.5x2.3	29	Hoopai 17; pepehi 9; pepehi 7; mole halua.
8673	14.5	7.8x2.5	42	Hoopai 50; hoopai 50; hoopai 50; hoopai 50.
8674	15.6	8.5x1.6	22	Puili halua; koeau; hoopai 38; hoopai 39.
8675	15.3	7 x1.4	17	Koeau halua; puili; koeau halua; kapuai koloa.
8676	13.5	8.2x1.3	15	Pepehi 7; pepehi 10; hoopai 25; mole halua.
9374	15.4	8.7x1.5	20	Pawehe; upena halua pupu; upena halua pupu; hoopai pawehe.
9375	17.5	10 x1.7	25	Hoopai 27; halua upena; hoopai halua 17; hoopai halua upena 16.
9376	15.7	9.7x1.6	24	Upena pupu; mole halua □; hoopai 21; puili halua. Nioi wood.
9377	17.2	10.7x1.8	31	Pepehi 14; pepehi 11; pepehi 7; pepehi 8.
9378	16.5	9.6x1.7	24	Upena halua pupu; upena halua pupu; pepehi halua pawehe; upena halua pupu.
9379	17.9	8 x1.7	30	Upena pupu; pepehi upena; halua upena pupu; halua pupu.
9380	15.7	9.5x2	29	Pepehi 8; pepehi 15; pepehi 11; pepehi 8.
9381	16	8 x1.5	17.5	Pepehi pawehe 12; pepehi 6; hoopai 22; puili halua. Uhiuhi wood.
9382	15.2	8.5x1.6	23	Niho mano; halua upena; hoopai 22; niho mano.
9383	17.8	10 x1.7	24	Upena pupu; hoopai 15; upena halua pupu; hoopai 21.
9384	14.5	8.2x1.4	17	Kapuai koloa; puili halua; halua upena; pepehi 7.
9385	15.8	9 x1.7	28	Hoopai 50; hoopai 28; pepehi 14; hoopai 32.
9386	15.2	9 x1.7	22	Halua upena pupu; hoopai halua 20; pepehi 12; pepehi 9.
9387	18	10.5x1.7	26	Pepehi 12; pepehi 5; pepehi 7; pepehi 10.
9388	15.2	8.5x1.7	22.5	Upena halua; upena halua pupu; hoopai 20; pepehi 10.
9389	15.8	9 x1.8	28	Hoopai pawehe 22; hoopai 30; hoopai 42; hoopai 24.
9390	16.8	9.5x1.9	29	Hoopai 39; hoopai 35; hoopai 36; hoopai 23.

Mus. No.	Length.	Face.	Weight.	
9391	16.8	9.5x1.9	30.5	Pepehi 12; pepehi 10; pepehi 12; pepehi 11.
9392	17	7.5x1.6	25	Upena halua; upena halua pupu; upena halua; upena pupu.
9393	18	9.9x1.4	22	Upena pupu; hoopai 17; hoopai 28; hoopai 25. Uhiuhi wood.
9394	16.5	9.7x1.6	24.5	Hoopai halua 15; pepehi 8; hoopai 18; hoopai 29.
9395	14.2	8 x1.4	14	Pawehe pupu; pawehe halua; halua upena; upena pupu.
9396	15.9	9 x1.4	16	Upena pupu; upena pupu; pepehi 6; upena halua pupu.
9397	16.5	9.8x1.7	27	Mole halua; pepehi 11; pepehi 6; pepehi 9.
9398	15.5	9 x1.6	21.5	Upena pupu; upena halua pupu; pepehi upena; pepehi upena. Koaia wood.
9399	15	6.7x1.7	23	Hoopai halua 17; upena halua; upena halua pupu; halua upena.
9400	17.2	10 x1.9	34	Pepehi halua; hoopai 28; hoopai 24; pepehi 11.
9401	15.2	8 x1.8	26	Upena halua pupu; halua upena; halua upena; mole upena pupu.
9402	16.5	10.5x1.5	21	Halua upena; pepehi 12; hoopai 18; hoopai 20.
9403	17.2	10.2x1.5	21	Iwipuhi; hoopai 18; pepehi 8; pepehi 13.
9404	14.5	7 x1.6	22	Upena halua; pepehi halua upena 13; halua upena pupu; hoopai halua 15.
9405	17.5	11 x1.7	32	Hoopai 29; hoopai 21; hoopai 32; hoopai 30.
9408	13.6	8 x2.1	30	Hoopai 42; mole; hoopai 33; mole.
9658	14.7	8.7x1.7	22.5	Koeau halua; hoopai 31; hoopai 33; hoopai 33.
9659	14	7.7x1.2	11	Pepehi 5; upena pupu; pepehi 4; halua upena.
9953	17	11 x1.8	36	Hoopai 33; pepehi 8; pepehi 12; hoopai 24.
9955	15.7	8.5x2	29	Hoopai 40; hoopai 19; hoopai 21; hoopai 34.
9956	15.5	9 x1.6	22	Hoopai 30; hoopai 30; pepehi halua 14; pepehi 10.
9957	16.5	8.7x1.9	28	Pepehi 7; pepehi 9; pepehi 12; pepehi 12.
9958	15.2	8.7x1.5	20.5	Pepehi halua 9; pepehi 9; halua upena pupu; halua upena pupu.
9959	15.5	8 x1.7	25	Hoopai halua 19; hoopai 35; hoopai 27; hoopai 35.
9960	15.8	8.2x1.6	20.5	Pepehi 12; pepehi 7; pepehi 8; mole halua.
9961	16.7	9.5x1.5	21.5	Pepehi 10; halua upena pupu; halua upena; pepehi 6.
9962	15.6	9.5x1.7	25	Hoopai 20; hoopai 20; pepehi 6; upena pupu.
9963	16	9.7x1.4	18	Pepehi 8; mole pupu; mole pupu; halua upena pupu.
9964	14.2	7.5x1.5	19	Pepehi halua 8; upena pupu; mole halua; pepehi 7.
9965	17	10 x1.6	28.5	Hoopai 20; pepehi 8; pepehi 11; hoopai 16.
9966	14.5	8.4x1.4	15	Hoopai 21; hoopai 24; hoopai 15; hoopai 15.
9967	16.5	9 x1.9	26	Pepehi 10; hoopai 27; pepehi 8; pepehi 8.
9968	14.2	7.7x1.5	19	Pepehi 11; hoopai 26; pepehi halua 13; hoopai 15.
9969	16.5	10 x1.9	29	Hoopai 27; hoopai 25; pepehi 13; hoopai 26.
9970	16.5	9.8x2	32.5	Hoopai 30; hoopai 27; hoopai 29; halua upena.
9971	15.7	8.2x1.6	22.5	Hoopai 25; pepehi 5; pepehi halua; hoopai 23.
9972	15.8	8.5x1.5	18	Hoopai 20; hoopai 27; hoopai 24; hoopai 20.
9973	15	8.6x1.7	22.5	Hoopai 30; hoopai 31; pepehi halua niho 10; pepehi 14.
9974	14.4	8.2x1.8	23	Hoopai 33; pepehi 11; pepehi 13; hoopai 18.
9975	17.3	9.8x1.4	18	Hoopai 22; pepehi 8; hoopai 20; pepehi 7.
9976	16.4	9 x1.5	16	Pepehi 9; pepehi 8; upena pupu; pepehi halua 7.
9977	16	9.7x1.2	14	Hoopai 17; pepehi 12; pepehi 13; mole upena pupu. Nioi wood.
9978	15.8	8.5x1.5	17	Hoopai 25; hoopai 23; pepehi 13; pepehi 12.
9979	15	8.2x1.8	19	Pepehi 8; pepehi 7; hoopai 17; pepehi halua 9. Lehua wood.
9980	15	9 x1.4	17	Pepehi 9; pepehi halua 8; upena pupu; hoopai 17. Lehua wood.
9981	15.5	8.2x1.5	20.5	Pepehi 7; pepehi 7; hoopai halua 15; halua upena pupu.
9982	17	6.7x1.7	16	Upena pupu; puili; puili halua pawehe; puili halua.
9983	16.7	9 x1.6	22.5	Mole halua; pepehi 5; hoopai 23; hoopai 27.

Mus. No.	Length.	Face.	Weight.	
9984	14.8	8.5x1.6	20	Pepehi halua 7; pepehi 6; upena pupu; hoopai 22. Koaia wood.
9985	15	8.8x1.7	23	Pepehi 9; pepehi 7; mole halua; pepehi 12.
9986	15.5	9 x1.4	15	Halua upena; pepehi 14; pepehi 6; pepehi halua 6. Koaia wood.
9987	15.2	8.3x1.4	17	Upena pupu; halua konane pupu; pepehi 6; pepehi halua 9.
9988	16.8	9.7x1.2	12	Mole pupu; pepehi 7; pepehi 10; pepehi halua 6. Koaia wood.
9989	14.4	8 x1.4	15	Pepehi 13; hoopai 20; hoopai 22; pepehi 11.
9990	14.5	8.6x1.4	14	Hoopai 16; pepehi 9; pepehi 8; hoopai 20.
9991	13.5	8.5x1.2	12	Mole halua; pepehi 5; mole pupu; pepehi 9.
9992	15	9 x1.7	28	Hoopai 38; hoopai 33; hoopai 33; hoopai 25.
9993	16.6	9.2x1.5	20	Hoopai 26; pepehi 11; hoopai 15; hoopai 27.
9994	14.7	8.5x1.5	16.5	Pepehi 5; pepehi halua 9; mole; mole upena pupu.
9995	14.5	8.7x1.2	12.5	Pepehi 7; mole halua; mole; pepehi 11.
9996	14.6	7.2x1.5	18	Koeau puili; puili halua pawehe; puili halua pawehe; puili. Koaia wood.
9997	13.4	7.5x1.6	19.5	Hoopai 27; hoopai 31; hoopai 32; hoopai 15.
9998	15.2	9 x1.2	12.5	Mole upena; hoopai 14; pepehi 8; mole halua.
9999	15	9.5x1.3	14	Iwipuhi; iwipuhi; hoopai 19; laau niu.
10077	15.9	6.7x1.9	29.5	Koeau; puili; puili halua; koeau halua.
10978	15	9.7x1.5	17	Hoopai 21; hoopai 23; pepehi 8; pepehi 12.

Papa Hole Kua Ula, or Malo Boards.

We come now to an implement which seems logically between the *kua kuku* and the *ie kuku*, the anvil and the beater. It is, in its usual form, a rather long and narrow board of the hard and tough kauila wood, grooved in the *hoopai* pattern, one of which is shown in Fig. 32, resting on the ordinary anvil. Others are shown in Fig. 44 that the varying sizes may be noted: the dimensions are given below.

These are said to have been used in making *malo* and *pa'u*, the waist cloth of the male and female respectively. I have never seen them used, and they are rare; neither are they found on the other groups, so far as known. A curious modification that brings them nearer to the kapa beaters is found in a specimen in the British Museum, and in another belonging to Hon. S. M. Damon, which he has kindly placed at my disposal for illustration (Fig. 45). I have seen no other specimen. The length of this is 32.5 inches, and the equal faces are 2.5 inches wide; the grooves number 39–39–19–38; length of face, 26 inches; weight, 7 lbs. 7 oz. The corners are slightly broken.

I believe that the effect in breaking up the fibre and making the tissue very flexible would be marked in the motion of two sets of *hoopai* grooves at nearly right angles to each other; the result must be a gentle pulling or grinding action, hence the product would be quite suitable for the malo or pa'u, both of which garments should be soft and flexible to be comfortable. We may consider then that the *papa hole kua ula* were a refinement for better finishing kapa.

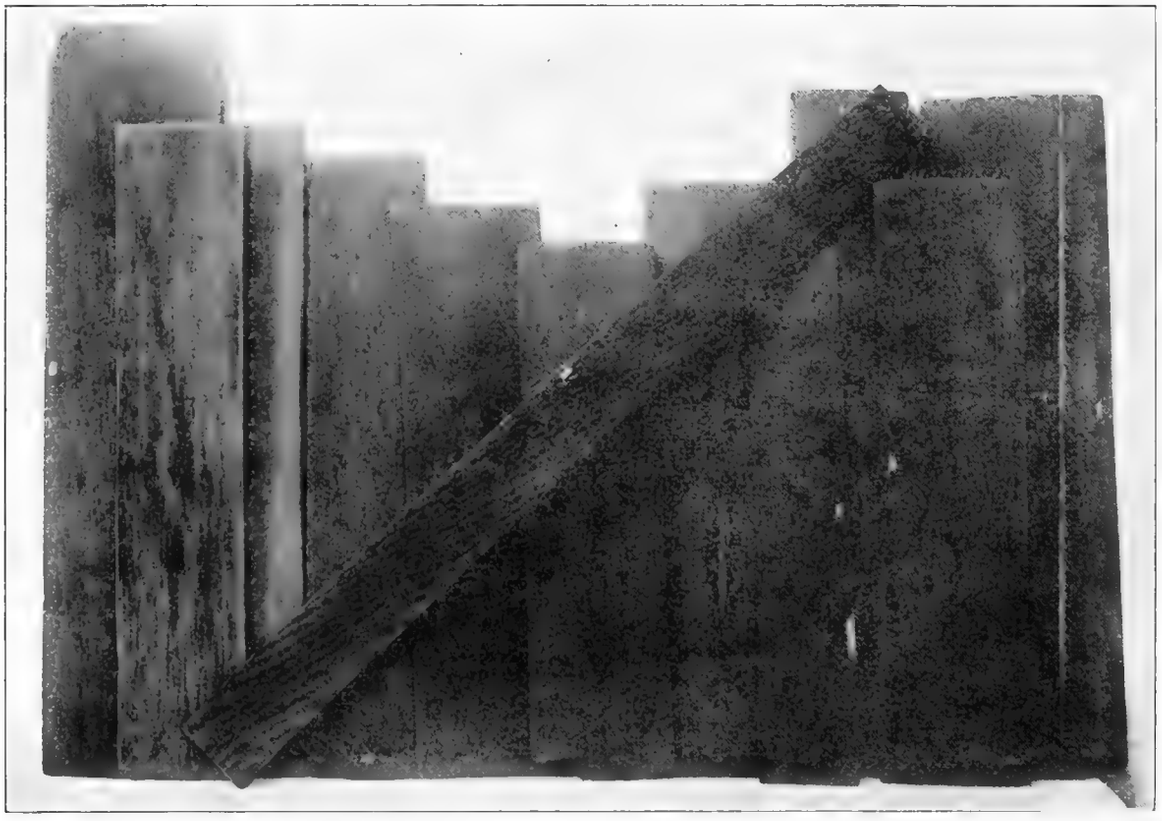


FIG. 44. PAPA HOLE KUA ULA.

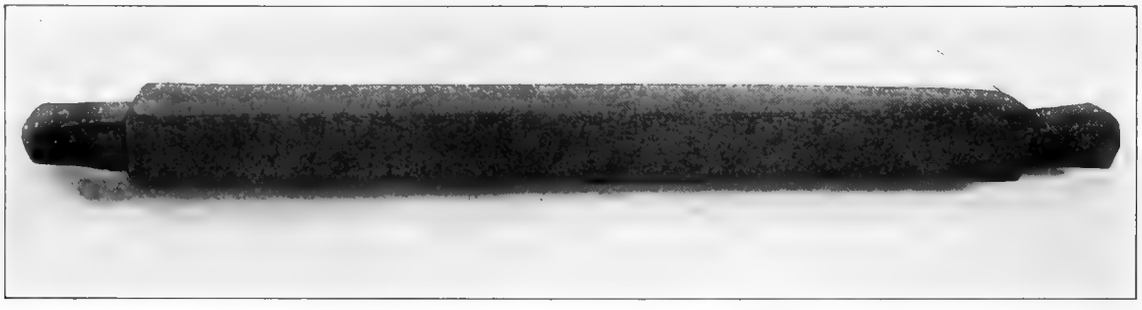


FIG. 45. PAPA HOLE KUA ULA, IN MR. DAMON'S COLLECTION.

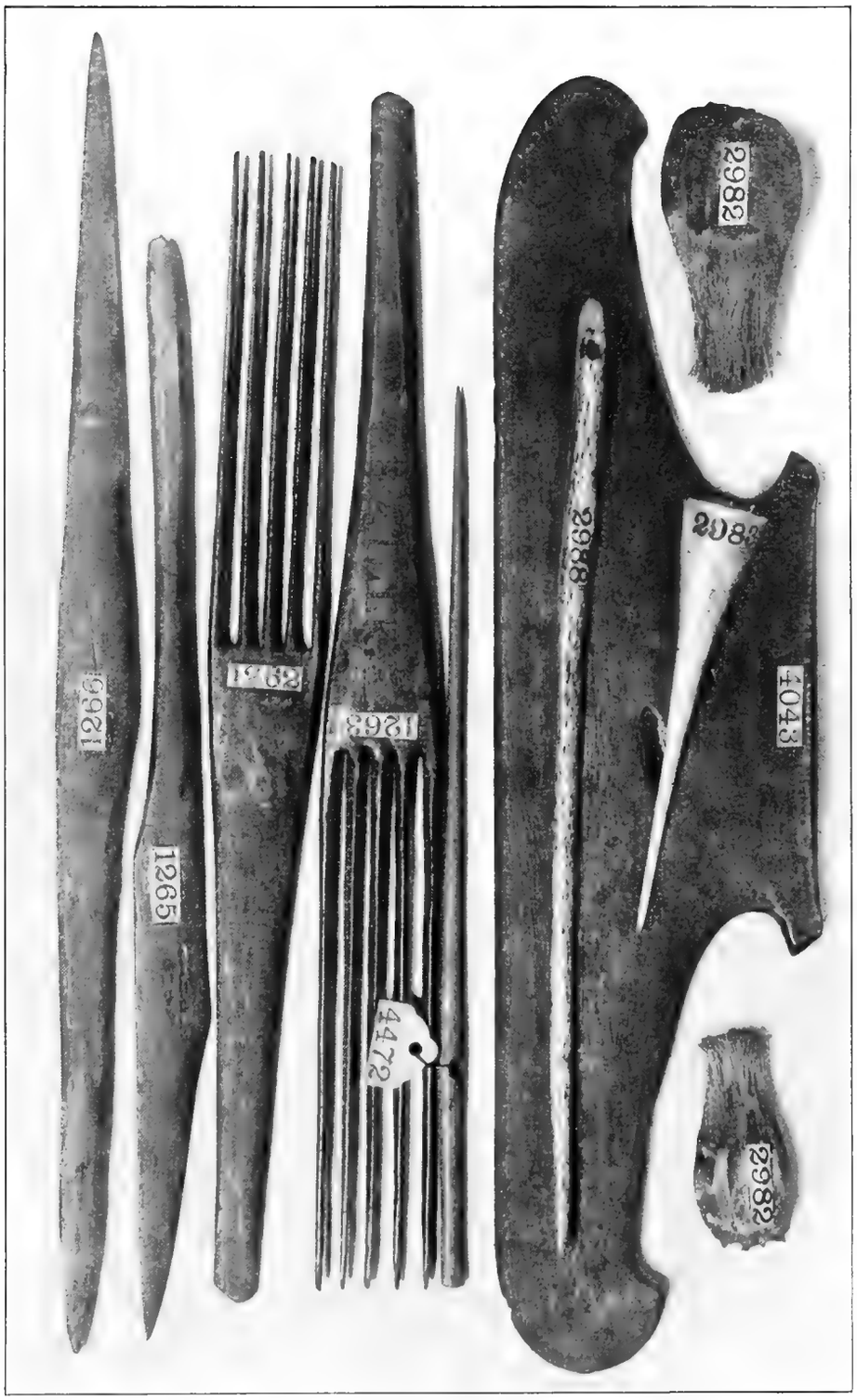


FIG. 46. INSTRUMENTS FOR MAKING AND MARKING KAPA.

It may well be believed that a pulp, more or less mucilaginous, would stick both to the beaters and to the boards; indeed the grooves were often clogged, and for use required an instrument to plow out the grooves. Such a tool is shown in Fig. 46, No. 4043, the lower edge being sharp enough to fill the shallow groove; the upper part is formed for a convenient handle. So few of these have survived that it may well be supposed that a sharp stick or edge of bambu were the more common cleaners. One of these cleaners is in the Leiden Museum (Fig. 47). The boards were grooved on both sides (and in one example on the long edges also), and the fineness of the grooving differed on the two sides. The sizes of the heavy kauila boards in this Museum are as follows (the boards are shown in Fig. 44):—

FIG. 47. GROOVE CLEANERS.

PAPA HOLE KUA ULA IN THE BISHOP MUSEUM.

Museum No.	Length.	Width.	Thickness.	Grooving per inch.	
745	38.4	10.3	.5-1.1	11.7-11.8 and 15.2-15.3	
746	33.3	7.8-8.1	1. -1.8	13.7-14.6 and 16 -16.9	
747	33.5	8.3-8.5	.7- .9	11.5-11.6 and 14.6-15.3	
749	52.5	4 -4.8	.6-1	12 and 14.3	Half a board.
750	42.4	10	.9-1.1	12.3-12.5 and 15.7	
751	32.4	8.4-8.5	.4- .8	9.8-10 and 13.8-14.3	
752	30	7.7	.6- .8	9.3 and 14.3-14.5	
754	36.8	4.1-4.5	.5- .9	12.5-13 and 15.8-16	Half a board.
755	29	5.1	.5-1	12 -12.3 and 17.3-17.8	
7704	35.3	6.6	.2-1.1	11.2-11.3 and 15.3-15.5	
7746	36.4	7-7.1	.3- .5	11.8-12 and 15 -15.1	Clear border.
9410	38.7	6.7	.3- .9	11.5-11.7 and 19.3-19.7	Edges 5 and 2 grooves.

Before leaving the actual manufacture of kapa, plain and unfigured, it will be well to note the effect of the figures cut on the beaters on the tissue itself, and it appears that they cause not merely a "water mark" to appear by transmitted light, as shown in Figs. 48, 49, which are impressions on the plate by light transmitted through the actual kapa.

In the first figure (48) the beaten fibres are shown unmarked, and the interlacing of the fibres appears complete in this, the thinnest of the kapa made by Hawaiians. A much thicker specimen is shown in the second figure (49), distinctly marked with the *koeau* pattern cut on the beater. The skill of the worker is shown in the exactness of the overlapping blows of the beater. It gives much the effect of woven cloth, and when the pattern is *hoopai* this effect is heightened. It is not difficult to see that the fabric cut into valleys and ridges, would be more flexible in one

direction, under either of these patterns, but another form of beater with a series of grooves at right angles to another, and *pupu* or depressions in the square interstices would cut the material into a sort of network possessing great mobility in more than one direction. This is shown in Fig. 50, the beater being the *halua pupu*. This well illustrates the *rôle* of the little holes which seem at first a merely idle variant of the pattern. We must give the Hawaiians the credit of having thought out the simple means of giving additional flexibility to the kapa without diminishing to any great extent the substance. In the photographs we are looking through the cloth, but,

FIG. 48. PLAIN KAPA.

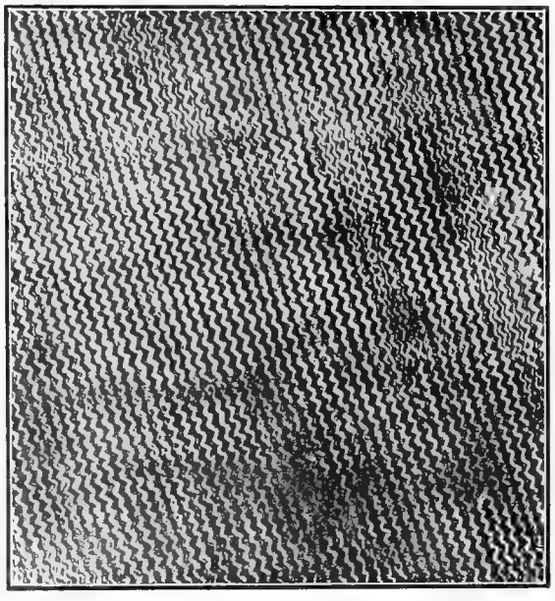


FIG. 49. KAPA MARKED WITH KOEAU.

except in this test, the cloth does not show the marking here so distinct. When, however, the kapa is beaten very thin the beater marking does make a distinct appearance on the surface, although far from as distinct as when viewed by transmitted light. The form of Fig. 50 is rather a distinct Kauai form, and seldom, if ever, found on kapa beaten on the other islands. There is another of these apparently merely ornamental patterns that accomplishes the same end without the pupu. This is the *halua upena*, shown in Fig. 51. The black lines of this pattern are where the pulp has been forced into the deep grooves, and the white rude triangles between where the flat surface of the beater has compressed the general surface of the kapa. Such cloth is very flexible even when quite thick, and was well adapted for malo and pa'u making.

Examples could be multiplied of the desirable modifications wrought by the carved beaters in the texture of the fabric, but those given will explain the process.

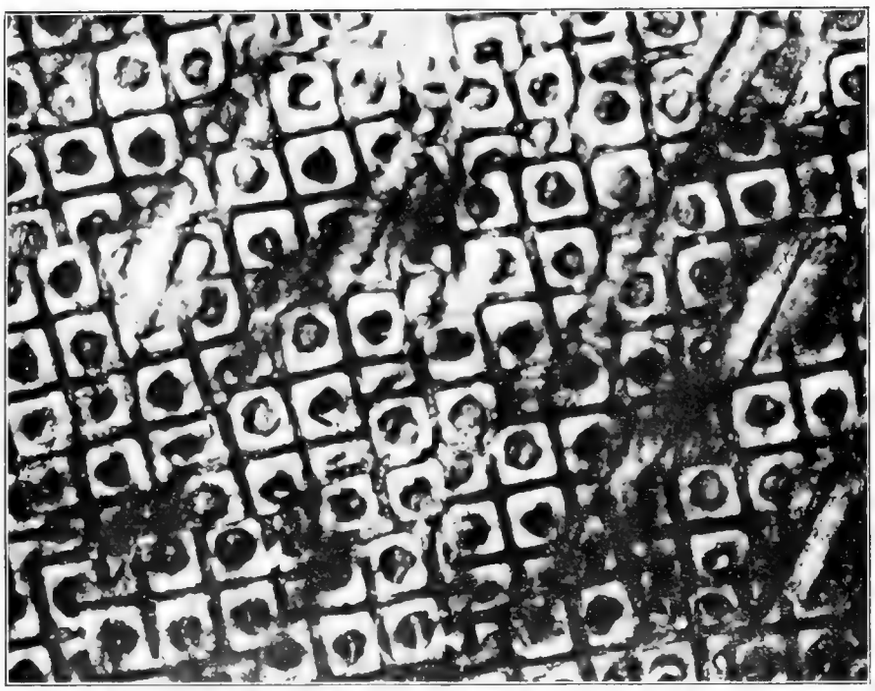


FIG. 50. KAPA BEATEN WITH HALUA PUPU.

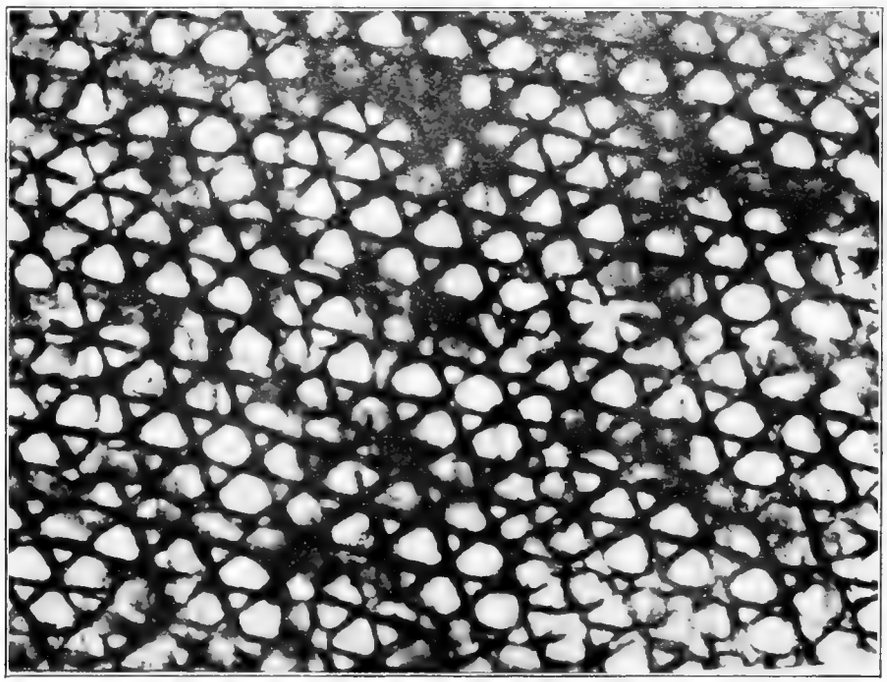


FIG. 51. KAPA BEATEN WITH HALUA UPENA.

The other Polynesians who did not use carved beaters, so far as known to me, had to depend on the tenuity of the fabric for desired flexibility.

We have considered the plain kapa varied by only the cryptic markings of the beater thus far, and while I shall leave the matter of ornamentation as practised by the old Hawaiians to a later page, we must here continue our review of the armamentarium of these primitive websters. Doubtless the first decorative marks were made

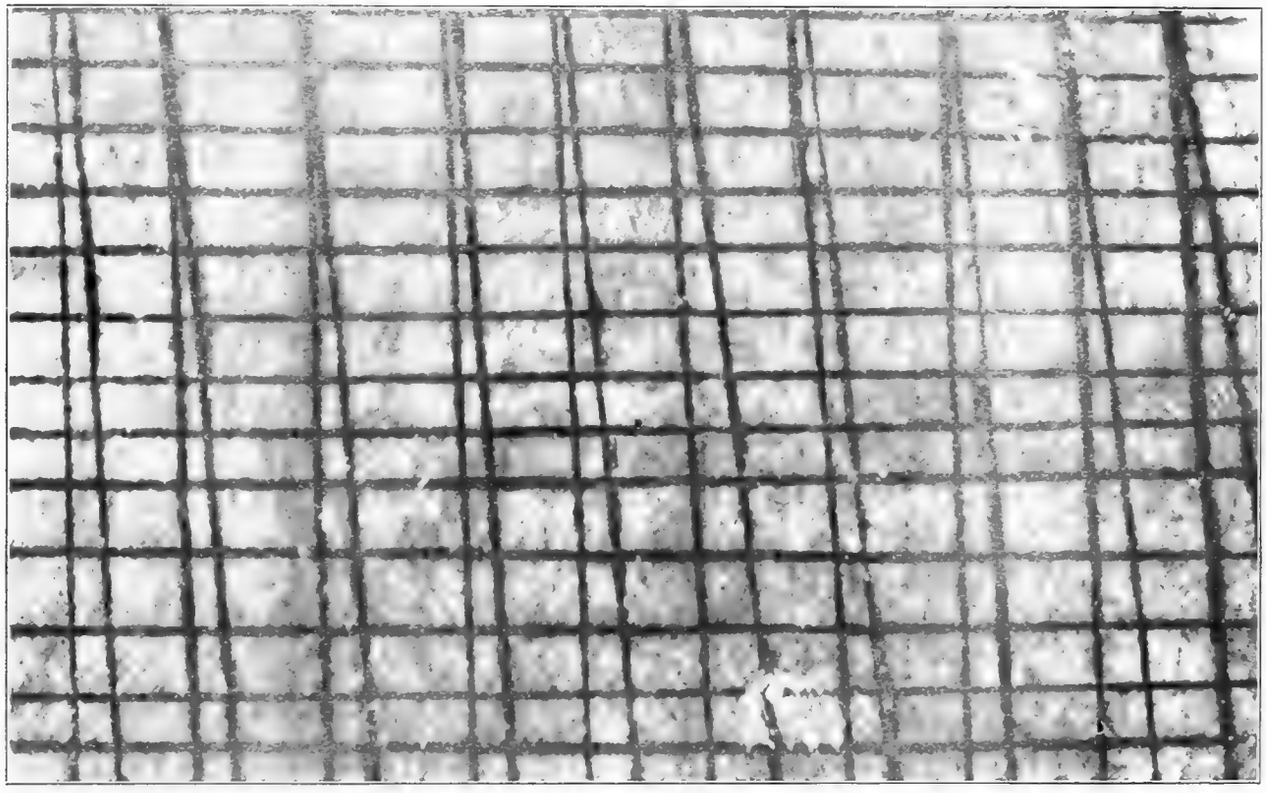


FIG. 52. KAPA MARKED WITH SINGLE LINES. COOK COLL.

with natural objects, as the rings of the pattern stamped with the end of a bambu (Fig. 7, p. 20), or with leaves or other natural objects shown in many illustrations of this book, but I do not quite consider these in the class of tools which are the work of man's hand, and of these last liners were probably very early used. At first a pointed stick dipped in the paint or dye would serve the purpose, and some of the illustrations will seem to some of my readers as marked with this rude tool, but soon a handier tool was required, with increasing skill and improving skill, and the well-made liners Nos. 1265 and 1266 of Fig. 46 were good pens for this work. Many of the patterns, beautiful in their simplicity, shown in our illustrations were made with such tools, and, as my readers can judge, well made.

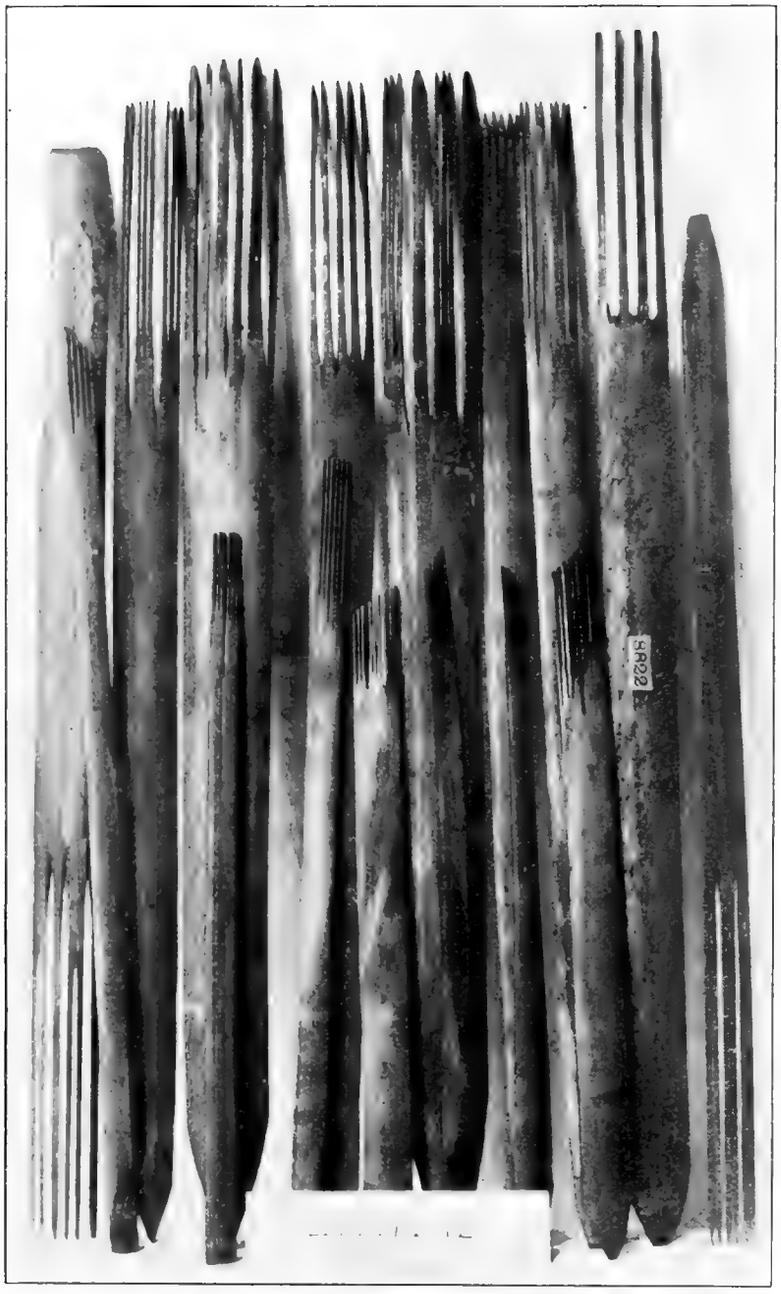


FIG. 53. BAMBU LINERS.

Our Polynesian friends did not always love labor for labor's sake, and we may suppose they were not long in inventing the labor-saving contrivance of the multiple pen shown in Nos. 1262 and 1263 of the same figure. These were made of the same hard, dark colored wood and might well have served for forks had the primitive Hawaiian *menu* called for such implements. The form was there, but not the use,

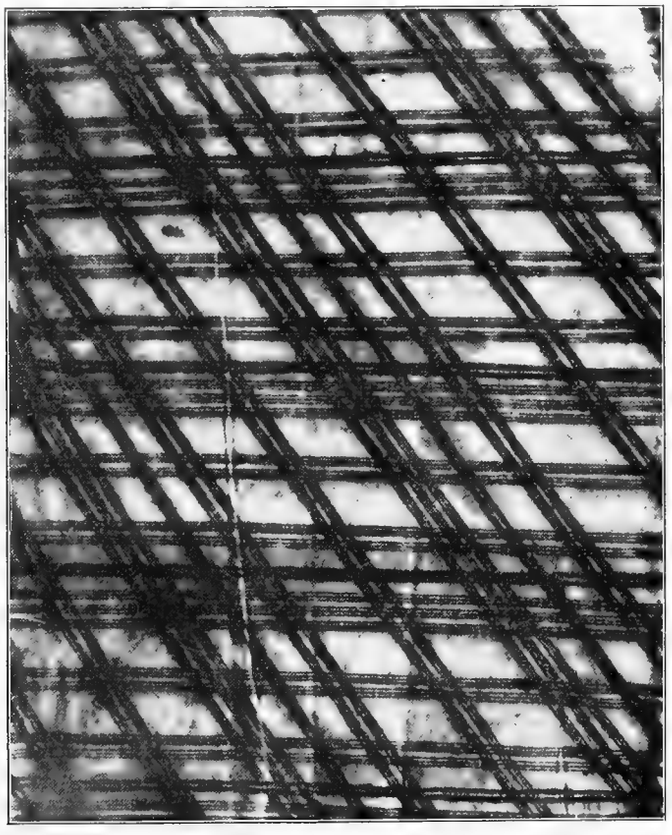


FIG. 54. COMPOSITE LINES.

and the cannibals of Fiji were perhaps the first ones in the Pacific ocean to trench upon the time-honored use of the fingers.[67]

Besides the neat wooden liners a much more common form was made from a splint of bambu, as shown in Fig. 53. These, it will be seen, have another feature of decorative convenience in the arrangement of the marking points in pairs, triplets, or any desired combination. Easily made and sharpened, light to handle and fairly well suited for taking up the colored ink and holding it for even distribution when wanted,

[67] It is claimed that the use of human flesh as food leaves a phosphorescent glow on lips and fingers of the partakers of this rich feast. I do not vouch for the truth of this, having never been a guest at such a banquet. The legend goes on that the glow was supposed to be the ghost or spirit of the baked one, and to avoid this presence, especially disagreeable to primitive man, the cylindrical forks often seen in museums were devised.

their use was general, and our illustrations will show the astonishing accuracy of the ruling and the cleanness of each individual line. Of course there are exceptions that I have not hesitated to present, for to me their very raggedness is an attraction over the very precise, almost machine-like ruling of Fig. 52, for example.

The bevel on some of these liners will be noticed, and also that they are right and left hand. A very few are pointed at both ends, but these are rare and seemingly inconvenient, from the danger of scattering the dye, a trouble which must have been a constant care with the kapa printers.

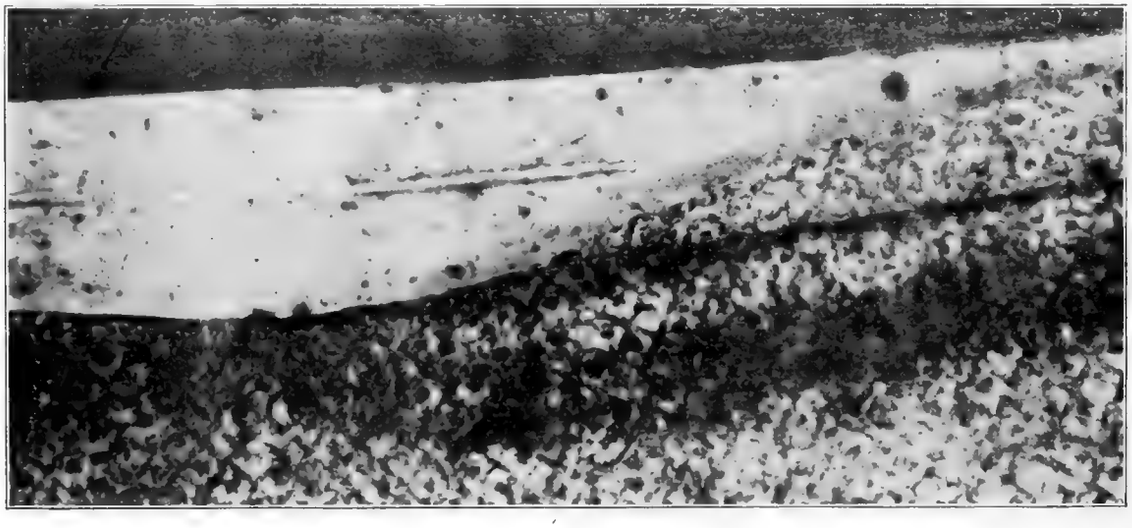


FIG. 55. SEAM IN A KUINA OF KAPA MOE.

A modification of lining is sometimes met with, as shown in Fig. 54 where the lines on close examination are found to be double. This adds not a little to the effect of the design. The ink must have been good to permit such ruling, and the pen was probably bambu, as the fibres of this are easily divided and do not wear readily.

Before we leave Fig. 46 we must call attention to the paint brushes, No. 2982, simply a key or achene of the cone of the pandanus.[68] By mastication the tough fibres of the base are separated from the often edible portion, and are as serviceable as the modern hog's bristles of the civilized painter. Some of the work of such brushes is seen in Plates I, R and W. The supply of such brushes was, in the mat-making days, almost inexhaustible.

The other tools represented in the figure were used in fastening together pieces of thick kapa, or more commonly the five sheets of kapa constituting a *kuina kapa moe*, or set of bed covers which were stitched together by a kapa tape at one side only (Fig. 55). No. 2983 was a stiletto of whale's ivory to punch the holes: No 2988 was a

[68] See the picture of this cone in Chapter III.

bone needle, and No. 4472 was a similar instrument of kauila wood. Coarse as these needles seem, they were quite capable of doing neat work in the hands of the old Hawaiian women. They were even more used in the southern groups.[69] See Fig. 55 for this stitching.

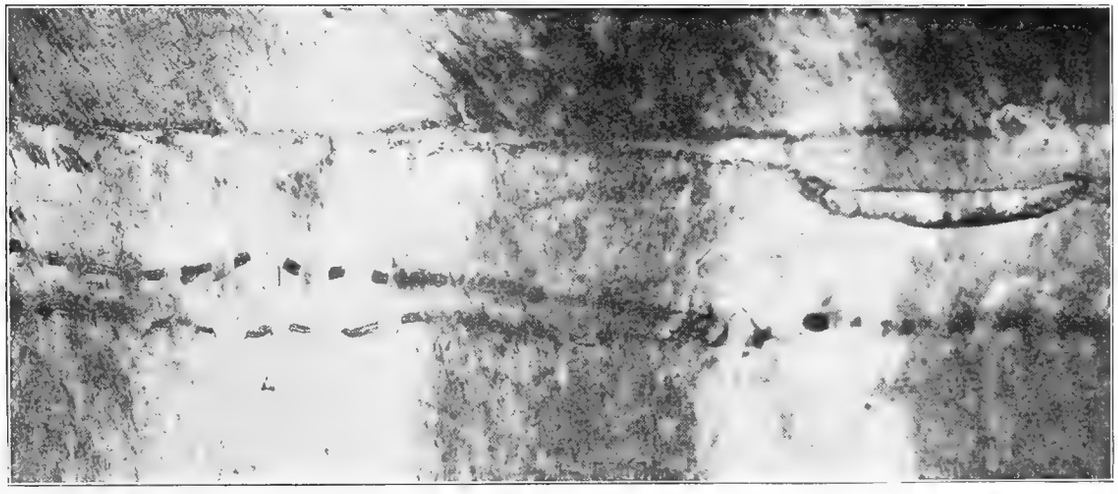


FIG. 56. UNDER SIDE OF SEAM IN THICK KAPA.

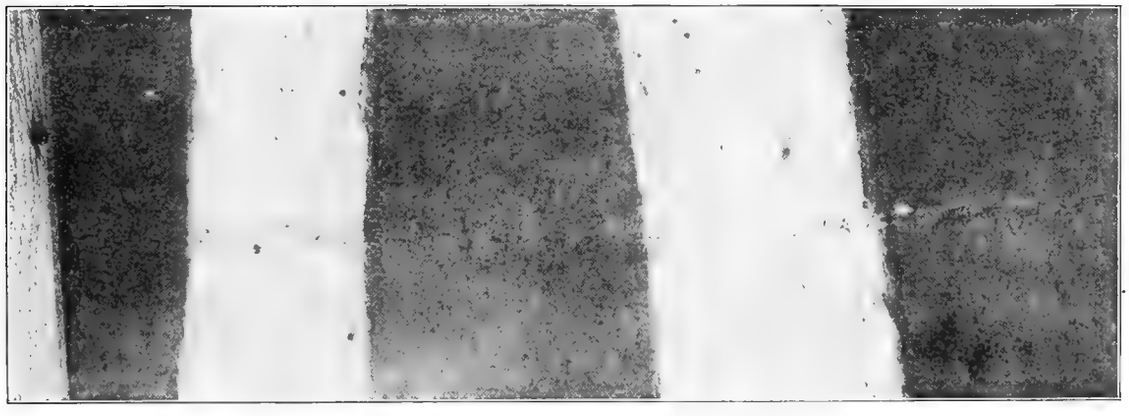


FIG. 57. UPPER SIDE OF THE SEAM SHOWN IN FIG. 56.

On examining the sewing on the oldest kapa, I find it was by no means of a single, simple kind, and we must stop here to examine this. The question even arises, why did they sew at all, when it was so common a practice to paste or weld by beating two or more sheets together? In some cases this question is not easy to answer; in the case of the *kuina* of the *kapa moe*, it was undoubtedly the easiest and most convenient method of uniting five sheets, that frequently might need a certain amount of separation for airing or dyeing, but when in use should be kept together firmly. The thread

[69] Cook seems not to have noticed this, as he gives the Hawaiian sole credit for sewing.

is either a simple tape of kapa untwisted, or more commonly a cord of the same material, or of hau bark, often well twisted as a foreign twine. From the upper or *kilohana* side of the *kuina* this thread does not show, a narrow strip being neatly folded over the seam as shown in Fig. 55, where also the average spacing of the stitches in the better grades of kapa is shown. Athough this seems little more than a basting thread, its strength is considerable, and the sheets would tear sooner than the uniting thread give way.

When the stitches are greatly shortened the suture becomes stronger and better adapted to unite sheets endwise, a sort of running rivet, which was perhaps a very early form of sewing. An example is given in Fig. 56 of a thick tapa dating from the end of the eighteenth century. The texture is firm and smooth, and one side is

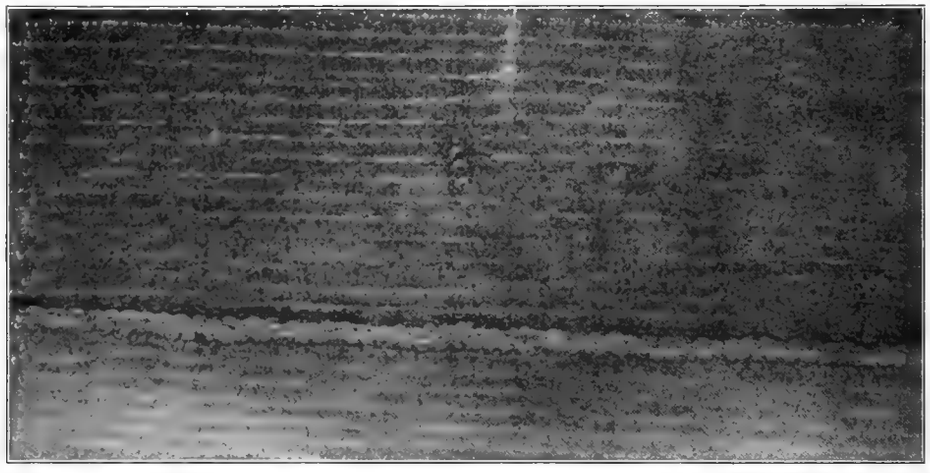


FIG. 58. UNDER SIDE OF A TAHITIAN SEAM.

decorated with converging stripes of black and crimson on the more finished face. The process seems to have been to place the two sheets finished face to finished face and run the stitches about an inch from the edge and an eighth of an inch apart. The thread is not of the same substance as the sheets, as in the previous examples, but a rolled, not twisted, cord of flattened fibres. When the ends are bent to one side and the sheets spread open the seam presents the appearance shown in Fig. 56. The lower line of stitches on the right of Fig. 56 was a botch, and the right line was continued above, leaving the false track simply in the fold.

Next I note in the same collection a good example of the twining stitch, or the over and over seam, in a thick fluted Tahitian tapa, which is painted red on the under side, which is shown with the seam in Fig. 58. The upper side is painted with nearly black zigzags on a light brown ground; the markings are on alternate flutings. Perhaps a more definite example of the commonest stitching (with a splice in the

thread) is shown in Figs. 59 and 60, the upper and under side of an Hawaiian kapa: the lining is in two shades of red on a buff ground. The rarest example that I can show is a seam in a specimen of kapa without designated locality, but which I am inclined to consider Hawaiian,[70] is shown in Fig. 64. The kapa is buff with red and black

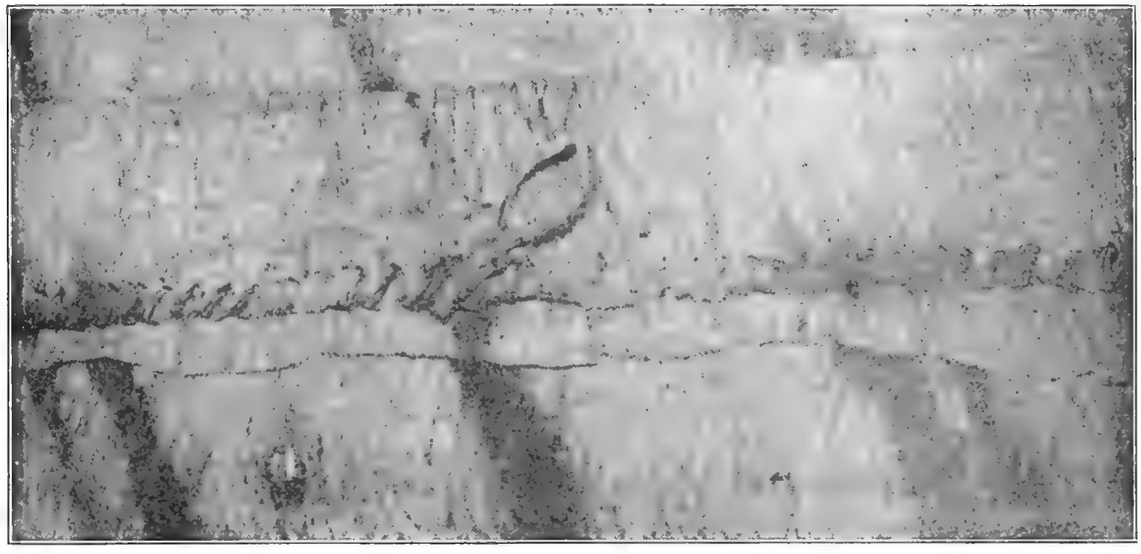


FIG. 59. UNDER SIDE OF AN HAWAIIAN SEAM.

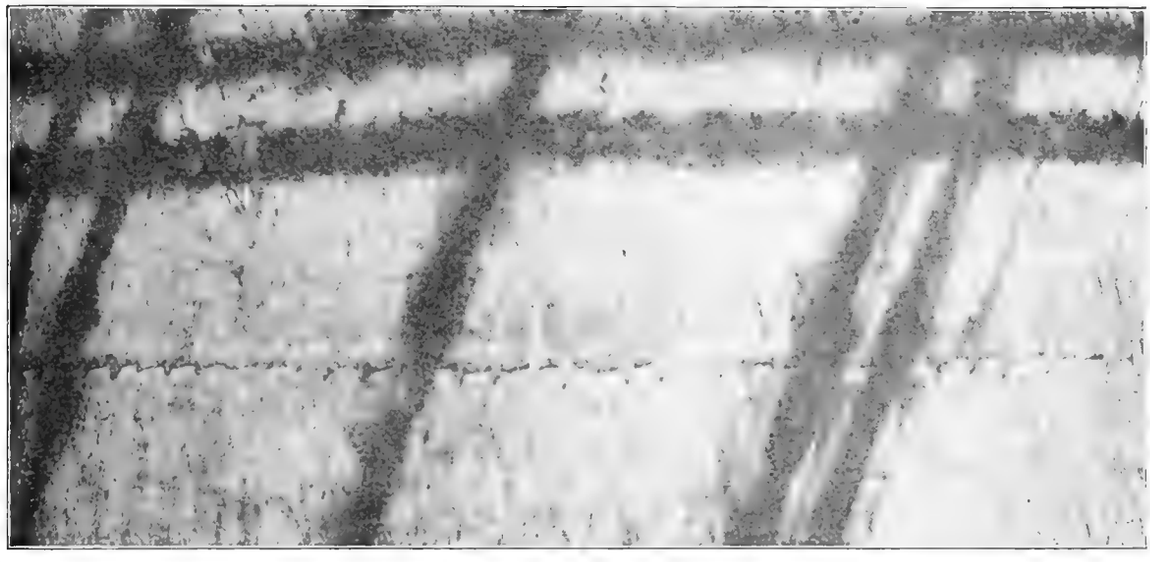


FIG. 60. UPPER SIDE OF SEAM SHOWN IN FIG. 59.

[70] Since the above was written, all doubt of its Hawaiian origin has been removed. In the curious collection of tapas brought home by Cook was a small fragment from these islands, which I painted for the lower figure of Plate W. I have since received from my friend Dr. Enrico H. Giglioli of Florence, Italy, a larger specimen of the same pattern from the Cook relics in the Florentine Museum, which most fortunately has a similar seam (Figs. 63, 64). This specimen has faded more than my small fragment, but the latter, having been preserved in book form and thus shielded from light, still exhibits the colors shown on Plate W.

lines painted on the upper side; by no means a fine piece of work. The smooth sides were put together and the edges turned back about five-eighths of an inch; the thread was then passed through and back (not over) the folded edge, close to this and at intervals of a quarter inch; the thread is smooth and of small twisted fibres, and the seam hardly shows on the right side, and it is not easy to follow the thread on the other.

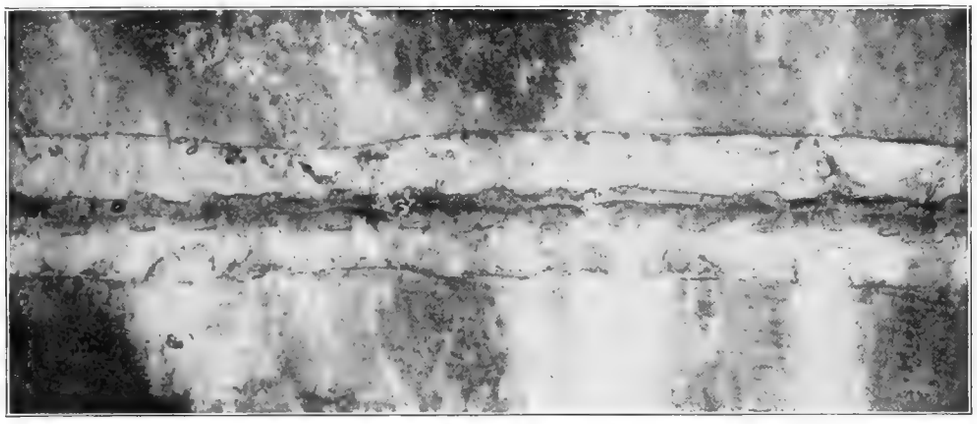


FIG. 61. UNDER SIDE OF AN OLD HAWAIIAN SEAM.

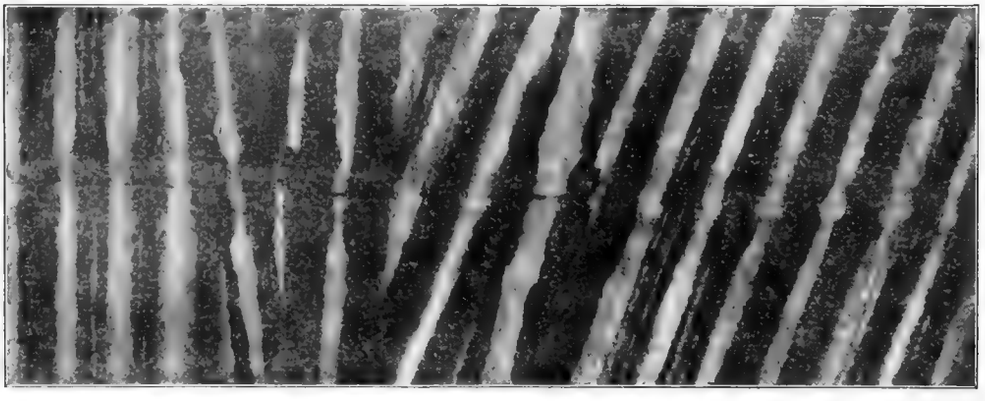


FIG. 62. UPPER SURFACE OF FIG. 61.

I should have called attention to the deft mending with a few stitches of the same thread used in the seam, near the middle of the upper half, Fig. 58. This mending in thin kapa was always done with paste and a thin bit of the cloth, but in thick specimens like this these thread mendings are often seen. Genuine darning I have never seen; it is always the twining stitch. In the Florentine specimen the thread seems to have been drawn tightly when the kapa, which is now very hard and stiff, was wet or moistened, and the ridge formed was then beaten or pressed flat.

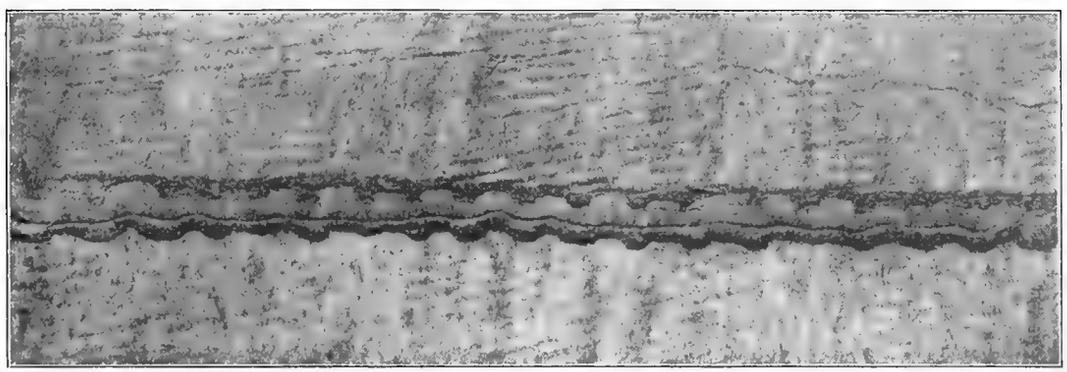


FIG. 63. SEAM ON KAPA IN COOK COLL. FLORENCE.

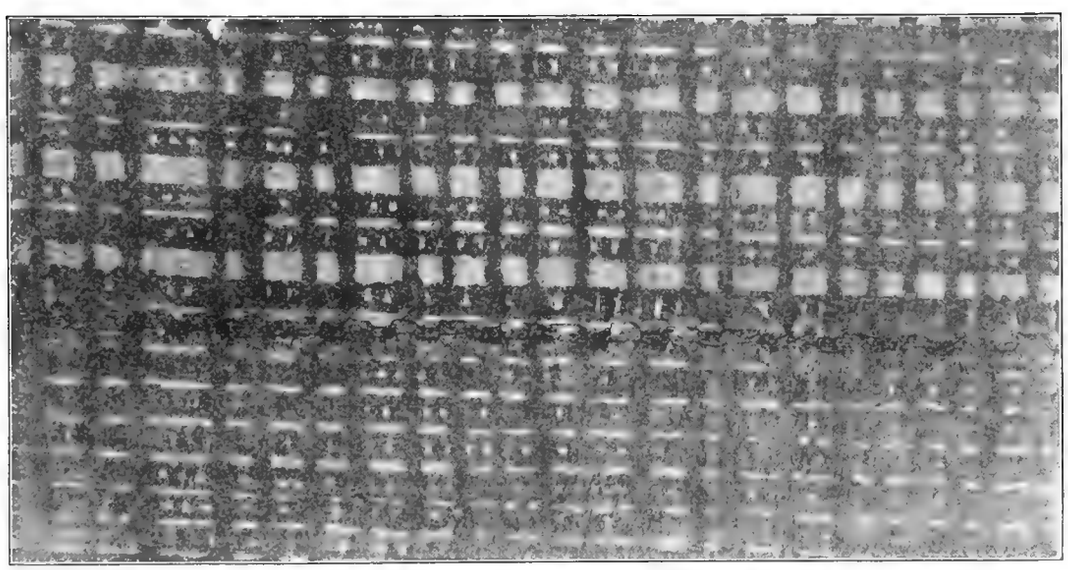


FIG. 64. UPPER SURFACE OF FIG. 63.

Bambu Printing Types.

The curious little bambu stamps which none of the early voyagers saw, or at least cared to mention, were a far better, if more laborious, substitute for the Samoan upete, and the similar wholesale stamp of the other southern groups. Fortunately (as in the case of the kapa beaters) we have in this Museum a large number for our examination. Especially liable to destruction, both by accident in use and the rav-

FIG. 65. THE CARVED END OF BAMBU STAMPS.

ages of insects, very few of the great numbers that must have been in use have survived, and it is seldom they are found in museums.

The native bambu,[71] *Ohe* (*Bambusa vulgaris*), never acquires great size, seldom more than two inches in diameter, so that the portion of its cylindrical stem that would be flat enough for a useful stamp is limited in most cases to less than an inch in width, while the distance between joints is quite sufficient for convenient handling. Plate 8 will show the general form of these, while Fig. 65 will show the carved ends,

[71] Captain John Adams, whose residence here extended over much of the last century, believed this grass was introduced, but he had no proof, and the use of it by the old Hawaiians for nose-flutes, fans, mats, bellows, straight-edge, knives, stamps and various instruments of percussion to mark time for the dance seems to indicate a greater antiquity. The native name is applied also to two other canes and to a tree of different family, so that cannot be cited as a witness to its claim as a child of the soil; on the other hand it is found scattered all over the group in valleys and at the foot of precipices, and in some cases in the craters of tufa cones.

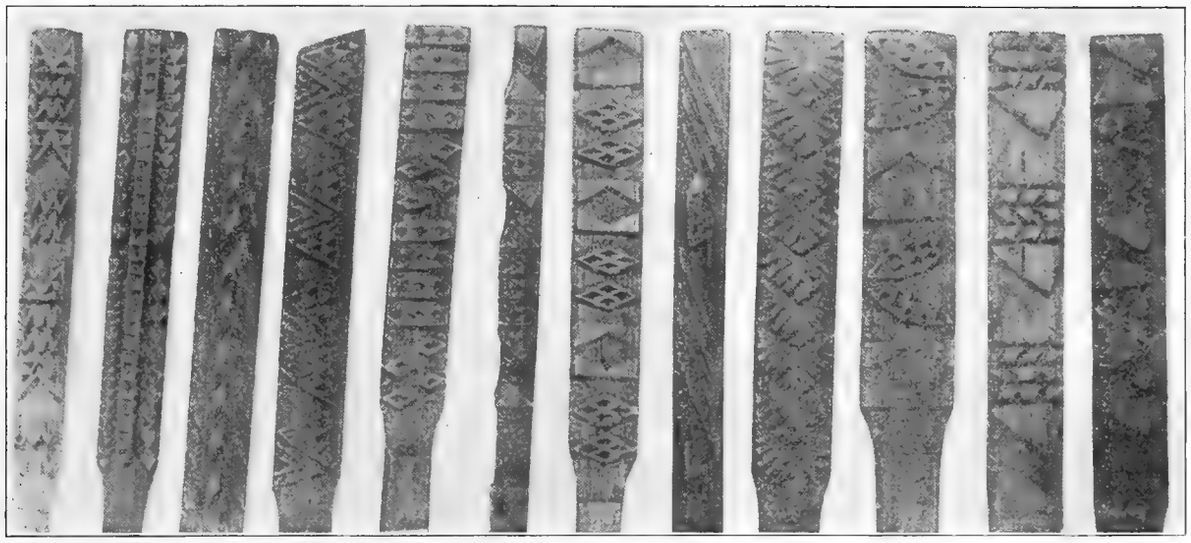


FIG. 66. BAMBU STAMPS IN THE DAMON COLLECTION.

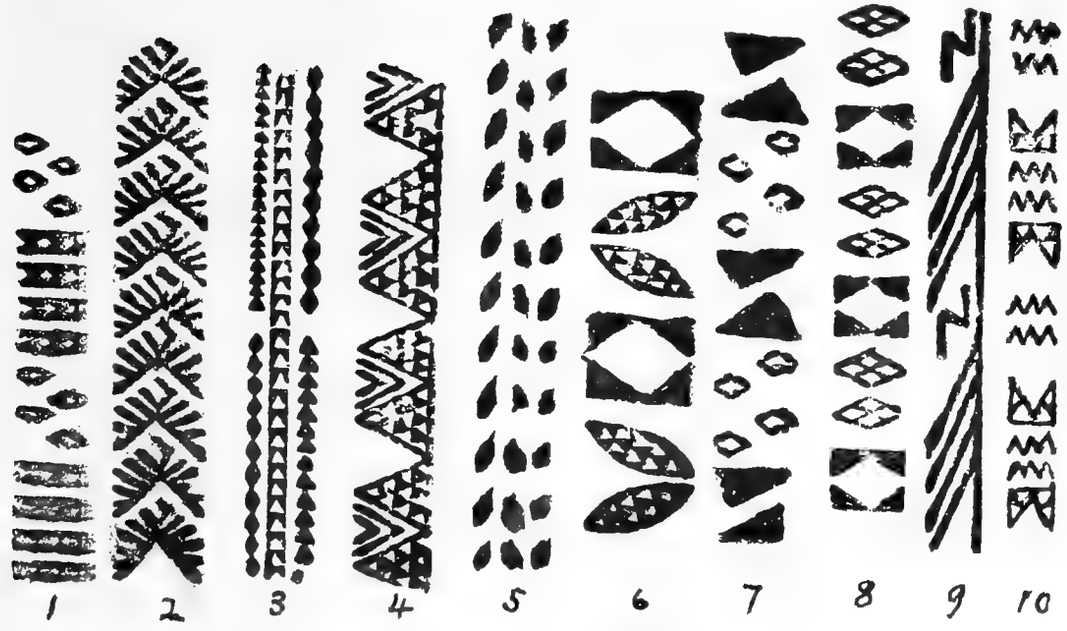


FIG. 67. IMPRESSION OF STAMPS IN FIG. 66.

and Plate 9 the impressions made. The relief is rather strong, and, with a careful hand, capable of giving a clear impression, while the combination of these impressions is capable of great variation. With the method of holding the stamp, supported by another bambu as a mahlstick, the process is by no means difficult.

Besides the *ohekapala*, *he ohe kakau* in this Museum, I have had the use of the very choice ones in the collection of the Hon. S. M. Damon at Moanalua. Of some of these an illustration is given in Fig. 66, while their impression is shown in Fig. 67.

If the bambu was not indigenous, or of very early introduction, it may well be asked with what did the older Hawaiians stamp the specimens which are still before us after an existence of a century and a half? In answer we may point to the very rare wooden stamps, one (B. P. B. M. 2949) is in this Museum, and another in Copen-

FIG. 68. STAMP IN COPENHAGEN.

FIG. 69. STAMP ON KAPA.

hagen; they also used tortoise-shell (*ea*) as illustrated in Plate 7, the third specimen from the right, where the pattern is cut from thin shell and neatly lashed to a bambu holder (which might have been of wood as well); and the impression from such a stamp is shown in No. 57 of Plate 9, and another in No. 38.

While all the designs at hand are geometric and apparently destitute of all symbolism, one in the Copenhagen Museum (which is given in Fig. 68 about double size), shows a very unusual pattern, and in the same museum I found two specimens of kapa of modern appearance, one with bunches of red and black leaves, the other with "palms", Fig. 69. In the same museum were six ohekapala, one with *ea* stamp; here also was one of the instruments for cleaning the hoopai grooves of pa'u boards and beaters, Fig. 47.

There is another tool which is in effect the carpenter's "chalk line". Cords of hau or coconut fibre were well twisted, dipped in dye and snapped across a sheet of kapa, the result being, if the operator was dexterous, a broken line of more or less regular rhombs. This is shown on many modern kapas and also on some of considerable age, but I am inclined to think the trick was borrowed from the foreigner.

Stone Implements for Kapa-making.

If we except the natural stones placed under the ends of the *kua kuku* or anvil for beating the kapa on, and the stones used to keep the bundles of bark beneath the surface while soaking in the brook, we have thus far met with no stone implements either in Hawaii or elsewhere,[72] for we can hardly call the stones put on the edges of the great sheets of kapa (as paper weights) to prevent disturbance by the wind while bleaching, or on the smaller sheets just from the printer, by a term so dignified. And yet, I remember there is a cut stone often used on the Hawaiian group for the same purpose, a weight, and it is included in the little group of stone tools figured below, as it is used more in other ways (grinding herbs for therapeutic application, etc.). I need only refer to it as Fig. 70, *a*, where it appears as a rude stone signet ring, and

a *b* *c* *d* *e* *f*

FIG. 70. STONE IMPLEMENTS USED IN KAPA WORK.

was conveniently formed for handling, while the weight (9 lbs. 2 oz.) was sufficient to hold the light kapa firmly to the ground.

Strictly, the kapa-making ends with this; and the following are used in the preparation of the dyes for decorating the kapa, or the sachet-powders for scenting the finished fabric. It is not a long nor a varied list, as may be seen in Fig. 70, where are collected all the stone objects known to be especially devoted to this use. It is of course understood that for crushing the kukui or kamani nuts for the extraction of their oil larger stone mortars were used, and these have been figured and described in a former work.[73] Rude and simple, carrying one in thought back to the stone age, are these little cups and mortars, but they served their purpose well in their time and now rest from their labors on the Museum shelves. In the figure *b* was a cup to hold the dye for the bambu stamps; *c* was the hollowed stone for the muller used to grind the ochre (*alaea*) of various shades of yellow and red found in many places on this

[72] In Mexico small stone beaters were used. These will be illustrated in the appendix.

[73] Ancient Hawaiian Stone Implements, Memoirs, vol. I, p. 366. Plate xlvi of the same volume shows ring poi-pounders like in form to the presser already mentioned, and which may well be an ill-made or partly-shaped poi-pounder.

group. The horizontal length of this cup is seven inches, and this will serve as scale for the other objects. As may be supposed few kapas were stamped in monochrome, and several paint saucers were required by the artist, and at *d* were two *poho hoolua* or cups for dye. The pestle or muller, *e*, has radiating grooves on its face, and is used to grind *nanahu* or charcoal (*pohaku kui nanahu*) in the mortar ending the group. The ochre mixed well with the oil, especially with that of the kamani (*Calophyllum Inophyllum*), dried quickly and made a very durable color. The charcoal was in great demand for giving a gray tint to the white kapa, for which purpose it was applied in a small bag of kapa much as indigo was sewed up in a cotton bag with us

FIG. 71. COCONUT AND BAG FOR CHARCOAL.

by the laundress of former times (2984 in Fig. 71). The sources of the charcoal were various, and doubtless each of the brighter kapa printers had his, or rather her, preference, much as the chief printers of these modern days have their decided choice in printer's ink. I was, many years ago, when I had a library, showing a folio of the early years of the sixteenth century to a printer who ranked high among the great printers of that day, and he sadly exclaimed, "Oh that we could get such brilliant ink as that now!" It would seem that the inks of the present day had attained great perfection, but they are not yet four hundred years old.

The kukui nut roasted, as some roast coffee, was a favorite source of *nanahu*, and in the coconut figured above are the remains of a few of these nuts as they were left by the old Hawaiian printer. In other islands the smoke of the burning kukui, so universal a candle among the people whose huts the noble trees shaded, would have

FIG. 72. A PORTION OF THE KAPA CASES IN THE BISHOP MUSEUM.

been collected as the medieval monk collected the soot of their more artificial though malodorous candles to compound the jet black and lasting ink with which they slowly and with loving hand engrossed those manuscripts coveted by the collector in these days of fast and often careless printing. Sugarcane was another source of charcoal, and the burnt caramel might vie with the nutty perfume of the kukui; neither had the disgusting smell of some of our modern inks. Doubtless there were other encaustics, but these were the chief ones.

FIG. 73. A BUNDLE OF WAOKE BARK.

CHAPTER III.

THE RAW MATERIAL.

THAT the small list I shall give here of the material used for the fabrication of bark-cloth is complete, even for the Hawaiian Islands, cannot be claimed. No one now knows what convenience or necessity added to the cultivated stock which was the main dependence of the kapa-makers: but this is of little importance in the Hawaiian region, for these supernumeraries played no important part in the manufacture. In other countries, especially in continental regions, the greater richness of the Flora gave many desirable trees and shrubs from which innumerable experiments, extending through uncounted centuries, had sifted out the most suitable from the merely good-enough; and we have seen that in the tapa region of Africa various (not always known) specimens of the genus Ficus are the chief purveyors, and in the Malayan home even the "deadly Upas tree", that bugbear in the stories of former days, furnishes a good and harmless bark easily beaten into useful cloth.

Still the Paper-mulberry, the *waoke*,[74] or *wauke*, of the Hawaiians, *aute*, *malo*, *masi*, etc., of other peoples, easily holds the first place, from China, where its use is first recorded, to the "islands in the uttermost part of the sea." Everywhere cultivated as a very useful plant, it appears as a homeless wanderer; like the Children of Israel, it has been taken from its native country to be a desirable help and comfort to the tribes who receive and cherish it. But unlike the Hebrew wanderers, its home has been forgotten:

"If I forget thee, O Jerusalem, let my right hand forget her skill."

Fully has its cultivation been described in the many quotations from the early voyagers, and it only remains to give the reader a picture of the plant and some idea of its botanical relationships. Would that a picture could be presented of an old Hawaiian plantation! But before photography was common they had ceased to be, and it must have been a more than usually skilful draughtsman who could fix the delicate, ever moving leaves of the waoke; in the breezes the rows along the edges of the kalo patches seemed to me like kahilis waving over the feast; the slender stems and the delicate leaves seemed in perpetual motion. The picture of a plant from Manoa valley (Fig. 74)[75] is the best at hand.

[74] I have preferred the first spelling as most closely conforming to the pronunciation of the old kapa-makers.

[75] The plant was kindly furnished by Dr. C. M. Cooke of the Museum staff.

But we must not let the waoke hurry us out of the orderly arrangement of our material. While there are many trees in the tropical region of the Pacific that may furnish bark fibre, and still more in the other tropical regions where bark-cloth was made, it will be wise to confine our studies mainly to those in the Polynesian groups, and more particularly to the known trees of the Hawaiian Islands, without, however, binding our pen too strictly when illustration is needed from other regions.

First, of course, we must treat of the fibre-furnishing plants, and so extensive has been the search for fibres for other purposes than cloth-making in the old way, that it is not difficult to get information of these. When we pass from the fabric to its decoration we are on a ground by no means so firm, for while the trees, shrubs, vines and roots furnishing dyes or paints are known by name, that is often all that we do exactly know of the methods which made them useful; we have with some of them only "a speaking acquaintance". Nor does our list stop with the vegetable world; it includes also earths, both as ochres and as mud, which was doubtless a compound of earthy and vegetable matter. Because our knowledge of these things is far from complete we are not to drop the discussion, but courageously offer to our reader what we think we know, honestly confessing our ignorance when it blocks the way, trying all the while to interest others, who may know far more of this or that, to take up the thread and spin it out as bright and fair as they may. Why not experiment with these plants; try their bark, both of stem and of root; their leaves, their fruit; macerate them and boil them, add mordants, whether oil, tannin or salts, and when we have done all these we do not know that the old Hawaiians used any of our processes. The temptation to dabble in dyes is great, and curious and often amusing results come of such experiments; but while we sometimes get a color fairly matching the old native dye, we find we can also get it in several other ways, and have come no nearer to the actual old Hawaiian process.

Of the perfumes so popular among the Hawaiians, many are used to scent clothes of woven cloth at the present day in much the same way that they gave their odor to correct the rather unpleasant smell of the raw kapa of the olden time. Certainly some of the native popular perfumes are not pleasant to a European.

While it would not be well to turn a treatise on the making of bark-cloth into a botanical text-book to any great extent, the labor in looking for this description or that synonym is certainly an inducement to save the reader a part of this trouble by quoting here such descriptions as are needful, or in some cases making modified descriptions from the living plant, or the specimens in the herbarium of the Bishop Museum.

Plants Furnishing Fibre.

The plants furnishing the fibre for the kapa fabric are mostly of two families as at present classified, the *Moraceæ* or Mulberry, and *Urticaceæ* or Nettle families. To the former belong the following genera:—

Morus, the Mulberry, furnishing through the silkworm a tissue.
Broussonetia, the Paper-mulberry or Waoke; the most important source.
Artocarpus, the Breadfruit or Ulu.
Ficus, the Fig, found in all tropical countries, though not native to Hawaii.
Antiaris, the poisonous Upas tree.

Of the latter are the following genera:—

Pipturus, the Mamaki, second on Hawaii only to the Waoke.
Bœhmeria, a plant of fine fibre; many species used for cordage.
Neraudia, the Oloa, and
Touchardia, the Oloná, not used for kapa, but for most durable cords, etc.

Outside of these closely related families are a few other plants, not much used but capable of furnishing good kapa:—

Paritium, the Hau, a very valuable tree, and
Thespesia, the Milo, with beautiful wood, both belonging to the Malvaceæ, and
Rubus, the Akalá or Raspberry, belonging to the Rosaceæ.
Celtis, one of the Elm family, used on the Nicobar Islands.

All these we may take up in this order and then pass in a less orderly manner to the dye stuffs and perfumes, but treating these generally in the order of their importance when known. Both the *Morus* and an allied Hawaiian genus, *Pseudomorus*, we pass by as foreign to our subject, and take first the best known and most widely spread source of the best kapa, *Broussonetia papyrifera*, the Paper-mulberry.

I shall give the generic description, as is customary, in the original form of description, and then the distinguishing points of the species before us in the vernacular. Where I have not had access to the original, or that is too incomplete, I have taken the version given by Hooker and Bentham in the Genera Plantarum.

Broussonetia Vent. Tab. du Règne Végét., vol. iii, p. 547; Endl. Gen. n. 1858.—Flores dioici. Fl. ♂: dense spicati, bracteati. Perigonium 4-partitum, laciniis ovatis, acuminatis, æstivatione imbricatis, demum patentibus. Stamina 4, perigonii

FIG. 74. BROUSSONETIA PAPYRIFERA. PAPER MULBERRY.

laciniis opposita; filamenta filiformi-subulata elastica; antheræ, introrsæ 2-loculares, dorso affixæ. Fl. ♀: super receptaculum globosum dense capitato-congesti, squamis pilosis (floribus abortivis) mixti. Perigonium urceolatum 3–4-dentatum. Ovarium ovatum, 1-loculare, gynophoro clavato demum elongato oblique impositum. Ovulum 1, parietale, amphitropum, micropyle supera. Stylus filiformis, excentricus, hinc stigmatosus. Achænium subcarnoso-gelatinosum, gynophoro baccato basi perigonio cincto

FIG. 75. BROUSSONETIA PAPYRIFERA. YOUNG TREE.

longe exserto elevatum, ejusque marginibus inæqualiter productis inclusum. Semen pendulum, uncinatum; testa tenuissime membranacea. Embryo intra albumen parcum carnosum homotropus, uncinatus; cotyledonibus oblongis incumbentibus; radicula umbilico contigua, supera.—Arbores lactescentes; foliis alternis, integris vel lobatis.

B. papyrifera Vent., *l. c.* — Foliis 3–5, lobis adultioribus subrotundo-ovatis indivisis, supra scabris subtus villosis.—*Morus papyrifera* Linn. See also Fig. 74. Although no longer cultivated on these islands, the waoke appears here and there as a volunteer and is not easy to eradicate.

Artocarpus Forst. Char. Gen. 101, t. 51.—Flores monoici, in capitula unisex ualia globosa v. oblonga densissime conferti, receptaculum carnosum undique obte gentes, involucro nullo. Fl. ♂: Perianthium 2–4-lobum v. partitum, lobis segmentisve apice concavis obtusis leviter imbricatis. Stamen 1, filamento erecto sæpius complanato; anthera breviter exserta. Ovarii rudimentum o. Fl. ♀: Perianthium tubulosum, obovoideum oblongum v. lineare, obtusum v. umbonatum, basi receptaculo

FIG. 76. MALE BLOSSOMS OF ARTOCARPUS.

carnoso immersum concretumque apice liberum, foramine minuto interdum 3–4-dentato pertusum. Ovarium rectum, inclusum, receptaculo sepultum sed ab eo liberum; stylus centralis v. plus minus lateralis, apice stigmatoso exserto lineari spathulato rarius subpeltato rarissime 2–3-fido; ovulum sub apice affixum, pendulum. Perianthia fructifera numerosissima v. rarius pauca, cum receptaculo carnoso in syncarpium apicibus liberis parum auctis echinatum v. areolatum alte connata. Achænia syncarpio inclusa; pericarpium membranaceum v. coriaceum. Semen conforme, pendulum,

testa membranacea; albumen 0; embryo rectus v. incurvus, cotyledonibus crasso-carnosis æqualibus v. valle inæqualibus, radicula brevissima supera.—Arbores lactescentes. Folia alterna, ampla, coriacea, pennivenia, integerrima v. pinnatim pauciloba, rarius pinnatim ∞-foliolata. Stipulæ laterales, cæterum variæ. Pedunculi axillares, solitarii, brevissimi v. longiusculi. Flores parvi, numerosissimi, receptaculum sæpius carnosum breve v. elongatum undique obtegentes. Syncarpia parva mediocria v. maxima, fructibus sæpe paucis perfectis prope centrum syncarpii immersis, perianthiis tamen omnibus tam sterilibus quam fertilibus apice sæpius æqualiter auctis, nunc obtusissimis v. umbonatis mutua pressione angulatis syncarpium extus areolatum v. perfecte continuum formantibus, nunc lineari-elongatis syncarpium echinatum efficientibus. Achænia intra perianthia v. locellos syncarpii libera.

Two of the more than forty species have long been cultivated in the Pacific region, the Jack and the Breadfruit, the latter in many varieties. This alone has interest in the present study, although several other species are used for their fibre in India and the Malay Peninsula.

A. incisa, native *Ulu.*—A tree 40–60 ft. high and spreading; the roots in the soft moist soil which it prefers often exserted, forming a network on the ground. Leaves coriaceous, more than a foot in length, pinnatifid with acute or somewhat obtuse lobes. Stipules 2, free, very large, rolled round the bud and imbricate, soon caducous. Flowers: ♂, thick, oblong, somewhat flattened: ♀, flowers on large globose receptacles, which are at first covered by two large spathaceous bracts, the latter terminal.

The Breadfruit was as close a companion of the Polynesians in their wanderings as the waoke. The Hawaiian Islands were the limit of its growth on the north, and we have already seen how its companion, the waoke, was brought to New Zealand by the Maori immigrants five or six centuries ago, only to be kept alive with great care, and finally to die out of the unfavorable climate. Perhaps they brought the breadfruit also in some of the canoes, but if they did it must soon have perished so far below the southern limit. On the Hawaiian group there is but one variety, seedless, and propagated by suckers,[76] while in the southern islands there are several. Among the Hawaiians, again, it was by no means so important an article of food as it was farther south and west; they never preserved it, as in Micronesia and elsewhere, and the season was short. Fine trees were found all over the inhabited parts of Hawaii, and at Lahaina, on Maui, were as fine trees forty years ago as any I have

[76] While there is but one botanical variety, every one who has eaten many knows that there is great difference in the quality of the fruits, also a marked difference in the shape of these fruits, the oblong ones being generally preferred.

seen in Samoa or Fiji. Here they generally mark the site of some deserted habitation, of which all other traces have disappeared.

The wood is white, soft and durable, and was much used formerly, but the part of the tree which most concerns us is neither wood, bark or fruit, but the male blossom, the *poule*, which, although useless as a male blossom, since the female never seeded, was used to some extent to mix with the fibre of waoke in the manufacture of

FIG. 77. FICUS TINCTORIA.

a rare kind of kapa to which it gave name. How the native came to use it,[77] or what good it did to the other fibre are unknown to me.

Ficus Linn. Gen. n. 1168. — Flores monoici v. rarissime dioici, receptaculo carnoso globoso ovoideo pyriformi v. rarius oblongo sæpissime androgyno ad os parvum ∞-seriatim bracteato inclusi. Fl. ♂: Perianthium 2–6-fidum v. partitum, lobis segmentisve imbricatis, rarissime ad squamam unicam reductum. Stamina 1–2, v. rarius 3–6, filamentis brevibus rectis; antheræ exsertæ v. inclusæ, ovatæ v. oblongæ. Ovarii rudimentum 0. Fl. ♀: Perianthii segmenta quam in mare sæpius pauciora

[77] It is possible that, as under the *Doctrine of Signatures*, it was used as the sigil of the malo, the waist-cloth of the men.

angustioraque, nunc tamen tenuia et late imbricata v. minuta v. o. Ovarium rectum v. mox obliquum; stylus saltem post fecundationem excentricus v. lateralis, brevis v. filiformis apice in stigma peltatum, cavum, oblongo-lanceolatum, lineari-lanceolatum v. longe caudatum rarius inæqualiter 2-crure dilatatus; ovulum apice v. sub apice lateraliter affixum pendulum. Achænia receptaculo sæpe aucto arcte inclusa, perianthio fructifero immutato v. rarius succulento stipata v. vestita, v. in paucis speciebus nuda; pericarpium crustaceum induratum siccum v. extus succulentum, rarius totum carnosum. Semen pendulum, testa membranacea; albumen sæpius parcum; embryo curvus, cotyledonibus æqualibus v. inæqualibus interdum plicatis, radicula sursum incumbente.—Arbores fruticesve lactescentes. Folia alterna v. rarius opposita, integerrima dentata v. lobata, forma et venatione quam maxime varia; stipulæ gemmam terminalem involventes, caducissimæ. Receptacula sæpius gemina v. uno abortiente solitaria, ad axillas v. ad nodos defoliatos ramorum vetustiorum, interdum in ramis distinctis aphyllis conferta v. racemosa, pedunculo sæpius brevissimo apice 3-bracteato v. nudo. Bracteæ ad os receptaculi ∞-seriatæ, parvæ, exteriores sæpe erectæ umbonem terminalem efficiunt, interiores horizontales v. intra receptaculum reflexæ. Flores ♂ interdum numerosi fœmineis intermixti, sæpe tamen iis pauciores, interdum perpauci in parte superiore v. juxta os receptaculi: ♀ sæpius numerosi, receptaculum intus fere totum v. partem inferiorem obducentes. Bracteolæ inter flores ♀ sæpius parvæ v. o, nunc inter superiores ♂ v. rarius ubique majores, flores achæniaque superantes.

As more than 600 species have been described in this great genus, scattered widely through the warmer regions of the earth, it would seem probable that one at least might have been found on the Hawaiian Islands; but although many species flourish in cultivation, none is indigenous. The bark of a number of species of fig, not always determined, was used, as we have seen, in Africa and elsewhere for its fibre, and the thick milky juice of the fruit was used in combination with the juice of the *Cordia* to make the beautiful crimson dye in Tahiti. As the species of Ficus used in these ways are not well known outside the tropics, and differ essentially from the common fruiting fig of temperate regions, the generic description has been given, and figures of two representative species commonly used (though not on the Hawaiian Islands) for the manufacture of bark-cloth and its decoration. I would not have it understood that these are the only ones used for these purposes, for there are scores of these useful trees perhaps as suitable as the ones selected, but these show the general form of the leaf and fruit of most of the class.

F. tinctoria Forst. Prod. n. 405.—Found in Fiji, the Society Islands and Wallis Island. In Tahiti called *mate*. A large tree entirely glabrous, with simple stem. Leaves alternate, with short, cartilaginous petioles, ovate-oblong, rather acute,

entire, with 8–10 pairs of veins, 3 inches broad. Twin fruits axillary, pedunculate, globose, little larger than a pea. The use of the fruit has been described on page 12, and need not be repeated here. The illustration is taken from Pl. LXIII of Seemann's Flora Vitiensis.

F. bengalensis Linn. Hort. Cliff. 471, n. 4.—The Banyan. A tree 70–100 ft. high, rooting from the branches, and thus forming accessory trunks, greatly extending the growth of the tree (I have seen in India an example covering four acres).

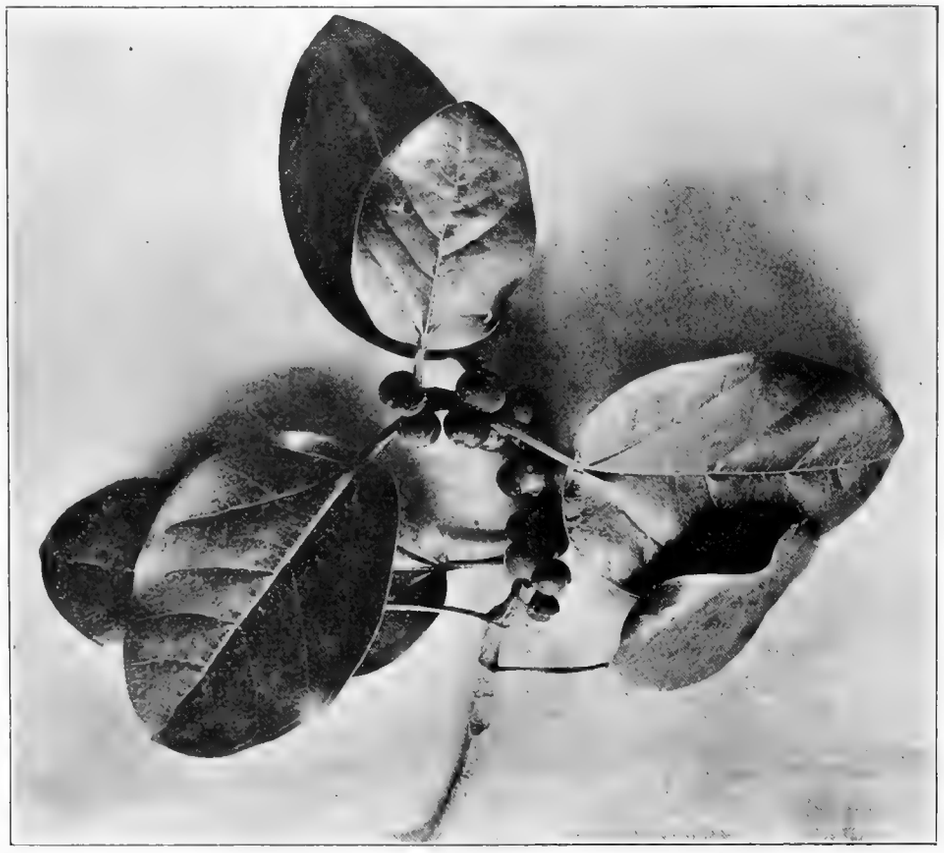


FIG. 78. FICUS BENGALENSIS. BANYAN.

Leaves 4–8×2–4 in., glabrescent above, beneath glabrous or minutely pubescent, reticulations distinct; nerves about 5 pairs, prominent; petiole ½–2 in., stout, stipules ¾–1 in., cori- aceous. Fruits sessile in pairs, axillary, globose puberulous, red and about the size of a small cherry when ripe, with three broad, rounded, spreading basal bracts. Tree planted in all the plains of India; wild only in the sub-Himalayan forests and on the lower slopes of the Deccan Hills. Cultivated also in the Hawaiian Islands. I made the photograph from which Fig. 78 has been engraved more than twenty years ago, and on seeking the tree for the purpose of assuring myself

of the species, found that the tree had been destroyed some years before to make room for a house. I am, therefore, not entirely certain of my determination of the species, but it is certainly a banyan. The bark was fibrous and well suited for beating out a coarse cloth, and in India is used much for ropes. (Desc. J. D. Hooker, Flora of India.)

Antiaris Leschen, in Ann. du Mus. Par., vol. xvi, p. 476, t. 22; Trécul in Ann. Sc. Nat., ser. 3, vol. viii, p. 142, t. 6, f. 158-162.—Flores monoici. Fl. ♂: in involucro ∞-floro, ∞-phyllo, foliolis plurifariam imbricatis, receptaculum demum convexum cingentibus, dense congesti. Perigonia 4-rarius, 3-phylla, inter se aliquando connata; foliolis spathulatis, apice inflexis, æstivatione imbricatis. Stamina 4, rarius 3, perigonii foliolis opposita, inclusa; filamenta brevissima; antheræ oblongæ, erectæ, extrorsæ, biloculares, loculis connectivo lineari adnatis, rima longitrorsum dehiscentibus. Fl. ♀: super receptaculum foliolis imbricatis instructum solitarii. Perigonium 0. Stylus brevis, bifidus, cruribus filiformibus. Ovarium involucro connatum, 1-loculare, 1-ovulatum; ovulum ex apice loculi pendulum. Fructus drupaceus. Semen testa chartacea; embryo exalbuminosus, cotyledonibus plano-convexis crassis; radicula supera.—Arbores vel frutices lactescentes; foliis (in *A. toxicaria*) distichis petiolatis integris integerrimus, nonnunquam dentatis, basi sæpe cordatis, apice acutis vel acuminatis; stipulis 2 axillaribus, non amplexicaulibus; inflorescentiis axillaribus, masculis geminis vel pluribus femineis solitariis.

A. toxicaria Leschen.—A majestic tree, attaining 250 ft.; branchlets glabrous, pubescent or pruinose, young villously hirsute. Leaves 4–8 in., glossy, base rounded or cordate; young lanceolate, serrulate, hirsute; petiole very short. Male receptacles orbicular and peduncles velvety, ½ in. diam. Fruit like a small fig, purple, scarlet or crimson, pyriform, velvety, intensely bitter, tipped with a few bracts. India on the Ghâts; Ceylon; Malay Islands. (J. D. Hooker.)

Pipturus Wedd., in Ann. Sc. Nat., ser. 4, i. 196.—Flores dioici v. rarius monoici, dense globoso-glomerati. Fl. ♂: Perianthium 4–5-fidum, lobis ovatis acutis valvatis. Stamina 4–5. Ovarii rudimentum lanatum. Fl. ♀: Perianthium ovoideum, apice attenuatum, ore contracto minute dentato, fructiferum tenuiter carnosulum. Ovarium inclusum, perianthio adhærens; stigma lineare, exsertum, uno latere villosum, deciduum; ovulum a basi erectum. Receptaculum sub fructibus globosum, leviter carnosum v. siccum, sæpe villosulum. Achænium perianthio parum aucto herbaceo v. carnosulo arcte inclusum, a quo tamen sæpius liberum; pericarpium rigide membranaceum v. tenuiter crustaceum. Semen conforme, testa tenuiter membranacea; albumen perpar-

cum; cotyledones latæ.—Arbores fruticesve elati, rarius scandentes. Folia alterna, integerrima v. crenato-serrata, 3–5-nervia, subtus sæpe canescentia; stipulæ in unam intrapetiolarem bifidam coalitæ, caducissimæ. Florum glomeruli nunc ad axillas sessiles solitarii, nunc spicati, secus rhachin simplicem v. ramosam dissiti sessilesque. Bractæ minime. (H. & B.)

P. albidus Gray, in Mann's Enumer., no. 430.—Shrub 5–8 ft. high, the young branches gray-tomentose. Leaves ovate, 3–4 × 1–2¼ in. on petioles of ½–1½ in., quite acute, crenato-serrate, rounded or slightly contracted at the base, chartaceous, sparingly hispid or glabrate above, shortly white-tomentose underneath on the areoles between the darker veins, tripli-nerved. Stipules triangular lanceolate, bifid to the middle into subulate lobes. Flowers all sessile in axillary clusters of 3–4 lines in diameter, which nearly clasp the stem, white-tomentose or rather hispid, either dicœcious or monœcious and then the female heads occupying the upper part of a branch, but not rarely both sexes in one glomerule. Bractlets minute. Male perigone reddish, acutely 4-fid to the middle or less. Stamens little exserted. Female perigones on a thick, at last fleshy receptacle, minutely 2–4-toothed, the commonly uncinate stigma longer than the perigone. Found on all the islands, especially by the roadsides through forest clearings. Variable as to both size and canescence of the leaves. Not known elsewhere. The Mamaki of the natives was second only to the Waoke in importance as material for kapa. At present there is much more of it growing on the islands than of Waoke. See Fig. 79.

Bœhmeria Jacq. Stirp. Amer., 246, t. 157.—Flores monoici v. dioici, utriusque sexus globoso-glomerati. Fl. ♂: Perianthium 4-lobum v. 4-partitum, rarius 3–v, 5-partitum, lobis segmentisve ovatis valvatis dorso sub apice mucronatis v. muticis. Stamina 4, rarius 3 v. 5. Ovarii rudimentum clavatum v. subglobosum. Fl. ♀: Perianthium tubulosum, compressum v. ventricosum, ore sæpius contracto 2–4-dentato, fructiferum interdum auctum in angulos 2 acutos v. alatos dilatatum v. intus cellulosum. Ovarium inclusum sessile v. stipitatum; stigma elongato-filiforme, uno latere pilosum, diu persistens nec in ovario articulatum; ovulum a basi erectum. Achænium perianthio marcescente inclusum eique haud raro accretum; pericarpium tenuiter crustaceum; dum liberum extus nitidum. Semen conforme, testa tenuiter membranacea; albumen varium; cotyledones ellipticæ v. ovatæ.—Arbusculæ frutices v. suffrutices, magis minusve pubescentes. Folia opposita v. alterna, æqualia v. inæquilatera dentata et rarius 2-loba, 3-nervia; stipulæ liberæ v. rarius intra petiolum basi connatæ, deciduæ. Florum glomeruli fere semper unisexuales, ad axillas v. ad nodos v. secus rhachin spicæ v. ramos cymæ panniculiformis sessiles. Bractæ parvæ, scariosæ.

FIG. 79. PIPTURUS ALBIDUS. MAMAKI.

FIG. 80. BŒHMERIA STIPULARIS.

B. stipularis Wedd., in Ann. Sci. Nat., Ser. iv, 1 (1854), 200.—Shrub 3–5 ft. high, with stout angular, hispid branches. Leaves opposite, equal, ovate, 6–7×4–5 in., on petioles 1–3 in., shortly acuminate coarsely serrate, emarginate or subcordate at base, thick in texture, rugose on upper face, tripli-nerved, all nerves strongly ridged underneath. Stipules interpetiolar, broad-lanceolate, 2–2½ in. bicarinate, soon caducous. Flowers monœcious with androgynous clusters, but with one sex prevailing; clusters 1–2 lines in diameter; male flowers prevail at the extremities of the panicle, female along the lower branches. The tough fibre was much used for kapa-making.

Neraudia Gaudich., in Freyc. Voy. Bot., 500, t. 117, et Voy. Bonite, t. 133.—Flores dioici, glomerulis dense capitatis ad axillas sessilibus. Fl. ♂: Perianthium 4-partitum, segmentis acutis valvatis, alabastro ovoideo v. acuminato. Stamina 4. Ovarii rudimentum longe lanatum. Fl. ♀: Perianthium tubulosum, basi ventricosum, apice tenuatum, ore contracto sub-4-dentato, fructiferum plus minus auctum carnosum. Ovarium rectum, inclusum; stigma lineare, supra ovarium articulatum, villosum, deciduum nisi in ore perianthii retentum; ovulum a basi erectum. Achænium perianthio carnosulo arcte inclusum, depressum, basi circumcirca incrassatum v. in lobulos seu cornua 4 dilatatum; epicarpium carnosulum, endocarpium crustaceum. Seminis testa endocarpio adnata; albumen parcum; cotyledones ovatæ.—Frutices, teste Gaudichaudio, lactescentes. Folia alterna, petiolata, integerrima, 3-nervia, supra interdum creberrime punctulata, cystolithis parum conspicuis; stipulæ parvæ, intrapetiolares. Florum capitula utriusque sexus ad axillas solitaria, arcte sessilia. (J. D. Hooker.)

N. melastomæfolia Gaudich., *l. c.*—A low shrub, 3–5 ft. high, *Oloa* of the natives, branching from the base. Leaves ovate or elliptico-oblong, 3–6×1–2½ in., on petioles ½–2 lines, entire, thin, chartaceous, 3-nerved, glabrous above, gray pubescent beneath or glabrate. Flowers sessile, pubescent, 3–10 in a cluster. The varieties may perhaps all be included under this original species. I have not identified any kapa made from this plant, but the old natives mention its use.

Touchardia Gaudich. Voy. Bonite, t. 94.—Flores dioici, utriusque sexus dense globoso-glomerati. Fl. ♂: Perianthium 5-partitum, segmentis membranaceis subimbricatis, sub apice dorso leviter mucronatis. Stamina 5. Ovarii rudimentum clavatum. Fl. ♀: Perianthium alte 4-lobum, lobis 2-seriatim imbricatis apice incrassatis concavisque. Ovarium rectum, inclusum; stigma brevissimum v. oblongum, uno latere papilloso-penicillatum, stylo brevi fultum; ovulum a basi erectum. Achænium perianthio carnosulo laxe inclusum, compressiusculum, pericarpium fragile. Semen conforme,

testa tenuiter membranacea; albumen mediocre; cotyledones ovatæ.—Frutex elatus, glaber. Folia alterna, longe petiolata, maxima, dentata, pennivenia et basi sub-3-nervia; Stipulæ magnæ, in unam intrapetiolarem connatæ. Florum glomeruli stricte globosi, ramos paucos paniculæ lateralis terminantes, v. uno alterove secus ramum paniculæ sessili. Flores in glomerulo fere sessiles, bracteis parvis scariosis. (J. D. Hooker.)

T. latifolia Gaudichaud, *l. c.*—Shrub, 4–8 ft. high, with a viscid juice. Leaves on petioles of 3–1 in., ovate, 9–16×5–9 in., acute, obtusely crenate, rounded at the base, chartaceous, dark green and glabrous on both faces. Stipules 2 in., acute. Glomerules generally in repeatedly forking cymes, with one branch suppressed and the middle glomerule sessile; the male cymes longer and broader than the female. This Hawaiian plant is found sparingly in deep ravines on all the islands; the oloná of the natives; its fibre is used not for kapa, but for cords and threads employed in sewing kapa; no more durable fibre is known. See Fig. 81.

Hibiscus (**Paritium**) Linn. Gen. n. 846.—Bracteolæ ∞, rarius 3–5, sæpius angustæ, liberæ v. coalitæ. Calyx 5-fidus v. 5-dentatus. Columna staminea infra apicem truncatum v. 5-dentatum (rarius anthiferum) filamenta ∞ exserens. Ovarium 5-loculare, loculis 3–∞-ovulatis; styli ramis 5, patentes v. rarius erecto-subconnati, superne sæpe incrassati, nunc brevissimi apice in stigmata capitata v. spathulata dilatati. Capsula loculicide 5-valvis, endocarpio rarius membranaceo-solubili v. in dissepimenta spuria per dehiscentiam fissa producto. Semina reniformia, subglobosa (v. rarius obovoidea?), glabra tomentosa v. lanata.—Herbæ frutices v. arbores, nunc elatæ hispidæ v. tomentosæ, nunc humiliores v. glabræ. Folia varia, sæpe partita. Flores colore vario, plerumque speciosi, petalis sæpe macula discolori notatis. Bracteolæ persistentes v. caducæ. (J. D. Hooker.) *Paritium* St. Hilaire, Fl. Bras. Mer. 1, 295.

H. tiliaceus St. Hilaire, *l. c.*—Small freely branching tree. Leaves orbicular-cordate on long petioles, about 5×5 in., shortly acuminate, entire, hoary beneath, glabrous above, palmately 7–9-nerved, the three middle nerves with a gland near the base. Stipules large, caducous. Peduncles short, in the upper axils or at the ends of the branches, with one to several flowers. Involucre campanulate, about half the length of the calyx, divided to the middle into 10–12 acute lobes. Calyx tomentose, nearly an inch long, with lanceolate lobes. Petals large, yellow, often with a brown centre. Capsule about an inch in diameter, opening into 5 valves, 3 naked seeds to a cell.—A tree of great importance to the natives, who called it *hau*. A most valuable

FIG. 81. TOUCHARDIA LATIFOLIA. OLONA.

FIG. 82. HIBISCUS TILIACEUS. HAU.

shade tree common near the shore on all the islands of the group; the light, tough wood serves for adz handles and to unite the outrigger to a canoe; the bark furnishes an excellent fibre for ropes and was often beaten into kapa of good quality. (Fig. 82.)

Thespesia Correa, in Ann. Mus. Par. ix., 290, t. 8, f. 2.—Bracteolæ 3–5, parvæ v. deciduæ. Calyx truncatus, minute v. setaceo-dentatus rarius 5-fidus. Columna staminea infra apicem dentatum (nunc antheriferum) filamenta ∞ exserens. Ovarium 5-loculare, loculis pauciovulatis; stylus apice clavatus, 5-sulcus v. in ramos breves stigmatiferos erectos clavatos subdivisus. Capsula lignoso-coriacea, loculicide 5-valvis v. fere indehiscens. Semina obovoidea, glabra v. tomentosa; cotyledones quam maxime complicatæ, radiculam brevem subrectam fere includentes, sæpius nigro-punctatæ. —Arbores v. herbæ elatæ. Folia integerrima v. angulato-lobata. Flores sæpius flavi, speciosi. Calyces non conspicue punctati, sed cotyledones insigniter nigro-punctatæ in T. populnea et T. Lampas. (H. & B.)

T. populnea Correa, *l. c.* — Tree 25–40 ft. high. Leaves roundish, cordate, acuminate, entire, 4–5 in. in diameter, glabrous. Peduncles and petioles equal. Involucral bracts lanceolate, equalling the calyx, soon deciduous. Calyx truncate. Petals obovate-oblong, 2 in., yellow turning dark during the day. Capsule oblate spheroid, almost woody, apparently indehiscent, but opening later. The *milo* of the natives, the same in Samoa, Tahiti and Tonga. Like the Polynesian race, it ranges from Hawaii to Madagascar. The wood is very beautiful, and the bark serves much the same purposes as the hau.

Rubus Linn. Gen. n. 632. — Calycis explanati tubus brevis, latiusculus, ebracteolatus; lobi 5, persistentes. Petala 5. Stamina ∞, rarissime definita, ori calycis inserta, filamentis filiformibus, antheræ didymæ. Discus tubum calycis vestiens. Carpella ∞, rarius pauca, receptaculo convexo inserta; styli subterminales, filiformes, stigmatibus simplicibus v. capitellatis; ovulo in loculis 2 (altero sæpe minimo) collateraliter pendula. Achænia drupacea, rarius sicca, sæpissime receptaculo conico sicco v. spongioso congesta, 1-sperma. Semen pendulum, testa membranacea; cotyledones plano-convexæ; radicula brevis supera.—Herbæ repentes v. frutices plerumque sarmentosi et aculeati, glabri tomentosi v. pubescentes, rarius cani v. glandulosi. Folia sparsa alterna simplicia lobata, 3–5 foliolata v. imparipinnata. Stipulæ petiolo adnatæ. Flores in paniculas corymbosve terminales et axillares dispositi, rarius solitarii, albi v. rosei. Fructus sæpe edulis. (H. & B.)

R. macraei Gray. Bot. U. S. Exped., p. 505, pl. 57. — Stem climbing 10–25 feet, often 2 in. thick at base. Stem prostrate or rambling. Leaves on stout petioles an inch or more long, pinnately trifoliate, but those of the short flowering branches

FIG. 83. AKALA. HAWAIIAN RASPBERRY.

entire or three-lobed; leaflets coriaceous, gray-tomentose and net-veined beneath, broad ovate, the terminal one subcordate, acuminate or somewhat obtuse, bluntly inciso-lobate and dentate. Stipules linear-lanceolate. Flowers numerous, subpaniculate. Calyx tomentose, 5-parted nearly to the base, the sepals broadly ovate, more or less serrate in the upper half. Petals as long as the sepals, obovate, pinkish. Achenes very fleshy, 1½–2 in.—"the fruit attains a diameter of two inches, red, sometimes yellow, very juicy and not disagreeable, but laxative if eaten in quantity." This polymorphous plant needs more examination of fresh specimens in the field, as the specific distinctions are at present badly mixed. Both Dr. Gray and Hillebrand depended on herbarium specimens for their descriptions, which do not correspond with my field notes; but here this is of less importance, as both species seem to have been used for kapa-making. When either of the species is cultivated marked changes occur, and the plant becomes less fruitful. While the fibre is good and strong, it is not as good as *waoke*, *mamaki* or *oloa* which were quite as accessible. The native name akalá applies to both species. (Fig. 83.)

Celtis Linn. Gen. n. 1143.—Flores polygami, fertiles hermaphroditi v. rarius fœminei, masculi cum v. absque rudimento ovarii, in ramis hornotinis cymosi fasciculati v. fertiles solitarii. Perianthium alte v. fere ad basin 5-rarius 4-partitum, segmentis imbricatis. Stamina 5, rarius 4, filamentis erectis v. vix incurvis demum exsertis; antheræ ovatæ. Torus sæpius dense pilosus, vix tamen in discum expansus. Ovarium sessile; stylus centralis, 2-partitus, ramis plumoso-stigmatosis divergentibus indivisis 2-fidisve; ovulum ab apice pendulum, anatropum. Drupa succulenta, ovoidea v. globosa, interdum 2-carinata, æqualis, endocarpio osseo sæpius rugoso. Semen subconforme, testa membranacea; albumen o v. perparcum; embryo curvus, cotyledonibus latissimis sibimet applicitis concavo-subcuculatis v. transverse subplanis et incurvo-replicatis, interdum corrugatis, radicula sursum incurva incumbente v. cotyledonibus amplexa.—Arbores fruticesve inermes v. spinosi. Folia alterna, annua v. perennantia, serrata v. integerrima, pennivenia et 3-(rarius 4.5-) nervia, basi sæpe obliqua; stipulæ laterales, liberæ. Cymulæ masculæ v. androgynæ laxæ v. fasciculiformes, axillares v. ad basin innovationum; flores fertiles in axillis superioribus solitarii v. pauci, longius pedicellati. (H. & B.)

C. vestimentaria is the specific name on the specimens sent me, but this does not appear in the Kew catalogue, so I am unable to cite the actual species; but this is less important, as its use does not extend into the Pacific region.

We turn from the fibre-producing plants to those used for dyes, and we shall find the old Hawaiians were as well provided with means to add variety and sometimes beauty to the tissue when beaten out, as with good quality and variety of fibre-producers. The reader need only turn to the *fac simile* plates to be convinced that the Hawaiians not only had the raw material but used it with skill and taste, perhaps not to be expected in a remote island group.

Aleurites Forst. Char. Gen. 111, t. 56.—Flores monoici v. subdioici, petaliferi. Fl. ♂: Calyx junior globosus, clausus, per anthesim in lobos 2–3 valvatim ruptus. Petala 5, calyce longiora. Stamina 8–20, receptacula conico affixa, 5 exteriora petalis opposita glandulis parvis alterna, filamentis liberis brevibus v. elongatis; antheræ erectæ, adnatæ, loculis parallelis longitudinaliter dehiscentibus. Ovarii rudimentum o. Fl. ♀: Perianthium maris. Discus inconspicuus, v. glandulæ minutæ petalis alternæ. Ovarium 2–5-loculare; styli in ramos 2 crassiuscule lineares divisi; ovula in loculis solitaria. Fructus magnus drupaceus, indehiscens, exocarpio carnoso haud crasso, endocarpio crustaceo v. duro 2–5-loculari v. abortu 1-loculari. Seminum testa crassa, lignosa; albumen crassum, durum; embryo rectus, cotyledonibus latis planis.—Arbores indumento stellari v. subsimplici. Folia alterna, longe petiolata, ampla, basi 5–7-nervia, integerrima v. 3-loba, petiolo apice 2-glanduloso. Flores laxe cymosi, cymis ad apices ramorum paniculatis.

A. moluccana Willd. DC. Prod. xv, sect. ii, p. 723. — Tree 40–60 ft. high, with soft wood, spreading branches pale-tomentose at the end. Leaves 6–8 in. long, varying in shape, either undivided or 3–5–7-lobed, the lobes triangular, acuminate, the base rounded or cordate, silver-green with the rib and nerves on the under side tomentose. Corymb 4–8 in. long, with subulate bracts, the pedicels longer than the calyx. Female calyx twice the size of the male. Petals white with a greenish tinge, oblanceolate in the ♂ flower, and bearded at the base, linear oblong in the ♀. Stamens about 18, filaments hispid, anthers erect, introrse. Ovary hairy, 2-celled. Fruit fleshy, coriaceous, subglobose, about 2 inches in diameter, often double.

Common on all the islands, especially on the lower slopes of the mountains, which are brightened by its silvery foliage. Known to all Polynesians as Kukui or Tutui, to others as the Candle-nut tree, from the ancient use of the roasted nuts strung on palm-leaf midribs as candles, a custom in use forty years ago in the grass house of the country. From the acrid juice from the rind of the nut they prepared a black dye, also used in tatuing; but the soot of the burning nut was a better black. The bark furnished a brown dye very common and durable. The *pilali* or gum exuding from the stem was a good adhesive, and the oil expressed from the nuts was used to

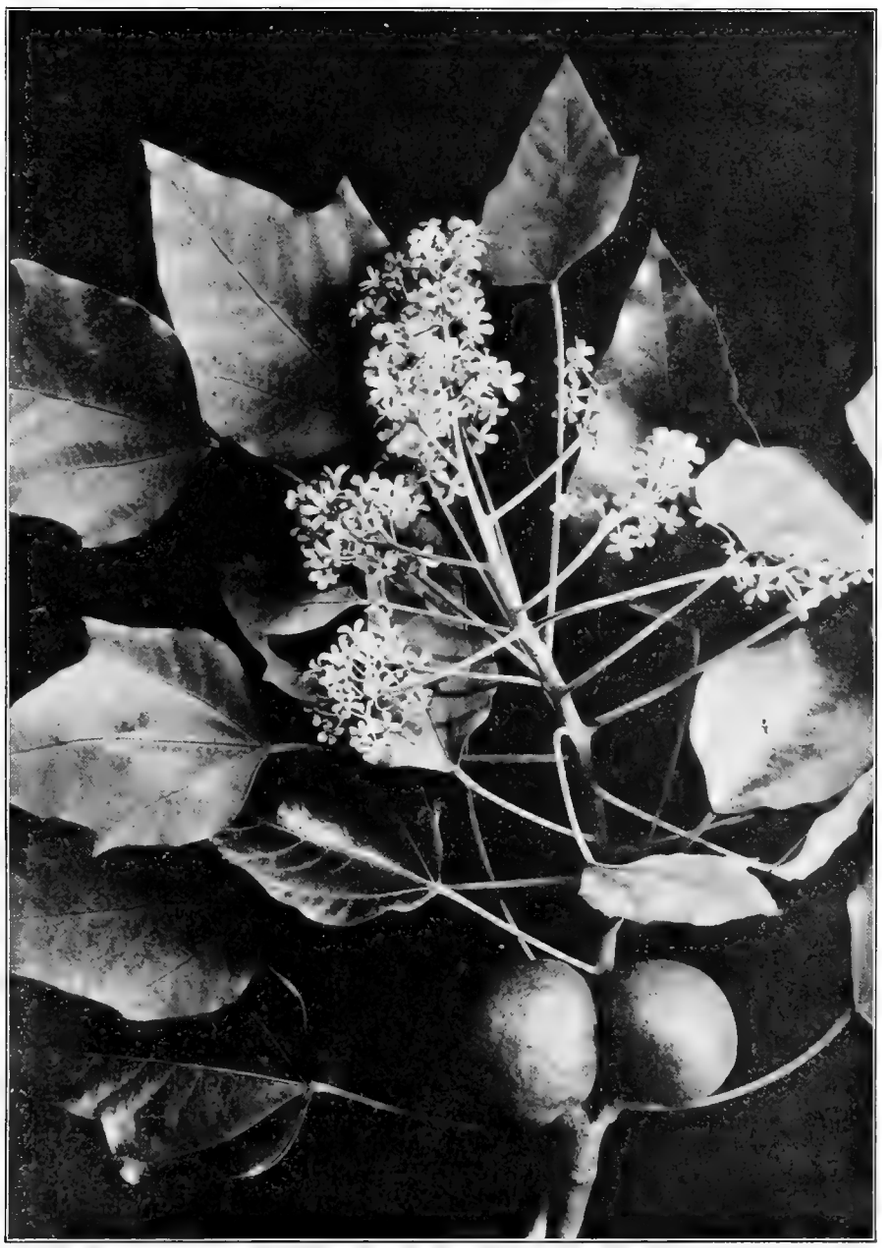


FIG. 84. ALEURITES MOLUCCANA. KUKUI.

burn in the stone lamps, and as a vehicle for the paints, for which, however, it was not so good as the oil of the kamani; again this oil was used with that of the coconut to waterproof the riding pa'u. There were on these islands several groves of kukui greatly regarded if not always in a religious light; such were that near the East end of Molokai where Lanikaula had his hermitage, and where it was a custom to seal vows by driving a lock of the votary into the soft trunk with a sharp stone, and the grand clump of gnarled and ancient stems near Kilauea, Kauai, where chiefs and people formerly held council together on important occasions. For domestic use in the olden time perhaps the kukui may be placed next in importance to the coconut.

In the southern islands, especially the Samoan, another tree of the same family held an important place as a dye, as has already been mentioned in the account of the kapa-making of that group. It occurs in tropical Asia, the Malayan peninsula and most of the islands of the south Pacific, and as it is a genus of a single species I include it here with the Hawaiian Flora, as I have the Antiaris, for its importance as a dye of many Polynesian kapas.

Bischofia Blume. Bijdr., 1168. — Flores dioici, apetali. Discus 0. Fl. ♂: Sepala 5, imbricata, concava, supra antheras fere cucullata. Stamina 5, filamentis brevibus; antheræ magnæ, loculis parallelis distinctis medium versus affixis longitudinaliter dehiscentibus. Ovarii rudimentum breve, latum. Fl. ♀: Sepala leviter concava, caducissima. Staminodia parva fere glanduliformia interdum adsunt ad basin segmentorum. Ovarium 3-rarius 4-loculare; styli lineares cressi, integri, a basi papillosi; ovula in loculis gemina. Fructus subbaccatus, globosus, indehiscens, sæpius 3-locularis, exocarpio carnoso, endocarpio pergameneo. Seminum testa crustacea (in vivo extus pulposa?); albumen carnosum; embryo rectus, cotyledonibus planis latis.—Arbor procera. Folia alterna, 3-foliolata, foliolis petiolulatis majusculis, sæpius crenatis. Racemi laterales, præsertim in ♂ paniculato-ramosi. Flores ♂ secus rhachin sparsi v. subfasciculati, brevissime pedicellati, ♀ longius pedicellati.

B. javanica Blume. Bijd., 1168. — A round-headed more or less deciduous-leaved quite glabrous tree, 30–40 ft.; bark smooth. Leaves very variable; petiole 1–6 in.; leaflets 3–5 in., from ovate to oblong-lanceolate, acuminate, repand-toothed, petiolules $\frac{1}{2}$–$\frac{3}{4}$ in. Panicles very slender, flowers green, males minute on short slender pedicels, fem. $\frac{1}{6}$ in. diam. on stout pedicels. Fruit fleshy on long, thickened pedicels, smooth, size of a pea, blue-black. Seeds smooth, shining, testa, splitting longitudinally, dark brown. (J. D. Hooker.) Five species have been reduced to two in Index Kewensis. Fig. 85. The color of this dye as used in Samoa is shown on Plates 23–27.

FIG. 85. BISCHOFIA JAVANICA.

Curcuma Linn. Gen. n. 6.—Calyx tubulosus, 2–3-dentatus, interdum hinc breviter fissus. Corollæ tubus brevis v. elongatus, superne dilatatus; lobi ovati v. oblongi, subæquales v. posticus longior breviterque acuminatus. Staminodia lateralia petaloidea, basi cum filamento anguste petaloideo, plus minus connata, petalum 3-fidum lobo medio antherifero simulantia; labellum paullo majus, superne dilatatum, integrum emarginatum v. 2-fidum. Anthera in filamento petaloideo sessilis; loculis contiguis connectivo latiore basi in calcara 2 producto. Ovarium 3-loculare, loculis ∞-ovulatis; stylus filiformis, stigmate ultra loculos antheræ erecto v. inflexo, æquali v. dorso gibbo antice 2-labiato ciliato. Capsula globosa, pericarpio membranaceo sub-3-valvi. Semina ovoidea v. oblonga, lævia, arillo nunc brevi, nunc lacero laciniis semen superantibus; embryo linearis, rectus, tenuis v. crassiusculus.—Rhizoma crassum, fibris tuberiferis. Caules erecti, 1–10 pedales. Folia sæpe ampla. Florum thyrsi densissimi, strobiliformes, oblongi v. elongati, bracteis concavis v. cucullatis amplis imbricatis apice rotundatis, superioribus sæpe vacuis coloratis pulcherrime comosis. Flores sub quaque bractea 2-∞, sessiles, singuli bracteola spathacea stipati. Fructus intra bracteas inclusi. (H. & B.)

C. longa Linn.—The *Olena* of the natives. Tuber oblong, palmate, exuding deep orange juice when pressed, which was used as a favorite but not very durable dye. Stem short; leaves few, elliptico-oblong, 8–12×3–4 in. acuminate, on sheathing petioles of nearly their length. Spike terminal. The Turmeric occurs in open glades on all the principal islands, but is much less common than formerly, and is sought by the natives for medicinal purposes.

Abutilon Gærtn. Fruct., ii, 251, t. 135.—Bracteolæ 0. Calyx 5-fidus. Columna staminea apice in filamenta ∞ diversa. Ovarii loculi 5-∞, verticillati, 3–9-ovulati; styli rami totidem, filiformes v. clavati, apice stigmatosi. Carpella matura, basi coalita v. omnino secedentia, superne rotundata divergenti-rostrata v. angulata, 2-valvia, intus nuda. Semina subreniformia, superiora sæpius adscendentia, inferiora pendula v. horizontalia.—Herbæ v. frutices, rarius arbores, tomento sæpius molli. Folia sæpius cordata, angulata v. lobata, rarius angusta. Flores plerumque axillares, colore vario sæpe luteo. (H. & B.)

A. incanum G. Don.—A low decumbent underbrush, 1–2 ft. high, covered with a soft, light gray pubescence. Stipules filiform, short. Leaves cordate-ovate, acuminate, crenate or serrate, canescent on both sides, gradually decreasing in size upward, the lowest 2×1¾ in., on petioles of 1–1¾ in. Flowers axillary and solitary on pedicels of ½–1½ in., which are articulate near their ends. Calyx canescent,

FIG. 86. ABUTILON INCANUM. MAO.

1½–2 in. deeply 5-cleft into ovate lobes, petals blue, obovate. Carpels 5, canescent, 4–6 lines high, connate about three-quarters of their length into a columnar subtruncate capsule, dehiscent at the apex and along the dorsal sutures. Seeds in each carpel 3, superposed, globose, pubescent. The native name is *Mao*, and is the "native cotton" mentioned by some travelers (p. 50) as used for dyeing a rather light green, a decoction of the fresh leaves being used. It is rather common on low dry land. Green seems to have been little favored by the old natives, for it is seldom seen on the kapa; it may, however, fade like many vegetable greens.

Morinda Linn. Gen. n. 235.—Flores hermaphroditi, rarius abortu unisexuales, plerumque mediantibus calycibus in capitula confluentes. Calycis tubus urceolatus v. hemisphæricus; limbus brevis, truncatus v. obscure dentatus, persistens. Corolla infundibularis v. hypocraterimorpha, tubo brevi fauce glabra v. pilosa; limbi lobi 5, rarius 4 v. 6–7 coriacei, valvati. Stamina 5, rarius 4–7, fauci corollæ inserta, filamentis brevibus; antheræ medio dorso affixæ, lineares v. oblongæ, utrinque obtusæ, inclusæ v. exsertæ. Discus tumidus v. annularis. Ovarium 2- v. (interdum imperfecte) 4-loculare; stylus inclusus v. exsertus, glaber v. pilosus, ramis 2 brevibus v. elongatis linearibus; ovula in loculis solitaria, septo infra medium v. basin versus loculi inserta, adscendentia, anatropa v. amphitropa. Syncarpium succulentum, polypyrenum, pyrenis cartilagineis v. osseis 1-spermis, interdum in putamen 2–4-loculare concretis. Semina obovoidea v. reniformia, testa membranacea, albumine carnoso; embryo teres, radicula infera.—Frutices v. arbores, erecti v. scandentes, glabri v. rarius pubescentes, ramulis teretibus v. obscure 4-gonis. Folia opposita, rarius 3-natim verticillata, sæpius membranacea. Stipulæ utrinque solitariæ, cum petiolis in vaginam connatæ. Capitula longe v. breviter pedunculata, axillaria v. terminalia, nunc umbellata. Flores albi.

M. citrifolia Linn.—A small glabrous tree with angular branches. Leaves broadly ovate, 6–8×4–6 in., on short petioles. Stipules broad and rounded, 4–6 lines connate below into a loose sheath which encloses the peduncle. Flower heads on short bractless peduncles placed opposite a leaf, their own supporting leaves remaining undeveloped. Calycine limb truncate. Corolla white, tubular or funnel-shaped. Style shortly bifid, as long as the tube. Syncarpium several inches in diameter. The *noni* of the natives formerly cultivated as a dye plant, and still used to some extent as medicinal. When fully ripe the fruit is used as a poultice, but has a most fœtid smell. The wood when fresh is intensely yellow, and the root is especially suitable for dyeing that color. The bark yields a red dye.

FIG. 87. MORINDA CITRIFOLIA, LINN. NONI.

Gardenia Linn. Gen. n. 296.—Calycis tubus ovoideus v. obconicus; limbus varius, tubulosus spathaceus lobatus v. partitus, sæpius persistens. Corolla hypocraterimorpha campanulata v. infundibularis, tubo calycem longe superante, fauce sæpissime glabra; limbi lobi 5–9, patentes v. recurvi, breves v. elongati, stricte contorti. Stamina 5–9, fauci corollæ inserta, filamentis brevissimis v. 0; antheræ sessiles v. subsessiles, dorso affixæ, lineari-oblongæ, acutæ v. obtusæ, inclusæ v. breviter exsertæ. Discus varius, sæpius annularis v. conicus. Ovarium 1-loculare v. rarius placentis axin attingentibus faciebus oppositis cohærentibus spurie 2-loculare; stylus crassus, apice clavatus v. fusiformis, teres v. sulcatus, vertice integro v. 2-fido lobis intus stigmatosis; ovula numerosa, placentis 2 parietalibus longitudinaliter stipitatis seriatim immersa, horizontalia. Fructus sessilis, oblongus, ovoideus, cylindraceus v. pyriformis, teres v. costatus, coriaceus v. carnosus et irregulariter ruptus, v. endocarpio indurato 2–5-valvi. Semina plurima, sæpissime cum placentis pulposis in massam loculo conformem conglobata, horizontalia, compressa v. turgida, obtuse angulata, testa coriacea v. membranacea albumini sæpissime corneo adhærente; embryo mediocris, cotyledonibus latis foliaceis, radicula tereti hilum spectante.—Frutices rarissime arbores, glabri pubescentes v. tomentosi, inermes v. rarius spinis rectis oppositis armati, ramulis teretibus novellis non raro vernicosis. Folia parva v. ampla, opposita, rarissime 3-natim verticillata v. uno pedunculo opposito suppresso, membranacea v. coriacea. Stipulæ intrapetiolares, triangulares, acutæ v. acuminatæ, sæpe basi connatæ. Flores majusculi v. magni, axillares et solitarii, rarissime terminales v. corymbosi, flavi v. albi. (H. & B.)

G. Brighamii Mann. Enum. n. 179.—Shrub 6–12 ft. high with dichotomous densely leafy branches. Leaves on short petioles, ovate, 1½–4×1–2½ in., shortly acuminate, chartaceous, with prominent straight nerves, shining above, papillose and in the young state puberulous underneath. Stipules triangular or truncate, connate inside the petioles into a complete sheath. Flowers single, terminal, subsessile. Calyx tube quadrangular, shortly produced above the ovary, 4-lobed. Corolla white, salver-shaped, 6-lobed. Anthers linear, their apices exserted. Style as long as the tube, the 2 clavate branches nearly half as long. Fruit globose, with 4 faint lines, about 1 in. in diameter, coriaceous, indehiscent, tipped with the contracted limb of the calyx, 1-celled, with 4 (or 3 or 5) parietal placentas projecting from the endocarp. Seeds many in a yellowish pulp with a coriaceous black teste and fleshy albumen.

G. Remyi Mann. Enum. n. 180.—Tree 30–40 ft. high, the young shoots exuding a glutinous substance which covers the leaves like varnish. Leaves obovate-oblong, 4–9×2–4 in. on short petioles, shortly acuminate, contracted at the base,

FIG. 88. GARDENIA REMVI IN FRUIT.

chartaceous, papillose underneath, prominently nerved. Stipules truncate and sheathing. Flowers terminal, single, sessile. Calyx tube angular, the 4–5 lobes falciform, dilated towards the obtuse apex, spreading with the plane vertical, 1½ in. long, equalling or exceeding the corolla. Corolla white with 7–8 obovate-oblong, suberect lobes. Anthers enclosed. Fruit 4–5-angled, pyriform, 1½–2 in. in both diameters. (Fig. 88.)

Flowers of both species fragrant, and the fruit pulp used for dyeing yellow. The native name *nanu* was applied to G. Remyi, and *nau* to G. Brighamii.

Suttonia (**Myrsine**) A. Rich. Fl. Nov. Zel., 349, t. 38. — Flores polygamo-dioici. Calyx, parvus, 4–5-fidus, persistens. Corolla 4–5-partita v. 4–5-petala, rarius brevius 4–5-fida, laciniis patentibus recurvisve, imbricatis rarius valvatis. Stamina 4–5, filamentis brevibus, v. subelongatis, basi petalorum insertis; antheræ breves. Ovarium globosum v. ovoideum, in stylum brevem v. elongatum v. fere obsoletum attenuatum, stigmate simplici capitato inæqualiter lobulato v. dilatato fimbriato v. lobato; ovula numerosa v. pauca, placentæ immersa. Fructus pisiformis, siccus v. subcarnosus, 1-spermus. Semen globosum, sessile, basi intrusum, reliquiis placentæ indutum, albumine corneo lævi v. leviter ruminato; embryo elongatus, cylindraceus, sæpius arcuatus v. sigmoideus. Frutices v. arbores glabri, rarius pubescentes v. tomentosi, ramulis sæpe crassiusculis. Folia coriacea, integerrima, rarius serrulata. Flores parvi, in fasciculos axillares sessiles v. pedunculatos dispositi, sessiles v. breviter rarius longius pedicillati, bracteati, bracteis sæpe imbricatis deciduis. Flores rarissime 5–7-meri. (H. & B.)

S. Lessertiana A. DC. Prod. viii, 96. — Tree 20–50 ft. high, with a rough, tuberculate bark. Leaves crowded at the ends of the branches, thick coriaceous opaque, the veins hardly prominent and connected by a continuous marginal nerve, glabrous on both faces, gradually merging in a short petiole. Flowers in the axils of the leaves and on projecting spurs of the bare branches in fascicles of 2–7, pedicels with short bracts at base. Calyx deeply 5–7-parted, the lobes somewhat acute. Corolla 1½–2 lines, twice the length of the calyx, yellowish, with reddish dots, thin, deeply divided into 5–7 lanceolate lobes. Stamens little shorter than the petals, the broad ovate anthers emarginate at the base. Ovary with 3–4 ovules. Stigma on a short style, capitate, on the fruit 5-laciniate or fimbriate. Drupe dry, rather globose, reddish with a chartaceous pyrena and a single round seed. (Fig. 89.)

By the natives this and several other species are called *kolea*, and formerly they extracted a red dye from the bark, or as others claim a black dye. This tree prefers the higher regions of the mountain slopes and is common on Konahuanui, Oahu.

FIG. 89. SUTTONIA LESSERTIANA. KOLEA.

Cordia Linn. Gen. n. 256.—Calyx tubulosus v. campanulatus, striato-costatus v. lævis, apice 3–5-dentatus v. dentibus cohærentibus demum varie fissus v. calyptratus, fructifer sæpe auctus drupa tamen brevior v. vix eam excedens. Corolla infundibularis hypocrateriformis v. campanulata lobis seu angulis 5 rarius 4 v. 6-∞, in alabastro varie plicatis v. planis, imbricatis v. subcontortis. Stamina tot quot corolla lobi, tubo æqualiter v. inæqualiter affixa, exserta v. inclusa; antheræ ovatæ oblongæ v. lineares, sagittatæ v. hastatæ. Ovarium 4-loculare; stylus elongatus, 2-fidus, ramis breviter v. alte 2-fidis, stigmatibus capitatis v. clavatis; ovula erecta, medio infra medium v. ima basi lateraliter affixa. Drupa calyci persistenti, imposita v. eo cincta v. subinclusa, putamine duro sæpe osseo crassoque, loculis 1-spermis 4 v. abortu paucioribus. Semina ascendentia, exalbuminosa; cotyledones nunc crassæ irregulariter plicatissimæ, nunc sæpius tenues latissime plicisque numerosissimis flabellatæ; radicula brevis.—Arbores fruticesve, indumento sæpissime scabro. Folia alterna v. rarius hinc inde subopposita, petiolata, integerrima v. denta. Flores sessiles, nunc in cymas dichotomas ramis scorpioideis, nunc in spicas cylindraceas v. capitula densa dispositi, sæpius aurantiaci v. albi, nunc maximi, nunc parvuli corolla calycem vix excedente. (H. & B.)

C. subcordata Lam. DC. Prod., ix, 477.—Tree 30–40 ft. high with a broad crown. Leaves ovate or subcordate 5–6×3–4 in., on petioles of 1–1½ in., acuminate, entire or wavy, glabrous, excepting slight tomentose patches in the axils of the principal veins. Flowers in short terminal or lateral cymes. Calyx 5–6 lines, coriaceous, irregularly and obtusely 3–5-toothed. Corolla large, campanulate, orange-colored, tube twice the length of the calyx, the broadly expanded limb 5–7-lobed, lobes rounded, imbricate-contorted, one lobe external. Style as long as the tube. Drupe ovoid, 1–1½ in. enclosed within the calyx. Hawaiian *kou*, Tahitian *tou*, names indifferently applied to either of several species. The wood is soft, durable, easily worked, and very beautiful. From the leaves, as we have seen in Banks' account (p. 12), is made the fine crimson dye with the juice of the fig. So far as I know the leaves of the present species are equally good for the purpose with any of the southern species. *C. Sebestena* is cultivated in Honolulu, and flowers all the year.

FIG. 90. CORDIA SUBCORDATA. KOU.

Dianella Lam. Dict., ii, 276.—Perianthium marcescens, non tortum, demum sæpius deciduum; segmenta distincta, subæqualia, sub anthesi patentia, oblonga 3–7-nervia. Stamina 6, perianthio breviora, hypogyna v. sæpius 3 interiora ima basi segmentorum affixa, filamentis apice v. medio v. fere a basi carnoso-incrassatis; antheræ oblongo-lineares, erectæ v. demum recurvæ v. replicatæ, basi inter lobos basales affixæ, loculis poris terminalibus sæpe in rimas introrsum continuas dehiscentibus. Ovarium sessile v. brevissime stipitatum, obtusum; stylus filiformis, stigmate parvo; ovula in loculis ∞ (4–8). Fructus succulentus, globoso-3-dymus v. ovoideo-oblongus, indehiscens. Semina in loculis solitaria v. pauca, ovoidea v. compressiuscula, testa nigra crustaceo-nitida; embryo linearis, rectus v. curvulus, albumine carnoso parum v. dimidio brevior.—Rhizoma sæpe ramosum v. stoloniferum, caule erecto rigido cum pedunculo sæpe pluripedali. Folia prope basin caulis conferta v. secus partem inferiorem approximata, disticha, vaginis equitantibus, lamina longe lineari, in parte superiore caulis pauca, vaginis brevibus, laminis parvis, radicalia pauca v. ad vaginas reducta. Flores cærulei, pedicellati, nutantes, laxe cymosi, cymis in panicula terminali ampla laxa dispositis, pedicellis sub flore articulatis. Bracteæ parvæ scariosæ v. o.

D. nemorosa Lam. Ency., ii, 276. Stem short. Leaves stiff, 1½–3 ft. long, ½–1 in. broad at the base, entire, closely nerved with a keeled midrib. Panicle as long as the leaves or longer, peduncle leafy, the foliaceous bracts quickly diminishing in size, the branches ascending, twice divided and drooping at the ends. Pedicles 3–6 lines. Perianth pale lilac, campanulate, 3–4 lines long, deeply parted into subequal oblong 5-nerved segments. Berry light blue (mazarine), obovoid, 4–5 lines. Seeds 2–3 in each cell, ovoid, compressed and margined. The *uki* of the natives. Flowers have a delicate scent, and the juice of the berries was utilized for dyeing pale blue, a color more permanent than would be supposed. The plant is common on the lower hills to a height of over 4000 ft.

FIG. 91. DIANELLA NEMOROSA. UKI.

Ochrosia Juss. Gen. 144.—Calyx 5-partitus, eglandulosus, segmentis obtusis. Corolla hypocrateriformis, tubo cylindraceo ad stamina parum dilatato, fauce esquamata; lobi 5, contorti, dextrorsum obtegentes. Stamina supra medium tubi inclusa; antheræ lanceolatæ, loculis basi inappendiculatis. Discus 0 v. brevissime annulatus. Ovarii carpella 2 distincta v. base connata; stylus filiformis; stigma oblongum, apiculo brevi 2-fido; ovula in quoque carpello 2–6, 2-seriata, ad utrumque latus placentæ prominentis superposita. Drupæ 2, divaricatæ, interdum basi connatæ, v. abortu solitariæ, epicarpio tenuiter carnoso, endocarpio crasso duro nunc osseo sæpius a dorso compresso, sulco ventrali plus minus diviso. Semina solitaria v. 2 placenta intrusa duplici separata, plano-compressa, testa membranacea; albumen 0 (v. carnosum?); cotyledones magnæ, planæ, radicula brevi supera.—Arbores. Folia verticillata v. rarius opposita, v. sparsa, tenuiter et crebre pennivenia. Cymæ ad apices ramorum pedunculatæ, foliis ultimis alternæ, demum laterales. (H. & B.)

O. sandwicensis Gray, in Proc. Am. Acad., V, 333.—A much branching glabrous shrub, 6–12 ft. high. Leaves 3 or 4 in a whorl, elongate-oblong, 4–6×1½–2 in., on petioles of ½–1 in., shortly acuminate, chartaceous, shining above, the close and faint nerves perpendicular to the rib and parallel and united by a distinct intramarginal nerve. Cymes compound, 2–3 in. long, divaricatingly branching, the angular peduncle ½–1½ in., the lateral pedicels ½–1 line, the median flowers subsessile; the bracteoles short ovate to dentiform. Calyx 1½–2 lines, with acute lanceolate teeth. Corolla yellowish, hairy inside, dilated below the throat, lobes linear-oblong, equal. Stamens inserted above the middle, with short hairy filaments and elongate included, anthers. Stigma included, clavate. Disk of two glands. Drupes dry, yellow, ellipsoid or ovoid-elongate. Seeds one on each side of the placenta and peltately attached to it. Testa thin chartaceous. Albumen hard fleshy. Embryo axillary, shorter than the albumen.

Becoming quite rare on all the islands; the *hoolei* of the natives who use the bark of stem and root to dye yellow. This plant is often confounded with the related *Rauwolfia sandwicensis* DC.

FIG. 92. OCHROSIA SANDWICENSIS. HOOLEI.

Eugenia Linn. Gen. n. 616.—Calycis tubus globosus ovoideus turbinatus v. elongatus, supra ovarium haud v. plus minus productus; limbi segmenta 4, rarissime 5, distincta, nunc ampla imbricata, nunc brevia v. in margine truncato vix prominula. Petala 4, rarissime 5–∞ v. 0, patentia distinctaque, v. conniventia et in calyptram plus minus connata. Stamina ∞, ∞-seriata, libera, v. basi in phalanges 4 præsertim in alabastro obscure connata, filamentis filiformibus; antheræ versatiles, sæpius parvæ, loculis longitudinaliter dehiscentibus sæpissime parallelis rarius divaricatis. Ovarium 2-rarissime 3-loculare; stylus filiformis, stigmate parvo; ovula in loculis ∞, placentæ e septo parum prominenti affixa, sæpius incurvo-adscendentia, in Sect. *Myrciaria* 2–4. Bacca subdrupacea v. pulposa, rarius subsicca et fibroso-cortica, calycis limbo persistente coronata v. rarius limbo deciduo truncato. Semina pauca, sæpius 1–4, globosa v. mutua pressione varie compressa, testa membranacea v. cartalaginea; embryo crasso-carnosus, radicula brevi, cotyledonibus crassis plus minus conferruminatis v. distinctis hemisphæricis v. heteromorphis.—Arbores fruticesve, glabræ v. rarius tomentosæ v. villosæ. Folia opposita (in una specie alterna?), coriacea v. membranacea, pennivenia. Inflorescentia nunc centripeta, pedicellis 1-floris oppositis, ad axillas solitariis fasciculatis v. in racemum brevem (ramum aphyllum) dispositis, nunc centrifuga cymis terminalibus densis v. in paniculas terminales lateralesve trichotomas dispositis. Bractæ et bracteolæ sæpius parvæ caducissimæque, rarius foliaceæ persistentes. (H. & B.)

A large genus of more than 500 species, the species not always clearly defined.

E. malaccensis Linn. — A glabrous tree 25–50 ft. high. Leaves opposite, elliptico- or obovato-oblong, 6–7×2½–3 in. on petioles of ½ in., acuminate, dark green and shining, not dotted, the sinuate marginal nerve distant from the edge. Cymes axillary, usually cauline, short, about 2 in. long. Calyx turbinate, produced beyond the ovary with 4 rounded lobes. Petals and stamens red (in one variety white). Fruit obovate, 2–3 in. diam. deep crimson (or white). Seed generally single. In the valleys and the lower forest zone on all the islands. The bark was an important dye and with the allied species *E. sandwicensis* was used for tanning. Native names of the two species, *Ohia ai* and *Ohia ha*.

The ohia ai (edible ohia) was almost the only Hawaiian fruit before the coming of the foreigner. When or how it was originally introduced no one knows, but it still offers its grateful if rather insipid fruit to the traveler, and is found ripe at almost any season in some of the well-watered valleys, while in others still in the flowering stage. It is, however, far more attractive to the eye than to the taste.

FIG. 93. EUGENIA MALACCENSIS. OHIA AI.

Bixa Linn. Gen. n. 654. — Flores hermaphroditi. Sepala 5, imbricata, decidua. Petala 5, ampla, contorto-imbricata. Stamina ∞ toro crasso inserta; antheræ ad medium induplicatæ ibidemque rimis brevibus falso terminalibus dehiscentes. Ovarii placentæ 2, parum prominulæ, ∞ ovulatæ; stylus elongatus, æstivatione recurvus; stigmate brevissime 2-lobo. Capsula dense echinato-setosa v. rarius nuda, 2-valvis, valvis crassis medio placentiferis; endocarpio membranaceo, solubili. Semina obovoidea, funiculis apice dilatatis; testa laxa, subcarnosa, ad raphem sulcata; cotyledones latæ, apice sæpe incurvæ.—Arbusculæ succo colorem luteum v. rubrum præbente scatentes. Folia ampla, integerrima, palminervia. Flores terminales paniculati, speciosi. Pedicelli sub calyce 5-glandulosi. (H. & B.)

B. orellana Linn.—Tree 10–12 ft. high. Leaves glabrous, cordate or ovate, acuminate. Capsule covered with setose prickles.

This shrub was formerly cultivated here for the red dye obtained by macerating the seed pulp, and has become naturalized in places. This is the Arnotto said to be a favorite coloring matter used by dairymen. I found it growing apparently wild in 1864 in Nuuanu and on the barren plains east of Kawaiahao church. A native of tropical America. (Fig. 94.)

This is another of the contributions that have reached these islands from the shores of tropical America. Whether it came with the *Argemone mexicana* which was already naturalized in the days of Captain Cook we cannot say, for that careful observer did not notice it. The pulpy seeds are eaten by birds through whose alimentary canal they pass without injury, and they may have come attached to the hairy or woolly hides of domestic animals imported later. I believe that the old Hawaiians used the plant as an useful dye at least a century ago. My observations convince me that with the diminished use the Bixa is disappearing from the group; it seems to be confined to a few gardens where it is cultivated for its pretty leaf and conspicuous fruit pod.

In addition to the following plants here described the old Hawaiians made use of two ferns, the *Palaá* (*Davallia tenuifolia*) and the *Amaumau* (*Sadleria cyatheoides*). The use of the former has been mentioned by Malo as a red dye applied in the *imu* or native underground oven (p. 12); the latter (the name also applies to a god who dwelt among the ferns) was used both for sizing the mamaki fibre and for a red dye. The descriptions in brief of these ferns are as follows:—

FIG. 94. BIXA ORELLANA. ARNOTTO.

Davallia (**Stenoloma** Fée) **tenuifolia** Swartz. Hook. Spec. Fil., p. 186.—Rhizome stout, creeping, densely fibrillose; stipes strong, erect, polished, naked, dark brown, 6–12 in. long; fronds 12–18×6–9 in., ovate, quadripinnatifid; lower pinnæ ovate-lanceolate, 4–6×2–3 in.; pinnules lanceolate, their segments cut down to the

FIG. 95. DAVALLIA TENUIFOLIA. PALAA.

rachis below with toothed, cuneate lobes, 1–1½ lines across at the apex; texture subcoriaceous, both surfaces naked, the upper shining; sori terminal, usually solitary, often rather broader than deep. The commonest of Hawaiian ferns. Native name *Palaá*. The leaves furnished the red dye. (Fig. 95.)

Sadleria cyatheoides Kaulf. Enum. Fil., p. 162. — Trunk 3–10 ft. high. Stipe 1–2 ft. long, naked except at the base where it is densely covered with red-brown scales. Fronds 2–6 ft. long, 9–18 in. broad, bipinnatifid. Pinnæ 30–40 on a side, 6–10×½–1 in. cut down to the rachis into very numerous connected linear pin-

FIG. 96. SADLERIA CYATHEOIDES. AMAUMAU.

nulæ, ⅜–½ × ⅛ in., acute or bluntish; texture coriaceous; veins immersed and inconspicuous. Sori at maturity covering the whole lower surface. Native name *Amaumau*, not *Amamau* as given by Hillebrand. (Fig. 96.)

While it is probable that the list of vegetable dye stuffs is not exhausted, I am unable to point to any other with certainty, although there are certain native names of dyes that may be synonyms of those already enumerated, or apply to unidentified plants.

FIG. 97. PELEA ANISATA. MOKIHANA.

The newly made kapa had an unpleasant odor, as is the case with most felted or textile fabrics, and the Hawaiians used many odoriferous plants to stifle the malodor of the manufacture. Some of these would not be pleasant to European nostrils, but some, as the sandal-wood, are generally liked, and on these islands are much used as perfumes to the present day. I shall make the list as small as possible with due regard to the importance the natives attached to the use of these perfumes, some of which are distinctly perceptible after many years in carefully preserved specimens of kapa.

Pelea A. Gray, in Bot. Amer. Expl. Exp., 339.—Flores polygami. Calyx quadripartitus, æstivatione imbricatus, cito deciduus. Petala 4, æstivatione valvata, mox decidua. Stamina 8: filamenta subulata v. complanata, fl. fert. breviora sæpiusque antheris (sagittatis) cassis donata. Discus hypogynus brevissimus, integer, seu octocrenulatus. Ovarium quadriloculare (loculis petalis oppositis), quadrilobum, sæpius umbilicatum: stylus centralis: stigma quadrilobum. Ovula in loculis gemina, hemitropa, adscendentia. Capsula quadripartita, stellariformis (coccis divaricatis), loculicida; endocarpio chartaceo ab exocarpio coriaceo seu lignescente solubili. Semina in loculis sæpissime bina, ovoidea, testa nitente drupacea. Embryo intra albumen carnosum rectus; cotyledonibus ovalibus; radicula supera.—Arbores Sandwicenses (necnon Samoenses), inermes, odoratæ; foliis simplicibus integerrimis oppositis seu verticillatis coriaceis punctatis venosissimis, venis in venulam intramarginalem plus minus confluentibus; floribus axillaribus. (A. G.)

P. anisata Mann, in Proc. Bost. Soc. Nat. Hist., x, 314.—A slender tree 15–20 ft. high. Leaves opposite, oblong, 3–7×1½–2¼ in., on petioles of 1 in., obtuse or rounded at both ends, or emarginate with an attenuate base, chartaceous. Flowers small, 1–3 or more on a common axis. Capsule thick coriaceous, small cuboid, subentire, the outer faces marked only by a shallow notch, the axis remaining entire after dehiscence. All parts of the tree, but especially the capsules, emit a strong odor of anise when bruised. The native name is *Mokihana*, a word meaning also a smell or perfume. The capsules were strung for *leis* as shown at the bottom of Fig. 97, the capsules having after a lapse of a dozen years still a strong anise odor. On Kauai, at least, it seems to have been the favorite perfumer, the threaded capsules, or the twigs of leaves being placed among the sheets of kapa. The native name of the genus is *Alani*, a tough wood used for making kapa-beaters. The species most preferred for this purpose was *P. sandwicensis*.

FIG. 98. ALYXIA OLIVÆFORMIS. MAILE.

Alyxia R. Brown. Prod. 469.—Calyx 5-partitus, eglandulosus, segmentis ovatis lanceolatisve brevibus. Corolla hypocrateriformis, tubo cylindraceo ad stamina dilatato, fauce esquamata; lobi 5, contorti, sinistrorsum obtegentes. Stamina medio tubo v. altius inclusa; antheræ lanceolatæ, loculis basi inappendiculatis. Discus 0 v. obscure annulatus. Ovarii carpella 2, distincta; stylus filiformis; stigma oblongum v. capitatum, apiculo inconspicuo v. breviter 2-fido; ovula in quoque carpello 4–6, 2-seriata. Drupæ v. baccæ 2 v. abortu solitariæ ovoideæ v. oblongæ 1-spermæ v. moniliferæ, articulis 2 rarius 3–4 oblongis 1-spermis. Semina ovata v. oblonga, sulcata v. placentam intrusam amplectentia; albumen corneum, ruminatum; cotyledones foliaceæ, ovatæ v. oblongæ, rectæ v. curvulæ, radicula brevi supera.—Frutices sæpius glabri. Folia 3–4-natim verticillata v. rarius opposita, coriacea, nitida pennivenia venis tamen parum prominulis. Flores parvuli, gemini v. cymosi, cymis capitellatis fasciculatis v. breviter spicato-paniculatis, axillaribus v. in axillis foliorum terminalium pseudo-terminalibus. (H. & B.)

A. olivæformis Gaud., in Bot. Voy. Freyc., p. 451.—A straggling or twining shrub. Leaves opposite and ternate, elliptico-oblong, 1½–2¼×½–¾ in., acuminate at both ends, coriaceous, glossy. Penduncles axillary, 3- rarely 4-flowered. Calyx small, acutely 4- rarely 5-parted. Corolla yellowish, the tube 2–2½ lines, the 4 rarely 5 ovate lobes half the length of the tube. Anthers small, acute enclosed. Style enclosed; stigma at first conical and slightly hairy at the top, but afterward capitate. Ovules 2 in each carpel, superposed. Drupes often twin in a single flower and stipitate, fleshy, black, elliptico-oblong, sometimes curved, 7–10 lines long, acuminate at both ends. The *maile* of the natives, who make great use of the fragrant branches; the perfume is, however, rather nauseous to foreign nostrils. (Fig. 98.)

Santalum Linn. Gen. n. 480.—Flores hermaphroditi. Perianthii tubus campanulatus v. ovoideus, ima basi ovario adnatus; lobi 4 rarius 5 usque ad discum soluti, valvati, intus pone stamina fasciculo pilorum instructi. Stamina basi loborum affixa iisque breviora, filamentis brevibus; antheræ ovatæ, loculis parallelis longitudinaliter dehiscentibus. Discus tubum perianthii tenuiter vestiens, inter stamina in squamas distinctas carnosulas spathulatas triangulares v. fere quadratas productus. Ovarium primum in fundo perianthii fere liberum, mox basi accrescens semi-inferum; stylus elongatus, stigmate breviter 2–3-lobo; ovula 2–3, infra medium placentæ centralis longe acuminatæ affixa, arcte reflexa. Drupa subglobosa, cicatrice annulari perianthii delapsi coronata, exocarpio haud crasso, endocarpio duro sæpius rugoso. Semen subconforme; embryo in centro albuminis rectus v. obliquus, linearis, teres, radicula

FIG. 100. ZINGIBER ZERUMBET. AWAPUHI.

cotyledonibus multo longiore.—Arbores fruticesve glabri. Folia opposita v. rarius alterna, petiolata, integerrima, coriacea v. subcarnosa, pennivenia sed costa sola sæpius conspicua. Flores quam in generibus affinibus sæpius majores, in axillis superioribus v. ad apices ramorum trichotome paniculati, paniculis laxiusculis at sæpius foliis brevioribus v. interdum ad racemos simplices reductis. Bracteæ inconspicuæ. (H. & B.)

S. freycinetianum Gaud. Bot. Voy. Freyc., p. 442, tab. 45. — Tree 15–25 ft. high. Leaves opposite, ovato-elliptico- or obovato-oblong, 2½–3 × 1¼–1½ in., on short petioles of 1–2 lines, somewhat obtuse at both ends, chartaceous, glabrate or slightly ochraceous underneath. Cymes paniculate, 1½–2 in. long terminal and in the axils of the uppermost leaves, the flowers almost sessile in clusters of 3–9. Bracts short, deciduous. Perigone dull-red, campanulate, the rather acutely ovate lobes as long as the tube or longer. Disk lobes short and broad, almost emarginate. Anthers longer than the filaments, included. Style little shorter than the perigone, shortly 3–4-cleft, the lobes capitellate. Drupe ovoid, 5 lines long, with a glaucous bloom when young and a truncate apex; the putamen smooth.

The *iliahi* of the natives, who used the powdered heart-wood, *laau ala*, as a perfume. The early traffic in sandal-wood from these islands led to the destruction of so many trees that the iliahi is now rare; it is found here and there as small trees, hardly large enough to yield much of the prized wood. In New Zealand a species of Santalum has the Maori name *Mairi*, the name of the fragrant Maile of the land of their origin. In some of the folds of the kapa in the Museum derived from the Hawaiian Alii I have found traces of the powdered sandal-wood.

Zingiber Adanson. Fam. ii, 66.—Calyx membranaceus v. hyalinus, tubulosus, breviter 3-lobus. Corollæ tubus cylindraceus, superne parum dilatatus; lobi angusti, posticus erectus, incurvus, concavus, laterales patentes. Staminodia lateralia basi cum labello connata v. præter lobos laterales labelli 0; labellum v. labelli lobus medius lateralibus major, integer v. breviter 2-fidus, interdum crispulus; anthera in filamento brevi erecta, oblonga, loculis inter se parum distantibus, connectivo ecalcarato ultra loculos in appendicem linearem v. subulatam producto. Ovarium 3-loculare, ∞-ovulatum; stylus filiformis, stigmate ultra loculos antheræ sæpius parvo subgloboso. Capsula globosa v. oblonga, pericarpio haud crasso, irregulariter rupta. Semina sæpius majuscula, oblonga, arillo lacero laciniis nunc brevibus, nunc elongatis semen longe superantibus.—Rhizoma horizontale, tuberosum. Caules foliati variant floriferi v. steriles. Thyrsi spiciformes, densi, strobiliformes v. longiusculi,

FIG. 99. SANTALUM. ILIAHI.

bracteis imbricatis, nunc in scapo radicali aphyllo vaginis obtecto nunc in caule foliato terminales v. in pedunculo recurvo laterales. Flores sub quaque bractea 1–3, singuli bracteola spathacea stipati. (H. & B.)

Z. Zerumbet Roscoe, in Trans. Linn. Soc., viii, 348. — Stem 1–2 ft. Leaves distichous, lanceolate, 7–8 in. long, acuminate, glabrous, shortly stipitate on a long sheath which runs out into two ears. Scape radical, about a foot long. Spike ovoid, 2–3 in. long, its bracts broadly rounded. Flowers yellowish white; middle lobe of labellum emarginate, yellow.

The *Awapuhi* of the natives, who used the powdered rhizome for scenting kapa.

Acacia Willd. Spec. Pl. iv, 1049. — Flores 5–4-meri, rarius 3-meri, sæpius sessiles, hermaphroditi v. polygami. Calyx campanulatus, dentatus lobatus v. in sepala distincta divisus, rarissime subnullus. Petala plus minus coalita v. rarius libera, rarissime 0. Stamina ∞ (sæpius ultra 50), exserta, libera v. ima basi in cupulam brevissimam v. discum perigynum brevissime et irregulariter connata; antheræ parvæ; pollinis granula in massas 2–4 in quoque loculo sæpissime aggregata. Ovarium sessile, v. stipitatum, 2–∞-ovulatum; stylus filiformis, stigmate terminali parvo. Legumen ovatum oblongum v. lineare, rectum arcuatum v. varie contortum, planum convexum v. teres membranaceum coriaceum v. lignosum, 2-valve v. indehiscens, intus continuum, septatum v. varie farctum, rarissime in articulos secedens. Semina transversa v. longitudinalia, sæpius ovata, compressa, funiculo filiformi v. varie in arillum carnosum dilatato. — Arbores frutices v. rarissime herbæ, inermes aculeatæ v. spinosæ. Folia bipinnata, foliolis sæpius parvis ∞-jugis v. ad petiolum foliiformem (phyllodium) reducta; glandula petiolaris sæpe adest. Stipulæ spinescentes v. inconspicuæ, rarius membranaceæ. Capitula globosa v. spicæ cylindricæ, pedunculis axillaribus solitariis v. fasciculatis, v. ad apices ramorum paniculatis. Flores parvi. Stamina flavescentia v. alba, rarissime semipollicem attingentia, in quoque flore numerosa, interdum usque ad 400. Bractæ sæpe 2, connatæ, breves, squamiformes, sub capitulo, v. in medio pedunculo v. ad ejus basin, sub floribus intra capitulum sæpius lineari-cuneatæ v. apice peltato-dilatatæ. (H. & B.)

A. farnesiana Willdenow. — A much-branched shrub, quite glabrous or slightly pubescent on the petioles and peduncles. Leaves of 4–6, rarely 8 pairs of pinnæ. Leaflets 10–20 pairs to a pinna, linear, about 2 lines long. Stipules converted into slender straight thorns very variable in length, the plant otherwise unarmed. Peduncles usually 2 or 3 together in the older axils, each bearing a singular globular head of sweet-scented yellow flowers. Pod thick, irregularly cylindrical

FIG. 101. ACACIA FARNESIANA.

fusiform, indehiscent, filled with a pithy substance, within which are the seeds. Of early introduction this plant has spread everywhere and become a troublesome weed. The flower heads, the *flor aroma* of the Spaniards, are used by European perfumers as well as by the old Hawaiians to impart their lasting and not unpleasant odor to various articles; with the latter, especially to sheets of kapa. (Fig. 101.)

Calophyllum Linn. Gen. n. 658.—Flores polygami. Sepala cum petalis 4–12, 2–3-seriatim imbricata. Stamina ∞, libera v. vix basi connata; filamenta breviter filiformia; antheræ erectæ, ovatæ v. oblongæ, 2-loculares, longitudinaliter dehiscentes. Ovarium 1-loculare; stylus longiusculus, stigmate peltato; ovulum 1, erectum. Drupa indehiscens, putamine crustaceo. Semen erectum, ovoideum v. globosum, testa nunc tenui nunc fungoso-incrassata.—Arbores. Folia coriacea, nitida, creberrime striato-penninervia. Paniculæ axillares v. terminales cymoso-trichotomæ v. racemiformes et minus stricte centrifugæ. (H. & B.)

C. Inophyllum L.—DC. Prod. I., 562.—A wide-spreading tree 40–60 ft. high, glabrous throughout. Leaves coriaceous, shining, broadly oblong or obovate, 8×4 in., rounded or emarginate, on petioles of nearly 1 inch. Racemes axillary, 2–7 in. long, the pedicels 1–1½ in. with short, soon deciduous bracts at the base. Sepals 4, rounded, 4–5 lines long. Petals 4, rarely 6–8, white, oblong, 7–8 lines. Style 2–3 lines. Fruit globose, 1 in. or more thick. Flowers very fragrant. This useful tree furnished fine timber, excellent oil, and a grateful perfume. (Fig. 102.)

While I have perforce omitted many of the dyestuffs used in other parts of the kapa-making world, enough have been enumerated to show that the Hawaiians were well supplied with the factors of several important colors, as yellow, red, brown, blue, mainly indeed from vegetables, although the ochres played no unimportant part. In what manner then were they used? The principal Hawaiian word meaning to color is *hooluu*, meaning to dive into the water, to plunge into a liquid, hence to dye; and this was the usual method of imparting color to pieces of kapa, but equally it was dyeing when the liquid imparting the color was sopped into the fibres, which was a common method used when the dye was in small quantity, or the piece of kapa to be colored small. We are told that some of the Solomon Islanders spit the dye from the mouth and rub it into the outlined figure with the finger. The application of color by the ohekapala, or by the ruling pen, or any natural object, as a fern leaf, was not dyeing but printing; the color was superficial and did not permeate all the fibres of the kapa. We have seen, however, that oil-mixed colors as applied by the

FIG. 102. CALOPHYLLUM INOPHYLLUM. KAMANI.

Tongans, Samoans and others with the *upete* often pass through the fabric and appear on the other side, in which case there seems to be no strict distinction between printing and dyeing.

The most interesting question is how the bark, leaves, seeds, fruits, were treated to make the potential color available. Most of the dyes here mentioned may be extracted by infusion, and others by boiling, but did the old Hawaiians boil? They had no pottery, and no metal pots, and did not boil their food; but that was rather a matter of taste than from a lack of either knowledge or utensils. Their cooking by placing hot stones inside of birds, dogs or pigs would surely teach them the process of "stone boiling" practised by many other Pacific islanders, as the Solomon Islanders, who had pottery of fair quality, though not so large as the huge cannibal pots of Fiji, and yet used this method in cooking their "long pig" in the large elliptical wooden bowls reserved for that purpose. The Hawaiians had wooden bowls (*umeke*) of generous size, quite sufficient to boil with hot stones the largest pig, dog or fish had they been so inclined. They also had stone bowls of perhaps five gallons capacity which could have been used for preparing a hot dye, and smaller stone cups were in universal use among them.

Then the question of mordants to precipitate the coloring matter in the fibres and so increase the permanency of the coloring. They used sea-water, urine and burned coral lime for such purpose. They recognized, if they did not understand the reaction between tannin and salts of iron, as in the familiar ink-making; this we have seen in the double dyeing with hili kolea, hili koa or hili kukui, and then with the iron-saturated mud or water. I have repeated this process and found it easily workable.

I do not intend to tire the reader with a recital of my many experiments with these dyes: I have pulverized them, infused them, steamed them (as we know the old Hawaiians did the *palaá*) mixed with sea-water with or without lime, both the original white kapa and the first dyed fabric; I have tried bark of the stem and of the root, leaves, fruit, seeds; but as I had not a single authentic recipe I cannot say that any one of these processes was the one used in coloring any individual piece of kapa. The experiments were interesting to me, and the results were sometimes good, but they only showed that color could be obtained from the material known to have been used by the Hawaiian kapa-makers, and not at all that they were used in that particular way.

A practical dyer could perhaps unravel the probable method, and fix with tolerable certainty the process used in certain cases; I cannot myself, and so rest contented with giving a list of the materials with which any can experiment. The one thing this list certainly teaches is the great amount of experimental research the men of old must have undertaken before this considerable number could have been brought

together. In the old days their knowledge of tree and plant, and their qualities, economic or therapeutic, was considerable, and they had a name for each and every one. Even two score years ago I seldom found a mature native who could not give me the Hawaiian name of any tree I found in the mountain forests.

It seems well to add to the list of raw material the principal woods preferred for the beaters, anvils and other necessary tools. By consulting the list of Ie kuku it will be seen that the greater part of these beaters was the produce of the *kauila* tree, and so great was its toughness that it was also in demand for the fabrication of the large and heavy spears, the daggers and other weapons.

Alphitonia Reissek, in Endlich. Gen. 1098.—Flores hermaphroditi. Calyx 5-fidus, tubus late obconicus, lobis 3-angulari-ovatis acutis patentibus intus carinatis. Petala sub disco inserta, subelongata, involuta. Stamina 5, filamentis filiformibus, petalis involuta. Discus crassus, pilosus, tubum calycis implens, 5-gonus. Ovarium disco immersum et cum eo confluens, 2–3-lobum, 2–3-loculare, in stylum 2–3-fidum attenuatum, stigmatibus obtusis. Drupa globosa v. late ovoidea, infra medium calycis tubo annulata, atra, 2–3-pyrena, epicarpio suberoso sicco pulvere atro v. rubro farcto, pyrenis lignosis v. crasse crustaceis intus longitudinaliter dehiscentibus. Semina late oblonga, compressa, plano-convexa, arillo membranaceo laxo fragili apice pervio induta, testa cornea coriacea v. ossea nitida, albumine cartilagineo v. carnoso; cotyledones orbiculatæ, crassiusculæ, planæ; radicula brevis. — Arbores interdum proceræ, ramulis ferrugineo-tomentosis. Folia alterna, petiolata, ovato-v. oblongo-lanceolata, integerrima, parallele penninervia, venulis crebris striolata, subtus incana, superne sicco atra. Stipulæ parvæ, deciduæ. Cymæ axillares et terminales. Flores ferruginei. Drupæ majusculæ. Tahiti, Fiji, Borneo, Philippines. (H. & B.)

A. excelsa Mann, Enum. 87.—A fine tree, 50–90 ft., the young branches rusty tomentose. Stipules subulate, soon caducous. Leaves ovate-oblong or lanceolate 2–6×¾–2 in., on petioles of ½–1 in. generally acute, entire, coriaceous, dark green and glabrous above, rusty tomentose beneath. Flowers in the axils of youngest leaves in short tomentose dichotomous cymes. Calyx tomentose, leathery, the lobes prominently ridged and expanded. Petals half as long as the calyx lobes, of delicate texture, spathulate and cucullate from a narrow flat base, enclosing the short stamens. Anthers short, ovoid, emarginate at the base. Disk pentagonal. Style very short, 2–3-fid. Fruit globose, 7–9 lines in diameter, enclosed to the middle by the adnate calyx, almost indehiscent. Arillus dark red enveloping the whole seed, opening by a transverse slit at the top. Cotyledons broad oblong; radicle papilliform. On dry slopes of most of the islands but not common. *Kauila* of the natives.

FIG. 103. ALPHITONIA EXCELSA. KAUILA.

Straussia A. Gray, in Proc. Amer. Acad., iv, 43.—Calycis tubus turbinatus v. hemisphæricus, pedicello articulatus; limbus brevis, cupularis, late 4–5-dentatus, persistens. Corolla breviter infundibularis, tubo intus glabro, fauce sparse pilosa; limbi lobi 4–5, patentes, coriacei, valvati. Stamina 4–5, fauci corollæ inserta; filamentis brevibus; antheræ basifixæ, semi-exsertæ, oblongæ, connectivo dorso incrassato. Discus tumidus. Ovarium 2-loculare; stylus brevis, glaber, ramis 2 brevibus; ovula in loculis solitaria, e basi erecta, truncata. Drupa pyriformis, rarius ovoidea, 2-pyrena pyrenis plano-convexis cartilagineis v. coriaceis. Semina plano-convexa, ventre profunde angustissime sulcata, testa firme membranacea intra fissuram albuminis dense cornei intrusa; embryo ad basin fissuræ, parvus.—Arbores v. frutices fere glaberrimi, ramulis robustis lignosis teretibus. Folia opposita, breviter petiolata, coriacea, obovata, obtusa. Stipulæ interpetiolares, latæ, obtusæ, caducæ. Flores parvi, in cymas longe pedunculatas terminales trichotome subcapitatim ramosas dispositi, brevissime pedicellati.

S. Kaduana Gray, *in loc.*—Tree 15–20 ft. high. Leaves obovate-oblong, 2–4×1¼–2 in. on short petioles, cuneate towards the base, chartaceous and pale beneath. Stipules short, broadly triangular. Panicle 2–5 in. long, erect or nodding, with only one or two whorls of rays toward the end of a long peduncle. Calyx with denticulate limb. Corolla about four times as long as calyx, naked at the throat, its 4–6 lobes generally longer than the tube. Drupe obovoid or top-shaped, almost quadrangular, with a broad flat disc. The native *Kopiko.*

Cæsalpinia Linn. Gen. n. 516.—Calycis tubus discifer brevis, nunc brevissimus; segmenta 5, imbricata, infimo exteriore concavo v. cymbiformi, sæpius majore. Petala 5, orbiculata v. rarius oblonga, patentia, valde imbricata, parum inæqualia v. summo intimo minore. Stamina 10, libera, declinata filamentis basi sæpius villosis v. glandulosis; antheræ uniformes, loculis longitudinaliter dehiscentibus. Ovarium sessile, in fundo calycis liberum, pauciovulatum; stylus teres, sæpe filiformis, apice rarius clavatus, stigmate terminali truncato concavo v. minuto. Legumen ovatum, oblongum, lanceolatum v. falcatum, compressum, exalatum suturis nerviformibus v. incrassatis, nunc planum v. turgidum coriaceum et 2-valve, nunc coriaceum v. crassum et indehiscens v. vix tardius 2-valve, inter semina sæpe farctum. Semina transversa, ovata obovata orbicularia ovoidea v. globosa, testa coricea interdum crasso-subcarnosa; albumen 0; cotyledones planæ v. crasso-carnosæ, basi integræ v. vix cordatæ; radicula brevis, recta.—Arbores v. frutices nunc alte scandentes, inermes v. aculeis sparsis horridi. Folia bipinnata, foliolis nunc parvis numerosis v. paucis,

FIG. 104. STRAUSSIA KADUANA. KOPIKO.

nunc majoribus herbaceis v. coriaceis. Stipulæ variæ. Flores flavi v. rubri, sæpe speciosi, racemosi, racemis laxis in axillis superioribus v. ad apices ramorum paniculatis. Bracteæ parvæ v. rarius majores et membranaceæ, sæpius caducissimæ; bracteolæ 0.

C. Kauaiensis Mann, Enum. 120.—A small tree with loose, spreading branches unarmed, the shoots fulvo-tomentose. Leaves abruptly bipinnate with 1–5 pairs of pinnæ, each pinna with 4–8 pairs of leaflets, the common rachis 3–5 in., the pinnæ 1½–3 in. long. Leaflets oblong, 1–1¼×½ in. obtuse at both ends, retuse, membranaceous. Stipules and stipellæ none or small wart-like. Raceme terminal, hoary, 1–3 in. long, densely floriferous from the base; the pedicels 1–2 in., jointed above the middle. Bracts acute, ciliate, caducous. Calyx glabrous, pinkish, the short tube 2 lines, the lowest lobe concave 6–7 lines, the others oblong obtuse, 3–4 lines. Petals pinkish-purple, shorter than the calycine lobes, the uppermost one obcordate, folded, of deeper color, the lateral ones sub-orbicular, the two lower ones obovate. Stamens exserted, declinate, the filaments hairy broad and flat below. Ovary glabrous, sessile, 3–5-ovuled. Style incurved; stigma small. Pod obovate, 3–3½×1¼–2 in., with a dorsal wing 3–4 lines wide running along its whole length and ending in an uncinate point flat, thin, indehiscent. Seeds 2–4, transverse, pale, ovate, flat with a punctiform hilum at the base. The native *Uhiuhi.*

Byronia Endl., in Ann. Wien Mus., i, 184—Flores polygami. Calyx parvus, 4–6-lobus. Corolla 5–9-partita v. lobata. Stamina lobis corollæ isomera v. iis duplo plura, filamentis subulatis; antheræ oblongæ. Ovarium globosum, 10–18-loculare, stigmate sessili discoideo. Drupa 10–18-pyrena, pyrenis cartilagineis.—Arbusculæ v. arbores glaberrimæ. Folia alterna, coriacea, lucida. Cymæ 3–chotomæ, axillares. Drupæ parvæ, siccæ multicostatæ.

B. sandwicensis Endl., *in loc. cit.*—A fine tree, 20–40 ft. high, quite glabrous. Leaves elliptico-oblong or obovate, 2–4×1–2½ in., on petioles of 6–15 lines, obtuse, narrowing toward the base, entire or rarely serrulate, coriaceous, dark green, glossy with impressed nerves. Flowers numerous in cymose pannicles of 2–4 in. length, the naked and compressed peduncle ½–2 in., the pedicels 3 lines, bibracteolate below the middle, the bractlets 1–1½ lines. Calyx 1 line, coriaceous, 4-lobed, the lobes rounded. Corolla 2 lines, rotate, white, deeply 6–10-cleft. Stamens 6–10, half the length of the corolla, with short ovoid anthers. Stigma of 12–20 rays. Drupe blue-black, fleshy globose, compressed, 3–4 lines in diameter, many-ribbed when dry, containing 10–20 separable pyrenas. Plate 26 in Gray's Botany of the U. S. Exploring Expedition.

FIG. 105. BYRONIA SANDWICENSIS. KAWAU.

This fine tree, beautiful as a young shrub, has an excellent timber-wood used often by the natives for *kua kuku* or kapa anvils; the native name is *Kawau*. The illustration, Fig. 105, is of the small-leaved variety on Oahu, where it is a small shrub rather than a tree. The odor of the fresh flowers is strongly honey-like.

Bambusa Schreb. Gen., Pl. 236.—Spiculæ 2–∞-floræ, secus ramos paniculæ dissite glomeratæ, rhachilla sub floribus articulata, floribus hermaphroditis v. superiore masculo, inferioribus interdum sterilibus. Glumæ rigide membranaceæ v. subcoriaceæ, muticæ v. breviter mucronato-acuminatæ, tenuiter multinerves, inferiores 3–4 vacuæ ab extima parva in superiorem florentibus subsimilem gradatim auctæ; florentes longiores, summa sæpius angusta vacua; palea glumæ subæqualis, sæpe angusta, carinis 2 acutis ciliatis valde prominentibus vix tamen vere alatis. Lodiculæ 3. Stamina 6, filamentis liberis. Ovarium apice hirsutum; stylus elongatus, indivisus v. varie 2–3-fidus, stigmatibus breviter plumosis. Caryopsis oblonga, facie plana v. leviter sulcata, gluma paleaque inclusa, libera, pericarpio tenui semini adhærente, humectato tamen facile solubili.—Gramina arborescentia v. rarius suffruticosa v. scandentia, interdum spinifera, foliis breviter petiolatis cum vagina articulatis planis venulis transversis obscuris v. conspicuis. Panicula in caule inferne foliis denudato, interdum quam maxime decomposita, rarius simplex. Spiculæ sæpius minores, secus ramos elongatos sæpissime fasciculatæ semi-verticillatæ sessilesque. (H. & B.)

B. vulgaris Schrad. & Wendl.—Unarmed, 20–40 ft. high, the branches scaly below, striate. Leaves stipitate, oblong-lanceolate, 6–12 in. long and ½–2 in. wide, acute, rounded at base, scabrous, ciliate at the mouth of the abruptly terminating sheath. Spikelets 6–10 lines long, stramineous, 6–8-flowered, with 3–4 fertile florets, the upper ones tabescent; the glumes of the fertile florets ovate-lanceolate with subulate points, 15–19 nerved, abruptly passing into the shorter sterile ones. Style long, pubescent, simple or 2–3 cleft. Anthers linear, purplish.

On all islands wild in low valleys, and varying considerably in diameter of stem and length of joints. Native name *Ohe*. The Hawaiians beside the use for printing type already described, used the larger sizes for outriggers to the canoes, the smaller for fishing poles, nose flutes, etc., and the intermediate ones for other musical instruments or noise-makers, although they had not the pandean pipes so common in the Papuan region on the west. I do not believe this grass was introduced by foreigners; many other forms have been brought here in the last thirty years. All seem to grow well, and the illustration shows a fine clump of the Hawaiian form growing near the shore at Hilo, Hawaii. Fig. 106.

FIG. 106. BAMBUSA VULGARIS. OHE.

In speaking of the paint brushes used by the old Hawaiians mention was made of the Hala (*Pandanus odoratissimus*) as the source of these simple brushes, but no specimen of the ripe fruit was at hand to illustrate the origin and form of the implement. I have since been able to supply the deficiency in Fig. 107. It has not been thought needful to refer to the hala tree otherwise, as this is the only part of this useful tree appearing in the manufacture of kapa.

FIG. 107. A RIPE FRUIT OF THE PANDANUS.

CHAPTER IV.

The Uses of Kapa.

An orderly treatise on the uses of kapa (of course in the olden time) must begin with the earliest and most important use,—that for clothing. A treatise on clothing with so little for text: a strip of cloth nine inches wide and nine feet long for the man, and for the woman a strip a little wider and somewhat longer! The gentler sex to whom we owe the multiplication of clothes and the variation of fashions, reduced to such simplicity as the learned Teufelsdröckh would find difficult to farther anatomize, and we unlearned ones can only admire as we do the Venus of Melos! The philosophy of *Sartor Resartus* crumbles away in a land where a tailor was as unknown as an electrician, and yet all were sufficiently clothed.

> "O fair undress, best dress! It checks no vein,
> But every flowing limb in pleasure drowns,
> And heightens ease with grace."

Three only were the forms of dress on Hawaii for both sexes: for the man the malo or narrow strip; for the woman the pa'u a similar strip but wider and longer; for both sexes the kihei or shawl; in modern terms trousers, petticoats and cloak.

Simple as these garments were they all admitted of grades in quality, decoration and size. We find a heavy penalty, sometimes death itself, was incurred if a commoner put on the malo of a chief; so there was a difference between the garb of a commoner and that of an aristocrat even in those primitive days, easily seen. Later the kapa malo of the chief developed into the more costly and durable network of oloná, which in the case of the Moi was sometimes covered with feathers and decorated at the ends with the teeth of his enemies. Fig. 108 represents the network of one of these in the Bishop Museum (No. 6921). The feathers are all gone, but a careful examination shows the quills of the feathers still attached to the web in places, and on the broad surface fragments of skin are also found indicating the former presence of the black plumage of the *iwa* (*Fregata aquila*) which was usually attached with the skin. There is also in this museum a fragmentary malo of mat work never covered with plumage, carefully preserved in the Queen Emma collection (No. 2600), supposed to be the famous malo of King Liloa which attested the birthright of his son Umi as told in Hawaiian song and legend.

To return to our plain kapa malo: it was usually adjusted to the body by holding one end under the chin, passing the malo backwards between the legs, bringing

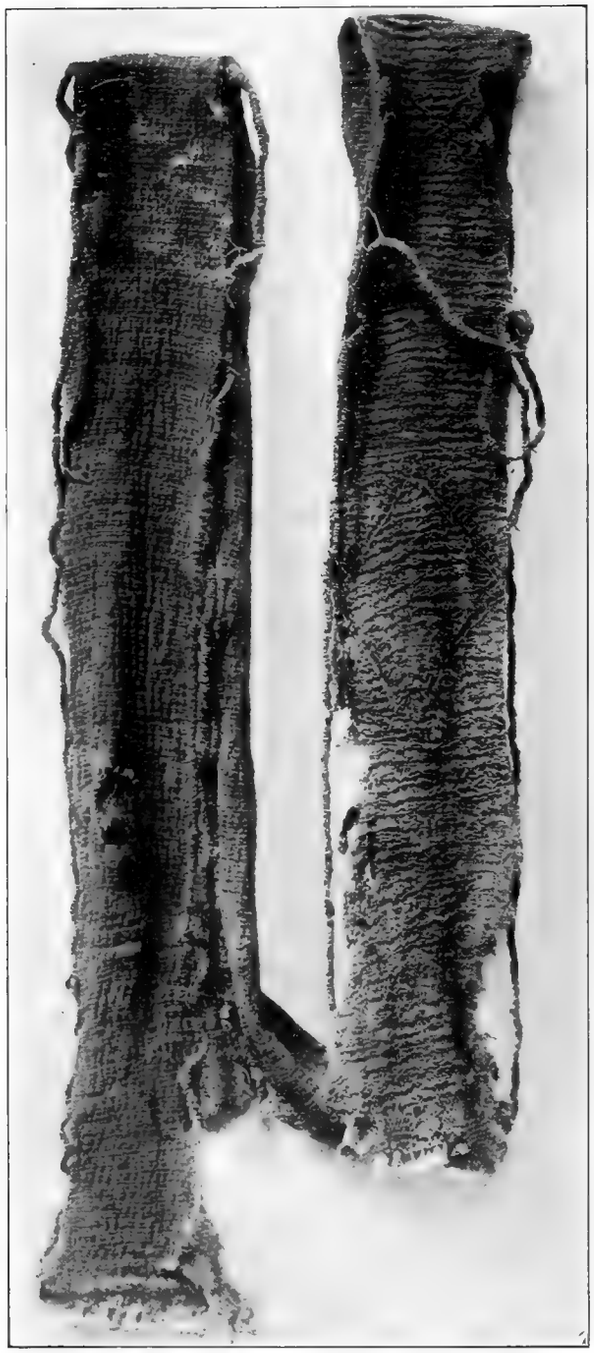


FIG. 108. NETWORK OF A ROYAL FEATHER MALO. B. M.

it up over one buttock and round the waist over the vertical end of the strip and deftly twisting the end around the part coming up to the waist. The suspended end then falls gracefully down and seems to form a very sufficient garment. The freedom from buttons and other detachable fastenings was purchased by the exertion of some skill in fastening the malo securely. It seems a simple thing to adjust a strip of cloth of suitable size to the pelvic portion of a man's body, but let my reader try the experiment and he will find it at first difficult to establish a feeling of security; there is an uncomfortable feeling that one or two safety-pins would help. We remember that it must be easily removed and as quickly readjusted. The deft twist of the end around the girdle portion was usually sufficient, although the old Fijian whose portrait is given in Fig. 109 used a more formal knot, sacrificing symmetry to security. When the kapa malo was wet it was not so easily detached; hence the custom of going without the malo in battle that any enemy might have no such sure and convenient hold. The Hawaiian *koa* was naked as the contestants in the Olympic games.

FIG. 109. OLD CANNIBAL FIJIAN.

We have seen that on the southern groups the length of the pendent portion of the malo varied greatly from one so short as to require a cord for attachment to the waist up to a length of several feet, so that the wearer when walking must throw it over his shoulder to get it out of the way. The dandies wore absurdly long malos. While kapa was the only material on Hawaii for clothing, there was no money to be carried in pocket, nor knife, nor keys, so the trousers pocket was not missed. With

the advent of foreigners came all these things, and also the cotton cloth (long cloth), and the adaptation of ends to means was amusing—I have seen a pocket formed by knotting a corner of the front pendent malo; once also a native who had been at work on a schooner on which I had been traveling, now at anchor, was seen to tie the dollar he received as wage in the corner of his malo and jump overboard to swim ashore. Pockets could thus be had without trousers.

From the manner of wearing the malo passed between the legs it was important that the material be soft and not very thick; with the pa'u no such necessity existed and female fancy might (and often did) increase the simple dress shown in Fig. 110 by adding many layers of kapa of indefinite length. While I have seen no specimen consisting of more than seven sheets, and few that exceed three, Mrs. Lucy G. Thurston, one of the pioneer missionaries to these islands, with whom I have often discussed events and manners of the olden time natives as they turned from their broken *kapu* and discredited idolatry to the new religion brought by the foreigners, describes in her autobiography[78] the largest pa'u I have heard mentioned. It was in 1820 at Kailua on Hawaii, on the occasion of a feast given by King Liholiho (Kamehameha II) to commemorate the death of his father Kamehameha I.[79]

"The King appeared in a military dress with quite an exhibition of royalty. Kamamalu, his favorite queen [who afterwards died with him in England] applied to me for one of my dresses to wear on the occasion; but as it was among the impossibles for her to assume it, the request called for neither consent nor denial. She, however, according to court ceremony, so arranged a native cloth pa'u a yard wide, with ten folds, as to be enveloped round the middle with seventy thicknesses. To array herself in this unwieldy attire, the long cloth was spread out on the ground, when, beginning at one end, she laid her body across it, and rolled herself over and over till she had rolled the whole around her. Two attendants followed her, one bearing up the end of this cumbrous robe of state, and the other waving over her head an elegant nodding fly-brush [kahili] of beautiful plumes, its long handle completely covered with little tortoise shell rings of various colors.

"Her head was ornamented with a graceful yellow wreath of elegant feathers, of great value.....A mountain vine [maile] with green leaves, small and lustrous, was the only drapery which went to deck and cover her neck and the upper part of her person. Thus this noble daughter of nature, at least six feet tall and of comely bulk in proportion, presented herself before the king and the nation, greatly to their

[78] Life and Times of Mrs. Lucy G. Thurston, wife of Rev. Asa Thurston, Pioneer Missionary to the Sandwich Islands. Ann Arbor, Mich., 1882. p. 41.

[79] The Hawaiians are accustomed to celebrate the *deathday* of friends or relatives rather than the birthday. Thus we hear of a rousing feast given on the first anniversary of the death of an only child.

admiration. After this presentation was over, her majesty lay down again upon the ground and unrolled the cloth by reversing the process of clothing."

I cannot give a portrait of the handsome Hawaiian queen, but I present a photograph of a Samoan girl of the same age, whose costume answers the description. Add the yellow feather lei and remove the fan and Kamamalu is before us. Mrs. Thurston tells us that the king usually dressed only in his malo.

In a former essay[80] we have considered the magnificent feather cloaks worn by the highest chiefs on great occasions or in battle, and as counterpart to these the female chiefs had a pa'u decorated with feathers in the same way. One made for Nahienaena, daughter of Kamehameha I, is now in the Bishop Museum, but in 1825 when Lord Byron brought back to their native kingdom the remains of Liholiho and Kamamalu, this superb garment 30 inches wide and 20 feet 8 inches long had already become old-fashioned to the fancy of the young princess then ten years old, and it was difficult to persuade her to put on the pa'u which a few years before would have been greatly prized.[81] Even in these early days foreign dress was creeping in to smother the comfort of Eden. Mrs. Thurston gives us glimpses of the transition stage which show how the little-dressed Hawaiians appeared to New England eyes. Kalanimoku, the most intelligent chief they had met, was dressed fully in foreign clothes and made an excellent impression. The court ladies, including two of the five dowager queens of Kamehameha I, were also dressed, from the account we might infer were overdressed; but I yield the account of this to Mrs. Thurston, a most competent reporter.

"Kalakua and a sister queen came on board....They had limbs of giant mould. I was taught to estimate their weight at three hundred pounds and even more. Kalakua was the mother of three of the wives of the young king. Two wives of Kalanimoku followed. They were all attired in a similar manner, a dress, then the pa'u which consisted of ten thicknesses of the bark-cloth three or four yards long, and one yard wide, wrapped several times round the middle, and confined by tucking it in on one side. The two queens had loose dresses over these.

"Trammeled with clothes and seated on chairs the queens were out of their element. They divested themselves of their outer dresses. Then the one stretched herself at full length on a bench and the other sat down upon the deck. Mattresses were then brought for them to recline in their own way.

"After reaching the cabin, the common sitting room for ladies and gentlemen, one of the queens divested herself of her only remaining dress, simply retaining her

[80] Memoirs B. P. Bishop Museum, vol. i, p. 1.

[81] This princess died in 1836, and since then the pa'u has been cut in halves and the parts united lengthwise to form a royal pall, last used over the coffin of Kalakaua. It is No. 6831 in the Bishop Museum.

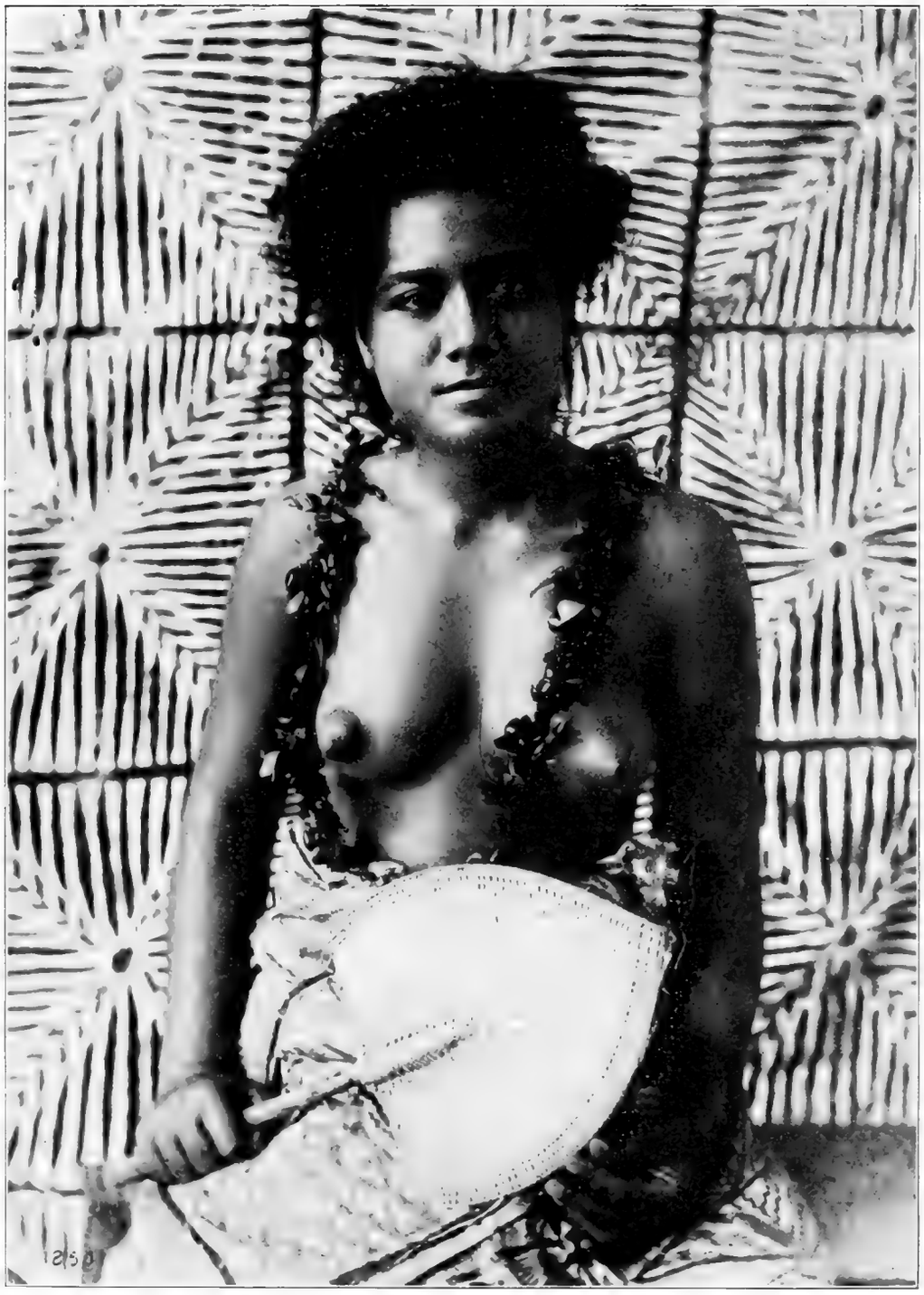


FIG. 110. A SAMOAN GIRL WITH LAVALAVA.

pa'u. While we were opening wide our eyes she looked as self-possessed and easy as though sitting in the shades of Eden."

Before the missionaries landed from the *Thaddeus*, the king dined on board with them. "His dress on the occasion was a girdle [malo], a green silk scarf put on under the left arm, brought up and knotted over the right shoulder, a chain of gold around his neck and over his chest, and a wreath of yellow feathers upon his head."

If the rather dissipated young king was as well-formed as his officer Kalanimoku it must have been pleasant to see him undisguised by the tailor, and we recall the account given by another missionary of another celebration of the anniversary of the death of Kamehameha I in May two years after the landing of the passengers by the *Thaddeus*. I have quoted this in another place in illustration of the use of Kahilis,[82] but it will bear repetition here in illustration of the dress of the highest chiefs in the land, very little modified from that of the olden time.

"Tameha-maru [Kamamalu] on this day was, as usual, a conspicuous object. The *car of state* in which she joined the processions passing in different directions consisted of an elegantly modelled whale-boat fastened firmly to a platform of wicker work thirty feet long by twelve wide, and borne on the heads of seventy men. The boat was lined and the whole platform covered, first with imported broadcloath, and then with beautiful patterns of kapa or native cloth of a variety of figures and rich colours. The men supporting the whole were formed into a solid body so that the outer rows only at the sides and ends were seen; and all forming these wore the splendid scarlet and yellow cloaks and helmets of which you have read accounts; and than which scarce anything can appear more superb. The only dress of the queen was a scarlet silk *pa'u* or native petticoat, and a coronet of feathers. She was seated in the middle of the boat and screened from the sun by an immense Chinese umbrella of scarlet damask [B. M. No. 5152] richly ornamented with gilding, fringe and tassels, and supported by a chief standing behind her, in a scarlet *malo* or girdle, and feather helmet. On one quarter of the boat stood Karimoku [Kalanimoku], the Prime Minister, and on the other Naihe, the national orator, both also in malos of scarlet silk and helmets of feathers, and each bearing a kahili or feathered staff of state near 30 feet in height. The upper parts of these kahilis were of scarlet feathers so ingeniously and beautifully arranged on artificial branches attached to the staffs as to form cylinders fifteen or eighteen inches in diameter, and twelve or fourteen feet long, the lower parts or handles were covered with alternate rings of tortoise shell and ivory of the neatest workmanship and highest polish."[83]

[82] Memoirs B. P. Bishop Museum, i, p. 19.

[83] Private Journal of a Voyage to the Pacific Ocean and Residence at the Sandwich Islands, in the years 1822, 1823, 1824 and 1825. By C. S. Stewart. New York, 1828, p. 109.

FIG. 111. A SMALL KAHILI.

Probably that grand display of royalty has never been surpassed on these islands. The charming young queen died in a distant land two years later and left no children. Kalanimoku died February 8, 1827, and Naihe died in 1831. While young Hawaiians of good form still survive, not one could clothe himself only in his dignity and his malo in such a pageant. The very kahilis have shrunk into overgrown fly-brushes. If the sculptor could have seen those two splendid chiefs we should have had no such commonplace figure of the great Kamehameha as that decked with "barbaric gold" standing before the Judiciary Building in Honolulu.[84]

FIG. 112. HAWAIIANS DRESSED IN HOLOKU. 1864.

FIG. 113. HOLOKU AND MALO. 1908.

People who are familiar with the modern dress of the Hawaiian women (worn also for comfort by some of the white women as well), should know that there is nothing about the "Mother Hubbard" garment called *holoku* connecting it with the indigenous apparel of the women. It is generally understood by those who have studied the matter that the pattern was given to the natives by the early American missionaries, and its form was largely in consideration of the structure of the enormous female alii, as well as for facility of manufacture.

[84] Mr. Gould lamented to me that he had no living model before him as he tried to give life and grace to flat photographs that had nothing kingly about them. One of the greatest physical evils the foreigner has brought to Hawaii is clothing of the type dwellers in New England were used to wear. As they brought their houses quite unsuited to the climate, so they brought their garb, and as a legitimate consequence, the Hawaiians are dying of consumption in greater numbers than from any other disease.

In the matter of the etymology of the name there is more doubt; it is, however, certain that in rendering the Scriptures into the vernacular when the translators came to such a passage as in Psalm CIX, 29, "And let them cover themselves with their own shame as with a *robe*," they had no Hawaiian equivalent for robe; either malo or pa'u was quite too scant to meet the demands of the passage, and so the modern *holoku* was used. "Ae uhi no lakou la lakou iho i ka hilahila me he holoku la."

While the malo was (with the rare exceptions mentioned) a simple plain garment for use rather than for decoration, the pa'u soon became complicated and much more than a covering. First, the sheets were multiplied, and often dyed of different colors; then came a change over the outer sheet on which much care was expended in ornamentation, when it was not merely a darker color than that of the inner folds, it was ruled or imprinted with attractive designs. Usually the component layers were stitched together at one end as was the case in the kapa moe. (Fig. 55.)

FIG. 114. HAWAIIAN RIDING PA'U.

As in many ethnic religions the dance was an important function of worship, although I do not place it in so high a position as some writers have done. The sacred dance was one thing, the popular hula quite a different, although sometimes confounded. I do not propose to discuss the Hawaiian dances here, whether religious or secular in motive, for this and other games and amusements will doubtless be treated fully in some subsequent publication in this series, but to the dance is due a development in pa'u decoration. The *pa'u hula* or dance skirt was distinct and often attractive. A common form was a yellow ground with red and black figure stamped either along the lower border or in a broad band down the front edge; sometimes the exposed surface of the pa'u was covered with the stamps or rulings; examples are given in Plates L, M, N and W. The texture was thin and soft so as not to interfere with the free motion of the hips so important a factor in the genuine Hawaiian hula.

When horses were introduced in the early part of the nineteenth century another form of pa'u was needed, and although the kapa pa'u with its two long ends just caught by the toe in the stirrup soon gave place to the foreign cloth with so much more tensile strength, kapa was used for some time, and varieties of it were

saturated with coconut or kamani oil for water-proofing and strengthening. When cotton cloth displaced the kapa very odd patterns were in demand; orange or red stripes, black zigzags on yellow, etc., all giving a bizarre but gay appearance to the Saturday afternoon riders on the plain then extending from the Kawaihao church to

FIG. 115. TANOA, KING OF BAU. WILKES.

Punahou, unmarked by fence or tree, and only broken by the Makiki gulch; this was fifty years ago. Cotton cloth was, however, printed in native patterns to please the more conservative, and two of these are in the Bishop Museum (Nos. 2323, 2324), black figures on yellow which has proved more durable than the native olena.

The Hawaiian chiefs had a malo used only when in bathing made of kapa soaked in kamani oil in which the seeds of *Haa* (*Antidesma platyphyllum* Mann) had been infused. This preparation made the kapa flexible, indestructible in the water, and of a bright color. On the Samoan and other of the southern groups, the *lavalava* or male dress was quite like the pa'u of the Hawaiian female, although not so long. A young Samoan of Pagopago in removing his lavalava to show me the fine pattern of his tatu incidentally gave me an opportunity of seeing that it was fastened on in the same way as the Hawaiian pa'u, a simple twist. All the pain and expense of the neat pattern extending from his navel to mid-thigh was thrown away, for he told me that if he left off his lavalava while in bathing he would be fined three shillings and sixpence; times were indeed changed! The *kihei* was common to the sexes and answered the purpose of a shawl when the cool trade winds were blowing from the mountain gorges. Of course a simple sheet of kapa frequently served the purpose of covering for warmth, but the specimens that have survived in museums are generally of good material carefully decorated, apparently, in later times, in close imitation of foreign shawls. Such a garment may have preceded the pa'u or served as substitute for that and the

FIG. 116. WOMAN IN MODERN DRESS.

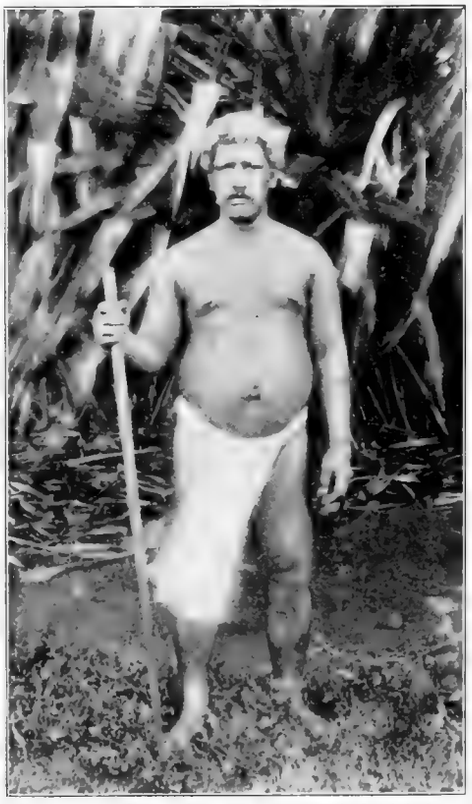


FIG. 117. MAN IN MALO.

malo as well. I do not remember ever to have seen it worn. It was usually passed under one arm and knotted over the opposite shoulder.

Temporary sandals used in crossing old flows of rough lava were sometimes constructed of braided kapa, but more commonly of hau bark, *dracæna* leaves, or any suitable material at hand. Plain bands of white kapa were sometimes worn about the arms or legs for ornament, and when the prized feather fillet was not at command, a strip of orange colored kapa made a not unbecoming band for the luxuriant growth of hair. Another use that has never been superseded was for long white pendants

FIG. 118. GROUP OF HAWAIIANS ON MOLOKAI. STOKES.

from the lower rim of the helmet of calabash figured by Cook as part of the armor of the rowers in the King's war canoe at the time of his visit. The frail helmets, strong enough to protect the heads from the sling-stones, then the only range projectile, passed away before the frailer kapa had ceased to be, and only the picture of the helmet that Cook gives us remains.

I have spoken in a previous page of the head dress of the Fijian. The Hawaiian did not ordinarily wear anything on head, except the thick crop of coarse hair, which in the case of a chief was sometimes trimmed into a *mahiole* or crest, a sort of mane. The Fijian, on the other hand, put a very large turban of white *masi* about his abundant hair in a fashion at once graceful and imposing. The portrait of Tanoa,

king of Bau, father of the more famous Cakobau (Thakombau) who, like Kamehameha I, united all the Vitian group under his rule, is from Wilkes. (Fig. 115.)

I cannot pass over the modern adaptation of the ancient dress of the Hawaiians, the more that this is seldom seen in the cities of Hawaii. In the country and on the smaller islands it is not uncommon. Mr. J. F. G. Stokes, Curator of Polynesian Ethnology in the Bishop museum has, in a recent visit to Molokai, made the photographs shown in Figs. 116–118. In the first figure the brachycephalic head is well shown, and the simple holoku which has taken the place of the pa'u.[85] In the house group the transition appears, and the shirt is worn for its warmth, and when the men are at work it is generally taken off. The front flap of the malo is much wider than was *en règle* in the days of kapa: this is especially shown in Fig. 117, where the strong wind at the time increased the apparent breadth. This dress has little of the grace of the older form of malo, but it is comfortable and sufficient for clothing. The men, it will be noted, have taken more kindly to the hat than the women have to the bonnet.

Next in importance and much greater in size come the *Kapa moe* or bed kapa, the night clothes of the old Hawaiian; this has already been described and some additional particulars may be found in the catalogue below. These kapa moe from their bulk comprise the greater part of the kapa extant. Of the choice decorated kapa there is perhaps not enough in all the museums to make a surface equalling that of half a dozen kuina of five sheets each. In use the owner either wrapped the kapa around him or shared it with one or more bedfellows on the spacious mat bed: if he had occasion to go out of the house in the night, he went with the kapa wrapped around him as a rude toga. During the ordinary summer weather along the coast the native use of the kapa moe in a close grass house would have been impossible to a white man, so warm is this covering. Sleeping in an open cave on the summit of Mauna Loa (13,675 ft.) I could not bear a kapa moe over my ordinary clothes, although water was freezing in the calabashes at my feet. In the morning the bed-making in a native house consisted in carefully folding the kapa moe and putting it in a safe place.

Many a sheet of old kuinas has been used, even in these later days, for a winding sheet; and specimens of the finest quality have been found in the ancient burial caves hidden for generations, but sure to be found sooner or later by accident (as in cutting for irrigation ditches or railroads, or by the well thought out plans of the professional cave hunter. There is a custom in some lands (I have forgotten where—

[85] A critic, who is more familiar with female dress than I can pretend to be, tells me that the garb in Figs. 113 and 116 is not a holoku but a muumuu or night dress. As the old natives never had a distinct night dress, and the term offered me does not appear in Andrews' Dictionary, I did not care to make the distinction, as the questionable dress is certainly worn in the day time by the women photographed. My readers can make their selection of terms.

it matters not, for it was far from Hawaii) of saving the bridal sheets for the last long sleep, and this seems to be in a measure the feeling of the old Hawaiians.

One more covering of frail mortality remains to be described,—the pall of black kapa. It was euphemistic to say as did Kaumualii, the last king of Kauai, "Wait till the black kapa covers me",—it was ill-omened to speak directly of one's death. These black sheets are rare in collections, and are very fragile: something in the method of dyeing destroys the fibre after a while and the sheet falls to pieces on the least disturbance: in a burial cave such a sheet can sometimes be blown about in fragments by a breath, although the undyed kapa of the same quality might retain its strength for centuries.

Kapa was used at times for screens and partitions in houses, and on the southern islands for mosquito nets, like the *tinamu* of the Samoans. The Hawaiians had none of these very troublesome insects before 1827 when they were maliciously introduced by a wicked white man.[86] If a white man brought the pest, other white men brought mosquito netting far superior to any made of kapa, and so no Hawaiian tinamu was invented.

As a decorative covering colored kapa had a very limited use on walls of houses, owing to the general darkness of the interior, although white kapa was sometimes used to cover the inside of the thatch. It was used for decoration on the walls of the more open lanai or porch, and we have seen the use on the whale boat in which Kamamalu was carried in the festival procession. The thick ribbed kapa was used as a mat, and a tough leathery variety was used in the early days of the Mission as a handsome and suitable material for binding books; a use that survives to the present day in the case of the much less durable Samoan kapa.

A firm, rather coarse, white kapa was used as a covering for the *anuu* or oracle in the heiau or temple where the gods were supposed to talk down to the priest or chief: as from the windy rain storms it had to be frequently renewed, the color was kept fairly white and these obelisks were visible for some distance, and as the temples were often along shore or on the high bluffs over the bays, served as landmarks to the

[86] Objection having been made to the use of the words *maliciously* and *wicked* by a member of the Publication Committee, I add the following account of the introduction of this pest, which all people are desirous of banishing, and many governments are trying at considerable expense to exterminate with more or less success. In 1864, while the guest of Rev. Dr. D. Baldwin of the American Mission at Lahaina, Maui, I was told by my host that in 1827 the master of a trading vessel then lying off the port of Lahaina was refused an unlimited supply of women on his vessel, and also found difficulty in getting all the intoxicants he desired. This was the order of the native chiefs, but, as usual in those times, it was imputed to the missionary company, and the disappointed mariner vowed vengeance on the supposed disturbers of his revels. On his next voyage he brought a tub of stagnant water with a supply of the enemy and landed it at Lahaina. Not long after a native came to Dr. Baldwin with a mosquito, which he called "a fly which bites," and the doctor recognized the insect which he had never seen on the Hawaiian Islands before. I leave to my readers whether such an act was malicious, and whether the fellow who did it was wicked. I may add that he openly boasted of his deed.

canoe voyager as in later years the white steeples of the little churches that dotted the shores of all the islands served for beacons; these in turn have generally disappeared and given place to the smoke stacks of the sugar mills or the irrigation pumps.

A strip of white kapa tied around a tree indicated that the fruit was kapu; the same signal on a stick placed in a path indicated "no thoroughfare"; a white flag, *hae keokeo*, analogous to the bush of the vintner, advertised a place where *poi*, the native bread, was for sale. In general, torn pieces of kapa were used for signalling as flags are at present.

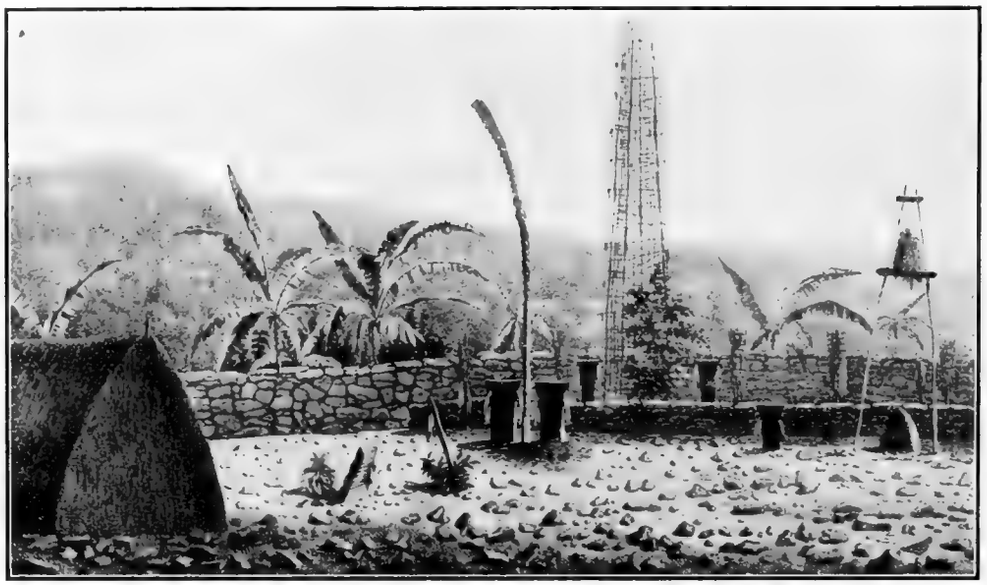


FIG. 119. VIEWS OF A HEIAU ON KAUAI SHOWING THE ANUU. COOK.

At certain seasons of the year, as at *makahiki* (first day of the year) and at some religious festivals, the images of the gods were dressed in fresh white or red kapa with great ceremony, while the old kapa dress was burned, lest some sacrilegious person might use it.

Strips of kapa made excellent cord or twine, or, when twisted or braided, even rope; the latter had another use in quite a different line as slow-match, the charred end readily catching the fire from the fire-sticks and, slowly consuming, held the fire conveniently (Fig. 120). Smaller strips were the wicks for the stone lamps so common on the group fifty years ago, the simple cups affording a ready way of increasing the light of a lamp by adding wick after wick around the rim.

Many if not all the Polynesian tribes had kites; their neighbors on the Gilbert Islands had a very strong one (B. M. No. 7124), worthy to be considered the father of the monoplane; but while this was made of pandanus leaf, the *lupe* of the Hawaiian

and the *manu* of the Maori were both often, if not generally covered with kapa much in the way an American boy would use paper for the same purpose.

In fastening the stone adze (*koi*) to the handle (*au*), a fold or two of kapa was interposed between stone and wood before binding together with sinnet; when kapa could not be obtained hala leaves were substituted, but kapa was preferred.

FIG. 120. HAWAIIAN FIRE STICKS.

The white, unstained kapa was used to bandage wounds, and was scraped into lint for stanching blood, precisely as we should use cotton or linen cloth at the present day. A peculiar strip of bandage was used by the *kahuna lapaau* (medicine man) as a compressor to aid delivery in childbirth. In general kapa in its various forms and qualities supplied the place of both cloth and paper in the economy of the primitive Hawaiians.

As an article of property kapa played an important rôle, and was folded into bundles and stored away for barter or presents. Cook describes in many places the way in which choice kapa was given to him both on Hawaii and in Tahiti; in the former place it was often wound around his body, but in the southern islands the

presentation was more formal and peculiar. It was on the eighth of September, 1777: "A party of us dined with our former shipmate, Oedidee, on fish and pork. The hog weighed about thirty pounds; and it may be worth mentioning that it was alive, dressed and brought upon the table, within the hour. We had but just dined when Otoo came and asked me if my belly was full? On my answering in the affirmative,

FIG. 121. A PRESENT OF KAPA. COOK.

he said, 'Then come along with me.' I accordingly went with him to his father's, where I found some people employed in dressing two girls with a prodigious quantity of fine cloth, after a very singular fashion. The one end of each piece of cloth, of which there were a good many, was held up over the heads of the girls, while the remainder was wrapped round their bodies, under the arm-pits. Then the upper ends were let fall, and hung down in folds to the ground, over the other, so as to bear some resemblance to a circular hoop-petticoat. Afterward, round the outside of all, were wrapped several pieces of differently colored cloth, which considerably increased the size; so that it was not less than five or six yards in circuit, and the weight of this singular attire was as much as the poor girls could support. To each were hung two *taames* or breast-plates, by way of enriching the whole, and giving it a rich appearance.

Thus equipped, they were conducted on board the ship, together with several hogs and a quantity of fruit, which with the cloth was a present to me from Otoo's father. Persons of either sex dressed in this manner are called *atee;* but I believe it is never practised except when large presents of cloth are to be made.....Both Captain Clerke and I had cloth given to us afterward thus wrapped round the bearers."[87]

Before closing this brief notice of the ancient uses of Hawaiian kapa, I must notice the modern use (which seems increasing) of the cheap Samoan stamped siapo, as a material for wall decoration and for covering books. The pleasing brown color and rather fantastic designs make suitable wall hangings for rustic bungalow or porches protected from the wind. For book covers the varnished varieties are more desirable, and will be found fairly durable.

It would have been well to insert the following information about the stone beaters of Mexico as an appendix to the chapter on Implements, but at the time that chapter was written I was ignorant of the existence of such beaters: only in Africa had I read of stone as a substitute for wood in this manufacture. I had also not looked into the use of bark-cloth in South America, although I have in my collection a thick and stiff fragment attributed to that large portion of the American continent without more definite information. The Indian tribes on the banks of the Amazon and the Orinoco certainly had ample material at their hand for making good cloth and for dyeing it as well, but the specimens that have come to my knowledge add nothing to the story of Hawaiian or Polynesian kapa-making.

Stone Kapa Beaters.—Although we have no record of stone kapa beaters ever having been in use in Polynesia, they were certainly in use in very ancient times in Mexico as well as on the Asiatic continent, and it is curious that the Mexican implements closely resembled the universal Polynesian form so far as the patterns of the striking surface are concerned. Since the note on page 113 was in print Reverend W. D. Westervelt has brought from Mexico and given to this Museum specimens of the stone face of the beaters used like the beaters in Japan to make paper as such and not the variety of felted vegetable fibre known as kapa and used as cloth rather than as paper.

When Cortez entered Mexico after his wonderful march through the Guatemaltecan forests he found an extensive literature of painted books made of paper beaten from the fibre of aloe or agave, and the very few of these that escaped the destroying hands of the Spanish priests are, like the painted tombs of the kings and nobles of ancient Egypt, a record of domestic arts and life. The very hieroglyphs,

[87] Cook, III Voyage, ii, 50.

however, mysterious to the unlearned, involuntarily betray secrets of domestic life as well as the mysteries of their religion. In this remote island we have no access to Lord Kingsborough's richly filled folios which probably show the stone faces of the paper (kapa) beaters in use or complete for use, but the stones themselves tell us enough to show that they had handles of some sort for their more effectual use.[88] These beaters are oblong, rectangular stones of the following dimensions and weights. To those given to the Museum I have added another still in the possession of the same collector.

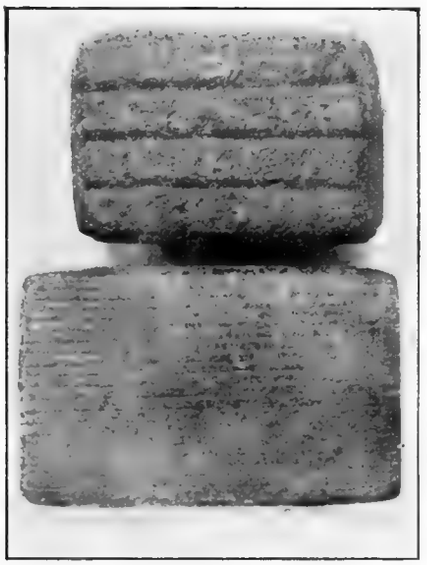


FIG. 122. MEXICAN STONE BEATERS (OBVERSE).

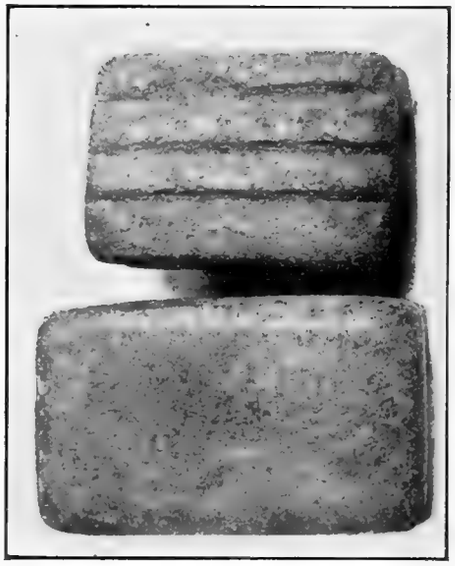


FIG. 123. MEXICAN STONE BEATERS (REVERSE).

A. 3 in. long; 1⅞ in. wide; 1⅛ in. thick. Weight 10.5 oz. Pattern on one side *hoopai* with 22 flat ridges, on the reverse *mole*. Three sides of the edge are cut with a smooth semicircular groove, rounded at the two corners, while the fourth side is flat. Material a reddish stone with quartz-like matrix interspersed with darker granules; the material of the three specimens is the same.

B. 2⅜ in. long; 1¾ in. wide; 1½ in. thick. Weight 7.5 oz. Pattern on both faces *pepehi* with 4 flat ridges. Edges grooved for a third of their width precisely as in the former specimen but not so smooth. A ruder and perhaps older specimen.

C. 3¼ in. long; 2 in. wide; 1¼ in. thick. Weight 10.2 oz. Pattern on one side *pepehi* with 12 rounded ridges on one side and 19 flat ones *hoopai* on the other.

These stones seem to have been attached to a convenient, probably flat, handle with rounded edges by means of a cord or thong.

[88] I have examined with care the only two codices in the museum library, the Nuttall, printed in 1902, the Codex Mogliabecchiano XIII. 3, printed in Rome 1904 for the Duc de Loubat and by him given to the Museum. I have, however, not been able to find a figure of what must have been a common implement.

CHAPTER V.

HAWAIIAN ORNAMENTAL DESIGN.

We have at some length studied the material and its manufacture into kapa, and also the implements and coloring matter used in its decoration both in form and color, and we have in this volume ample illustration of the results obtained, and with these we are able in some degree to compare the Hawaiian work with that of other Pacific islanders; it now remains to examine cursorily the nature of the designs used by the old Hawaiians, of whose work we have the fullest series, and where it differs from the others to at least note the fact; we have not specimens enough of all the other groups to do much more. I have already in the introductory lines of this treatise disclaimed all exact knowledge of the art of ornamentation, and any intention of doing more than directing the attention of my reader to the varieties of line and figure found in the old Hawaiian kapa; of the beauty of coloration the plates themselves will be the clearest expositor.

Professor A. C. Haddon of Cambridge has fully treated one branch of the subject,[89] but the explanatory description of the ornamentation of Polynesia has yet to be written, indeed has yet to be studied. When I began this series of treatises on Hawaiian Antiquities in 1897 it was generally believed that the old Hawaiians had left no pictorial records, for their kapa showed none, both human and animal forms seemed wholly absent from that class of applied ornament except as echini were sometimes used as a stamp, but hardly as a pictorial representation, even vegetable forms are rare as already noted; but within the past dozen years discoveries have been made in caves and on ledges generally submerged by the tides or covered with deposits of sand which storms occasionally remove for a sort time, by A. F. Judd Esq., Mr. J. C. Farley of Kauai, and Mr. J. F. G. Stokes, Curator of Polynesian Ethnology in this Museum, and some others, of most curious delineations of human and animal forms, some of them apparently ancient, and all very primitive in style. These are cut into the rock (a more or less cellular basalt), and are now being studied by Mr. Stokes, and his results will in due course be published,[90] so that I merely call attention here to their existence in face of the fact that they have never appeared on kapa so far as known. Hawaiian bas-reliefs and full figures of persons as well as of the gods have long been familiar and are sufficient in number and quality to compare favorably with the carving of the Maori at the extreme southwest of the Polynesian region. From

[89] The Decorative Art of British New Guinea: a study in Papuan Ethnography. Dublin, 1894.
[90] Occasional Papers, IV, 4: a portion of the study.

the few specimens that have survived our regret is great for the hundreds, yes thousands, that were ruthlessly destroyed in the "reformation" of 1819 without the slightest regard for their value as the best of primitive art. This general destruction was mostly of idols and occurred before the arrival of the American missionaries, so that it cannot be laid to their charge; indeed it was to the early missionaries that we owe the few that have escaped destruction. As it is my purpose to illustrate the remains of Hawaiian sacred images in another place they are only referred to here to show that this people had both knowledge and skill in anthropomorphic sculpture. It is generally admitted that the beginnings of plastic art are in the rude images of the gods; but it is a curious fact that the Maori of New Zealand, so celebrated for their fine carvings made few and exceedingly rude idols while making remarkably elaborate images of their legendary heroes who had undergone apotheosis, and also of their primary gods, but these were not objects of worship. Even the tiki that surmounted the house gables in New Zealand did not come into that category; they were supposed to protect in some way the house and its contents, but in the way of amulet or charm as the horse-shoe in more civilized lands protects the clothes-line from mildew or theft.

The Hawaiians had few land animals whose forms might have been reproduced; the whale, dog, pig and rat were the only mammals. The lizard was more or less sacred and there are examples of its use in decorating the faces of gods. In the Bishop Museum is a figure of Kalaipahoa (No. 132), whose eyebrows are marked by well drawn lizards and this figure is repeated on chin and cheeks. Besides this *moo* the *manó* or shark (an object of worship) was carved both in stone and wood so as to be easily distinguished. There were birds, especially sea-birds, of which the natives of the Solomon Islands made much use in their carving and flat decoration, but the Hawaiians do not seem to have drawn or stamped them on their kapa. Of the inhabitants of the sea, so important to them as a food supply, the Hawaiians had many whose forms would lend themselves to decorative art, and indeed were so utilized by other of the Pacific islanders (Pl. 23). Such were the hammer-head shark, the sword-fish, squid, brilliant colored chætodonts and many others; but our islanders seem to have used only the sea-urchins of all the rich assortment in their kapa designs. In the vegetable world of which they knew so much, we find none of the attractive fern leaf prints so characteristic of Tahitian decoration, nor the fruits not uncommon elsewhere; yet the ferns of the Hawaiian group are very beautiful, and the flowers and native fruits would elsewhere have been sought for their decorative qualities.

I have endeavored to show that the Hawaiians had both the knowledge and the means to produce designs representing natural objects both on the flat and in the round in wood and in stone. They certainly did not possess the desire for decorating

their implements whether of war or of peace so generally shown by the Papuans of the western Pacific, nor the more subdued talent for decoration shown by their kinsmen to the southward, the Maori of New Zealand, the Tongan, Marquesan and Mangaian. The exquisite diapers carved by the latter on ceremonial paddles, etc., are unrivalled in Polynesia; so are the Marquesan war clubs, and the New Zealand house and canoe carvings.

All these things are, however, by the way which leads only to the Hawaiian decoration of flat surfaces in their desire to make these surfaces more attractive and distinguished. I have already[91] called attention to the patterns used in their remarkable feather-work, the triangles, crescents and circles of color contrasting with the solid ground in the cloaks and capes, and have tried to show that these commonplace figures when altered by the folds in which these robes were worn became most striking and attractive. If these costly and labor-filled constructions were to serve as mats or as wall tapestries they would generally be considered of poor design; in the ever moving folds of a garment hanging from the shoulders of an active man they became most fitting. Here the material on which the design was worked did not in the least interfere with the free expression of any artistic impulse: almost as freely as the tapestry needle traced the figures on the medieval "cloth of Arras" might the deft fingers of the local artists have traced pictures on the net work to which the feathers were attached; the mosaic feather-work of the Mexicans proves this.[92] One other thing is to be noted in the feather decoration; the Hawaiians had brilliant colors and used them when they saw fit; the rich orange of the *mamo*, the scarlet of the *iiwi*, the crimson of the *apapane*, the green of the *ou*, and the clear yellow of the *oo* were certainly brilliant colors and well used.

In another flat decoration, that of mats, it has been shown[93] that the material decidedly curbs the fancy and, as they were braided in and neither stamped nor painted on the surface, they were geometric in form as shown in Fig. 124 which is borrowed from the memoir referred to. These simple designs seem well suited to mats, far more

[91] Hawaiian Feather Work. Memoirs I, part 1.

[92] That the germ, at least, of pictorial decoration was in the Hawaiian artist seems to be shown in the very remarkable quilts made by these people since cotton cloth and sewing machines have been brought to the islands. These quilts form the treasure of the housewife much as the choice kapa of the olden time were cherished. When the missionary ladies taught the native women to sew and make quilts the traditionary patchwork of New England was the sampler; but the native women had no store of waste pieces as had the American housekeeper, and they had to buy at the stores. It was considerable and careful work also to fit the squares and triangles accurately. When the little hand sewing machine came to the islands all this was changed, and the quilter sewed on patterns of her own choice, and very striking these patterns often are. Turkey-red seems the favorite color, but the interesting part is that in adopting foreign methods of manufacture they did not also take foreign designs. Bread-fruit leaves, are a very favorite selection, so are the radiating form of squids, and I have seen a most elaborate design of a horseman lassoing a bull in excellent form.

[93] Mat and Basket Weaving of the Ancient Hawaiians. Memoirs II, part 1 (1906).

so than the life-like lion, tiger or dog seen on the mats woven in American or English looms not many decades ago.

The kapa ornamentation is purely geometric (the exceptions are few, and as far as known will be noted), and it is not symbolic; it is not intended to convey any esoteric meaning, it is simply to please the eye as the perfumes with which the kapa was impregnated were to tickle the nostrils. If any of my readers choose to see a cloud or a whale in any of the Hawaiian kapa designs they are of course at liberty to do so; some of the figures may be "very like" either. In naming the *bent knee* pattern it was not meant that the zigzag presents a human knee, but merely that the shape reminded one of the knee in such a position; it was never a symbol of a bent knee, or worship in the sense that the Egyptian hieroglyph for water (also a double zigzag) represented the motion of waves.

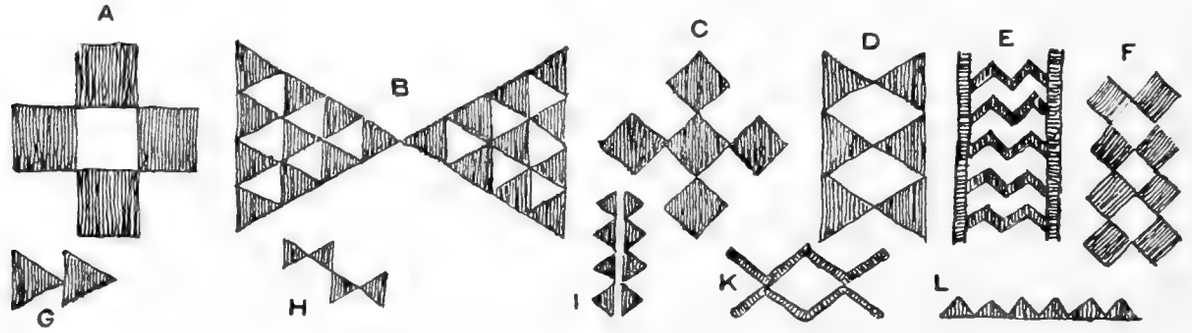


FIG. 124. GEOMETRIC DESIGNS USED IN MAT WEAVING.

For convenience we may adopt a classification of Hawaiian kapa designs which has already been briefly suggested in the description of marking tools and is now enlarged to put in more orderly form before my readers the extent and variety of merely geometrical printed or ruled designs used by the Hawaiian kapa makers and printers of earlier days. I include the designs of the other Polynesians only by way of side-light.

1. Lines straight, either single or in groups and parallel. Pls. E, O, Q, R, S, W, 38. This, although the simplest, could not have been the earliest form of decoration, for it requires the use of a ruler or straight edge; a rude curve is easier to the untaught artist.

2. Lines straight with abrupt variation (Pls. 29 and O); unexpected terminations (Pl. 47), or the common zigzag (Pl. P). These add great variety to the mere ruled line.

3. Lines straight inclined to each other (Fig. 62, Pl. 39).

4. Lines straight in two or more series crossing each other at right angles (Figs. 52, 64), or any lesser angle (Figs. 44, 60, Pl. H).

5. Any of the previous classes with the interspaces filled (Pl. B, T). This is a very common and often effective design; where the spaces were small the color was added by the single pen, if larger by the hala brush.

6. Lines straight, single or clustered interspersed with minute figures or dots (Fig. 126, Pl. 46, upper figure).

7. Geometric figures stamped either in block (Pls. A, G) as borders (Pls. B, K, L, M, N), or in rhombs, zigzags (Pl. 44), covering the greater part of the surface of

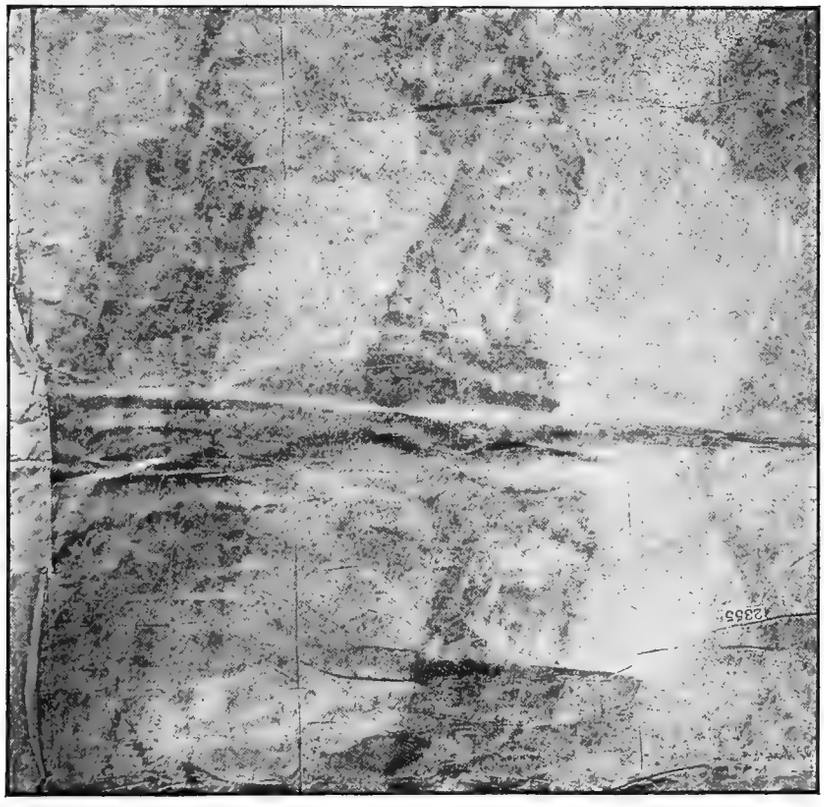


FIG. 125. THE BENT KNEE PATTERN.

the sheet. Some specimens of this last variety show not merely exactness of execution, but great patience in covering seventy or eighty square feet of kapa, the stamps in two or more colors (Pl. G).

8. Detached figures, usually geometric (Fig. 127, Pls. K, W), sometimes (in more modern examples) in rude imitation of natural objects (Fig. 69).

9. Figures (stamped) of irregular outline arranged as borders or transverse bands (Pls. A, G, L, N).

10. Stamps of natural objects (Pl. F). As we have seen in Fig. 4 the Tahitian fern stamped, and in Fig. 7 the end of a bambu joint, so in Hawaii natural objects

as a sea egg (Echinus), or a flat fish hook, were sometimes used, but never with the artistic effect of the Tahitian printer.

11. Figures or lines arranged in curves (Fig 68, Pl. 40).

12. Masses of color of no definite shape formed by beating colored rags of kapa into the wet sheets (Pl. 35).

13. Dots or blotches distributed evenly over the entire surface of the sheet or in bands straight or zigzag (Pl. 41).

14. Painted kapa (Pl. I).

All these may be monochrome (commonly black or red) on various grounds, white, yellow, buff, pink. They may also be combined in many ways. It is not

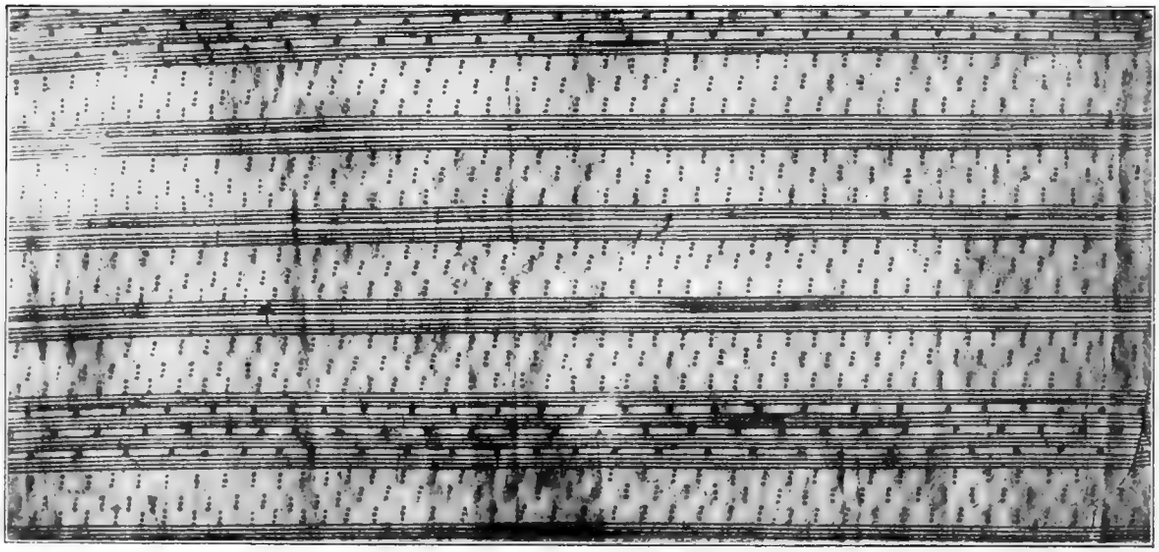


FIG. 126. THIN YELLOW KAPA STAMPED BLACK AND RED. BRITISH MUSEUM.

always easy to see how some of the patterns could have been printed: the "black lace" specimens (Pl. 43) for instance, but when this is old or has been kept in a damp place, as in some burial caves, the combining paste loses its adhesiveness and two layers or sheets appear, one white or light brown, the other entirely black punctured with a pointed stick of circular or elliptical section. When these thin sheets are united by a paste of *pia* (*Tacca pinnatifida*) a beautifully uniform surface is the result. While this ingenuity seems noteworthy, and so far as I am aware is not found elsewhere in the tapa-making regions, there may be other equally ingenious processes of which only the results, not the processes, are known to me.

Of similar construction is the pattern in the upper half of Plate K, only here three sheets are required, two of them almost as thin as the beautiful *kalukalu* (Fig. 128), between which the third, colored and cut into strips, is *sandwiched*. The

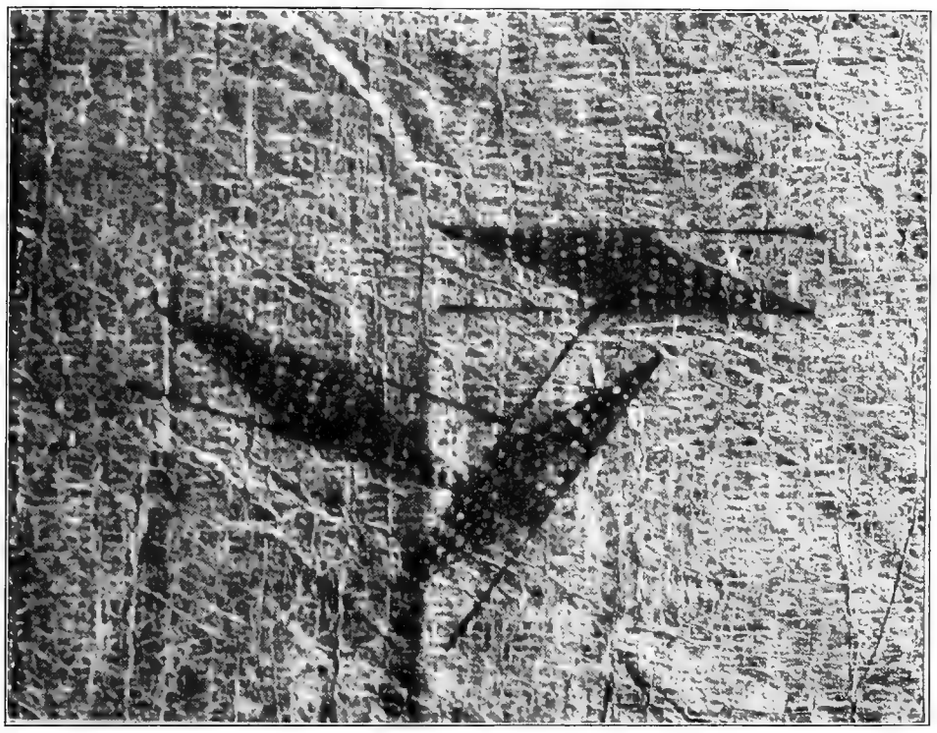


FIG. 127. BLACK STAMPED ON OHELO COLORED GROUND. B. P. B. M. 2444.

FIG. 128. KAPA KALUKALU. B. P. B. M. 2466.

delicacy and beauty of the resulting fabric can hardly be seen in the illustration which is photographed from kapa No. 2505 in this Museum. I think the fabric was beaten again while still moist and before the thin paste had hardened, it is so firmly united.

A notable peculiarity of some Hawaiian patterns is the fact that the impressions of the stamp form a background while the interstices become the prominent figures. This is shown in the reduced photograph of kapa No. 2469 in this Museum which is also shown in color and full size in Pl. Z (frontispiece). In this (Fig. 129), the curious hooked forms were at first a puzzle, and as they were usually called the "fish-hook pattern" a vain attempt was made to find some form of hook that could have suggested the pattern. Mr. Stokes, of this Museum, at last solved the riddle very practically by making a stamp of which the impression is given in the two detached parts of Fig. 130; the upper showing the careful arrangements of similar adjacent impressions. As this is actual size it will readily be seen how the result on Pl. Z is obtained. This was an old time method, all the specimens known being small, choice fragments bearing marks of great age and careful manufacture. As the size of the stamps precluded the use of native bambu, wood was used and we do not have to discuss whether that grass was indigenous or introduced. In Pl. Z is also shown (No. 3) another specimen stamped like the last with a large wooden stamp, but here the stamp is the important part and not the interstices. Still a third has recently come into the possession of this Museum and belongs to the former class; it is shown in Pl. ZZ (facing p. 212).

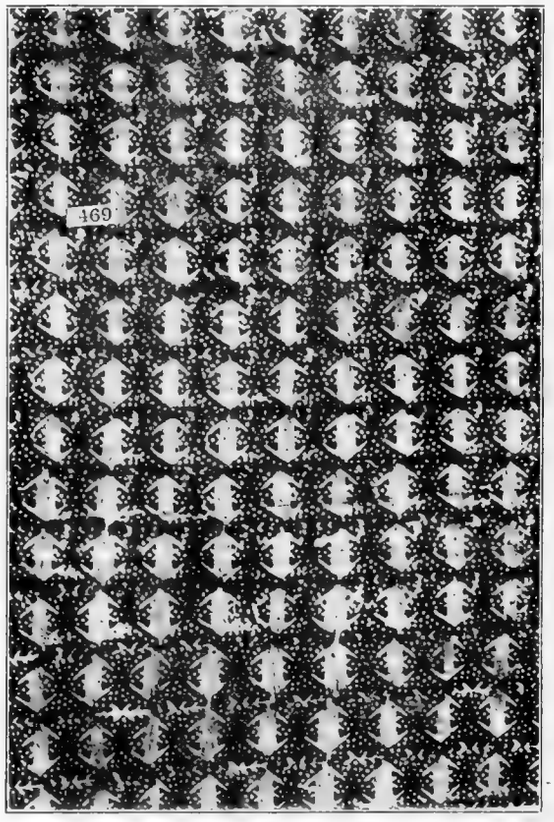


FIG. 129. KAPA. B. P. B. M. 2469.

All these are on thin smooth waoke kapa of a buff color tinted in part with noni root. As this color is rather fugitive the preservation on all these specimens is remarkable and shows that they have been carefully kept from light. The method of relieving the heavy black of the stamp by easily bored round holes should be noted. In the third example the curved sides of the stamp trace the sides of the prominent pattern.

In studying the Cook kapa, by which is meant the specimens brought home by Captain James Cook, and scattered in various ways so that no complete set remained for the British Government or any one museum, it was found true of the specimens in the author's collection, numbering about one hundred and fifty, that the *nao* or pattern produced by the beater on the compressed fibre, and best seen by transmitted light, is *mole* or smooth in the Hawaiian as well as in those from the southern islands,

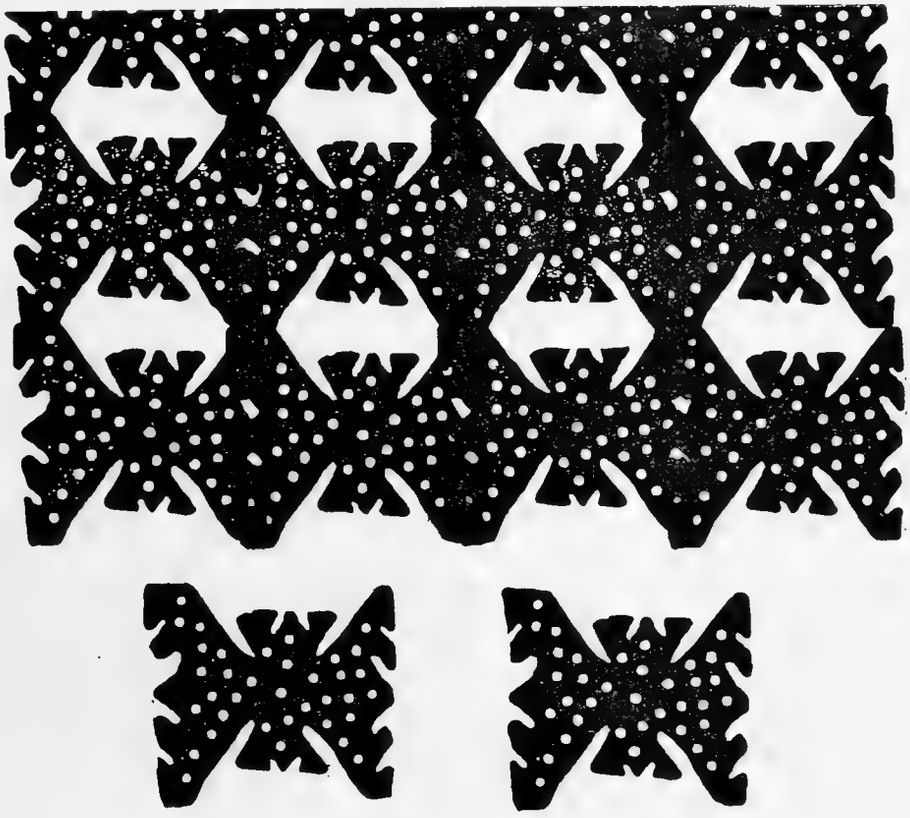


FIG. 130. STAMP OF NO. 2469.

Tahiti, Samoa, Tonga, Fiji, etc., with very few exceptions, and these comprised none of the more complicated designs so distinct a mark of the Hawaiian beaters; only the *hoopai*, which is common to all races using kapa.

This was certainly an interesting discovery, and so far as the plain, undecorated kapa is concerned made it a difficult task to determine the origin of the specimens as the mole and hoopai beaters and the material beaten as well as the general process of manufacture were the same in all groups. With the decorated specimens the case was different.

Why do we find none of the products of the carved beaters in which the Hawaiian kapa makers delighted? Is it possible that all the remarkable patterns on these beaters originated during the three score years following Cook's advent in which the manufacture flourished? This supposition is negatived by the existence of many specimens with the best patterns made within thirty years after Cook's last visit, as may be noted in the following catalogue of specimens studied. Other specimens with

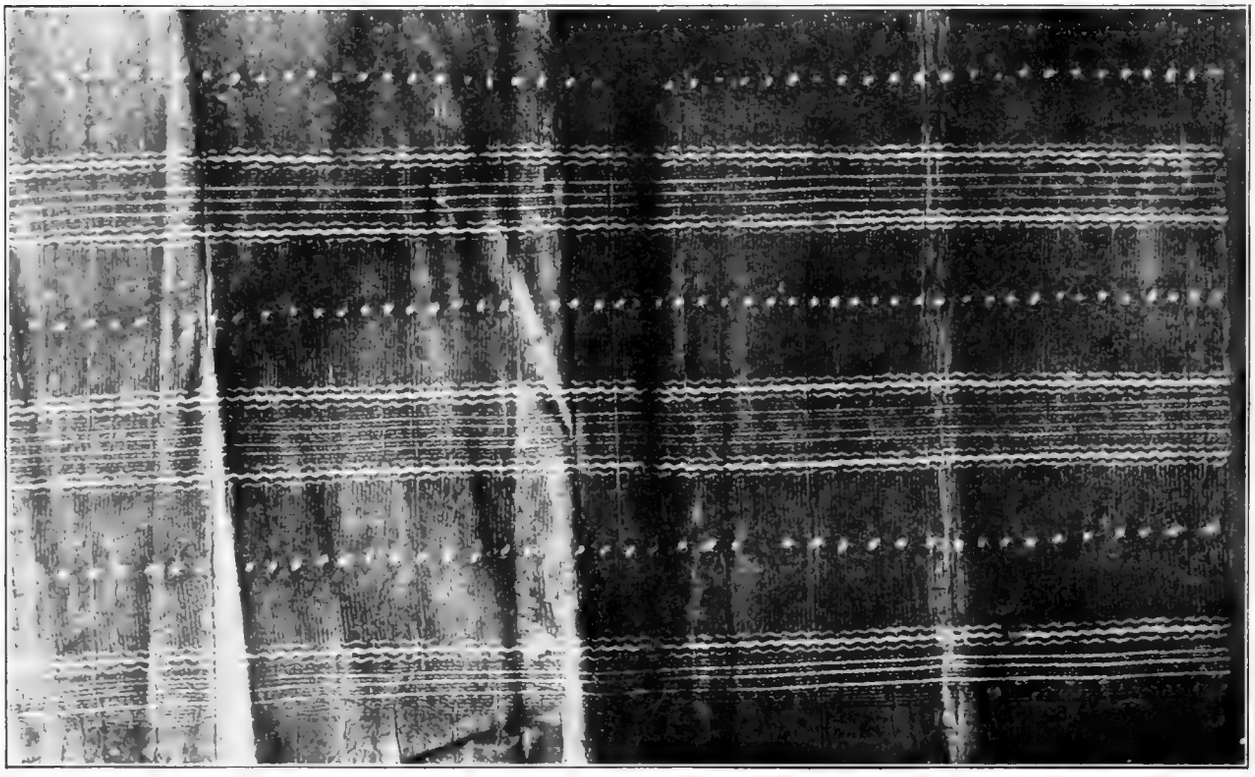
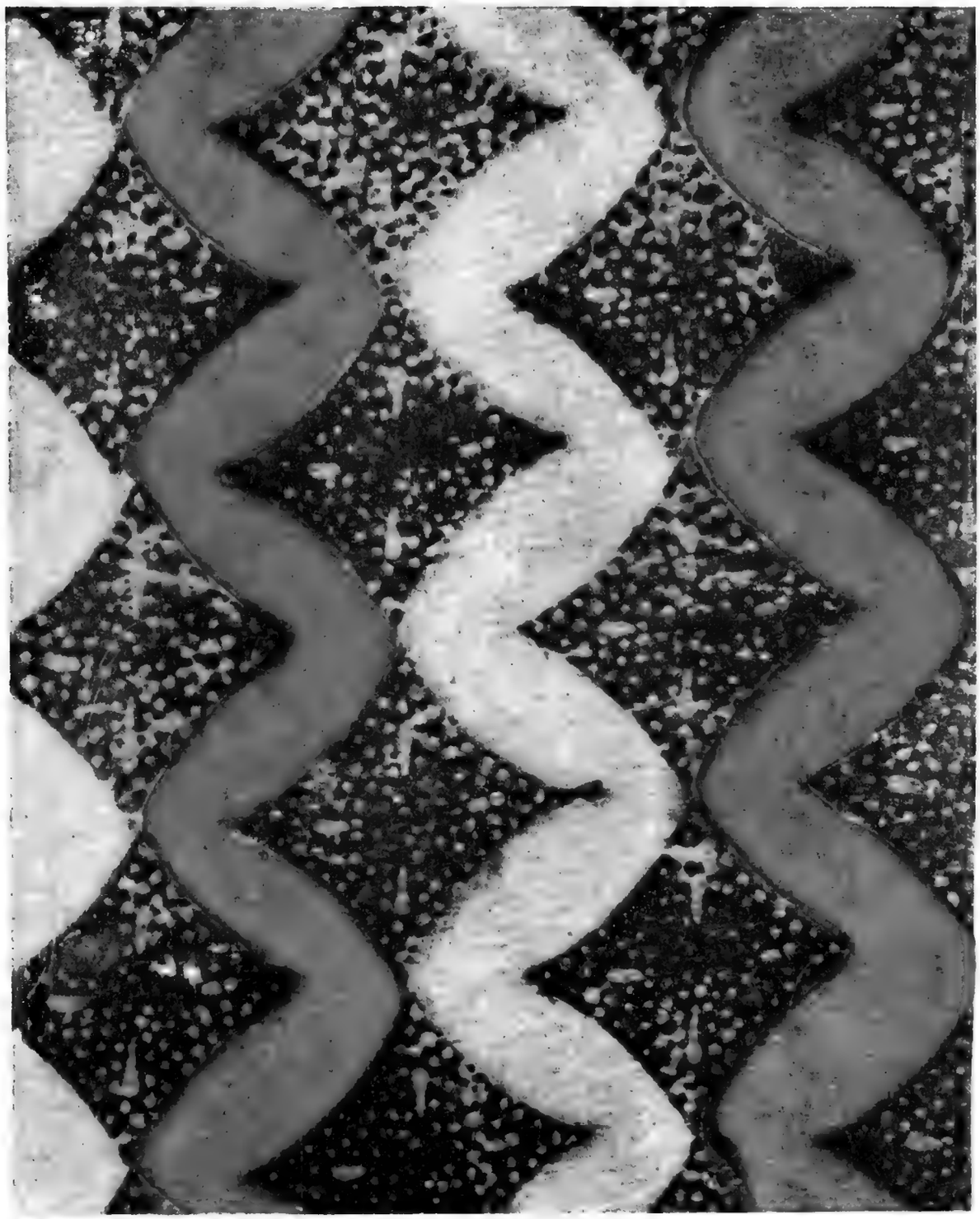


FIG. 131. A REMARKABLE HAWAIIAN KAPA. BRITISH MUSEUM.

almost all these beats have been found in burial caves that appear on satisfactory evidence to be traceable at least as far back as the day when the great Navigator perished on the shore of Kealakeakua Bay. It is true that the mole kapa was generally preferred for decorative purposes, ruling especially, and the decorative specimens would naturally be most valued by collectors of that early day. Also the plain kapa, if collected, may have perished by neglect, and in support of this theory it may be added that there are very few specimens in the collection mentioned of the *mamaki* kapa, a kind very generally in use by the common people in those days.



HAWAIIAN KAPA

It seems probable that the designs on the Hawaiian beaters marked no sudden late renaissance, but existed before the time of Cook's visits, developing by degrees. It may be added in regard to the kapa in the Cook collection that the bulk of the pieces from the Hawaiian Islands came from the southernmost, Hawaii, with a few from the island of Kauai (at which he first touched) and none from Oahu, Molokai or Maui; the two former being noted for the good quality of kapa made there.

I regret that the illustration of the British Museum kapa, Fig. 131, does not show the details as sharply as the original photograph sent to me from the British Museum, but the regret is stronger that a specimen of the original kapa is not in my possession, for the "Thin Tapa stamped in white, black and brown" is a very remarkable piece. The photograph shows it to be a portion of a pa'u or malo (we have no scale); if the former, the width must be at least thirty inches; if the latter, not less than nine or ten. In either case the photograph is greatly reduced, and the original would be far easier to understand, being on a much larger scale. This kapa was well bleached and very white (the Hawaiians had no white paint so far as known), and the broad dark longitudinal bands (in the figure) are composed of closely ruled transverse undulating lines; similar but larger lines in black form the lighter bands, while the lines of what appear to be white dots in the darker bands are punctures in diamond-shaped pieces of the same brown as the transverse zigzags (possibly these are black, as the photograph does not sufficiently differentiate between a rusty black and a faded brown), and these pieces seem to be pasted on or beaten in to the white kapa. Unfortunately these tiny pieces do not appear in the figure.

Whatever the process used, and I do not say that the actual kapa would not bear a different interpretation from this made from a photograph so greatly reduced, the specimen, however made, shows great skill and patience in the chiefess who decorated this bark-cloth; would that her name might have been preserved as the names of the old carvers of wood among the Maori are preserved!

It need not be supposed that the thirty or more yards of cloth sometimes composing a pa'u were all decorated with such painstaking care; only two or three yards which appear on the outside when the garment was worn need be so decorated.

CHAPTER VI.

VOCABULARY OF HAWAIIAN KAPA TERMS.

I have decided to print separately the lists of Kapa terms in the principal Polynesian dialects, but will supplement these by a comparative table of the various names for the principal implements and materials. The list of dictionaries and other authorities quoted will be found below. Few of the Polynesian dictionaries, or rather vocabularies, furnished many technical terms.

Aahu a kind of kapa; waoke bark soaked in water; to put on kapa, to cloth one.
Aeokahaloa kapa made of waoke and colored with charcoal a blue gray (Pl. BB, 8).
Aha name of a kind of kapa made on Molokai.
Ahiahi faded colors; the uncolored portions of dyed kapa.
Ahunalii a colored kapa.
Akalá Hawaiian raspberry (Fig. 83, p. 136); pink kapa made from it or colored like the berry juice.
Akeakea term applied to faded kapa.
Akoa snuff-colored kapa dyed with akoa (Pl. AA, 8).
Alaalawainui a small tree whose fruit is used in dyeing.
Alaea red ochre used as paint when mixed with kukui or kamani nut oil.
Aleuleu old kapa; all kinds of poor kapa; same as Apeupeu.
Alolua kapa printed or painted on both sides.
Amaumau a fern (*Sadleria cyatheoides*) used as sizing or also as a reddish dye (Fig. 96, p. 161).
Anoni kapa made by mixing bits of variously colored kapa in the beating (Pl. 35, 1).
Apeupeu inferior kinds of kapa; see Aleuleu.
Apikipiki variegated kapa.
Awapuhi *Zingiber zerumbet*, Ginger; used as a perfume (Fig. 100, p. 166).
Awelu torn or ragged kapa.
Ẹleuli a perfumed kapa (from Puna?).
Haa a plant (*Antidesma platyphyllum*) used in dyeing.
Hai goddess of the kapa beaters.
Haimanàwa rather thin white kapa.
Halakea kapa dyed with *niu* (coconut).
Hale kua or kuku house where the women beat kapa in wet weather.
Halua striped; a pattern on beaters, two sets of parallel lines crossing at right angles.

Hamoula kapa stained or painted red like kuaula.
Hana white or waoke kapa (a doubtful name).
Hanina ancient name of a yellow pa'u (?).
Hau a tree (*Hibiscus tiliaceus*); the bark sometimes beaten into a fine kapa (Fig. 82, p. 134).
Heahea to stain or print cloth red; same as ahea.
Hili black dye from *kolea* (*Suttonia sp.*) bark; general term for barks used as dye.
Hiwa a clear black kapa that might be offered to the gods.
Hoa to beat kapa (or anything else); see Hohoa.
Hoahoa a round mallet for the first beating of kapa; see Hohoa, Pl. 1.
Hoai to join two pieces of kapa by sewing.
Hohoa to beat kapa after coloring to soften it; to smooth kapa by beating; also the instrument.
Holahola to smooth out the creases in kapa.
Hole to cut grooves in a kapa beater.
Holei tree of which the bark and roots dye yellow (*Ochrosia sandvicensis*, Fig. 92).
Holoku a long flowing garment with sleeves, Ps. 109:29; name of the gown introduced by the missionaries; a word made for the translation of the above scriptural passage.
Hoolei see Holei above.
Hoopai to strike; the name of the most common pattern on beaters (Fig. 34, No. 6).
Huikahi a short malo or waist cloth.
Hulali a shining white kapa.
Humuna a seam.
Ia or Ie a kapa beater (Pls. 2-7).
Iekuku the more common name for a kapa beater.
Iho the collective name for the inner kapa sheets of a kuina or kapa moe.
Iliki a varnish made of kukui bark, lani, opumaia, etc.; also banana bud.
Ililuna the outer bark which is scraped off in kapa-making.
Ka'e the inner bark of waoke.
Kaee hard or stiff, as new kapa or newly dyed kapa.
Kaiaulu same as kilohana, the best of a set or kuina of kapa moe.
Kalukalu a very thin, gauze-like kapa. Fig. 128 the most delicate made.
Kamalena a pa'u or other kapa dyed yellow.
Kapa cloth beaten from the inner bark of various trees.
Kapa kuina from kapa and kui to stitch; the five sheets of a kuina.
Kapa moe a set of sheets of kapa for bed covering united at one edge by sewing.
Kapaoa or Kupaoa *Raillardia scabra;* one of the *Compositæ* used to scent kapa.
Kapeke a malo dyed in different colors on the two sides.
Kawau *Byronia sandwicensis;* wood much used for the kua on which kapa is beaten (Fig. 105, p. 179).
Kelewai kapa dyed in mud (kele).
Kihei a kapa garment used as a shawl for protection from cold or rain.

Kikama white kapa made from waoke.
Kikeekee a zigzag line in decoration much used by Hawaiians.
Kikiko spotted or dotted kapa (Pl. 41).
Kiokio variegated kapa.
Kiolena a place for coloring kapa; to spread kapa to dry in the sun.
Kiwaawaa rough kapa.
Kiwawa waoke partly beaten into kapa.
Kohu coloring matter for printing kapa.
Kolea *Suttonia* (*Myrsine*) *Lessertiana*, a shrub with red and astringent bark, used to dye black or red, according to Hillebrand (Fig. 89, p. 148).
Kopiko *Straussia sp.*, a tree whose wood is used for making kuas (Fig. 104, p. 177).
Kopili a small white kapa put on idols; a variety of waoke; see Oloa.
Kou *Cordia subcordata* (Fig. 90, p. 151); a valuable tree; wood ornamental and durable; leaves used as dye.
Kowaha a variety of waoke.
Kua the anvil on which kapa was beaten (Fig. 32, p. 77).
Kuau the mallet for beating kapa; same as Iekuku.
Kuaula red, thick kapa, usually ribbed.
Kui to beat; also a needle.
Kuina (*kui* and *ana* uniting) a set of *kapa moe* sewed together at one side, usually five sheets of which the uppermost is decorated and called *kilohana;* a seam.
Kukaa a bundle of kapa.
Kukai to plant waoke by the sea.
Kuku the operation of beating kapa.
Kukui *Aleurites moluccana* (Fig. 84, p. 139); the candlenut tree, used extensively as a dye.
Kuloli a variety of waoke found at Palilua, Hawaii.
Kupalu to beat kapa.
Kupaoa see kapaoa, a plant used to scent kapa.
Kupenu to dip kapa into a dye; to smooth out kapa.
Kuponua second quality of waoke.
Lalani kapa marked with rows; striped kapa.
Lapa the carved bambu strips for printing kapa; same as Ohekapala (Figs. 65, 66).
Lapalapa the torn end of a piece of kapa.
Lauhuki a god of the kapa-makers; the office of the person (girl) who keeps the kapa wet during the beating.
Laulole waoke, literally the cloth tree.
Lena or Olena *Curcuma longa*, turmeric; the tuberculous root used to dye or paint yellow.
Loli to spot kapa; same as kikohu, e nionio.
Lualua soft, flimsy kapa.
Luu or Hooluu to dye.

Maaloa *Bœhmeria stipularis; mamaki* (Fig. 80, p. 130); from the inner bark a durable kapa was made.
Maaweawe spotted; marked with small variation of color.
Mahiehie to dye kapa with fast colors.
Mahuna small spotted, used for covering idols; kapa like paipaikukui; a thin kapa much used in sorcery, often oiled. Mahunalii is another form.
Maiele *Cyathodes Tameiameiæ.*
Maihi or Maihe to strip off bark for kapa-making.
Maile *Alyxia olivæformis;* a trailing plant much used by natives for its perfume (Fig. 98, p. 164).
Mao *Abutilon incanum;* a small malvaceous plant used to dye green (Fig. 86, p. 143).
Mamaki *Pipturus albidus* (Fig. 79); a plant used extensively for making kapa.
Maokioki spotted, variegated.
Moelua a red kapa.
Mokihana *Pelea anisata;* a shrub much used to scent kapa, the capsules to make leis (Fig. 97, p. 162).
Momo kapa of poor quality.
Moomoo kapa of second or third rate; kapa not much valued.
Nahenahe a soft kapa.
Nanu *Gardenia Remyi* (Fig. 88, p. 147); a tree with fragrant flowers; the pulp of fruit dyes yellow.
Nao a streak on kapa; the pattern formed by the beater.
Nau *Gardenia Brighamii;* the pulp around the nut dyes a good yellow; flowers fragrant.
Ninio or Paninio to stamp kapa.
Nio a handsome kind of kapa.
Noni *Morinda citrifolia;* a small tree, the bark used to dye brown, the root red (Fig. 87, p. 145).
Ohekapala strips of bambu carved on one end for printing kapa (Figs. 65, 66).
Ohelohelo light red kapa; color of *Ohelo* (*Vaccinium reticulatum*).
Ohia ai *Eugenia malaccensis* (Fig. 93, p. 157).
Ohia ha *Eugenia sandwicensis;* also *Metrosideros polymorpha.*
Ohiwaoke a bundle of waoke.
Ohuohu a blackish kind of kapa.
Okena or Olena *Curcuma longa*, turmeric, much used in dyeing yellow.
Oloa a small white kapa to cover a god when prayed to; waoke bark soaked soft.
Omoha a figure used in printing kapa.
Onio spotted kapa (Pl. 41, 1).
Onionio spotted, striped or variegated kapa.
Onohiula a deep red kapa.
Opi folds or creases in kapa.
Opihi a stamp on kapa; a limpet.
Ouholowai mamaki kapa dyed differently on the two sides.

Ouou the sound of the kapa mallet in beating.
Pahupalapala container for dye or paint for printing kapa.
Pai to stamp.
Paihi *Metrosideros polymorpha; Ohia ha;* the bark of this tree yields a black dye.
Paina fine, white kapa.
Paipai kapa beating; to peel off tree bark.
Paipaikukui a pale yellow kapa made on Molokai.
Paiula kapa made by beating rags of red with new white waoke; a rack for spreading pa'us.
Pake a soft and flexible white kapa.
Paku sewing two pieces of kapa together or uniting by beating when wet.
Palaa *Davallia tenuifolia;* a fern used for dyeing red; any dark color (Fig. 95, p. 160).
Palaholo paste made from the stipites of *Amaumau*, *Sadleria cyatheoides* (Fig. 96, p. 161).
Palapala to print on kapa.
Palapalani to print kapa and put it out to dry.
Palupalu name of a yellow pa'u.
Panai to mend kapa or patch holes left in the beating.
Panainai to lengthen kapa by splicing.
Paniki dye for kapa; *wai hoohinuhinu.* A varnish, perhaps, rather than a dye.
Panionio or Paninio to dye with gay colors.
Papalu an apron of kapa.
Papanoanoa full of holes, as lace kapa (Pl. 36, 2; Pl. 43).
Pau (ke) a poor kapa; one of no distinct color.
Pehuakoa kapa colored with koa bark.
Pelehu a kind of kapa made on Kauai.
Pepele a kapa made somewhere on Kauai
Pia the starch or paste from *Tacca pinnatifida.*
Piai a name for the kukui nut, *Aleurites Moluccana.*
Pilati gum of any tree; especially of the kukui.
Pinana when the pattern on kapa changes direction abruptly; a favorite trick (Pl. 29, 2).
Pinauea a kind of kapa.
Pipi the act of sprinkling kapa with water during the beating.
Poaaha the bark of young waoke; bark of superior quality or fineness of fibre.
Pohaka a printed kapa.
Pohoala a single kapa; a remnant.
Pokohukohu or Pukohukohu the red dye of the root bark of noni.
Pola edge or end of kapa; the part of the *malo* that hangs over the girdle in front.
Poniponi kapa painted with various colors.
Popolo lumae *Phytolacca brachystachys;* berries used as dye.
Poulu a shrub or small tree from whose bark a kind of kapa was made.

Pouleulu (po intensive, ule penis, ulu breadfruit) male flower of breadfruit used in kapa.
Puakai a red dye.
Puakeawe *Cyathodes Tameiameiæ.*
Puaniu kapa colored with coconut.
Puhionio to color in spots; to stamp with different colors.
Puili a small cord; one of the patterns of a beater (Fig. 35, Nos. 9, 10).
Pukapuka a kind of lace kapa, see Pl. 43.
Pukohukohu kapa colored with noni.
Pukupuku crumpled kapa; a crêpe.
Pulohiwa shining black kapa.
Pulou black or dark-colored kapa, the former used at funerals.
Puloulou bunches of black kapa; a wisp of kapa on a pahu (stick) as a sign of kapu.
Pulu to soak kapa material until soft; also the soaked material.
Pulupulu fine scrapings of kapa for lint or tinder.
Punana a kind of white kapa where the fibres show like the twigs of a bird's nest.
Punoni red dye of the noni; kapa so dyed.
Puolo kapa folded and bound up for storage or the market.
Pupupu a white kapa used for pa'u; the small shed used for beating kapa in; a heap of refuse kapa.
Puukukui a kapa made of waoke and pouleulu.
Uahaao a pattern (*nao*) = halua upena.
Uaua a yellow pa'u dyed with olena (turmeric).
Uhele or Uhole the process of stripping bark from a tree for kapa-making.
Uki *Dianella nemorosa* (Fig. 91, p. 153); the berries used as a light blue dye for kapa.
Uwahaao = Koeau.
Uwiki full of small holes either from over beating or to make lace kapa.
Waiele any dark-colored dye for kapa.
Waihooluu a general term for a dye
Wailiilii thick yellow kapa, striped.
Walahee *Plectronia odorata;* a shrub whose leaves were used for dyeing black.
Waoke *Brousonettia papyrifera;* the paper-mulberry; also written wauke (Figs. 74, 75, pp. 120, 121).
Wea or Weo a red dye.
Wehiwehi kapa with black stripes (Fig. 19, p. 42).
Weluula kapa made from bits of red beaten up with waoke. Same as paiula.

Andrews, Lorrin. A Dictionary of the Hawaiian Language, to which is appended an English-Hawaiian Vocabulary and a Chronological Table of Remarkable Events. Honolulu, 1865.

VOCABULARY OF SAMOAN KAPA TERMS.

Aasi to scrape *tutuga*, the paper-mulberry, with a shell *asi*.
Afu a wrapper of *siapo* used as a sheet.
Afuloto bedclothes of siapo, the Hawaiian kapa moe.
Ago turmeric, *Curcuma longa;* see Lega.
Ailua to sew two pieces of siapo together.
Ale, Aleoa the second coat of coloring or varnish on siapo.
Aoa the banyan fig; the bark used as fibre, the fruit as dye (Fig. 78, p. 126).
Asi sandal-wood; a shell used to scrape the outer bark from tutuga.
Aumalute a rod of tutuga stripped of its bark.
Aute Chinese rose, *Hibiscus rosa-sinensis;* the flower juice colors black.
Avapui ginger, *Zingiber zerumbet* (Fig. 100, p. 166).
Elei to put the color on siapo.
Eleiga a stage in the preparation of siapo.
Ema a shining black siapo.
Epa Fauepa a pile of mats and siapo on which the body of a dead chief lies in state.
Faafeia ornamented siapo.
Faagatagata to mark siapo like a snake; with undulations.
Faalau a large siapo; one much above ordinary size.
Faanifonifo siapo with a toothed border; or serrate.
Fafai to scrape the outer bark from tutuga.
Fatuvalu an inferior siapo, neither well beaten nor well colored.
Fauepa a heap of siapo serving for the bier of a dead chief.
Feia or feie ornamentally marked siapo.
Felanuai variegated siapo.
Gafigafi old siapo used as a wrapper for valuable articles.
Gatu old siapo used for wrapping or as rags in sickness.
Ie the grooved mallet for beating out siapo.
Ietosi the grooved mallet for beating tutuga.
Ieie a rag of siapo.
Laei native clothing (of siapo).
Laua white siapo not finished.
Lauua leaf of paper-mulberry; bark of the ua prepared for making native cloth. *Syn.* tutuga for which it has been substituted on account of superstitions connected with fishing.
Lavalava a printed loin-cloth. This is much the same as the Hawaiian pa'u.
Lega a paste made of turmeric to dye yellow.
Leuleu or leveleve an old siapo.
Lufa a large black siapo.
Lulu to sprinkle siapo while it is being beaten.
Malo a narrow girdle, the only garment worn in battle.

Mati the tree *Ficus prolixa* and its fruit.
Maunu a young plant of tutuga, not grown sufficiently for barking.
Milo a malvaceous tree common in the islands, *Thespesia populnea.*
Molemole smooth, soft; the smooth surface of the beater.
Nonu a species of *Morinda;* the Hawaiian *noni*, *M. citrifolia* (Fig. 87, p. 145).
Oa a tree, *Bishofia javanica*, from which is obtained a brown dye for siapo (Fig. 85, p. 141).
Oai to mark or paint siapo.
Oaiga marking native cloth or siapo; same as Elei.
Otuotu stiff as applied to siapo.
Pala a black mud used as dye.
Paoa to use too much oa in coloring siapo.
Papanu to be overloaded with color; common condition of cheap modern siapo.
Papata large pattern; of coarse texture.
Penupenu soft siapo, soft from usage.
Piasua arrow-root cooked with juice of coconut; pia the ancient name of *Tacca pinnatifida.*
Potu a siapo screen behind which an aitu spoke; the white border of siapo.
Pulepule striped siapo.
Pulupulu a large piece of siapo to wrap around the body.
Punefu old dirty siapo (from its bad smell).
Punipuni to close up holes in tutuga.
Sei a small curved stick used as a stretcher for siapo.
Sema a red siapo.
Siapo cloth made from *Broussonetia;* also mosquito net made of the cloth (tainamu).
Sisili a maker of turmeric; this dye was used among the Pacific islanders for many purposes.
Soaa the mountain banana, *Musa uranospatha.*
Soliga a present in siapo given by a virgin.
Suluga siapo which relatives dwelling in a distant land bring at the death of their kinsman.
Suni the piece of tutuga used to sponge up the scented oil as it forms.
Taafiafi rags of siapo.
Tainamu a mosquito net made of siapo.
Talama to give a second coat of black varnish to siapo.
Taloa a siapo of one color.
Tapa a white border of siapo; to call or summon.
Tasina a striped siapo (from Fiji).
Tata the rubber for putting on the colors of siapo.
Tauanave *Cordia subcordata* (Fig. 90, p. 151).
Tauapoapo to adjust a bad wrapper of siapo to cover the body.
Tiputa a woman's upper garment, Tahitian (Fig. 3, p. 11).

Tou a tree, *Cordia subcordata*; to prepare siapo with tou.
Tuapipi the second growth of paper-mulberry.
Tusi to mark or print siapo.
Tusitusi striped siapo.
Tutu to beat tutuga, Hawaiian kuku.
Tutua the wooden block on which tutuga is beaten.
Tutuga *Broussonetia papyrifera*, the paper-mulberry; the prepared bark of the same. According to W. von Bülow, the term applies to bark of *Pipturus incanus*. Arch. intern. d'Ethnog. xii, 67.
Tutututu marked with speckles.
Ua (tough, tenacious) syn. of tutuga; the bark scraped for making siapo.
Uaulu bark of young bread-fruit.
Ululima a siapo fifty upeti wide.
Uluselau a siapo a hundred upeti wide.
Ulututuga a bundle of scraped bark of tutuga.
Upeti form used for printing siapo (Fig. 16); used as a measure for the cloth.
Vaisa the preparatory wash (mordant) used to fix a dye.

Pratt, Rev. George. A Grammar and Dictionary of the Samoan Language. Second Edition edited by Rev. S. J. Whitmee. London, 1878.

Violette, Le P. L. Dictionnaire Samoan-Francais-Anglais et Francais-Samoan-Anglais. Paris, 1880.

VOCABULARY OF TONGA KAPA TERMS.

Ega *Curcuma longa*, turmeric, the Samoan lega.
Falo to smooth out wrinkled gatu.
Fau *Hibiscus tiliaceus*, the Hawaiian hau (Fig. 82, p. 134).
Fukai tuitui soot of tuitui nuts used as coloring matter.
Gatu cloth made of hiapo.
Hea tree whose juice furnishes a varnish for gatu.
Hiapo fibrous bark of paper-mulberry; Samoan siapo; cloth of a brown color.
Holo old gatu; cloth soft from use.
Ike a beater; the Hawaiian ie.
Kalalu the rustling of gatu.
Kapa i gatu the border of a sheet of gatu.
Kie fau cloth made from fau bark as at Futuna and elsewhere.
Kili bark in general; Hawaiian ili.
Kofe bambu, the Hawaiian ohe.
Koka *Ficus prolixa;* the bark yields a brown-red varnish for gatu. Koka aga to paint gatu.
Kumi black gatu.
Lena bark of hiapo; in Hawaiian the word means yellow or turmeric.

Maukapu gatu cut through the middle.
Molemole smooth, as in Hawaiian and Samoan.
Nono *Morinda citrifolia.*
Pakoko dry bark of hiapo not yet beaten.
Takinaga a place to hang gatu to dry or bleach.
Tapa, tapatapa, tatapa the white part of a sheet of gatu.
Tohi ae gatu to imprint on gatu.
Toutapa a woman who paints and arranges the white part of gatu.
Tuitui *Aleurites*, Hawaiian kukui; verb to sew.
Tukui gatu a long bundle of gatu tied up.
Tutu the bark of hiapo.
Tutua the block on which tutu is beaten.

Dictionnaire Toga-Français et Français-Toga-Anglais, précédé d'un Grammaire et de quelques Notes sur L'Archipel, par les Missionaires Maristes. Paris, 1890.

TAPA TERMS OF RAPANUI OR EASTER ISLAND.

Garahu charcoal, Hawaiian nanahu.
Hakaha to strip off bark, same as kuhure.
Hakateatea to bleach in the dew of early morning.
Horehore to dye, the Hawaiian holei.
Hurihuri the color black, Hawaiian uli, Tahitian uli; also blue.
Kahu nui a shawl or cloak, Hawaiian kihei.
Kerekere black, Hawaiian eleele; also blue.
Kiri bark of a tree, Hawaiian ili, Tongan kili.
Kuhure to strip off the bark of the paper-mulberry.
Manava eete to stamp or imprint.
Maute the paper-mulberry; Maori and Tahitian aute.
Meamea yellow.
Pareu female dress, the Hawaiian pa'u.
Pua to dye.
Ruru to print.
Tapa bark-cloth.
Teatea white; Hawaiian keokeo.
Tigi tigi to beat tapa.
Titi miro the beater or mallet.
Tope to bleach.
Uraura red; Hawaiian ulaula.

Roussel, le R. P. Vocabulaire de la Langue da l'Ile-de-Pâques ou Rapanui. Louvain 1908, Extrait du Muséon, pp. 159-254, Nos. 2-3.

VOCABULARY OF FIJIAN KAPA TERMS.

Bicibici a marking or pattern on native cloth.
Buco white used chiefly of masi; masi buco.
Dutua the plank on which malo is beaten; Tongan tutua.
Gatu native cloth when made in large or wide pieces.
Iki the beater for masi; Hawaiian ie.
Katudrau (100 fathoms) a large bale of malo; sometimes contains many hundred fathoms.
Kesa a sort of dye for marking malo; applied to any color.
Kupeti a carved plank on which malo is printed; Samoan upete.
Lauci *Aleurites.*
Liku female dress; when of malo like the Hawaiian pa'u.
Liti charcoal of kukui nuts used for printing malo.
Loaloa black made from lauci seed.
Madra cloth that has been used.
Malo the paper-mulberry; also the dress (malo) made from it. In most parts of Fiji the cloth is called masi.
Masi cloth beaten from paper-mulberry.
Nionioro marked in a certain way; see Hawaiian onionio.
Samu mallet for beating masi.
Samusamu a beating of masi.
Sasa the round board on which masi is kesaed or stained.
Seavu white native cloth; same as masi buco.
Sulu a waist cloth; differs from the Hawaiian malo in not passing between the legs.
Taloa masi stained black.
Tasina native cloth marked or printed on the kupeti.
Tidolo malo or vau sticks stripped of their bark.
Tiniyura a bui ni malo, a tail of malo, the long train of a chief's dress.
Togonilau a kind of marking when dyeing with kesa.
Tou *Cordia sp.*
Tusi native cloth kesaed with various colors and patterns.
Tuvalou a quantity of masi hung about a person at a solevu or festival.
Vaqaqa inner bark of a tree when prepared for making cloth.
Waqani a pattern for printing masi.

Hazlewood, Rev. D. A Feejeean and English Dictionary. Vewa, Feejee, 1850.

VOCABULARY OF TAHITIAN AHU TERMS.

Aaa native cloth not well made.
Aahu a piece of cloth; cloth in general.
Aaone large bundles of ahu, coarse or unfinished, prepared for a public presentation to the king or high chief.

Aari same as *nono*, *Morinda sp.*
Aati a strong kind of cloth from breadfruit bark.
Aatiaute cloth made from *aute* bark.
Abu a small shrub of which the bark is used to tan or dye cloth; same as hiri.
Aere a tree whose bark was used for making ahu.
Ahore used of a young tree from which the bark has been stripped.
Ahuapi cloth doubled and pasted together; a quilt.
Ahumamau a garment constantly worn.
Ahufara a scarf or shawl similar to the Hawaiian kihei; a mat made of pandanus leaves.
Ahupara a cloth of good quality.
Ahupau, Ahupaau an inferior cloth.
Aiaiaoa cloth made from the fibrous roots of the aoa or banian.
Aito iron-wood tree; used for a dye.
Amaa small branches of which the bark is used to make cloth.
Ao the grooves of the cloth mallet; the marks of these grooves; the inside bark used for cloth-making; to rip up the bark for removal in cloth-making.
Aoa the Banian fig.
Aoareva the large grooves in the cloth mallet; Hawaiian pepehi.
Aorereva a kind of cloth.
Apaa a thick cloth made by men (not by women as usual) and worked by night to be sacred to the gods, and used to cover them during certain ceremonies.
Apaariaria a beautiful cloth made from *aute* bark.
Apapa a parcel of *aute* or *pouru* laid out for cloth-making.
Apape a kind of scented cloth, called also *vaivai*.
Api folds of cloth pasted together.
Apiapi cloth dyed and perfumed with certain plants.
Araia a stiff, black cloth.
Arero a small strip of cloth; the pendent part of a malo.
Areu cloth worn about the loins; same as *pareu*.
Areva a thin white ahu marked with long stripes from the coarse side of the mallet.
Aroà the best side of a piece of cloth.
Atiitii to beat small scraps of cloth as little girls do.
Auperu to fold up cloth.
Aute Paper-mulberry.
Avapuhe ginger; used as a perfume; Hawaiian awapuhi.
Faateatea to bleach cloth; to make white.
Faatoro to solicit the making of ahu, as is the custom of chiefs.
Farehaa a shed in which to beat cloth.
Fatifatiaeve an immense roll of cloth.
Fefetu a fold or roll of cloth.
Fenia a tree furnishing a bark for dyeing.

Ferafera to remove wrinkles from cloth.
Haa cloth-making by the women.
Haamati to dye crimson with the *mati* juice.
Haapaa a dark-colored ahu; v. to dye this color.
Haapaau to make or wear the coarse cloth called *paau*.
Haapaopao to dye cloth brown or of a dark color.
Hapaa a strong, durable cloth.
Haro to paint or spread the crimson dye on cloth called *ahuharo*.
Hiri a strong native cloth; the bark used to dye this cloth.
Hopuu name of a fine white cloth.
Itere the fag end of a piece of ahu.
Mao a tree whose bark is used as a dye; in Hawaiian this is the name of *Abutilon incanum* (Fig. 86, p. 143).
Maraea araea red ochre; in Hawaiian alaea.
Maraia a dark colored ahu.
Maro a man's dress; maroapi, a quilted maro; maroapu, a wide girdle.
Mati the crimson dye from fig juice; also the berry.
Motuu a mountain shrub with a dark red berry used as a dye.
Muriaito red paint or dye from the *aito* tree.
Ninamu brown or gray cloth.
Oao the red-berried shrub used in dyeing (*Ficus*).
Ohina a grayish cloth.
Oieie ahu partly made and thick.
Opapa a kind of spotted cloth.
Oraa, Aoa Banian fig; also the cloth made from it.
Ore a modern name for the *Aoa* tree.
Paau a coarse native cloth.
Pahoa to prepare the bark for making ahu.
Paoo bark of the *aute* in preparation for making ahu.
Paraoro to take the wrinkles out of cloth.
Pareu folds of ahu worn around the loins of both sexes.
Parupape a fine ahu.
Parure a strong ahu.
Pateatea a kind of ahu.
Patu a small wooden mallet.
Pauma a kite made of ahu.
Pauraura a kind of ahu.
Pauteute a kind of ahu.
Peperu a roll or bundle of ahu.
Pia *Tacca pinnatifida*, the plant whose starch was used to cement ahu.
Puotihi the inside sheet of a *tihi;* usually of inferior ahu.
Puveuveu a rag of ahu.

Rahi to arrange the bark for making ahu.
Reipee, Reipu a kind of ahu.
Rotomati the crimson color of the mati berries impressed on ahu.
Rufarufa worn out ahu.
Rumirumi to press and smooth the wrinkles in a garment; Hawaiian lomilomi.
Ruru a roll or bale of ahu.
Taata to prepare bark for ahu making by removing the rough outside.
Tahau to bleach ahu in the morning dew.
Tahauhau to bleach ahu repeatedly as above.
Tahema an ornamental handkerchief worn by dancers.
Tahere a sort of a malo worn by Tahitians; same as Tihere.
Tahono to join pieces of ahu; to lengthen.
Taia to smooth cloth by rubbing or pressing.
Tape a fragment of ahu less than a fathom long.
Tatiti to print or decorate ahu with figures.
Tauaoa roots of aoa tree from which ahu is made.
Taupepe to spread out a wet cloth.
Tiafati to fold cloth.
Tiahono to lengthen ahu by pasting on a piece.
Tihere, Tahere a man's malo.
Tihi a great quantity of ahu wrapped around the waist in former times and then given to visitors (Fig. 121, p. 200).
Tihiura a large shawl stained along the border.
Tipara a kind of ahu, spelled also tapara.
Tipe a sort of ahu.
Tiputa, Tiaputa, Tuputa a garment of ahu like a poncho (Fig. 3, p. 11).
Tite aute or cloth made from it.
Titete ahu in a certain stage of preparation.
Titia the long beam on which ahu is beaten; v. to beat ahu on this beam (Fig. 1, p. 9).
Tou a tree, *Cordia sp.;* Hawaiian kou (Fig. 90, p. 151).
Tuetue thick, stout cloth, also irregular cloth.
Tuoru a cloth from which *tiputas* were made.
Tupai a mallet for beating ahu (Pl. 6).
Tupepu, Pupepu a kind of thin ahu.
Tutu to beat layers of bark to make ahu; to express juice from *mati* berries; Hawaiian kuku.
Tutuhaa to beat bark for making ahu.
Tutua the beam on which the bark is beaten.
Umaa a dress of ahu, such as the tihi.
Umaamaa a kind of ahu.
Umati cloth made of the mati fig, or that is dyed crimson.
Upua (a liver) name of a dark-colored cloth.

Upapariirii cloth made of many layers of *aute*.
Uperu, Auperu a small bundle of ahu.
Urepo cloth colored dark by bog mud; Hawaiian lepo.
Utoutou to stain cloth with *mati*.
Uvaravara, Uverevere a thin kind of ahu.
Vaivai a kind of ahu, generally scented.
Vaivaihaua name of a sort of ahu.
Varequai a fine, thin cloth.
Vau to bark a tree for material to make ahu.
Veriverihiva cloth of various colors.

Jaussen, Missionaire. Grammaire et Dictionnaire de la Langue Maori, Dialecte Tahitien. St. Cloud.

Davies, Rev. John. A Tahitian and English Dictionary, with introductory remarks on the Polynesian Language and a short Grammar of the Tahitian Dialect: with an Appendix. Tahiti, 1851. London Missionary Society's Press.

COMPARATIVE TABLE OF KAPA TERMS.

English.	Hawaiian.	Tahitian.	Tongan.	Rapanui.	Samoan.	Fijian.
Paper-mulberry	waoke, wauke	aute	hiapo	maute	tutuga	malo
Bark-cloth	kapa	ahu	ua, tutugu, gatu, hiapo	tapa	siapo	masi, malo gatu
Bark	ili	....	kili	kiri	paù	.....
Anvil	kuakuku	tutua, titia	tutua	tutua	tutua	dutua
Beater	ie, iekuku	ie, tupai	ike, tata	titi miro	ie, ietosi	iki
Male dress	malo	maro, tihere	vala	.....	malo	malo, sulu
Female dress	pa'u	pareu	.....	pareu	lavalava	liku
Shawl	kihei	ahufara	kofu pulupulu	kahu nui	ofu pulupulu	.....
To bark	uhole, paipai	kohore, vau	fohifohi	kuhure, hakaha	fafai	dravoci loqata
To beat	kuku, kupalu	tutu, ratu	tapahu, tapanu	tigi tigi	ta	.....
To print	pai, palapala	tatiti	tohi ae gatu paki-tohi	manavaeete, ruru	vai, tusi	.....
To dye	luu, hooluu, kupe-nu	atete	.....	horehore, pua	'fufui	lomo ca
To bleach	hookeo	faateatea, tahau-hau	faka hina	hakateatea	faasinasina	.....
Smooth	mole	.....	molemole	molemole	molemole	.....
Black	uli, eleele	uri	uliuli	hurehure, kerekere	uli, eleelea	lonloa
White	kea, keokeo	.....	hina, te tea	teatea	paepae sina	buco vulavula
Yellow	olena, lena	.....	kena, melomelo	meamea	samasama	dromodromoa
Red	ula, ulaula	ura	kula	uraura	ulaula	dravaka kulakula
Charcoal	nanahu	....	malala	garahu	malala	liti, qilaiso
Ochre	alaea	araea	.....	.....	.....	.....
Turmeric	olena	.....	ega	lega	lega	rerega
Taeca	pia	pia	.....	pia	pia	yabia
Candlenut	kukui	tiari	tuitui	lama	lama	lauci, tuitui
Cordia	kou	tou	.....	tou	tou	tou
Morinda	noni	nono	nono	nonu	nonu	kura
Bambu	ohe	ohe, kofe, ofe	kofe	.....	ofe	bitu
Ginger	awapuhi	avapuhi	.....	.....	avapui	.....

CHAPTER VII.

A CATALOGUE OF THE KAPA STUDIED.

EARLIEST among the extant collections of Bark-cloth we must place the curious one already referred to (p. 21), compiled from the Cook collections in book form, of which several copies differing slightly in size and arrangement of specimens are known. Beginning with this quaint little volume, we will continue with another collection of the famous voyager's kapa of larger size and far better preservation, but without descriptions, date or name of editor: it is, however, perhaps the choicest of all. Next is the author's private collection containing, besides many specimens which will be described with those in the Bishop Museum, kapa gathered in visits to many museums, and sent by correspondents who desired to make the knowledge of bark-cloth manufacture more complete. Finally come the abundant collections of this Museum largely consisting of complete *Kapa moe*, *pa'u*, *malo and kihei*, or, in other cases folds of cloth unappropriated to any special use. This Museum collection includes the choice kapa of the Kamehameha family to which has been added by gift or purchase until it undoubtedly ranks first in size and value.

All the other collections mentioned consist entirely or in great part of specimens not exceeding in the main the convenient size of six by nine inches. When the imprinted pattern requires it of course this limit must be over-stepped, but the smaller size is better suited for study or comparison. It may be added here that the preservation of volumes of bound specimens of kapa must be carefully watched, at least in this climate, for the kapa tissue is very attractive to the paper-eating beetles.

1. New Amsterdam (Tasman's name for Tongatabu). A thin cloth printed brown with the *upete*, showing pattern on both sides (Figs. 17–18, pp. 40–41), "and made to resist rain, by being smeared over with the juice of a glutenous (*sic*) herb or plant."
2. Otaheite [Tahiti]. Thin, tough, white; beat is hoopai very fine. "This is used to spread below the chiefs while at dinner under the trees."
3. Sandwich I. [Hawaii]. Coarse fibre, mole, painted with irregular stripes of black crossed by others of red at an angle of 45°, both series in pairs. "This was no larger than a common cloth; the dyes are mattie ficeus [not so, but red ochre], and burnt cocoa-nut, mixed with the oil of the same."
4. Hawaii. A small bit of thick mole, with the figures as shown in Pl. W, 1.
4. Hawaii. Mamaki hoopai "and very strong. It resists water pretty well." Dyed a reddish brown.
6. Tahiti. Thick, white and felt-like; in two layers not well united. "Used for bedding."

7. Tahiti. A hard, ribbed fabric, dyed red, "wore by the common people in the rainy season; it is glazed as is No. 1."
8. Hawaii. Mole, colored as shown in Pl. W, 2. "Was six yards square; it is a master-piece of the Sandwich Islands manufacture, and worn by the ladies of honour." To the small fragment from which the author painted the plate referred to has since been added a much larger piece from the Florence collection of Cook's kapa by Dr. E. H. Giglioli, and there is little doubt that both are from the same large specimen.
9. Tahiti. A rather rough specimen with transverse ribs. It appears to have been dyed yellow but is now faded out. "Wore by the people in fine weather; it is made of the outer rind [?] of the mulberry tree."
10. Tahiti. White, thick and soft.
11. Tahiti. A strong, hoopai specimen of stiff, thin, white kapa.
12. Tahiti? Soft, yellow, and from the beat, which seems to be *mole halua pupu*, I should attribute it to Hawaii.
13. Tahiti. Yellowish, with a zigzag pattern painted in brown; a very small fragment; "used in religious ceremonies."
14. Tahiti. Quite like a kind made by the Hawaiians. Beat hoopai pawehe; grey on under side, dark brown on upper marked with darker parallel lines; "used in the mourning dresses."
15. Tahiti. A thick, soft kapa originally dyed yellow and stamped red with end of bambu, Fig 7. The catalogue has "used at the human sacrifice, but the Tahitians did not have human sacrifices."
16. Hawaiian. A thick, opaque, dark brown. The catalogue says "the dye the same as number 9, laid on with a small reed in the hand," but that number is not of the same color even allowing for fading.
17. Tahiti. White and ribbed like corduroy; "beat with a grooved piece of wood, and used as a mat."
18. Tahiti. Very fine white hoopai. "The very finest of the inner coat of the mulberry, and wore by the chiefs of Otaheite.....Some of the seamen were sent ashore to bring fresh provisions on board; and not having an opportunity to return immediately one of them wandered a little way up country, where he saw some children at play, which to his surprise they all left and surrounded him, making many antic gestures; at last a girl, about 14 years of age, made a leap at him, at the same time endeavored to seize a few red feathers which he had stuck in his cap, which he directly took out and presented her; upon which she made off with amazing swiftness, and the rest after her; he then returned to his companions, who were preparing to go on board. It was now the cool of the evening, when she came down to the water side, and singling him out from the rest, presented him the piece of cloth from which this was cut. A true sign of gratitude in those people."
19. Tahiti. A brown, thin, hoopai fabric "made out of old cloth for bedding to the common people." Soft and suitable.
20. Hawaiian. Of fine white texture, pepehi grooved.

21. Tahiti. A thin white kapa, ruled in black; "not fully completed." The pattern was like Pl. 34, 2.
22. Hawaiian. Fine thin kapa ruled in black with broader lines in alaea red.
23. Hawaiian. The fragment (now half its former size) is too small to make out the pattern painted in red and black upon a thick, leathery kapa, ribbed on the reverse. "Wore by the priests." The general character is shown in Pl. S, 1, left half.
24. Hawaiian. Thin mole mahuna kapa; "wore by the young women and oiled over to resist water."
25. Hawaiian. Similar in texture to the last but marked with dark red stripes; "an under garment; sometimes used for ornament."
26. Hawaiian. Thick white (probably once yellow or pink) with a texture like chamois leather. "Used as ornaments upon their canoes."
27. Tahiti. White, poorly beaten and fibrous but soft; "used by chiefs for sitting on."
28. Tahitian. Thin, white, papery with irregular brown blotches. "Used as a sash, and under garments for the dancers at Otaheite."
29. Hawaiian. Kapa mahuna with lines in groups of three.
30. Hawaiian. A thick felt-like kapa of several layers loosely beaten together; white, slightly smeared with red on one side. "A covering for the common people."
31. Hawaiian. Soft mole kapa resembling No. 3, but with finer dark lines in threes with wider red parallel lines and four finer red crossing at a slight angle. For the general effect see Pl. H, 2. A number of samples of this style were in Cook's collection.
32. Tahitian. Rather soft, white with a slight red smear on one side. "Wore by the chiefs going to battle." Probably as malo.
33. Tongatabu. A coarse, loosely beaten kapa varnished with red on one side. "Wore by the common people; no rain will penetrate it." It closely resembles Samoan siapo.
34. Tahiti. A thick, coarse, ribbed cloth painted in triangular patterns of orange, red, brown, with black dividing lines. So far as the diminutive specimen shows the design, it was gaudy rather than artistic. "Wore as garments by the ladies. ....A number of the natives being on board of the Resolution, one of the chiefs took a particular liking to an old blunt iron which lay upon one of the officer's chests, and taking hold of a boy about nine years of age, offered him in exchange, pointing to the iron. The gentleman, although he knew he could not keep the youth, yet willing to see if he would willingly stay; or if any of the rest would claim him, took the child and gave the savage the iron; upon which a woman, who appeared rather young for the mother, sprung from the other side of the ship, and with the highest emotions of grief seemed to bewail the loss of the infant: but the lieutenant, with a true British spirit, took him by the hand and presented him to her, upon which, after putting her hands twice upon her head, she unbound the roll of cloth which was round her body, from which this specimen was cut, and having spread it before him, seized the boy, and jumping into the sea

both swam ashore, nor could he ever learn whether she was the mother, sister or relation, and this he lamented the more, as such affection was very seldom seen among those people."

35. Tongan. A well-made hoopai kapa apparently white or cream color although the catalogue refers to it as colored. It was presented to Mr. King.
36. Tahitian. A good hoopai kapa presented to Lieutenant King by one of the priests.
37. Tongatabu. A coarse, durable kapa stamped brown with the upete.
38. Tahitian. Thin, white papery cloth "wore by the young dancers of both sexes."
39. "A fine specimen of the lace-bark, from Jamaica, bought at the Duchess of Portland's sale."

Cook Collection II.

While we have here some of the finest known specimens of the Hana Kapa few have any designated locality, and of these several are surely wrong; nor do we know when or by whom the collection was brought together in the goodly volume of one hundred and ten specimens measuring generally 7.2×10.5 inches. Of the figured ones it is not so difficult to determine the origin; but with the plain white fabrics it is sometimes impossible, pieces known to have been made in Tahiti are undistinguishable from some of equally positive Hawaiian origin, and the size of a hand specimen increases the difficulty. As was to have been expected we have in this collection kinds of kapa found also in the first one, and these are perhaps pieces of the same sheet. All are remarkably well preserved, being bound betwixt stiff sheets of ledger paper, and they give evidence of very little handling. If only the origin were authoritatively stated the collection would be a model one.

1. Tahiti? Rather thick mole cloth through which the dyes used have to some extent penetrated. The order of the line decoration is two bands each of three wavy black lines on white; then a broken line of round red dots, and the black bands repeated; then ten thin lines of dark red and one broader one on a red-brown ground followed by a band of this ground color of equal width; repeat. This may be Hawaiian or Tahitian with the preference given above.
2. Tahiti. A thin brownish fabric, mole, ruled with thin black lines averaging 3.8 inch apart crossed by converging lines in pairs; two dark red and six black lines; repeat.
3. Hawaii. Yellow hoopai kapa with bands of red ochre alternately .8 and .6 inch, each with an open zigzag of the ground color in its midst.
4. Hawaii. A firm mole fabric with bands of color nearly covering the unbleached ground. Pl. U, 2. Probably portion of a pa'u.
5. Tahiti or Tonga. A very well-beaten mole fabric ruled with thin parallel black lines in pairs about .2 inch apart; these are crossed at an angle of 45° by similar double lines fifteen in number separated by seven dark red thicker lines, or thirteen lighter red, all of the red lines single. Pa'u.

6. Hawaii or Tahiti. Thin mole fabric ruled with double black lines, twenty-three or more (cannot be determined from the specimen), then a space of ground color with transverse lines of red dots in series of three; then two bands of four black lines each; then a slightly wider band of the ground color with the dots; then two similar bands with elliptical daubs of dark red at intervals of about an inch; repeat.
7. Hawaii. A thick, leathery fabric crudely marked with converging lines of red and black. It is most interesting for a neat specimen of sewing shown in Figs. 61, 62.
8. Tonga. A thick corduroy fabric with converging bands of red and black.
9. Tahiti? A thick, ribbed kapa of yellow-brown tint ruled with wavy lines of alternate red and black, crossed with rudely painted bands of black with open zigzags of ground color dotted with red.
10. Hawaii. Very smooth mole kapa of light brown tint marked with red and black figures as shown in Pl. E, 4.
11. Hawaii. Thin white kalukalu kapa with crossing bands of twin dots as shown in Pl. 41, 1.
12. Tahiti or Hawaii. A kapa of open and rather uneven beat but fairly smooth surface ruled with fifteen black lines about .5 inch apart, then three similar lines close together, two wider red lines followed by the three lines and repeat; crossed by converging pairs of red and black lines.
13. Hawaii. Stiff and papery hoopai kapa ruled in broad black lines as shown in Fig. 19. Brought by Cook from Kauai. The black carries a durable varnish.
14. Tahiti? Thin kapa of a reddish tinge carefully ruled with darker red twin lines at right angles to each other.
15. Tahiti? A gray surface ruled with dark brown lines, generally in pairs, with a thinner line of the same color intervening.
16. Samoa? Mole kapa dyed yellow and stamped or printed with flat triangles with a base of 4.5 inches and of dark red color and varnished surface, leaving equal triangles of the yellow ground.
17. Hawaii. A double sheet, the front one mole with a wool-like surface (Pl. O, 1); the other hoopai yellow-brown on inside where attached to the other sheet, the reverse with smooth red paint.
18. Hawaii. A firm kapa mole of a reddish yellow tinge, marked irregularly with panels of close wavy black lines separated by elbows of broad bands of two shades of red or by strips of the ground color with red dots. A good seam crosses the specimen.
19. Hawaii. Stout mole kapa of a yellow-white tint, the most of the surface being covered with well-ruled lines in bands crossing each other at a small angle. The lines are alternately broad (.2 inch) and very narrow. The specimen has been sewed with a running cord like a basting, but this has been mostly cut away in binding.
20. Tonga? A thin but tough kapa ribbed and well covered with red and black wavy lines with here and there a band of red lines of varying width. Where the original surface shows it is often dotted with red. Perhaps Hawaiian.

21. Hawaii. Red-brown mahuna kapa with ruled black lines in fours alternating with single lines.
22. Tahiti? The specimen is colored half yellow and half dark brown; the beat seems hoopai pawehe at first sight, but a more careful examination reveals two hoopai sheets pasted together with the hoopai ridges at different angles; the under sheet is plain yellow-brown.
23. Hawaii. A stout mole kapa richly colored by lining as shown in Pl. U, 4.
24. Hawaii. A thick kapa with a decidedly woolly surface on the obverse but smooth on the back. One of the rich combinations of color in compound bands (Pl. O, 2).
25. Hawaii? Thick mole kapa marked with red lines 2.7 inches apart, these being crossed by similar lines in pairs converging.
26. Tahiti? Unbleached mole kapa with black lines crossed by another series of double converging lines at right angle, and still another series crossing at 45°. This is rather irregularly ruled, and has a confused effect.
27. Hawaii. Red and brown bands, some parallel and others crossing these at slight angles. Of the same class as No. 19.
28. Tahiti. Thin white mole, fibres distinct and silvery, covered at intervals of three inches with rudely drawn pairs of dark brown lines .2 inch each line.
29. Hawaii. Mole kapa with bands of black lines in two slightly separate series of four each; these bands are .7 inch apart and the intervening blank is dotted by alternating pairs of green and single larger red. A common Hawaiian device.
30. Hawaii. A thick kapa of which a portion is shown at exact size in Pl. U, 3.
31. ———? A thin dark brown hoopai kapa (Pl. BB, 11) with a slight glaze on one side. I am unable to place this well-made specimen of which I have seen no duplicate.
32. Hawaii. White kapa of ordinary quality, very thin.
33. Rurutu (Austral Group). A red hoopai kapa marked with two series of parallel black lines crossing each other at 45°. It resembles, but is not so thin as the Hawaiian mahuna.
34. Tongatabu. A very leathery kapa, bright red on the back but covered with a darker varnish on the face.
35. Hawaii. A red mamaki kapa of hoopai beat, tough and strong.
36. Tahiti? Yellow hoopai kapa covered with rude zigzags of dotted and smeared dark brown and parallel with these a brown ochre sort of shadow.
37. Tahiti. Thin, white and soft kapa closely resembling No. 10 of the former Cook collection.
38. Hawaii. This pretty gray kapa is shown in Pl. H, 2.
39. Hawaii. A firm mole kapa closely covered with double ruled lines with here and there a broader red one of which the color has penetrated the fabric.
40. Hawaii? A much thinner kapa ruled uniformly with dark brown having red lines at considerable intervals.
41. Hawaii. Brown-red mamaki kapa; well made and strong.
42. Hawaii. Apparently the border of a pa'u hula; yellow once and stamped with various zigzags and rhombs.

43. Hawaii. A rather poor specimen of kapa, stiff and leathery, decorated with the common converging red and black bands; here each band is lightened by cross lines in zigzag.
44. Tahiti. A white, silky, soft, but poorly beaten kapa.
45. Tahiti. A thick corduroy, yellowish (faded) kapa covered with a network of red lines 3/8 inch wide.
46. Tonga? A kapa thin and silky, with bands of red enclosed by black lines. Much like Pl. E, 1, but omitting the intermediate line. A bright and pleasing design for a pa'u.
47. Hawaii. A thin, well-beaten mole kapa ornamented with the favorite "colon" stamp in green and red (Pl. 41, 2).
48. Hawaii. An odd specimen of marbled appearance, perhaps composed of old kapa rags rebeaten; it is tough and papery and seems to be quite like No. 103 which is marked Sandwich Islands.
49. Hawaii? Plain white hoopai kapa rather thin but not kalukalu.
50. Tongan? Kapa of a medium thickness and rather soft; beat pepehi with a double transverse beating. A dead red band occupies more than half of the specimen. Perhaps a malo.
51. Hawaii. A thin mole kapa with more than fifty closely ruled lines, then a broad red band and repeat.
52. Tonga? A thick and tough kapa of pepehi beat and decorated in an almost barbaric style, which is hard to describe or even understand, but so far as the limited size of the specimen shows the pattern it is made up of bands of zigzags, the principal one 2.5 inches wide having a succession of knees in red black and yellow-brown, the ground color; when this last shows the strip is covered with red lines ladder-wise; another band is a jumble of black zigzags with transverse red lines crossing them without rhyme or reason.
53. Tahiti. A thin kapa of a gray color marked with two series of parallel lines .2 inch apart, crossing each other at an angle of 45°. At intervals a reddish band of three lines runs parallel to one series.
54. Tahiti. A thin, yellow-red kapa of mole beat.
55. Hawaii. A thin kapa of pepehi halua beat, with darker red fibres interspersed in line resembling Chinese writing. Exactly how these fibres are kept in line I do not understand, but they certainly antedate the supposed American device for checking counterfeiters of the bank-bills.
56. Hawaii. Another similar piece but of hoopai beat, and a single line of darker fibres.
57. Hawaii. A thick, mole kapa with two black lines and a single red one at intervals of six inches with three rows of stamps apparently bearing no relation to the lines except direction, the stamps alternating two short red lines and two small green quares touching by corners.
58. Hawaii. A thick, woolly, mole kapa, marked with bands consisting of five red lines bounded generally (not always) by much broader lines of the same color,

and these bands are crossed by narrow red lines alternating double and single at an angle of about 80°. A seam in the specimen is shown in Figs. 59 and 60.

59. Hawaii. Of the same thick kapa as the last and marked with similar red lines. The abrupt termination of some of the lines is shown in Pl. 47, 1.
60. Tahiti. A kapa ruled as in No. 53, but thicker and a lighter ground color. The parallel red lines much more frequent.
61. Tonga? A thick mole kapa ruled with black lines about half an inch apart, crossed by red converging and intersecting lines.
62. Hawaii or Tahiti. Kapa mottled by beating in fragments of colored kapa as shown in Pl. 35, 1; here the colors are gray and red in separate patches.
63. Tahiti. A thin yellow kapa of apparently a pepehi halua beat, marked with red equilateral triangles 3.2 inches on a side.
64. Tahiti. A very soft piece of cloth originally yellow (although every trace of color has vanished), with impressions of fern leaves now brown but once crimson, as explained in the text and shown in Fig. 4 and Pl. 19, 2.
65. Tonga? A corduroy kapa of buff color marked with red and black converging bands; some of these are filled with transverse black and red serrate lines; not a very good piece of decoration.
66. Tahiti. Another variety of the thin lined kapa of Nos. 53 and 60.
67. Hawaii. This mole kapa is thick and rather soft; the decoration on the buff ground is a repeat of the following; a broad (.5 inch) red line, nine black wavy lines, two wavy red lines, nine black and a broad red. In the next band a red line takes the place of one of the black ones.
68. Tongatabu? A smooth buff hoopai kapa painted uniform red on one side, giving the fabric a leathery consistency.
69. Hawaii. A thick mole kapa, reddish in tint and well covered with black and red lines and cross hatchings.
70. Hawaii. A thick buff mole kapa well covered with black zigzags interrupted here and there by spaces of ground color dotted with red; also intersected by broad red and thin black lines.
71. Hawaii. A rather thin mole kapa ruled with narrow black and broader red lines much as shown in Pl. 38.
72. Hawaii. A wonderful specimen of coloration; shown in Pl. R, 2. The fabric is thick, well-beaten and smooth on the back.
73. Tonga. A thin kapa ruled and painted red and black with a coat of varnish making it tolerably waterproof. The colors have penetrated the fabric.
74. Hawaii. A stiff mahuna kapa marked with dark bands of four lines each; oiled.
75. Hawaii. A very neat and well-drawn pattern on a firm, thick kapa (Pl. T, 1).
76. Hawaii. Another illustration of the perfection of the art of coloration attained by the old Hawaiians. In the midst of this specimen are three bands each of nine pale red lines admirably ruled; the middle band has a darker tint imposed in rhombs giving the effect of an entwining shadow; on either side of these three bands are three narrow ones of only three lines, red on one side, dark brown on the other.

77. Hawaii. Another specimen of similar character is shown in Pl. R, 1. The cloth is of the same thick but soft texture, and the colors are applied with equal skill.
78. Hawaii. A buff corduroy with one side painted uniform red. The appearance is similar to No. 68, but the shade of red is brighter and the ridges much broader than in that specimen of uncertain origin.
79. Hawaii. A thick, firm kapa with the smooth surface usually selected for printing or painting, both of which processes have been used here (Pl. T, 3).
80. Hawaii. The intersections of the panels of thick wavy black lines, and the red stamps on the light ground are shown in Pl. T, 2.
81. Tahiti. Another modification of the reticulate pattern so common among the southern Polynesians.
82. Hawaii. This specimen is nearly double the length of other specimens in this collection, the extra length being required to show the irregular succession of the lined and stamp-spaces. Pl. H, 3, gives a better idea of this complex though not beautiful pattern than any description.
83. Hawaii. Buff-colored kapa of woolly surface covered with bands of red composed of coalescing lines, not more than nine or less than three.
84. Hawaii. Kapa similar to the last but with a different arrangement of red lines.
85. Hawaii. A soft brown kapa with bands of four dark lines occasionally covered with a semi-transparent varnish of red; these at intervals of two inches, the spaces dotted with four rows of twin line stamps.
86. Hawaii. Thick, leathery kapa of a buff color nearly covered by converging bands filled with thick, transverse, wavy black lines, relieved by occasional red bands or rows of round red spots. It belongs to the class of Nos. 18, 70, etc. (see Pl. U, 2).
87. Hawaii. Apparently from the same piece as the last.
88. Hawaii. Thick, leathery kapa with converging bands of dark red crossed in various ways with black lines. A seam is shown in Figs. 56, 57. For the filling see Pl. U, 3.
89. Tongatabu. A buff, mole kapa with bands of two black lines with an intermediate one of lighter color, crossed at right angles by converging red lines, in pairs.
90. Hawaii. Plain buff kapa with parallel bands of three red lines at intervals of .5 inch; crossing these a band of red fibres in the fabric.
91. Hawaii. A dark brown (Pl. AA, 10) hoopai kapa, soft and well beaten, without decoration.
92. Hawaii. A thick, red glazed, hoopai halua kapa.
93. Tahiti. A soft yellow kapa of medium thickness, imprinted with crimson leaves and bands of fibres. Both colors are quite faded.
94. Hawaii? A buff kapa with red bands, but the interwoven lines forming the bands are unlike others in the collection.
95. Hawaii. A very beautiful buff kapa ruled with great care in several delicate shades of brown and red.
96. Tahiti. A yellow kapa in three layers of which the inner is thin mole, the middle thicker hoopai, and the outer a fine hoopai; imprinted with the crimson rings by the bambu stem (Fig. 7). Cook's II Voyage.

97. Hawaii. A thick, papery kapa closely lined in minute squares with black which seems to have stained the whole tissue.
98. Hawaii. A beautifully beaten red mahuna kapa. The even thinness is remarkable and could hardly have been surpassed by modern machinery.
99. Hawaii. A fine red mahuna kapa carefully lined with black.
100. Hawaii. The woolly surface with bands of red lines so often represented in this collection.
101. Tahiti. Although this and the following specimen are marked "from Pitcairn Island" they really represent Tahitian manufacture, as the women taken from Tahiti by the mutineers of the Bounty to this then uninhabited island doubtless brought with them their handicraft. This specimen is a tough, coarse, white hoopai.
102. Tahiti. A yellow mole kapa with the imprint in crimson as shown in Pl. 20, 2. The serrate strip is loosely pasted on; both yellow and crimson are colors of the past.
103. Tahiti. Two layers of thin kapa apparently stamped in brown on the upete; the color has penetrated both layers.
104. Hawaii. Another specimen of the marble mottled thin kapa already mentioned.
105. Tahiti. This beautiful white fabric is marked "Otaheite, the finest made in that island." The hoopai beat is so close as to resemble a weave and the texture is of "silver paper."
106. Tahiti. A thick corduroy painted red on the reverse, while in front the buff color appears, and each ridge has a wavy black line. The specimen also shows a remarkably fine seam.
107, 108. Tahiti. These two specimens are identical in substance and vary slightly in decoration; soft and thin; probably from the same piece.
109. Tahiti. Another of the fine hoopai white specimens. It is slightly discolored.
110. Tahiti. A coarse, dark red, glazed kapa; peculiar to this group.

Specimens of Kapa in the Author's Collection.

Specimens found also in the Museum collection are not here enumerated but will be catalogued together below. This collection is given separately as it contains many specimens of kapa made outside the Polynesian region, and many that from their age and authenticity rank with those of the Cook collections. The numbers are those of the individual collection and should not be confused with Museum numbers.

240. White waoke, hoopai kapa. Collected by Rev. W. Wyatt Gill. Given by H. Balfour, Esq., Oxford, Eng.
241. Red (AA, 11) kapa made by the forest tribes Tanála, Madagascar, from fig bark(?). From the Sibree collection. Given by H. Balfour, Esq.
242. Heavy, stiff brown (BB, 11) kapa from Shom Pen, Great Nicobar, where it is called Ok ho; worn also by coast women when in mourning. Said to be made from a species of Celtis. E. H. Man collection. Given by H. Balfour, Esq.

243. Very light brown undyed kapa from the NGarasi District, Rubiana, Solomon Ids. H. B. M. S. Penguin, 1894. Given by H. Balfour, Esq.
244. One of the thick, poorly beaten kapa from Bogotu, Ysabal, Solomon Ids. The light brown is smeared with the blue so favorite a color on this group, and the decoration is one of the three-balled dumb-bells already referred to in the text (p. 62); this is in deeper blue with a bordering line of red ochre; the drawing is poor, but the beating of the fibre is even poorer.
245. Dark blue (BB, 7) kapa from Bili village, Eastern Rubiana, Solomon Ids. H. B. M. S. Penguin. Given by H. Balfour, Esq.
246. Dark blue lined kapa, the lining straight with loops, from NGarasi District, north coast of Rubiana, Solomon Ids. H. B. M. S. Penguin, 1894. Given by H. Balfour, Esq. To this specimen is appended this note: "juice of plant mixed with lime and water; sometimes chewed and spat upon the cloth and shaped into patterns with the finger." I have endeavored, so far without success, to learn the name of this plant of which the coloring matter is very bright and durable.
247. Thin, uneven kapa, unbleached and spotted with black; the color red is somewhat lighter than AA, 11, and the texture is open. Brought from Rubiana by the Penguin and given by H. Balfour, Esq.
248. Unbleached red-brown kapa from Rubiana, "quality C fine." Penguin collection. Given by H. Balfour, Esq.
249. Another of the Rubiana kapa, "quality A coarse," from the same source.
250. A light brown kapa (nearly AA, 9) from Lake Mwero, British Central Africa, 1893. Given by H. Balfour, Esq.
251. A fairly well-beaten, heavy, unbleached kapa made on Great Nicobar, of Celtis fibre, collected by F. E. Tuson in 1889. Given by H. Balfour, Esq.
252. A heavier specimen of the Celtis kapa from Great Nicobar, collected by Major R. C. Temple, 1895. Given by H. Balfour, Esq.
253. Waoke, mole kapa from Fiji. The cloth is very soft and silky, well bleached and stamped and ruled in neat designs of black and red. Portion of a sula given by the Peabody Academy of Science (E. 3178), Salem, Mass.
254. Siapo from Samoan Ids. The base is well-beaten waoke, mole as all cloth from this group, ruled with wonderful care and skill in fine lines of black and red, some of the small squares painted in with black, and the back of the sheet varnished with the common red-brown (Pl. 34, 1). Given by the late Gorham D. Gilman of Boston.
255. A white, poorly beaten kapa from Rapanui (Easter Island), collected by Paymaster W. J. Thomson, U. S. N. Given by U. S. National Museum.
256. A thin, oiled waoke kapa of mole beat and once part of a pa'u. The pattern is ruled in black. Hawaiian. Given by U. S. N. M.
257. A portion of an old pa'u from Hawaii, ruled and stamped in red and black. Originally olena yellow. From the U. S. N. M. (3605).

258. A well-made mamaki kapa of hoopai halua beat from the Hawaiian Ids. U. S. N. M. (3440).
259. Mamaki kapa bleached, hoopai beat; one of the under sheets of a bed kapa; very old. From the Peabody Academy of Science, Salem, Mass. (E. 3151).
260. Waoke, mole, brown (lighter shade of AA, 8). Portion of the under sheet of a bed kapa. Brought from the Hawaiian Ids. by Captain Nathaniel Page, 1812–1818. Given by the Peabody Academy, Salem, Mass. (E. 3155).
261. A thick, waoke, hoopai kapa from the Hawaiian Ids., decorated as shown in Pl. V, 2. Given by U. S. N. M.
262. White hoopai Hawaiian kapa with fragments of paiula and nanahu kapa beaten in, as shown in Pl. 35, 1. Brought home by Captain William Bunker in 1802. P. A. S. (E. 3161).
263. From a beautiful Tongan waoke, mole, malo, well bleached and stamped in black and dark red. From the Wilkes Expedition, and given by U. S. N. M. (8274).
264. A red leathery striped Hawaiian kapa, the design and color as shown in Pl. S, **2**. Wilkes Expedition, given by U. S. N. M.
265. A fine waoke pepehi kapa from Tahiti; the mottling is shown in Pl. 35, 1, and is described in the text. Brought home by Captain Nathaniel Page, 1812–1818, and given by P. A. S. (E. 3156).
266. Portion of a fine sula brought from Fiji. S. C. Phillips, 1832. Given by P. A. S. (E. 3175). This masi is lined in black and red as shown in Pl. 34, 2.
267. A rich brown kapa punctured and pasted on a white substratum (Pl. 36, 2). Brought from the Hawaiian Ids. about 1820 by Captain Driver and given by P. A. S. (E. 3170).
268. Portion of a kihei of waoke from Kauai with the rather unusual niho mano beat; originally yellow, this color has quite faded out leaving the tasteful border as shown in Pl. 44, 1. Given by P. A. S. (E. 3173).
269. A kapa originally yellow, stamped as shown in Pl. D, 1. Brought from the Hawaiian Ids. in 1802 by Captains Crowninshield and Folger. Given by P. A. S. (E. 3163).
270. Portion of a pa'u, yellow with a line decoration in black and red. Mr. William Eldredge, 1807–1810. Given by P. A. S. (E. 3168).
271. A dark brown (AA, 10) waoke kapa lined with black; brought from Tongatabu by Captain William P. Richardson, 1812. Given by P. A. S. (E. 3154).
272. A fine white, hoopai halua waoke kapa brought from the Marquesas Ids. by Captain Benjamin Vanderford, 1826. Given by P. A. S. (E. 3293).
273. A fine white, hoopai waoke kapa brought from Tahuata [Christina], Marquesas Ids., by Captain Vanderford in 1826. Given by P. A. S. (E. 3291).
274. A waoke, mole, yellow (originally) kapa ruled as shown in Pl. C, 1. Brought from the Hawaiian Ids. in 1802 by Captains Crowninshield and Folger. Given by P. A. S. (E. 3165).
275. A waoke, hoopai, white kapa brought in 1841 from the Hervey Ids. by J. W. Taylor and given by P. A. S. (E. 3148).

276. A heavy waoke mole kapa, yellow striped with red; "part of a shawl worn by ladies." Brought from Tahiti in 1799 by Captain Benjamin Carpenter and given by the P. A. S. (E. 3158).
277. A heavy, yellowish, mole kapa, painted dead red on one side (AA, 12). Given by P. A. S. (E. 3157). This is a most remarkable kapa, and when it came into my possession I was inclined to attribute it to the Marquesas, although it was marked "Hawaii." I have since found among the kapa used in swathing the bones of the dead in the burial caves in these islands similar cloth. It is thick and covered with sharp raised lines arranged in the pawehe manner with dots in the centre of the rhombs, and on the reverse the depressions are almost as distinct as the ridges; it is like the impression on paper made by a seal and its matrix. In the specimen these lines are one-sixth of an inch apart, and on the limited size (6×9 inches) there is little evidence of overlapping as is usual when these lines are made in the nao by the ordinary beater; and yet we have specimens of this same pattern in minature where almost the same regularity occurs when the process was undoubtedly beating with the iekuku. When it is understood that the cloth is thick and the relief almost that of embossed Cordovan leather, the skill and strength of the maker will be appreciated.
278. Portion of a pa'u brought from the Hawaiian Ids. in 1802 by Captains Crowninshield and Folger. It is stamped in black and ruled with compound red (paiula) lines alternating with the stamps, and the stamped bands have a faint streak of noni down the midst. Given by the P. A. S. (E. 3164).
279. Thick, yellow, waoke, hoopai kapa, stamped in crimson with fern leaves; from Tahiti, said to have been made by the Queen. Given by the P. A. S. (E. 3167).
280. Gray waoke kapa of pepehi beat and mottled with red on one side, soft and thin. Brought from Nukuhiva, Marquesas Ids., by Captain Nathaniel Page, 1812–1818. Given by P. A. S. (E. 3292).
281. Red and black, leathery, hoopai kapa, varnished on one side; from Aitutaki, Hervey Group. B. N. Silsbee, 1830–1840, and given by P. A. S. (E. 3176).
282. White hoopai, waoke kapa brought from Pitcairn's Island by Dr. Babbit, 1822. Given by P. A. S. (E. 3147).
283. White hoopai, waoke kapa, brought from Hivaoa [Dominica], Marquesas Ids., in 1826 by Captain Benjamin Vanderford, and given by P. A. S. (E. 3294).
284. Mole, waoke kapa, unbleached; brought in 1802 from the Marquesas Ids. by Captains Crowninshield and Folger. Given by P. A. S. (3295).
285. Yellow waoke, pepehi kapa; brought from the Hawaiian Ids. by Mr. William Eldredge, 1807–1810. Given by P. A. S. (E. 3169).
286. A very open, thin, white, mole kapa from the island Geby, just south of the equator, between Gilolo and New Guinea. Given by P. A. S. (E. 3150).
287. A very old piece of the Tahitian yellow waoke hoopai kapa stamped with crimson fern print (Pl. 19, 2). There are really two sheets of kapa pasted together, each very thin, as shown where water has destroyed the pia paste on one edge. Given by P. A. S. (E. 1914).

288. Mole waoke kapa, stamped in black and overlined in red; the ground yellow. Brought from the Hawaiian Ids. in 1802 by Captains Crowninshield and Folger. Given by P. A. S. (E. 3162).
289. Yellow, mole kapa, stamped in black and painted in red (Pl. D, 2). Although attributed in the P. A. S. to Marquesas, I am inclined to place it with Hawaiian work; the stamps are a common Hawaiian pattern and the whole character of the work indicates a Hawaiian origin.
290. A similar yellow, mole, stamped kapa of undoubted Hawaiian origin (Pl. B, 1); a portion of a pa'u brought from these islands by Captains Crowninshield and Folger in 1802, and given by P. A. S. (E. 5152).
291. The specimen of hoopai, olena, ribbed kapa was perhaps part of a chief's malo, has a broad transverse stripe of bright red, and longitudinal stripes of red and green. Brought from Hawaiian Ids. by Captain Nathaniel Page, 1812–1818, and given by P. A. S. (E. 3171).
292. A beautiful specimen of mole, white kapa decorated as shown in Pl. P, 2. Hawaii, 1827. Given by P. A. S. (E. 3160).
293. A white, mole, waoke kapa from New Zealand. C. F. Williams, 1850. Given by P. A. S. (E. 3149). Very rare.
294. A soft, white, hoopai under sheet of a kapa moe brought from the Hawaiian Ids. by Captains Crowninshield and Folger, 1802. Given by P. A. S. (E. 3166).
295. A similar specimen of hoopai (finer) white kapa brought from Tahiti. John F. Jeffrey, 1802. Given by P. A. S. (E. 3146).
296. Portion of yellow, waoke kapa dress from Tahiti, stamped with crimson by grass and other leaves. Given by British Museum. Now faded to a greenish brown ground.
297. A neat pattern of crimson rectangles (length three times width) on yellow, thick, hoopai kapa. Tahiti. Given by British Museum.
298. A thick mole, unbleached kapa lined and painted in red and black longitudinal lines and stripes, the former often crossed by one or more series of the same color. Hawaiian previous to 1830; collection of Sir. Edward Belcher. Given by the British Museum.
299. A specimen of Tahitian yellow kapa stamped with red circles by bambu ends, that shows a very thin yellow sheet pasted to an equally thin white sheet; a thicker hoopai, white sheet underlies this as in the Hawaiian bed kapa and pa'u. Given by the British Museum.
300. Like the last, a specimen of Tahitian work; the two sheets are both hoopai and equally yellow, and the fern leaf impressions have not penetrated the under of the pasted sheets. Given by the British Museum.
301. A leathery kapa, red and varnished on one side, brown beneath, that may have come from the Marquesas. Given by the British Museum.
302. A thick, white, mole kapa with bands of complicated ruling in black, the interstices red with noni (Pl. V, 3). Perhaps of Tongan origin. Given by British Museum.

303. A white, mole, Hawaiian kapa lined closely with red and brown lines variously grouped. The specimen was given by the British Museum and shows a fine over and under seam. (See Pl. Q, 2.)
304. A thin, white, mole kapa covered closely with black lines and stripes, from Tongatabu. Given by the British Museum.
305. A thick, red (AA, 12, but darker) kapa to which is attached a yellow, mole, roughly beaten sheet. The darker has a grain apparently produced by a pupu beater, but considerable wear has broken up the fibres between the round thicker spots and flattened these spots so as to make the diagnosis difficult. Given by the British Museum as Hawaiian.
306. Very thin and beautiful piece of kalukalu Hawaiian kapa, probably an under sheet of a kapa moe; a mottled gray; very old. Given by the British Museum.
307. A coarse, white, hoopai Hawaiian kapa of the date of Vancouver's second visit to the group. Given by the British Museum.
308. Oiled, mole pa'u, dyed noni red, from Hawaiian Ids. Given by British Museum.
309. Hawaiian matting consisting of a thick, mole kapa, white with broad red bands; to this is pasted a thin kapa of hoopai halua beat. Given by the British Museum.
310. Mamaki sheet, hoopai (very fine), ohelohelo tint; under sheet of kapa moe. Hawaiian. Given by the British Museum.
311. Two sheets of thick hoopai matting, white. Given by the British Museum.
312. A thin pepehi sheet, perhaps yellow formerly; under sheet of kapa moe from Hawaiian Ids. Given by the British Museum.
313. Thick white hoopai kapa from Hawaiian Ids., stiff and apparently unused. Given by the British Museum.
314. The yellow under sheet of an Hawaiian pa'u; some lines of color have been transferred from the kilohana. Given by the British Museum.
315. Portion of a fragment of a kihei from Kauai; the beat is hoopai pawehe, originally yellow, traces of which cling to the oil from the stamped red and black pattern. (Pl. M, 2.)
316. A white, mole, waoke malo from the Marquesas.
317. A dark gray mamaki, hoopai, lalani kapa, the stripes of dark and lighter red closely covering the surface. Hawaiian.
318. A thin sheet of orange-red kalukalu kapa. Hawaiian.
319. Pa'u hula, yellow with black stamps, halua pupu beat. Hawaiian.
320. A mamaki, hoopai, ouholowai, lalani, kapa pa'u. Hawaiian.
321. Mamaki, hoopai, halua, lepo colored under sheet of an Hawaiian pa'u.
322. Mamaki, hoopai, brown kapa, marked with darker brown crossed lines (Pl. H, 1). Hawaiian. Purchased from a native who said it came from Kauai. Probably from a burial cave.
323. A thin, mole, oiled kapa, dyed red and ruled with black in rhombs covering two-thirds of the surface. Collected by Captain Beechey, R. N., at Hawaiian Ids., 1825–1826. Given by H. Balfour, Esq.

324. A red puakai, mole kapa, rather indefinitely lined and marked with back blotches. Molokai. Given by Mary Ailau.
325. A yellow lined puakai kapa ready for coloring red. Given by Mary Ailau.
326. Portion of a kihei from the collection of Mrs. Whitney, Kauai; thin hoopai halua, the red noni, stamped as shown in Pl. Z, 3 (frontispiece). Given by Mary Ailau.
327. Black kapa shroud, hoopai halua beat, sent to Boston from Hawaii in 1836. From American Board of Commissioners for Foreign Missions.

[Numbers omitted are duplicates of the Museum collection.]

340. Fragment of an ancient pa'u, yellow, stamped with alaea and nanahu (Pl. L, 2).
343 Thick, mole Hawaiian kapa, ruled and stamped as shown in Pl. P, 1. From A. B. C. F. M. Boston.
344. A tough, white, Hawaiian malo of the olden time (Pl. 35, 2), not unlike those described by Cook.
345. Specimen of the half perforated kapa of Hawaii. The beat is halua pawehe of the united sheets, the under one being a bluish gray at present. Given by Gorham D. Gilman of Boston.
346. A fragment of brown (once yellow?) mole kapa stamped in black and smudged with red noni. The beauty of color and the clearness of the stamp have not been reproduced in Pl. Z, 1, by the "three color process." Given by Gorham D. Gilman of Boston.
347. A thick, mole, Hawaiian kapa from Maui, shown in Pl. U, 1. Given by Gorham D. Gilman.
348. Very old Hawaiian pa'u, originally yellow hoopai and stamped with alaea and nanahu, as shown in Pl. L, 1.
349. A fragment of thin pepehi halua kapa, originally yellow with red and green stamps (Pl. B, 2).
359. A large sleeping mat of thick kapa figured with a beautiful design in fine black lines; the style of ornamentation is Mafor. From the Mafor Papuans of Ansus, Joby Island, Geelvink Bay, N. W. New Guinea. Collected by Beccari in 1873. Size 35×70 inches; the ends dentiled. Given by Enrico H. Giglioli of Florence.
360. A fine apron of figured kapa (woman's dress) from Pisang (banana) Bay, S. W. New Guinea. It is a new locality only recently explored, immediately east of Utanata. The apron is fifteen inches wide and two feet long, the five dentils at the base each ending in five straps five inches long. The label of the Dutch collector fixes the date as April, 1902, and that it was "geklapti" from *Broussonetia papyrifera*, and that the red-brown coloring matter is from the mangrove bark. Given by E. H. Giglioli.
361. A fine white, mole, fringed kapa dress from Tahiti. The fringe is dyed a light blue in places, and there are seven bands of double fringe pasted across the sheet very neatly. In two places the dress is "slashed." Given by E. H. Giglioli.
362. A portion of the Cook kapa from the Florence collection already referred to (Pl. W, 2). Given by E. H. Giglioli.

363. Ornamented end of a beautiful Fijian sula given by P. A. S. (E. 3179). It is shown greatly reduced in Pl. 14. The specimen measures 32×28 inches.
364. Ornamented end of a Fijian sula, similar in character to the last but of much inferior execution. It measures 24×43 inches. Given by P. A. S. (E. 3174).
365. Bed curtain of reddish brown, hoopai halua tapa from Tahiti, lined with two series of darker red rulings with dots of same color at the intersections. Peale collection, 4445. Given by Philadelphia Academy of Natural Sciences.
366. Thin mamaki, ouholowai, hoopai, lined in black kapa moe. Hawaiian. From Peale collection, 4446. Given by P. A. N. S.
367. Waist ribbon from Kauai; hoopai halua (Pl. E, 1). Peale collection, 4448. Given by P. A. N. S.
368. Waist ribbon from Kauai; halua pupu (Pl. E, 3). Peale collection, 4449. Given by P. A. N. S.
369. Waist ribbon from Kauai; halua pupu (Pl. E, 2). Peale collection, 4450. Given by P. A. N. S.
370. Waist ribbon from Kauai; pepehi, stamps of black and red. Peale collection, 4451. Given by P. A. N. S.
371–379. A series of specimens from Peale collection; 4452–4460 much alike, varying only in the arrangement of the same colored lines and black figures as shown in Pl. 48. All from Kauai, and given by P. A. N. S.
380–381. Two shawls differing from the ribbons merely in size. Peale collection, 4468, 4469. Given by P. A. N. S.
382. Malo of mole, red, puakai kapa; lines transverse, double. Peale collection, 4471. P. A. N. S.
383. Malo of thick, mole kapa; colored blue-gray, over which are bands of five black lines, the end of broad red band. Peale collection, 4472. P. A. N. S.
384. Malo of thick, mole kapa from Oahu; yellow border is stamped with black zigzags, the rest is stained red. A small hole in the specimen has been mended with a patch rather clumsily sewn on. Peale collection, 4473. P. A. N. S.
385. Thin sheet of halua pupu kapa, faded yellow. Peale collection, 4475. P. A. N. S.
386. Portion of an ohelo-colored, mole pa'u from Oahu (Pl. K, 2). Peale collection, 4480. P. A. N. S.
387. Another ohelo-colored, mole pa'u stamped in black. Peale collection, 4481. P. A. N. S.
388. Pa'u, once yellow, well stamped with black figures; beat niho mano. Peale collection, 4482. Given by P. A. N. S.
389. Pa'u hula, hoopai pawehe, yellow, with red and black stamps (Pl. N, 1). Peale collection, 4483. Given by P. A. N. S.
390. Malo of thin, gray, mole pupu kapa, lined with black and red. Peale collection, 4484. P. A. N. S.
391. Malo, white hoopai pawehe kapa stamped with black "suns" in blocks of twenty or forty. (Pl. 44, 2.) Peale collection, 4485. Given by P. A. N. S.

392. Pa'u mamaki, hoopai, brown, with a broad band of red and three narrow lines of the same color on each side, then two broad bands with five narrow lines enclosed; from Oahu. Peale collection, 4486. P. A. N. S.
393. Pa'u hula, yellow, pepehi halua, stamped with black bands; from Oahu. Peale collection, 4487. P. A. N. S.
394. Pa'u hula, hoopai pawehe, yellow stamped with red and black zigzags. Peale collection, 4488. P. A. N. S.
395. Pa'u mamaki, hoopai halua, brown, with dark red broad and narrow stripes; Oahu. Peale collection, 4489. P. A. N. S.
396. Strip of mamaki hoopai halua kapa with very broad red and black bands; from Oahu. Peale collection, 4490. P. A. N. S.
397. Hawaiian malo, oiled, of gray fabric with lines of black fibre and a beat that I have seen in no other kapa. It may be that the maker used two beaters, one in each hand, and beat together. The lines of black fibre, plain enough by reflected light, are nearly invisible by transmitted light. Peale collection, 4491. P. A. N. S.
398. Portion of a kihei from Oahu; a red lace-like ground, kapuai koloa beat, striped with black lines of varying breadth. Peale collection, 4492. P. A. N. S.
399. A thin, brown (AA, 9) ground with broad and narrow stripes of darker tint (AA, 11); the beat is puili. Peale collection, 4493. P. A. N. S.
400. A leathery, yellow, hoopai kapa from Oahu, decorated as shown in Pl. S, 2. Peale collection, 4494. P. A. N. S.
401. A pa'u of rich yellow, pepehi beat, stamped with large rhombs of red and black, and a narrow border lined in the same colors.
402. A corner of a very old and thin kihei, gray and stamped with an elaborate border seven inches wide and with two bands of what may have been originally noni red.
403. A fragment of leathery kapa of ancient Hawaiian style covered with red and black lines and grids as shown in Pl. S, 1. Given by Enrico H. Giglioli of Florence, from the Cook collection in that city.
404. A remarkable shroud from a burial cave on Hawaii. This consists of two sheets of reddish brown kapa sewn together by a hank of untwisted fibre (probably hau) in a manner of which I have seen no other example. Starting with a knot in the hank, the fibre comes to the surface six times in the space of 2.6 inches; the stitches being an eighth inch apart, and rather spread on the surface, while the connecting cord beneath the under sheet is straight and narrow; then the fibre continues *between the sheets* 2.6 inches, coming up four times as before, and so on to the end of a long side of the kapa which measures in its rather curled and shrunken state 6×7.7 feet, or about the size of an ordinary kapa moe.

    The upper sheet of No. 404 is composed of a thin sheet of waoke, perhaps unbleached, perhaps stained by the dye of the upper layer, pepehi halua pawehe, when pasted to the upper layer which is thicker and dyed with kukui bark; the beat of this thicker sheet is pepehi halua, and the shrinkage has produced the

long straight lines which so closely simulate cotton cords. The under sheet is of similar character and color. By purchase.

I should recall the fact that in the caves in which the remains of alii are deposited, trusting to various means of concealment, all of which time and the enterprise of seekers are likely to reveal, the bones, or in some cases the dried mummy (as in the caves on the Waimea, Hawaii, plain, now covered after remaining open some years) were wrapped in kapa of the choicest, and age added no little value to the kapa selected; hence we may place the age of a cave deposit at ninety or a hundred years, while the kapa found around the remains may (in the wonderfully dry caves of Hawaii) have been made a century or even more before the burial. These very old specimens present the greatest puzzle to the student of kapa-making, for they seem to show processes in the manufacture quite distinct from those known in the last century. Not one of the Cook kapas are comparable with the torn, wrinkled, stained, often decayed fragments from the caves. After careful and prolonged disinfection in the vapor of carbon bisulphid, they must often be soaked in water to remove the long time creases and wrinkles, and this process serves to show us if the fabric is in different layers pasted together; the microscope must then be used to determine the source of the fibre. Even then the nao or beat is, as in the present example, different from those produced by any of the great number of beaters in this Museum, and long and painstaking examination of the unusual impressions in the fabric will not always suggest the method; then must follow the teasing out of the fibre under the microscope to follow its devious way through the fabric. With all this care the wish arises that one could only have seen one of these pieces beaten!

405. A red-brown paikukui kapa of plain pepehi halua beat; found in the same burial cave as the last number. With these was found a royal malo of ancient make, to be described below with the Museum collection, No. 8842.

406. A thin, oiled kapa of halua pupu beat; perhaps once a portion of a pa'u, but in later times much more valued for sorcery methods. Source not known.

Specimens of Kapa in the Bishop Museum.

The numbers are those of the Museum Accessions.

2310. Pa'u, oiled, single sheet, nao mole; 3.5×9 ft.

2311. Pa'u, oiled, three sheets, kilohana figured, mole; 3.5×13 ft.

2312. Pa'u, oiled, five sheets, kilohana figured, mole; 2.8×11 ft.

2313. Pa'u, oiled, two sheets, kilohana figured, mole; 3.5×9 ft.

2314. Pa'u, oiled, three sheets, kilohona figured, mole; 3.5×9 ft.

2315. Pa'u, oiled, fragment of under sheet; 2.5×6.7 ft.

2316. Pa'u, oiled, two sheets, kilohana figured all over with black and red stamps on yellow, mole, under sheet halua; 3×9 ft.

2317. Pa'u, oiled, kapa mahuna with brown stripes, hoopai halua, fragment; 3.2×2.2 ft. Queen Emma collection.

2318. Pa'u, in four sheets of very thin kapa; nao halua pupu; purplish, with red, black, and combination of the two colors, triangular figures; 3×11.2 ft. J. S. E.*

2319. Pa'u, four sheets, yellow, with black and red figures; nao halua pupu; 3.5×9 ft. Queen Emma collection.

2320. Pa'u, single yellow sheet with black stripes and designs; nao hoopai halua; 4×22.2 ft.

2321. Pa'u, five sheets; kilohana yellow, with borders and bright red stamps; sheets 1, 2 and 4 yellow; 3 and 5 brown; nao 1 mole, others halua pupu; 3.2×9 ft.

2322. Pa'u, five sheets; kilohana yellow-white, figures in red; nao 1, 2 mole halua, 3, 4, 5 nananahuki; 2×10.5 ft.

2323–24. Pa'u of yellow cotton cloth stamped in black in Hawaiian patterns; a good imitation.

2325. Pa'u, single sheet with inserted triple strips in red and black between two thin, mole sheets of white, and the whole beaten together; nao mole; 3.3×13 ft. (See No. 2505.)

2326. Pau ohelohelo (faded) with stripes and black stamps, hoopai halua; fragment from Molokai.

2327. Pa'u hula, yellow, with triple serrate black stripes; nao halua pupu; 3.6×16 ft.

2328. Pa'u paiula, five sheets, plain, fine and thin; nao 1 halua pupu, 2 hoopai pawehe, 3 hoopai halua, 4 halua upena pupu, 5 halua upena; 3×7 ft.

2329. Pa'u, red-brown, with black stripes and stamped border; faded yellow fragment.

2330. Pa'u hula, mole, yellow, with stamped black zigzags and bands; 3.6×10 ft. J. S. E.

2331. Pa'u hula, yellow, with parallel and converging red and black serrate lines; nao halua pupu; 3.7×10 ft. J. S. E.

2332. Pa'u hula, yellow, with black and red stripes, mole; 3.7×10 ft.

2333. Kapa moe, kilohana red-brown, with broad gray stripes; one blue and two white sheets, all halua pupu; 7.2×10 ft.

2334. Kapa moe, kilohana mottled gray, with four white sheets, soft, halua upena pupu; 8×12 ft. Queen Emma collection.

2335. Kapa moe, kilohana white, with red and black triangles, hoopai halua; a rotten fragment from the Hawaiian Museum.

2336. Kapa moe, kilohana blue, with gray figures and stripes, modern decoration; four white sheets, nao in all but last halua pupu, that pupu; 6.5×9.7 ft.

2337. Kapa moe, kilohana paiula, the red from foreign cloth; one white sheet; 5.7×10 ft. Made in 1868 by Huli of Waiea, S. Kona, Hawaii. J. S. E.

2338. Kapa moe, kilohana white, with stripes of red triangles; four white sheets, all halua pupu; 7.5×9.7 ft.

2339. Kapa moe, kilohana white, with blue and pink unartistic figures; three white sheets, nao in all halua pupu; 6×7 ft.

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* Mr. Joseph S. Emerson, on the staff of the Hawaiian Government Survey, sold to the Hon. Charles R. Bishop, at various times, his ethnological collections, to which his familiarity with the natives and their language added considerable value, and Mr. Bishop gave all these to this Museum.

2340. Kapa moe, kilohana pink and blue; four white sheets, halua pupu; 7.5×10 ft.

2341. Kapa moe, kilohana white, with broad pink and narrow gray stripes; four white sheets, all halua pupu; 7.7×9.5 ft. Kauai.

2342. Kapa moe, kilohana red, with square gray patches; nao kapuai koloa; four white sheets with nao indefinite; 7.5×9.5 ft.

2343. Kapa moe, kilohana in two sheets of soft brown lalani, the stripes of darker brown; three half inch stripes, fifteen narrow ones and repeat; same on both sheets which are hoopai halua; 6.7×10 ft.

2344. Kapa moe, kilohana red-brown, varnished, striped with red and black, the latter wider; sheet 2 gray, puili, brittle, with black stripes; 3 darker and striped, hoopai; 4 lighter gray; 7×10.5 ft.

2345. Kapa moe, kilohana red-brown, with broad and narrow dark brown stripes; old and thin; nao of 1–4 hoopai pawehe, 5 iwi puhi; 6×7.7 ft.

2346. Kapa moe, kilohana and four sheets; dark brown, hoopai striped with black; very heavy; 7.2×11.7 ft.

2347. Kapa moe, kilohana and four sheets mamaki hoopai, dark brown (AA, 10) striped with black; ouholowai; all sheets striped with great variations of broad and narrow lines; 7.7×11.2 ft. From Hawaiian Museum.

2348. Kapa moe, kilohana pink, with blue mottled stripes; four white sheets, all halua pupu; 7×9.7 ft. Made about 1881 by Kukona of Wailuku, Maui. J. S. E.

2349. Kapa moe, kilohana (1) pink, with broad mottled gray zigzag stripes, kuilewa; white sheet; kilohana (2) gray, with red mottled stripes; two white sheets, all halua pupu; 6.7×9.2 ft. J. S. E.

2350. Kapa moe, kilohana, two dark brown, plain; three sheets ginger-colored, soft; nao of all halua pawehe; 7×9 ft.

2351. Kapa moe, kilohana paiula stamped with dark gray rhombs; one white sheet; all halua pupu; 7.2×10 ft.

2352. Kapa moe, kilohana blue, with black squares and triangles; one white; kilohana (2) white with broken stripes; two white sheets; 12×10.5 ft. Keelikolani collection.

2353. Kapa moe, kilohana ohelohelo with dark mottlings; four white; 6.5×9.7 ft.

2354. Kapa moe, kilohana paikukui stamped with black; four white sheets; 9×7.5 ft.

2355. Kapa moe, kilohana yellow-brown, with dark bent knee band (Fig. 125); one white, one pink, one white, one blue; 7×9.7 ft. Hawaiian Museum.

2356. Kapa moe, kilohana salmon color, with red and black stamped stripes; one white; kilohana (2) stamped in red and black; one white; nao of all halua pupu; 8×9.2 ft. Hawaiian Museum.

2357. Kapa moe, kilohana paiula, with mottled stripes; four white sheets; sewed with kapa cord; kilohana and third sheet halua upena, the rest pupu; 6.5×8.5 ft. Hawaiian Museum.

2358. Kapa moe, kilohana paiula, with six stripes of nanahu; two gray (BB, 4) sheets, all kapuai koloa; 6.5×8.7 ft. Hawaiian Museum.

2359. Kapa moe, kilohana white, with red beaten in in stripes about four inches wide; one nanahu gray, three white, all with nao halua pupu; stiff and papery; 6.5×8.5 ft. Hawaiian Museum.

2360. Kapa moe, kilohana red with faint blue stripes; one white, one red, two white; various beats, mostly halua pupu; 7.3×9 ft. Hawaiian Museum.

2361. Kapa moe, kilohana paiula, with gray mottled bands of beaten-in red fibre and charcoal; three white sheets, coarse and heavy; sewed with kapa cord; 7×9 ft. Waipio, Hawaii. J. S. E.

2362. Kapa moe, kilohana white, with black stamped stripes (Pl. 42, 1); four white sheets, all halua pupu; 7.6×10 ft. J. S. E.

2363. Kapa moe, kilohana white, with black and brown stripes, hoopai halua pawehe; 7.2×9.7 ft.

2364. Kapa moe, kilohana and two sheets all black; 8×10.3 ft.

2365. Kapa moe, kilohana, three sheets of ginger-colored soft kapa, nao kapuai koloa; 7.3×9 ft.

2366. Kapa moe, kilohana of coarse mole kapa with broad red and black bands painted on the yellow ground; 5.7×8.7 ft.

2367. Kapa moe, kilohana white, with red and gray stripes, nao halua pupu; 5.7×9.2 ft. From Keoni of Kiilae. J. S. E.

2368. Kapa moe, kilohana gray, halua pupu, 8×10 ft.

2369. Kapa moe, two sheets of white kapa, nao halua upena, sewed together in the usual way; 4.7×8 ft. Used, it is said, to wrap children in. J. S. E.

2370. Kapa moe, kilohana mamaki eleuli, uwahaao, kuikui, hoopai; 6×7 ft. Has been washed. Hawaii. J. S. E.

2371. Kapa moe, kilohana mamaki, puili, brown-yellow; 8×9 ft. Punaluu, Kau, Hawaii. J. S. E.

2372. Kapa pa'u, light brown, coarse, mole, very strong linen-like; 2.3×41.5 ft.

2373. Kapa moe, kilohana mamaki, hoopai, banded zigzags and lines (kuilewa) in noni and nanahu; 5×6.2 ft. Hawaii. J. S. E.

2374. Kapa moe, kilohana, red-brown, kapuai koloa, stiff; 7.5×8.5 ft.

2375. Kapa pa'u olena, hoopai pawehe; 3.3×16.2 ft.

2376. Kapa malo, plain white, mole fragment; 1.2×3.2 ft.

2377. Kapa malo, light salmon color striped longitudinally with kukui gray; .8×6.7 ft. J. S. E.

2378. Kapa malo niau (alaea), four longitudinal stripes black, mole. J. S. E.

2379. Kapa malo olena, with black patches, nao nananahuki; .7×7 ft.

2380. Kapa malo with pink and gray zigzags; .7×7 ft.

2381. Kapa malo, blue-gray, mole, coarse; 1×6.5 ft.

2382. Kapa malo olena, mole halua, huipu na uhane ipo; 1×14.2 ft. Used to call together bad spirits.

2383. Kapa malo olena, nao niho mano; .5×7 ft. For boys. J. S. E.

2384. Kapa pa'u olena, with stripes and figures in red and black, nao hoopai halua; 3.5×8.5 ft.

2385. Kapa pa'u, ginger-colored, three sheets, mole, red and black stamps; 4.5×7 ft. Old and fine work.

2386. Kapa pa'u mao, puahala, soft; 3.5×9 ft.

2387. Kapa pa'u, ginger-colored, nao halua upena, rebeaten; 3.5×9 ft.

2388. Kapa pa'u, dyed with awapuhi and lemon, nao halua upena pupu; 4×13 ft.

2389. Kapa pa'u, four sheets, ginger color, all halua upena pupu; 3.5×9.5 ft. Old and soft. Iliipu. Queen Emma collection.

2390. Kapa pa'u hula puakai, two sheets, very old; outer with two broad stripes of brown enclosing two narrow ones; inner with same broad stripes enclosing three pair of the narrow ones; 2.6×13.7 ft.

2391. Kapa pa'u hula puakai, two sheets, mole, old, ruled with broad and narrow lines; 3×10.5 ft.

2392. Kapa pa'u hula puakai, brown, closely transversely striped with darker brown; 2.2×9.2 ft.

2393. Kapa mahunalii, nao halua pawehe; 1.6×5 ft. The most valuable kapa in Emerson collection for kahuna use. Was put by Huki around idol 132 B. P. B. M. when that divinity was sent to Rev. Caleb Kimball in Connecticut. J. S. E.

2394. Kapa aeokahaloa, gray (BB, 8), nao peculiar; 5×8.5 ft. Used for kahuna work.

2395. Kapa moe, kilohana white, with noni and nanahu echinus stamps (Pl. F, 2); nao hoopai; 6×8.5 ft. Kauai. Whitney collection. Hawaiian Museum.

2396. Kapa, pink-white, thin, nao launiu, mahunalii; 2.7×4.2 ft. Remarkably well beaten.

2397. Kapa, white, mole, stamped with bands of black Maltese crosses (niho) alternating with bands of black echinus and red stamps (Pl. F, 1); 2.3×7 ft. Kauai. Hawaiian Museum.

2398. Kapa pea palau, yellow, mole, with figures red and black in alternating rows; 2.2×6 ft. Foreign pattern. Hawaiian Museum.

2399. Kapa moe, kilohana paiula, with four bands of mottled black in pairs of triangles; four whitish sheets, all hoopai halua; 8×9.3 ft.

2400. Kapa moe, kilohana paiula kuilewa pattern in gray; four white sheets sewed by white kapa cord; nao in all halua pawehe; 8×9.6 ft.

2401. Kapa moe, kilohana paiula uniform; four yellowish white sheets, very soft, mole, sewed with red kapa cord; 8.7×10.3 ft.

2402. Kapa moe, kilohana paiula, with mottled stripes of nanahu; four soft white sheets; beat of all kapuai koloa; sewed with kapa cord; 8×11 ft.

2403. Kapa moe, kilohana paiula, with four blue stripes; four white sheets; nao of 1, 2, 5 halua pupu; of 3 and 4 pepehi; all of soft texture; 8×10.7 ft.

2404. Kapa moe, kilohana chocolate (BB, 11); 2 ginger, awapuhi; 3 and 4 chocolate, 5 ginger; nao in all hoopai halua; 6.6×9.6 ft.

2405. Kapa moe, kilohana paiula, with mottled nanahu bands; four white sheets of papery texture, all kapuai koloa; 7.5×10.5 ft.

2406. Kapa moe, kilohana paiula uniform; four white sheets of papery texture, all halua pupu, but with different beaters; 7.3×9.5 ft.

2407. Kapa moe, kilohana paiula uniform; three white sheets, soft, and all hoopai halua; 7.5×8.3 ft.

2408. Kapa moe, kilohana paiula mixed with fine nanahu; four white sheets, all halua pupu and stiff texture; 8.5×11.2 ft.

2409. Kapa moe, kilohana paiula, with serrate border pointing inwards, of gray nanahu; four sheets yellowish white, much stained and very soft; all halua pupu; 7×9.2 ft.

2410. Kapa moe, kilohana (BB, 3); one sheet brown, three ginger (AA, 9); kilohana halua pupu, others hoopai halua; sewed with kapa cord; 7.5×10 ft.

2411. Kapa moe, five sheets (AA, 9), faded, soft, and all hoopai halua; 6.6×8.6 ft.

2412. Kapa moe, kilohana pink, much faded, five sheets white, soft, old; nao of all hoopai pawehe; 8×11 ft.

2413. Kapa moe, kilohana paiula uniform; four white, halua pupu sheets; 2 and 5 a larger rhomboidal pattern in the nao; all very soft; 6×9 ft.

2414. Kapa moe, kilohana paiula; all five are delicate sheets; 7.3×8.6 ft.

2415. Kapa moe, kilohana plain gray, of pili grass; two sheets, halua pupu; 8.5×11.3 ft.

2416. Kapa pa'u, with two kilohana, light brown, 1 mole ruled with red, 2 mole ruled black, 3 light brown, mole pupu, 4–6 light brown mole; 2.3×11.6 ft.

2417. Kapa moe mamaki, kilohana dark brown (AA, 10), 2 light brown (AA, 8), 3 darker (AA, 12), 4 and 5 light brown, all hoopai; 6.2×7.3 ft. Queen Emma collection.

2418. Kapa moe, kilohana (2) aeokahaloa (BB, 8), with a paiula sheet between; nao of all nananahuki; 7×8.5 ft. Made in Kona, Hawaii, in 1864. J. S. E.

2419. Kapa moe, kilohana aeokahaloa; two white sheets, halua pawehe, scented with mokihana; 6.5×8.6 ft. Made in 1867 in Kona, Hawaii. J. S. E.

2420. Kapa moe, four sheets paiula, some yellow in the second; soft and delicate texture; mottled beat; 9.5×13 ft.

2421. Kapa moe, kilohana paiula; four white, mole sheets, all soft; 9.2×12.5 ft.

2422. Kapa moe, kilohana white, with paiula bands; four soft white sheets; 8×10.5 ft.

2423. Kapa moe, kilohana gone; four white, mole sheets; 7×9.2 ft.

2424. Kapa moe, kilohana white, with broad red stripes on which is a chain pattern in blue which seems to have been put on last, as it permeates the sheet; four white sheets, all halua pupu; heavy and papery; 7.5×10.5 ft.

2425. Kapa moe, kilohana paiula, red fibres on the surface, white underneath; two white sheets, all halua pupu; 7×9.7 ft. Stitched with thread. Hawaiian Museum.

2426. Kapa moe, kilohana paiula, foreign color made about 1858, mottled; two white sheets, one of same date thin and soft, kalukalu, the other made in 1847, all by Kanopa of Kona, Hawaii; nao of all hoopai halua; sewed by strip of kapa twisted; 6.2×9 ft. J. S. E.

2427. Kapa moe, kilohana faded red and blue, halua pupu; two white hoopai sheets; 6×8 ft. Made in 1868 in South Kona, Hawaii. J. S. E.

2428. Kapa moe, three sheets white, 1 and 2 niho liilii, 3 halua niho mano; 6×8 ft. Made in 1868, Hawaii. J. S. E.

2429. Kapa moe, kilohana paiula, with nanahu in rather indistinct squares; four white sheets, all halua pawehe; 8×10 ft. Made at Laie, Oahu. J. S. E.

2430. Kapa moe, kilohana paikukui; two sheets olena, all hoopai; 7.3×9 ft. Hawaiian Museum.

2431. Kapa moe, four ginger-colored soft sheets; 5.5×6.5 ft.

2432. Kapa moe, kilohana (Pl. 40); the quadrants of the circles are stamped in black and red alternating; the circumference is stamped in black with a slightly different figure; the small figures between the circles are composed of two black and two red impressions of the same stamp that was used for filling the circles; 3.5×4.7 ft.; a fragment of the original. This belonged to the chief Leleiohoku in 1848. J. S. E.

2433. Kapa moe, kilohana white, glazed (originally yellow?), with borders and stamps in black and red (alaea) on yellow; 5.5×6.5 ft. Hawaiian Museum.

2434. Kapa moe, kilohana originally olena, with alaea and nanahu zigzag stripes; nao hoopai halua pawehe; 7×8 ft. Hawaiian Museum.

2435. Kapa moe, kilohana puahala kakau; 6.5×7.5 ft. Hawaiian Museum.

2436. Kapa moe, kilohana pualima, white, stamped in squares enclosing a four-leaved black stamp; border red and black triangles, surface glazed; nao hoopai; 7.7×10 ft. Hawaiian Museum.

2437. Kapa pa'u, olena, with stripes and figures stamped in black; nao halua pupu; 3×8 ft. Hawaiian Museum.

2438. Kapa kihei, stamped in red and black (Pl. 46, 2); hoopai halua; 3×4 ft. J. S. E.

2439. Kapa pa'u hula, olena, with stripes in black; nao halua upena; 2.5×11 ft.

2440. Kapa pa'u hula, olena, with black stamps and stripes; nao halua pawehe; 3×23 ft.

2441. Kapa moe, kilohana light red-brown, with dark brown striped squares as shown in Pl. 36, 1; one white sheet halua pupu like the former; one brown, with a rare beat, shown in Fig. 36, 18 (beater 2945); 6×7.5 ft. Made in Pelekunu Valley, Molokai; cleaned in 1886. J. S. E.

2442. Kapa pa'u, olena, with blotchy zigzags in red and black; nao halua upena; 3.5×8.6 ft.

2443. Kapa pa'u, blue, with triangles filled with stamped lines in red and black (Pl. J, 2); nao halua pupu; 3.5×4 ft.; a fragment. Kauai.

2444. Kapa pa'u ohelohelo, with black stamps (Fig. 127, p. 209); four light brown sheets; the kilohana is halua pawehe, all other sheets halua upena pupu; 3.2×7.5 ft. Queen Emma collection.

2445. Kapa pa'u, olena, with black stripes and figures; nao mole; 3.7×8.5 ft.

2446. Kapa moe, kilohana yellow (nau) with stripes of black and green painted; mole; 6.3×9 ft. J. S. E.

2447. Kapa moe, kilohana yellow, with stripes of black zigzags enclosing alaea stamps, the stripes converging and diverging longitudinally; 7×9.3 ft.

2448. Kapa kihei, with red and green stamps; 5×5 ft. Hawaiian Museum.

2449. Kapa pa'u hula, puakai, mole, ruled in black; one sheet red, ruled in same way; 3×7.2 ft.
2450. Kapa moe, kilohana composed of a black sheet punctured and beaten to a white one (Pl. 43); 5×6 ft.
2451. Kapa malo waipalupalu, striped with black and red, mole, rough; 1.2×8.7 ft. Queen Emma collection.
2452. Kapa pa'u mahuna, three sheets; 1 hoopai halua, 2 pepehi halua, 3 hoopai; old; 3.5×10 ft.
2453. Kapa pa'u, brown, with black and red stamps; halua pupu; 3.6×4.5 ft. Queen Emma collection.
2454. Kapa pa'u paiula, hoopai pawehe; 3×15 ft. Hawaiian Museum.
2455. Kapa, gray-black, from a burial cave; 8.5×10 ft. J. S. E.
2456. Kapa moe, kilohana paiula; one pale blue sheet, one white, all hoopai pawehe; 6.6×7.5 ft. J. S. E.
2457. Kapa poniponi (purple), halua puka; 5×7.2 ft. J. S. E.
2458. Kapa moe, kilohana paiula, pale nanahu; nao puahala; four white sheets halua pupu; 6×8 ft. Kuina sewed with foreign thread. Hawaiian Museum.
2459. Kapa mamaki, plain brown, halua puili; 6.5×8.5 ft. From Kawaihae uka. J. S. E.
2460. Kapa hinahina kuikui, red-brown, rough; nao halua pupu; 5.6×7 ft. J. S. E.
2461. Kapa mahuna ohelohelo, hoopai halua; 6.6×8.2 ft. Hawaiian Museum.
2462. Kapa moe ipo of Kamehameha III; kalukalu, the finest made; 6.5×8 ft. J. S. E.
2463. Kapa keokeo, nao pawehe, old and very soft; 4.3×8 ft.
2464. Kapa moe olena, nao halua pupu; 6.2×8 ft. Made about the middle of the last century. J. S. E.
2465. Kapa kihei; carefully stamped body with border; halua pupu; 6×6.5 ft.
2466. Kapa kalukalu, mole; a fragment of good quality.
2467. Kapa kalukalu, thin, white, but much strained; 1.7×5.5 ft.
2468. Kapa ohelohelo, with black stripes and stamps, hoopai halua; a fragment. (Pl. 46, 1.)
2469. Kapa keokeo, with black stamps and pink noni, mole; a fragment. (Pl. Z, 1.)
2470. Kapa pa'u, mole, thick, gray, with red and black stamped bent knee pattern (Pl. J, 1); 3×14 ft.
2471. Kapa keokeo lalani, white, with alaea stripes and green colon stamps; a fragment. (Pl. Q, 1.)
2472. Kapa puakai, nao mole; light brown with red spots and bands; one broad band alternating with a band of same width (two inches) composed of twelve lines; a fragment.
2473. Kapa puakai, mole, red, used for hoounauna; fragment. J. S. E.
2474. Kapa moe, kilohana white, with red and blue bands; nao halua puka. Given by Liliuokalani.
2475. Kapa fragment, gray, with bands of painted rusty black zigzags; nao hoopa halua.

2476. Kapa pa'u hula, originally yellow, with converging rows of red and black stamps; nao hoopai pawehe; a fragment.
2477. Kapa pa'u, ginger-colored (AA, 5), with red and black stamped bands and figures; 2.5×3.5 ft.
2478. Kapa pa'u, orange, with black stripes and figures; nao launiu; 3.5×8 ft. Queen Emma collection.
2479. Kapa keokeo, nao mole; 5×7 ft. Hawaiian Museum.
2480. Kapa moe, kilohana paiula, halua upena, very old; 3.5×10 ft. Hawaiian Museum.
2481. Kapa kihei aeokahaloa; nao halua niho mano; 7.3×8.7 ft. Made in 1864. J. S. E.
2482. Kapa moe, kilohana mamaki, ahinalii; nao puili; 7.7×9.7 ft. From Kau, Hawaii. J. S. E.
2483. Kapa moe, kilohana eleuli; nao koeau; 8×9.2 ft. Punaluu, Hawaii. J. S. E.
2484. Kapa of rich alaea red, darker than AA, 6; hoopai halua; 4.2×5.5 ft. Bought at auction of Estate of W. P. Leleiohoku in 1848. J. S. E.
2485. Kapa ouholowai, mamaki, striped with brown-red; 7×9.2 ft. Punaluu, Hawaii. J. S. E.
2486. Kapa ouholowai, mamaki, with darker brown stripes in pairs; 7×9.5 ft. Punaluu, Hawaii. J. S. E.
2487. Kapa dress, white, mole, with double red and black rulings (Pl. C, 4). Hawaiian Museum.
2488. Kapa poni, kolu, nanauahuki; 5×5.5 ft. Not identified in the Emerson collection. J. S. E.
2489. Kapa pa'u hula, paiula; nao puili; 4.5×5 ft. From Kalalau, Kauai. J. S. E.
2490. Kapa kihei, glazed, figured red and black, faded; 6×7.2 ft.
2491. Kapa kihei, glazed, stamped in red and black squares, hoopai halua; 6×8 ft.
2492. Kapa kelewai (BB, 12), hoopai pawehe; 6.2×8.5 ft. Kawaihae uka, Hawaii. J. S. E.
2493. Kapa kelewai; nao hoopai halua; same origin as last; 7×9 ft. J. S. E.
2494. Kapa pa'u paikukui, with darker stripes; two sheets, both mole; 2.5×9 ft. Keelikolani collection.
2495. Kapa, almost black (AA, 10); nao hoopai halua; 5×8 ft.
2496. Kapa moe, gray; nao halua puka; 7.5×8.5 ft. Kauai.
2497. Kapa moe, kilohana gray nanahu, halua pupu; 8×10 ft. Queen Emma collection.
2498. Kapa moe, four sheets kalukalu, very thin and delicate; 1, 3 paiula, 2, 4, 5 gray nanahu; nao undefined except 1, which is halua upena pupu; 5×6.7 ft.
2499. Kapa aeokahaloa (BB, 9), halua pupu; 5.7×7.5 ft. Punaluu, Hawaii. J. S. E.
2500. Kapa moe, gray nanahu; nao kapuai koloa; 5.6×7 ft. Hilo, Hawaii, 1886. J. S. E.
2501. Kapa aeokahaloa (BB, 4), halua pupu; 8×10 ft. Queen Emma collection.

2502. Kapa moe, kilohana paiula (foreign color), mole pupu; 8×8.5 ft. Made in 1886. J. S. E.
2503. Kapa moe, gray sheet from an ancient kuina; 4.1×6.6 ft. Deverill; Hanalei, Kauai. J. S. E.
2504. Kapa kelewai; nao hoopai pawehe; 6.6×9 ft. Kawaihae uka, Hawaii. J. S. E.
2505. Kapa moe, haimanawa (Pl. K, 1), the strips of colored kapa inserted, as described in the text; nao mole; 3×9.5 ft. Hawaiian Museum.
2506. Kapa keokeo, thin and marked with irregular blotches of red; nao mole; 5.2×7 ft. Hawaiian Museum.
2507. Kapa moe, kilohana blue with indigo leaves and foreign cloth; nao mole puka; 5.3×8.6 ft. J. S. E.
2508. Kapa moe, kilohana kuilewa pattern; paiula with bands of gray zigzags (BB, 4) holei; colored evenly with puakai and the bands added; 7×9.5 ft. Hookena, Hawaii. J. S. E.
2509. Kapa moe, kilohana paiula with blue-gray bands; halua upena pupu; 6.6×9 ft. Honomalino, Kau, Hawaii. J. S. E.
2510. Kapa moe, kilohana paiula with gray nanahu bands; nao nananahuki; 6×8.6 ft. Honuapo, Kau, Hawaii. J. S. E.
2511. Kapa moe, kilohana paiula, mole pupu; 8.5×11 ft. Made in S. Kona, Hawaii, 1868. J. S. E.
2512. Kapa moe, kilohana paiula, thick, pepehi; 7×9.3 ft.
2513. Kapa paiula, gray on under side, showing through the beats of halua pawehe; 6×8 ft. J. S. E.
2514. Kapa paiula; nao mole pupu; 4.6×6.6 ft. Hawaiian Museum.
2515. Kapa paiula kalukalu, mole; 7.3×9.2 ft. J. S. E.
2516. Kapa paiula, perhaps a hula skirt; halua upena; 4.2×10.5 ft. J. S. E.
2517. Kapa moe, kilohana white, with red (AA, 4) and gray (BB, 4) stripes, the red foreign, the gray koa bark; halua pupu; 5.7×9.2 ft. J. S. E.
2518. Kapa paiula, with indefinite dark green markings; 7×9 ft. J. S. E.
2519. Kapa moe, two sheets olena; nao pepehi; 6×8.5 ft. J. S. E.
2520. Kapa olena, halua pupu; 8.5×12 ft. From Honomalino, Hawaii. J. S. E.
2521. Kapa olena; nao nananahuki; 8.6×11 ft. From Honomalino, Hawaii. J. S. E.
2522. Kapa olena; nao nananahuki; 7×9 ft. From Ninole, Kau, Hawaii. J. S. E.
2523. Kapa olena, mole halua; 7.5×9 ft. Honomalino. J. S. E.
2524. Kapa olena, halua maka upena; 4.5×11 ft. Honomalino. J. S. E.
2525. Kapa moe, olena; 4.5×6 ft. Made in 1868. J. S. E.
2526. Kapa moe, olena, bright, halua upena; 7×9 ft. Made in S. Kona, Hawaii, in 1864. J. S. E.
2527. Kapa pa'u olena, old; nao hoopai; 3.2×8 ft. J. S. E.
2528. Kapa mahuna, olena, paikukui; nao hoopai pawehe; 3.5×5 ft.
2529. Kapa pa'u olena, mole, with longitudinal stripes of deeper color; 2.5×7.7 ft.
2530. Kapa olena, much faded; hoopai pawehe; 3.2×3.5 ft. Hawaiian Museum.

2531. Kapa kihei mamaki; ahinalii; soaked in kalo patch and then dyed with seeds of haa (AA, 8); nao puili; 3×4 ft. For a child. J. S. E.
2532. Kapa fragment, halua pupu (AA, 7); 3×5 ft.
2533. Kapa ouholowai, dark brown (AA, 8), with black stripes; nao hoopai; 3.7×7.3 ft.
2534. Kapa pa'u, oiled, five sheets, mole, halua different beaters; 3.2×17 ft.
2535. Kapa pa'u, oiled, each of the five sheets of a different beat; 1 pepehi halua, 2 pepehi pupu, 3 halua pupu, 4 pepehi, 5 launiu; 3×15.6 ft.
2536. Kapa pa'u, oiled, six sheets; 1 halua pupu; 2, 3 and 6 pepehi, 4 hoopai halua, 5 launiu; 3×13.5 ft.
2537. Kapa pa'u, oiled, three sheets; 1 halua pupu, 2 mole halua; 3 has three distinct beats; 3.2×20 ft.
2538. Kapa pa'u, oiled, single sheet; nao halua pupu; 3×12 ft.
2539. Kapa pa'u, oiled; another sheet of the same size and beat; perhaps of the same pa'u.
2540. Kapa pa'u, oiled, single sheet halua pupu; 3×12.5 ft.
2541. Kapa pa'u, oiled, one sheet nao mole; 3.5×15.5 ft.
2542. Kapa moe, kilohana olena, halua pupu, two sheets white; 4.2×5 ft. J. S. E.
2543. Kapa kukui noni (AA, 4), dyed with kukui bark and noni root; reddish on top and yellow beneath; the coloring matter was placed on the yellow side and passed through; 6.2×9 ft. J. S. E.
2544. Kapa moe, olena kilohana nao nananahuki; 7.5×8.7 ft. Honomalino. J. S. E.
2545. Kapa olena, halua upena pupu; 7×9.2 ft. J. S. E.
2546. Kapa moe, kilohana alaea; nao mole; 6.5×9 ft. Hookena, S. Kona, Hawaii. J. S. E.
2547. Kapa kihei olena (faded), halua upena; 4.5×5 ft. J. S. E.
2548. Kapa pa'u hula, olena, with black stripes and figures; 3.5×9 ft. J. S. E.
2549. Kapa kukui, brown; nao hoopai pawehe; 3.5×7.7 ft. Queen Emma collection.
2604. Kapa moe, kilohana red, with palenanahu bands; nao halua pupu; two white sheets, one pepehe halua, the other halua pupu; 7.3×9 ft. Hawaiian Museum.
2605. Kapa moe, kilohana and three sheets ouholowai striped with black in varied series; 1 and 4 nao puili halua, 2 koeau, 3 puili; 7×8.5 ft. Hawaiian Museum.
2606. Kapa moe, two sheets very soft mao, mole; 6.2×9 ft.
2607. Kapa moe, white sheet taken from a kuina in the Deverill collection; old; nao halua pupu; 6.7×9.5 ft. Kauai. J. S. E.
2608. Kapa moe, one sheet yellowish white, halua pupu; 7×9 ft. Kauai.
2609. Kapa moe, kilohana yellow, halua niho mano pupu; two white sheets mole halua; 5×7 ft. J. S. E.
2610. Kapa kea, halua upena; 5.2×7.7 ft. From Punaluu, Kau, Hawaii. J. S. E.
2611. Kapa kea, mole pupu (puka); 7.7×9.7 ft. Ninole, Kau, Hawaii, 1886. J. S. E.
2612. Kapa kea, halua pupu; 6.3×9 ft. Made previous to 1855. J. S. E.
2613. Kapa kea, halua pawehe; 6.3×8.5 ft. Dates from early '60s. J. S. E.
2614. Kapa kea, niho liilii; 8×10.5 ft. Punaluu, Kau, Hawaii. J. S. E.
2615. Kapa kea, like the preceding; 7.7×9.5 ft. J. S. E.

2616. Kapa kea, mole pupu; 7.7×10.5 ft. Made at Ninole, Kau, Hawaii. J. S. E.
2617. Kapa kea, niho mano; 7.7×10 ft. J. S. E.
2618. Kapa kea, halua upena; 4.6×7.7 ft. Honuapo. J. S. E.
2619. Kapa kea, niho mano; 6×8.2 ft. J. S. E.
2620. Kapa kea, halua pawehe; 6×8.2 ft. Honuapo, Kau, Hawaii. J. S. E.
2621. Kapa kea, halua pupu; 5×6.5 ft. Kauai. J. S. E.
2622. Kapa kea, halua niho mano; 7×8.6 ft. Honuapo, Kau, Hawaii. J. S. E.
2623. Kapa kea; 7.2×8.5 ft. From Honuapo. J. S. E.
2624. Kapa kea, nananahuki; 7×8.5 ft. Made in early '60s at Hookena, Kau, Hawaii. J. S. E.
2625. Kapa kea, niho liilii, thick; 4×10.3 ft. Punaluu, Kau, Hawaii. J. S. E.
2626. Kapa kea, halua upena; 8.5×9.3 ft. Punaluu. J. S. E.
2627. Kapa kea, niho liilii, very soft; 5×8 ft.
2628. Kapa kea, mole pupu, stiff; 7.5×10.5 ft.
2629. Kapa kea, mole pupu; 7.3×10 ft.
2630. Kapa kea, perhaps once yellow; niho liilii; 7.3×9.3 ft.
2631. Kapa moe, three sheets white; 1 and 3 halua pupu, 2 niho liilii; 5.7×7.7 ft. Hawaii, 1868. J. S. E.
2632. Kapa moe, white, halua puili; 6×8 ft.
2633. Kapa moe, white, very old, niho liilii; 6.5×11 ft. Hawaiian Museum.
2634. Kapa moe, mahuna olena (faded), halua pupu; 4.7×9 ft. Hawaiian Museum.
2635. Kapa moe, white, old and worn out; 8×8 ft. Hawaiian Museum.
2636. Kapa pa'u, oiled, old, mole halua; 3.5×10 ft.
2637. Kapa moe, kilohana purple, mole pupu; yellow-brown under sheet, pawehe; very old; 5×7 ft.
2638. Kapa pa'u hula, three sheets, 1 paikukui (AA, 6), 2, 3 olena, hoopai and pepehi; 4.2×7 ft. Hawaiian Museum.
2639. Kapa pa'u hula, olena nanahu kakau; well stamped in black; 3×8.7 ft.
2640. Kapa malo, alaea, with narrow transverse stripes of black; much faded; .8×6.6 ft. Emerson says, "dyed with alaea seeds." I know of no such seeds, and alaea is ochre. The fading, however, would indicate vegetable dye. Hookena, Hawaii. J. S. E.
2641. Kapa malo, alaea; longitudinal border and transverse >>> stripes in black; .9×7 ft. J. S. E.
2642. Kapa malo, alaea, much faded, thick, halua upena; .8×6.3 ft. Hookena. J. S. E.
2643. Kapa malo, puolena, niho mano; .7×7.7 ft. Made February, 1887. J. S. E.
2644. Kapa malo, olena; nao nananahuki; .8×9.6 ft. Made at same date as last. J. S. E.
2645. Kapa malo, keokeo, halua pupu; .8×5.5 ft. Made at Hana, Maui. J. S. E.
2646. Kapa poaaha, white, mole; .3×11 ft. J. S. E.
2647. Kapa aha, "awapuhi and citron," mole pupu; 5.5×8.5 ft. J. S. E.
2648. Kapa pa'u, mamaki; three sheets old and soft, sewed together with foreign thread; 1, 2 nao kapuai koloa, 3 hoopai; 2.7×5.2 ft.

2649. Kapa mao (AA, 9), halua pupu, soft, used as "medicine"; 5.2×9 ft. Hawaiian Museum.
2650. Kapa pa'u, two sheets mao, mole, faded; 3.7×12 ft. Queen Emma collection.
2651. Kapa pa'u, light brown, puahala, faded; 3×14 ft.
2652. Kapa pa'u, five sheets, soft; 1 light brown, halua pupu, 2 ditto hoopai; 3 darker brown, pawehe; 4 light brown halua niho mano; 5 ditto, halua upena pupu; 3.5×7.7 ft. Sewed with kapa cord. Queen Emma collection.
2653. Kapa pa'u, four sheets, soft; 1 lighter shade of BB, 12; 2–4 lighter still; sewed with kapa cord of the darker color; 3.2×7.5 ft.
2654. Kapa pa'u, five sheets, originally yellow, coarse; kilohana has a border and double rhombs of zigzags in black, pepehi halua; 2 pepehi; 3 and 4 pepehi halua; 5 pepehi halua pupu; 3×10.5 ft.
2655. Kapa moe, three sheets very soft; 1 and 3 brown; 2 paiula with black bands; nao 1 pepehi; 2 puahala; 3 halua pupu; 6×7.3 ft.
2656. Kapa moe, four sheets awapuhi, halua upena, soft; 5.5×6.5 ft.
2657. Kapa pa'u, two sheets, light brown, soft, with indefinite beat; 4×9.5 ft. Queen Emma collection.
2658. Kapa pa'u, three sheets lighter shade of AA, 7, soft; 1 and 3 halua pupu; 2 hoopai; 3.2×13 ft.
2659. Kapa mahunalii used in sorcery; oiled, old and brittle; nao konane; fragment. From Oahu. J. S. E.
2660. Kapa moe, kilohana paiula, with indefinite lilac markings; halua pupu; 4.5×6.5 ft.
2661. Kapa mamaki, hoopai halua; 6.5×9 ft. Kawaihae uka, Kohala, Hawaii. J. S. E.
2662. Kapa pa'u, brown, hoopai halua; 3×13.5 ft.
2663. Kapa pa'u, mao (ginger-colored), mole, soft; 4.5×7 ft.
2664. Kapa mahuna, oiled, halua pawehe; 4×8.5 ft. J. S. E.
2665. Kapa mahuna, oiled, hoopai halua; 3×4.2 ft. Honaunau, S. Kona, Hawaii. J. S. E.
2666. Kapa, old, leathery, red-brown (AA, 12); under side light brown, reticulated with black; nao halua pawehe; 2×2.5 ft. From Kanupa burial cave, Hawaii. J. S. E.
2667. Kapa, gray (BB, 4); nao mole pupu; 2×6 ft. From Kanupa cave. J. S. E.
2668. Kapa, red, mole; 2.5×6 ft. From Kanupa cave. J. S. E.
2669. Kapa pa'u, oiled, single sheet halua pupu; 3.2×12 ft.
2670. Kapa, oiled, halua pupu; 3.7×5 ft.
2671. Kapa, oiled, halua pupu; 1.3×3.5 ft.
2672. Kapa, oiled, mole; 3.3×4.6 ft.
2673. Kapa, oiled, mole; 1.5×3.7 ft.
2674. Kapa, oiled, halua pupu; 3×4 ft.
2675. Kapa, oiled, mole, red tinge, rotten; 3.2×3.3 ft.
2676. Kapa, oiled, mole; 1.7×2.5 ft.

2677. Kapa pa'u mahuna paikukui palapalaia = a border richly stamped with black and alaea painted; halua pupu; 4×10 ft. Hawaiian Museum.
2678. Kapa pa'u hula puakai, ruled in pairs, mole; 2.5×8 ft.
2679. Kapa malo, coarse beat with evident jointures; .6×9 ft. J. S. E.
2680. Kapa mamaki, gray, with narrow darker stripes; nao pawehe; 2×6 ft. From Kanupa cave. J. S. E.
2681. Kapa, oiled, and striped with black, hoopai; 4.3×4.5 ft. From burial cave.
2682. Kapa pa'u hula, kilohana with two longitudinal bands, each of eight zigzags in black, and as many of orange; a white sheet; a red sheet and two white; all of indefinite beat; much stained; 1.7×2.5 ft. J. S. E.
2683. Kapa, gray on one side, red on the other; nao pawehe; 4.7×7 ft. From burial cave on Hawaii. J. S. E.
2684. Kapa mole, oiled; placed by Huki on the idol (B. P. B. M. 132) as an inner cover, when it was sent to Medway, Conn.; fragment. J. S. E.
2685. Kapa mamaki mahuna, used by the kahuna in treatment of disease; it was thrown over the shoulders of the patient while the kahuna prayed; nao halua pupu; fragment. Molokai. J. S. E.
2686. Kapa a'e (a term applied to a very soft kapa; not common), white, made of waoke malolo; a fragment. J. S. E.
2687. Kapa malo olena, yellow on one side, reddish on the other; nananahuki, thick; .5×7 ft. For a boy. J. S. E.
2688. Kapa pa'u hula puakai, mole; a stripe a quarter inch wide alternating with two narrower ones; fragment. Hana, Maui. J. S. E.
2689. Kapa mahuna, halua pawehe; 1.7×3.5 ft. Kipahulu, Maui. J. S. E.
2690. Kapa pa'u hula, fragment, fine yellow, with black stamps; thin, soft, halua pupu. Given to the Prince of Hawaii (son of Kamehameha IV) in hookupu on Kauai. J. S. E.
2691. Kapa mamaki; nao hoopai; 1×2.7 ft. Bought at Queen Emma's auction. J. S. E.
2692. Kapa pa'u, fragment of kilohana, yellow, stamped with red and black. From collection of Kaikioewa. J. S. E.
2693. Kapa nanahu, a piece of kapa saturated with charcoal black used to impart its color to other kapa. J. S. E.
2694. Kapa puakai, colored with olena, then to be dyed with noni; fragment. Pelekunu, Molokai. J. S. E.
2695. Kapa pa'u hula, formerly belonging to Queen Kalama (wife of Kamehameha III). J. S. E.
2696. Kapa puakai, fragment; nao mole. Hana, Maui. J. S. E.
2697. Kapa ouholowai, with one broad, eight narrow stripes, halua puili; fragment. Used only by chiefs. From Queen Kalama. J. S. E.
2698. Kapa mahunalii, oiled, halua pawehe. From the witch Kamaipuupaa, the kahuna wahine of Kamehameha V. J. S. E.

2699. Kapa kuikui; a most beautiful form of lace kapa; black and stiffened with pia(?), then bruised, not punctured, so as to leave almost transparent oval depressions in the fibre. The collector claims that this was beaten with small stones; but, if so, it was a wonderful beating! From Koolau, Oahu. J. S. E.

2750. Kapa fragment from a burial cave on Hawaii; dark brown with the reverse buff; nao pepehi halua. J. S. E.

2751. Kapa pa'u hula; consists of two sheets pasted together, one striped vertically with alaea and olena; mole. Fragment from Kanupa cave, Hawaii. J. S. E.

2752. Kapa malo, puakai, oiled, red, mole; fragment. Used only by chiefs when bathing. Hana, Maui. J. S. E.

2753. Kapa kahuna, oiled, halua pawehe, fragment. J. S. E.

2754. Kapa fragment, oiled, halua pupu; 1.6×2 ft. Used by kahunas. J. S. E.

2755. Kapa kahuna, oiled, mole; 1.8×3.2 ft. Molokai. J. S. E.

2756. Kapa pa'u hula paikukui, marked by a cord; nao halua pupu; 1.5×1.3 ft. Molokai. J. S. E.

2757. Kapa mamaki (AA, 11); nao hoopai; fragment. Kahuna uses. Kamoiliili, Oahu. J. S. E.

2758. Kapa pa'u hula, oiled, mole halua, stamped in black. A fragment from Kamehameha IV. J. S. E.

2759. Kapa pa'u hula, pink with black stamps, hoopai halua. A fragment from Kalalau, Kauai. J. S. E.

2760. Kapa paiula, halua upena. A fragment from Kaikioewa. J. S. E.

2761. Kapa pa'u paikukui; 1.8×2.8 ft. Used in childbirth by kahuna. J. S. E.

2762. Kapa mahuna paikukui, oiled, mole. Used to influence evil spirits. From Queen Kalama. J. S. E.

2763. Kapa mahuna, oiled; nao peculiar; 1.5×2.6 ft. Used by the kahuna. Lahaina, Maui. J. S. E.

2764. Kapa moe kilohana; nao puahala squares lined in red and gray; design same as 2441. Kamalo, Molokai. J. S. E.

2765. Kapa fragment, oiled, halua pupu. Hana, Maui. J. S. E.

2766. Kapa mahuna from a kihei, oiled, halua pupu. Laie, Oahu. J. S. E.

2767. Kapa mahuna, oiled, hoopai; part of kihei. From Waimea, Kauai. J. S. E.

2768. Kapa mahuna, halua pupu. Used by a kahuna lapaau at Waimea, Kauai. J. S. E.

2769. Kapa kihei mahuna, halua pawehe, thin, almost translucent. From Kaikioewa, a high chiefess of Waimea, Kauai. J. S. E.

2770. Kapa pa'u hula, olena, with black stamps; a fragment. Made at Waimea, Oahu. J. S. E.

2771. A set of samples in a kuina all represented in larger specimens. Hawaiian Museum.

2772. Kapa ribbons; a glazed surface of white hoopai, stamped with dark brown figures. Hawaiian Museum.

2773. Kapa mamaki, hoopai halua; softened with use; much torn and mended fragment.

2774. Kapa eleele, in fragments, as is not uncommon with kapa of this color; the dye seems to rot the fibres, and I have never seen any of considerable age that was whole.

2775. Kapa malo kea, mole, a white fragment.

2776. Kapa moe, awapuhi and nanahu; black and yellow triangles and stripes; halua puahala; 5.5×8 ft. South Kona, Hawaii. J. S. E.

2777. Kapa pa'u, hoopai pawehe; two pieces sewed together with kapa cord; three painted longitudinal bands, black and red; between them, various zigzag patterns (Pl. V, 1); 2.7×11.5 ft. Hawaiian Museum.

2778. Kapa malo eleuli; olena soaked in mud; with darker ⋁-shaped lines; .7×6 ft. Hookena, Hawaii. J. S. E.

2779. "Ke kapa keia a Lauhuki i kuku ai nona ka olelo o ke kuku a kou Koeke a Lonokaenui." A fragment from Queen Emma's collection thus labelled; not otherwise remarkable.

3201. Kapa aeokahaloa; color, BB, 8; halua pupu; 4×6.7 ft. Given by Liliuokalani.

3202. Kapa moe, kilohana nau; 2 olena, 3 mao, 4 and 5 olena; nao hoopai halua; 7.5×9.7 ft. Liliuokalani.

3203. Kapa moe, kilohana palahea or marked with splotches of red-brown all over; four white sheets; nao of 2 hoopai halua, all the rest hoopai pawehe; 7.5×10 ft. Liliuokalani.

3204. Kapa moe, kilohana nau (AA, 6); four white sheets, all halua pupu; stiff; 6.6×9 ft. Liliuokalani.

3205. Kapa moe, kilohana paiula, four white sheets, all halua pupu, but with different beaters; 7.5×9.3 ft. Liliuokalani.

3206. Kapa moe, four white sheets halua pupu, papery texture; no kilohana; 6.6×9.2 ft. Liliuokalani.

3207. Kapa moe, kilohana light yellow, with stripes, and stamped figures in red and gray; three yellow sheets; 6×8.6 ft.

3208. Kapa poncho, yellow, decorated with straw flowers, etc.; 3.6×4.6 ft. Modern make.

3209. Kapa ribbons; nine specimens from Mrs. J. M. Whitney.

3210. Kapa eleele; nao halua pawehe; 3.5×9 ft. Hilo, Hawaii.

4023. Kapa malo puakai, thin, mole; 1×5.5 ft.

5861. Kapa olena; nao halua pupu; 2.6×9.2 ft. Mrs. Grace Chapman.

5862. Kapa aeokahaloa (BB, 4); nao halua pupu; 3.5×5 ft. Mrs. Grace Chapman.

6792. Kapa malo, olena, faded; one half covered with stamped crosses; sewed in middle; .7×8 ft. Given by Gorham D. Gilman.

6812. Kapa keokeo, used as covering for the royal feather cloaks; 1.2×8.7 ft. Hawaiian Government.

6813. Kapa keokeo, halua pupu, covering for feather cloaks; 7×9 ft. Hawaiian Government.

6814. Kapa olena, halua pupu, covering for feather cloaks; 6×9 ft. Hawaiian Government.

6815. Kapa keokeo, halua pupu, covering for feather cloaks; 7×9 ft. Hawaiian Government.

6879. Kapa moe kilohana, hoopai, gray, striped in red and black; fragments of the white kapa cord that bound it to the kuina remain; 4.5×7.5 ft. Gorham D. Gilman.

6880. Kapa mole, figured with red and black stamps (Pl. Z—frontispiece); old and much torn; 3.2×7.5 ft. Gorham D. Gilman.

6881. Kapa moe, hoopai halua; brown sheet (AA, 9), but faded; 6.2×8.7 ft. Gorham D. Gilman.

6882. Kapa keokeo, hoopai pawehe, much torn, very rotten; 8×9.5 ft. Gorham D. Gilman.

6883. Kapa keokeo, hoopai, rather discolored; 6×7.5 ft. Gorham D. Gilman.

6884. Kapa pa'u olena; this portion has faded and been washed, so as to render the nao indefinite; 2.8×8.7 ft. Gorham D. Gilman.

6885. Kapa poncho, thin, red, hoopai halua; rosettes in black and red; two rows of cut border; 3.5×3.2 ft. Gorham D. Gilman.

6886. Kapa poaaha. Given by Gorham D. Gilman.

6887. Kapa poaaha. Given by Gorham D. Gilman.

6940. Kapa kalukalu; 6×7.5 ft.

7720. Kapa dress, oiled, pepehi; lined with cotton cloth and trimmed with yellow kapa, halua pupu.

7721. Kapa pa'u hula, hoopai with eight bands of darker color alternating with four and five broken lines; 3.7×12 ft.

7722. Kapa olena, striped with dark red by snapping cord; hoopai halua; 3.5×9.2 ft.

7770. Kapa moe, kilohana surface mottled with alaea and nanahu; nao indefinite, several beaters; 8×11.5 ft. A. B. C. F. M. Purchased.

7771. Kapa moe, kilohana olena stamped well with nanahu and alaea; 7.5×10.5 ft. Made in 1834. Purchased from A. B. C. F. M.

7772. Kapa malo, coarse, heavy, mole; olena striped lengthwise with alaea; .6×9 ft. A. B. C. F. M.

7773. Kapa belt of white and very elastic fabric. A. B. C. F. M.(?)

7774. Kapa malo mole, yellow, with red lines; half of the specimen fine lines, the other half with lines twice the breadth and at right angle to the former. A. B. C. F. M. Purchase.

7775. Kapa of coarse beat striped red with zigzags (Pl. P, 1). A. B. C. F. M. Purchase.

7776. Kapa mamaki, light brown, hoopai, striped lengthwise with bands of darker brown lines; 2.6×3.5 ft. Purchased from A. B. C. F. M.

7777. Kapa malo, printed in stripes and black figures (Pl. 35, 2); 1.2×9.5 ft. A. B. C. F. M. Purchase.

7778. Kapa pa'u olena, nao mole; 2.6×14.7 ft. A. B. C. F. M. Purchase.

7779. Kapa holoku, greenish brown, stamped or ruled with black and red. Dates 1839. A. B. C. F. M. Purchase.

7780. Kapa molo keokeo pawehe, glazed and stamped with faded yellow and brown; one end with circular decoration; 1.2×7 ft. A. B. C. F. M. Purchase.

7781. Kapa eleele kupapau (pall); nao hoopai, very rotten; 6.6×9.8 ft. Brought from islands 1836. A. B. C. F. M. Purchase.

7782. Kapa pa'u, kilohana mole, brown, closely covered with red and black rulings and cross rulings; three yellow sheets, 1 and 2 mole pupu, 3 pepehi; 2.6×12.5 ft. A. B. C. F. M. Purchase.

7783. Kapa dress for child (Pl. C, 3). A. B. C. F. M. Purchase.

7784. Kapa olena, washed with nau, and with transverse reddish lines; sewed together in middle; a fragment; 1.5×2.8 ft. A. B. C. F. M. Purchase.

7785. Kapa pa'u, kilohana olena, mole, beautifully stamped all over with brilliant black and red; 2 hoopai halua, stamped in black; 3 hoopai; 4 and 5 hoopai; all oiled; 2.7×10.7 ft. A. B. C. F. M. Purchase.

7786. Kapa pa'u, olena, faded, pepehi halua; nananahuki; 2.5×11 ft. A. B. C. F. M. Purchase.

7787. Kapa kihei keokeo, stamped with red and black, mole; much worn, but some of stamps very effective; 5.5×6.6 ft. A. B. C. F. M. Purchase.

7788. Kapa gown, figured in green, brown and brick-red; thin, white base; ornamentally made in foreign style. A. B. C. F. M. Purchase.

7789. Kapa kalukalu, red mole; 4.5×6.2 ft. A. B. C. F. M. Purchase.

7791. Kapa holoku, made of white hoopai kapa, very dirty and figured roughly with alaea splotches. Given to A. B. C. F. M. by James Jackson Jarves, and purchased from the Board.

8037. Kapa, red-brown, glazed, hoopai pawehe, leathery and heavy; pattern as Pl. H, 1; 6.5×8.2 ft. Made during the reign of Kamehameha III, who died in 1854.

8812. Kapa hoopai pawehe, red; 2.9×9 ft. From Kona, Hawaii.

8813. Kapa hoopai, pawehe, light gray; 3×10 ft. From Kona, Hawaii.

8814. Kapa keokeo, curiously stamped in black (Pl. 42, 2); a fragment; 6.2×3.4 ft. Kona, Hawaii.

8816. Kapa pau, originally pink, but much faded, halua upena, kuilewa in black; 2.6×6.3 ft.

8817. Kapa keokeo, pawehe; 4.2×6.6 ft.

8825. Kapa pa'u (AA, 5); first kilohana mole, four longitudinal stripes, interrupted black bands, the intervals with stamped arrow-heads and zigzags, sheet halua upena; second kilohana, mole pupu, three bands interrupted, red and black lines, intervals, with double and treble red and black stamped diamonds, very soft and beautiful; 4 mole, 5 halua pawehe; 4.8×7.1 ft. Bishop collection.

8826. Kapa pa'u, kilohana gray, mole, most exquisitely decorated with seven bands, five inches wide, of black and red ruled lines, each band different, at angle of 45°; four yellow sheets, two in front of kilohana mole, the others pepehi halua; 2.7×8 ft. In decoration, the finest pa'u in the collection. As it was stored in a trunk and folded with the kilohana inside, it escaped notice until too late to include in the plates.

8827. Kapa pa'u (AA, 5), kilohana mole, ruled with two bands longitudinally, each formed of 4–6 bands of ruled black and red lines, the bands "faulted" every 3.5 ft.; four sheets same color, 1 and 4 mole, 2 and 3 pepehi; 2.5×14 ft.; old and creased.

8828. Kapa pa'u, with two kilohana face to face, mole, each with four plain ginger-colored sheets fastened together by kapa cord; first kilohana greenish brown, with black lines closely ruled in patterns; second kilohana yellowish, with broad longitudinal lines over finer ones at angle of 45°; 2.3×12.2 ft. Bishop collection.

8829. Kapa moe, kilohana paiula, with four white sheets, very soft and well made; nao of all hoopai pawehe; 7.8×9.7 ft. Bishop collection.

8830. Kapa moe, kilohana paiula, kapuai koloa; four white sheets, almost kalukalu, the third halua pupu, others like kilohana; 9×12 ft. Bishop collection.

8831. Kapa moe; three sheets fine and soft, slightly torn; nao indeterminate; 8.7×12 ft. Bishop collection.

8832. Kapa moe, three sheets, white, soft, hoopai pawehe; 7.5×9 ft. Bishop collection.

8833. Kapa moe, kilohana olena, with fifteen bands lengthwise, stamped and ruled in red and black; black stamps in intervals; stiff and papery; nao halua pupu; 6.7×8 ft.

8834. Kapa fragment, white, with punctured black pasted over it, the punctures large and small arranged in zigzags (Pl. 36, 2); 3×5 ft. Given by Gorham D. Gilman.

8835. Kapa moe, four white sheets, 1 pepehi halua, the rest hoopai; 7×9 ft.

8836. Kapa, originally yellow, thin, pepehi, decorated with 29 longitudinal, undulating lines of red, rather irregular, with dotted stamps following the lines; a broad line of red with black stamps borders the whole; 7.8×8 ft.

8837. Kapa olena, halua upena, soft; 4×6 ft.

8840. Kapa shroud; two sheets united by a peculiar suture described on p. 248 in list of the author's collection; 6×7.6 ft. Probably at least 150 years old.

8841. Kapa paikukui, pepehi halua, used to wrap bones in burial cave on Hawaii; 6.2×7.2 ft.

8842. Kapa malo of four sheets sewed together by running stitch; two sheets were pasted together and decorated with transverse black bands on red with narrow white with stamps of three red balls alternating with a single ball. On the whole the decoration tells of great antiquity as does the condition of the malo, and it may reasonably be attributed to some important moi whose hidden bones it accompanied; 2×12 ft. From a burial cave on Hawaii.

8843. Kapa keokeo hoopai; a fragment from the same cave as the three previous numbers.

8844. Kapa fragment, ragged; marked with transverse bands of three black lines; also a reticular arrangement of these lines and what seems to be a tassel at the end. Burial cave as above.

8845. Kapa; a heavy rudely beaten fragment from burial cave, black on one side, red on the other; maceration gave a claret-red color. Purchased like the previous cave specimens.

9296. Kapa moe, kilohana paiula much faded; nao mole pupu; sheets 2 and 3 gray, halua pupu; 4 and 5 mole pupu; 5.7×8.5 ft. Deverill collection.

9298. Kapa, gray, thin, darker than BB, 8; nao puili; 6×9 ft. Deverill collection.

9299. Kapa moe keokeo, halua pupu; 7×9 ft. Deverill collection.

9300. Kapa keokeo, with red and blue wide bands; mole pupu (blue foreign;) 5.5×6.2 ft. Deverill collection.

9301. Kapa halua pupu, gray (BB, 9); 4.5×6.6 ft. Deverill collection.

9302. Kapa kalukalu keokeo; 4.2×6 ft. Used for swaddling cloth. Deverill collection.

9303. Kapa pa,u, olena, four sheets, a fragment; kilohana with black and red stamps, halua pupu; 2 yellow, halua pawehe; 3 lighter color; 4 yellow pepehi. Deverill collection.

9304. Kapa malo, yellow, with four rows of black stamped designs; halua pawehe, thin and faded; border of red and black stamps; 1.5×7+ ft. (end torn off). Deverill collection.

9305. Kapa pa'u hula, olena, with two broad bands and one narrow one of red and black stamps; red stamps in one of the interspaces; halua pawehe; 3×8 ft. Deverill collection.

9306. Kapa pa'u olena hula, like the previous number, but with stamped figures in two of the interspaces; 3×7.7 ft. Deverill collection.

9307. Kapa pa'u olena, pepehi halua; stamped in six rows, alternately red and black; 2, 3, 5, 6 arranged as triangles; 3.6×9.8 ft. Deverill collection.

9656. Kapa ohelohelo (noni?), stamped with strings of black triangles, halua pupu; 4.2×6.7 ft. Given by Mrs. W. R. Castle.

9657. Kapa moe, kilohana white, with red and gray bands, mole pupu; 6.5×8.5 ft. Mrs. W. R. Castle.

10,329. Kapa moe, kilohana paiula + five yellowish white sheets; nao indeterminate; 7.8×10.8 ft. Kaiulani collection.

10,330. Kapa moe, kilohana paiula hoopai halua + three light buff sheets, hoopai pawehe; 7.4×9.7 ft. Kaiulani collection.

10,331. Kapa moe, kilohana paiula+four white mole pupu sheets; 7.5×10 ft. Kaiulani collection.

10,332. Kapa moe, kilohana paiula, painted with various inartistic designs in light blue; four white sheets, all halua pupu; 7.3×10.4 ft. Kaiulani collection.

10,333. Kapa moe, kilohana white, with red and gray blotches beaten in in five bands; four white sheets, thick and stiff; nao indeterminate; 7×9.5 ft. Kaiulani collection.

10,334. Kapa moe, kilohana white, with red and blue bands; thin and softer than the four under white sheets; all halua pupu; 7×10 ft. Kaiulani collection.

10,335. Kapa moe, kilohana thin, white, with longitudinal bands of red and gray; four stiff white sheets, all halua pupu; 7×11 ft. Kaiulani collection.

10,336. Kapa moe, kilohana buff, with paiula and gray beaten in; four sheets buff; old and much worn; 6.3×8.7 ft. Kaiulani collection.

10,337. Kapa moe, kilohana red on gray ground, four inner sheets of various shades of buff; halua pupu; 6.5+×8.5+ ft. Kaiulani collection.

10,338. Kapa moe, two sheets hoopai, stiff and unused; one dyed with nau (AA, 6), the other bright yellow; 7×8+ ft. Kaiulani collection.

10,339. Kapa moe, kilohana white, with coarse stamped border in blue and red modern pigments; nao halua pupu, except the third sheet which is niho mano; 7.5×10 ft. Kaiulani collection.

10,340. Kapa moe (no kilohana); four old white sheets, much used; 5.5+×8 ft. Kaiulani collection.

10,341. Kapa moe mamaki; three sheets striped with black lines; color dark gray; nao hoopai; 7.2×10.5+ ft. Kaiulani collection.

10,342. Kapa olena, ruled lengthwise with three bands of 4, 9, 6 black lines; mole halua; 3×3.5 ft. Kaiulani collection.

10,343. Kapa olena, apparently cut from the last specimen; 2.7×3.8 ft. Kaiulani collection.

10,345. Kapa hoopai halua, thin, with black stamps; fragment; 1.5×3.5 ft. (Pl. ZZ, p. 212.) Kaiulani collection.

It has not been thought needful to enumerate all the specimens of bark, partly made kapa (poaaha) and the fragments from the burial caves, with the kapa wrappers around the bones. The latter are represented by catalogued specimens. Enough has been given to show that material for study has not been wanting, however insufficiently it may have been utilized, rather from want of knowledge than from chariness of labor expended on this ancient and now nearly lost art.

We may turn to the specimens of bark-cloth from other island groups of the Pacific Ocean, but as most of these are of comparatively modern manufacture, those noted in the Cook collections are more worthy of attention.

Samoan Siapo.

2059. A jacket of thin, white, siapo, upete printed and ornamented with black trimming. Source unknown.

2179. Siapo tiputa, worn by young girls; thin, white, with black and brown lines and painted stripes; 1.7×4.2 ft. J. S. E.

2200. Siapo fusi or belt, white; made by the wife of Unutoa, a chief of Pagopago.

2205. Siapo, light colored, divided into rectangles by thick double lines of dark brown varnish, and these filled with triangles, yellow dashes and rude black figures; 6×7 ft. Craig collection.

2206. Siapo, painted all over with squares and other geometrical figures; varnished; part of brown fringe plain, one side fancy cut; 4×7 ft. Tutuila, Samoa. J. S. E.

2207. Siapo, soft, upete figured; 5×6.7 ft. J. S. E.

2208. Siapo, soft, upete stamped, white at each end; 8×11 ft. J. S. E.

2209. Siapo, soft, upete stamped, ends white figured with indefinite lines; 7×9.5 ft. J. S. E.

2210. Siapo, soft, upete stamped, figured; 9×15.7 ft. J. S. E.

2211. Siapo, soft, figured, divided by wide red lines into various sized patches, often with a red circle two inches in diameter; 7×11 ft. J. S. E.

2212. Siapo, soft, upete stamped with dark varnish lines and circles; toothed border on three sides, slashed with rhomboidal or arrow-head openings; 7×8.5 ft. Tutuila. J. S. E.

2213. Siapo, heavy, divided into squares filled with various devices and varnished; 11.5×14 ft.

2214. Siapo, heavy, with varnished black figures on white (Pl. 17, 2); 9.5×12 ft.

2215. Siapo, heavy, lines parallel with broader transverse lines in dark varnish; 9.6×10.2 ft. J. S. E.

2216. Siapo, heavy, varnished figures; 8.5×9 ft. J. S. E.

2217. Siapo, heavy, painted all over with geometrical figures and zigzags; dentils lined and all varnished; 8×10 ft. J. S. E.

2218. Siapo, heavy, varnished all over, dark and lighter bands hardly visible; 5.7×8.5 ft. Given to Mrs. Bishop by Com. (later Admiral) L. Kempff.

2219. Siapo, varnished all over, divided into large triangles by light bands with curved figures; under side deep red, with parallel linings; 6.5×9 ft. J. S. E.

2220. Siapo, surface painted in a dark red tone; triangular cut border on three sides, of a dark brown varnish; 7×9 ft. J. S. E.

2221. Siapo, heavy, checkers and irregular dark brown figures; 5.7×8 ft. J. S. E.

2222. Siapo, heavy, fringed on three sides, triangular pattern in dark brown; 5.5×7.5 ft. J. S. E.

2223. Siapo, heavy, upete figures on white, and various other figures, some in yellow, the dentils of the border half yellow and half dark brown; 7.5×8 ft. J. S. E.

2224. Siapo, heavy, two-inch circles with seven or eight radiating lines; 5.5×9.5 ft. J. S. E.

2225. Siapo, figured in yellow and black on white border of triangles and leaves; uncut; 6.2×9 ft. J. S. E.

2226. Siapo, dark, with lighter triangular bands; 5.7×8.2 ft. J. S. E.

2227. Siapo, zigzag in blue (foreign), red and black, also ruled figures; 6×8 ft. J. S. E.

2228. Siapo, white, with black painted figures, some ciliate; 5×7 ft. J. S. E.

2229. Siapo, heavy, painted red-brown, ciliated bands arranged in various ways, straight and curved; fringe yellow; 5×5.5 ft. J. S. E.

2230. Siapo screen or double curtain with suspending cords of braided hau; 6.2×11 ft. Used as a sleeping screen. From Mataafa, Tui Atua, Upolu. J. S. E.

2231. Siapo tainamu or mosquito curtain, painted; 14.5×15 ft. J. S. E.

2232. Siapo lavalava, white, with black figures and dots; 1.8×13 ft. J. S. E.

2950. Siapo, dark, varnished; 8×8.2 ft.

2954. Siapo, white, with upete stamps in brown; 6.5×9 ft.

2955. Siapo, white, with red bordered sections, brown stamps, white edge on one side with dentils; 4×7 ft. Hawaiian Museum.

2956. Siapo, white, with careful black rulings and painted triangles; red glazed beneath; 6.2×4 ft.

2957. Siapo, white, ruled and painted in black; red beneath; fringe cut; 3.5×5.3 ft.
2958. Siapo, white, with upete stamped brown; wide white border; 5×8 ft.
2959. Siapo, painted with brown and yellow checkers and other figures; 6.5×8.3 ft.
2960. Siapo, divided into rectangles, dark ciliated crescents in alternate sections (Pl. 27); 6.5×8.6 ft.
2961. Siapo lavalava, with thin black border; with various small figures; 2×12.6 ft.
2962. Siapo, white, with brown upete stamps; 9.6×11 ft. J. D. Strong.
2963. Siapo, white, with brown upete figures; 9×9 ft.
2964. Siapo, white, with brown upete stamped figures; portion marked only with irregular lines; fringed; much patched in beating; 5.3×7.6 ft.
2965. Siapo, brown, covered with dark red and black triangles; varnished; fringed on two ends; 5.6×7.3 ft.
2968. Siapo lavalava, white, with brown figures and darker border lines and round spots; 1.5×10 ft. J. S. E.
2969. Siapo lavalava, white, with figures in black and brown; 1.6×12.2 ft.
2970. Siapo lavalava or pulou, white, fringed; 1.6×18 ft. J. S. E.
2971. Siapo made into a jacket or coat, brown.
3573. Siapo, white, with serrate border on three sides; painted black zigzags and lines; 4.5×5.2 ft.
5846. Siapo, with solid red varnish on one side, dentils on three edges; 2.7×5.4 ft. Mrs. M. D. Hendricks.
5847. Siapo, two sheets pasted together; main part marked in ten-inch squares; three sides with white fringe; 7.7×9.2 ft. Good workmanship. Mrs. M. D. Hendricks.
8838. Siapo, white, with black and red rulings and painted squares in black; 3×5.5 ft. 1835. Labelled "Hawaiian Mat." Gorham D Gilman.
8839. Siapo, white, ruled with black and red in many patterns, often with black squares painted in; red glazed beneath; 3.1×5.5 ft. 1835. Gorham D. Gilman.
9464. Siapo, dentate at each end, stamped with squares filled with triangles, etc.; 5.7×8 ft. Deverill collection.
10,328. Siapo, upete stamped in the middle with a comparatively plain border 2.7 ft. wide running lengthwise on both sides; 12.5×31.5 ft. Kaiulani collection.

Bark-Cloth from other Groups.

1765. Gbola or bark-cloth for malo. From Kai, New Guinea.
1766. Po or bark-cloth for malo. Kela, New Guinea.
1767. Po or bark-cloth for malo. Bukaua, New Guinea.
1768. Obo or bark-cloth for malo. Jabin, New Guinea.
1769. Nakwin or cloak of bark-cloth (Fig. 22, p. 60). Jabin, New Guinea.
1784. Gi or bark-cloth malo, decorated. From Poom, New Guinea.
1785. Mal or bark-cloth malo, decorated. From Siassi, Low Ids., New Guinea.
1996. Fan of black and white bark-cloth with a fringe of white. Fiji. Craig collection.
2027. Masi or kapa used as a turban; thin and white. Fiji. Craig collection.

2028. Masi for turban, thin and white. Hawaiian Museum.
2799. Kapa, thick, papery, hoopai; 7.2×8 ft. Marquesas Ids.
2952. Bark-cloth; leathery, dark red, yellowish underneath; 7×9 ft. Marquesas Ids. Craig collection.
6091. Kapa, white, hoopai, made from breadfruit bark; 5.5×11.6 ft. Tubuai, Austral Ids. Seale.*
6092. Kapa, red-brown, of breadfruit bark, hoopai. Used at childbirth. Given by Orsmund Walker. Rurutu, Austral Ids. Seale.
6093. Kapa, white, stiff, hoopai; 3.5×6.3 ft. Given by Orsmund Walker. Rurutu, Austral Ids. Seale.
6112. Kapa, white, hoopai, with a narrow border with beats at right angles to the rest; 6.5×6.7 ft. Huapu, Marquesas Ids. Rev. Kauwealoha. Seale.
6113. Kapa, white, hoopai; 5.6×12 ft. Nukuhiva, Marquesas Ids.
6114. Kapa, white, stiff, hoopai. Rev. Kauwealoha, Nukuhiva, Marquesas Ids. Seale.
6115. Kapa, white, hoopai; 8×22.8 ft. Nukuhiva, Marquesas Ids. Seale.
6116. Kapa, white, stiff, hoopai; 10×12.6 ft. Nukuhiva, Marquesas Ids. Seale.
6117. Kapa, white, stiff, hoopai; 7.3×14.7 ft. Nukuhiva, Marquesas Ids.
6118. Kapa, red-brown; 6.7×9 ft. Nukuhiva, Marquesas Ids. Seale.
6167. Kapa, coarse, brown, partly made. Nukuhiva, Marquesas Ids. Seale.
6298. Kapa hoopai, marked with kukui and toa bark; 7.2×8.5 ft. Rarotonga. Seale.
6299. Kapa hoopai, dyed with turmeric and rudely painted with kukui bark; 4×6.7 ft. Given by Col. and Mrs. Gudgeon. Rarotonga. Seale.
6300. Kapa, brown, hoopai, harsh in texture; 6.2×8 ft. Col. and Mrs. Gudgeon. Seale.
6301. Kapa; 5.8×8.7 ft. From Aitutaki, Hervey Group. Seale.
6304. Kapa, white, thick, with elaborate decoration in freehand (Pl. 17, 1); 5.8×7 ft. Once belonged to the king of Niuë. Given by Mr. and Mrs. Kahn.
6309. Kapa, white, hoopai, stiff; 5.8×7 ft.
6982. Kapa, coarse, light blue with darker blue figures outlined in red (Fig. 24); 2.6×5 ft. New Hebrides.
6983. Kapa, heavy, blue; 3.2×5.7 ft. Bogotu, Solomon Ids. Craig.
7986. Masi head dress or turban, white, both edges fringed; 1.8×33 ft. Collected 1896, W. T. B. Fiji.
7987. Masi, white, fringed on long edges; 2.5×20.5 ft. Collected, W. T. B. Suva, Fiji.
7988. Masi, light brown, very thin, fringed on all edges; 2.2×5.8. Collected, W. T. B. Suva, Fiji.
7989. Masi sula, white, with black and brown decoration (Pl. 11); 5.8×6.2 ft. Collected, W. T. B. Fiji.

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*Alvin Seale, then on the Museum staff, was sent to explore the southeastern Polynesian groups where the kapa industry had long flourished, but he found little left, and it was mainly by the generosity of foreign residents that he was enabled to send to the Museum the specimens enumerated.

7990. Masi sula, black on white (Pl. 13); 1.1×9.5 ft. Collected, W. T. B., 1896. Suva, Fiji.

7991. Masi sula, black stamps on white (Pl. 12); 2.6×18 ft. Collected, W. T. B., 1896. From NGau, Fiji.

8033. Bark-cloth, white; 7.5×9.5 ft. Marquesas Ids. By S. T. Alexander.

8257. Bark-cloth from Malaita, Solomon Ids. Seale.

8258. Bark-cloth; 2.5×5.3 ft. From Solomon Ids. Seale.

8264. Malo of coarse white fabric 2.5 ft. wide at one end, 1.75 at the other, and 7 ft. long. Figured in blue as shown in Pl. 30. Seale.

8267. Malo of blue, figured all over with animals and thunderbolts; 2.7×5 ft. Seale.

8268. Kapa, with breadfruit varnish on the face; 4.7×9.2 ft. From Mangaia, Hervey, Ids.

8269. Kapa, rough, hoopai, breadfruit bark-cloth; light brown (BB, 12), stiff texture. Used on bridal day, according to the collector; 5.4×16.2 ft. Rarotonga. Seale.

8270. Kapa from Rarotonga closely resembling Samoan; 7.3×9.2 ft. Seale.

PLATES

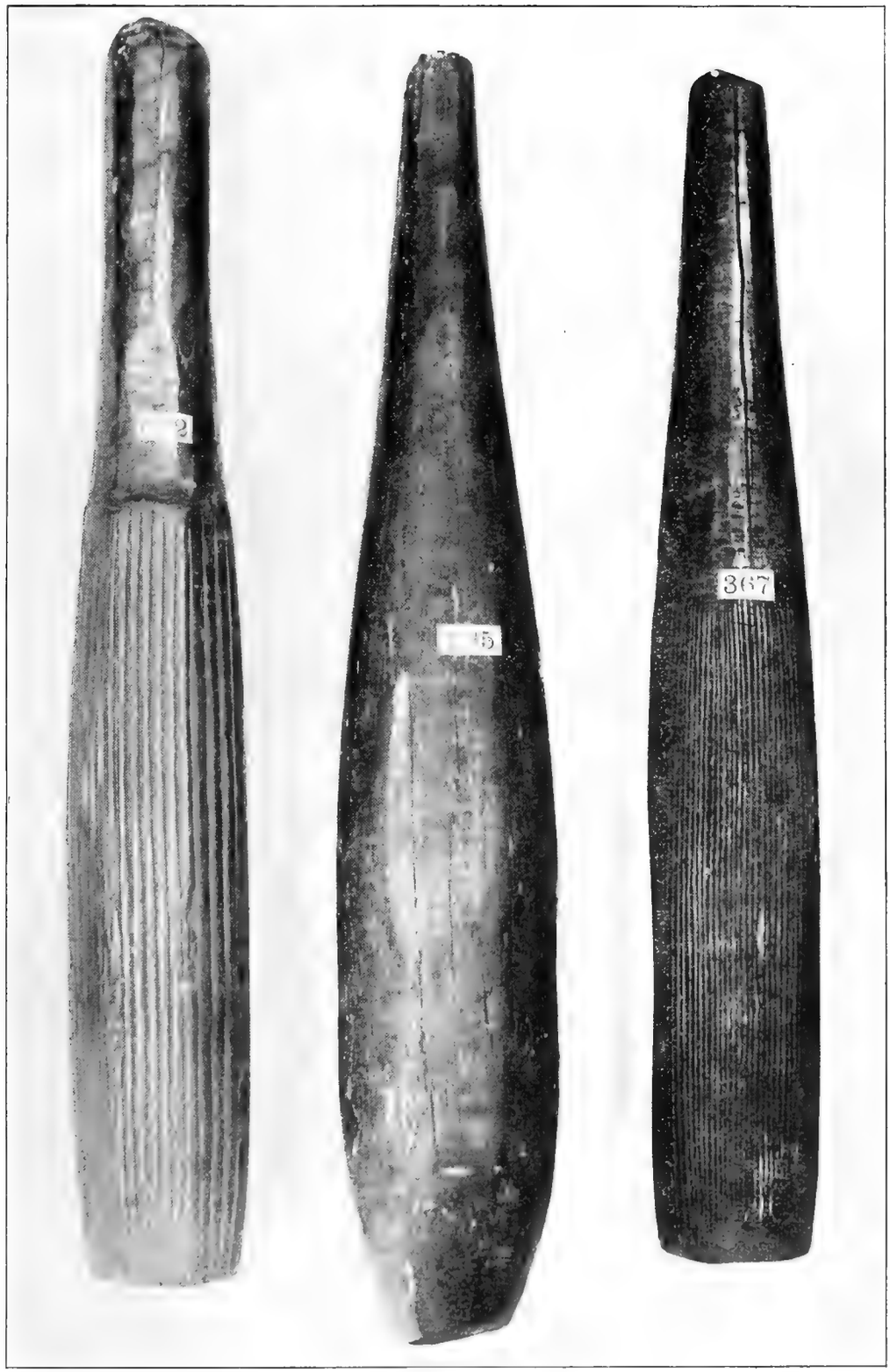
PLATE 1.

Na Hohoa or Preliminary Beaters.

No. 372 is a polyhedral form rather uncommon, and apparently made by rubbing down the sides on a rough stone and then grooving.

No. 385 is a beater of plain round form like a club; these are not often used.

No. 367 is the regular form. All these are figured about half length.



NA HOHOA OR PRELIMINARY BEATERS.

PLATE 2.

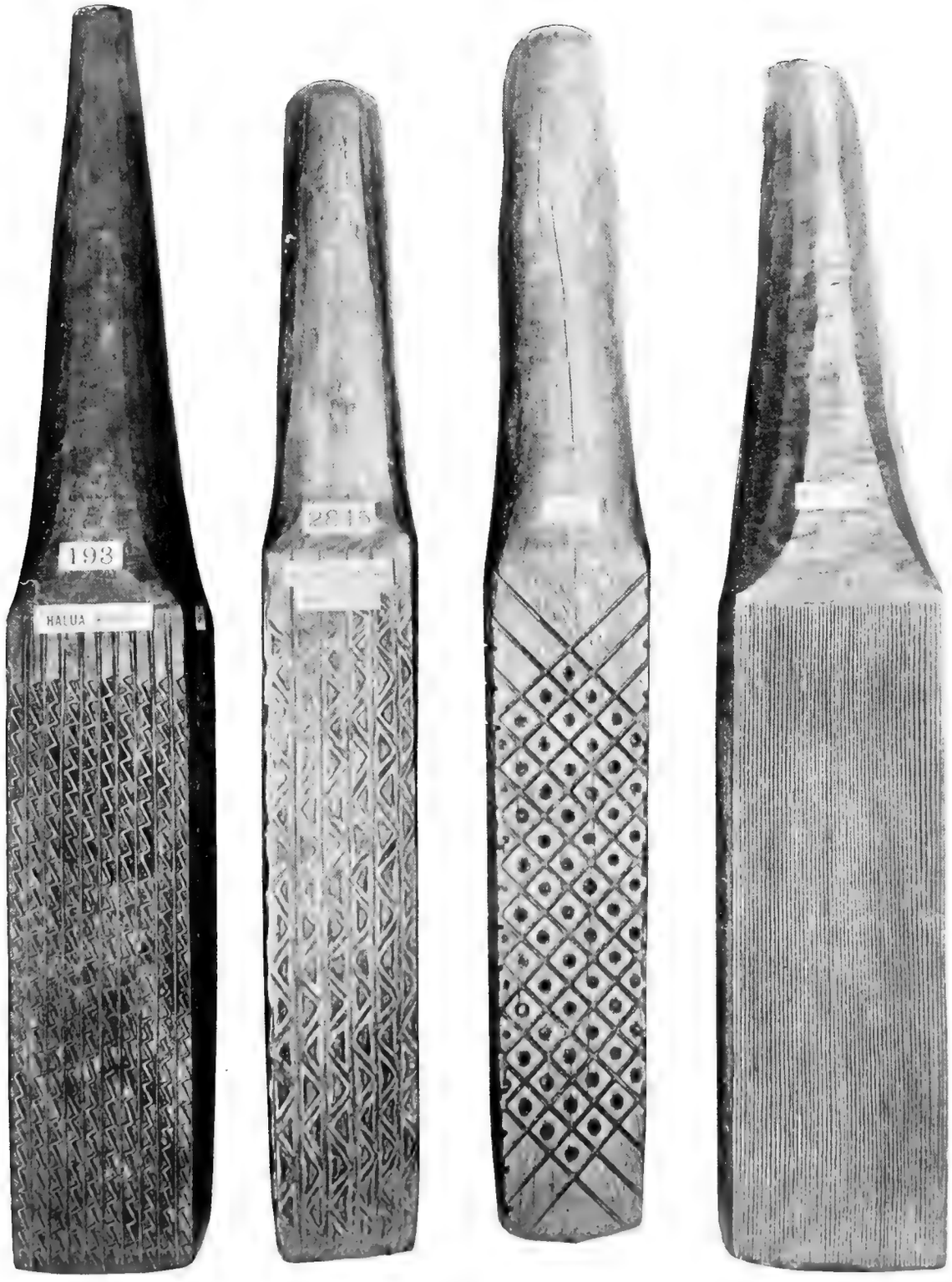
HAWAIIAN IE KUKU OR KAPA BEATERS.

No. 193 is a marked specimen of the halua koeau pattern exceedingly well carved.

No. 2845 is the only beater of this peculiar pattern in the Museum collection, and there is also a kapa beaten with it that is by no means new although in good condition. The halua pawehe niho mano or shark tooth design gives a good surface to the kapa.

No. 284 shows a favorite pattern, especially on Kauai, with the lines so deeply cut as to appear made by a saw, but probably a shark tooth cutter could do as clean work.

No. 8673 is a fine specimen of the hoopai pattern.



HAWAIIAN IE KUKU OR KAPA BEATERS.

PLATE 3.

Hawaiian Ie Kuku or Kapa Beaters.

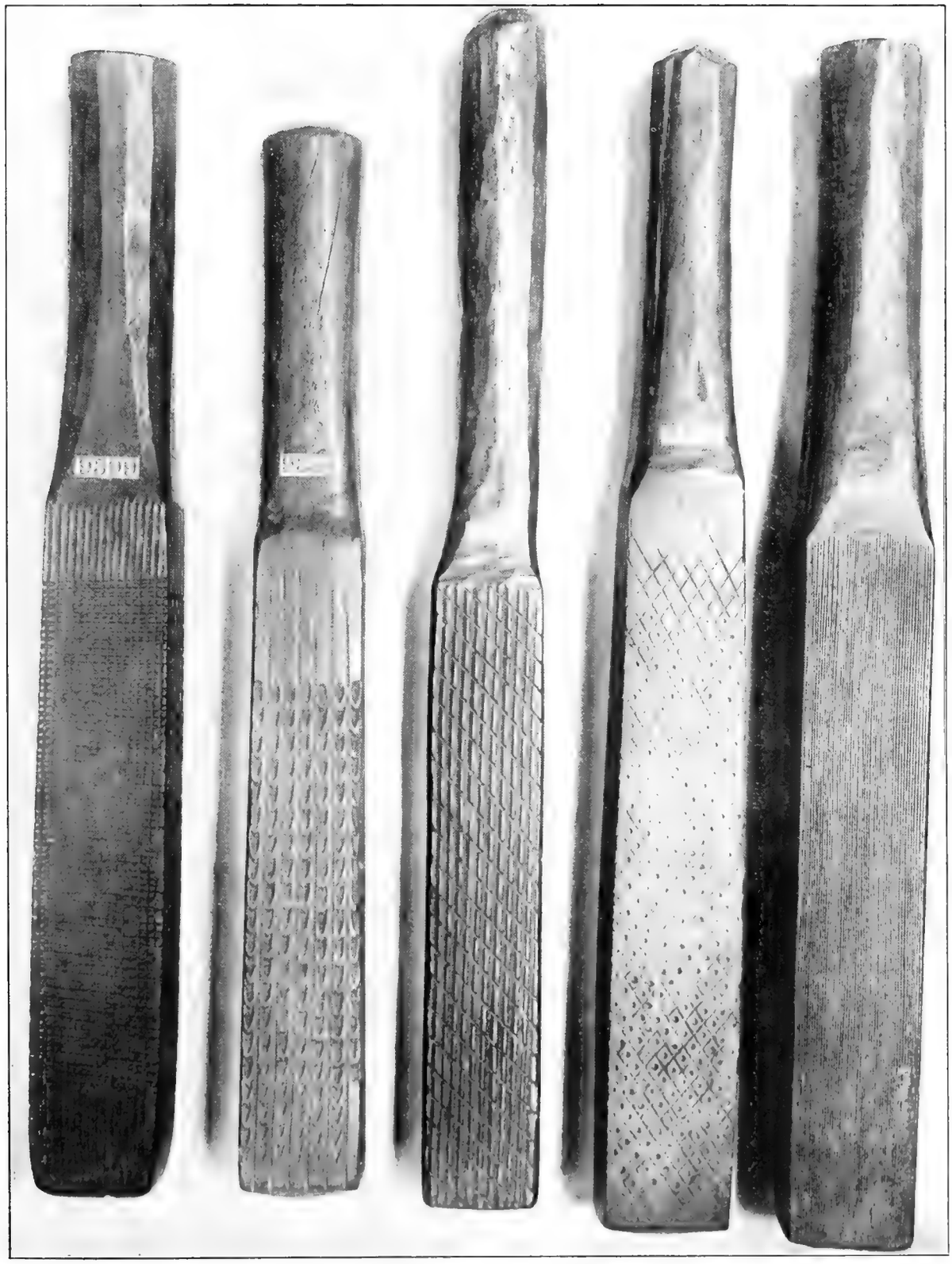
No. 9399 is a good example of the hoopai halua.

No. 9384 is a well cut specimen of the kapuai koloa pattern.

No. 9381 has a remarkably long handle, and the pattern pepehi pawehe has carefully even lines.

No. 9376 is the favorite Kauai pattern with lines closer than common.

No. 9385 is the hoopai pattern with very close lines; intended for the finest kapa.



HAWAIIAN IE KUKU OR KAPA BEATERS.

PLATE 4.

Hawaiian Ie Kuku or Kapa Beaters.

No. 9379 is a pepehi with the halua lines irregularly spaced so that the "islands" are of different shapes and sizes.

No. 9401. The pattern upena halua pupu is regular but the space failed on the right side.

No. 9375 is a very regular specimen of hoopai halua, probably from Kauai.

No. 9376 is a halua koeau with the zigzags very cleanly cut.

No. 9383 is an example of the odd forms common to Kauai having two puka or pupu on each "island".

9379 9401 9375 9376 9383

HAWAIIAN IE KUKU OR KAPA BEATERS.

PLATE 5.

Marquesan Tapa Beaters.

These all show the short handle and long face peculiar to the group. The hoopai pattern is not very regular, and in some shows considerable wear. The ornamental markings on Nos. 9952 and 6128 may be marks of proprietorship; the termination of the handle differs in each.

9949 9950 9951 9952 6128

MARQUESAN TAPA BEATERS.

PLATE 6.

Tahitian Tapa Beaters.

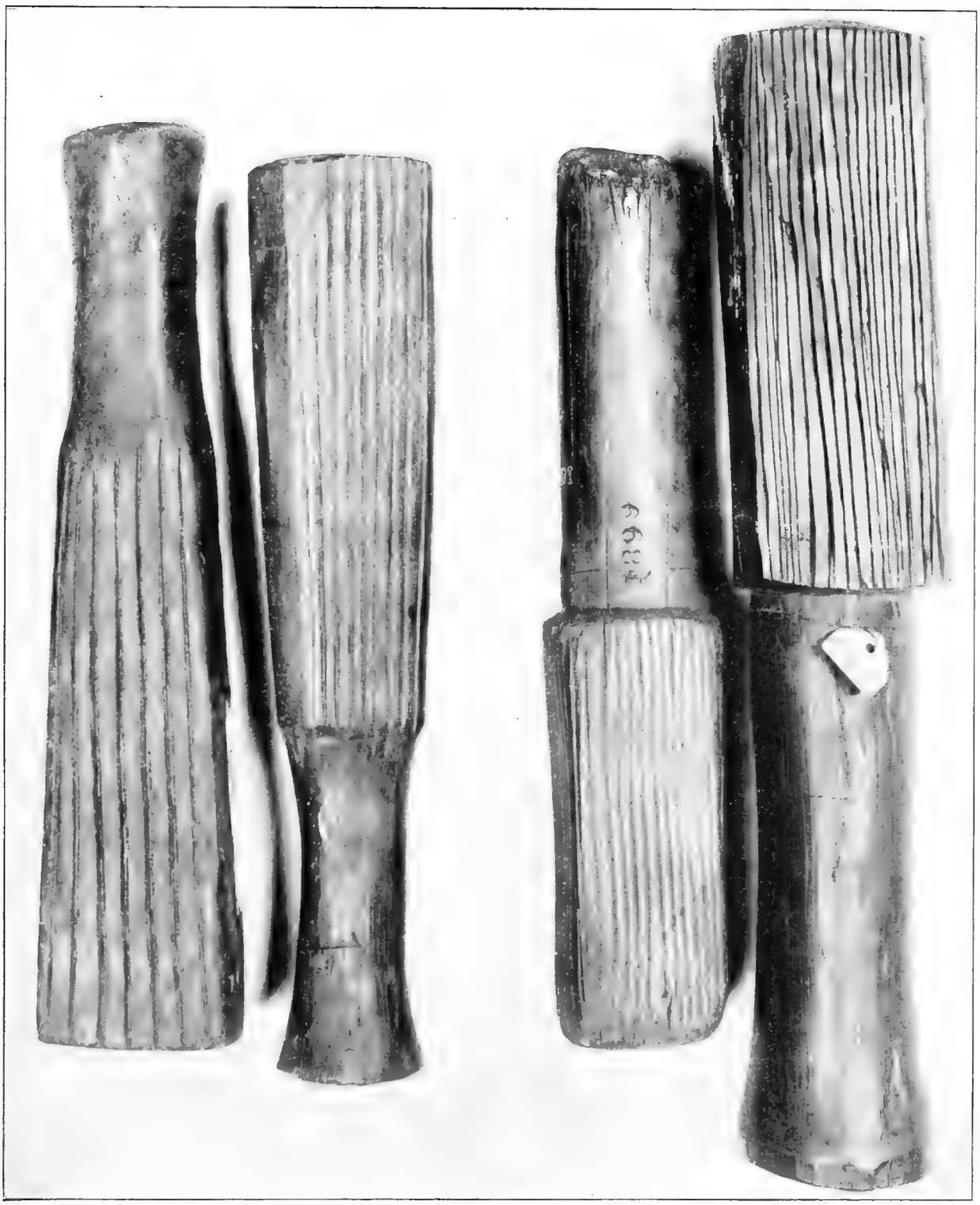
These beaters, showing both the hoopai and pepehi patterns are of good shape and more carefully formed than any of the Hawaiian specimens, but the patterns are not so carefully cut. While some are short, the average is longer than on Hawaii.

TAHITIAN TAPA BEATERS.

PLATE 7.

Beaters from the Tongan and Solomon Groups.

The beaters on this plate are short and thick and generally distinct from the Polynesian forms already shown. In the Tongan the sides are no longer parallel but inclined towards the handle, which is short and flaring. The clumsiness of the Solomon Islands specimens is in keeping with the coarseness of the fabric they prepare; the shape and proportion of the faces remind one of the stone faces used in old Mexico. No ruler seems to have been used in marking the ridges.

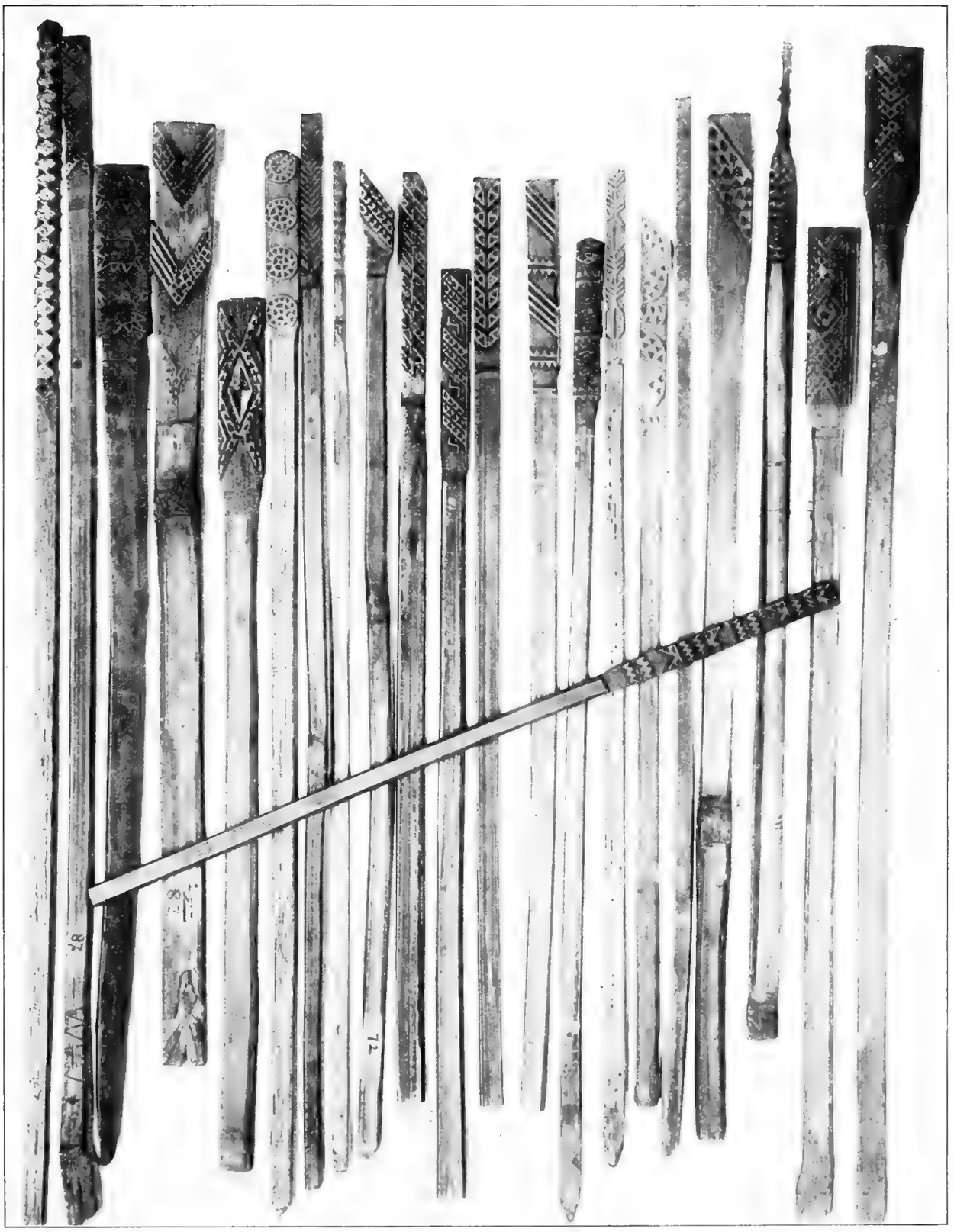


Tonga. TAPA BEATERS. Solomon Islands.

PLATE 8.

HAWAIIAN OHEKAPALA OR BAMBU STAMPS.

These are represented at about half size, and give a fair idea of their average form and carving. They are lateral type instead of vertical. On the next plate will be seen impressions of these and others.



NA OHEKAPALA. BAMBU STAMPS.

PLATE 9.

IMPRESSIONS OF BAMBU STAMPS IN THE BISHOP MUSEUM.

These are photographed from the actual impressions. Some, as Nos. 2, 10, 12, 18, 24, 27, were for detached designs; others like Nos. 4, 5, 6, 32, 47, 54, served for lines of various length, and others like Nos. 9, 16, 44, 51, by repetition laterally made bands of any length, or borders. It will be easy to identify many of these in the examples of stamped kapa given in the text or plates.

IMPRESSIONS OF BAMBU STAMPS.

PLATE 10.

Sula from Fiji.

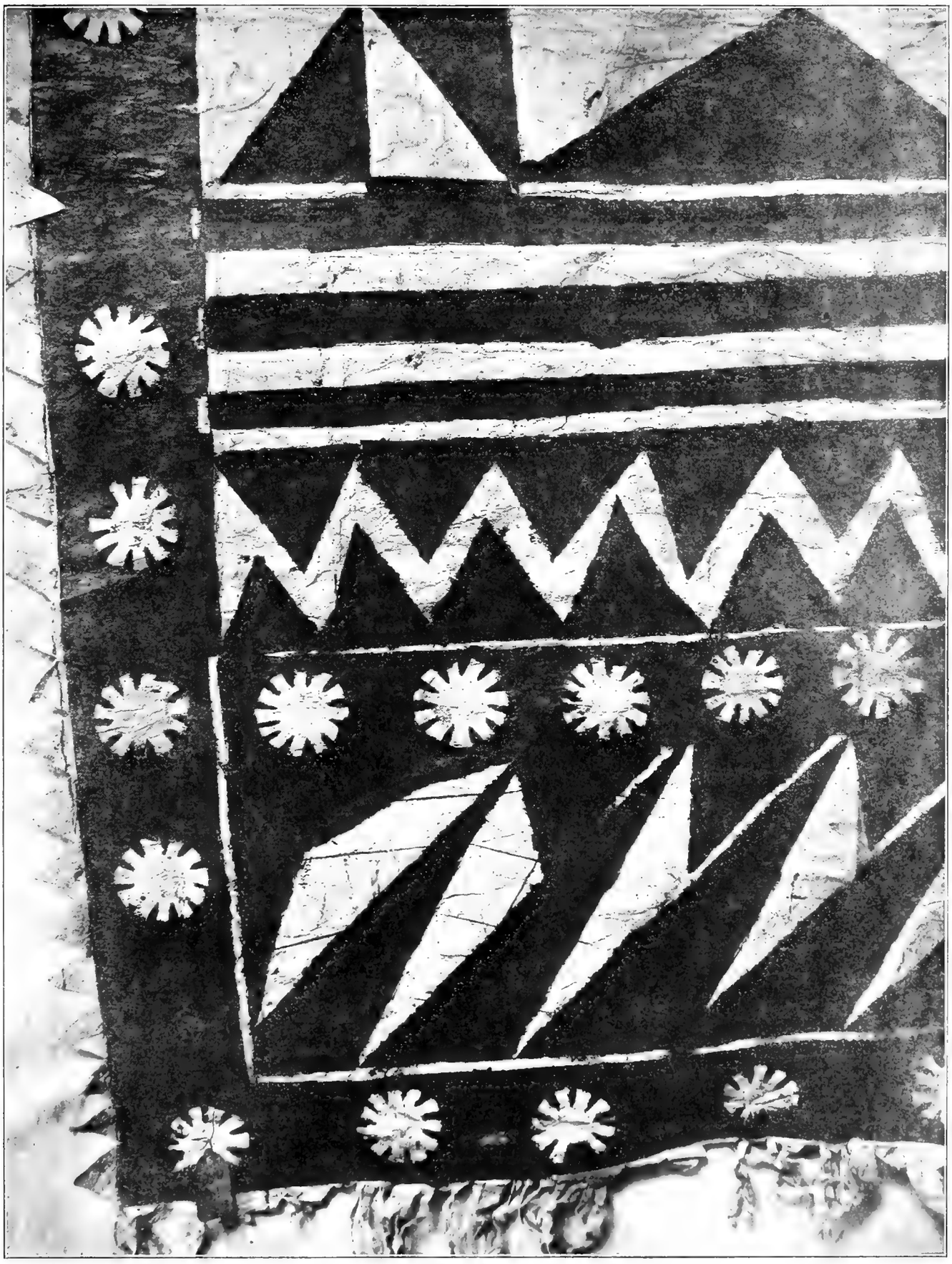
A very beautiful border of a sula brought from Fiji by the Wilkes Expedition in 1840, now in the National Museum, the photograph kindly sent me by the Museum authorities. The design is totally different from the Hawaiian and is very artistically arranged and stamped. The lower section is mainly in black, the upper in bischofia brown stamped with the upete; the border is carefully elaborated and is worthy of much more study than we can give it here.

MASI FROM FIJI. WILKES EXPLORING EXPEDITION.

PLATE 11.

Fijian Masi in Bishop Museum.

A somewhat coarse but very effective design; one edge ornamented with dentils, the other fringed. The band with the florets is a deep red-brown, the rest black on white. Collected at Suva by the author in 1896. Width 70 in., length 75 in. This is so nearly square that it could hardly be used as a sula. The fringe is interspersed with fanciful clippings of masi. (7989.)

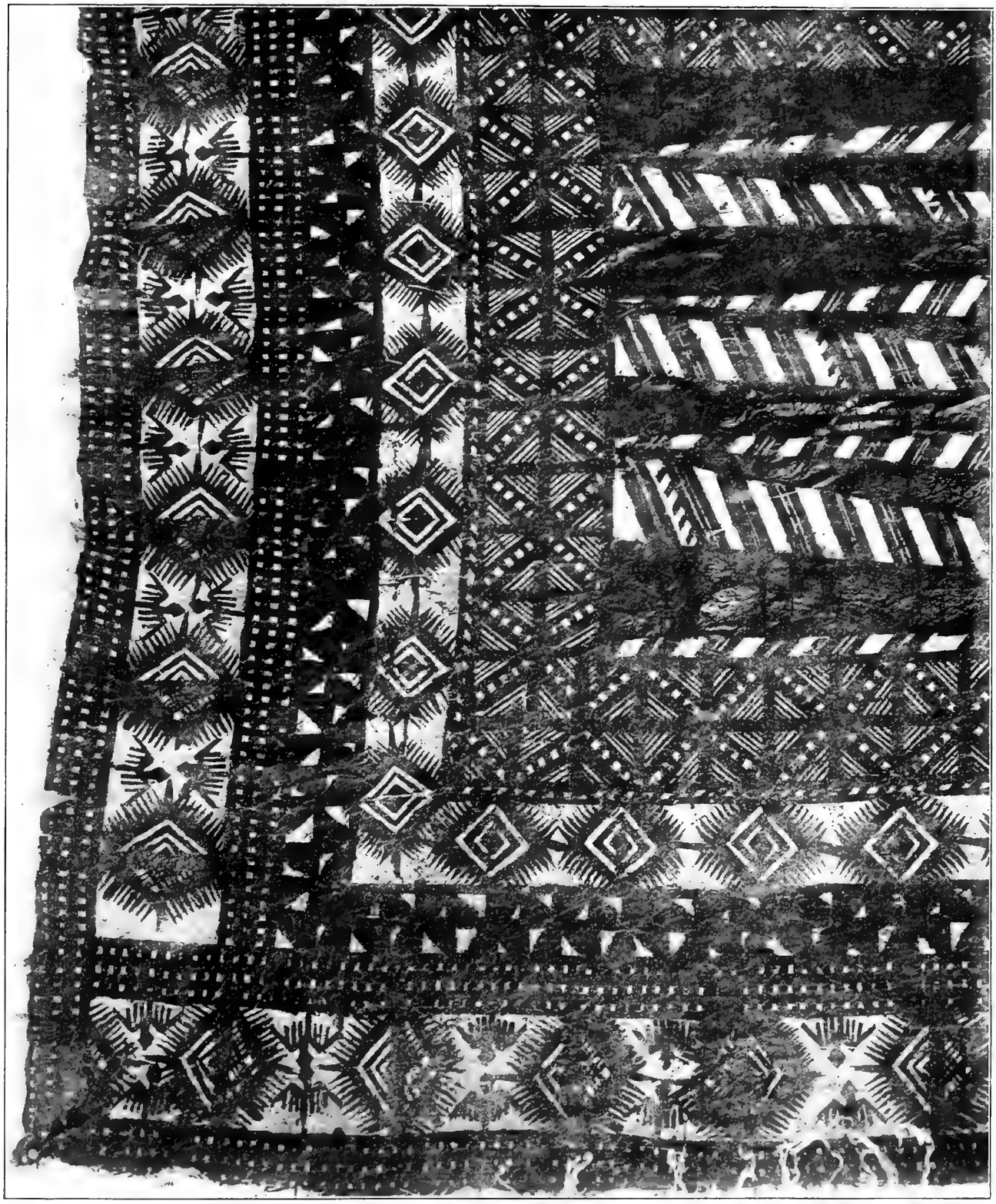


FIJIAN MASI, BISHOP MUSEUM.

PLATE 12.

Fijian Sula in Bishop Museum.

From Ngau, Fiji. White masi stamped in black. The garment is 32 in. wide and 18 ft. long. Collected by the author at Suva in 1896. The conventionalized birds in the outer border are noteworthy, but the general effect of the stamping is crowded and ill-fitting; probably a modern work. (7991.)



FIJIAN SULA, BISHOP MUSEUM.

PLATE 13.

FIJIAN SULA, BISHOP MUSEUM.

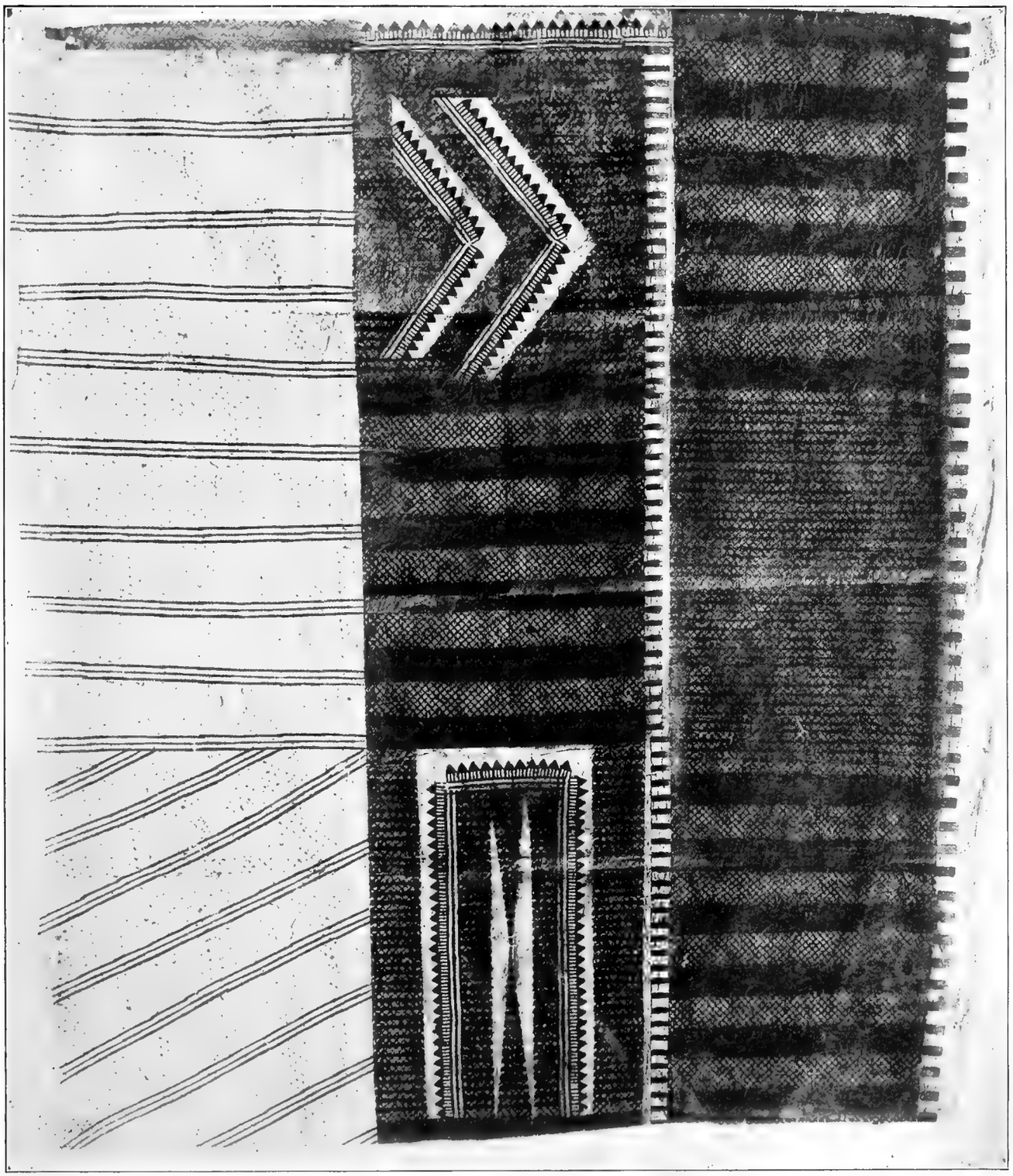
This makes an effective dress, but does not compare with the work shown on Plate 10. The garment is 13 in. wide and 9.5 ft. long, obtained in Suva by the author. For three feet from each end the pattern is as shown in the plate; the middle is decorated with three squares; the color is black on white with a deep red centre to the broadest black line. There is a finely divided fringe all round. (7990.)

FIJIAN SULA, BISHOP MUSEUM.

PLATE 14.

Fijian Sula.

This interesting sula is very neatly marked: the row of dentils at the bottom seems to have been stamped and is of a lighter red than the row of smaller dentils above. The pointed fringe of the inserted ornaments is of the same dark red as the smaller dentils: the cross ruling is so close as to darken the white surface of the thin but not well beaten tapa. The lining on the white portion consists of two black lines with an intermediate red one, and the arrangement of the two series reminds one of the Hawaiian method of decoration. The specimen is in the author's collection sent from the Salem Museum.

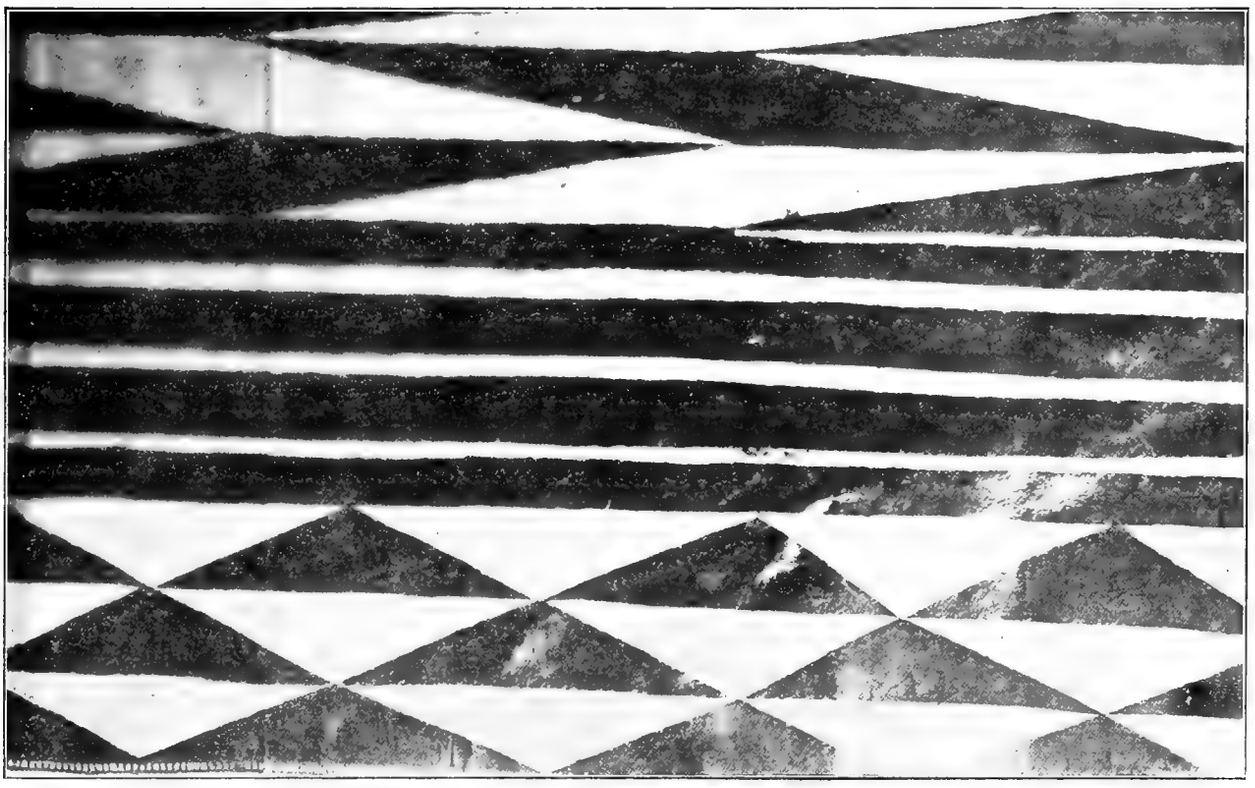


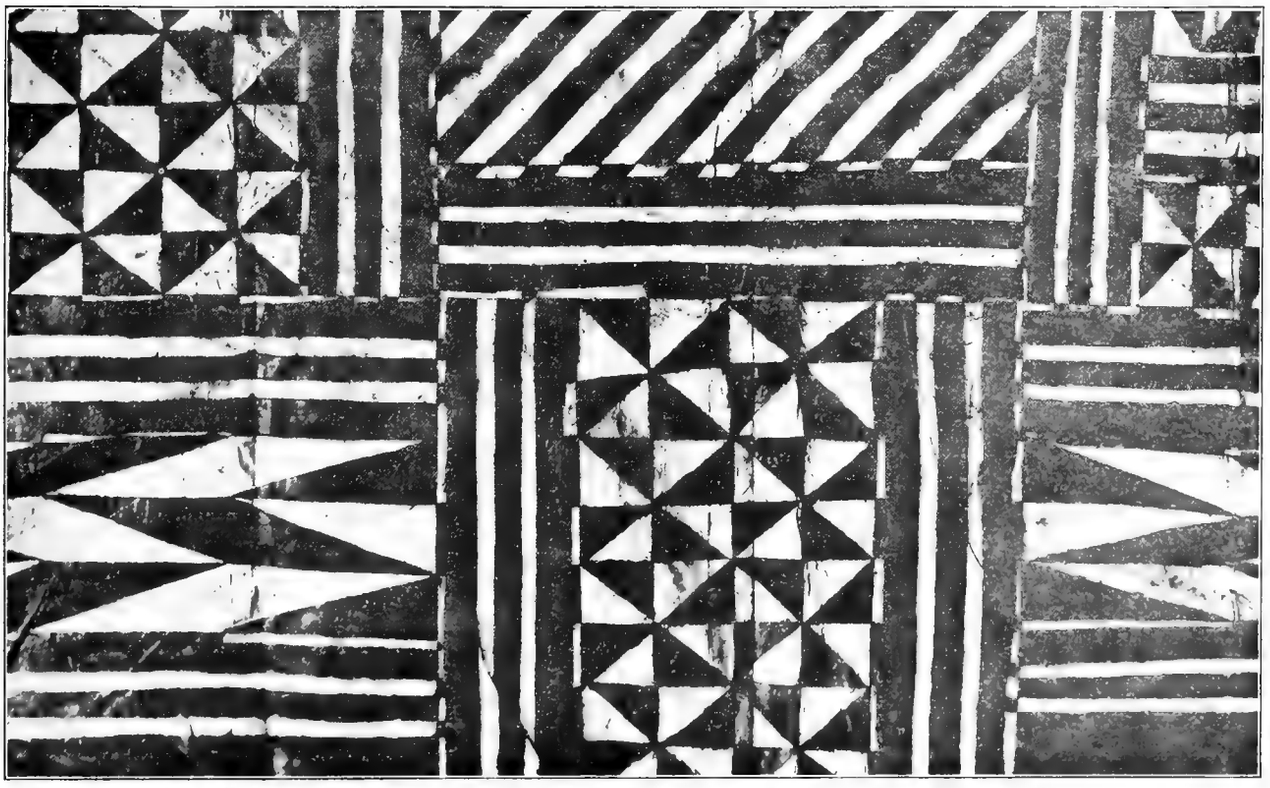
FIJIAN SULA.

PLATE 15.

FIJIAN MASI FROM TAVIUNI. BRITISH MUSEUM.

These boldly designed patterns depend largely for effect on the triangles. In the upper specimen these are black and red; in the lower black and brown. I have not the exact scale, but in the plate the pattern is greatly reduced.





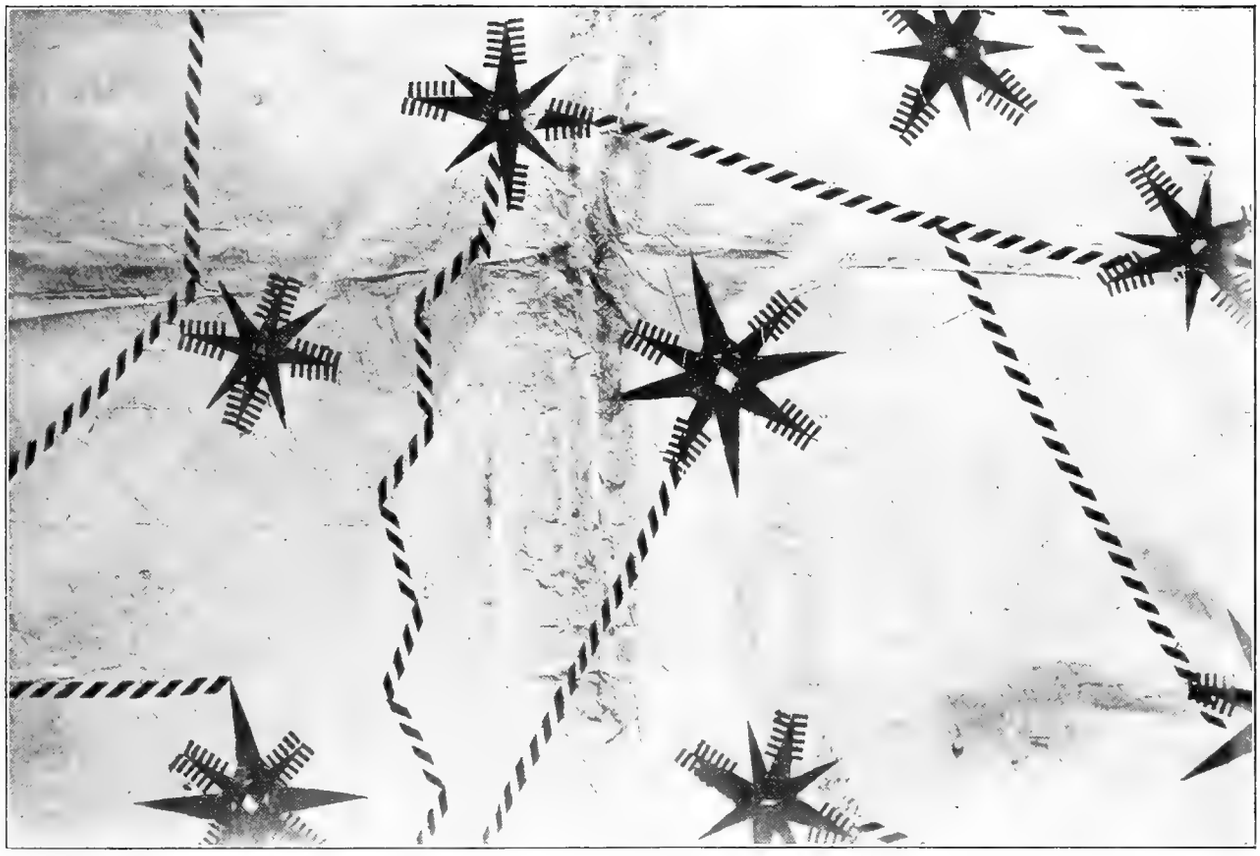
FIJIAN CLOTH FROM TAVIUNI. BRITISH MUSEUM.

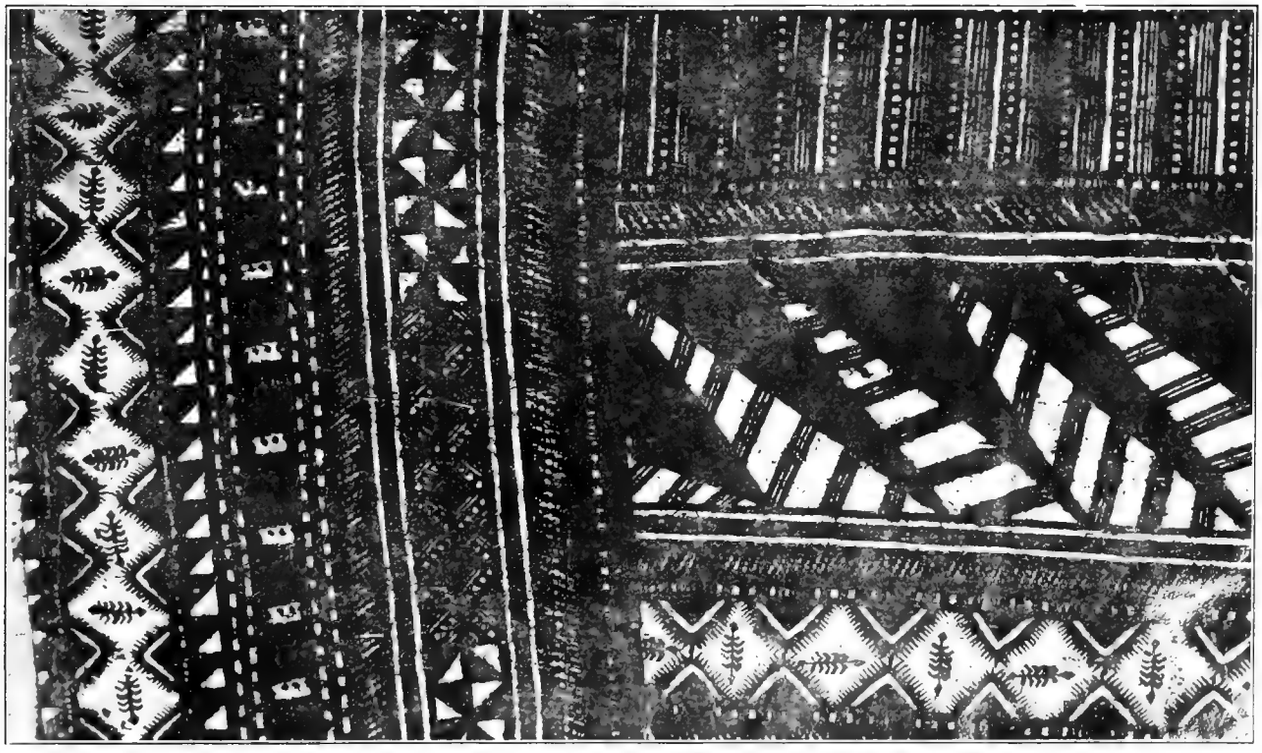
PLATE 16.

Fijian Patterns in the British Museum.

The upper figure showing stars on irregularly stamped lines has a good appearance in the sheet. The stars could not have been stamped as a whole as no two are alike.

The lower figure is from a sula of which a portion of the design recalls the figure in Plate 10, but the execution is far inferior.





FIJIAN PATTERNS IN BRITISH MUSEUM.

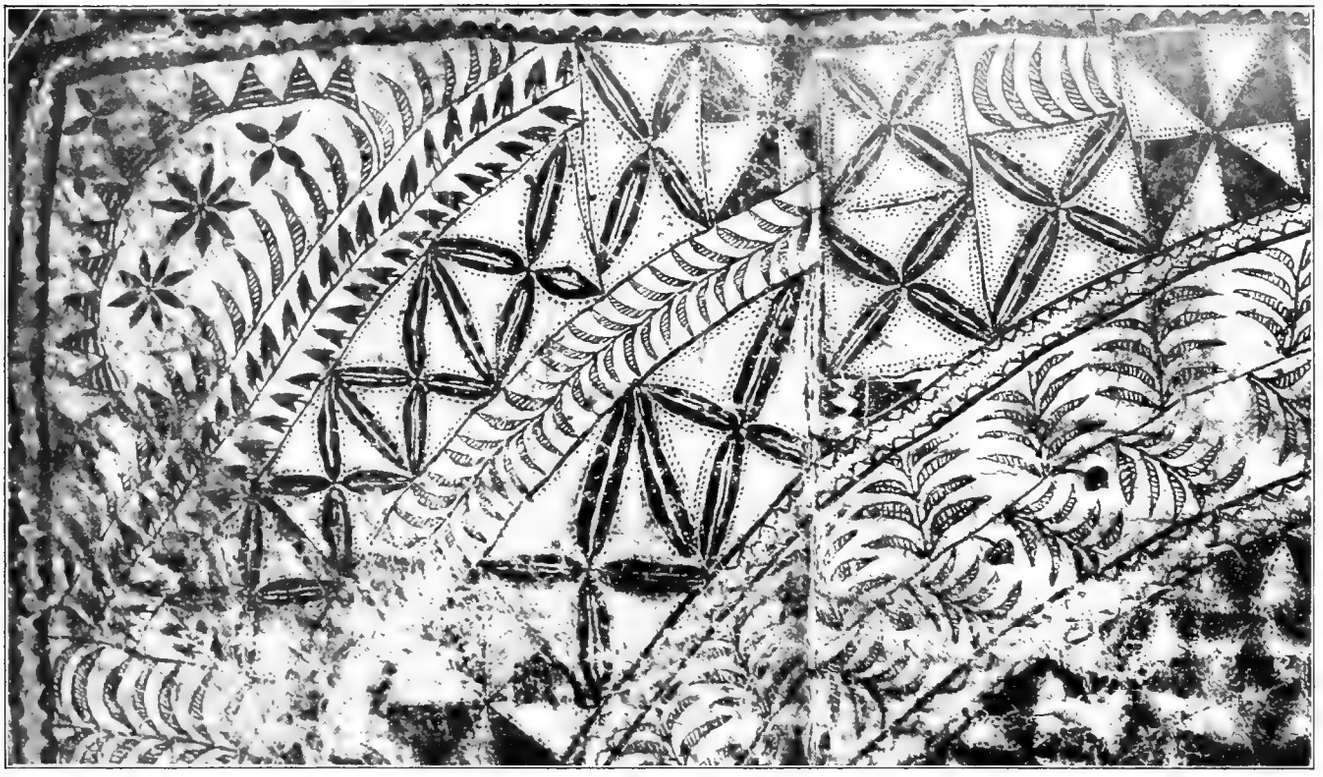
PLATE 17.

Tapa from Niue.

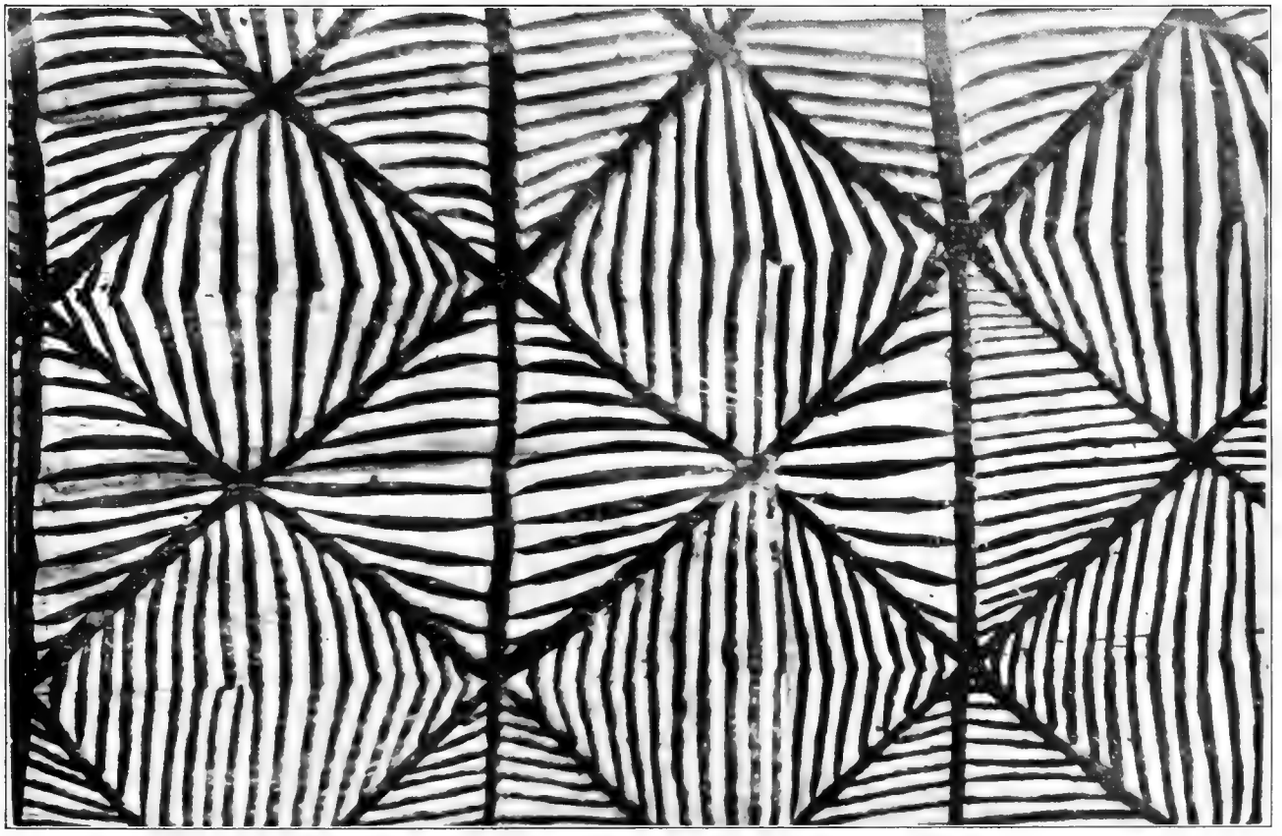
The well worn and rather dirty tapa from Niue was once the property and dress of the king of that island. The floral patterns are drawn with patience but not with a steady hand. The taro leaves and bananas are easily recognized.

Siapo from Samoa.

The Samoan pattern seems a favorite one with that people, and in the present example is more vivid than usual: staring steadily at it should be enough to hypnotise a sensitive subject. Obtained by the Museum collector.



TAPA FROM NIUE.

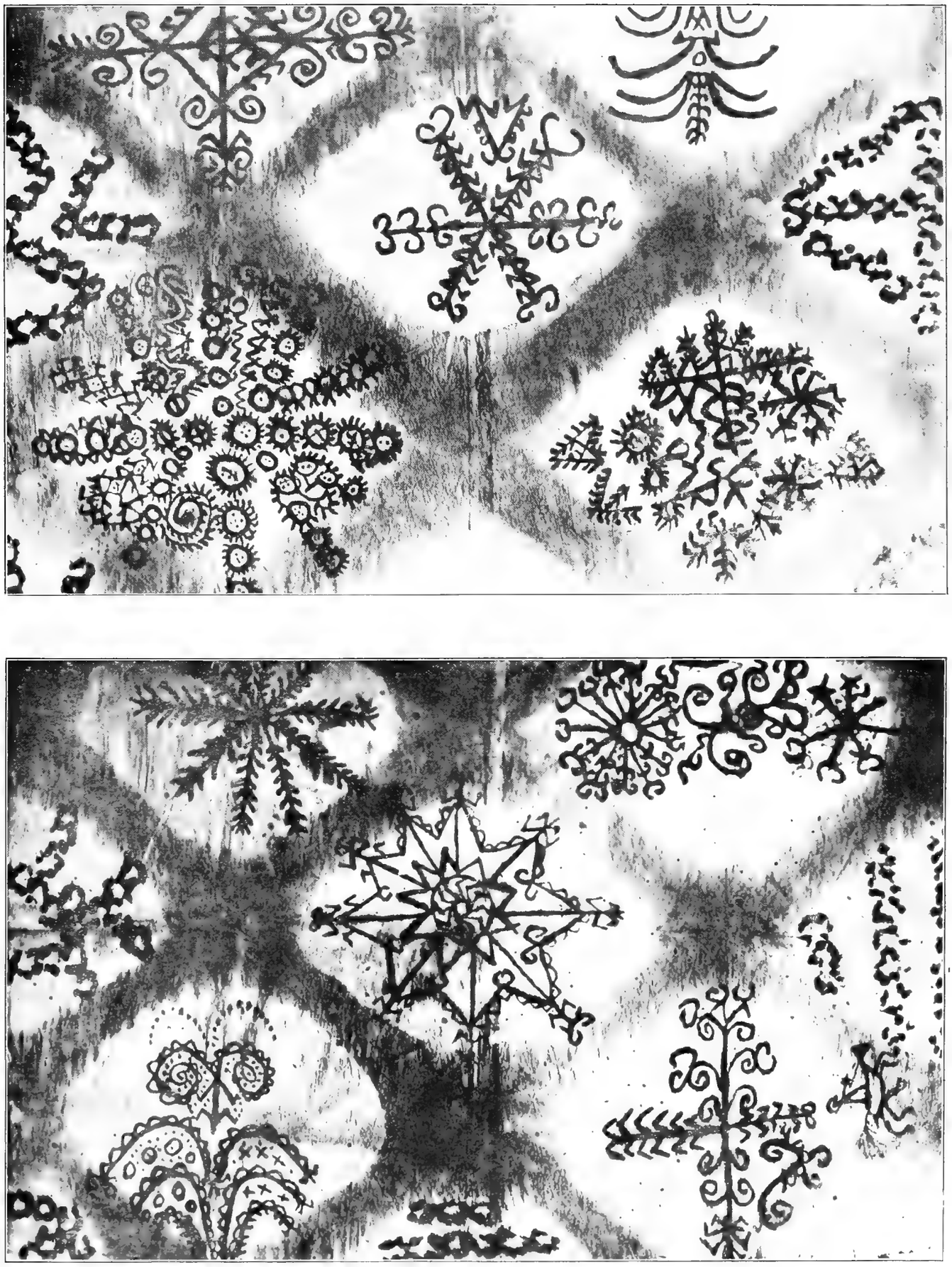


COMMON TRIANGULAR PATTERN FROM SAMOA.

PLATE 18.

TAHITIAN TAPA. BRITISH MUSEUM.

The designs of this tapa are in brown on white, the dusky bands between them being yellow. It is hard to say what they were not intended to represent: only the figure on horseback can be fairly identified. The use of the spiral should be noted.



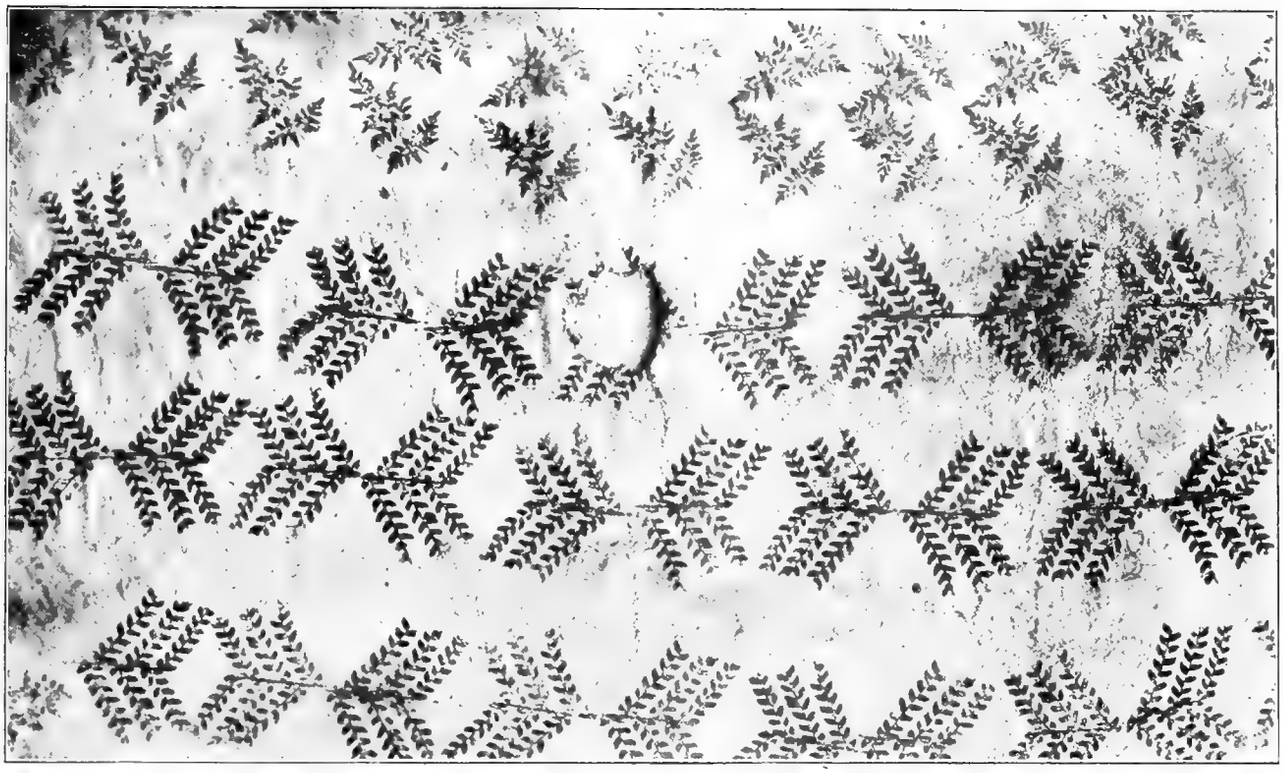
TAHITIAN TAPA. BROWN AND YELLOW ON WHITE.

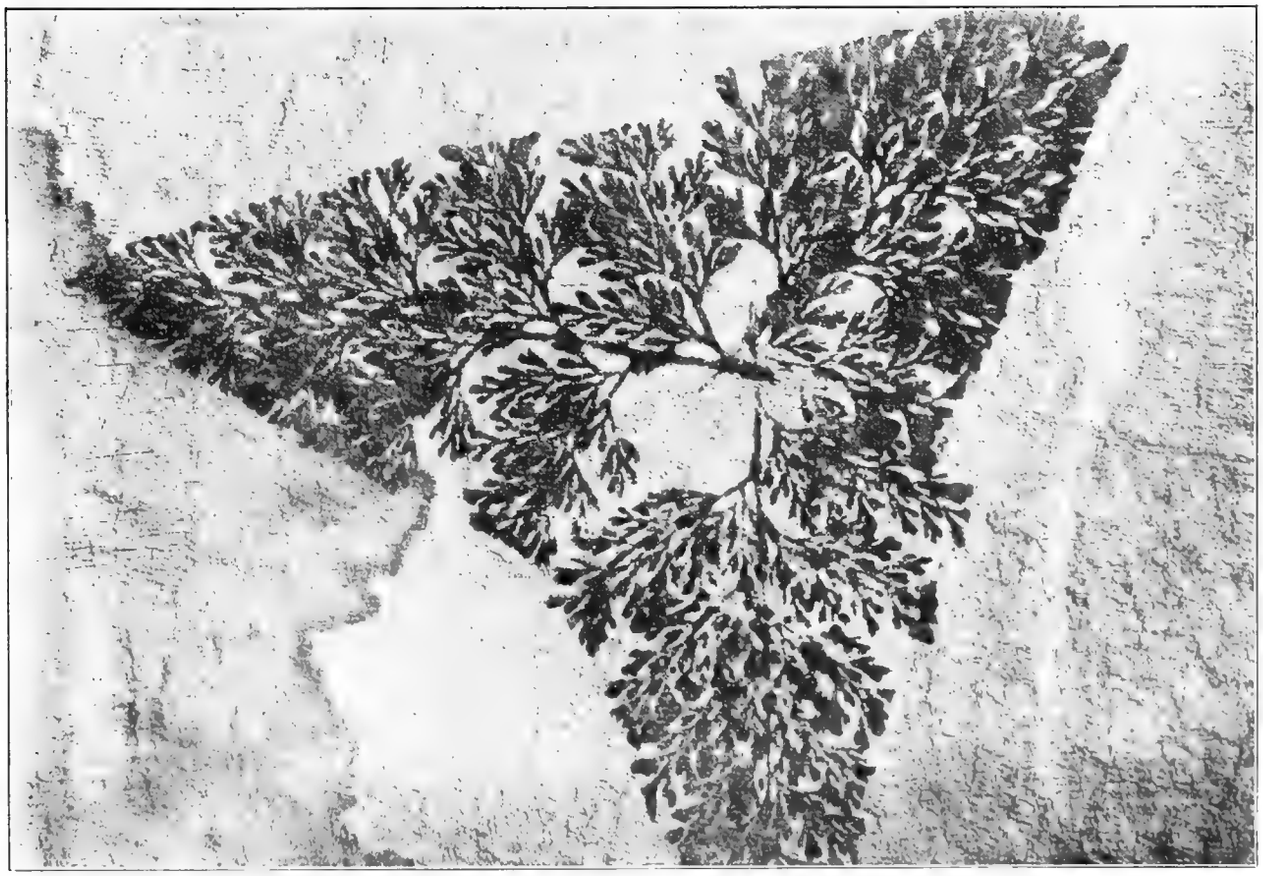
PLATE 19.

Tahitian Tapa.

In the upper specimen the fern leaves are mingled with some other leaf which I do not recognize: this is much reduced and from specimen in the British Museum.

The lower is the more common fern arranged as a central pattern on a large sheet. In both examples the stamp was originally a vivid crimson on bright yellow. The lower pattern is in the author's possession and is much stained.



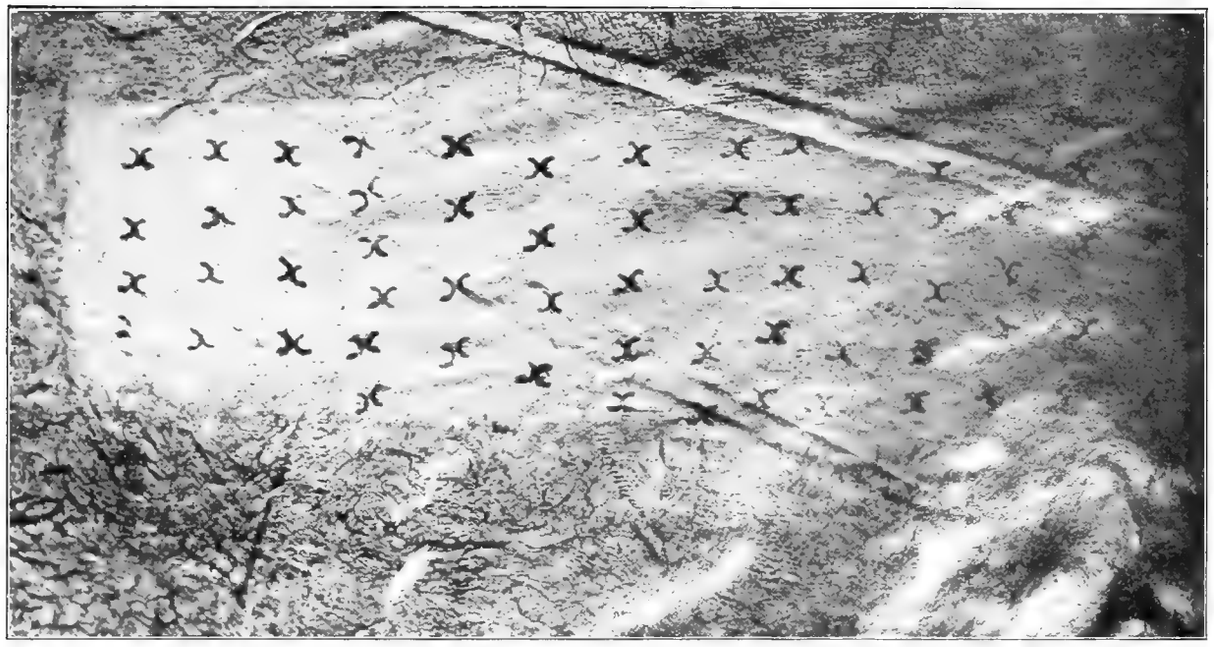


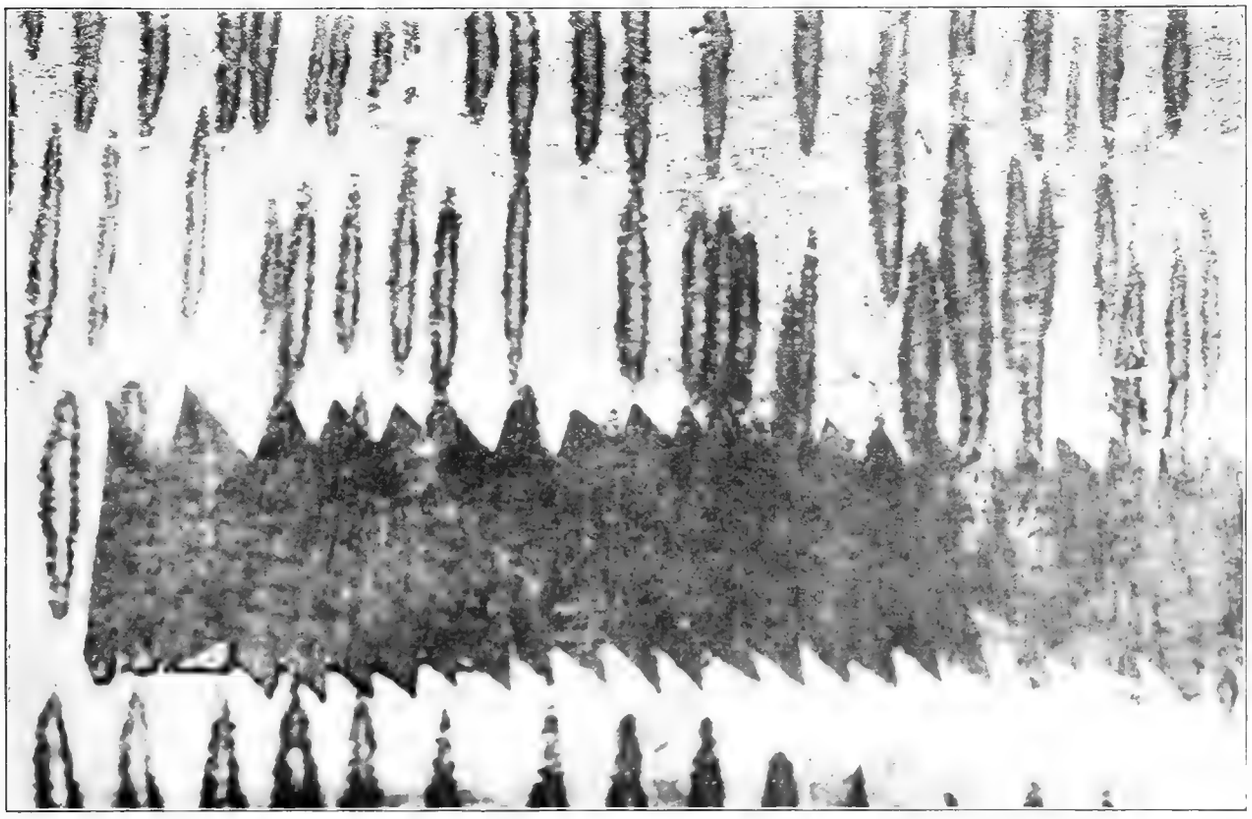
TAHITIAN TAPA. CRIMSON ON YELLOW.

PLATE 20.

Tahitian Tapa.

The upper specimen is from the British Museum: crimson stamped on yellow. The lower one is apparently stamped with the cut stem of some ensiform leaf, brown (originally crimson?) on yellow. It hails from Pitcairn's Island where the mutineers of the Bounty took refuge with their Tahitian women. The large serrated strip is pasted on.



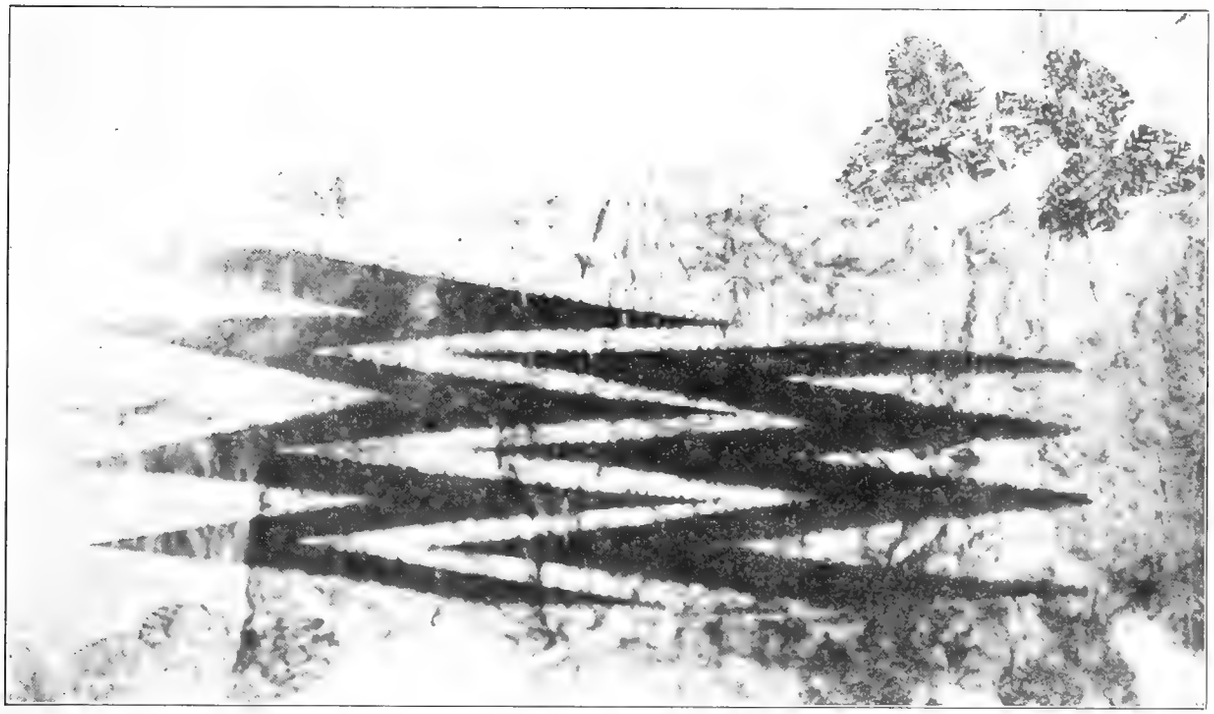


TAHITIAN TAPA. YELLOW STAMPED IN RED. LOWER FROM PITCAIRN ISLAND.

PLATE 21.

Tahitian Tapa.

The upper specimen is thick, of a buff color stamped light brown (originally crimson?). The bold zigzags are a peculiar feature. The lower is the favorite fern pattern. British Museum.

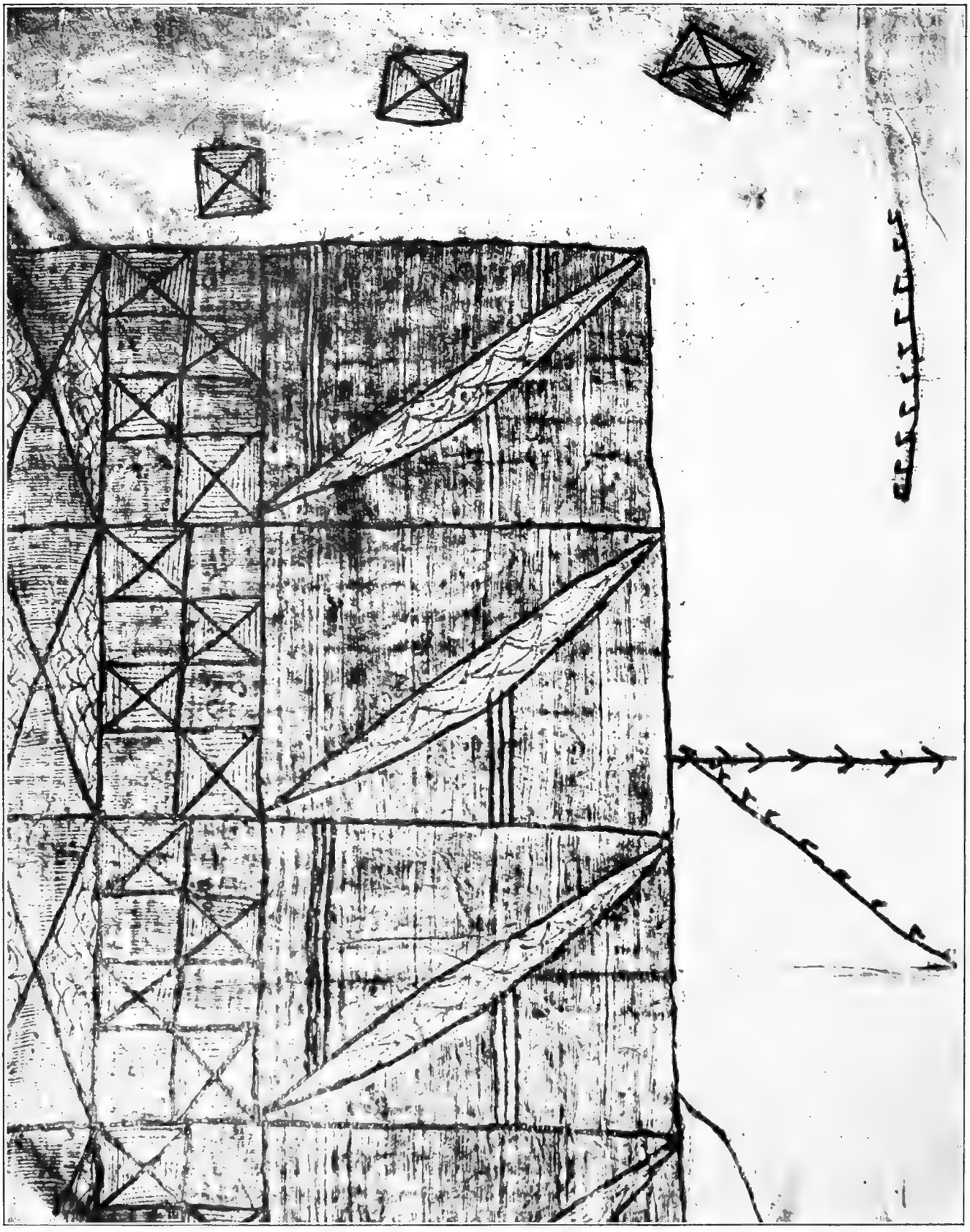


TAHITIAN TAPA. THICK, BUFF STAMPED LIGHT BROWN [ORIGINALLY RED?].

TAHITIAN TAPA. RED STAMPED ON YELLOW.

PLATE 22.

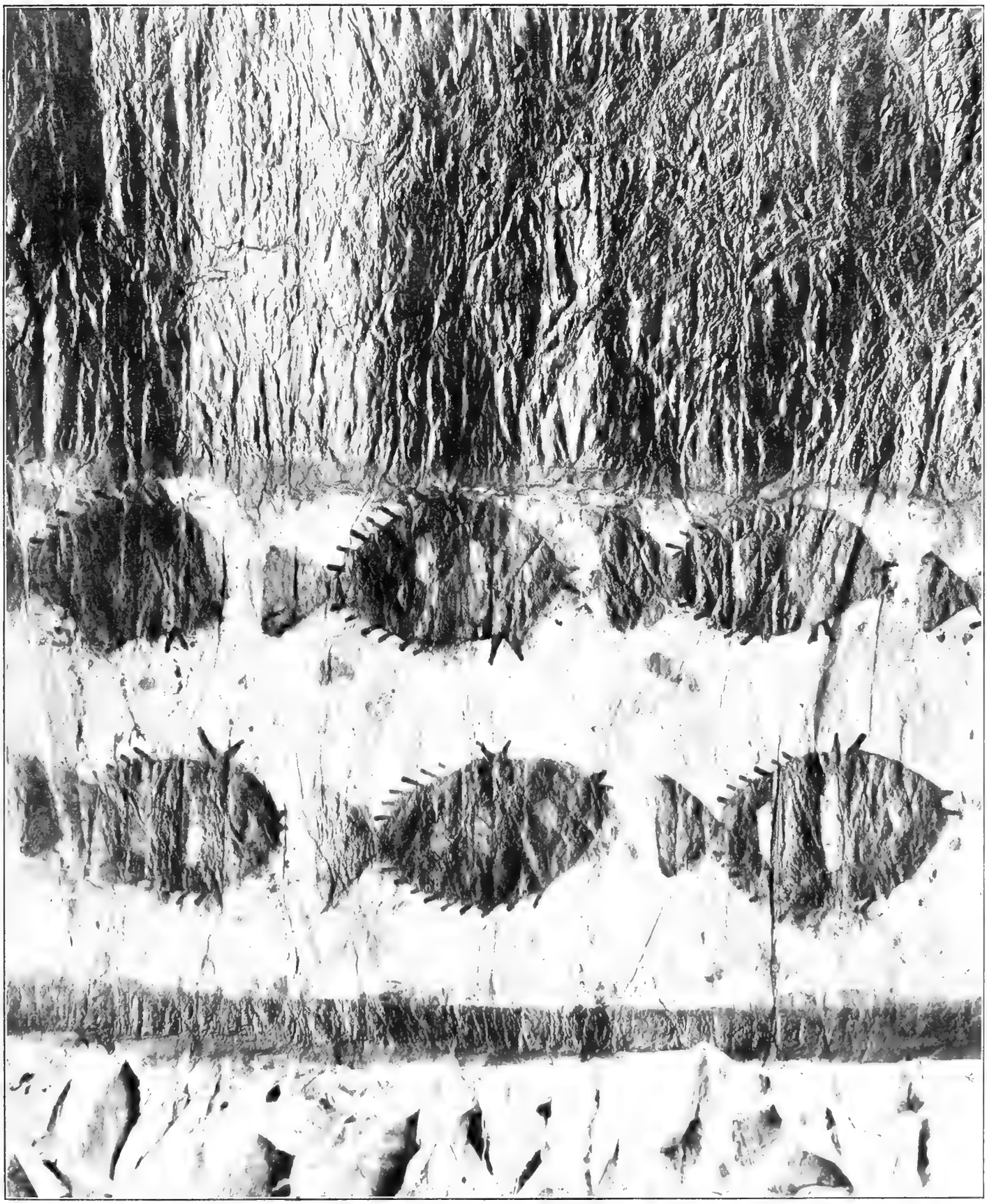
Siapo No. 2960 in the Bishop Museum collection is of the ordinary upete stamping rather neatly done, but the interesting part of the sheet is the white border so often found on these siapo where the artist has indulged her fancy in scribbling. The diagonally marked squares are put in without order. The scale of the plate is about one-seventh of original.



SAMOAN SIAPO.

PLATE 23.

This Samoan siapo is in the United States National Museum, and is noteworthy for the fish designed in the border; they are evidently swimming.

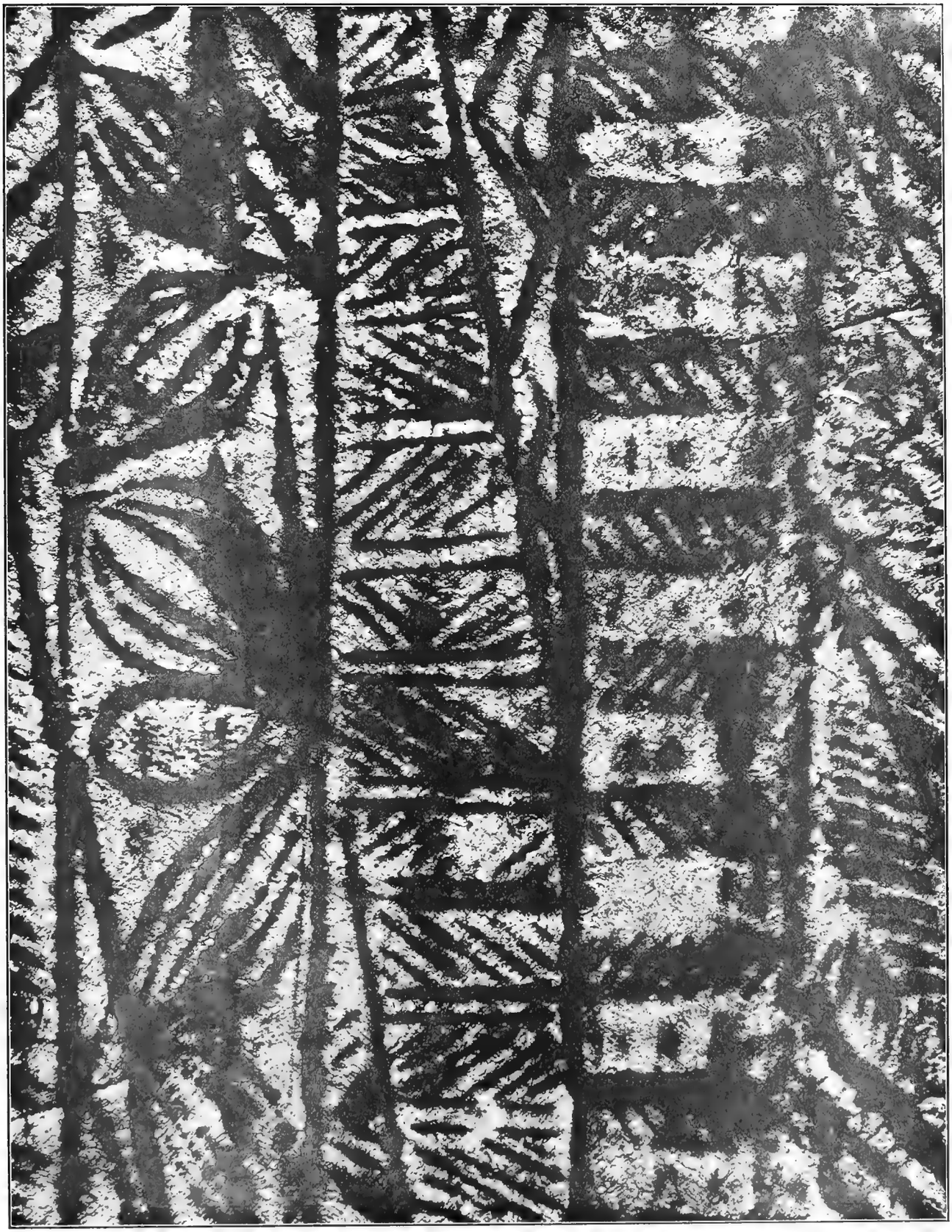


SAMOAN SIAPO. UNITED STATES NATIONAL MUSEUM.

PLATE 24.

TAPA FROM AITUTAKI.

This is No. 6301 B. M. and is given actual size and color. The sheet measures 8 ft. 5 in.×5 ft. 9 in.

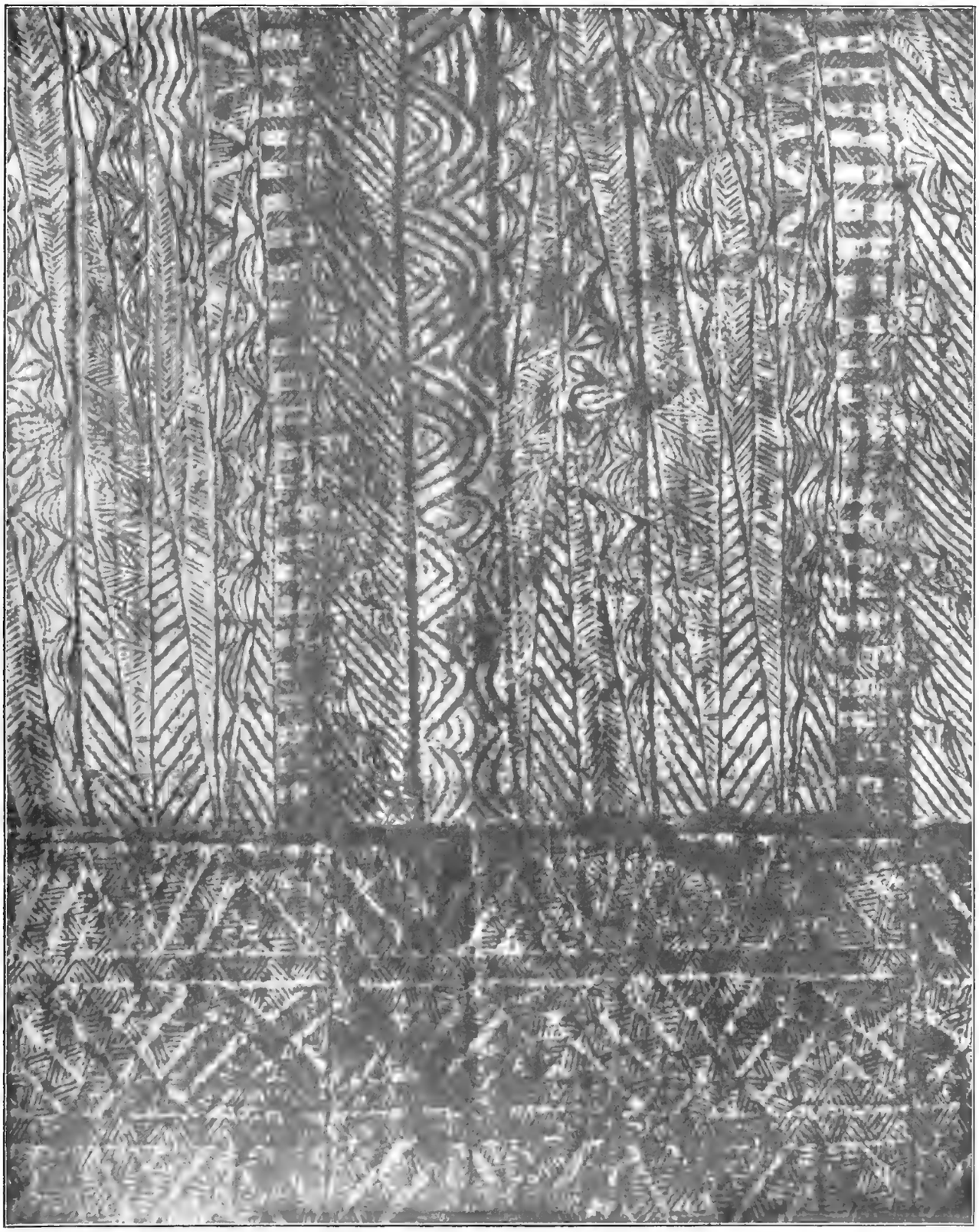


TAPA FROM AITUTAKI.

PLATE 25.

Tapa from Aitutaki.

This is the same tapa represented in the previous plate of natural size here reduced to one-quarter, to show the curious variation in design.

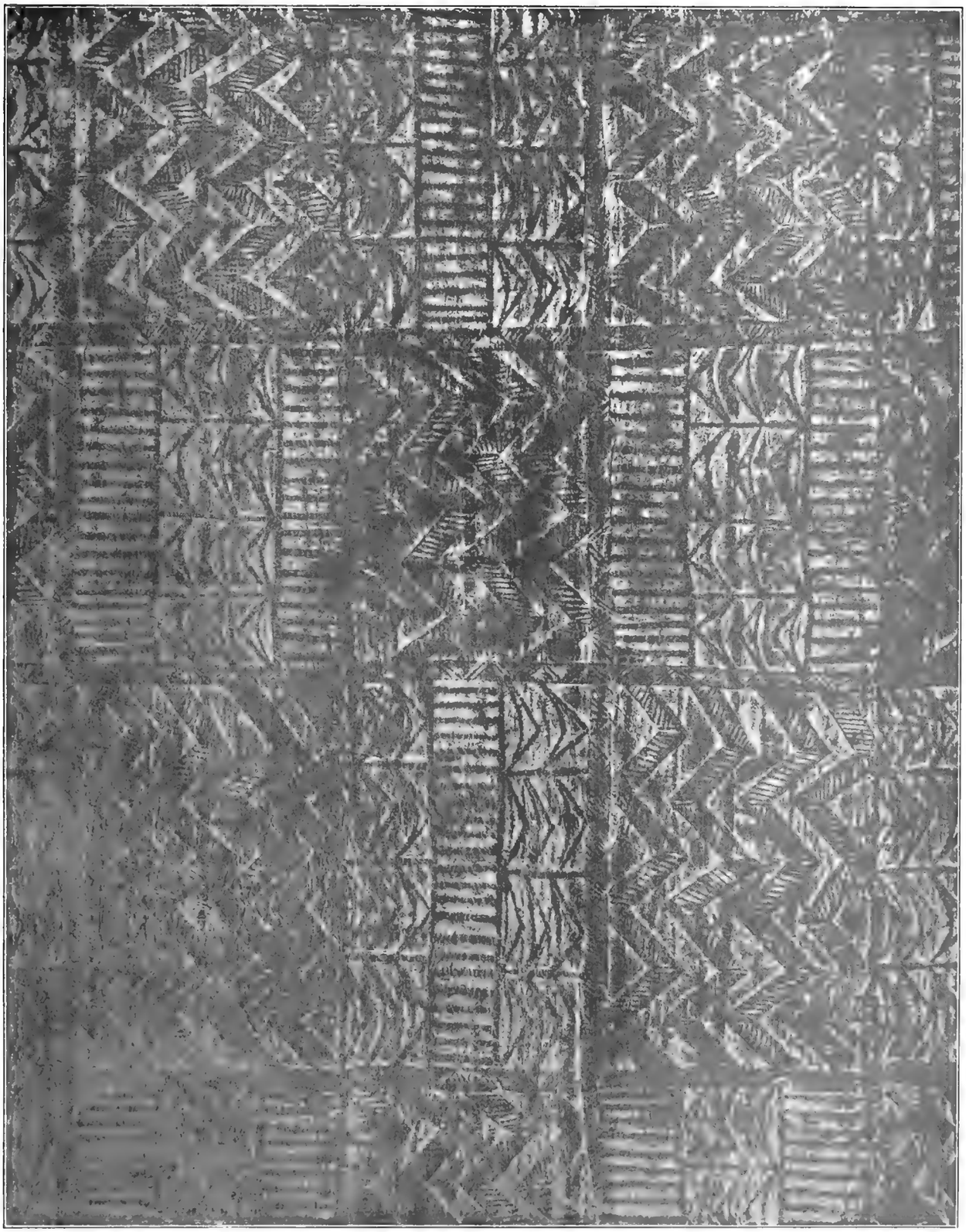


TAPA FROM AITUTAKI.

PLATE 26.

RAROTONGAN TAPA.

This tapa from Rarotonga is reduced to one-quarter size to illustrate the design. All of the tapas from the southeast Pacific have strong family resemblances. This sheet measures 9 ft. 3 in.×7 ft. 4 in. Two sheets were brought in by our collector, evidently stamped with the same upete: the other measures 8 ft. 5 in.×7 ft. 8 in. (8270.)

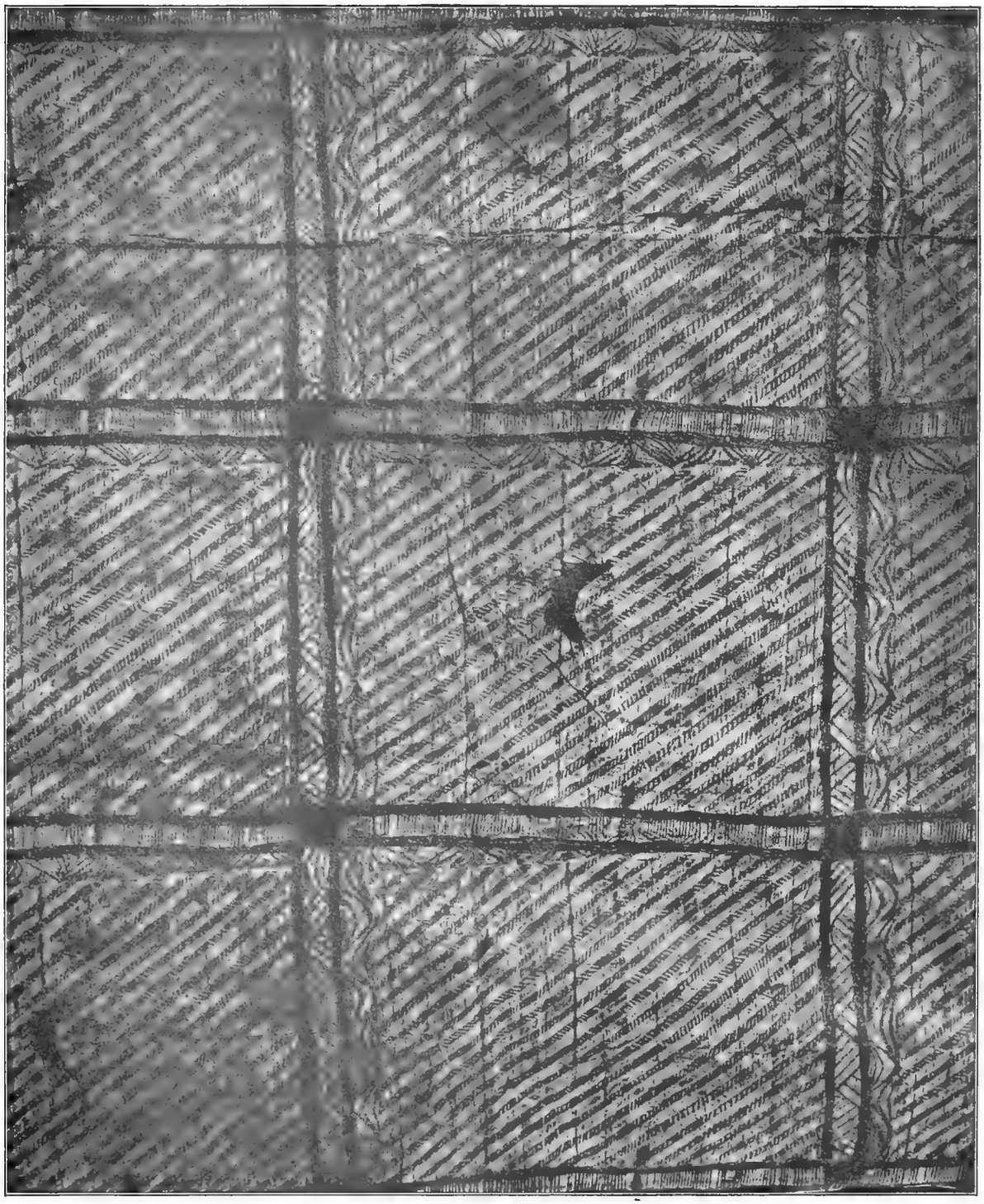


RAROTONGAN TAPA (8270).

PLATE 27..

Samoan Siapo.

This siapo from Mrs. Bishop's collection (2960) is printed in the usual way but the surface is divided into rectangles by double lines, and these alternate rectangles have a ciliated crescent in the centre: the divided lines filling these enclosures would indicate a wooden upete. The plate is reduced six times.

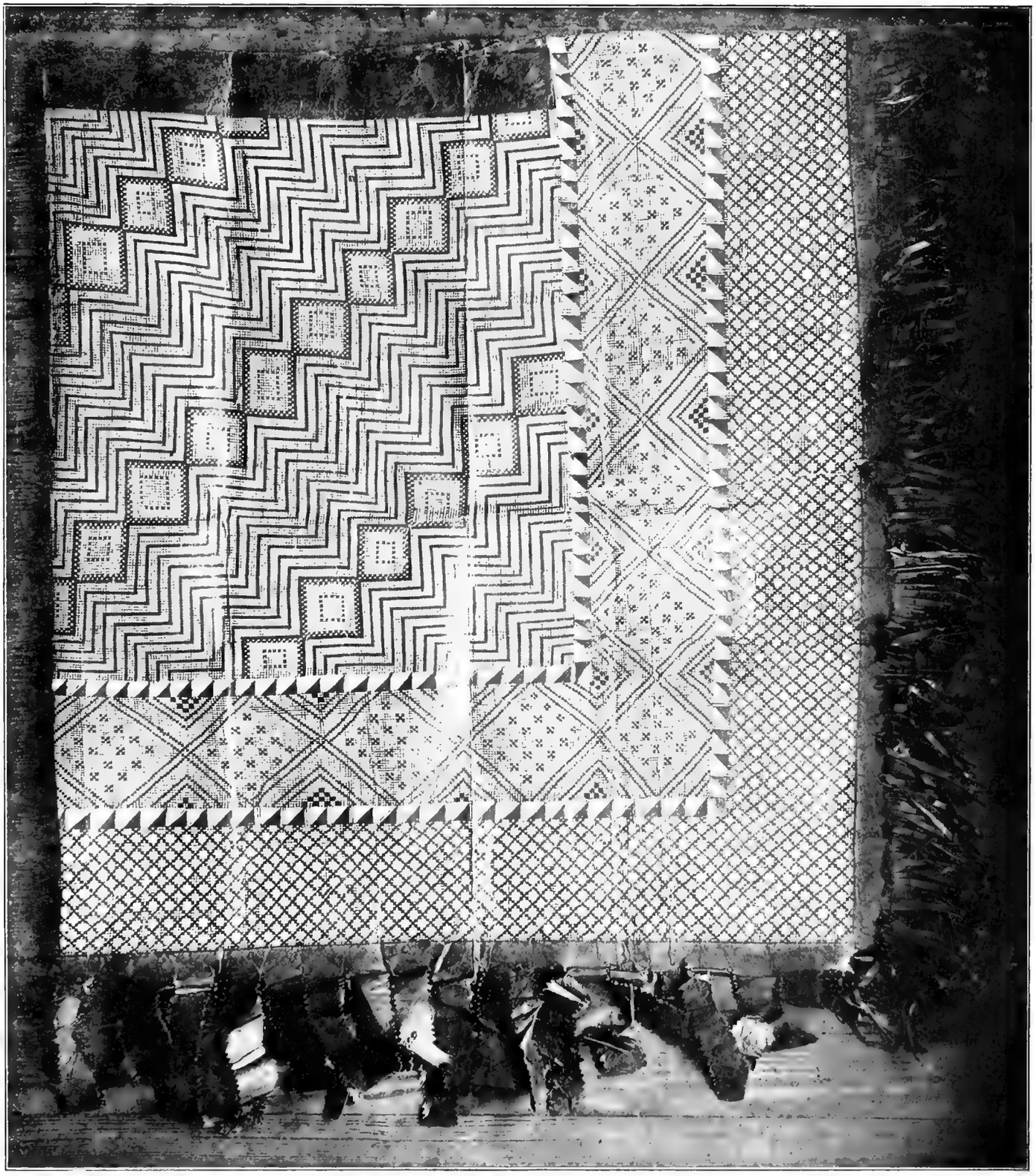


SAMOAN SIAPO.

PLATE 28.

Marshall Islands Tapa.

A very neat and curious imitation of the beautiful mats of the Marshall Islands natives. The ruling is carefully done; and the dark border which resembles the siapo of the Samoans is cut into a coarse fringe. From a photograph kindly furnished by the National Museum.

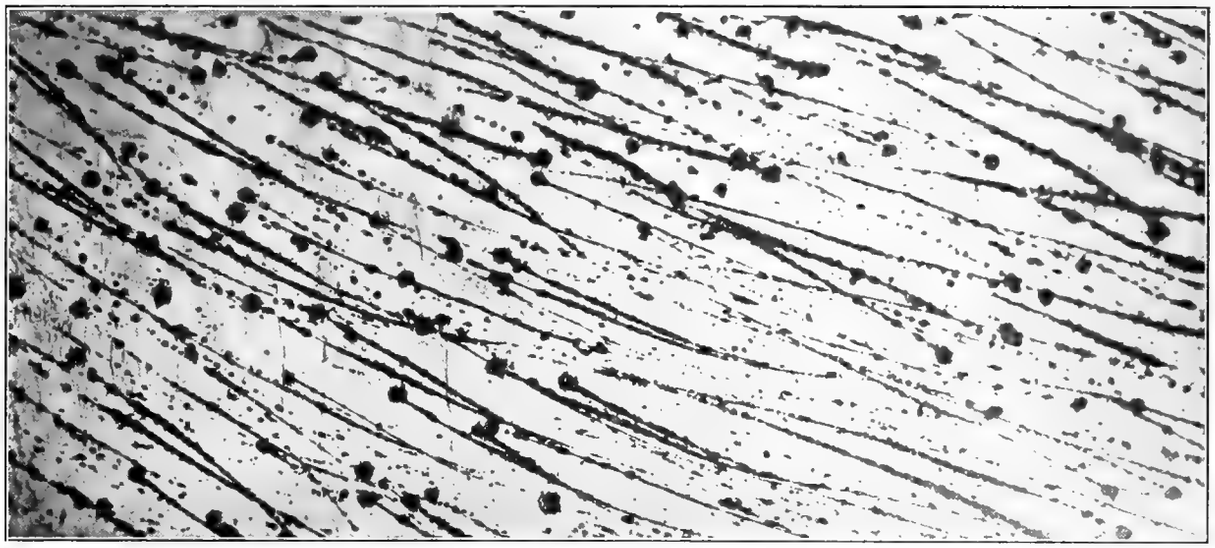


MARSHALL ISLANDS KAPA, IMITATING MAT.

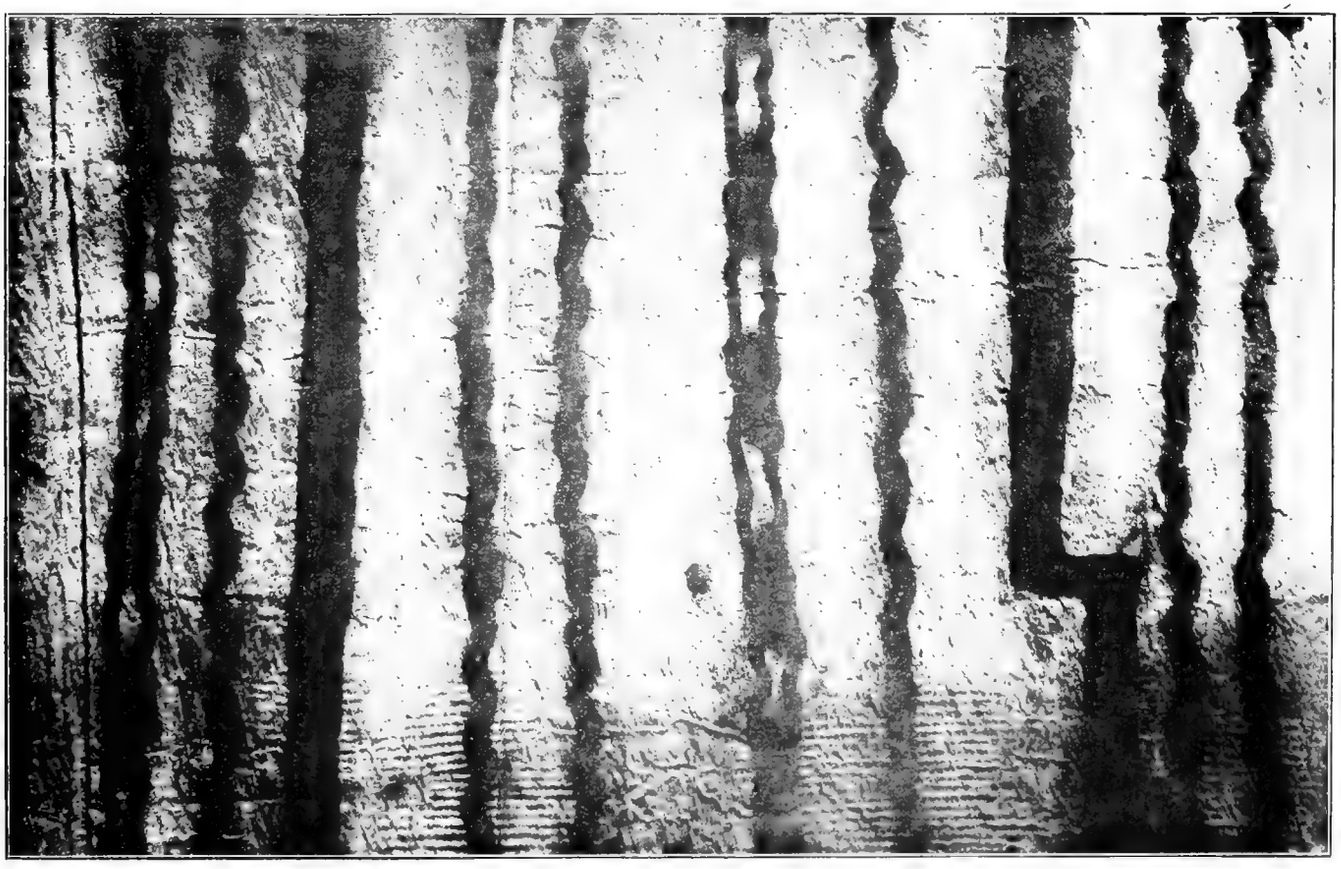
PLATE 29.

Rarotongan Tapa. Tongatabu Tapa.

These two specimens, both from the British Museum, illustrate designs used on the Hawaiian Islands as well, but I have less perfect specimens for illustration from the latter source. The upper one looks much as if the tiny drop of lava thrown from the Hawaiian active craters with its filament of Pele's hair attached had been cemented on a stiff sheet of kapa and used as a type or upete. The blotches and their trail resemble nothing else so closely. The lower specimen from Tongatabu shows clearly the sudden change of direction in a line which all the Polynesian kapa designers much affected. The Rarotongan specimen is black on white, while the one from Tongatabu seems to be black and red (?) on a gray or buff ground.



RAROTONGAN TAPA, BLACK ON WHITE. BRITISH MUSEUM.



TAPA FROM TONGATABU.

PLATE 30.

BARK-CLOTH FROM THE SOLOMON ISLANDS.

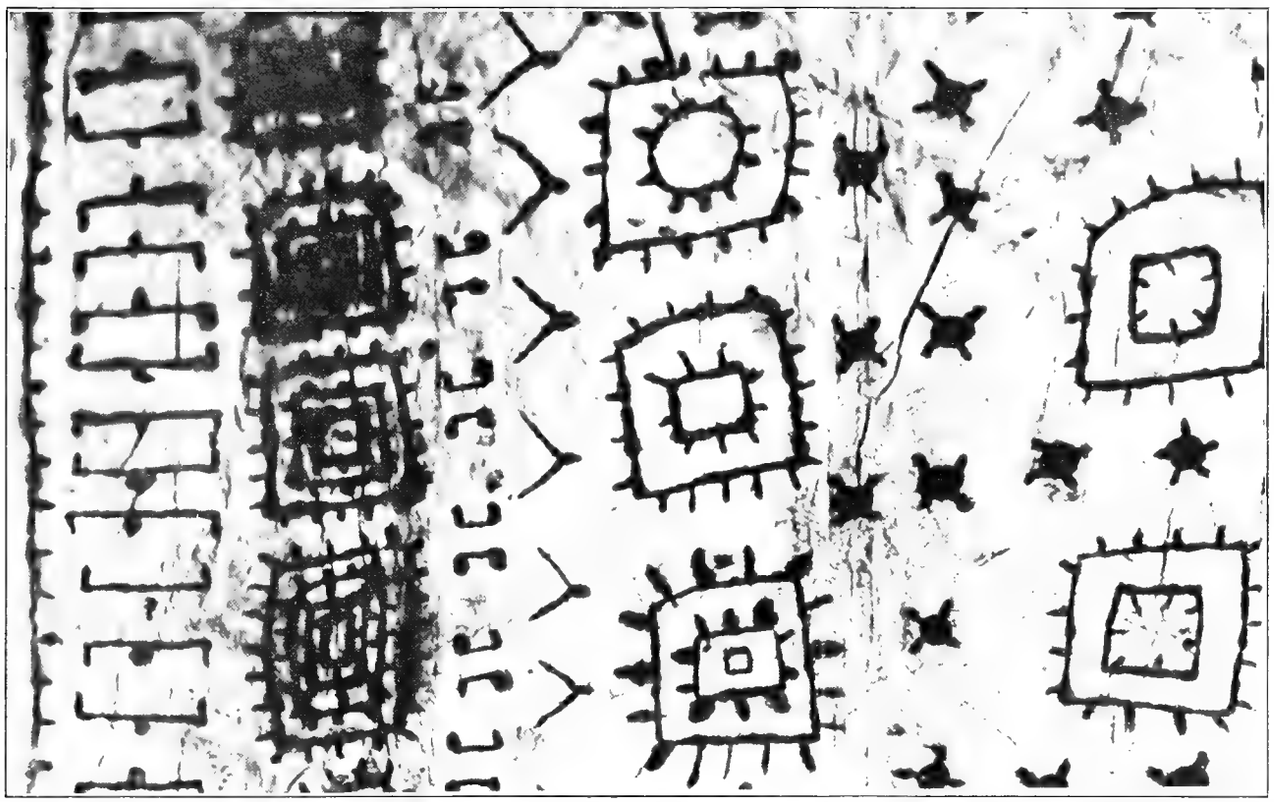
These curious figures, apparently of a dugong or some allied form, are painted in light blue on a dirty white cloth (B. M. 8264). The same number (five) appears on another similar cloth from the same locality (B. M. 8267), but here the color is a much deeper blue, more like No. 7 in color plate BB. The figures between the animal rows seem to be hooks or some similar implement and may indicate that so many of the animals were captured. Reduced to one-fifth of the original size.

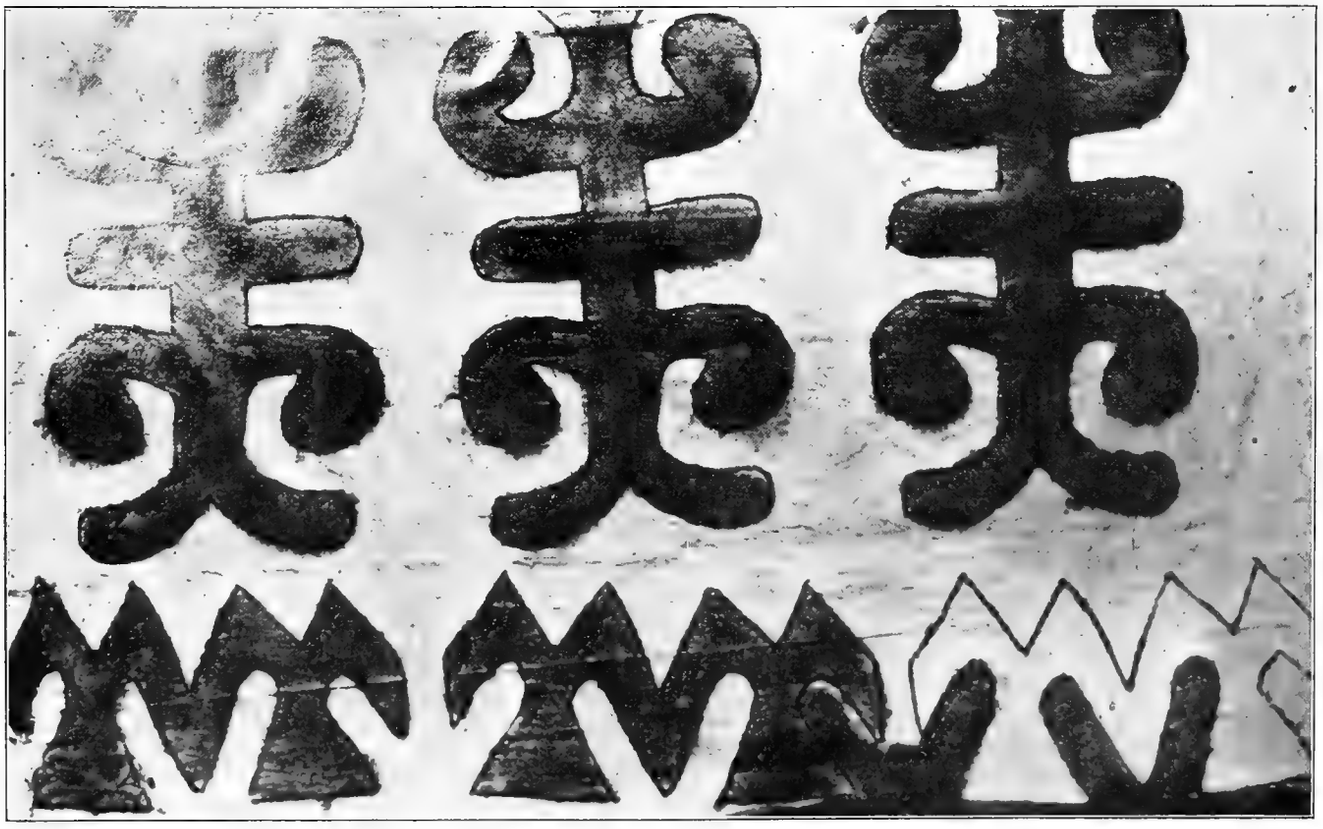
CLOTH FROM SOLOMON ISLANDS.

PLATE 31.

Cloth from New Hebrides and Solomon Islands.

The upper specimen is a curious design in black on a white ground. The lower is from the Solomon Islands, dark blue figures on a light gray ground. The larger figures are often seen on cloth from this group but their significance I do not know. The most interesting portion of the specimen is in the lower right hand corner where the outline has carelessly been filled in with the blue incorrectly, and as the mistake could not be easily corrected, as the color soaks through the fabric, the correct outline has been left unfilled. Both these specimens are from the British Museum, and from similar figures in this Museum I suppose them reduced about one-third.





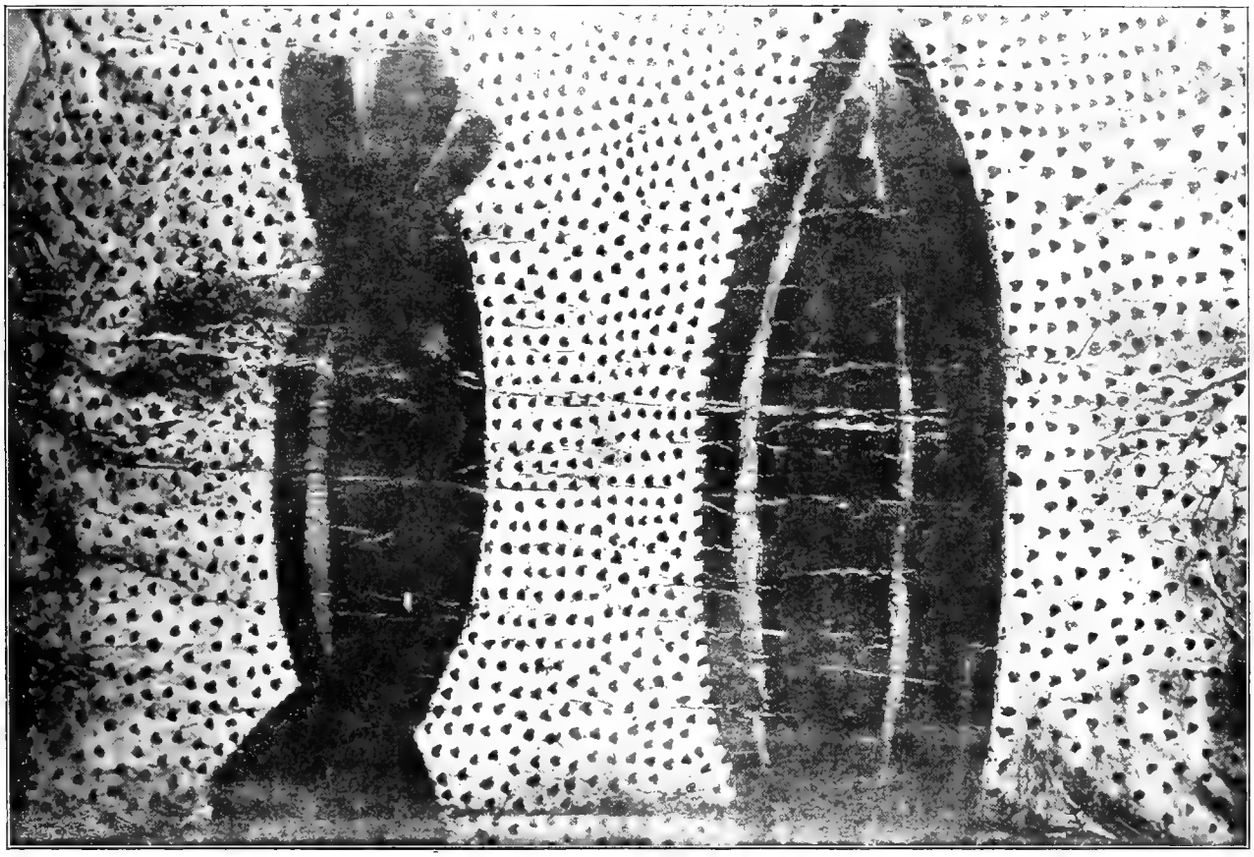
SOLOMON ISLANDS CLOTH. BRITISH MUSEUM.

PLATE 32.

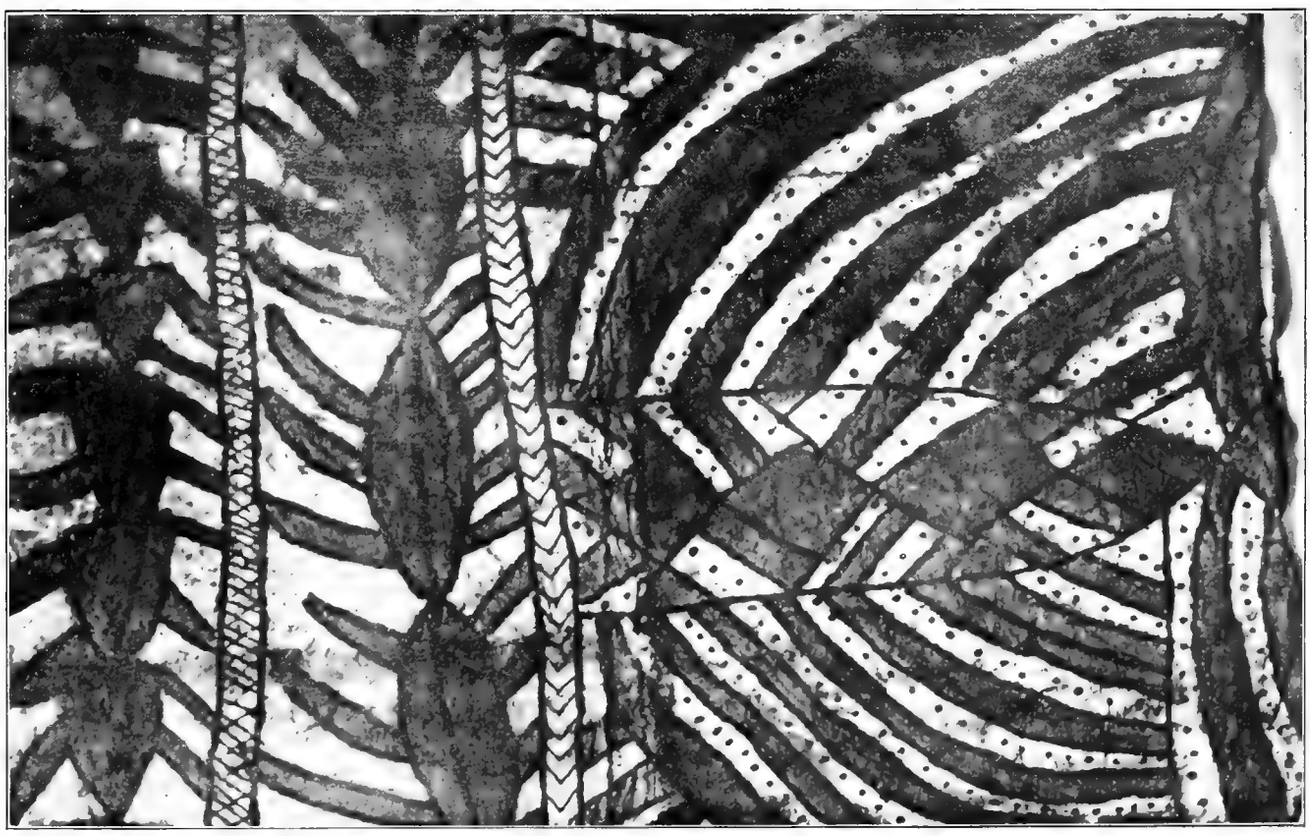
Papuan Tapa.

1. A specimen in the British Museum painted in yellow, red and black; perhaps representing bananas.

2. This specimen, also in the British Museum, is attributed to New Guinea on the photograph sent the author. The ground is buff, the outlines of the figures black and the filling yellow.



NEW HEBRIDES. YELLOW, RED AND BLACK ON BUFF. BRITISH MUSEUM.

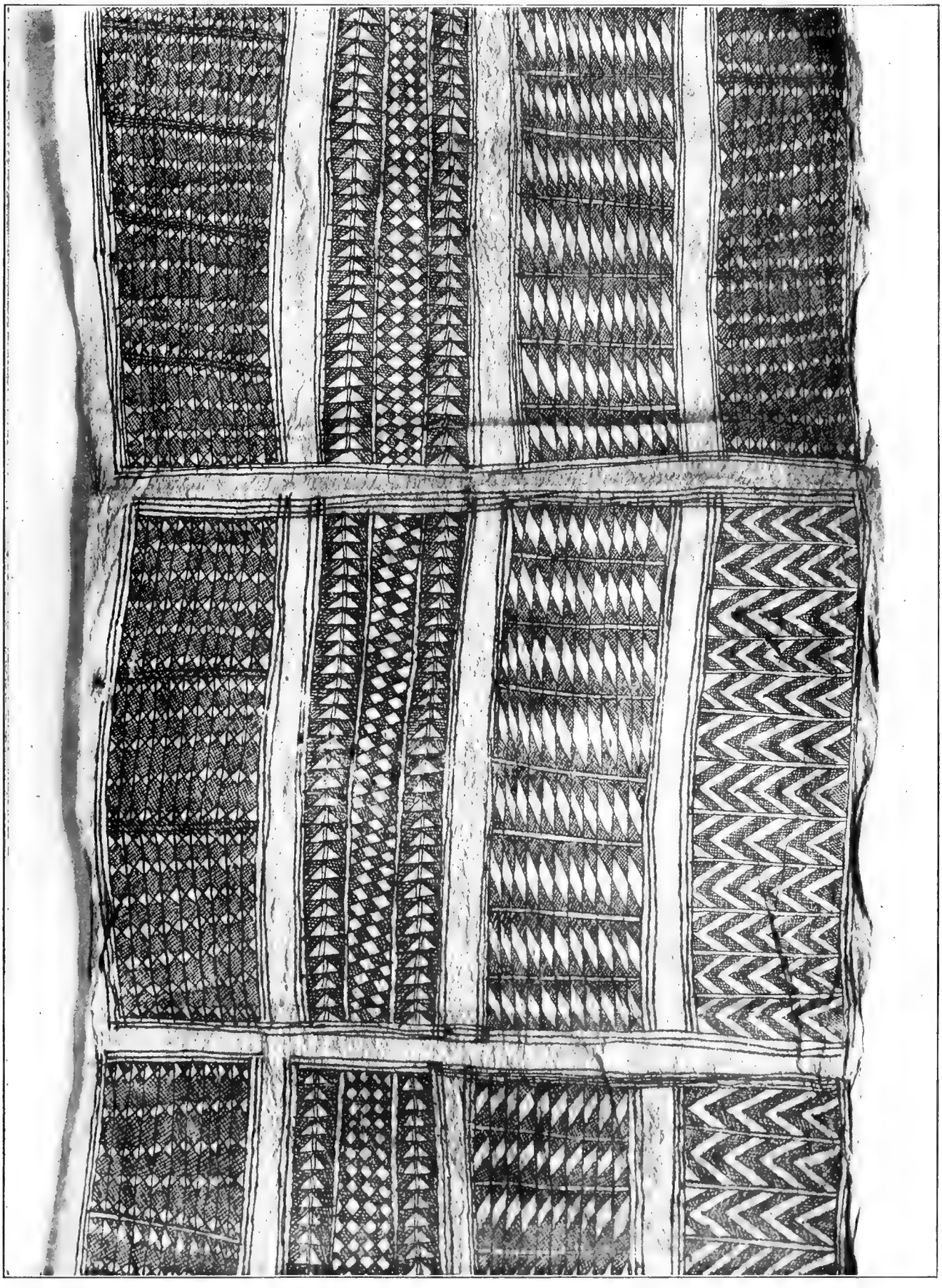


NEW GUINEA. BLACK AND YELLOW ON BUFF. BRITISH MUSEUM.

PLATE 33.

Santa Cruz Cloth.

This elaborate waist-cloth was brought from the Santa Cruz group in the western Pacific by the Wilkes Exploring Expedition and is in the National Museum, to whose officers I am indebted for the photograph.



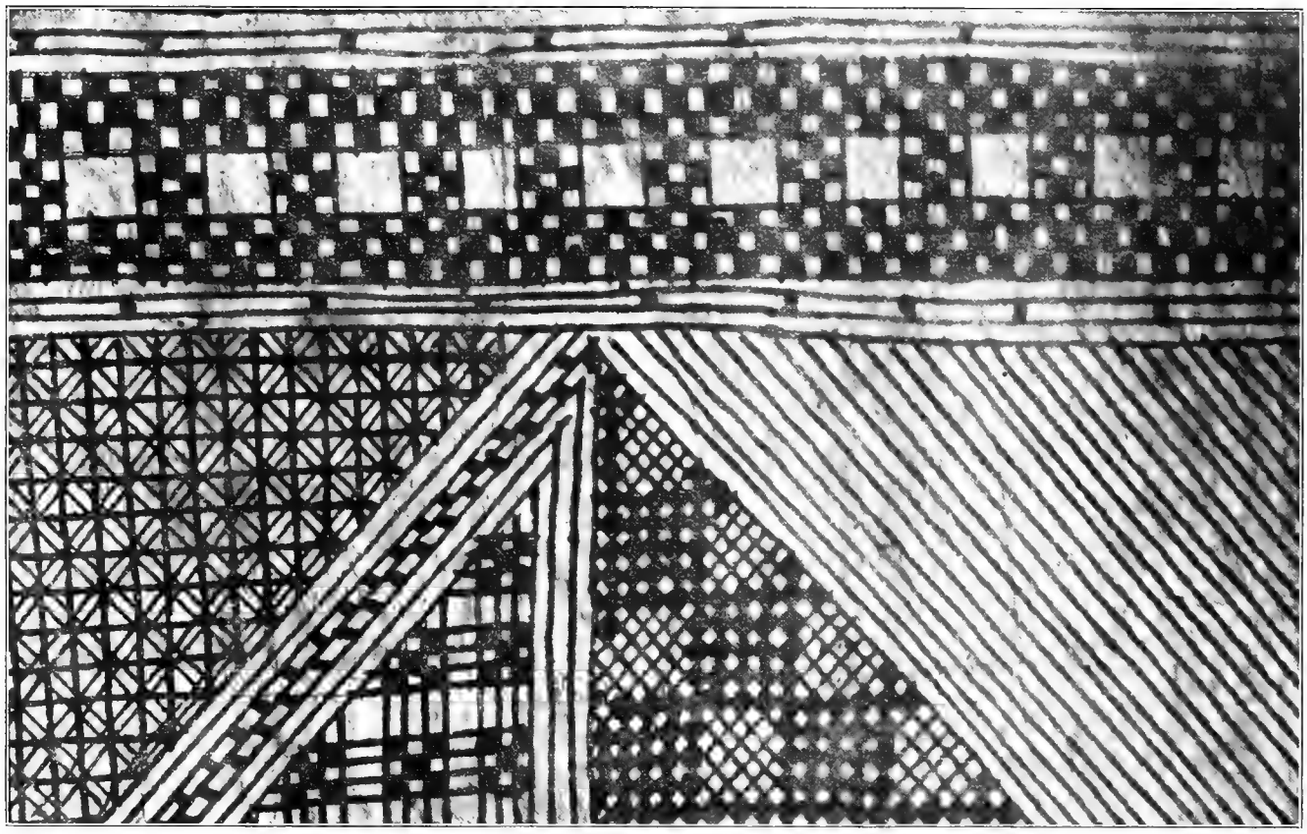
SANTA CRUZ CLOTH. WILKES EXPLORING EXPEDITION.

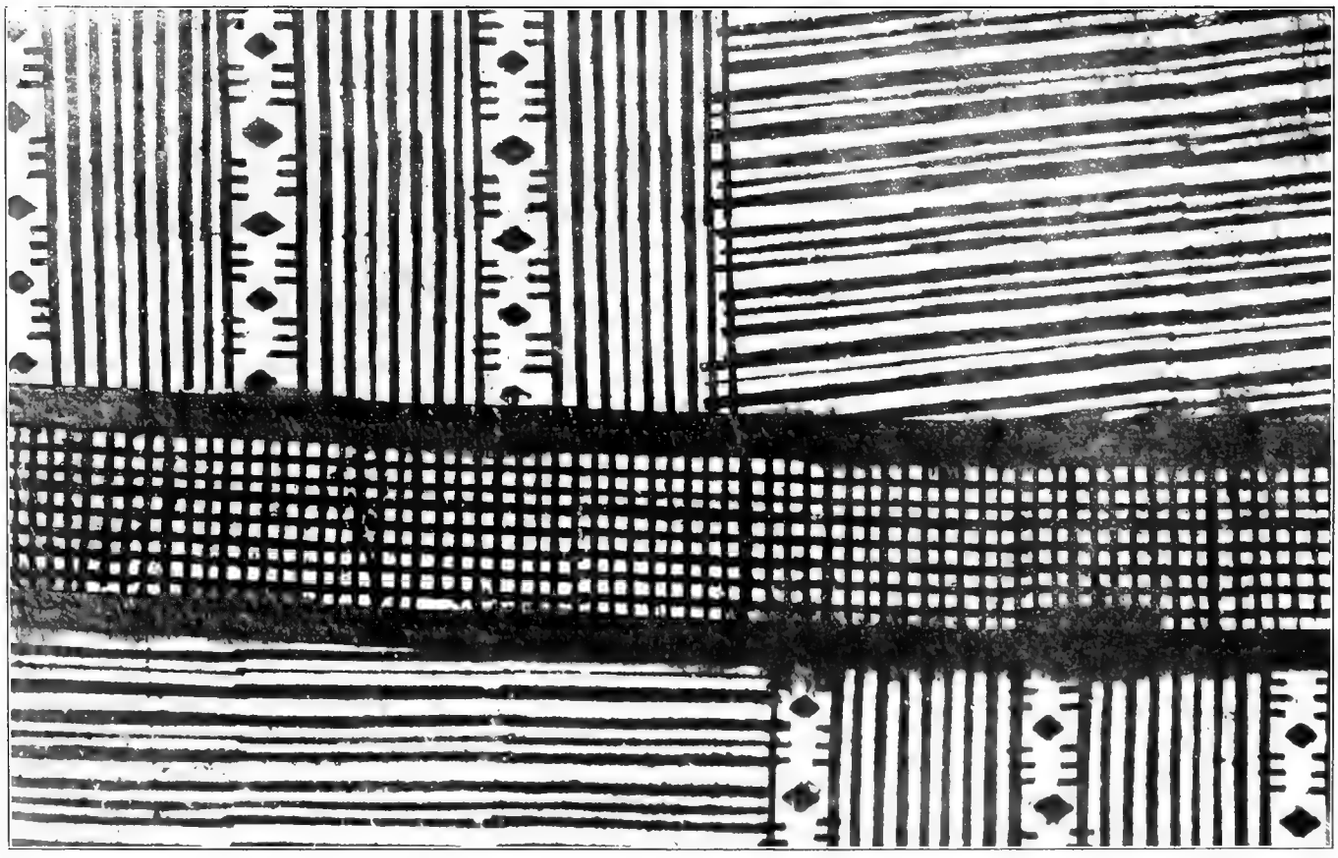
PLATE 34.

Specimens from Samoa and Fiji.

1. Is from Samoa and was given by the late Gorham D. Gilman. The ground is white ruled in red (the lighter) and black; the reverse is painted or varnished red.

2. This is from Fiji and was presented to the author by the Peabody Academy, of Salem (E. 3175). The original sula from which this specimen was taken was brought home by S. C. Phillips in 1832. The two longitudinal broad lines are in red, the rest in black; the diamonds and triple short lines are stamped. It is interesting to note the similar style of these two patterns.





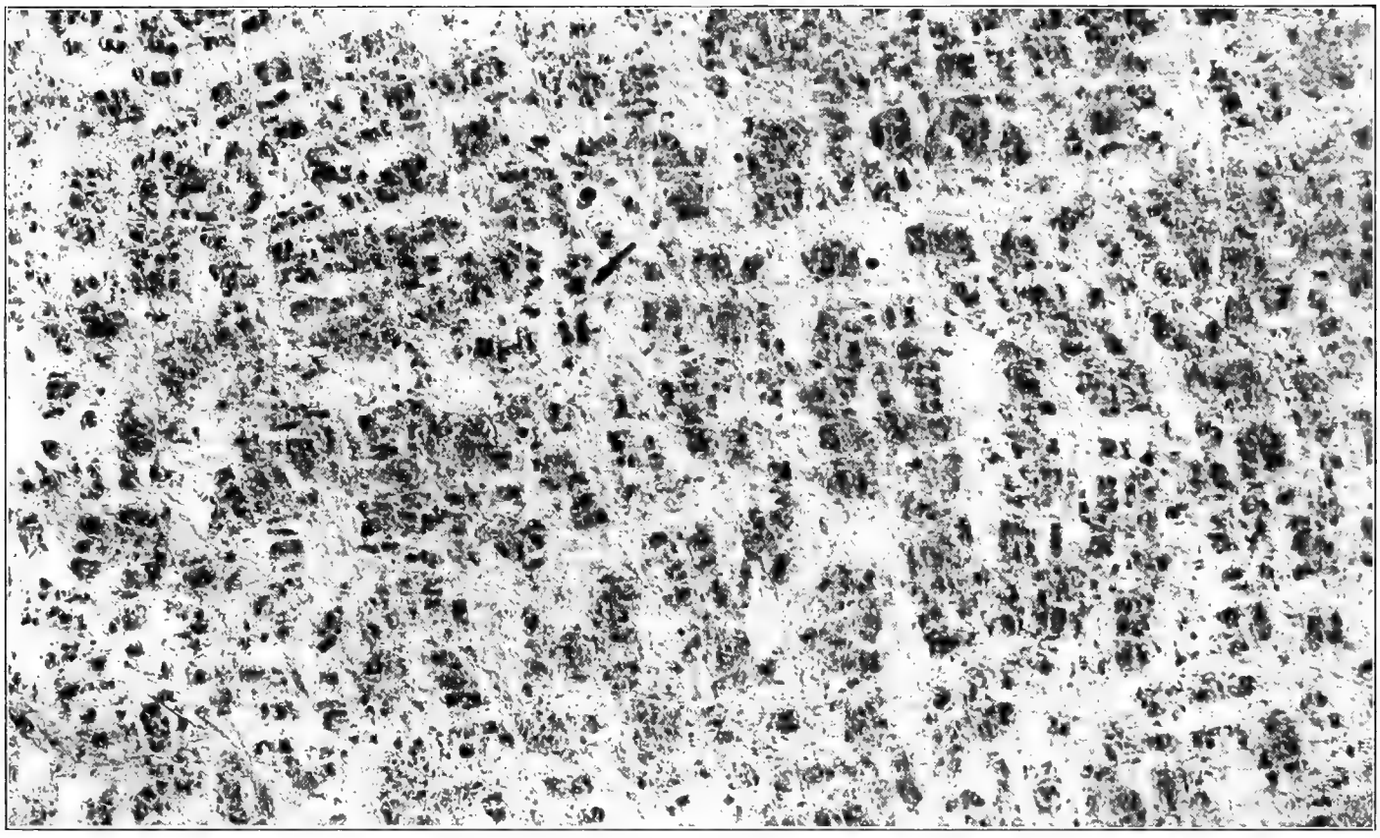
SPECIMENS FROM SAMOA AND FIJI.

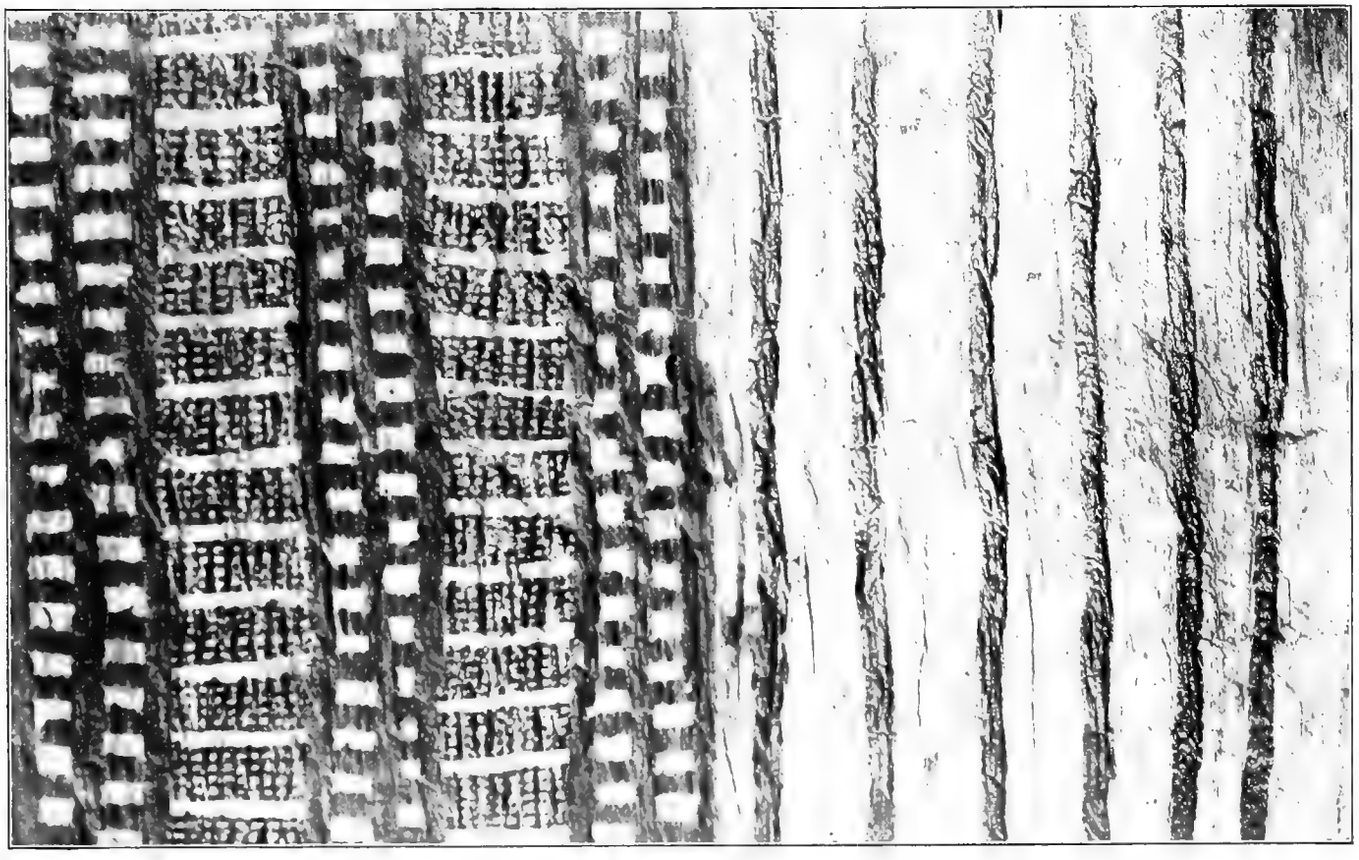
PLATE 35.

Tahitian and Hawaiian Kapa.

1. The upper specimen is so precisely like many specimens of undoubted Hawaiian origin that I was disposed to claim it as such and made the photograph from the small specimen in my private collection to show the variety rather than use the very large specimens in this Museum. I am, however, inclined to place it to the credit of the southern island, as I know such tapa was made there as well as here. The specimen, No. E. 3156 in the Peabody Academy of Science in Salem, was brought home by Captain Nathaniel Page between 1812 and 1818. The fabric was made by beating in fragments of kapa of a darker color.

2. The lower one is from a malo of Hawaiian make long in the collection of the A. B. C. F. M., and from thence purchased for this Museum. The black lines have a slight varnish on them and seem to be painted.





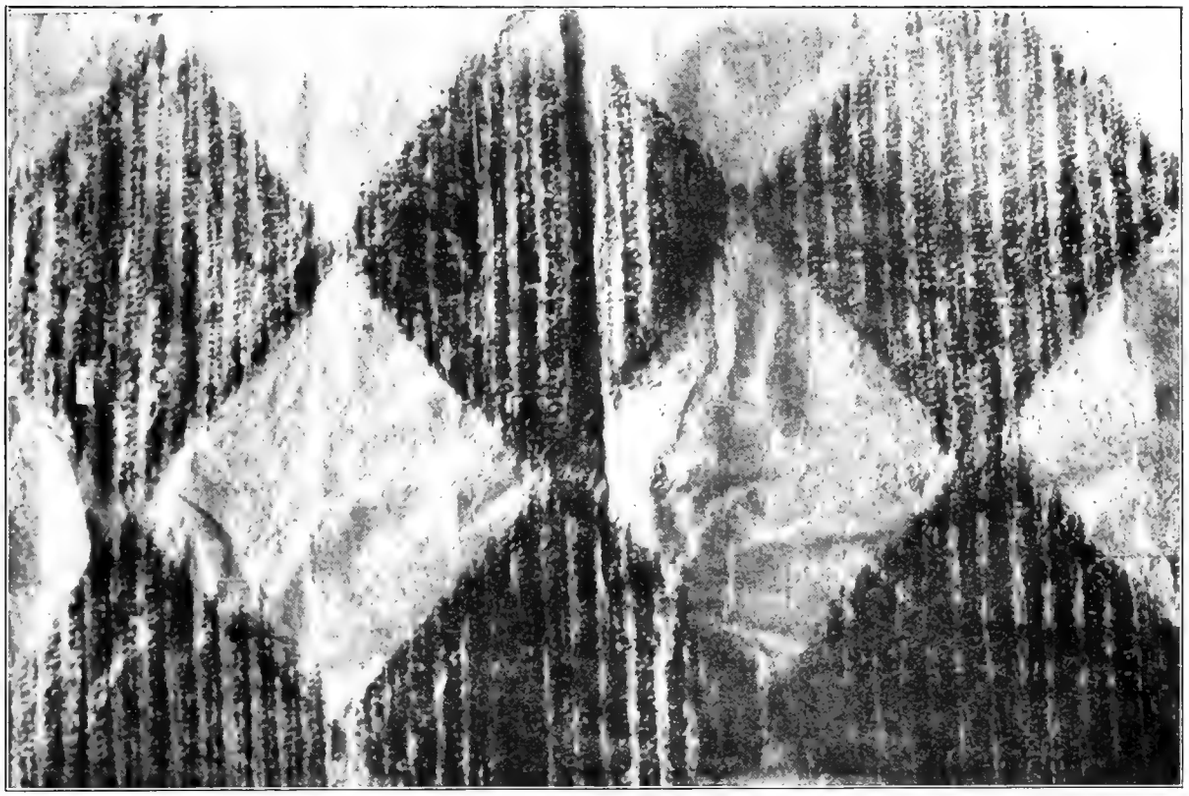
HAWAIIAN KAPA.

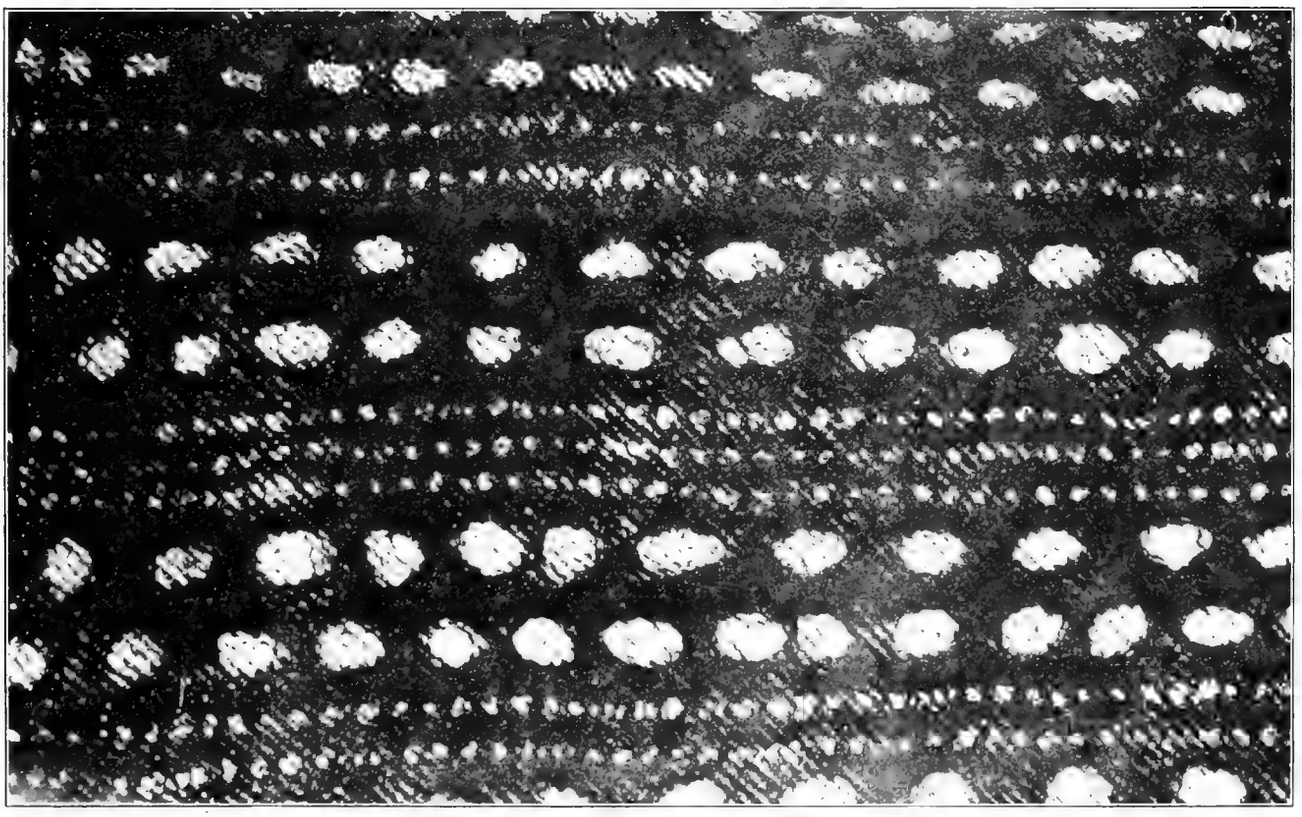
PLATE 36.

HAWAIIAN KAPA IN BISHOP MUSEUM.

1. A kilohana of a kapa moe. The sheet is pale buff; stripes in the dark squares are stamped in rich red-brown alternating with painted stripes in blue-gray. The whole effect is very rich. Reduced five times. (B. M. 2441.)

2. A punctured sheet of dark brown kapa pasted on a white sheet. Obtained on these islands by Captain Driver about 1820. From a specimen given to the author by the Peabody Academy of Science, Salem (E. 3170).



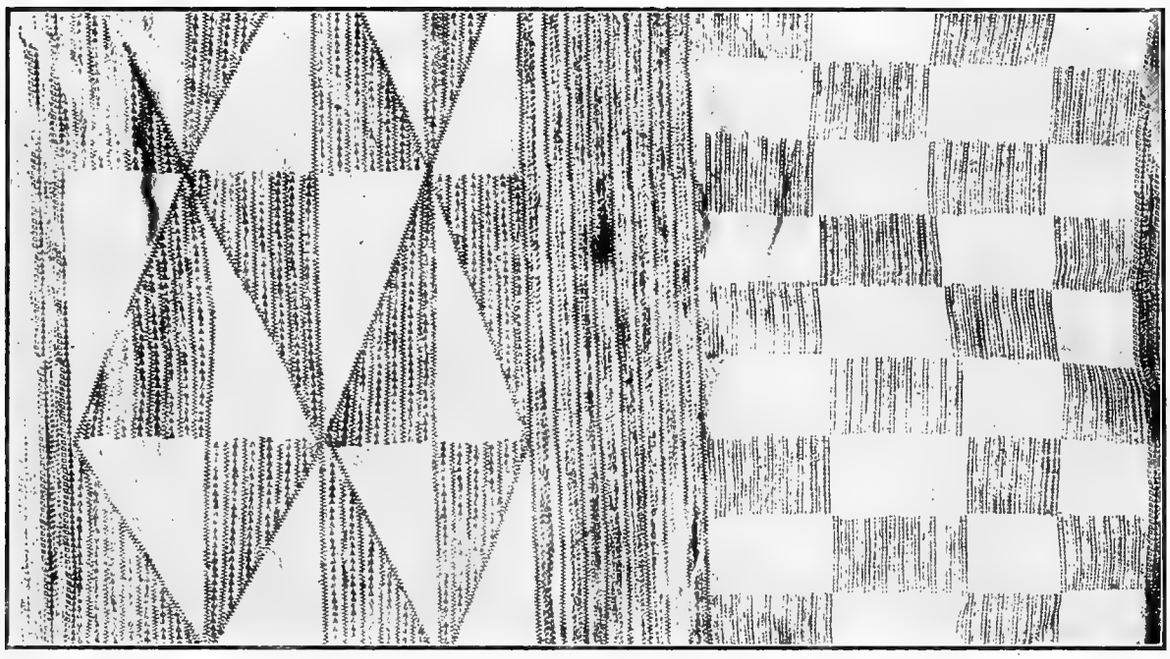


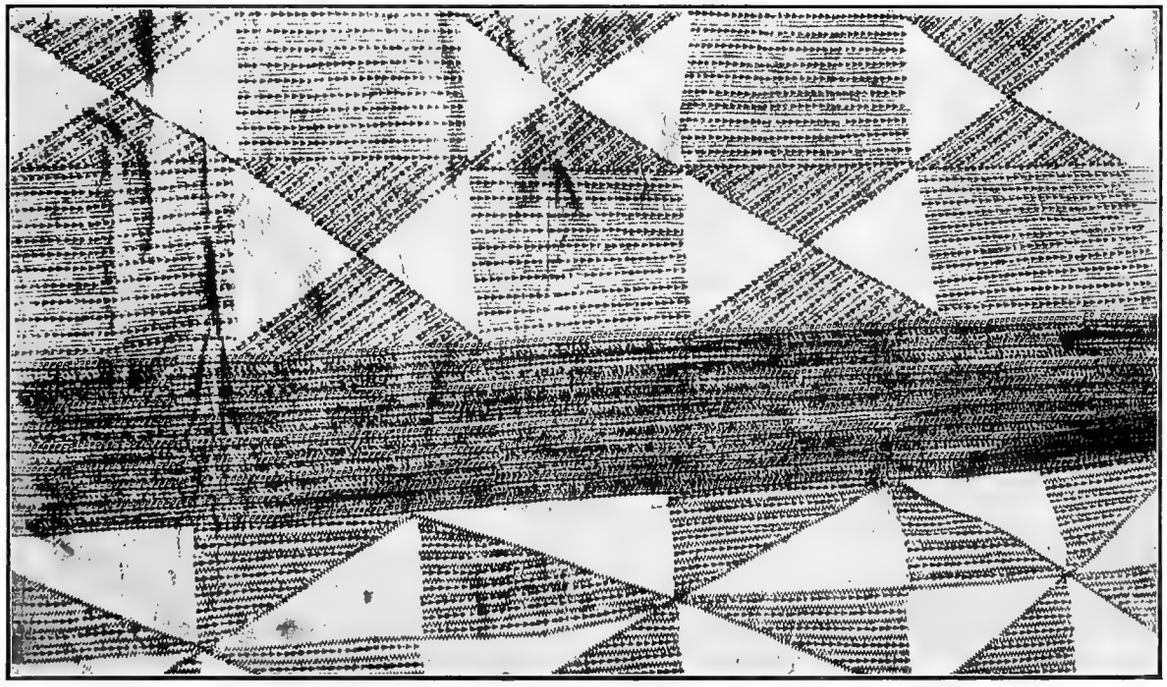
OLD HAWAIIAN KAPA.

PLATE 37.

Hawaiian Kapa.

Both specimens are from the same sheet which is white with the lines forming the pattern stamped in brown; as will be seen the triangles are not always outlined. Loaned for the illustration, which is greatly reduced.





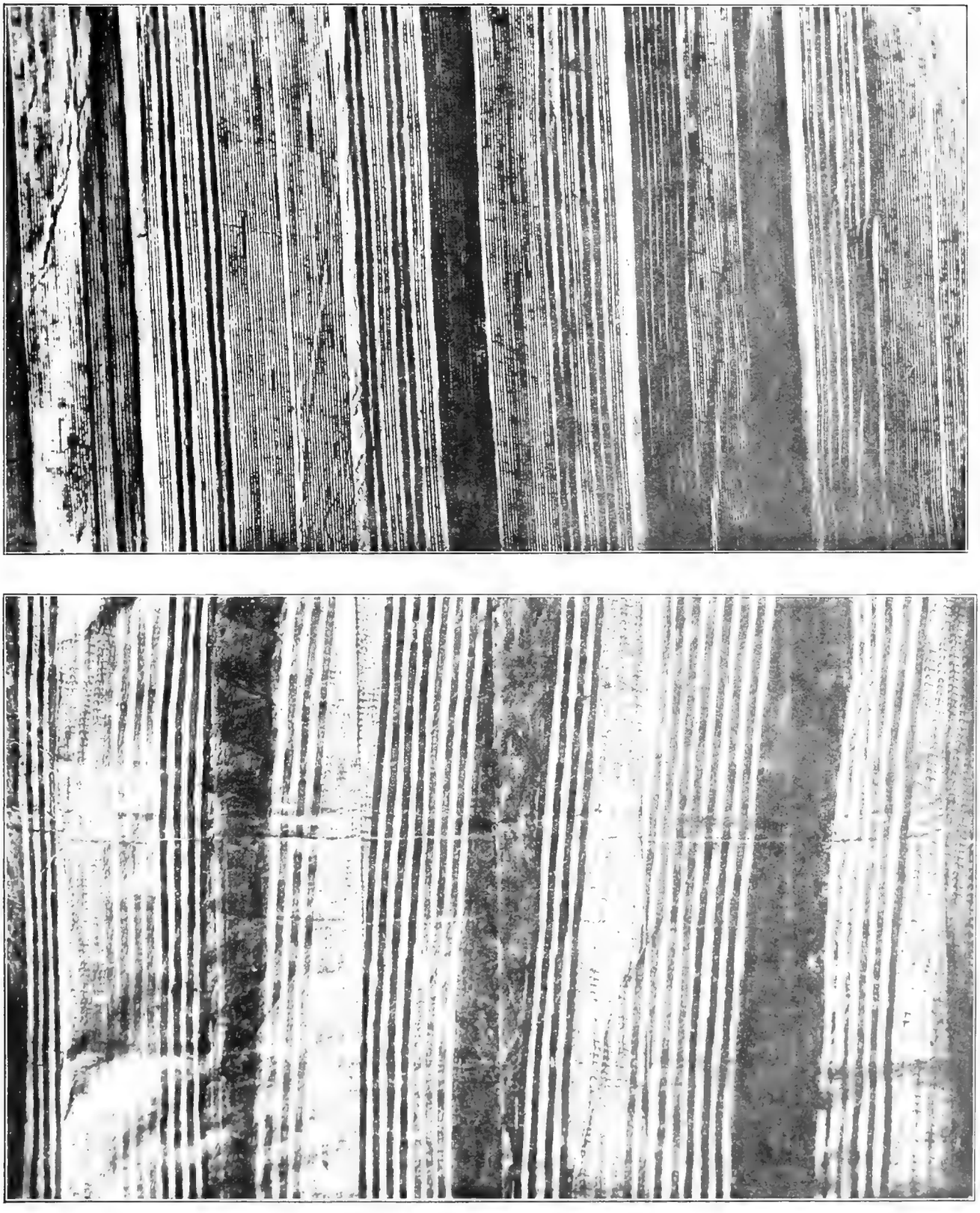
HAWAIIAN KAPA. FROM SAME SHEET. BROWN ON WHITE.

PLATE 38.

HAWAIIAN KAPA IN BRITISH MUSEUM.

1. This pattern is ruled in red, black and brown on white.

2. In the lower pattern the ruled lines alternate with stamped ones. Both specimens are reproduced from photographs and the scale is not given, but the reduction is considerable.

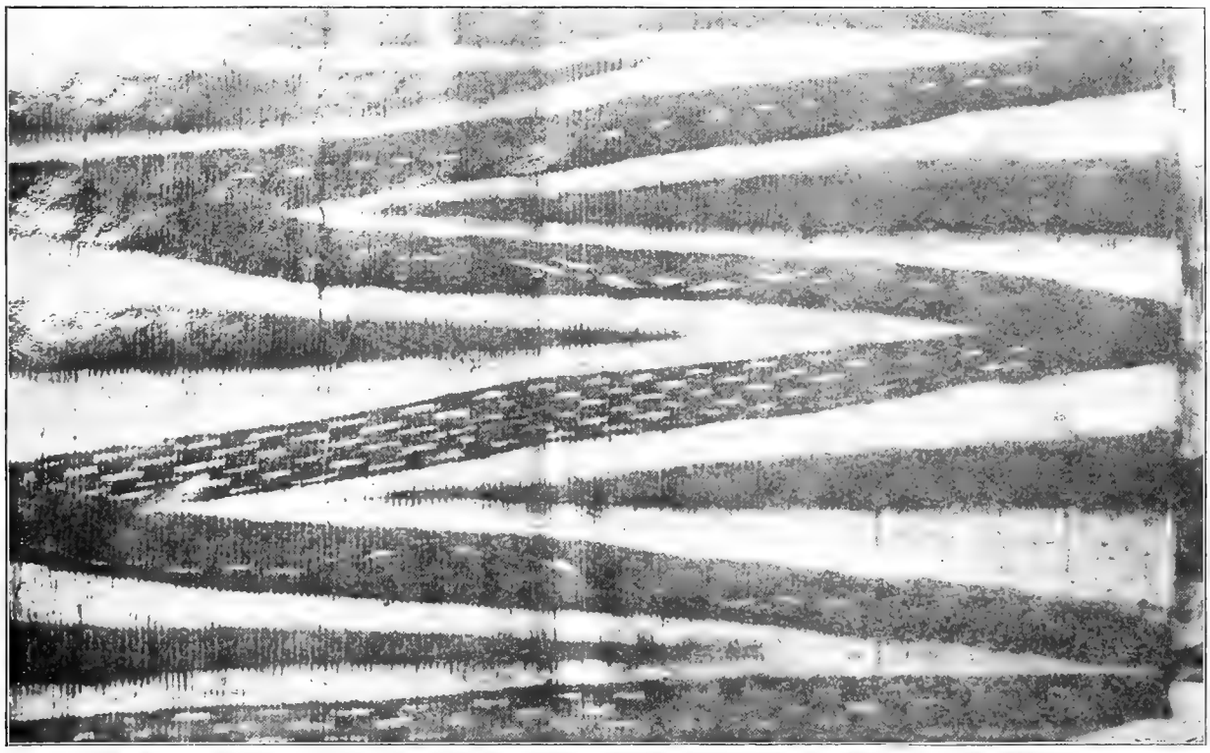


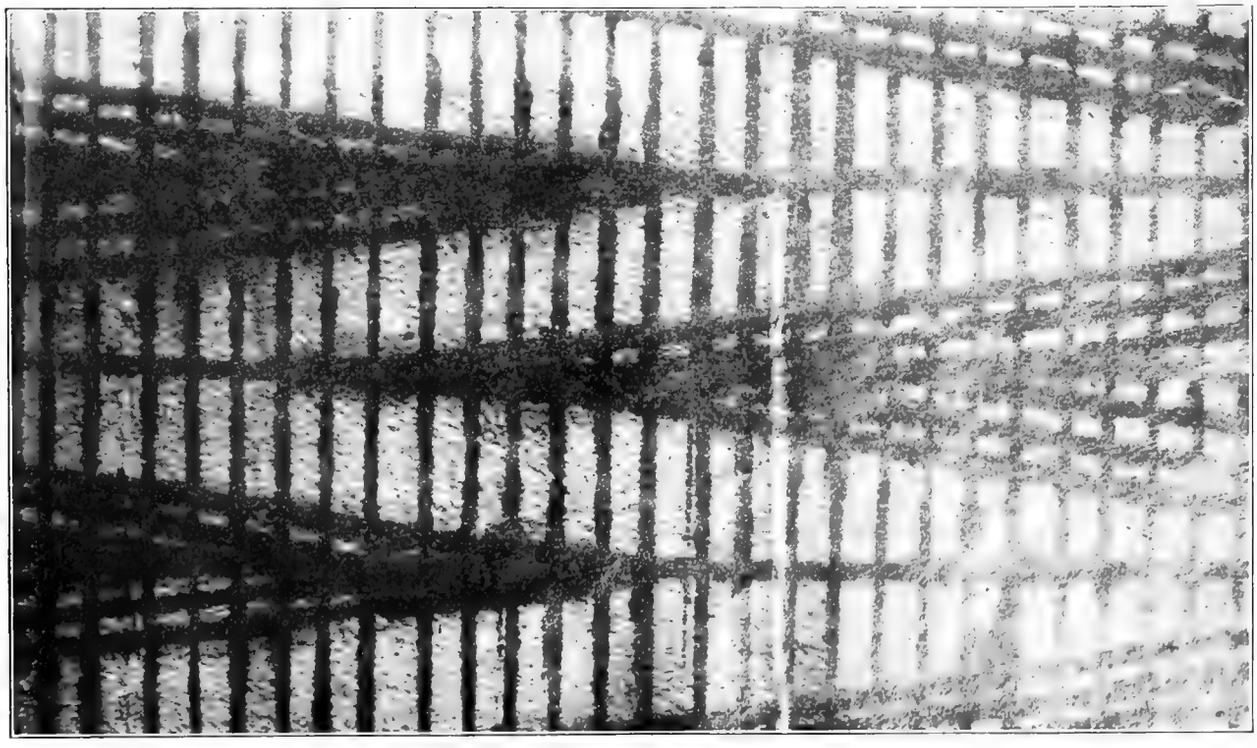
HAWAIIAN KAPA. BRITISH MUSEUM.

PLATE 39.

LINE PATTERNS OF THE TIME OF COOK.

1. Bands stamped in black and brown on white. From the British Museum.
2. Converging lines in red and black in the K. K. Hofmuseum, Vienna.



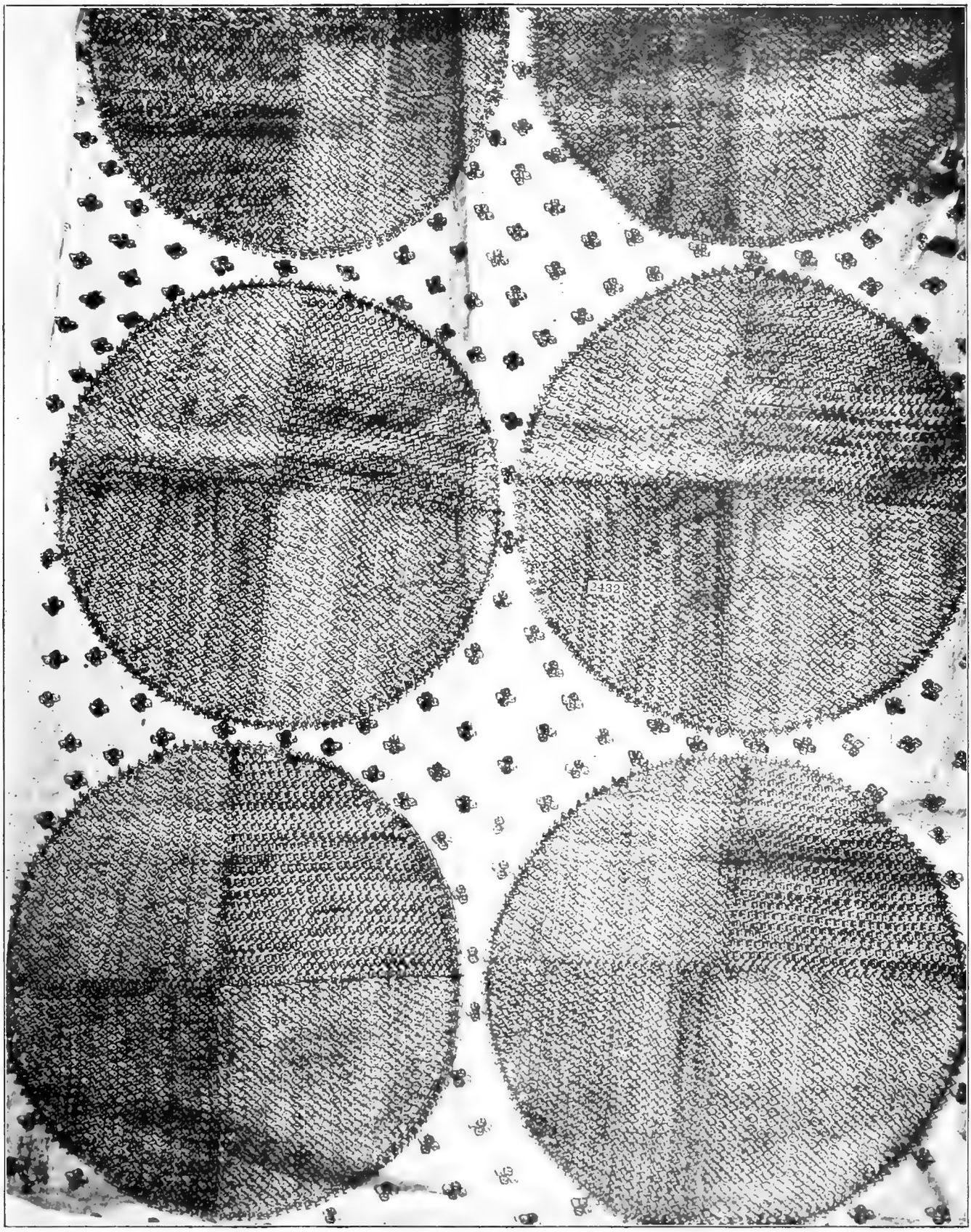


HAWAIIAN KAPA. BRITISH MUSEUM AND K. K. HOFMUSEUM, VIENNA.

PLATE 40.

HAWAIIAN KAPA IN BISHOP MUSEUM.

This remarkable specimen was probably a kilohana to a set of bed kapa. The quadrants of the circles are stamped in black and red alternating, the circumference is stamped in black with a slightly different figure. The small figures between the circles are composed of two black and two red impressions of the same stamp that was used in filling the circles. No. 2432 B. M., reduced to one-fourth size.



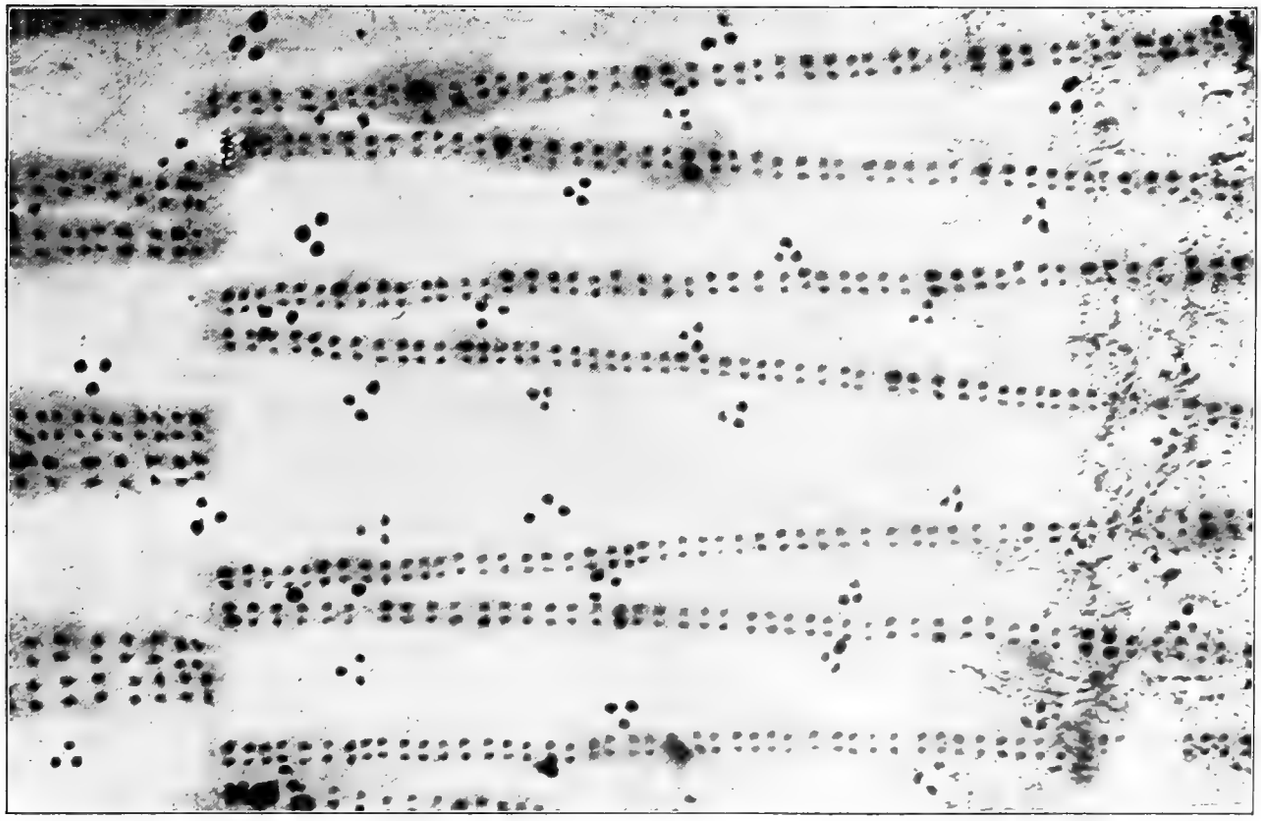
HAWAIIAN KAPA, RED AND BLACK. BISHOP MUSEUM.

PLATE 41.

HAWAIIAN KAPA. COOK COLLECTION.

1. A soft, smooth and thin piece of white kapa on which twin dots are stamped in intersecting bands. The dark figures are painted in red ochre.

2. A kapa of similar character to the last, the bands being stamped in twos, the intermediate figures in threes. Both specimens from the author's collection of Cook kapa. Nearly same size.



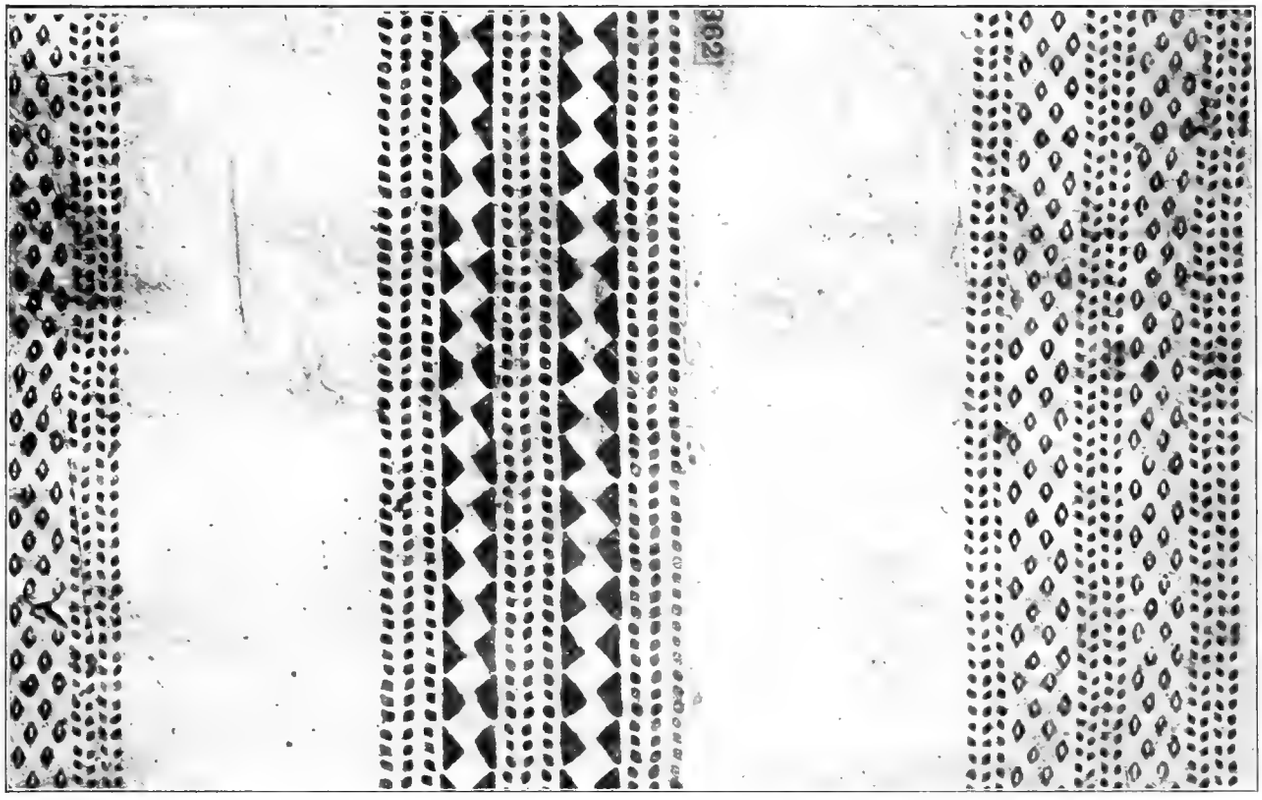
HAWAIIAN KAPA. COOK COLLECTION.

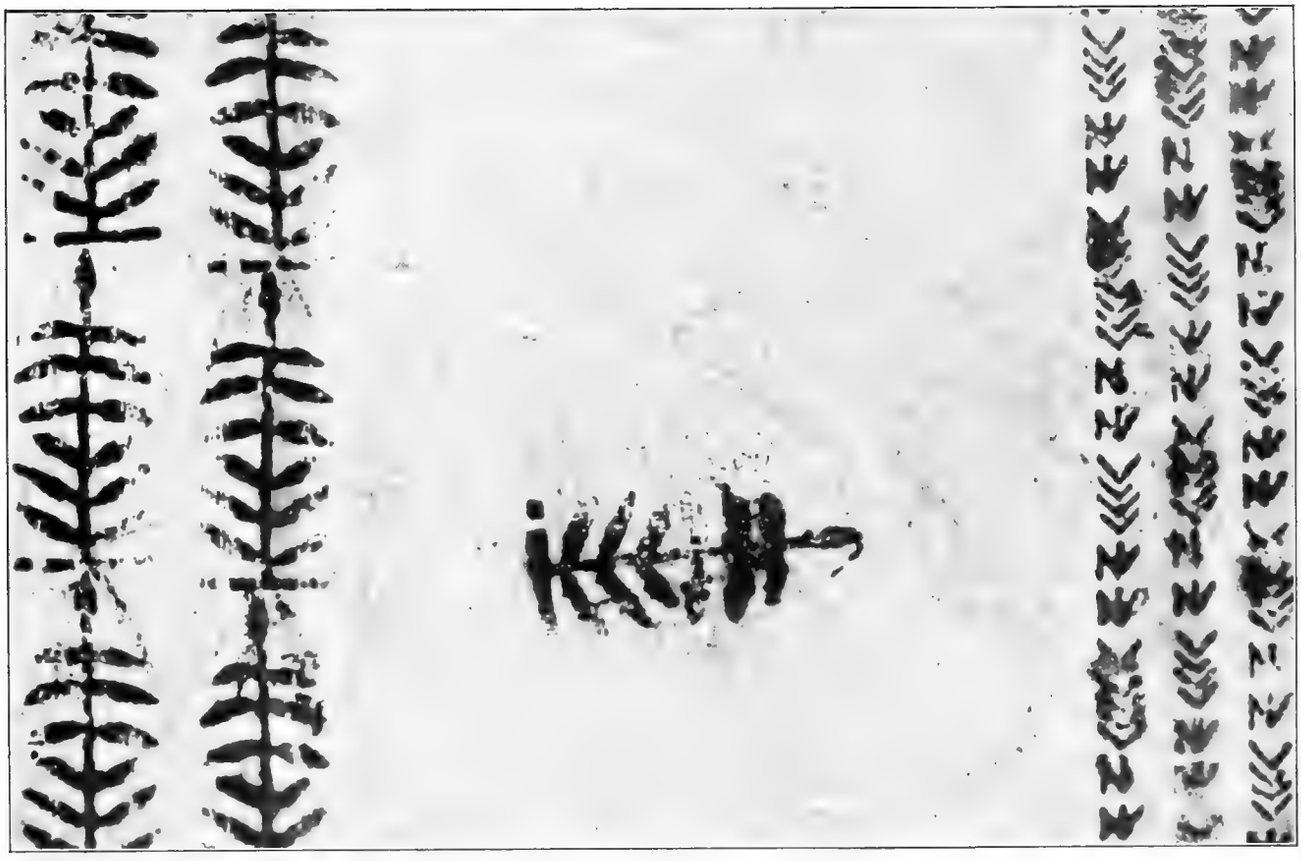
PLATE 42.

HAWAIIAN KAPA IN BISHOP MUSEUM.

1. This kilohana of a kuina of kapa moe is a remarkable example of expert stamping. The sheet is well bleached and the stamps are in black; the regularity is almost as exact as if printed on a modern press. (No. 2362 B. M.)

2. This small fragment (B. M. 8814) is roughly stamped, but is of a curious design. It is represented full size.



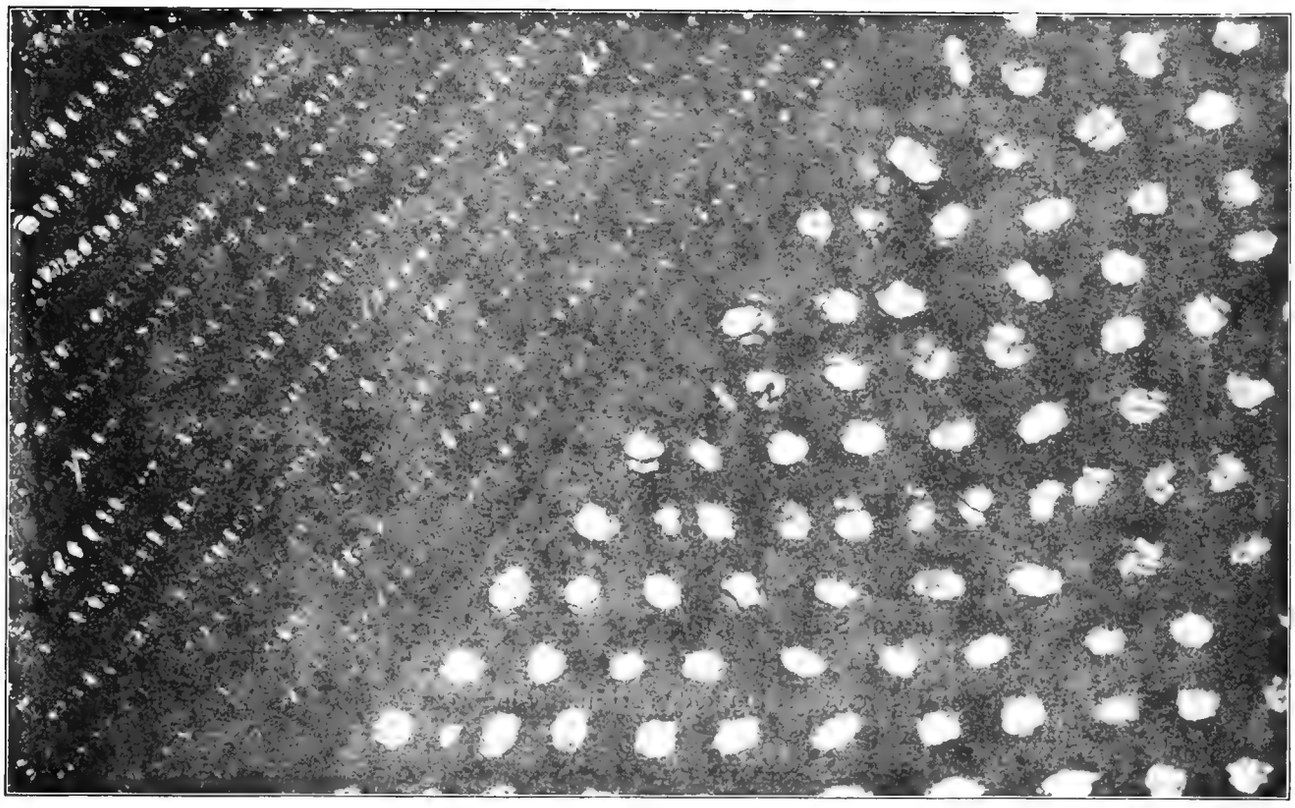


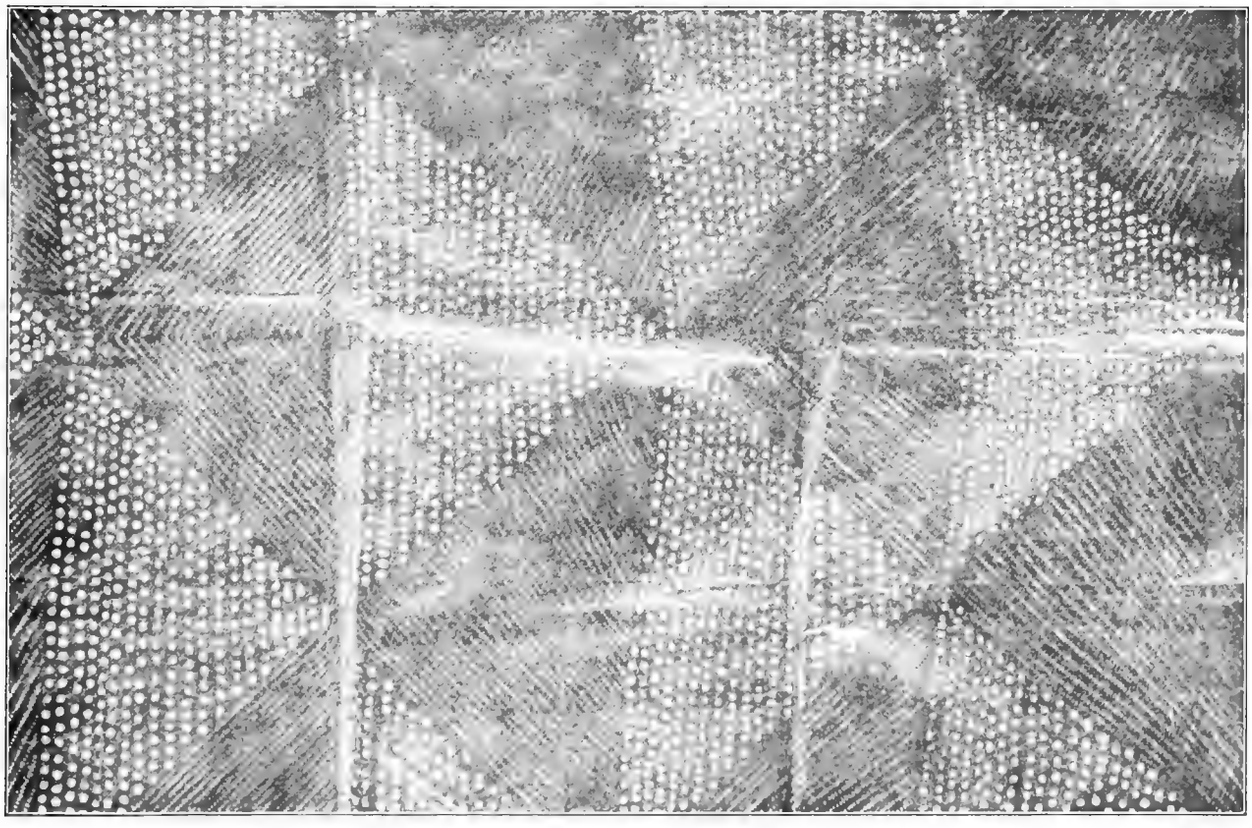
HAWAIIAN KAPA, BLACK ON WHITE.

PLATE 43.

Punctured Hawaiian Kapa.

Both specimens are from the same sheet (B. M. 2450), the upper full size, the lower is reduced to one-sixth in order to show the arrangement of the punctures in triangular form. Like all these punctured patterns the black (which in this case is kalo patch mud which turns in time to a rusty brown) is thin and punctured as shown, then while wet is pasted to the white sheet and the two beaten together.





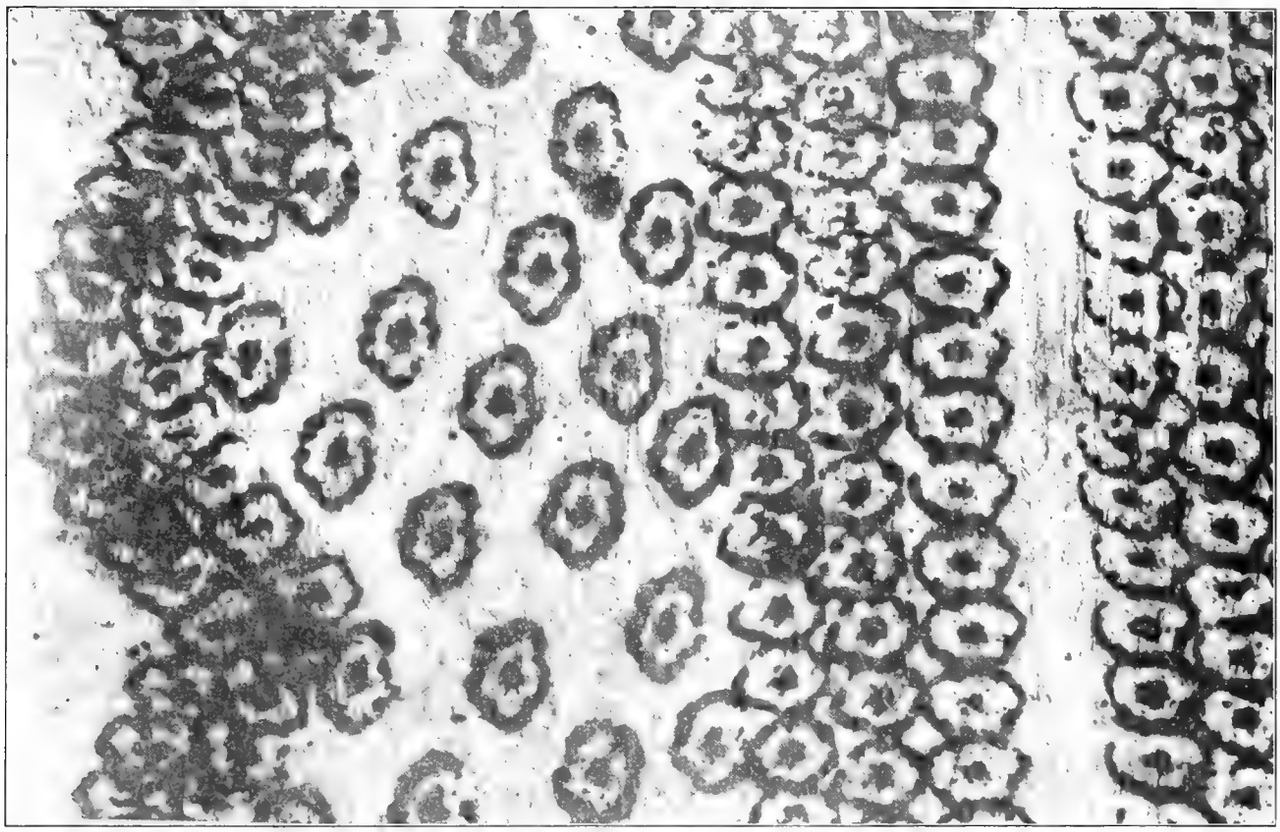
HAWAIIAN BLACK LACE KAPA.

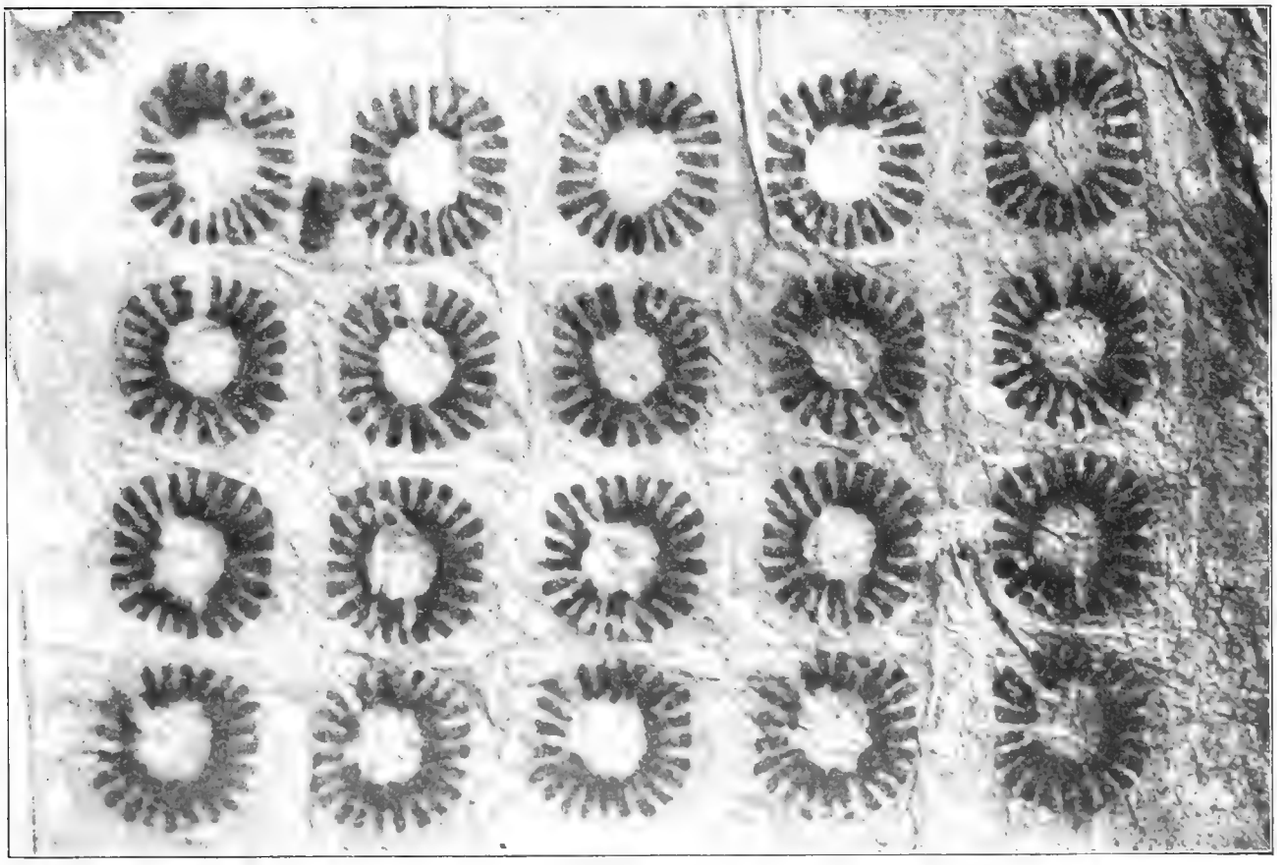
PLATE 44.

Hawaiian Kapa.

1. This specimen of a border from Kauai was given to the writer by the Peabody Academy of Science. Originally yellow with turmeric dye, it has faded almost completely, but the black stamps were in the ink made from the soot of kukui nuts and have remained much as originally impressed. This pretty border was part of a kihei or native shawl.

2. This kapa was apparently stamped in rectangles composed of twenty rosettes, but the fragment sent me leaves this uncertain. Sent me from the Philadelphia Academy of Natural Sciences, and I understand it was brought here by the Wilkes Expedition.



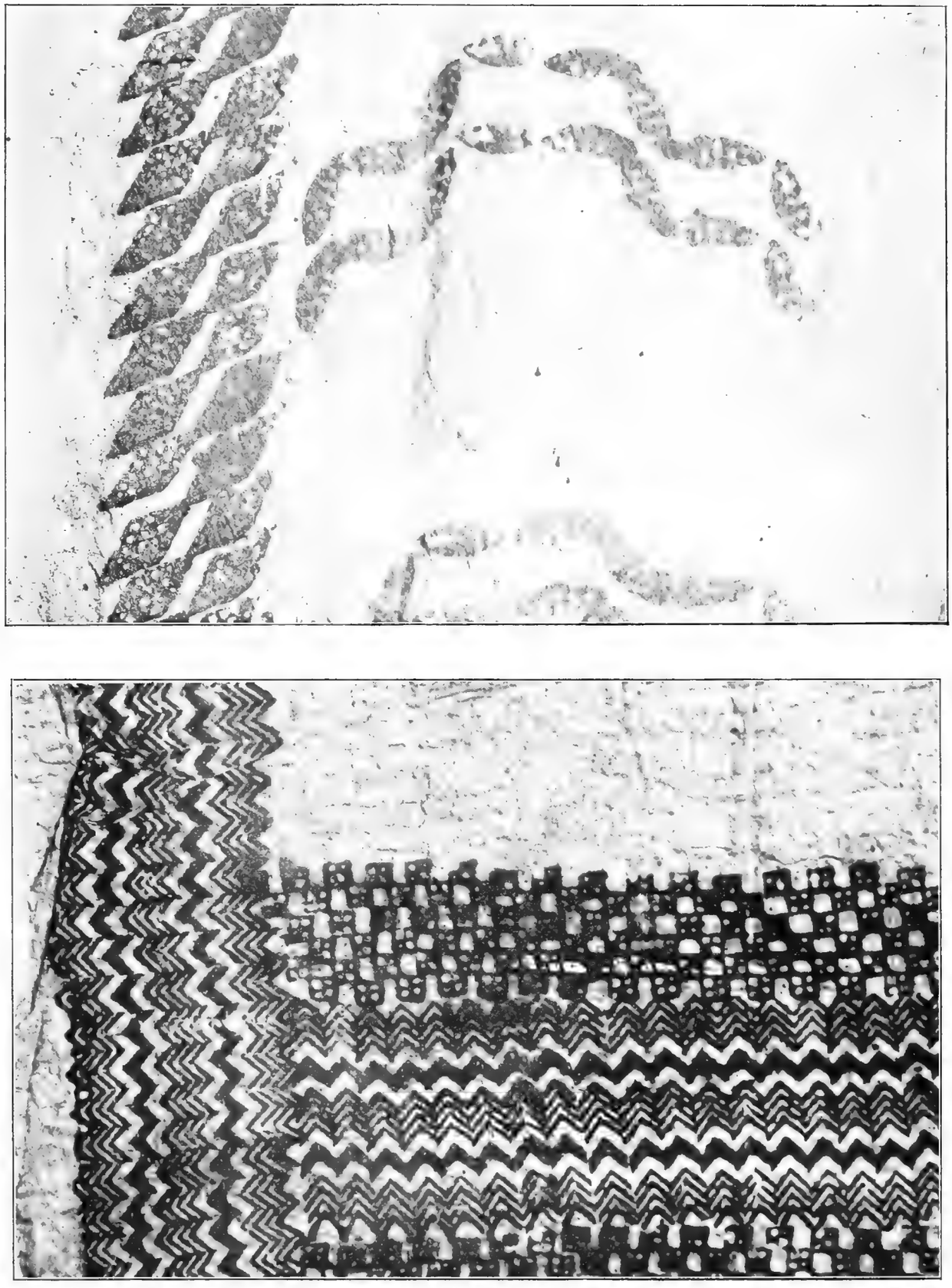


HAWAIIAN KAPA.

PLATE 45.

Hawaiian Yellow Kapa with Black Stamps.

Both the patterns on this plate belong to the decoration of the pa'u or female dress, whether for the hula or, later, for riding. The base is yellow and the figures are stamped with more or less care. Both specimens are in this Museum.



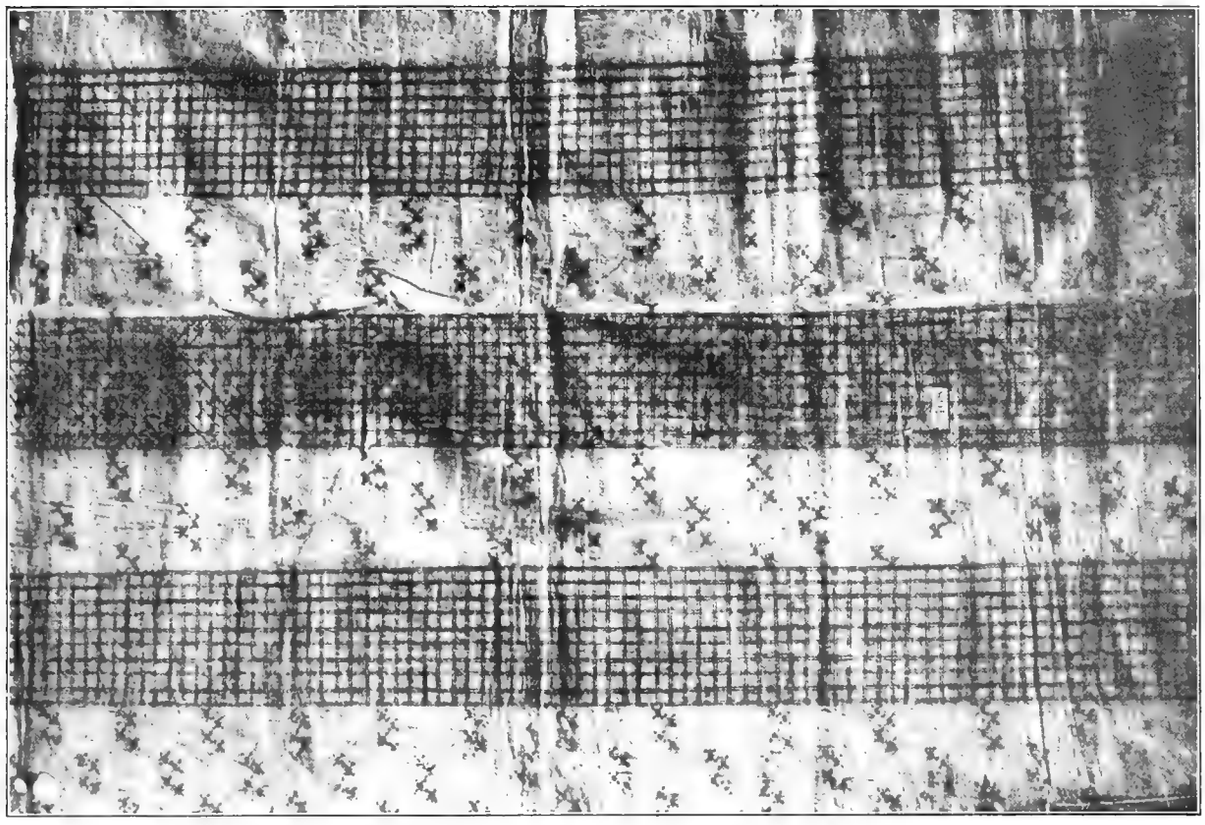
HAWAIIAN KAPA, BLACK ON YELLOW. BISHOP MUSEUM.

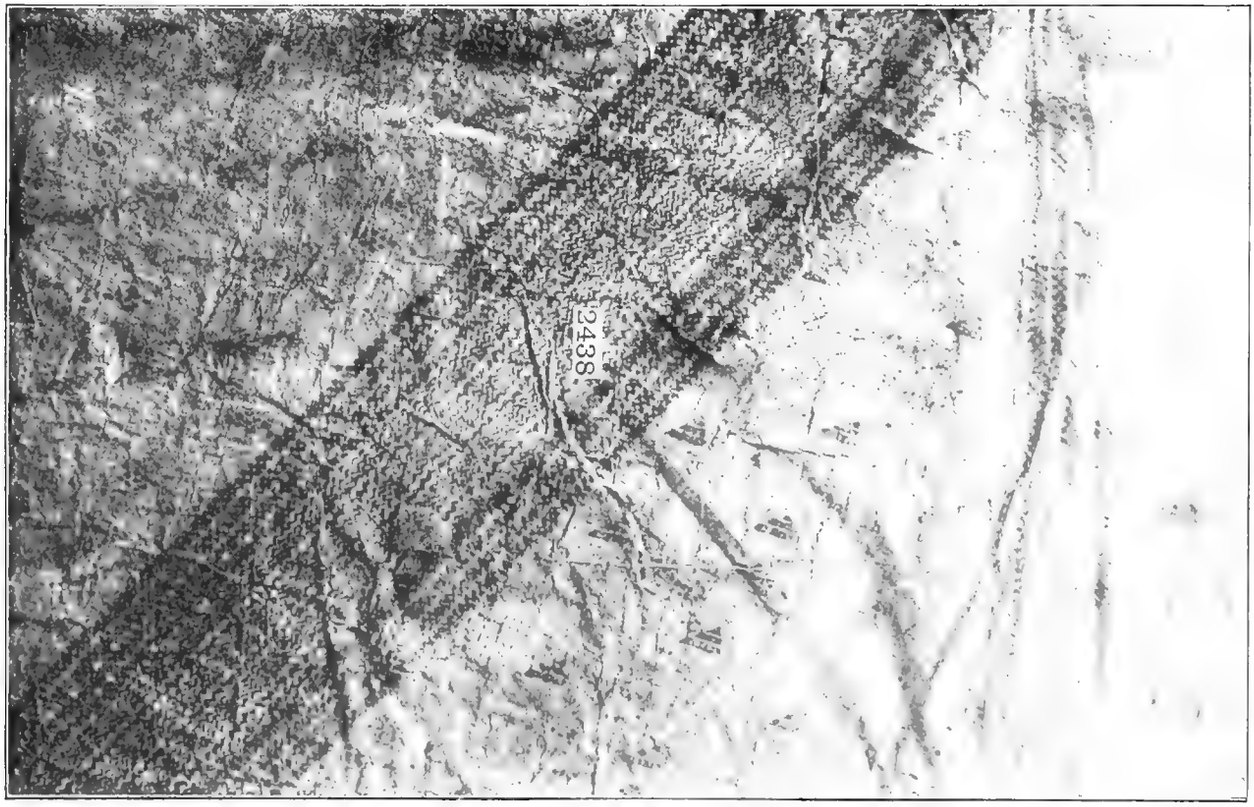
PLATE 46.

HAWAIIAN KAPA.

1. A specimen from Mrs. Bishop's collection. The ground is pale pink, perhaps ohelo. The bands are ruled with double lined pens, each alternate one also ruled transversely; between the bands are little figures, perhaps flowers, scattered rather irregularly. A fragment. (No. 2468 B. M.)

2. Another fragment, part of a once yellow kihei, stamped in black and bright red. Much worn, but well stamped. (B. M. 2438.)





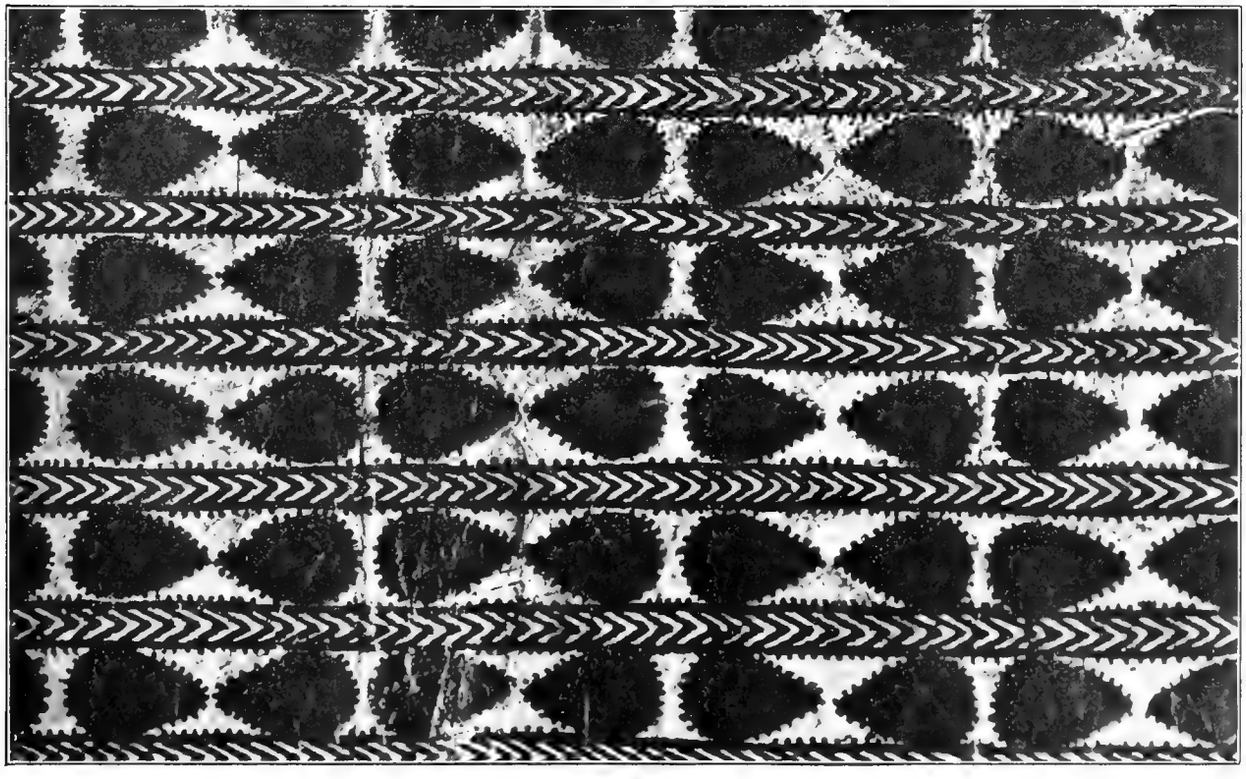
HAWAIIAN KAPA.

PLATE 47.

Hawaiian Kapa.

1. A very soft white kapa from the author's collection of Cook kapa, ruled with bright red lines.

2. A curious design sent me from the British Museum printed in black on white. No scale was given, but I should judge it to be not more than quarter size. The ovoid figures are not leaves, and the fringe about them is a part of the same ornamentation of the stripes.

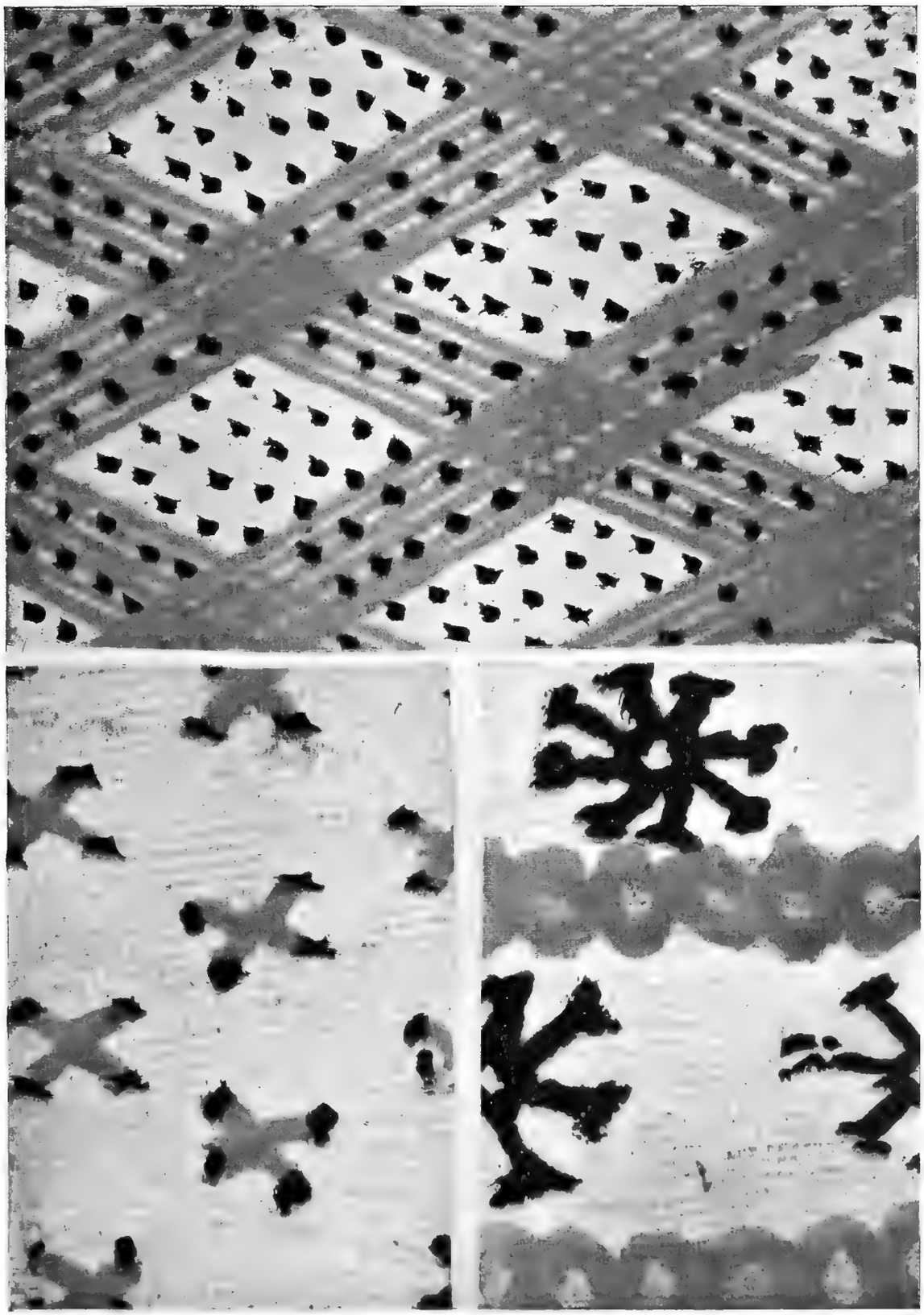


HAWAIIAN KAPA.

PLATE 48.

Hawaiian Kapa.

These specimens are from Oahu, and are of the same design and coloration. They were parts of stripes used for malo or pa'u.



HAWAIIAN KAPA FROM OAHU.

KA HANA KAPA

BY

WILLIAM T. BRIGHAM

MEMOIRS OF THE BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY. III.

COLOR PLATES

MUSEUM PRESS
HONOLULU, H. I.
1911

Explanation of the Color Plates.

AA and BB are intended to show the color of the specimens referred to in the text and are made carefully from actual specimens. Doubtless in some cases the color has faded from its original tone, especially with the yellows.

A. Represents a portion of a pa'u: the ground yellow stamped in black and red; both the yellow (olena) and red (noni) have nearly faded out. A good type of band formed by narrow stamps.

B. Portion of a pa'u, well beaten and dyed yellow (olena) and stamped red (alaea) and black (nanahu). Collected by Captains Crowninshield and Folger in 1802. Given by the Peabody Academy of Science, Salem, Mass. (E. 3152).

C. Yellow (originally) kapa ruled with black and red, collected by Captains Crowninshield and Folger in 1802. Given by the P. A. S. (E. 3165). 2. A fragment from the Philadelphia Academy of Natural Sciences, dating from the time of the Wilkes Expedition: originally yellow with black lines and brown filling. 3. Portion of a child's dress; the red filling is alaea. Purchased from the American Board of Commissioners for Foreign Missions (B. P. B. M. 7783). 4. Portion of a holoku (B. P. B. M, 2487) ruled first in red, then in black.

D. Fragment of yellow kapa stamped in black and ruled in red. Peale collection, 3168. Given by P. A. N. S. 2. From the Marquesas by Captains Crowninshield and Folger in 1802. Given by P. A. S. (E. 3159).

E. 1–3. Striped kapa from the Rembrandt Peale collection, 4448, 4450 and 4449. Given by P. A. N. S. 4. Curious specimen from the author's collection of Cook kapa, C. 10.

F. 1. A much faded specimen originally with a bright pink lining and black stamps of *niho me ke haukeuke* (B. P. B. M. 2397). 2. A showy kapa (B. P. B. M. 2395) marked with what is called the "echinus pattern" for some unknown reason. The pink bands were originally much brighter.

G. 1. An oiled kapa pa'u remarkably stamped with many thousand impressions in black and red (B. P. B. M., 2316). 2. Another oiled kapa once belonging to Queen Kalama, wife of Kamehameha III (B. P. B. M. 2695). Both these much desired for purposes of native sorcery.

H. 1. A brown, leathery, mamaki kapa from Kauai, author's collection. 2. From Cook collection II, 37. 3. From same collection, No. 81.

I. 1. A thick, painted kapa kilohana, very old (B. P. B. M., 2776). 2. Kapa rudely painted with alaea and nanahu, said to have been found in a burial cave some twenty-five years ago (B. P. B. M., 2335).

J. 1. A gray kilohana stamped with the "bent knee" pattern in alaea and nanahu (B. P. B. M. 2470). 2. A kilohana of blue with surface cut into triangles by stamped lines of black, some filled in with red (B. P. B. M. 2443).

K. 1. A kilohana made as described on page 113 (B. P. B. M., 2505). 2. Portion of a kapa pa'u from Oahu. Black stamps on ohelo-colored ground. From R. Peale collection, No. 4480. Given to the author by the P. A. N. S.

L. 1. Very old and thin kihei or pa'u (B. P. B. M. 2435). 2. A similar fragment stamped in alaea and nanahu; B. P. B. M.

M. 1–2. Stamped figures, from very old and ragged pa'u in the author's collection. 3. Specimen in this Museum 2434.

N. 1. Curiously arranged border of a piece from the Peale collection (P. A. N. S., 4483). 2. Old piece of similar character (B. P. B. M., 2692). The ground of plates L–N was originally yellow.

O. 1. A woolen-like kapa from the author's collection of Cook kapas II, 16. 2. Another specimen of similar character from the same collection, No. 23.

P. 1. A specimen of excellent kapa, well stamped, a fragment of a malo purchased from the A. B. C. F. M. (B. P. B. M., 7775). 2. Kapa from the P. A. S. (E. 3260), dating from the beginning of the last century.

Q. 1. Ruled and stamped kapa (B. P. B. M. 2471). 2. A well-ruled specimen from the British Museum in the author's collection.

R. 1. Specimen of similar age and character in the author's collection of Cook kapas II, 76. 2. A wonderfully colored specimen from the same collection, 71.

S. 1. A specimen from which the label has unfortunately been detached, but I believe it from a choice collection of Cook kapa sent me by my friend the late Enrico H. Giglioli of Florence. 2. Leathery kapa from the Peale collection (P. A. N. S., 4494).

T. 1, 2, 3 are all from the author's collection of Cook kapa, II, 74, 79, 78.

U. 1. A fragment of a malo given by the late Gorham D. Gilman of Boston, long a merchant on the Hawaiian Ids. in the first half of the last century. 2, 3, 4 are from the Cook II, 4, 30, 23.

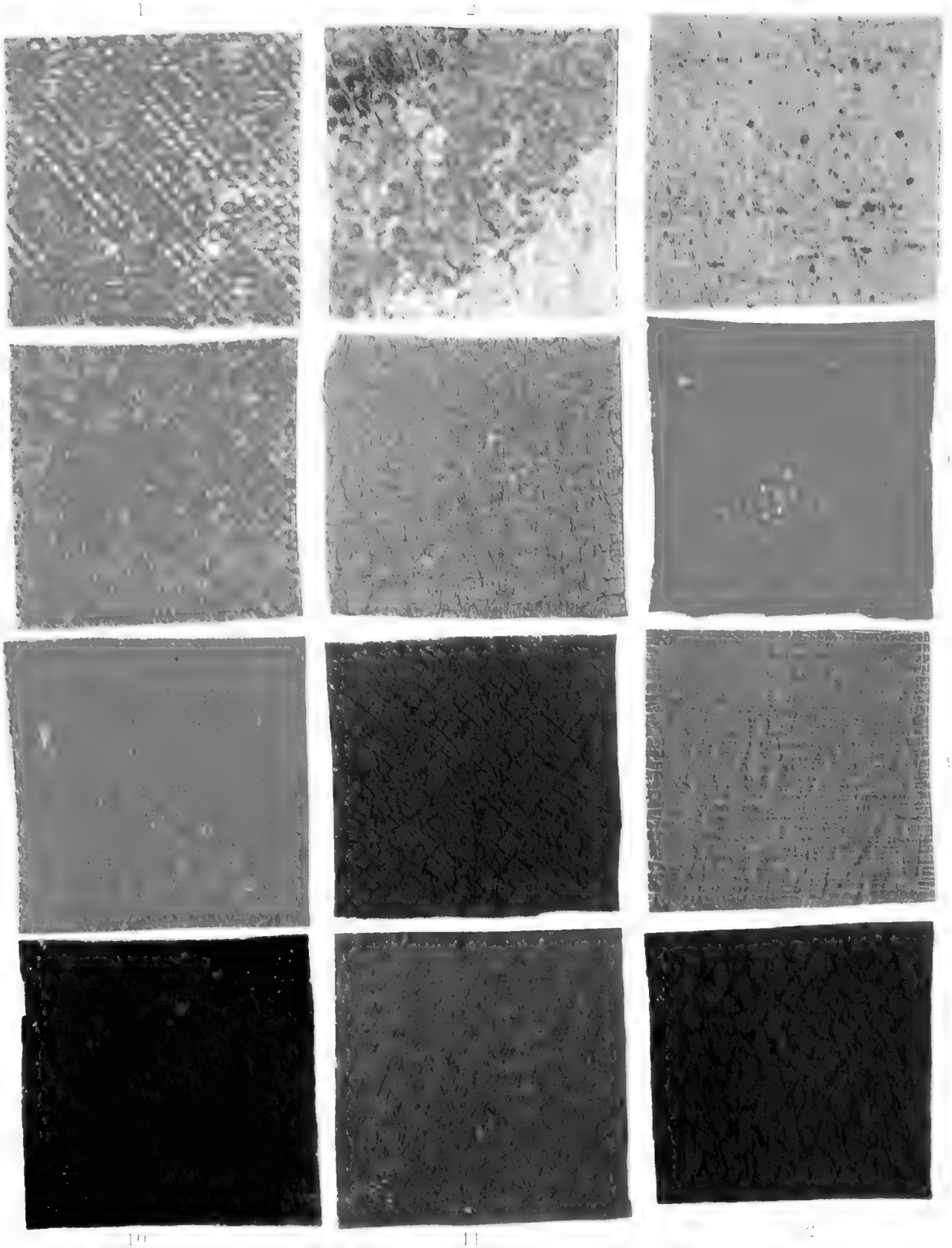
V. 1. A small piece (B. P. B. M. 2777.) decorated with nanahu, alaea and noni. 2. From the U. S. Nat. Museum. 3. From the British Museum.

W. Both specimens on this plate were from the Cook collection first cited, and as they were very small, owing to the unwise generosity of some former owner of the book, the author has repeated the pattern with care for the colors.

X. A remarkably well ruled and stamped specimen in the Kaiserlich-Königlich Naturhistorische Hofmuseum. This and the following plate (Y) was made from specimens kindly loaned by Herr Custos Dr. Franz Heger. These with other of the Cook relics were bought in London in 1806 by the order of the Emperor Francis II, from the Parkinson and Leverian collections. Sydney Parkinson was artist to Sir Joseph Banks during Cook's first voyage. The original inventories of this purchase were examined during a visit to this splendid museum, but no information of special interest was obtained. The purchase was only curiosities for the imperial cabinet.

Y. This specimen, in the Vienna museum from Cook, is attributed to Tongatabu, otherwise I should not hesitate to call it Hawaiian.

All the above plates were photo, chromo-lithograph by Herr Löwy of Vienna. Plate Z, the frontispiece, was made by the American Colortype Company, by the three color process. Plate ZZ, page 212, by the same process in Honolulu.



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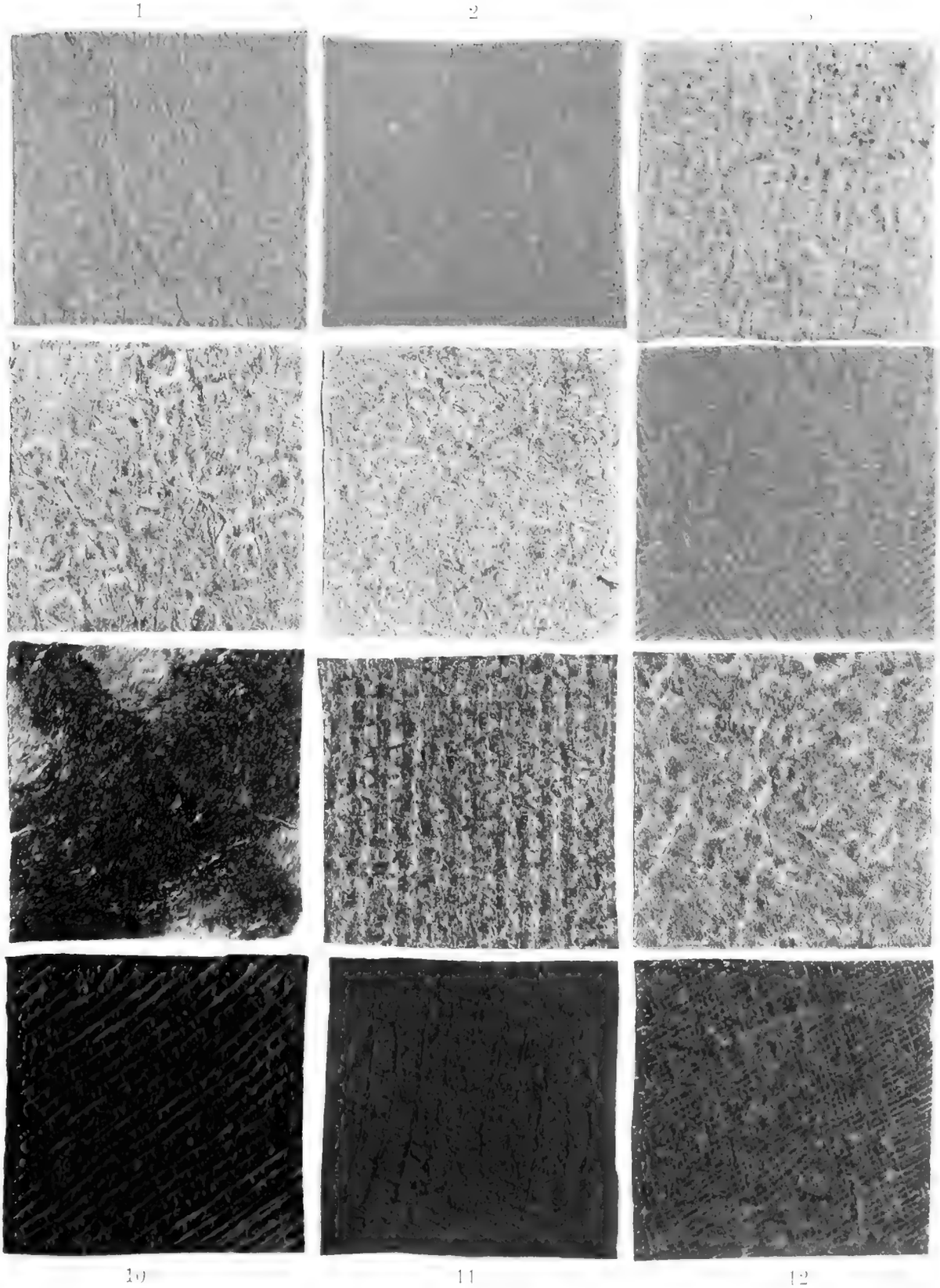

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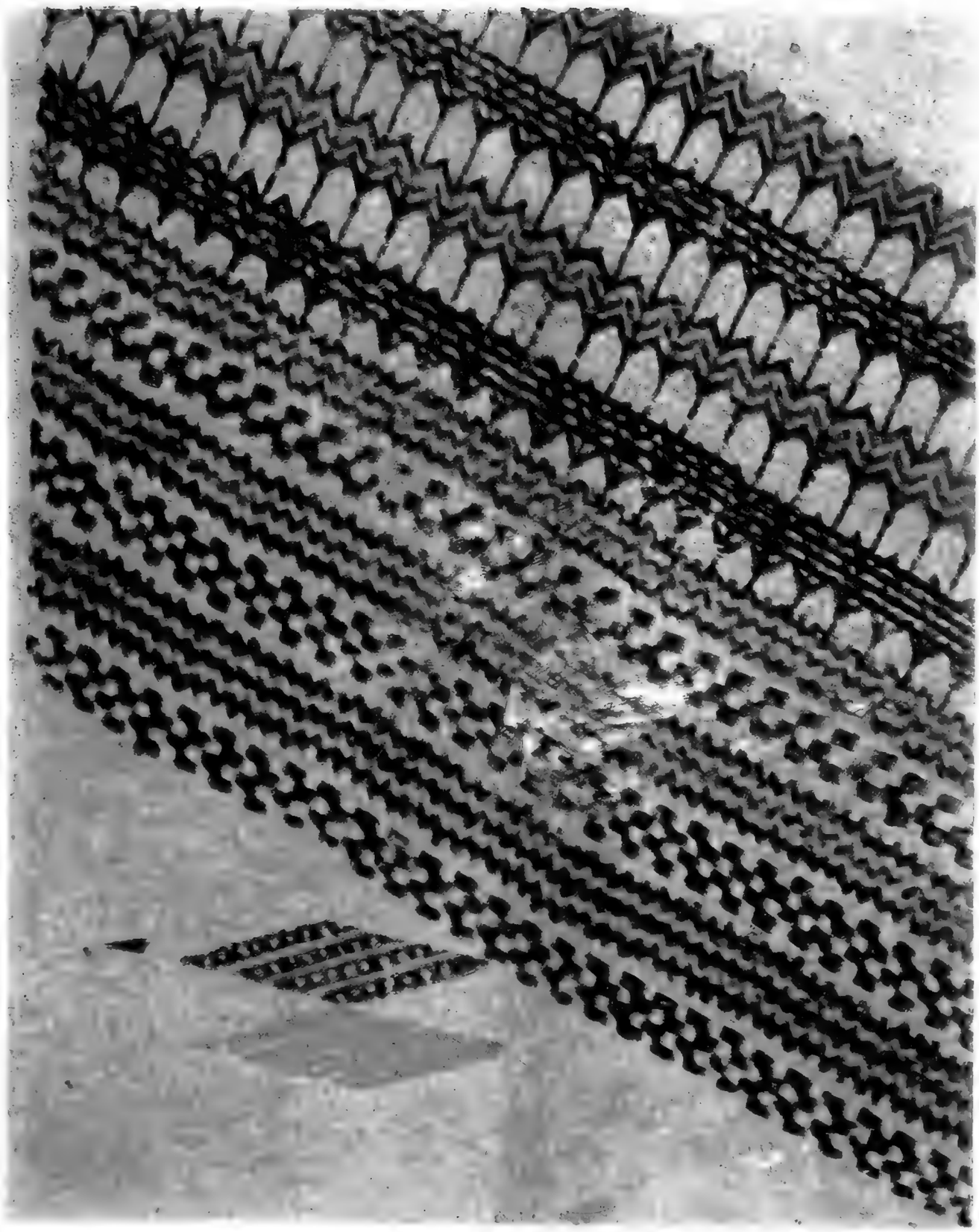

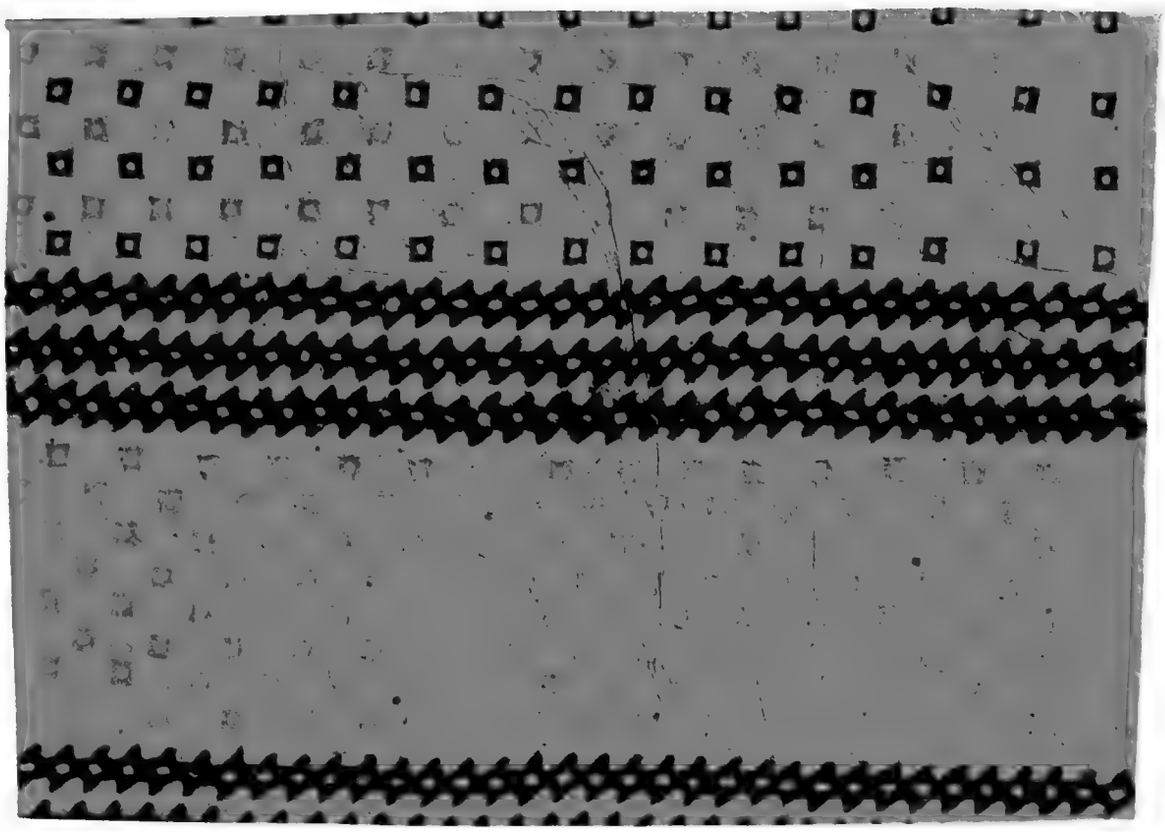

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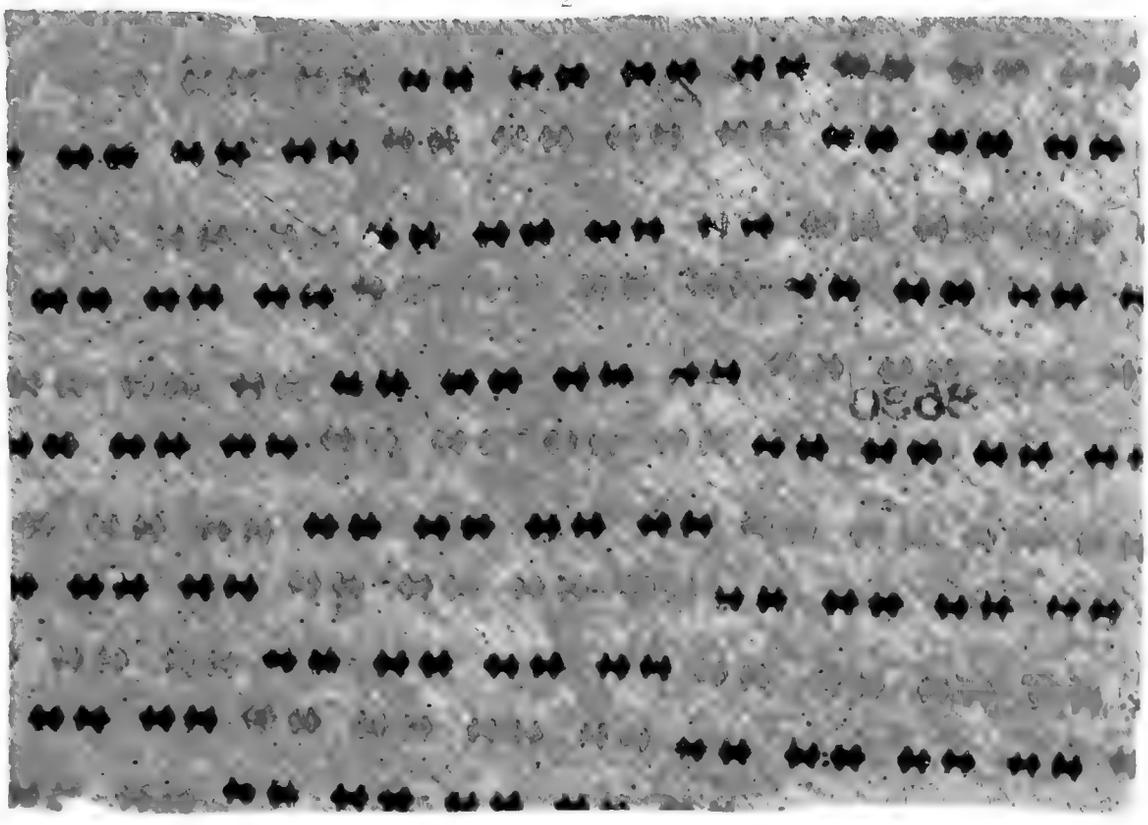

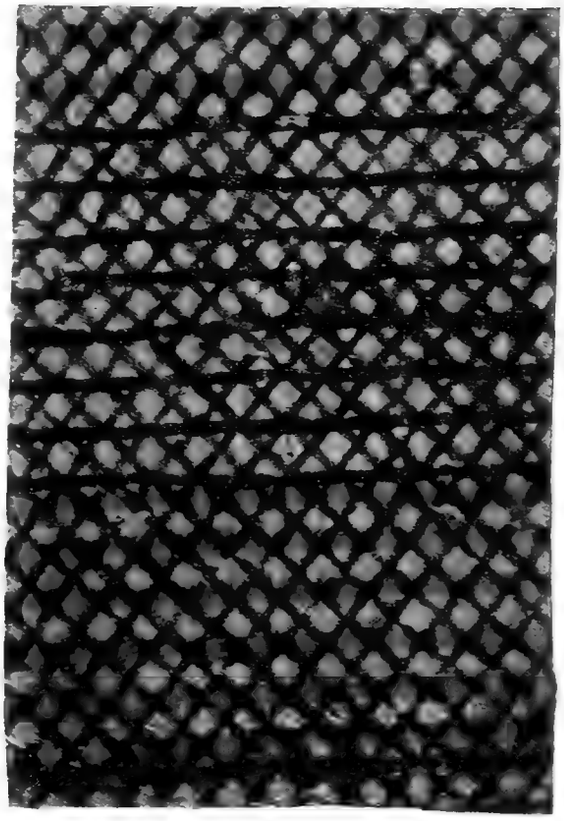

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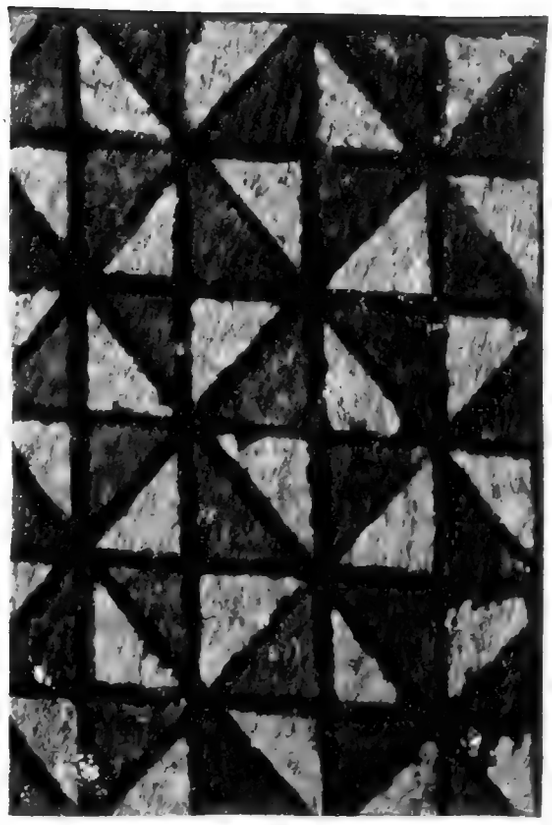

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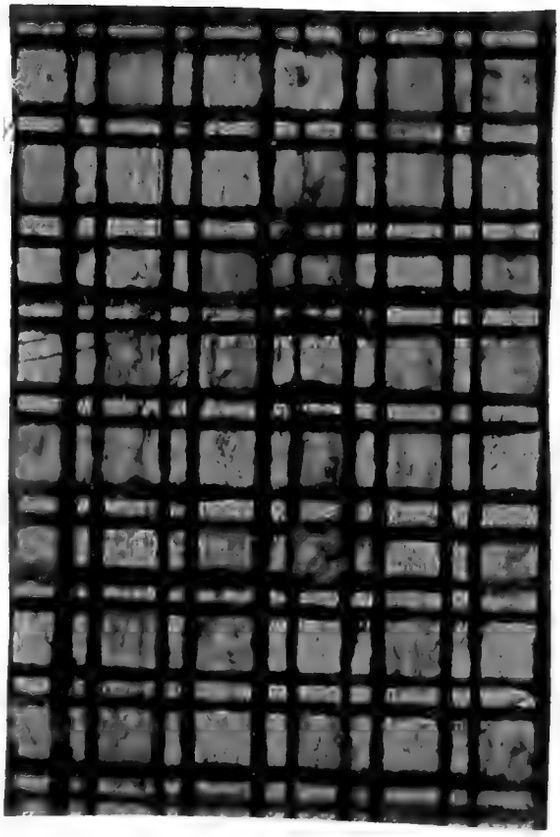

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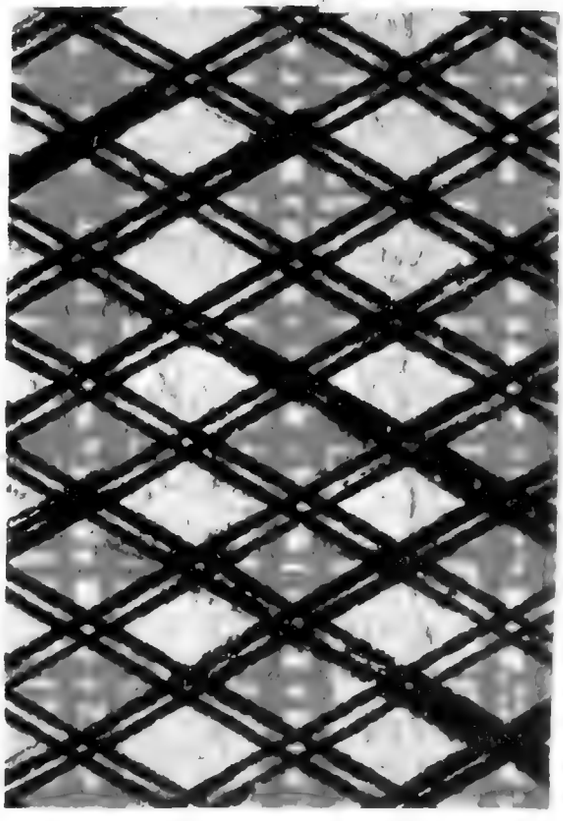

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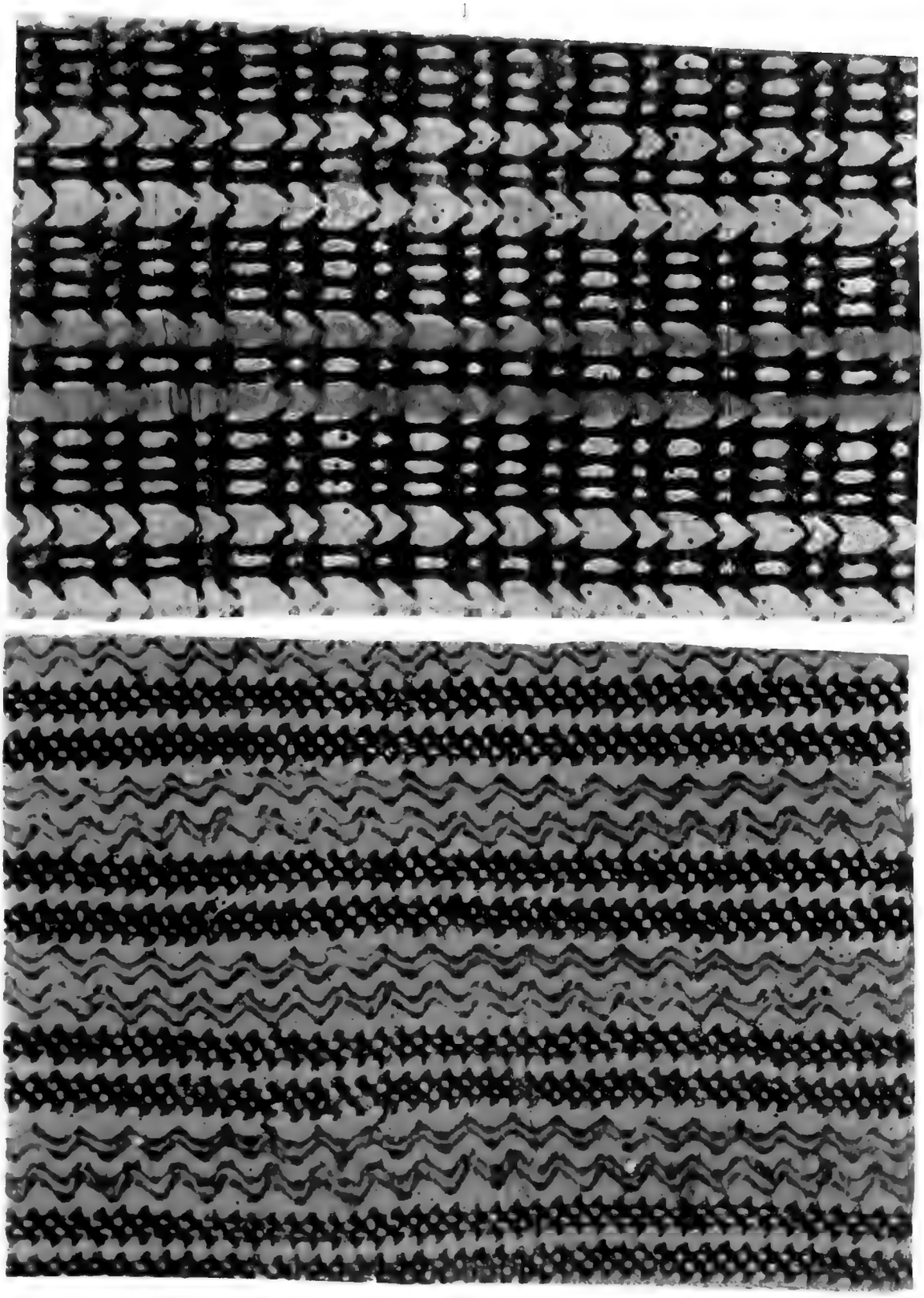

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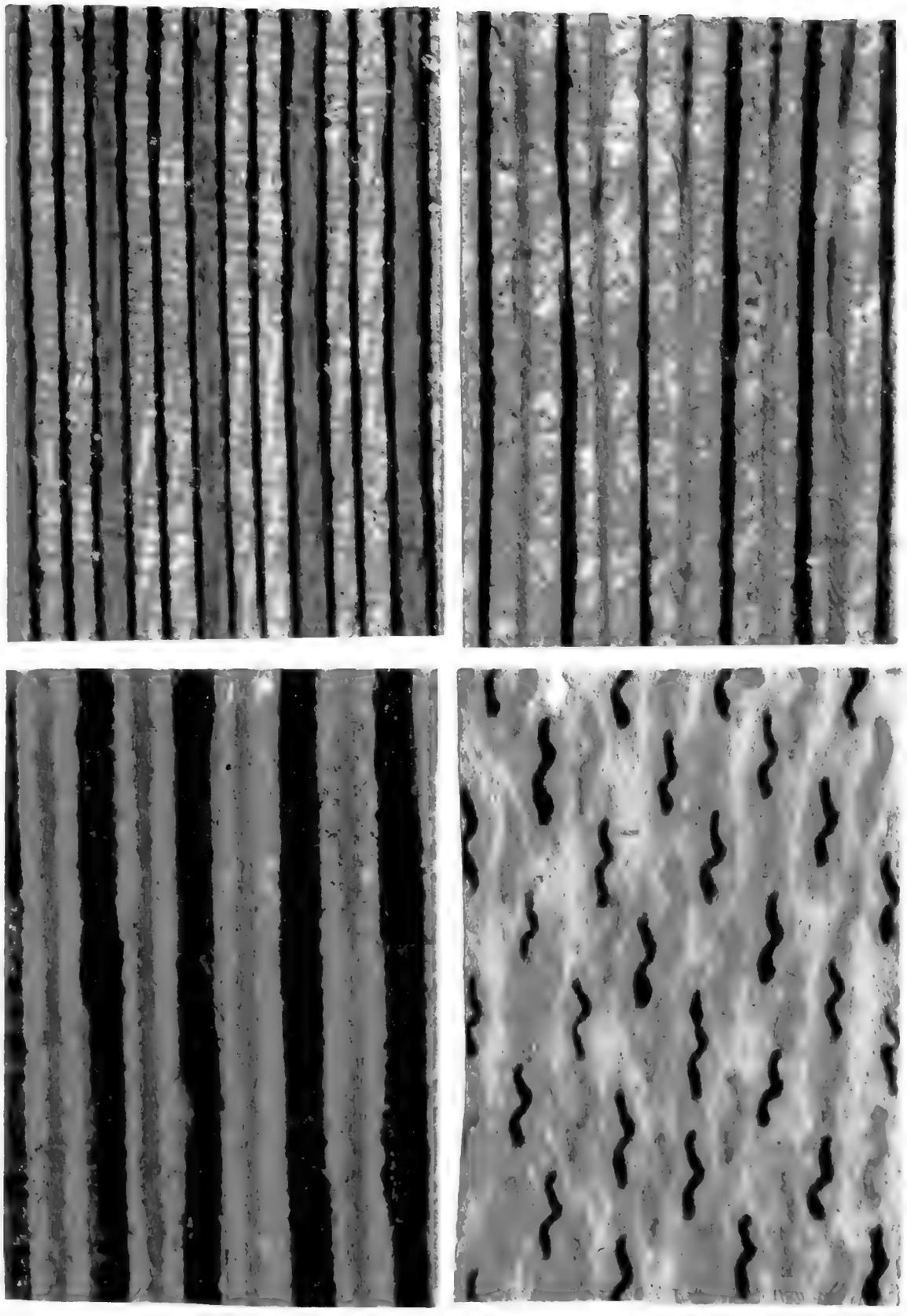

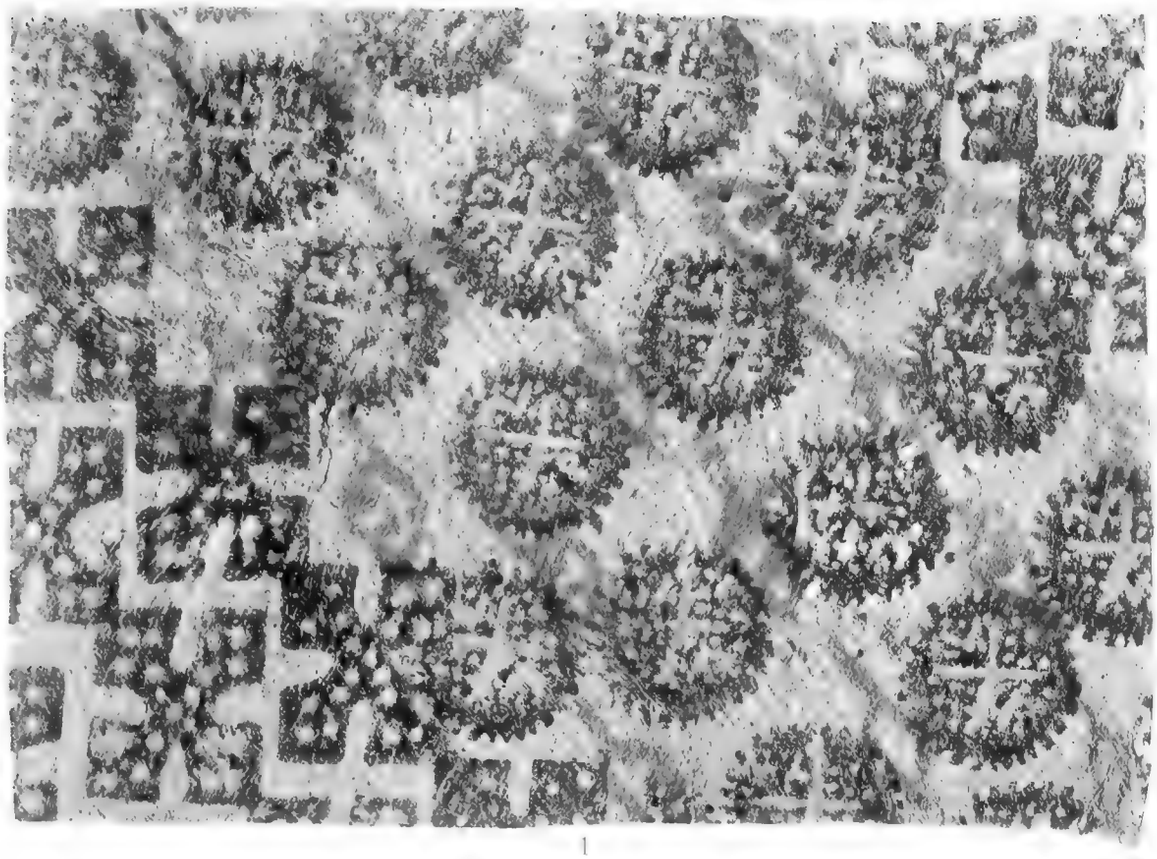

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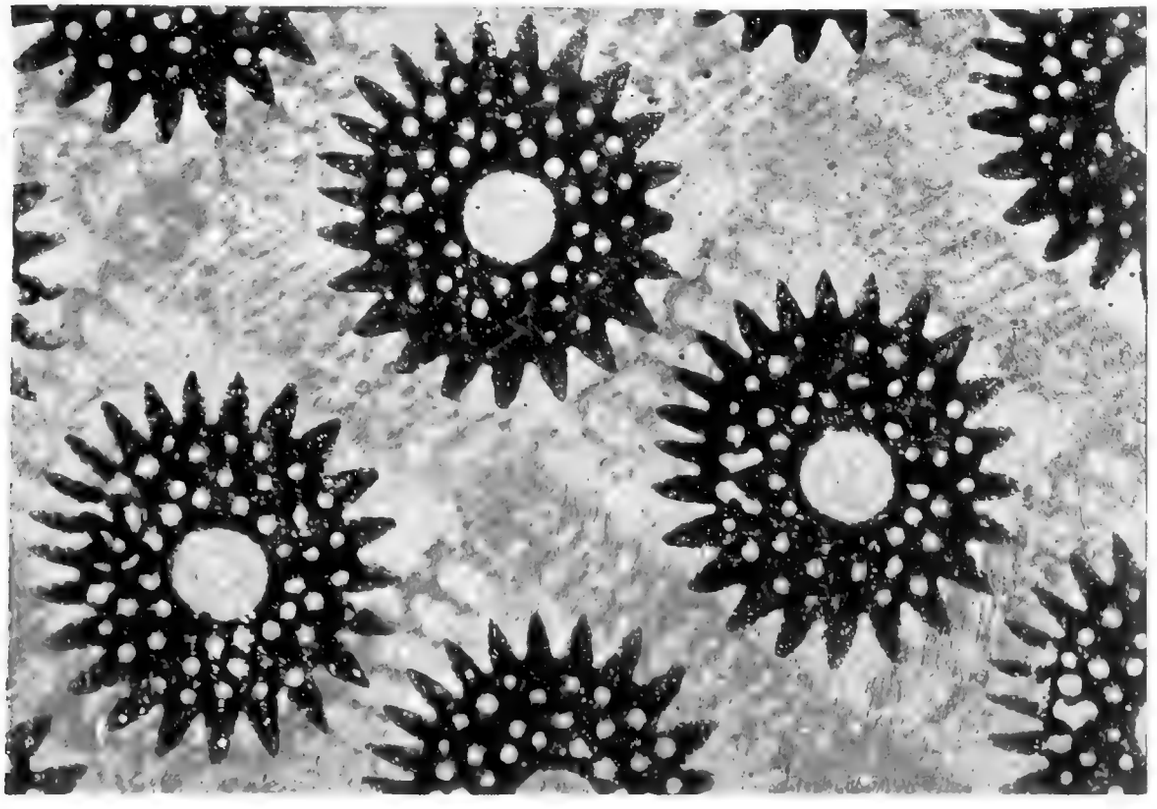

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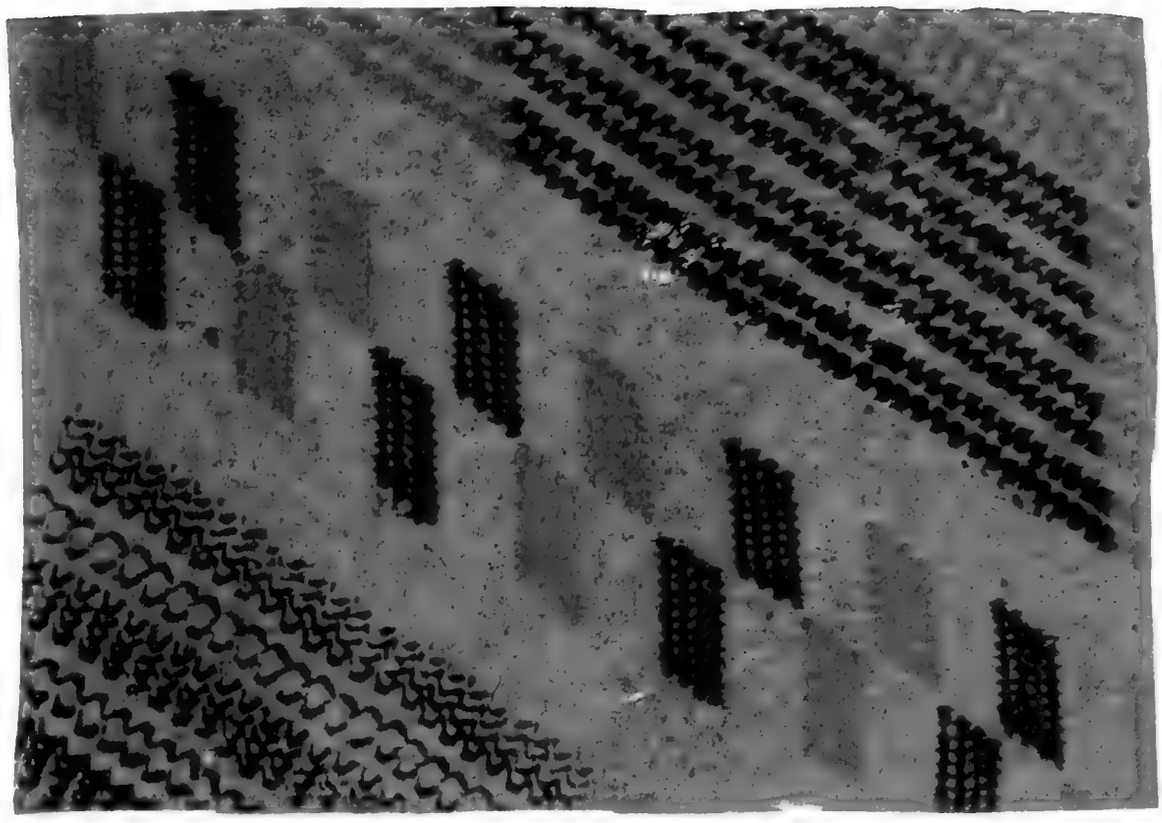

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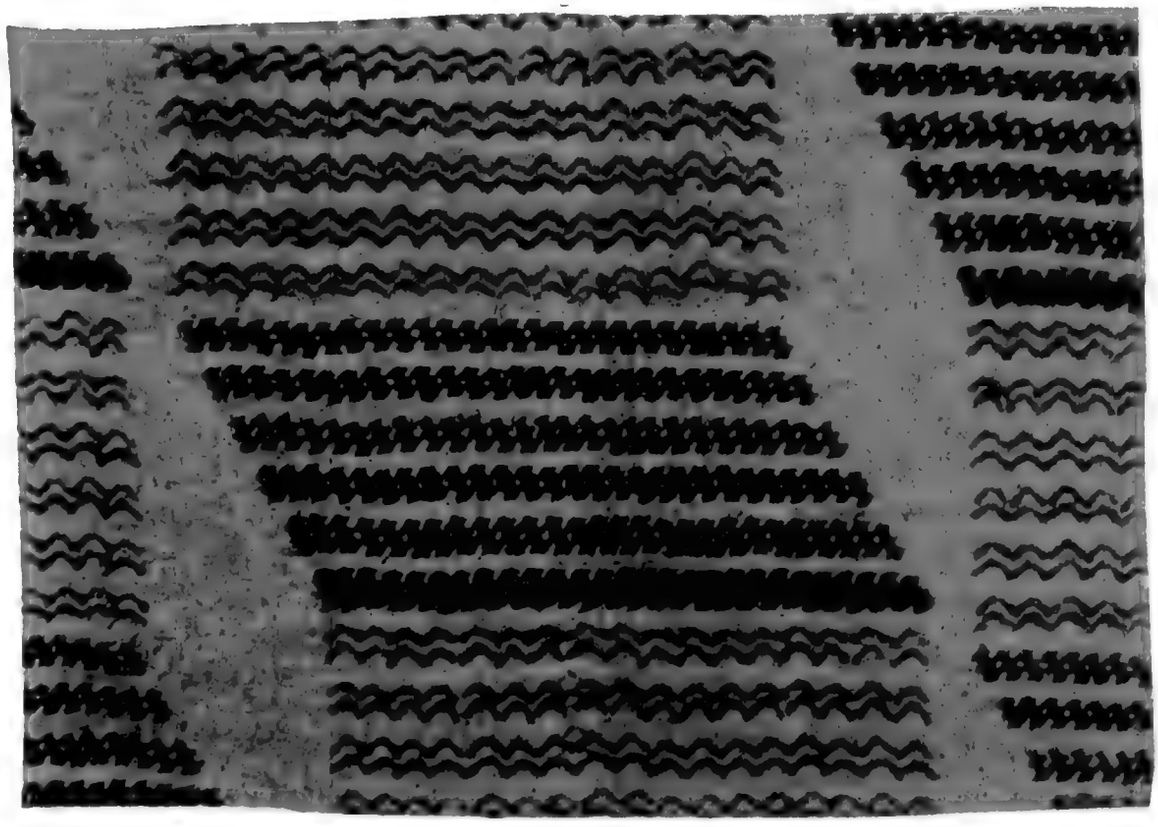

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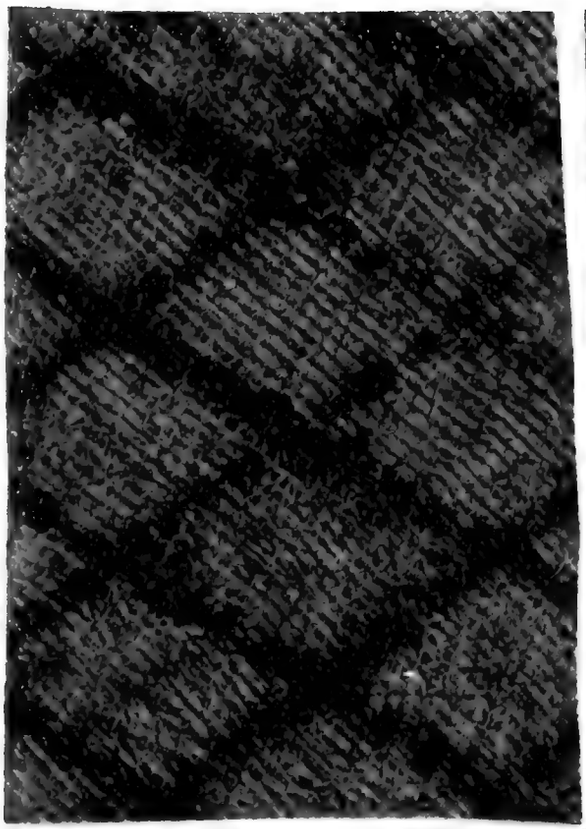

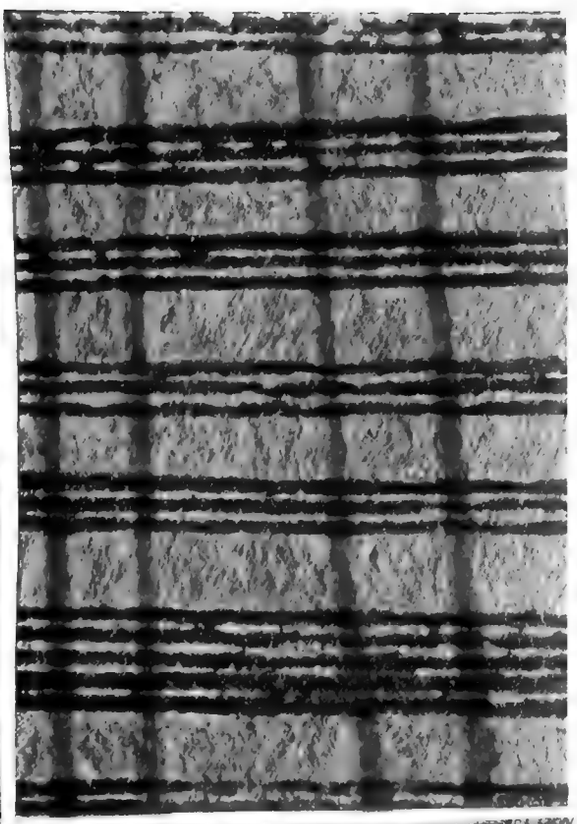

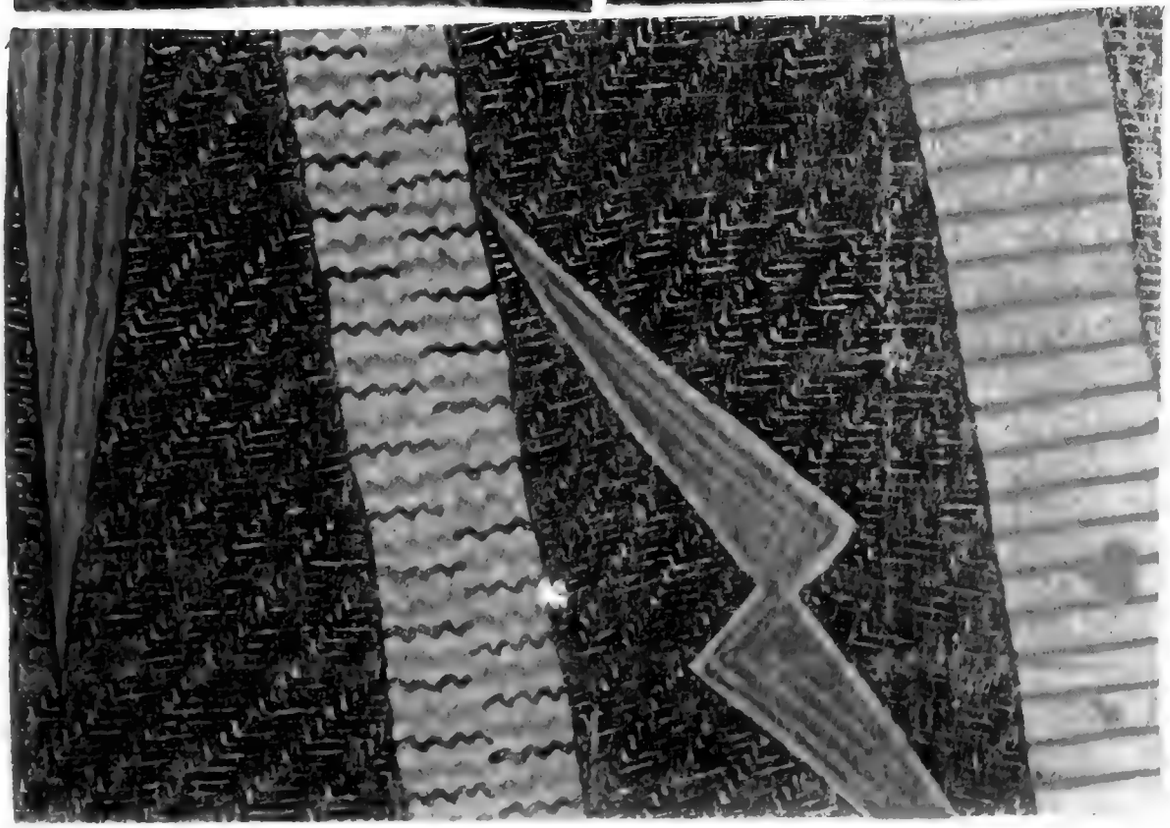

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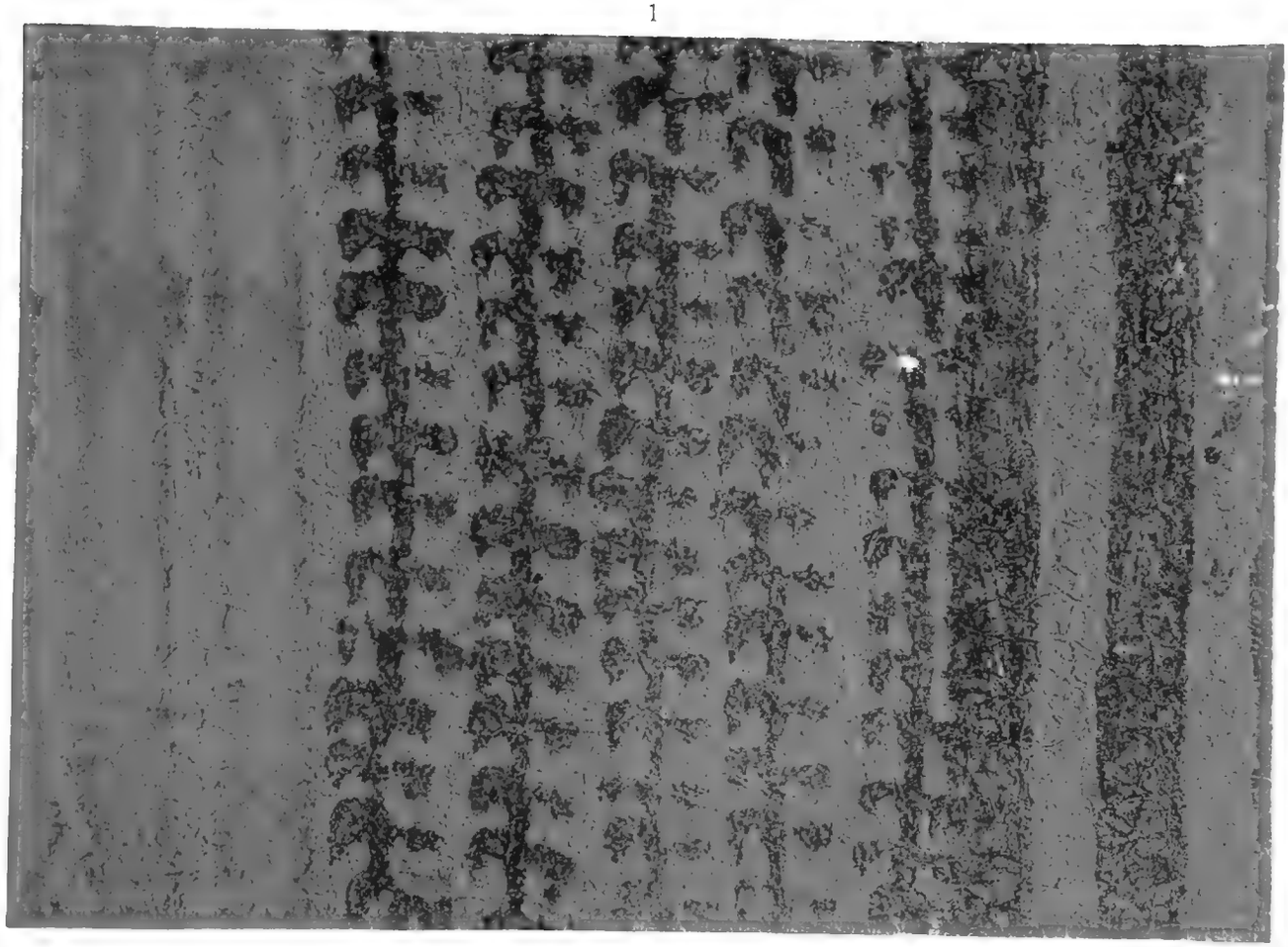

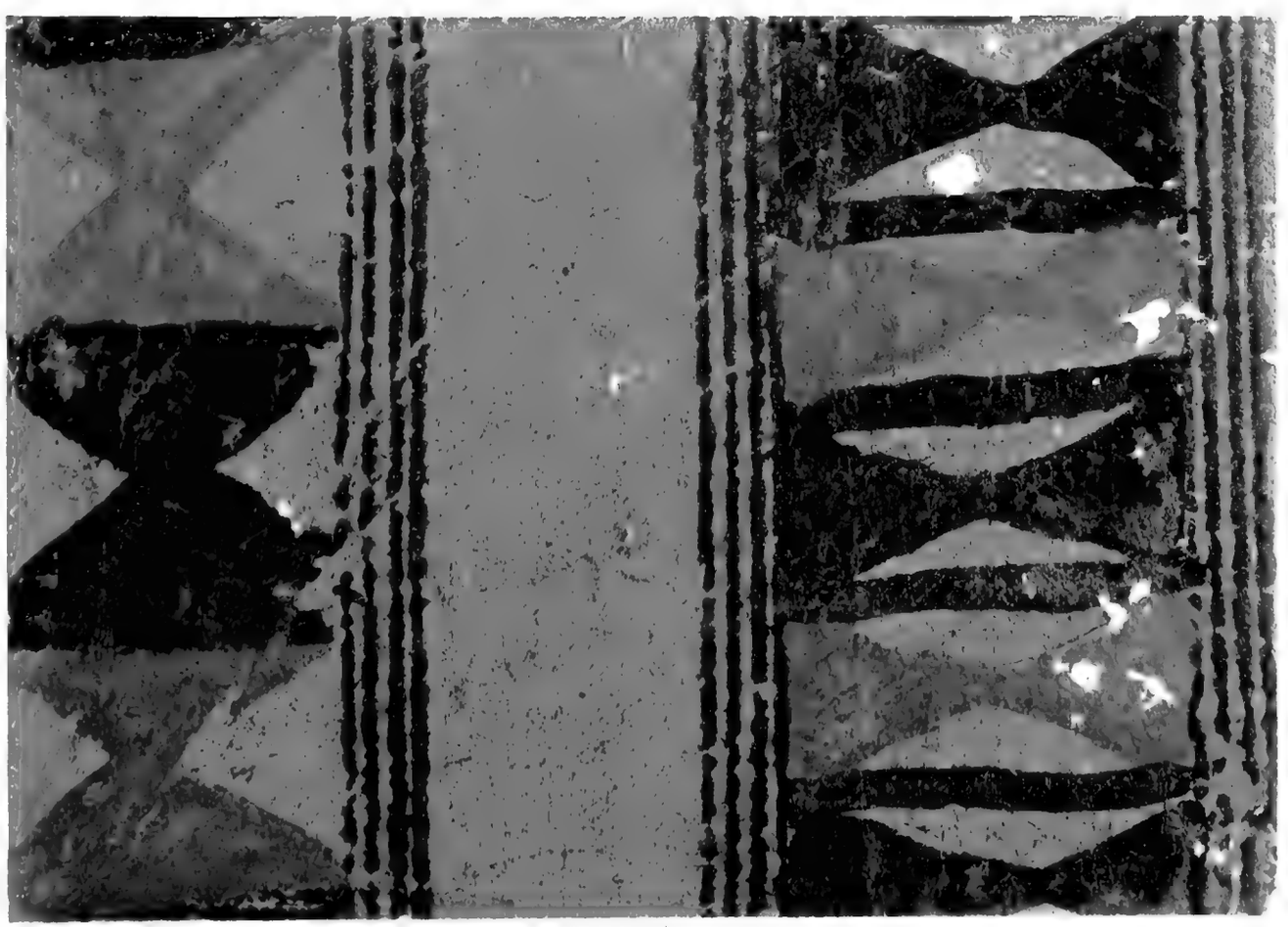

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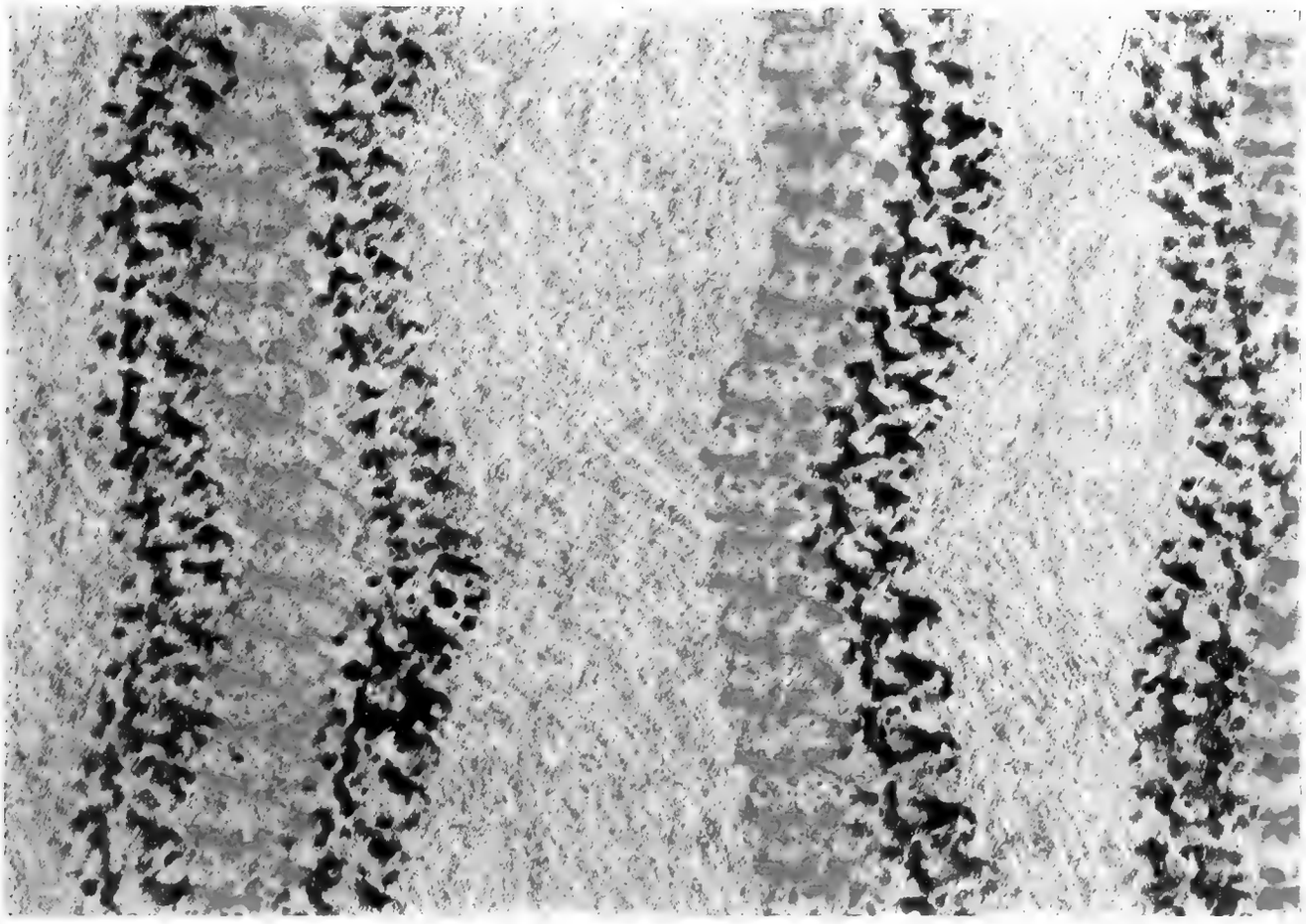

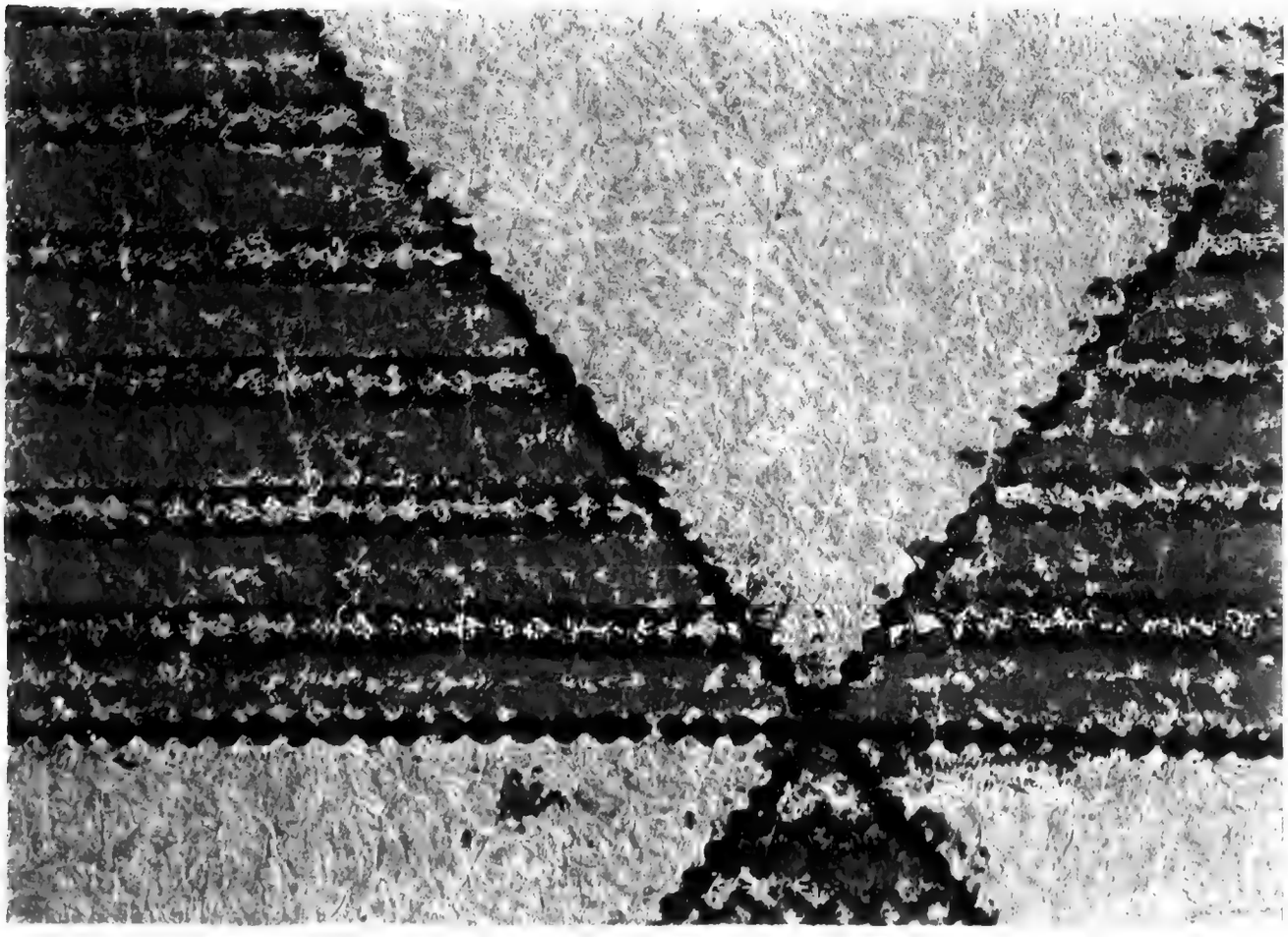

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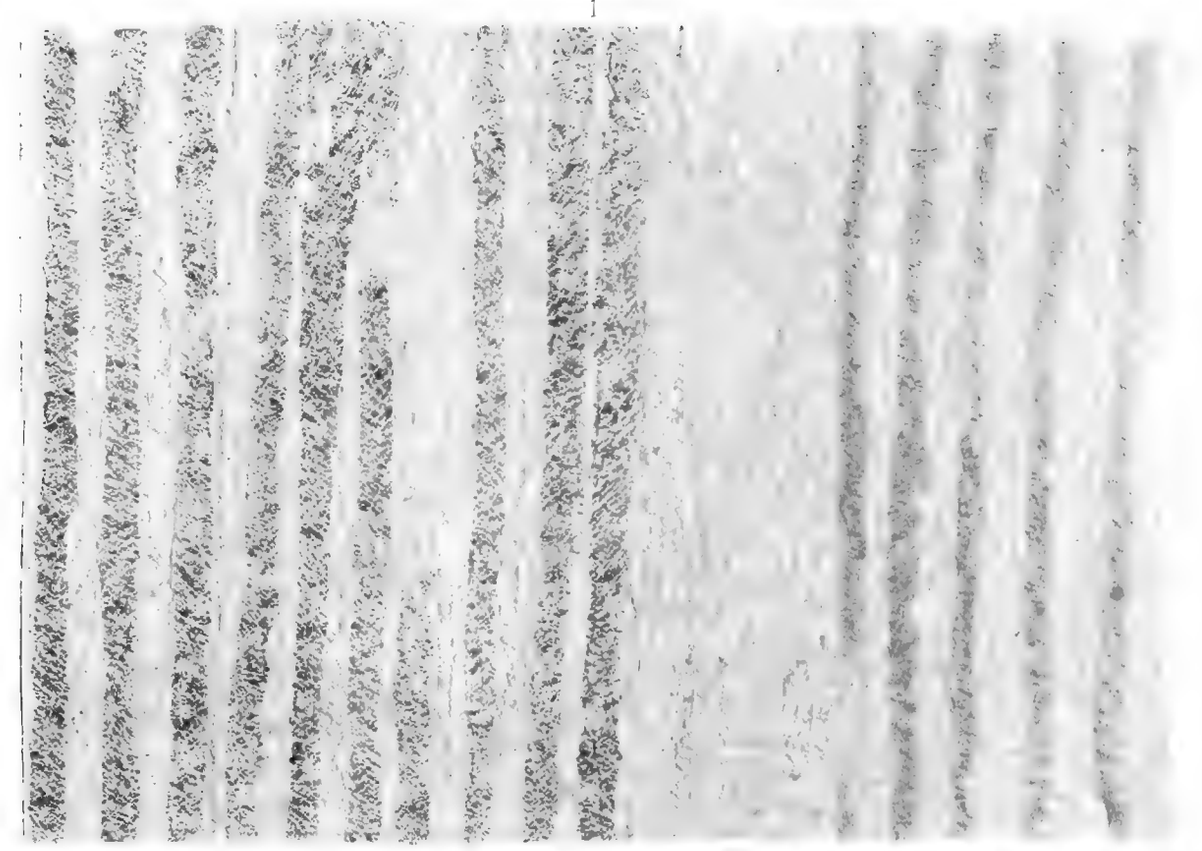

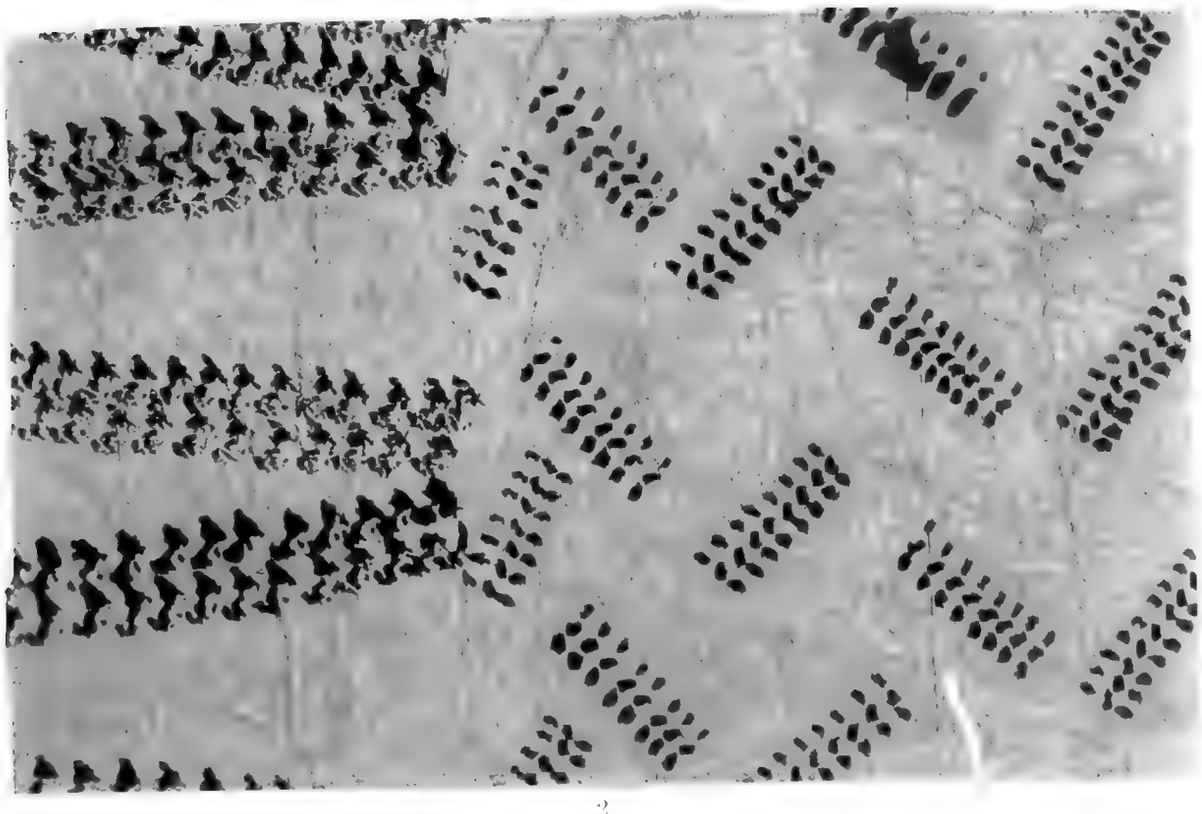

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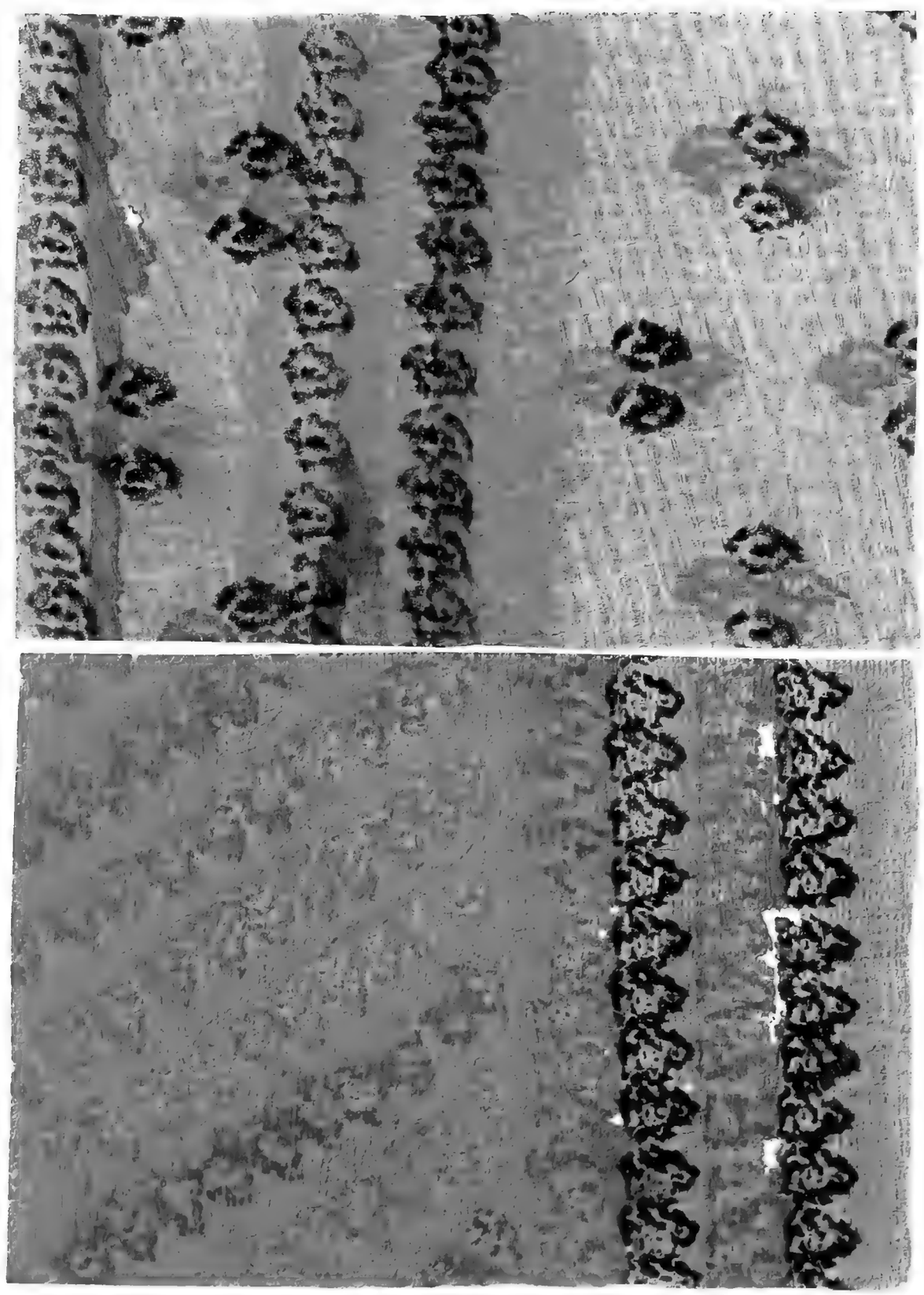

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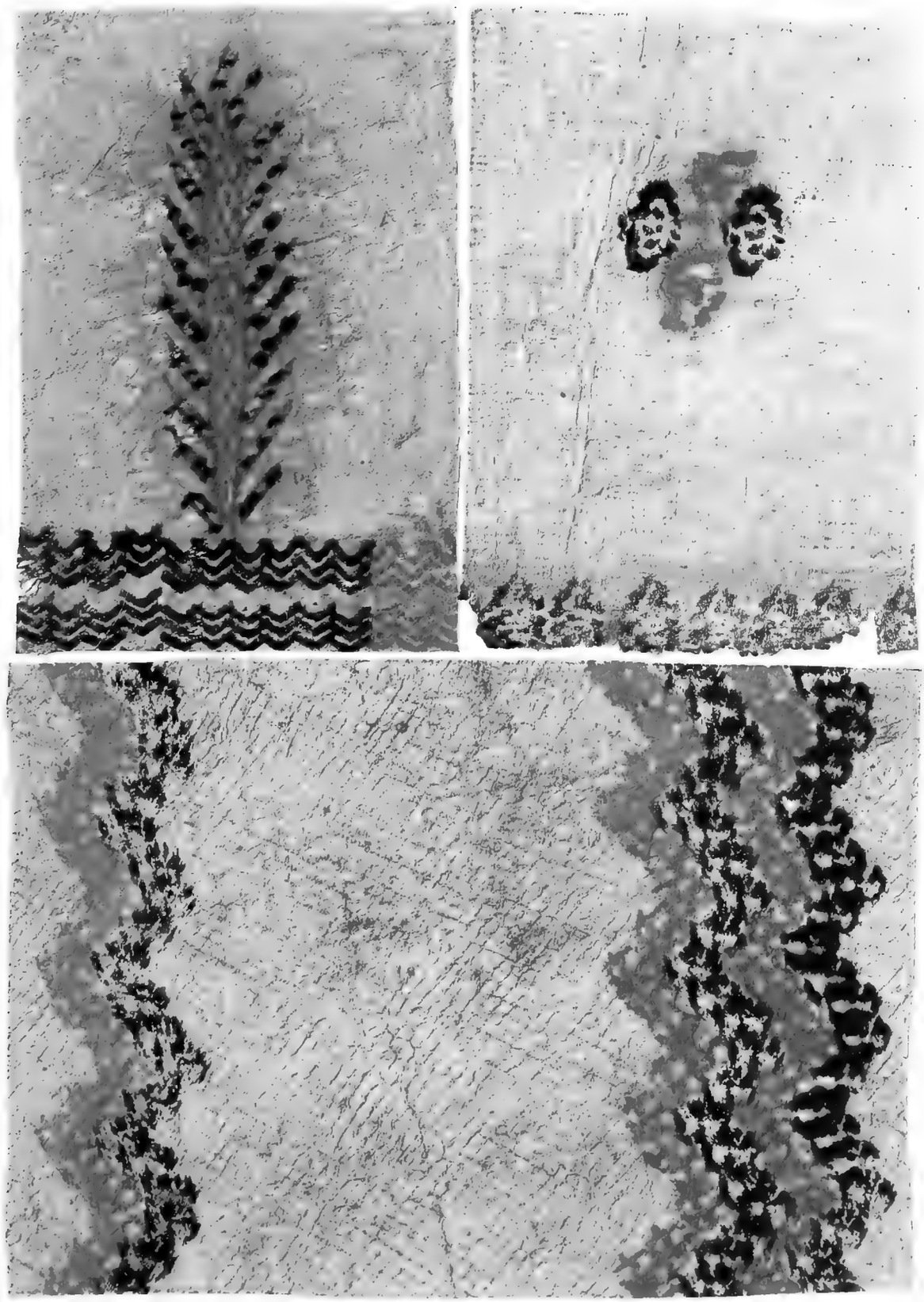

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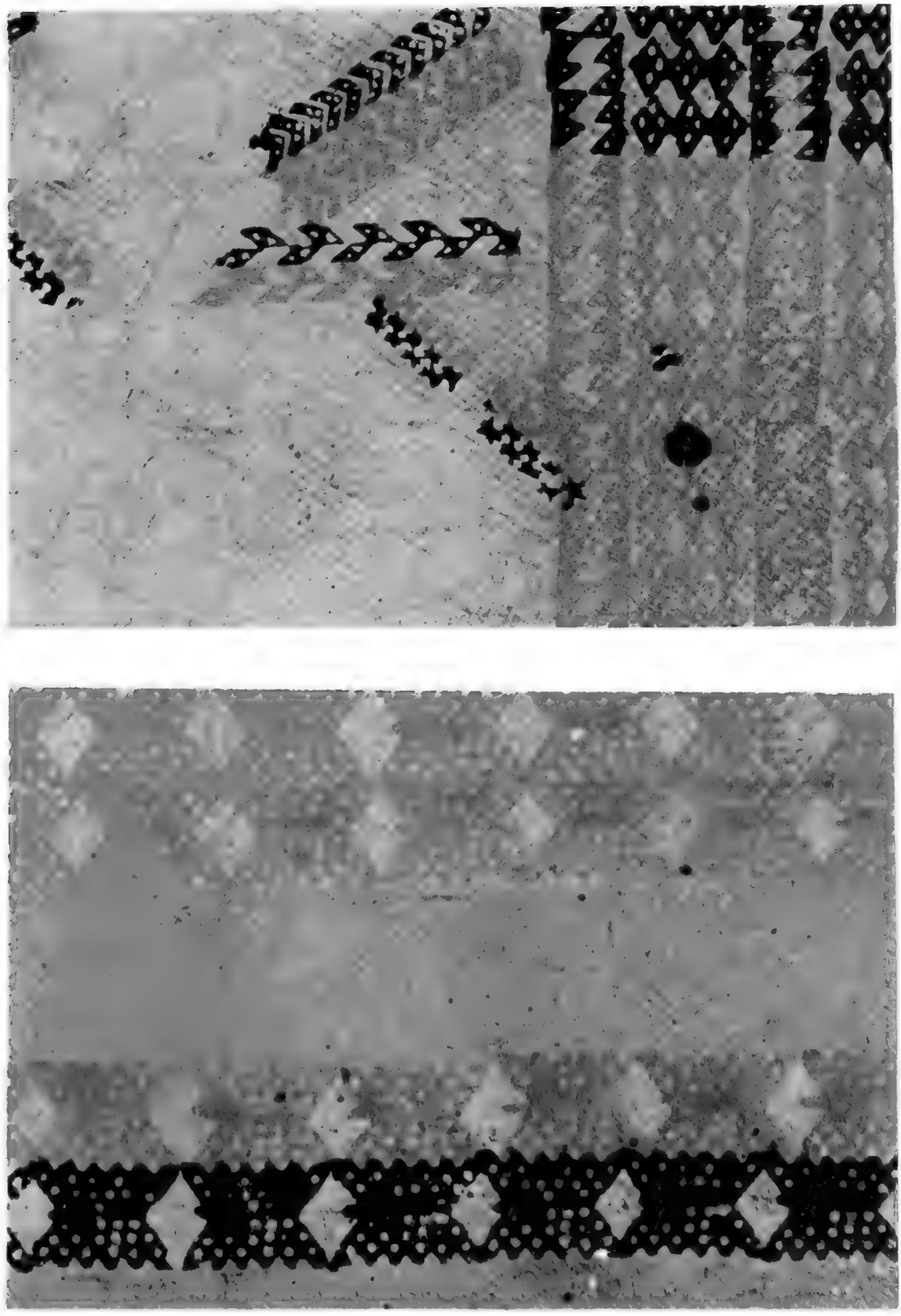

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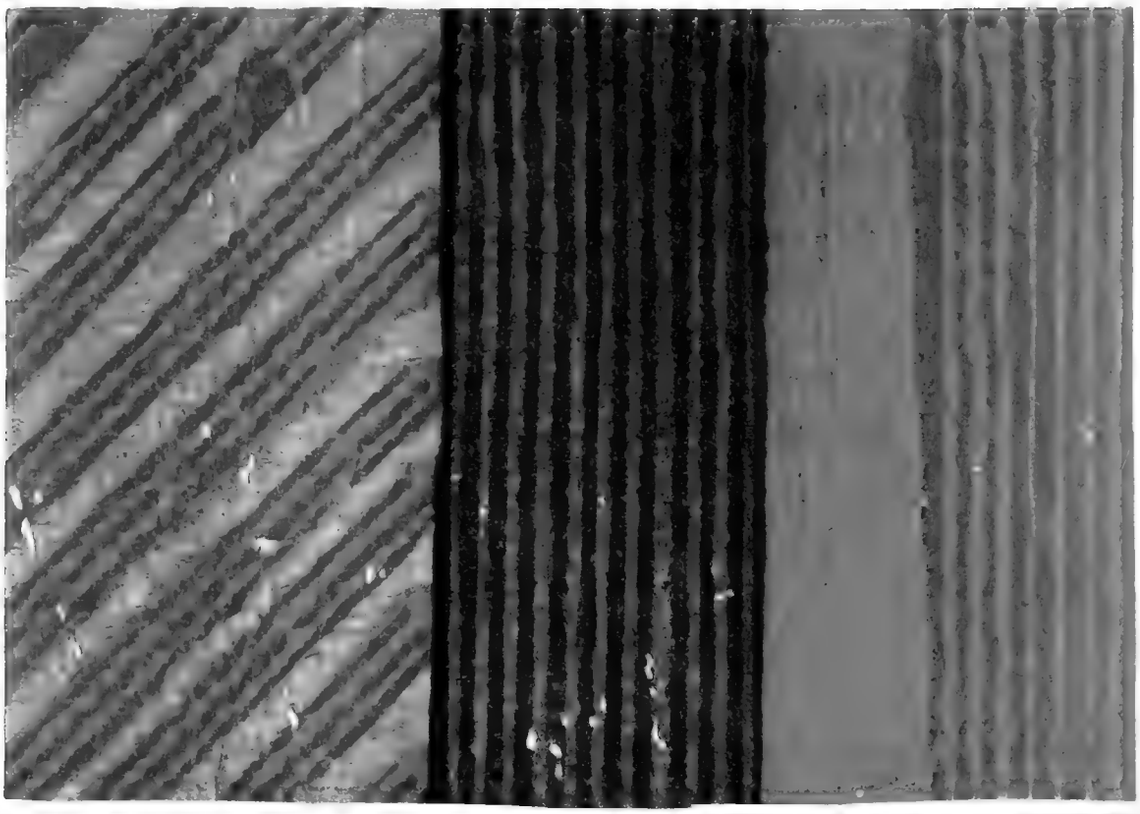

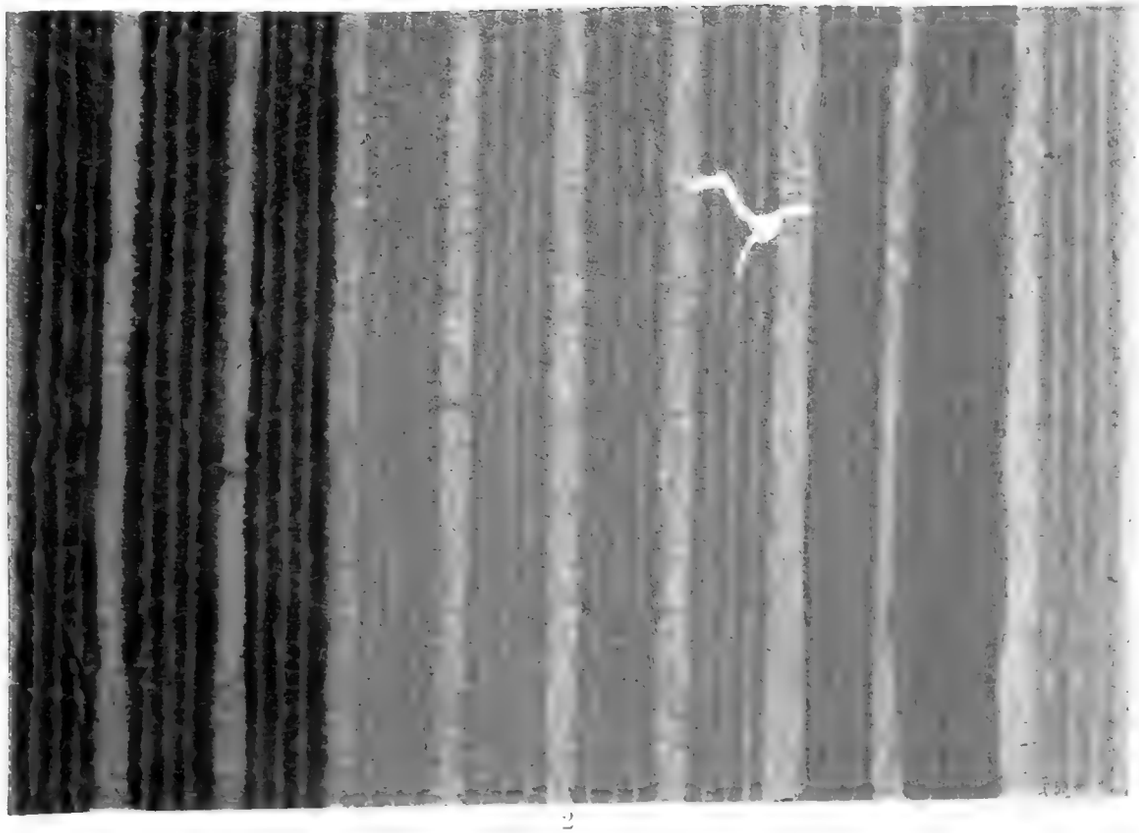

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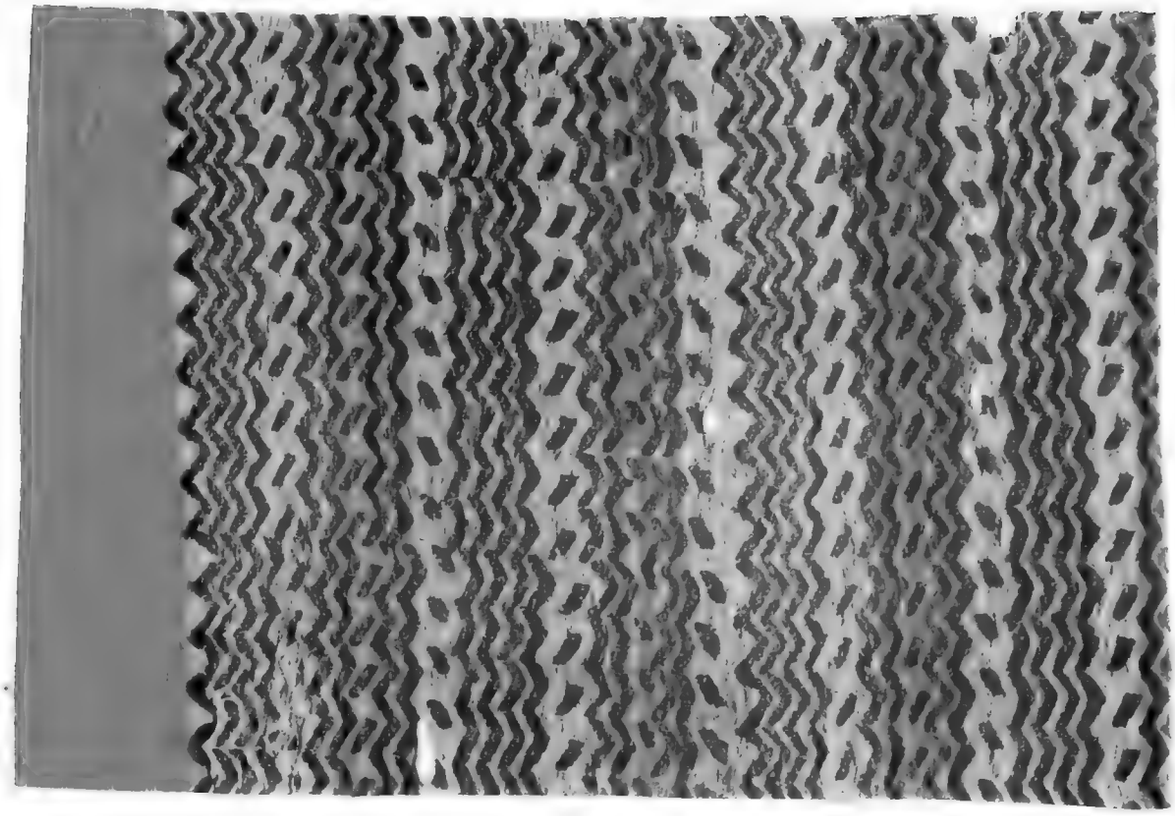

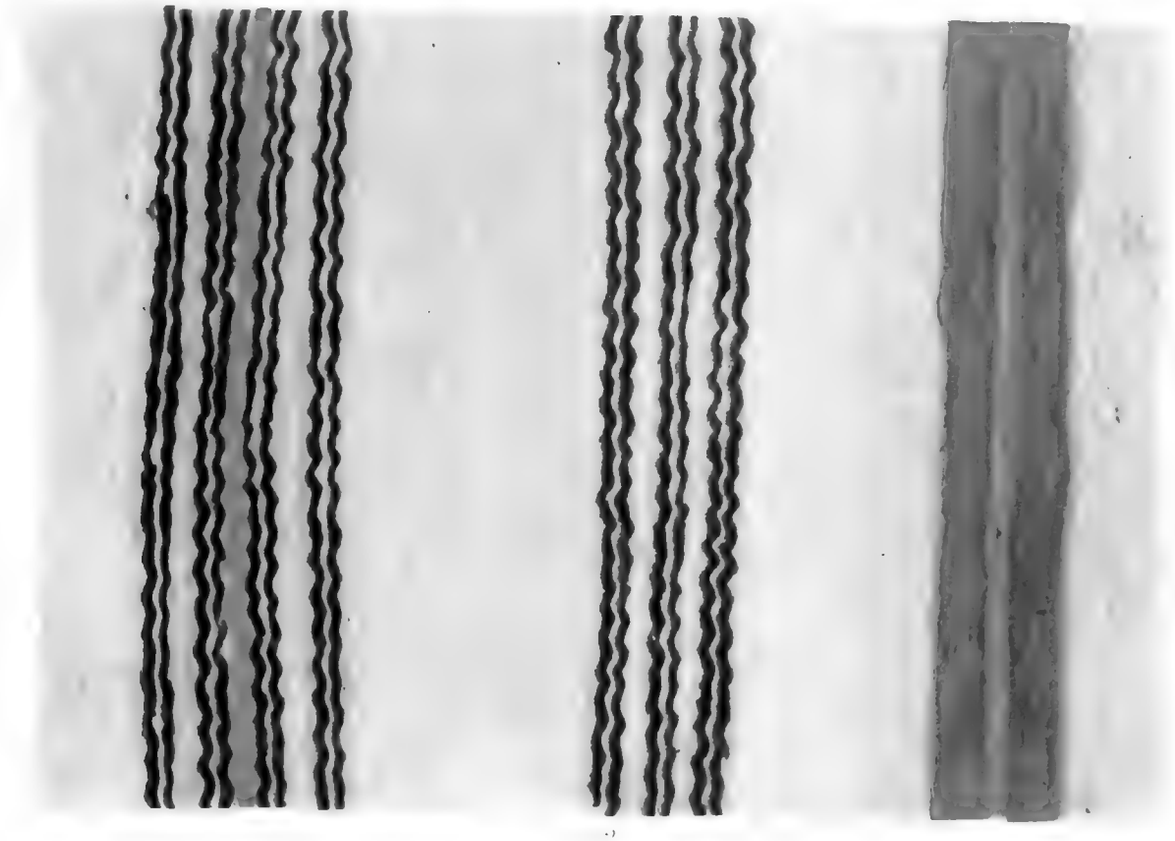

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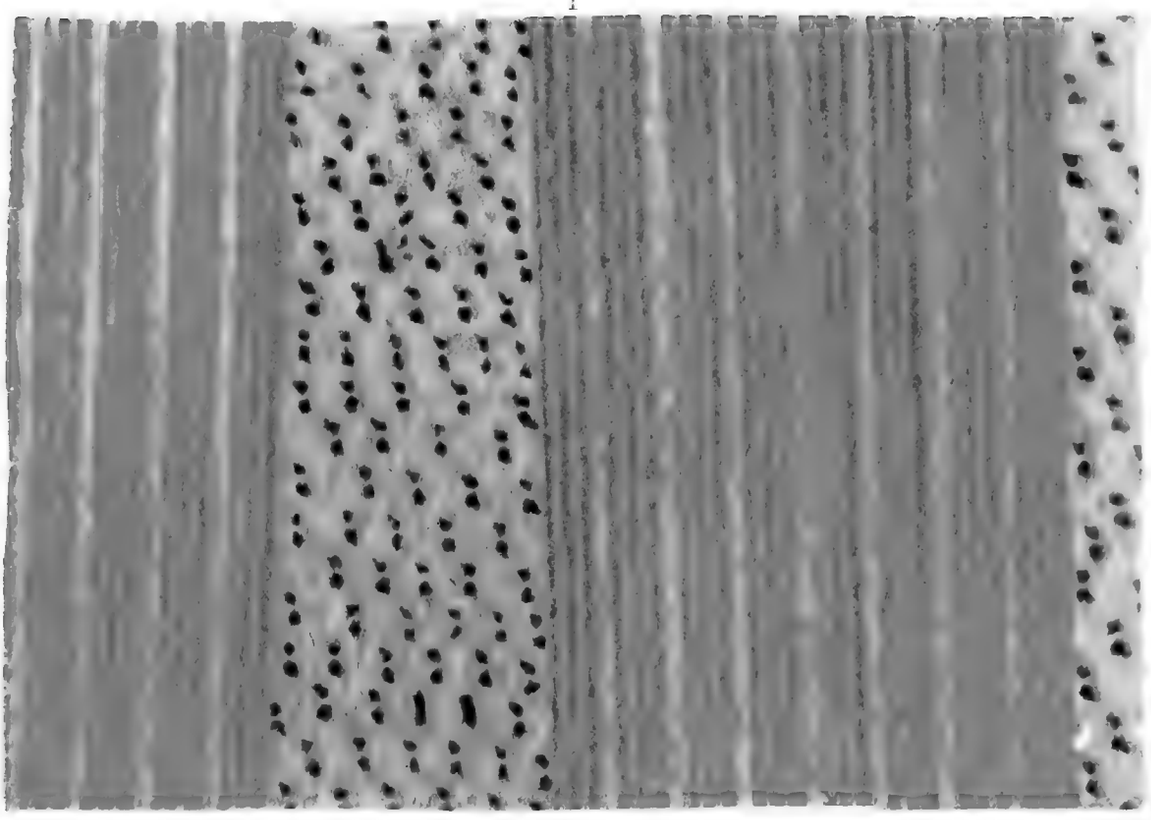

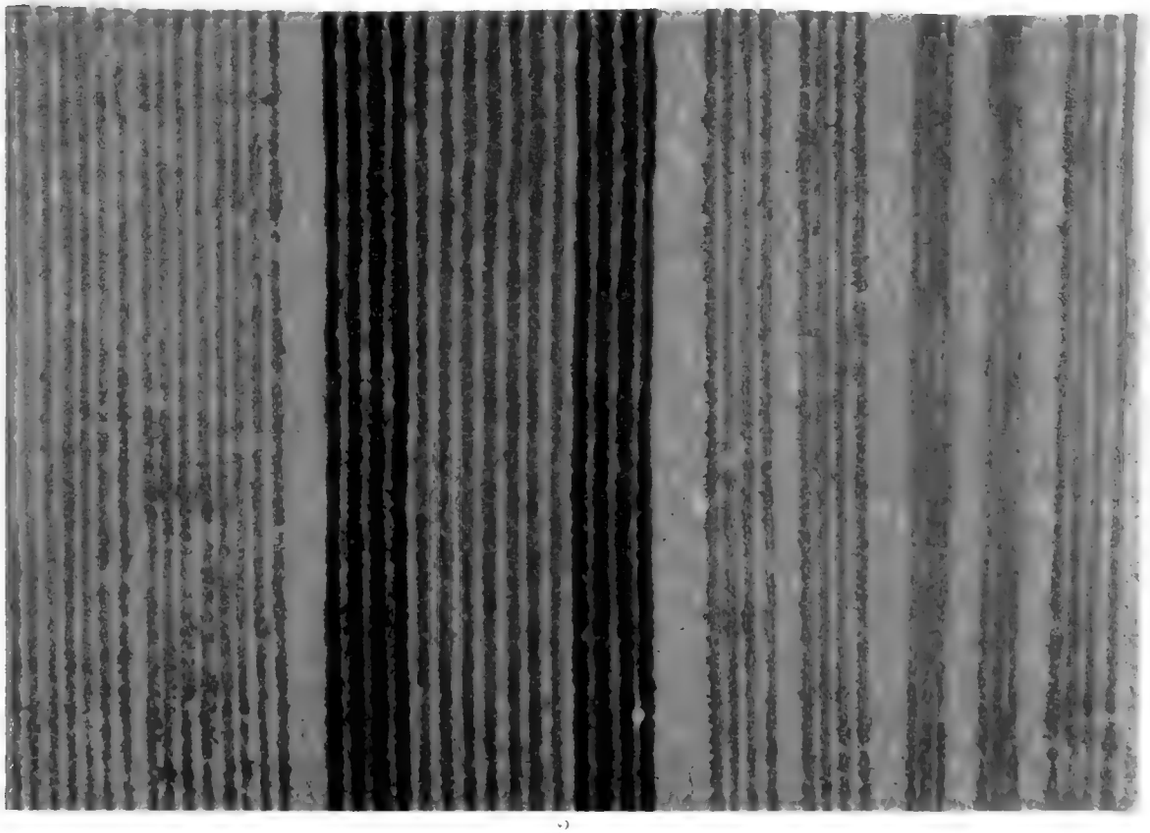

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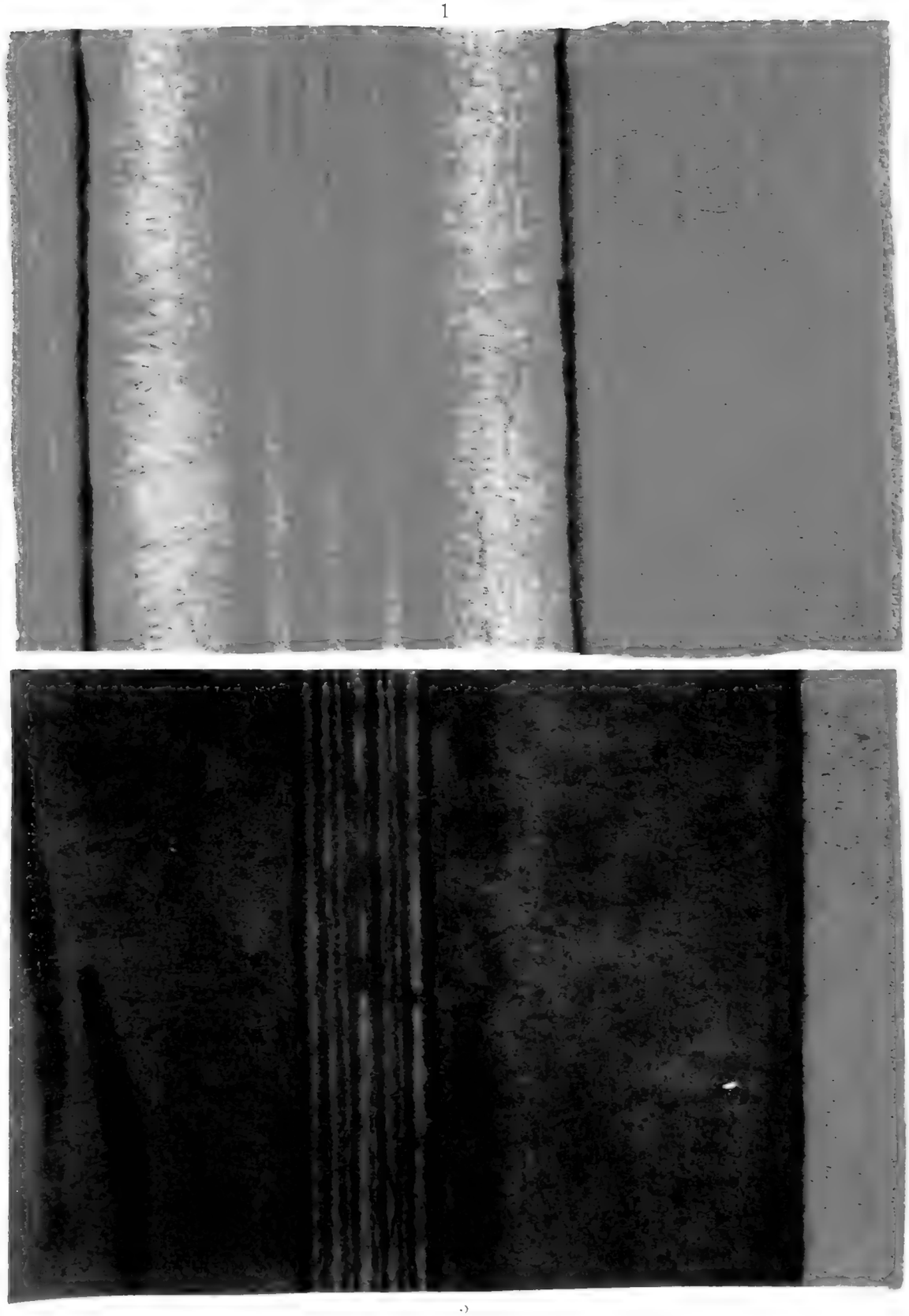

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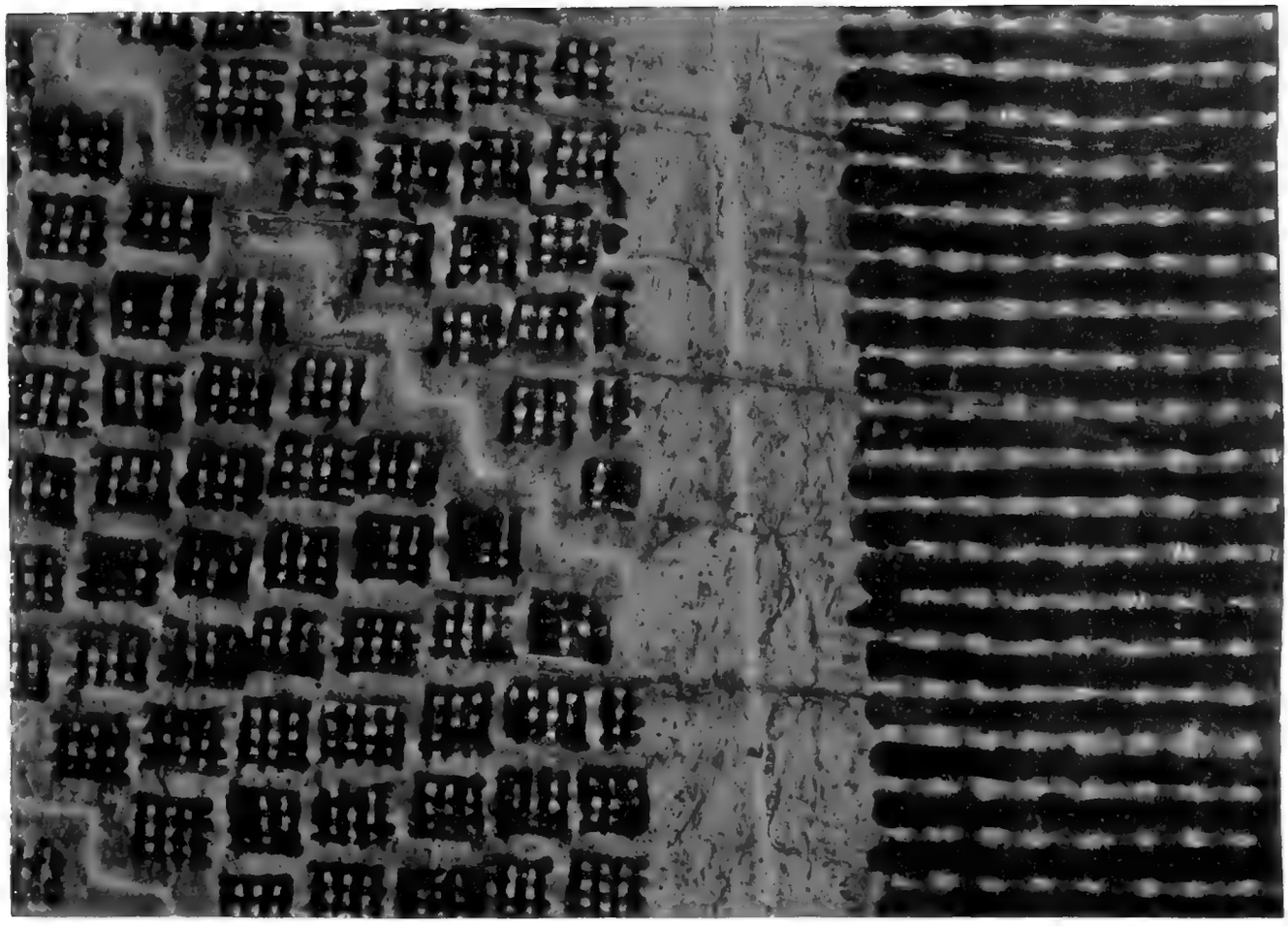

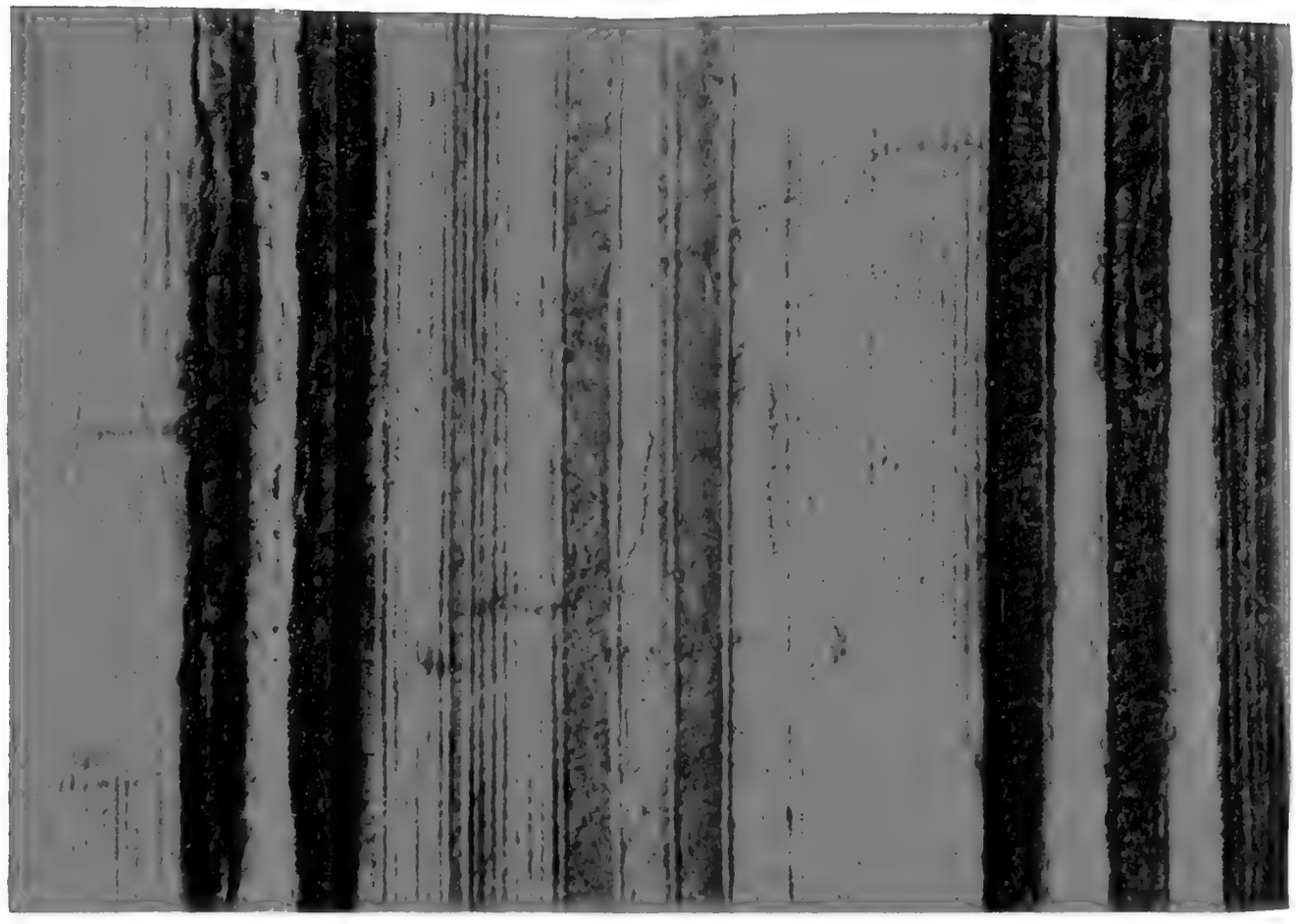

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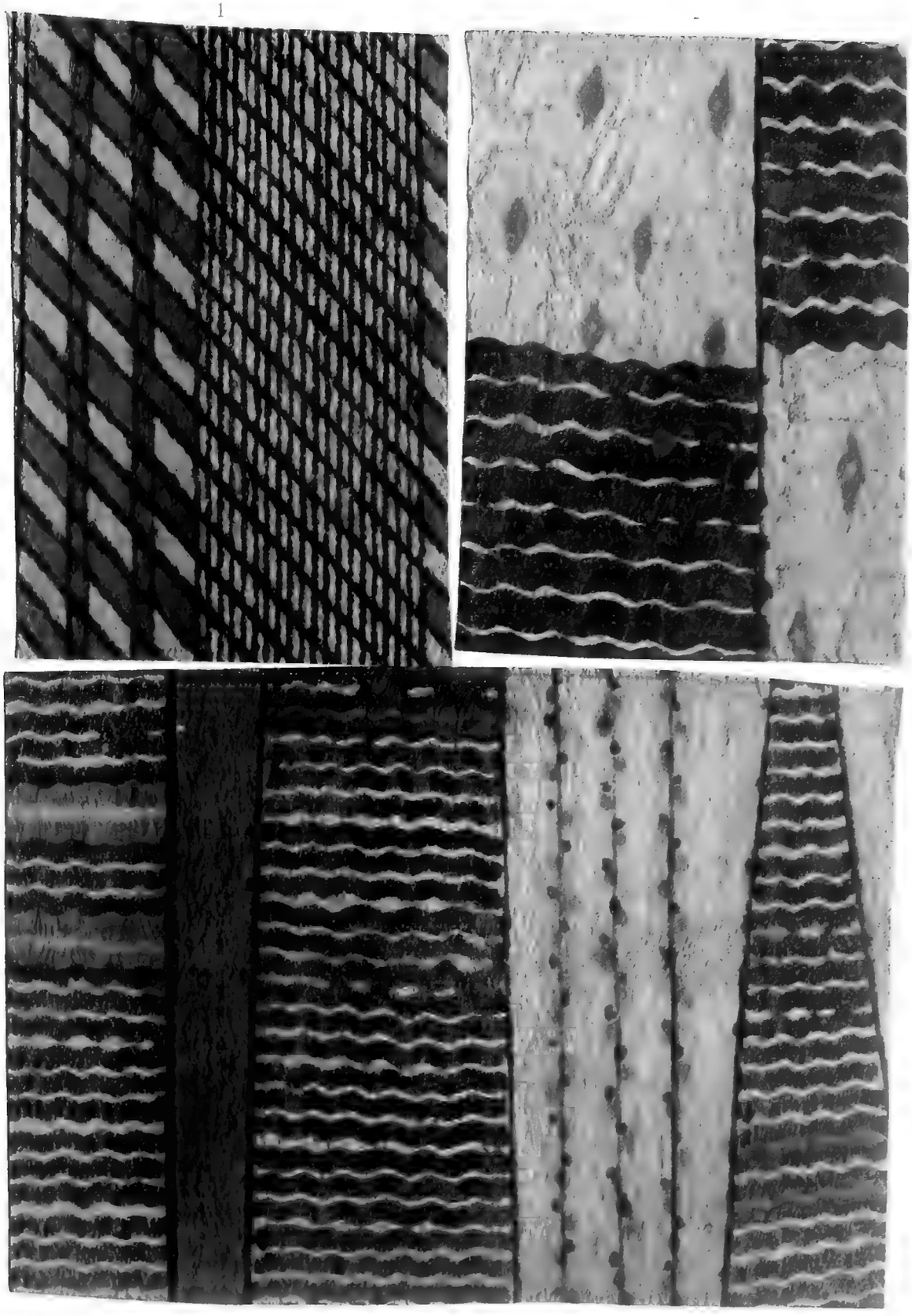

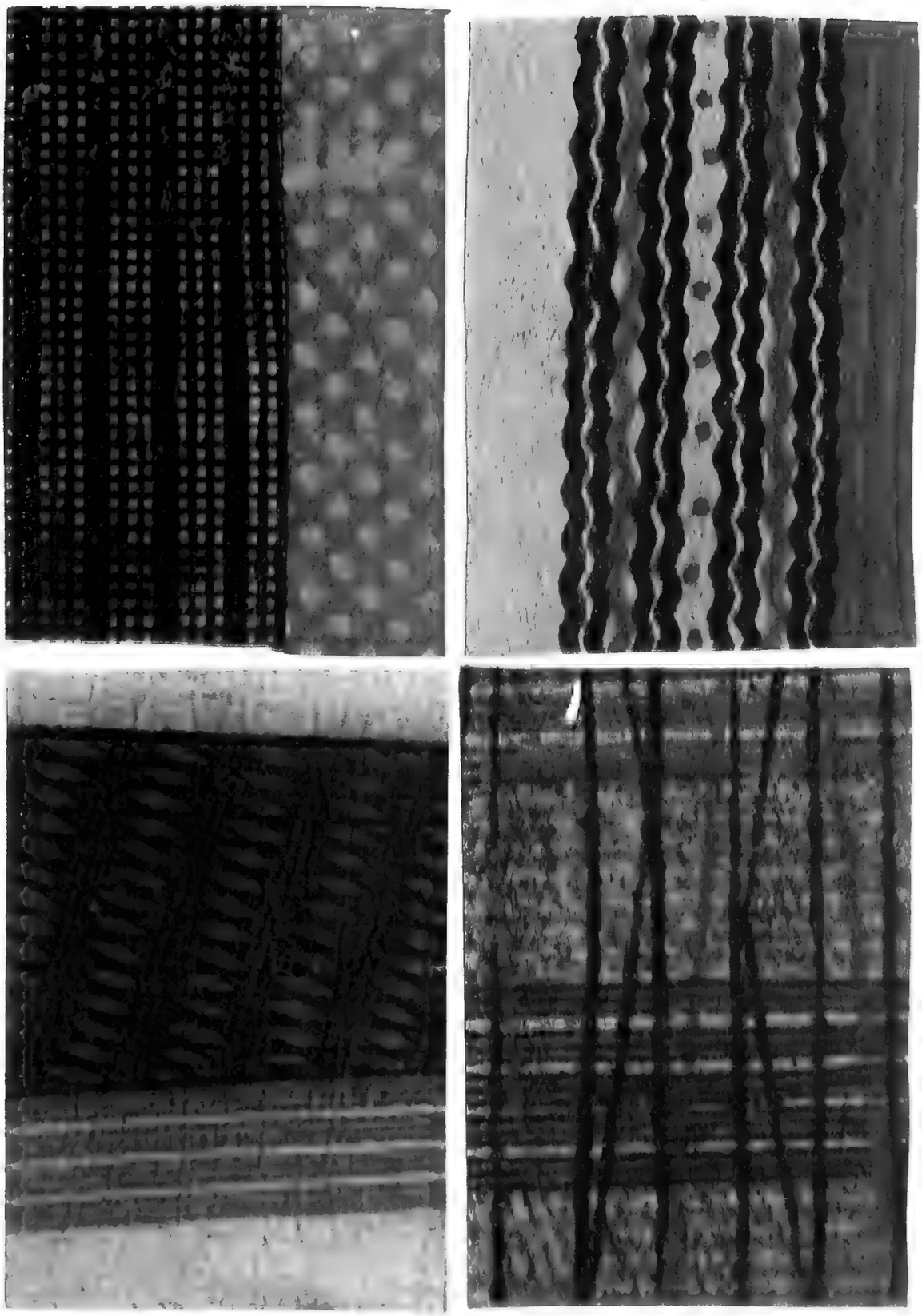

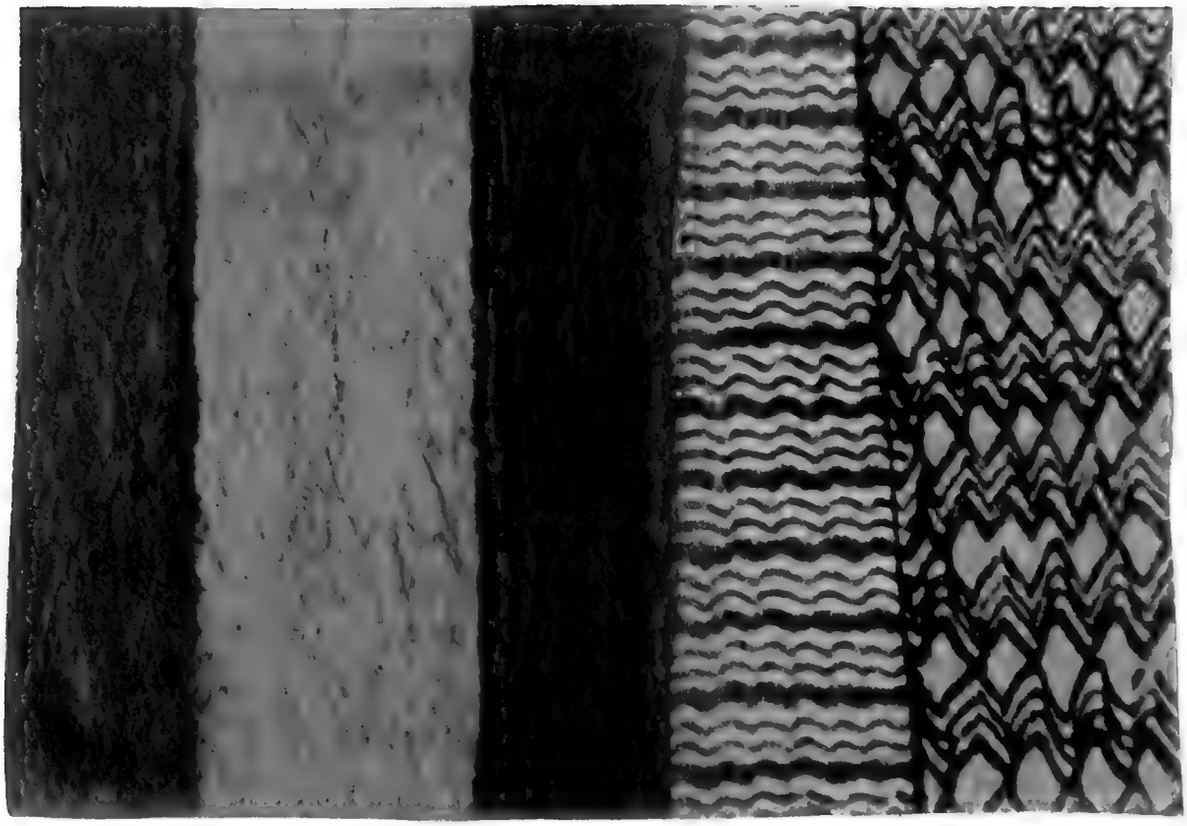

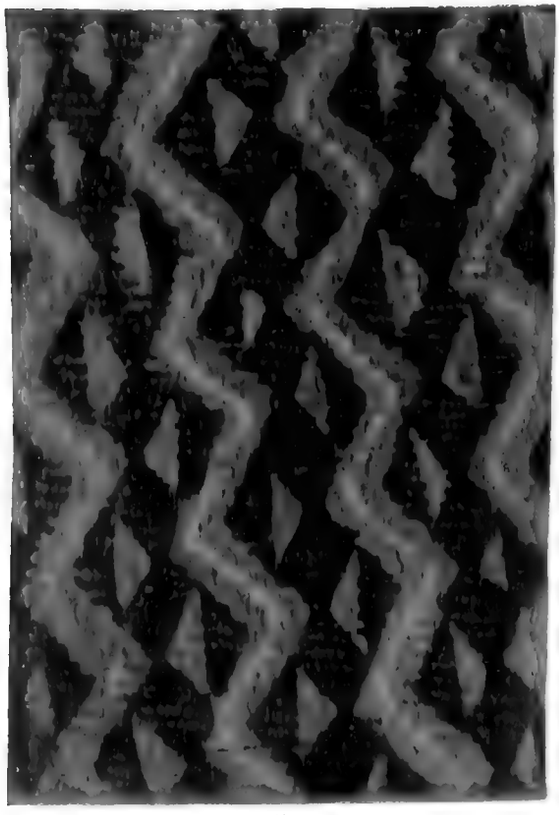

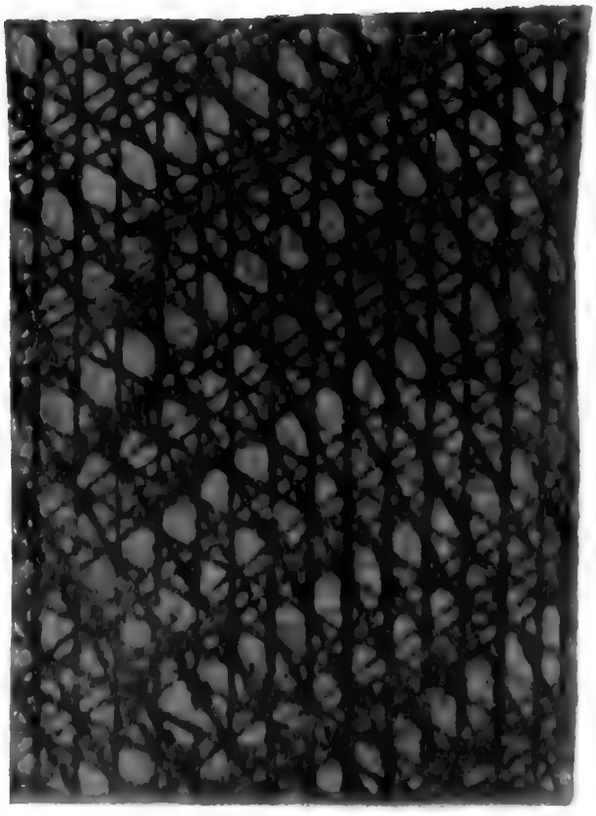

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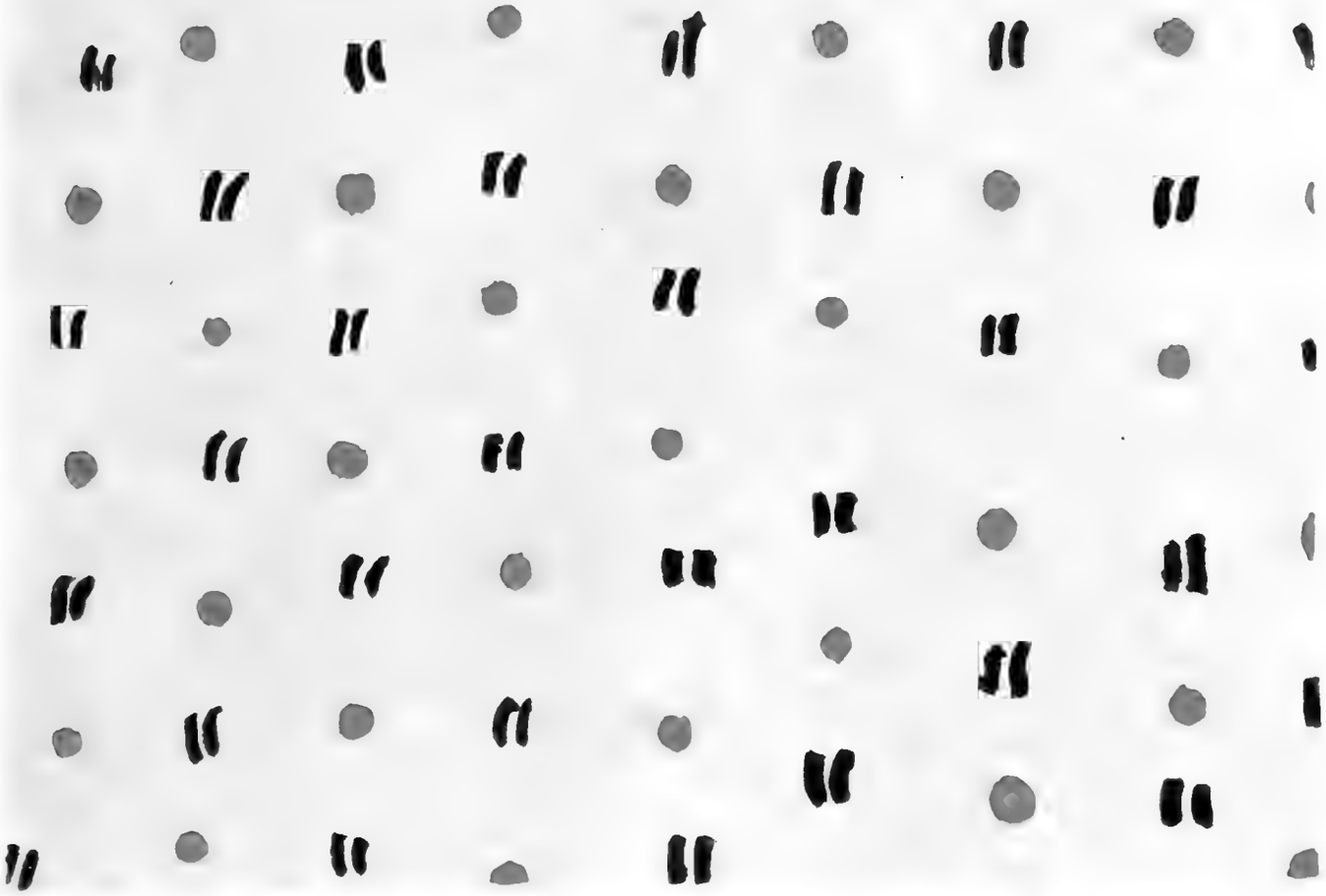

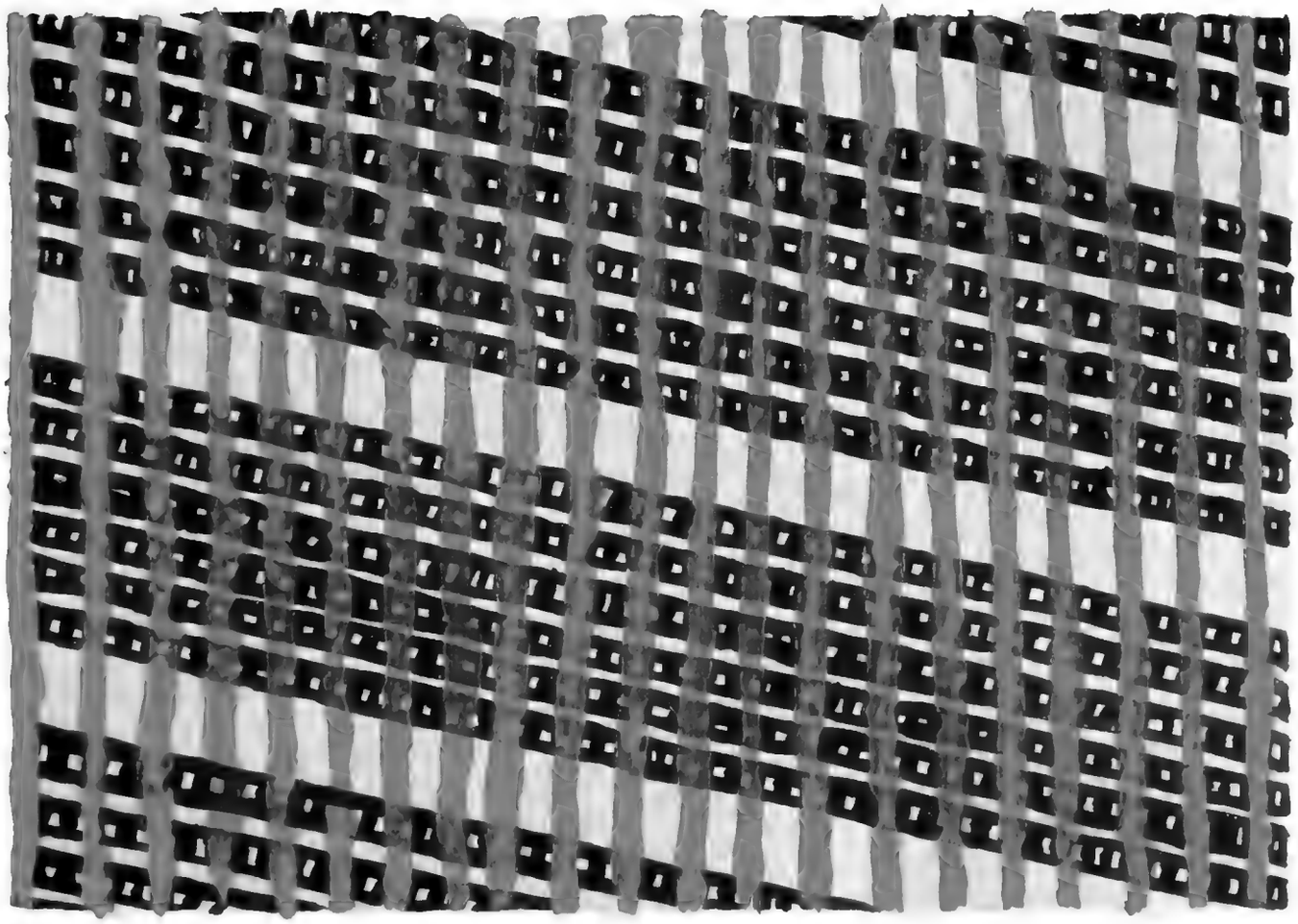

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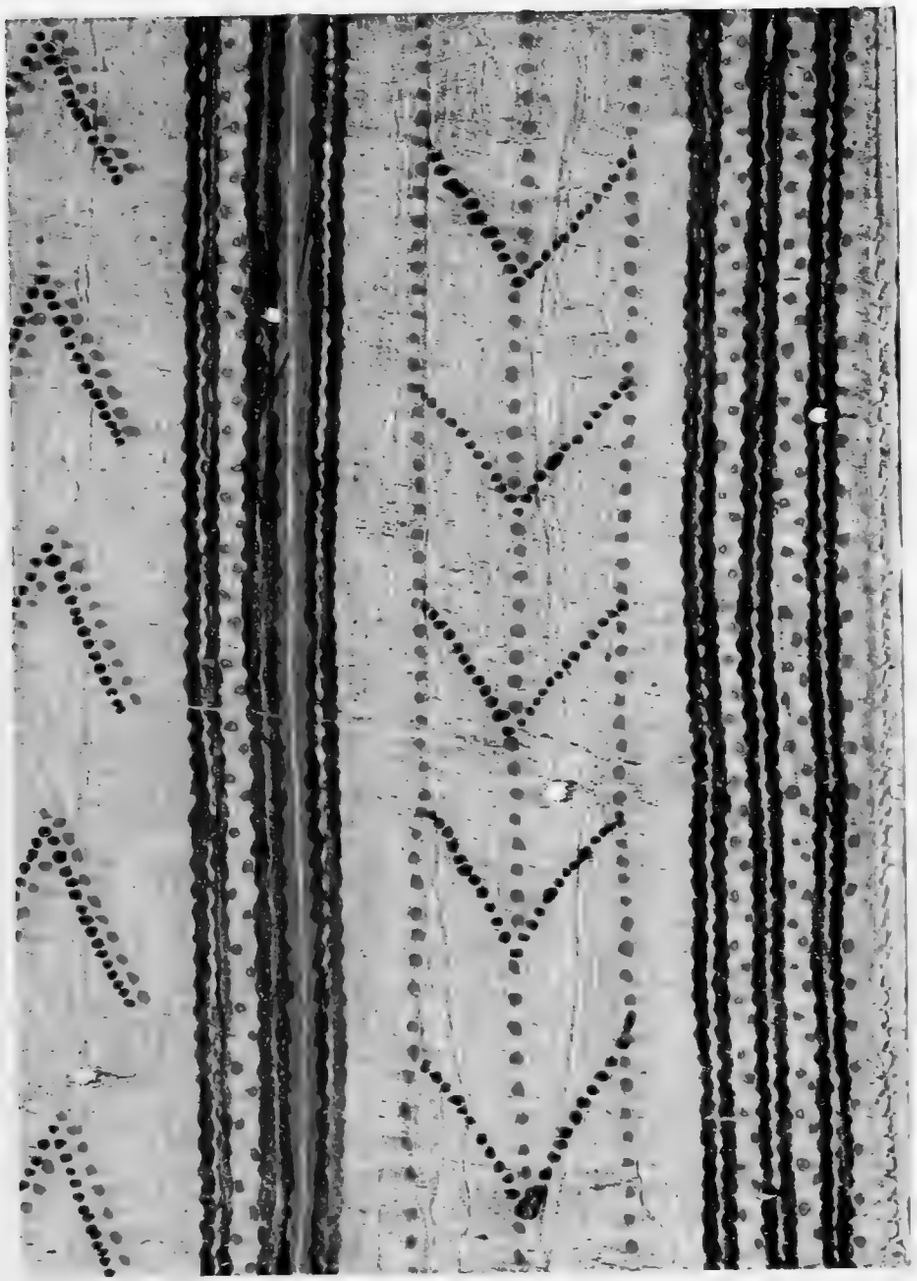

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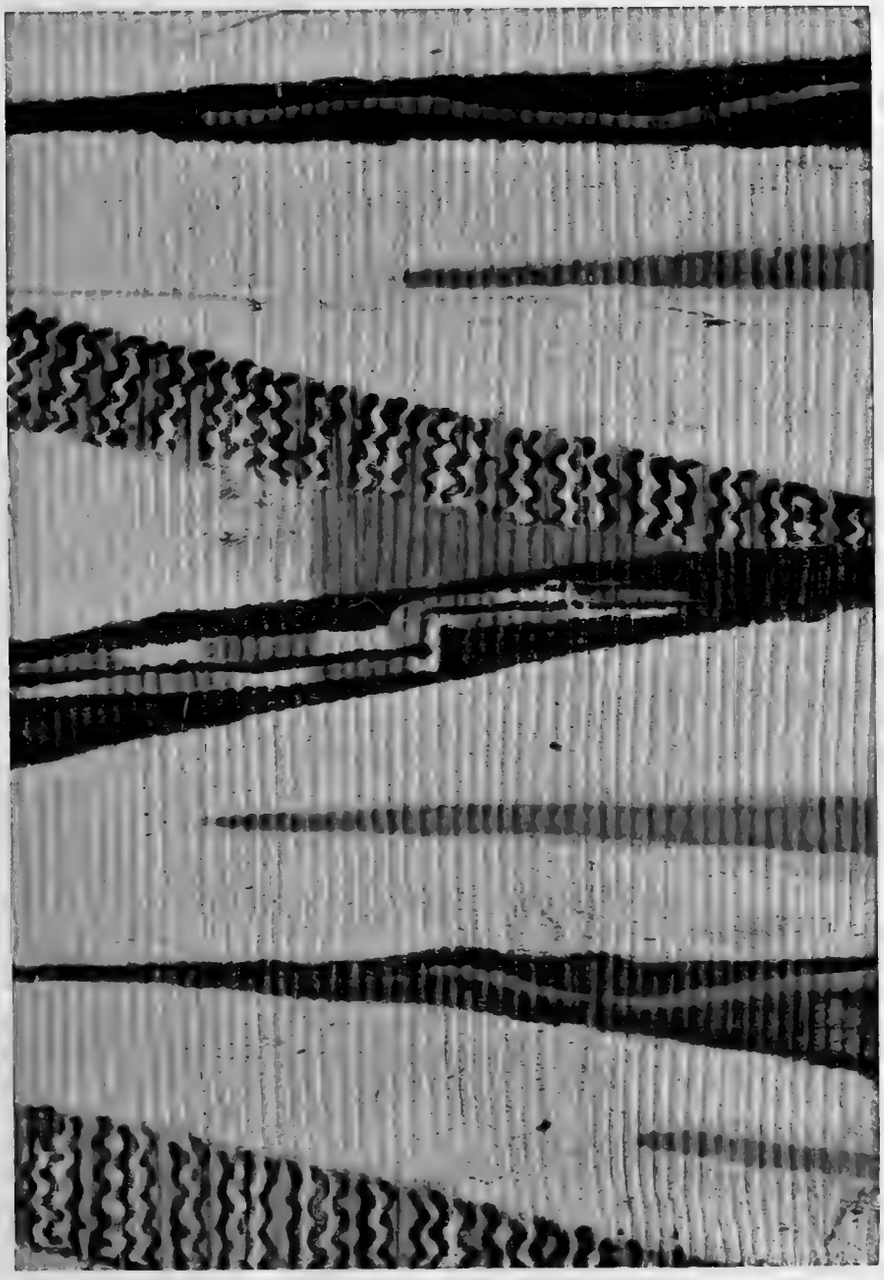

TONGATABU TAPA.

KA HANA KAPA

BY

WILLIAM T. BRIGHAM

MEMOIRS OF THE BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY. III.

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