THE TECHNIC OF ABORIGINAL AMERICAN BASKETRY

By OTIS T. MASON

Basketry is one of the textile industries. It is differentiated from network and loom products by the fact that its materials are usually rigid. However, no wide gulf separates the different varieties of textiles, basketry merging on the one side into lace work and on the other into bagging and other soft fabrics, its own types and classes also being often associated in the same example. In form, basketry varies through the following classes of objects:

1. Flat mats or wallets, generally flexible.

2. Plaques or food plates, which are slightly concave.

3. Bowls for mush and other foods, and for ceremonial purposes, hemispherical in general outline.

4. Pots for cooking, with cylindrical sides and rounded bottoms.

5. Jars and fanciful shapes, in which the mouth is constricted, frequently very small, and now and then supplied with covers. The influence of civilization in giving modern shapes to basketry has not been beneficial to this class of forms.

There are two distinct types of basketry, namely, (I) *hand-woven* or *plicated* basketry, which is built on a warp foundation, and (II) sewed or wrapped basketry, which is built on a coiled foundation of rods, splints, or straws, and is called *coiled* basketry.

I.—Kinds of Woven Basketry

Woven or plicated basketry may be divided into several kinds or subvarieties. It is to be understood that no loom is ever used in basketwork. Matting is frequently made over a bar, and soft wallets require a framework to hold the warp, but in basket-

making all the insertion of weft or filling is done with the fingers, as in plaiting or braiding.

a. Checkerwork.—This occurs in the bottoms of many North Pacific Coast examples and also in the work of eastern Canadian tribes (figure 9). In this ware the warp and the weft have the same width, thickness, and pliability. It is impossible, therefore, in looking at the bottoms of the cedar-bark baskets and the matting of British Columbia (figure 10) or eastern Canada, to tell which is warp and which is weft. Indeed, in very many examples the

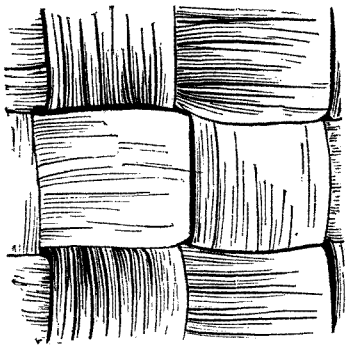

FIG. 9—Plain checker weaving in basketry with hard material.

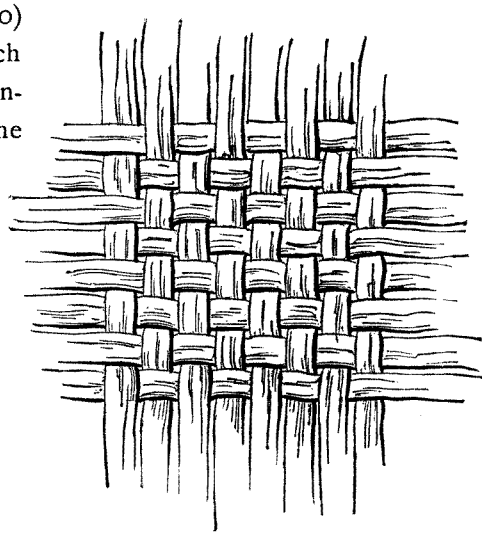

FIG. 10—Plain checker weaving in basketry with bast or other soft material.

warp and weft of a checker bottom are turned up at right angles to form the warp of the sides, which may be wicker or twined work. A great deal of bark matting is made in this same checker-work, but the patterns run obliquely to the axis of the fabric, giving the appearance of diagonal weaving. When warp and weft are fine yarn or threads, the result is the simplest form of cloth in cotton, linen, piña fiber, or wool. The cheap fabrics of commerce are of this species of weaving. In art, latticework frequently shows the bars intertwined as in checker basketry.

b. Diagonal or twilled basketry.—This is seen in those parts of the world where cane abounds. In America it is common in

British Columbia, Washington, southern United States, Mexico, and Central America, and of excellent workmanship in Guiana and Ecuador. The fundamental technic of diagonal basketry is in passing each element of the weft over two or more warp elements, thus producing either diagonal or twilled, or, in the best examples, an endless variety of diaper patterns (figure 11).

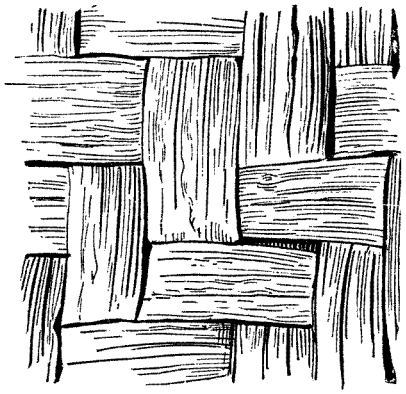

FIG. 11—Diagonal or twilled weaving in basketry with flat, ribbon-like elements.

Excellent effects are produced in this kind of weaving by means of color. Almost any textile plant, when split, has two colors: that of the outer or bark surface, and that of the interior woody surface or pith. Also, the different plants used in diagonal basketry have great variety of color. By the skilful manipulation of the two sides of a splint, or by using plants of different species, geometric patterns, frets, labyrinths, and other designs in straight-line are possible. Examples of matting from the nitrous caves and modern pieces from the Cherokee — both in matting and basketry — are double. By

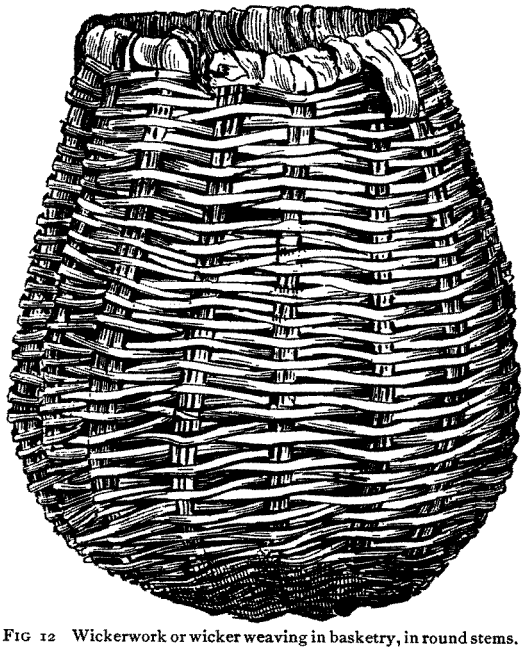

FIG 12 Wickerwork or wicker weaving in basketry, in round stems.

this means both the inside and the outside of the texture expose the glossy outer silicious surface of the cane.

c. Wickerwork.—This is common in eastern Canada; it is unknown on the Pacific coast and Interior basin, excepting in one or two pueblos, but is seen abundantly in southern Mexico and Central America. It consists of a wide or a thick and inflexible warp, and a slender flexible weft (figure 12). The weaving is plain and differs from checkerwork only in the fact that one of the elements is rigid. The effect on the surface is a series of ridges. It is possible also to produce diagonal effects in this type of weaving.

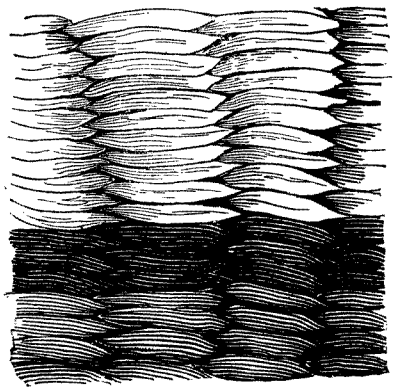

FIG. 13—Close wickerwork on Hopi plaque, the warp hidden.

The finest specimens of wickerwork in America are the very pretty Hopi plaques made of *Bigelovia graveolens*. Short stems are dyed in various colors, worked into the warp, and driven tightly home so as to hide the ends and also the manner of weaving (figure 13). Various patterns are effected on the surface—clouds, mythical birds, and symbols connected with worship. It has passed into modern industry through the cultivation of osiers, rattan, and such plants, for market-baskets, covers for glass bottles, and in ribbed cloth, wherein a flexible weft is worked on a rigid warp.

d. Twined or wattled basketry.—This is found in ancient mounds of Mississippi valley, in bagging of the Rocky mountains, and all down the Pacific coast from the island of Attu, the most westerly of the Aleutian chain, to the borders of Mexico. It is the most elegant and intricate of all in the woven or plicated species. Twined work has a set of warp-rods or rigid elements, as in wickerwork; but the weft elements are commonly adminis-

tered in pairs, though in three-ply twining and in braid twining three weft elements are employed. In passing from warp to warp these elements are twisted in half-turns on each other so as to form a two-ply or three-ply twine or braid. According to the relation of these weft elements to one another and to the warp, different structures result as follows:

1. Plain twined weaving, over single warps.

2. Diagonal twined weaving or twill, over two or more warps.

3. Wrapped twined weaving, or birdcage twine, in which one weft element remains rigid and the other is wrapped about the crossings.

4. Latticed twined weaving, *tee* or Hudson stitch, twined work around vertical warps crossed by horizontal weft element.

5. Three-ply twined weaving and braiding in several styles.

1. *Plain twined weaving.* — Plain twined weaving is a refined sort of wattling. The ancient engineers in America who built obstructions in streams to aid in catching or impounding fish, drove a row of sticks into the bottom of the stream, a few inches apart. Vines and brush were woven upon these upright sticks which served for warp. In passing each stake the two vines or pieces of brush made a half-turn on each other. This is a very primitive mode of weaving. Plain twined basketry is made on exactly the same plan: there is a set of warp elements which may be reeds, or splints, or string. The weft consists of two strips of root or other flexible material, and these are twisted as in forming a two-ply string passing over a warp stem at each half-turn (figure 14). Pleasing varieties of this plain twined weaving will be found in the Aleutian islands. The Aleuts frequently use for their warp, straws of wild rye or other grasses in which the straws are split and the two halves pass upward in zigzag form;

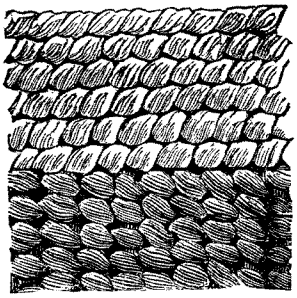

FIG. 14—Plain twined weaving in Nez Percé wallet.

each half of a straw is caught alternately with the other half of the same straw and with a half of the adjoining straw, making a series of triangular instead of rectangular spaces (figure 15).

A still further variation is given to plain twined ware by crossing the warps. In bamboo basketry of eastern Asia these crossed warps are also interlaced or held together by a horizontal strip of bamboo passing in and out as in ordinary weaving. In

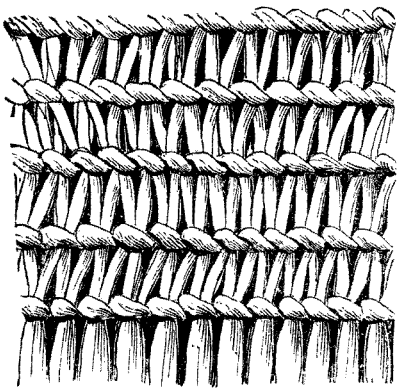

FIG. 15—Plain twined weft on zigzag warp in Aleut wallet.

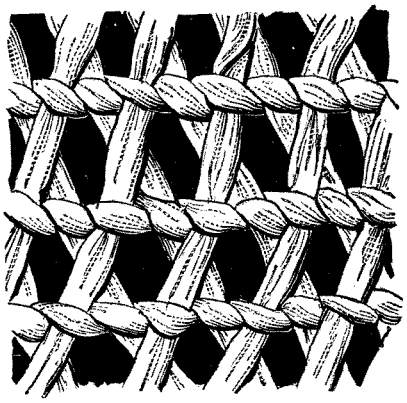

FIG. 16—Twined weaving on crossed warp.

such examples the interstices are triangular, but in the twined example here described (figure 16) the weaving passes across between the points where the warps intersect each other, leaving hexagonal interstices. This peculiar combination of plain twined weft and crossed warp has not a wide distribution in America, but examples are to be seen in southeastern Alaska and among relics found in Peruvian graves.

2. *Diagonal twined weaving.*—In diagonal twined weaving the twisting of the weft filaments is precisely the same as in plain twined weaving. The difference of the texture on the outside is caused by the manner in which the wefts cross the warps. This style abounds among the Ute Indians and the Apache, who dip the bottles made in this fashion into pitch and thus make a watertight vessel, the open meshes receiving the pitch more freely.

The technic of diagonal twined weaving consists in passing over two or more warp elements at each half-turn; there must be an odd number of warps, for in the next round the same pairs of warps are not included in the half-turns. The ridges on the outside, therefore, are not vertical as in plain twined weaving, but pass diagonally over the surface, hence the name (figure 17). This method of manipulation lends itself to the most beautiful and delicate twined work of the Pomo Indians. Gift baskets, holding more than a bushel

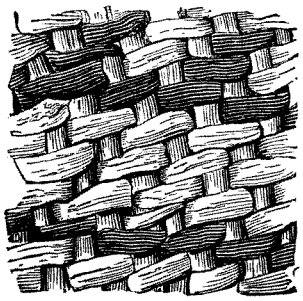

FIG. 17—Diagonal twined weaving, twilled patterns.

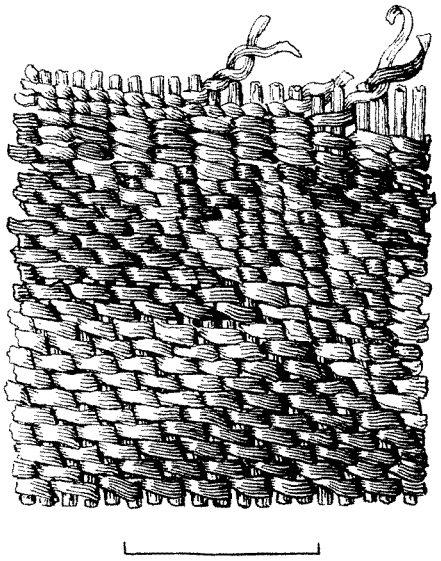

FIG. 18—Outside view of mixed twined weaving.

and requiring months of patient labor to construct, are thus woven. Figure 18 shows how, by varying the color of the weft splints and changing from diagonal to plain weaving, the artist is enabled to control absolutely the figure on the surface.

3. *Wrapped twined weaving.*—In wrapped twined weaving one element of the twine passes along horizontally across the warp stems, usually on the inside of the basket. The binding element of splint, or strip of bark, or string, is wrapped around the crossings of the horizontal element with the vertical warp (figure 19). On the outside of the basket the turns of the wrapping are oblique; on the inside they are vertical. It will be seen, on examining this figure, that one row inclines to the right, the one

above it to the left, and so on alternately. This was occasioned by the weaver's passing from side to side of the square carrying-basket, and not all the way round as usual. The work is similar to that in an old-fashioned birdcage where the upright and horizontal wires are held in place by a wrapping of finer soft wire. The typical example of this wrapped or birdcage twine is to be seen among the Indians of the Wakashan family living about Neah bay, Vancouver island, and southwestern British Columbia (figure 20).

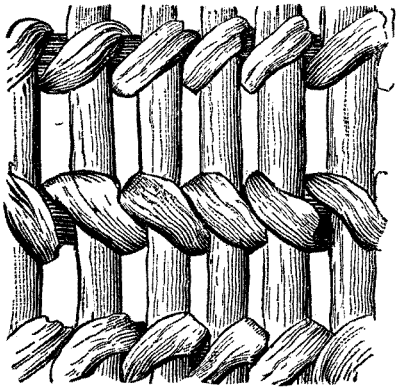

FIG. 19—Wrapped twined weaving or birdcage pattern.

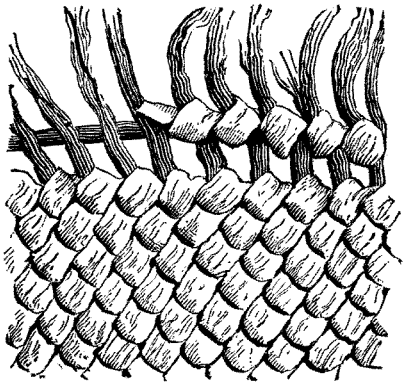

FIG. 20—Wrapped twined weaving or birdcage pattern in soft material.

In this type the warp and the horizontal strip behind the warp are both in soft cedar bark. The wrapping is done with a tough straw-colored grass. When the weaving is beaten home tight the surface is not unlike that of a fine tiled roof, the stitches overlying each other with perfect regularity.

Figure 21 shows a square inch of the inside of a basket with plain twined weaving in the two rows at the top; plain twined weaving in which each turn passes over two warp rods in four rows just below; in the middle of the figure, at the right side, it will be seen how the wrapped or birdcage twined work appears on the inside, and in the lower right-hand corner is the inside view of diagonal twined weaving. In the exquisite piece from which this drawing was made, the skilful woman has combined

four styles of two-ply twined weaving. On the outside of the basket these various methods stand for delicate patterns in color.

4. *Lattice twined weaving.*—The lattice twined weaving, so far as the collections of the United States National Museum show, is confined to the Pomo Indians, of the Kulanapan family, residing on Russian river, California. Dr Hudson calls this technic *tee.* This is a short and convenient word and may be used for a specific name. The *tee* twined weaving consists of four elements—(*a*) the upright warp of rods, (*b*) a horizontal warp crossing these at right angles, and (*c*, *d*) a regular plain twined weaving of two elements, holding the warps firmly together (figure 22). In all the examples in the National Museum the horizontal or extra warp is on the outside of the basket. On the outside the *tee* basketry does not resemble the ordinary twined work, but on the inside it is indistinguishable. Baskets made in this fashion are very rigid and strong, and frequently the hoppers of mills for grinding acorns, and also water-tight jars are thus constructed. The ornamentation is confined to narrow bands, the weaver being greatly restricted by the technic.

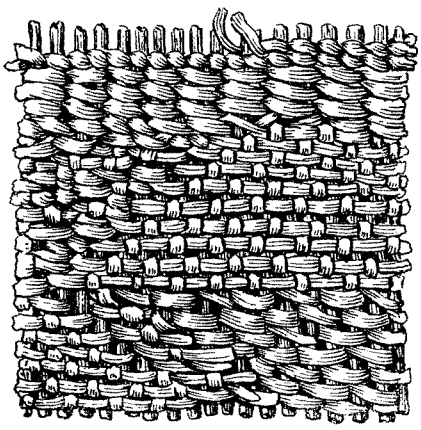

FIG. 21—Inside view of mixed two-ply twined weaving.

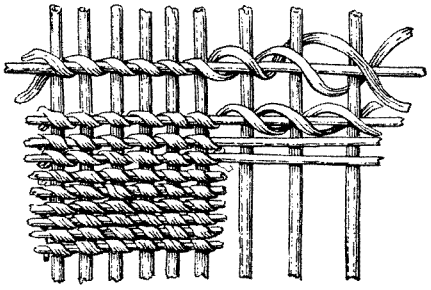

FIG. 22—Tee or lattice twined weaving. Peculiar to the Pomo, of Russian river, Cal.

5. *Three-ply twined weaving.*—Three-ply twined weaving is the use of three weft-splints or other kinds of weft elements instead of two, and there are five ways of administering the weft:

(a) *Three-ply twine* (figures 23 and 24).—In this technic the basket-weaver holds in her hand three weft elements of any of the kinds mentioned. In twisting these three, each one of the strands, as it passes inward, is carried behind the warp stem adjoining; so that in a whole revolution the three weft elements have in turn passed behind three warp elements. After that the process is repeated *ad libitum*. By referring to the lower halves of figures 23 and 24, the outside and the inside of this technic will be made plain.

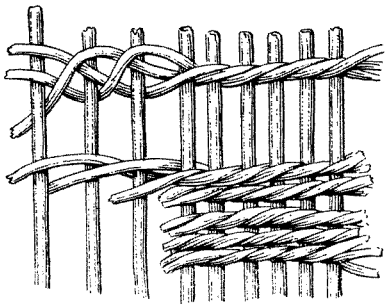

FIG. 23—Outside view of three-ply braid and three-ply twined weaving, the weft having three elements.

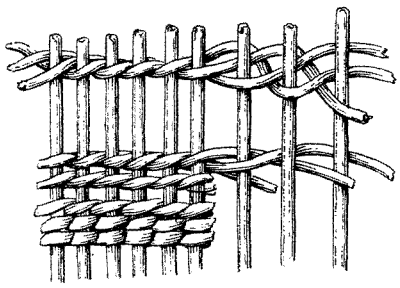

FIG. 24—Inside view of three-ply braid and three-ply twined weaving.

On the outside there is the appearance of a two-ply string laid along on the warp stems, while on the inside the texture looks like plain twined weaving. The reason for this is apparent, since in every third of a revolution one element passes behind the warp and two remain in front.

(b) *Three-ply braid.*—In three-ply braid the weft elements are held in the hand in the same fashion, but instead of being twined simply they are plaited or braided, and as each element passes under one and over the other of the remaining two elements, it is carried inside a warp stem. This process is better understood by examining the upper parts of figures 23 and 24. On the surface, when the work is driven home, it is impossible to discriminate between three-ply twine and three-ply braid. The three-ply braid is found at the starting of all Pomo twined baskets, no matter how the rest is built up.

Figure 25 shows a square inch from the surface of a Hopi twined jar. The lower part is in plain twined weaving; the upper part is in three-ply twine. Philologists have come to the conclusion that the Hopi are a very mixed people. The three-ply work shown in this figure is a Ute motive. The National Museum collections represent at least seven different styles of basketry technic practiced among the Hopi people of Tusayan.

(c) *Three-ply overlaid twined weaving.*—In Tlinkit basketry the body is worked in split spruce-root, which is exceedingly tough. The ornamentation, in which mythological symbols are concealed, consists of a species of embroidery in which the figures

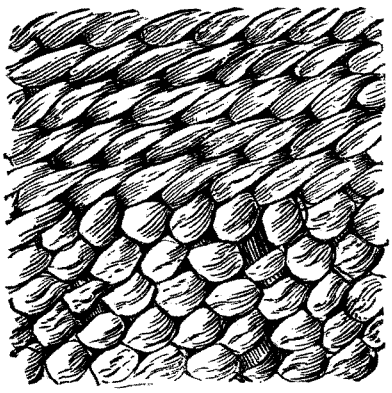

FIG. 25—Three-ply and two-ply twined weaving on the same basket jar.

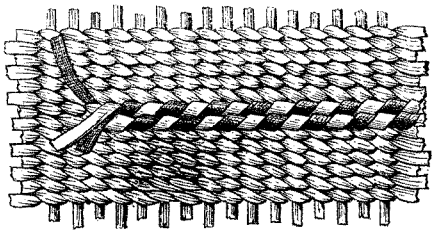

FIG. 26—Three-ply overlaid twined weaving. Tlinkit pattern. After Wm. H. Holmes.

appear on the outside of the basket, but not on the inside. In the needlework of the civilized woman the laying on of this third element would be called embroidery, but the Indian woman twines it into the textile while the process of basket-making is going on; that is, when each of the weft elements passes between two warp rods outward, the colored or overlaid element is wrapped around it once. Straws of different colors are employed (figure 26). An interesting modification of this Tlinkit form of overlaying or false embroidery occurs occasionally among the Pomo Indians under the name of *bŏg* or *bāg*, and it is fully explained and illustrated by James Teit in his memoir[1] on the Thompson

[1] *Memoirs of the American Museum of Natural History*, vol. II, New York, 1900, figure 132, p. 190.

River Indians. In this Thompson River example the twine or weft element is three-ply. Two of them are spun from native hemp or milkweed, and form the regular twined two-ply weaving. Around this twine the third element is wrapped or served, passing about the other two and between the warp elements, and then the whole is pressed down close to the former rows of weaving. On the outside of the bag this wrapping is diagonal, but on the inside the turns are perpendicular. The fastening off is coarsely done, leaving the surface extremely rough. I am indebted to Dr Franz Boas for the use of Mr Teit's figure. This combination is extremely interesting. The author says that it "seems to have been acquired recently through intercourse with the Sahaptins." A little attention to the stitches will show that the bags and the motives on them are clearly Nez Percé or Shahaptian, but the wrapping of corn-husk outside the twine is not done in Nez Percé fashion, but after the style of the Makah Indians of Cape Flattery, who are Wakashan (figure 27).[1]

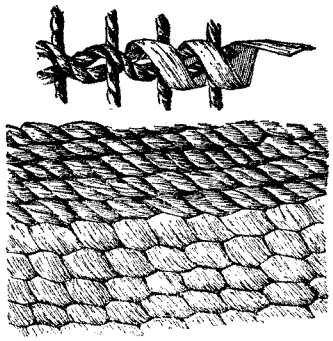

FIG. 27—Three-ply wrapped or served twined weaving. After James Teit.

II.—COILED BASKETRY

Coiled basketry is produced by an over-and-over sewing with some kind of flexible material, each stitch interlocking with the one immediately underneath it. The transition between lacework and coiled basketry is interesting. In the netted bags of pita fiber, common throughout middle America, in the muskemoots or Indian bags of fine caribou-skin thong from the Mackenzie River district, as well as in the lace-like netting of the

[1] See *Scientific American*, July 28, 1900, and *American Anthropologist* (N. S.), April, 1900.

Mohave carrying-frames and Peruvian textiles, the sewing and interlocking constitute the whole texture, the woman doing her work over a short cylinder or spreader of wood or bone, which she moves along as she works. When the plain sewing changes to half-hitches, or stitches in which the moving part of the filament or twine is wrapped or served one or more times about itself, there is the rude beginning of open lacework. This is seen in Fuegian basketry as well as in many pieces from various parts of the Old World.

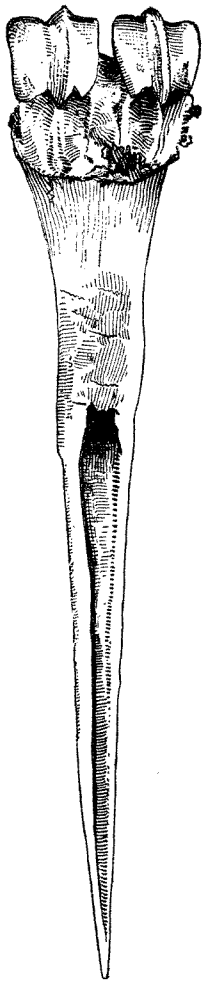

FIG. 28—Bone awl for making coiled basketry.

The sewing materials vary with the region. In the Aleutian islands it is a delicate straw; in the adjacent region it is spruce-root; in British Columbia it is cedar- or spruce-root; in the more diversified styles of the Pacific states every available material has been used—stripped leaf, grass stems, rushes, split root, broad fillets, and twine, the effect of each being well marked. In all coiled basketry, properly so-called, there is a foundation more or less rigid, inclosed within stitches, the only implement used being originally a bone awl (figure 28).

Figure 28 shows the metatarsal of an antelope sharpened in the middle and harder portion of the column, the joint serving for a grip to the hand. Mr Cushing was of the opinion that the bone awl was far better for fine basketwork than any implement of steel; the point, being a little rounded, would find its way between the stitches of the coil underneath and not force itself through them. The iron awl, being hard and sharp, breaks the texture and gives a very rough and clumsy appearance to the surface, as will be seen in figure 34. In every culture-province of

America wherever graves have been opened, the bone stiletto has been recovered, showing the widespread use of threads or filaments employed in joining two fabrics, or for perforating those already made to receive coilwork and other embroideries.

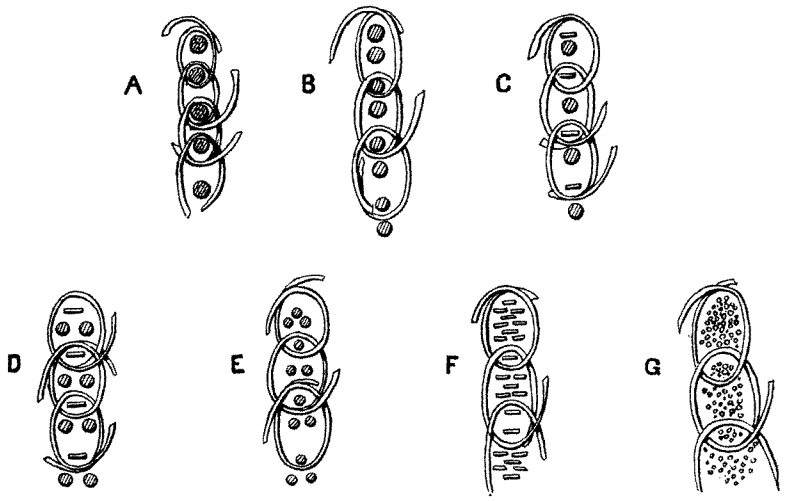

FIG. 29—End view of stitches in coiled basketry: A, single-rod foundation; B, two-rod, vertical foundation; C, rod and welt foundation; D, two-rod and welt foundation; E, three-rod foundation; F, splint foundation; G, grass or shred foundation.

Coiled basketry may be divided by the foundation filaments into the following classes:

a. Single-rod foundation.—In rattan basketry and Pacific Coast ware, called by Dr Hudson *tsai*, in the Pomo language, the foundation is a single stem, uniform in diameter. The stitch passes around the stem in progress and is caught under the one of the preceding coil, as in figure 29 A. In a collection of Siamese basketry in the National Museum the specimens are all made after this fashion; the foundation is the stem of the plant in its natural state, the sewing is with splints of the same material, having the glistening surface outward. As this is somewhat unyielding, it is difficult to crowd the stitches together and so the foundation is visible between.

In America, single-rod basketry is widely spread. Along the

Pacific coast it is found in northern Alaska and as far south as the borders of Mexico. The Pomo Indians use it in some of their finest work. The roots of plants and soft stems of willow, rhus, and the like, are used for the sewing, and being soaked thoroughly can be crowded together so as to entirely conceal the foundation (figure 30).

b. Two-rod foundation.—One rod in this style lies on top of the other; the stitches pass over the two rods in progress and under the upper one of the pair below, so that each stitch incloses three stems in a vertical series. A little attention to

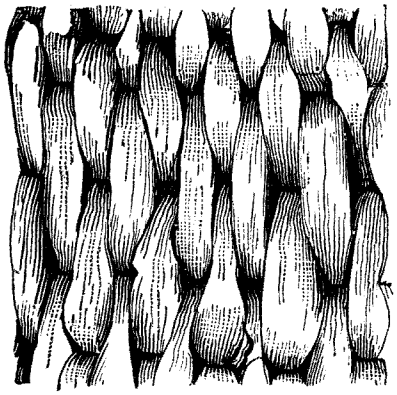

FIG. 30—Coiled work on single-rod foundation.

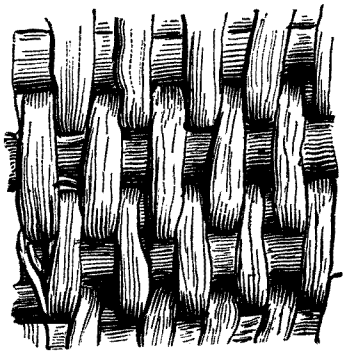

FIG. 31—Coiled work on two-rod, vertical foundation.

figure 31 will demonstrate that the alternate rod or the upper rod in each pair will be inclosed in two series of stitches, while the other or lower rod will pass along freely in the middle of one series of stitches and show on the outer side. Examples of this two-rod foundation are to be seen among the Athapascan tribes of Alaska, among the Pomo Indians of the Pacific coast, and among the Apache of Arizona. An interesting or specialized variety of this type is seen among the Mescaleros of New Mexico, who use the two-rod foundation, but instead of passing the stitch around the upper rod of the coil below, simply interlock the stitches so that neither one of the two rods is inclosed twice. This Apache ware is sewed with yucca fiber and the brown stems

of other plants, producing a brilliant effect, and the result of the special technic is a flat surface like that of pottery. The National Museum possesses a single piece of precisely the same technic from the kindred of the Apache on the lower Yukon.

c. Rod and welt foundation.— In this kind of basketry the single rod of the foundation is overlaid by a strip or splint of tough fiber — sometimes the same as that with which the sewing is done, at others a strip of leaf or bast. The stitches pass over the rod and strip which are on top down under the welt only of the coil below, the stitches interlocking. The strip of tough fiber

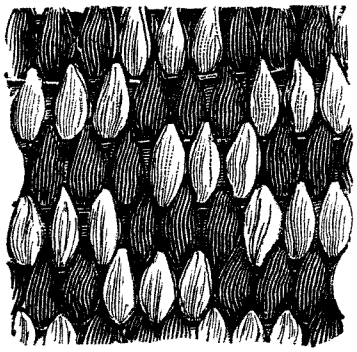

FIG. 32—Rod and welt foundation of coiled basketry.

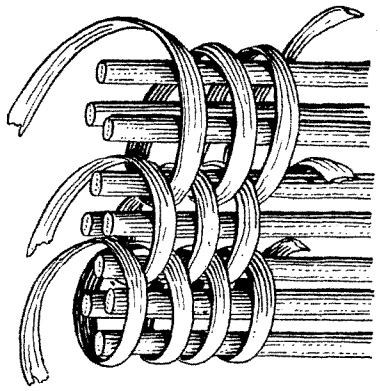

FIG. 33—Three-rod foundation in coiled basketry.

between the two rods which serves for a welt has a double purpose — strengthening the fabric and chinking the space between the rods. This style of coil work is seen on old Zuñi basket-jars and on California examples. This type of foundation passes easily into forms *a* and *b* (figures 32 and 29 C and D).

d. Three-rod foundation.— This is the type of foundation called by Dr Hudson *bam-tsu-wu*. Among the Pomo and other tribes in the western part of the United States the most delicate pieces of basketry are in this style. Dr Hudson calls them the "jewels of coiled basketry." The surfaces are beautifully corrugated and patterns of the most elaborate character can be

wrought on them. The technic is as follows: Three or four small, uniform willow stems serve for the foundation, as shown in figure 33, also in cross-section in figure 29 E. The sewing, which may be in splints of willow, black or white carex root, or cercis stem, passes around the three stems constituting the coil, under the upper one of the bundle below, the stitches interlocking. In some examples this upper rod is replaced by a thin strip of material serving for a welt (see 29 D). In the California area the materials for basketry are of the finest quality. The willow stems and carex root are susceptible of division into delicate filaments. Sewing done with these is most compact, and when the stitches are pressed closely together the foundation does not appear. On the surface of the *bam-tsu-wu* basketry the Pomo weaver adds pretty bits of bird feathers and delicate pieces of shell. The basket represents the wealth of the maker, and the gift of one of these to a friend is considered to be the highest compliment.

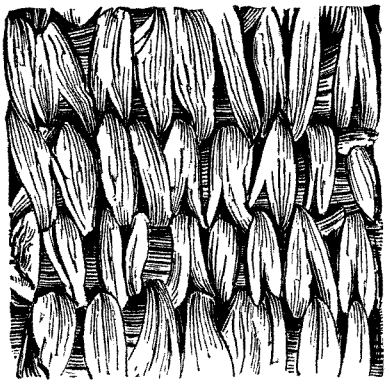

FIG. 34—Splint foundation of coiled basketry.

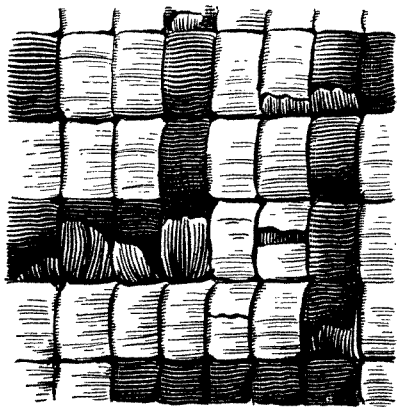

FIG. 35—Imbricated variety of splint coil in basketry, called Klikitat stitch.

e. Splint foundation.—In basketry of this type the foundation consists of a number of longer or shorter splints massed together and sewed, the stitches passing under one or more of the splints in the coil beneath (figures 29 F and 34). In the Pomo

language it is called *chilo*, but it has no standing in that tribe. In the Great Interior basin, where the pliant material of the California tribes is wanting, only the outer and younger portion of the stem will do for sewing. The interior parts in such examples are made up into the foundation. All such ware is rude, and the sewing frequently passes through instead of around the stitches below. In the Klikitat basketry the pieces of spruce or cedar root not used for sewing material are also worked into the foundation (figures 35–37).

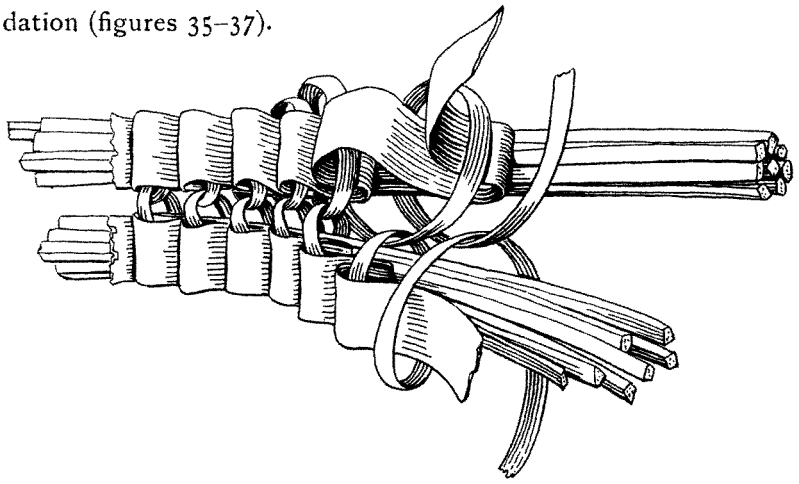

FIG. 36—Detail of imbricated basketry.

In a small area on Fraser river, in southwestern Canada, and on the upper waters of the Columbia, basketry called "Klikitat" is made. The foundation, as stated, is in splints of cedar or spruce root, while the sewing is done with the outer and tough portion of the root; the stitches pass over the upper bundle of splints and are locked with those underneath. On the outside of these baskets is a form of technic which also constitutes the ornamentation. It is not something added, or overlaid, or sewed on, but is a part of the texture effected in the progress of the manufacture (figures 36, 37).

The method of adding this ornamentation in strips of cherry bark, cedar bast, and grass stems dyed with Oregon grape, is

unique, and on this account I have applied the term *imbricated* to the "Klikitat" basket, as shown in figures 35 to 37. The strip of colored bark or grass is laid down and caught under a passing stitch; before another stitch is taken this strip is bent forward to cover the last stitch, doubled on itself so as to be underneath the next stitch, and so with each stitch it is bent backward and forward so that the sewing is entirely concealed, forming a sort of "knife plaiting." In some of the finer old baskets in the National Museum, collected sixty years ago, the entire surface is covered with work of this kind, the strips not being over an eighth of an inch wide. Mr James Teit[1] describes and illustrates this type of weaving among the Thompson River Indians of British Columbia, who are Salishan. The body of the basket is in the root of *Thuja gigantea*, and the ornamentation in strips of *Elymus triticoides* and *Prunus demissa* (figure 37).

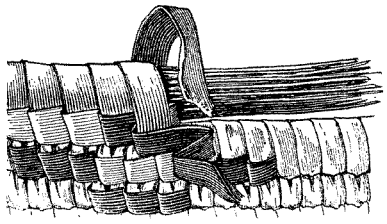

FIG. 37—Imbricated basketry detail from the Thompson River Indians, British Columbia. After James Teit.

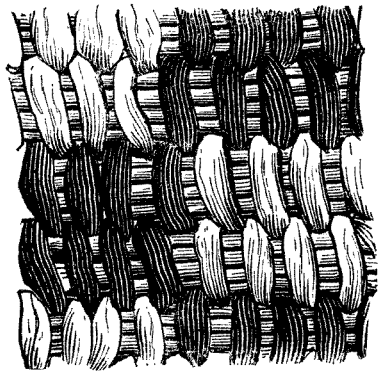

FIG. 38—Coiled basketry with grass foundation.

f. Grass foundation.—The foundation of this type of basketry is made up of a small bundle of straws or rushes. The sewing may be done with split stems of hardwood, willow, rhus, and the like, or, as in the case of the Mission baskets in southern California, of the stems of rushes (*Juncus acutus*), or stiff grass (*Epicampes rigidum*). See figure 38 and the cross-section given in figure 29 G. In the larger granary baskets of the Pima a bundle

[1] *Memoirs of the American Museum of Natural History*, Anthropology, I, page 189, figure 131 *a*.

of straws furnishes the foundation, while the sewing is done with broad strips of tough bark, as in figure 39. In the Fuegian coiled basketry, of which no figure is given, the sewing is done with rushes, but instead of being in the ordinary over-and-over stitch it consists of a series of half-hitches or buttonhole stitches.

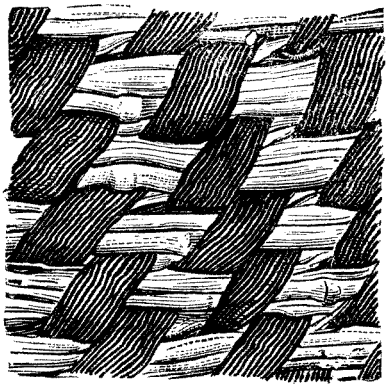

FIG. 39—Coiled work sewed with broad strips of tough bark.

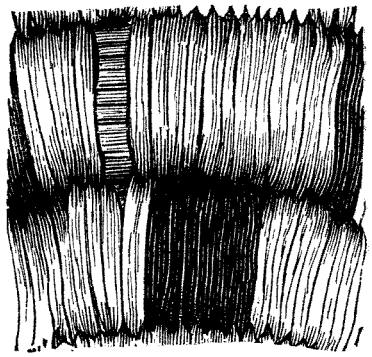

FIG. 40—Coiled work on shred foundation, from the hard parts of yucca leaves.

Among the basketry belonging to the grass-coil foundation type are the Hopi plaques built upon a thick bundle of the woody stems of the yuccas, which furnish also the sewing material from the split leaf (figure 40). If this be examined in comparison with a style of basketry found in Egypt and in northern Africa as far as the Barbary states, great similarity will be noticed in the size of the coil, the color of the sewing material, the patterns, and the stitches. The suggestion is here made that this particular form of workmanship may be due to acculturation, inasmuch as this type of basketry is confined in America to the Hopi pueblos, which were brought very early in contact with Spaniards and African slaves.

Ornamentation in basketry is produced by the use of different colored materials, by overlaying, embroidery, dyes, featherwork, shells, beads, etc. The technic of decoration and the geographic distribution of the forms of technic explained in this paper must be reserved for another time.