
SMITHSONIAN INSTITUTION—BUREAU OF ETHNOLOGY.

A STUDY
OF
PUEBLO POTTERY
AS ILLUSTRATIVE OF
ZUÑI CULTURE GROWTH.
BY
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CONTENTS.

	Page.
Habitations affected by environment.....	473
Rectangular forms developed from circular.....	475
Flat and terraced roofs developed from sloping mesa-sites.....	477
Added stories developed from limitations of cliff-house sites.....	479
Communal pueblos developed from congregation of cliff-house tribes.....	480
Pottery affected by environment.....	482
Anticipated by basketry.....	483
Suggested by clay-lined basketry.....	485
Influenced by local minerals.....	493
Influenced by materials and methods used in burning.....	495
Evolution of forms.....	497
Evolution of decoration.....	506
Decorative symbolism.....	510

ILLUSTRATIONS.

	Page.
FIG. 490.—A Navajo hut or hegan.....	473
491.—Perspective view of earliest or Round-house structures of lava	474
492.—Plan of same	475
493.—Section of same	475
494.—Evolution of rectangular forms in primitive architecture	476
495.—Section illustrating evolution of flat roof and terrace	477
496.—Perspective view of a typical solitary-house	478
497.—Plan of a typical solitary-house	478
498.—Typical cliff-dwelling	479
499.—Typical terraced-pueblo—communal type.....	480
500.—Ancient gourd-vessel encased in wicker.....	483
501.—Havasupai roasting-tray, with clay lining	484
502.—Zuñi roasting-tray of earthenware.....	485
503.—Havasupai boiling-basket	486
504.—Sketch illustrating the first stage in manufacture of latter	486
505.—Sketch illustrating the second stage in manufacture of latter	486
506.—Sketch illustrating the third stage in manufacture of latter	486
507.—Typical example of basket decoration	487
508.—Typical example of basket decoration.....	487
509.—Typical example of basket decoration	487
510.—Terraced lozenge decoration or “Double-splint-stitch-form.” (Shú k'u tu lia tsí nan)	488
511.—Terraced lozenge decoration or “Double-splint-stitch-form.” (Shú k'u tu lia tsí nan).....	488
512.—Double-splint-stitch, from which same was elaborated	488
513.—Double-splint-stitch, from which same was elaborated	488
514.—Diagonal parallel-line decoration. (Shú k'ish pa tsí nan)	488
515.—Study of splints at neck of unfinished basket illustrating evolution of latter	489
516.—Example of indented decoration on corrugated ware.....	490
517.—Example of indented decoration on corrugated ware.....	490
518.—Cooking pot of spirally built or corrugated ware, showing conical projections near rim.....	490
519.—The same, illustrating modification of latter.....	491
520.—Wicker water-bottle, showing double loops for suspension.....	491
521.—Water-bottle of corrugated ware, showing double handle.....	492
522.—The same, showing also plain bottom.....	492
523.—Food trencher or bowl of impervious wicker-work.....	497
524.—Latter inverted, as used in forming bowls	497
525.—Ancient bowl of corrugated ware, showing comparative shallowness.	498

	Page.
FIG. 526.—Basket-bowl as base-mold for large vessels	499
527.—Clay nucleus illustrating beginning of a vessel	499
528.—The same shaped to form the base of a vessel	499
529.—The same as first placed in base-mold, showing beginning of spiral building	500
530.—First form of vessel	500
531.—Secondary form in mold, showing origin of spheroidal type of jar...	501
532.—Scrapers or trowels of gourd and earthen-ware for smoothing pottery.	501
533.—Finished form of a vessel in mold, showing amount of contraction in drying	501
534.—Profile of olla or modern water-jar	502
535.—Base of same, showing circular indentation at bottom	502
536.—Section of same, showing central concavity and circular depression.	502
537.—“Milkmaid’s boss,” or annular mat of wicker for supporting round vessels on the head in carrying	503
538.—Use of annular mat illustrated	503
539.—Section of incipient vessel in convex-bottomed basket-mold	504
540.—Section of same as supported on annular mat and wad of soft sub- stance, for drying	504
541.—Modern base-mold as made from the bottom of water jar	504
542.—Example of Pueblo painted-ornamentation illustrating decorative value of open spaces	506
543 and 544.—Amazonian basket-decorations, illustrating evolution of the above characteristic	507
545.—Bowl, showing open or unjoined space in lines near rim	510
546.—Water-jar, showing open or unjoined space in lines near rim	510
547.—Conical or flat-bellied canteen	512
548 and 549.—The same, compared with human mammary gland	513
550.—Double-lobed or hunter canteen (Me’ wi k’i lik ton ne), showing teat-like projections and open spaces of contiguous lines	514
551.—Native painting of deer, showing space-line from mouth to heart...	515
552.—Native painting of sea serpent, showing space-line from mouth to heart	515
553.—The fret of basket decoration	516
554.—The fret of pottery decoration	516
555.—Scroll as evolved from fret in pottery decoration	516
556.—Ancient Pueblo “medicine-jar”	517
557.—Decoration of above compared with modern Moki rain symbol	517
558.—Zuni prayer-meal bowl illustrating symbolism in form and decora- tion	518
559.—Native paintings of sacred butterfly	519
560.—Native painting of sacred migratory “summer bird”	519
561.—Rectangular or Iroquois type of earthen vessel	519
562.—Kidney-shaped type of vessel of Nicaragua	520
563.—Iroquois bark vessel, showing angles of juncture	520
564.—Porenpine quill decoration on bark vessel, for comparison with Fig. 561	521

A STUDY OF PUEBLO POTTERY AS ILLUSTRATIVE OF ZUÑI CULTURE-GROWTH.

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HABITATIONS AFFECTED BY ENVIRONMENT.

It is conceded that the peculiarities of a culture-status are due chiefly to the necessities encountered during its development. In this sense the Pueblo phase of life was, like the Egyptian, the product of a desert environment. Given that a tribe or stock of people is weak, they will be encroached upon by neighboring stronger tribes, and driven to new surroundings if not subdued. Such we may believe was the influence which led the ancestors of the Pueblo tribes to adopt an almost waterless area for their habitat.

It is apparent at least that they entered the country wherein their remains occur while comparatively a rude people, and worked out there almost wholly their incipient civilization. Of this there is important linguistic evidence.

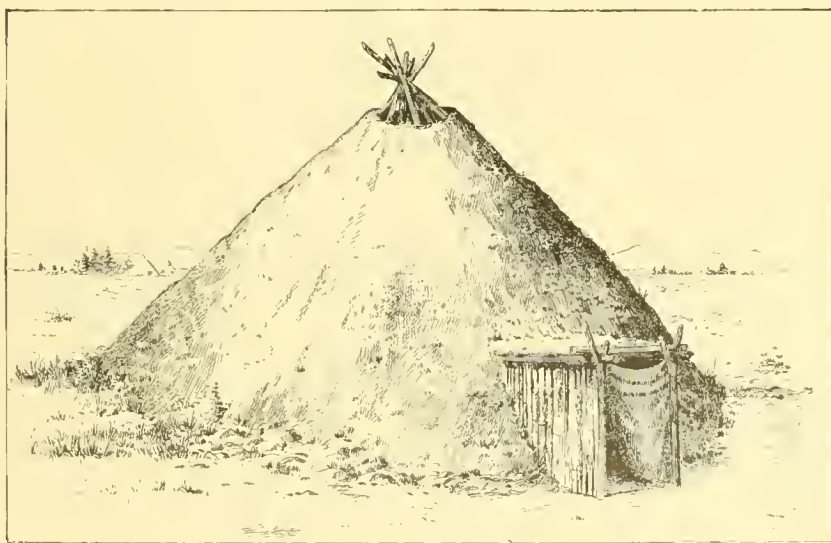


FIG. 490.—A Navajo hut.

A Navajo hogan, or hut, is a beehive-shaped or conical structure (see Fig. 490) of sticks and turf or earth, sometimes even of stones

chinked with mud. Yet its modern Zuñi name is *hám' pon ne*, from *ha we*, dried brush, sprigs or leaves; and *pó an ne*, covering, shelter or roof (*po a* to place over and *ne* the nominal suffix); which, interpreted, signifies a "brush or leaf shelter." This leads to the inference that the temporary shelter with which the Zuñis were acquainted when they formulated the name here given, presumably in their earliest condition, was in *shape* like the Navajo hogan, but in *material*, of brush or like perishable substance.

The archaic name for a building or walled inclosure is *hé sho ta*, a contraction of the now obsolete term, *hé sho ta pon ne*, from *hé sho*, gum, or resin-like; *shó tai e*, leaned or placed together convergingly; and *tá po an ne*, a roof of wood or a roof supported by wood.

The meaning of all this would be obscure did not the oldest remains of the Pueblos occur in the almost inaccessible lava-wastes bordering the southwestern deserts and intersecting them and were not the houses of these ruins built on the plan of shelters, round (see Figs. 491, 492, 493),

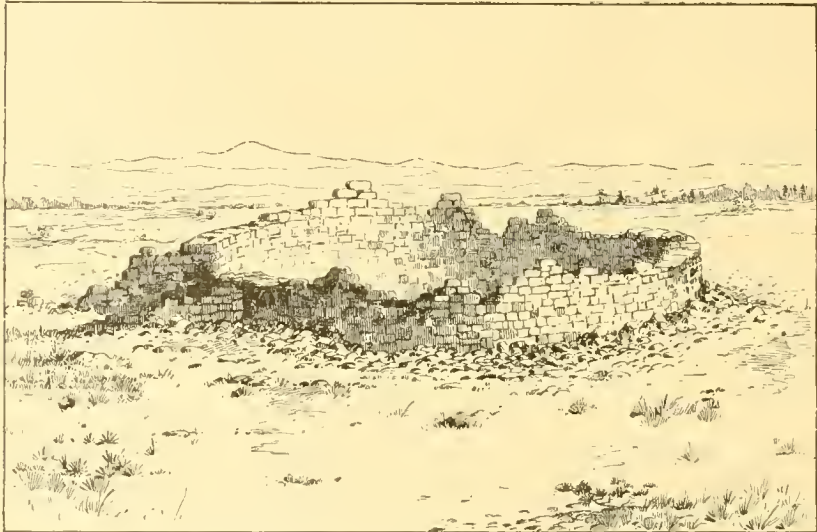


FIG. 491.—Perspective view of earliest or Round-house structure of lava.

rather than rectangular. Furthermore, not only does the lava-rock of which their walls have been rudely constructed resemble natural asphaltum (*hé sho*) and possess a cleavage exactly like that of piñon-gum and allied substances (also *hé sho*), but some forms of lava are actually known as *á he sho* or gum-rock. From these considerations inferring that the name *hé sho ta pon ne* derivatively signifies something like "a gum-rock shelter with roof supports of wood," we may also infer that the Pueblos on their coming into the desert regions dispossessed earlier inhabitants or that they chose the lava-wastes the better to secure

themselves from invasion; moreover that the oldest form of building known to them was therefore an inclosure of lava-stones, whence the application of the contraction *hé sho ta* and its restriction to mean a walled inclosure.

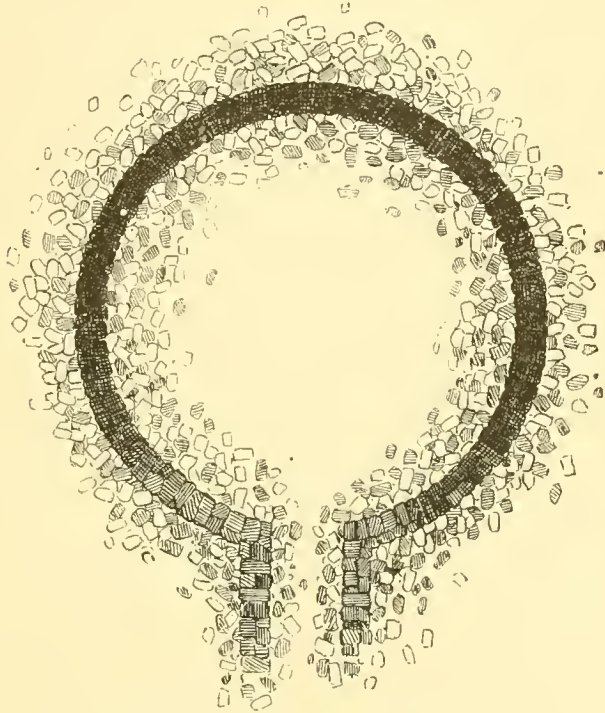


FIG. 492.—Plan of Pueblo structure of lava.

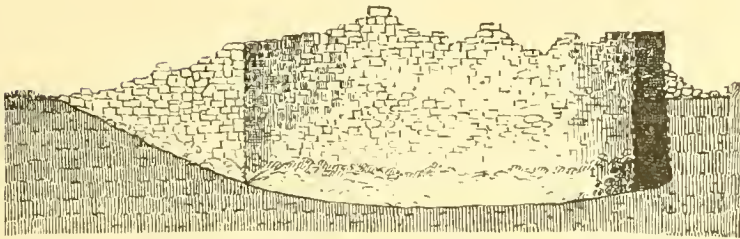


FIG. 493.—Section of Pueblo structure of lava.

RECTANGULAR FORMS DEVELOPED FROM CIRCULAR.

It may be well in this connection to cite a theory entertained by Mr. Victor Mindeleff, of the Bureau of Ethnology, whose wide experience among the southwestern ruins entitles his judgment to high consider-

ation. In his opinion the rectangular form of architecture, which succeeds the type under discussion, must have been evolved from the circular form by the bringing together, within a limited area, of many houses. This would result in causing the wall of one circular structure to encroach upon that of another, suggesting the partition instead of the double wall. This partition would naturally be built straight as a twofold measure of economy. Supposing three such houses to be contiguous to a central one, each separated from the latter by a straight wall, it may be seen that (as in the accompanying plan) the three sides

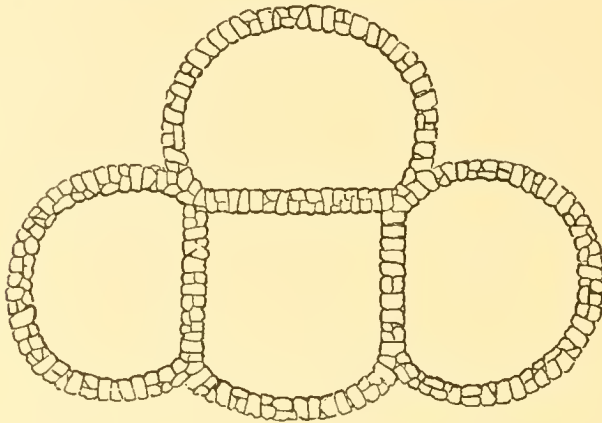


FIG. 494.—Evolution of rectangular forms in primitive architecture.

of a square are already formed, suggesting the parallelogramic as a convenient style of sequent architecture.

All this, I need scarcely add, agrees not only with my own observations in the field but with the kind of linguistic research above recorded. It would also apparently explain the occurrence of the circular semisubterranean *ki wi tsi we*, or estufas. These being sacred have retained the pristine form long after the adoption of a modified type of structure for ordinary or secular purposes, according to the well known law of survival in ceremonial appurtenances.

In a majority of the lava ruins (for example those occurring near Prescott, Arizona), I have observed that the sloping sides rather than the level tops of *mesa* headlands have been chosen by the ancients as building-sites. Here, the rude, square type of building prevails, not, however, to the entire exclusion of the circular type, which is represented by loosely constructed walls, always on the *outskirts* of the main ruins. The rectangular rooms are, as a rule, built row above row. Some of the houses in the upper rows give evidence of having overlapped others below. (See section, Fig. 495.)

FLAT AND TERRACED ROOFS DEVELOPED FROM SLOPING MESA-SITES.

We cannot fail to take notice of the indications which this brings before us.

(1) It is quite probable that the overlapping resulted from an increase in the numbers of the ancient builders relative to available area, this, as in the first instance, leading to a further massing together of the houses. (2) It suggested the employment of rafters and the formation of the *flat* roof, as a means of supplying a level entrance way and floor to rooms which, built above and to the rear of a first line of houses, yet extended partially over the latter. (3) This is I think the earliest form of the terrace.

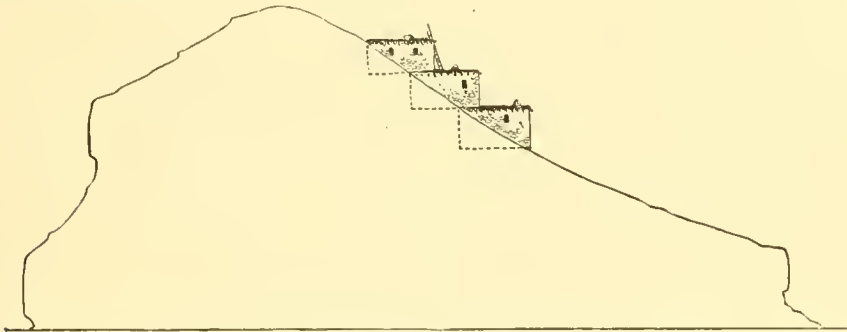


FIG. 495.—Section illustrating evolution of flat roof and terrace.

It is therefore not surprising that the flat roof of to-day is named *té k'os kwîn ne*, from *te*, space, region, extension, *k'os kwî e*, to cut off in the sense of closing or shutting in from one side, and *kwîn ne*, place of. Nor is it remarkable that no type of ruin in the Southwest *seems* to connect these first terraced towns with the later not only terraced but also literally cellular buildings, which must be regarded nevertheless as developed from them. The reason for this will become evident on further examination.

The modern name for house is *k'ia kwîn ne*, from *k'ia we*, water, and *kwîn ne*, place of, literally "watering place;" which is evidence that the first properly so called houses known to the Pueblos were solitary and built near springs, pools, streams, or well-places. The universal occurrence of the vestiges of single houses throughout the less forbidding tracts of the Pueblo country (see Figs. 496 and 497) leads to this inference and to the supposition that the necessity for protection being at last overcome, the denizens of the lava-fields, where planting was well-nigh impossible, descended, building wherever conditions favored the horticulture which gradually came to be their chief means of support. As irrigation was not known until long afterwards, arable areas were limited, hence they were compelled to divide into families or small

clans, each occupying a single house. The traces of these solitary farm-houses show that they were at first single-storied. The name of an upper room indicates how the idea of the second or third story was developed, as it is *ósh ten u thlan*, from *ósh ten*, a shallow cave, or rock-

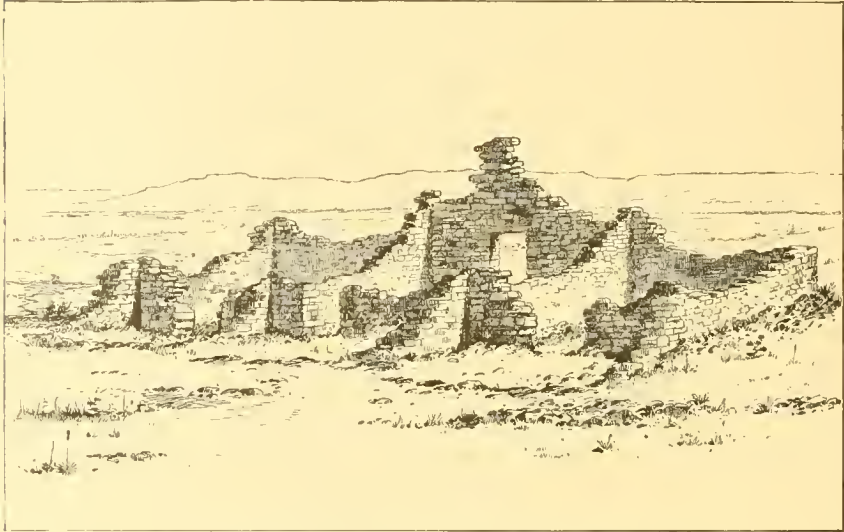


FIG. 496.—Perspective view of a typical solitary house.

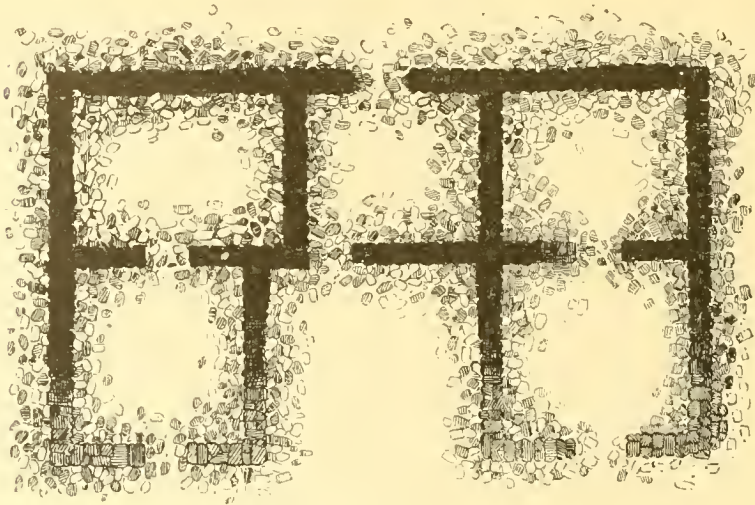


FIG. 497.—Plan of a typical solitary house.

shelter, and *ú thla nai e*, placed around, embracing, inclusive of. This goes to show that it was not until after the building of the first small farm-houses (which gave the name to houses) that the caves or rock-

shelters of the cliffs were occupied. If predatory border-tribes, tempted by the food-stores of the horticultural farm-house builders, made incursions on the latter, they would find them, scattered as they were, an easy prey.

ADDED STORIES FOR CLIFF DWELLINGS DEVELOPED FROM LIMITATIONS OF CLIFF-HOUSE SITES.

This condition of things would drive the people to seek security in the neighboring cliffs of fertile cañons, where not only might they build their dwelling places in the numerous rock-shelters, but they could also cultivate their crops in comparative safety along the limited tracts

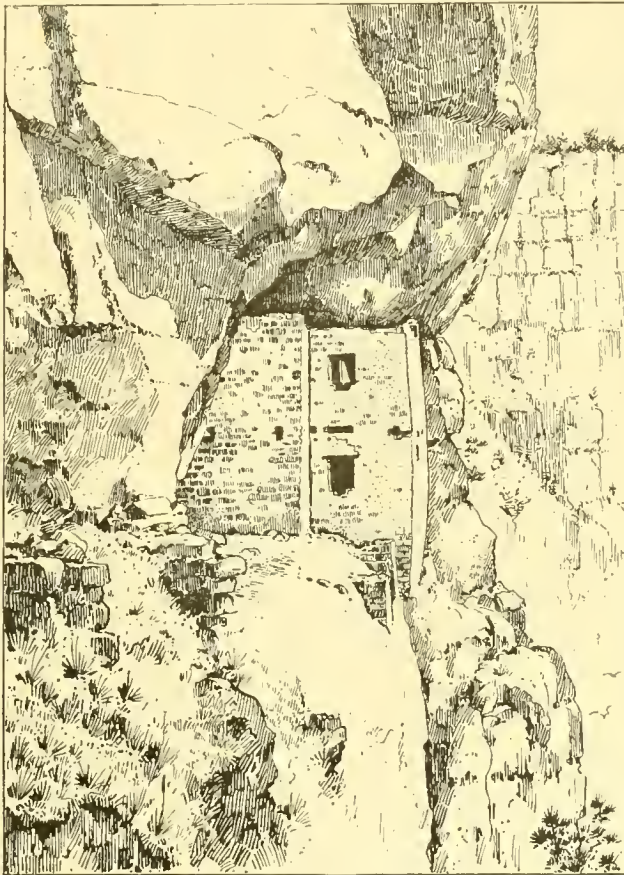


FIG. 498.—A typical cliff-dwelling.

which these eyries overlooked. The narrow foothold afforded by many of these elevated cliff-shelves or shelters would force the fugitives to construct house over house; that is, build a second or upper story

around the roof of the cavern. What more natural than that this upper room should take a name most descriptive of its situation—as that portion built around the cavern-shelter or *ósh ten*—or that, when the intervention of peace made return to the abandoned farms of the plains or a change of condition possible, the idea of the second story should be carried along and the name first applied to it survive, even to the present day? That the upper story took its name from the rock-shelter may be further illustrated. The word *ósh ten* comes from *ó sho nan te*, the condition of being dusky, dank, or mildewy; clearly descriptive of a cavern, but not of the most open, best lighted, and driest room in a Pueblo house.

To continue, we may see how the necessity for protection would drive the petty clans more and more to the cliffs, how the latter at every available point would ultimately come to be occupied, and thus how the "*Cliff-dwelling*" (see Fig. 498), was confined to no one section but was as universal as the farm-house type of architecture itself, so widespread, in fact, that it has been heretofore regarded as the monument of a great, now extinct race of people!

COMMUNAL PUEBLOS DEVELOPED FROM CONGREGATION OF CLIFF-HOUSE TRIBES.

We may see, finally, how at last the cañons proved too limited and in other ways undesirable for occupation, the result of which was the confederation of the scattered cliff-dwelling clans, and the construction,

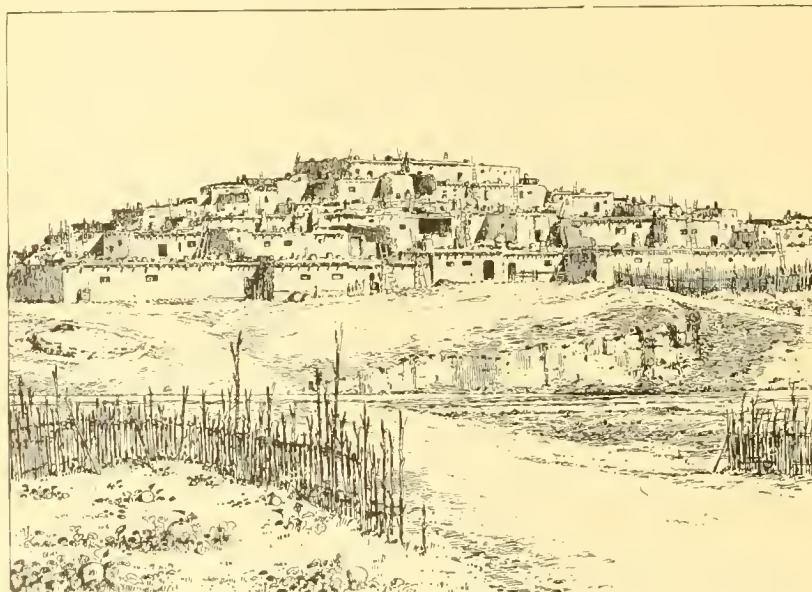


FIG. 499.—Typical terraced communal pueblo.

first on the overhanging cliff-tops, then on *mesas*, and farther and farther away, of great, many-storied towns, any one of which was named, in consequence of the bringing together in it of many houses and clans, *thlu él lon ne*, from *thlu a*, many springing up, and *él lon a*, that which stands, or those which stand; in other words, "many built standing together." This cannot be regarded as referring to the simple fact that a village is necessarily composed of many houses standing together. The name for any other village than a communal pueblo is *tí na kwĩn ne*, from *tí na*—many sitting around, and *kwĩn ne*, place of. This term is applied by the Zuñis to all villages save their own and those of ourselves, which latter they regard as Pueblos, in their acceptance of the above native word.

Here, then, in strict accordance with the teachings of myth, folk-lore and tradition, I have used the linguistic argument as briefest and most convincing in indicating the probable sequence of architectural types in the evolution of the Pueblo; from the brush lodge, of which only the name survives, to the recent and present terraced, many-storied, communal structures, which we may find throughout New Mexico, Arizona, and contiguous parts of the neighboring Territories.¹

¹ See for confirmation the last Annual Report to the Archaeological Institute of America, by Adolph F. Bandelier, one of the most indefatigable explorers and careful students of early Spanish history in America.

POTTERY AFFECTED BY ENVIRONMENT.

There is no other section of the United States where the potter's art was so extensively practiced, or where it reached such a degree of perfection, as within the limits of these ancient Pueblo regions. To this statement not even the prolific valleys of the Mississippi and its tributaries form an exception.

On examining a large and varied collection of this pottery, one would naturally regard it either as the product of four distinct peoples or as belonging to four different eras, with an inclination to the chronologic division.

When we see the reasonable probability that the architecture, the primeval arts and industries, and the culture of the Pueblos are mainly indigenous to the desert and semi-desert regions of North America, we are in the way towards an understanding of the origin and remarkable degree of development in the ceramic art.

In these regions water not only occurs in small quantities, but is obtainable only at points separated by great distances, hence to the Pueblos the first necessity of life is the transportation and preservation of water. The skins and paunches of animals could be used in the effort to meet this want with but small success, as the heat and aridity of the atmosphere would in a short time render water thus kept unfit for use, and the membranes once empty would be liable to destruction by drying. So far as language indicates the character of the earliest water vessels which to any extent met the requirements of the Zuñi ancestry, they were tubes of wood or sections of canes. The latter, in ritualistic recitation, are said to have been the receptacles that the creation-priests filled with the sacred water from the ocean of the cave-wombs of earth, whence men and creatures were born, and the name for one of these cane water vessels is *shó tom me*, from *shó e*, cane or canes, and *tóm me*, a wooden tube. Yet, although in the extreme western borders of the deserts, which were probably the first penetrated by the Pueblos; the cane grows to great size and in abundance along the two rivers of that country, its use, if ever extensive, must have speedily given way to the use of gourds, which grew luxuriantly at these places and were of better shapes and of larger capacity. The name of the gourd as a vessel is *shop tom me*, from *shó e*, canes, *pó pou nai e*, bladder-shaped, and *tóm me*, a wooden tube; a seeming derivation (with the exception of the interpolated sound significant of form) from *shó tom me*. The gourd itself is called *mó thlá á*, "hard fruit." The inference is that when used

as a vessel, and called *shop tom me*, it must have been named after an older form of vessel, instead of after the plant or fruit which produced it.

While the gourd was large and convenient in form, it was difficult of transportation owing to its fragility. To overcome this it was encased in a coarse sort of wicker-work, composed of fibrous yucca leaves or of flexible splints. Of this we have evidence in a series of gourd-vessels among the Zuñis, into which the sacred water is said to have been transferred from the tubes, and a pair of which one of the priests, who came east with me two years ago, brought from New Mexico to Boston in his hands—so precious were they considered as relics—for the purpose of replenishing them with water from the Atlantic. These vessels are encased rudely but strongly in a meshing of splints (see Fig. 500), and while I do not positively claim that they have been piously



FIG. 500.—Gourd vessel enclosed in wicker.

preserved since the time of the universal use of gourds as water-vessels by the ancestry of this people, they are nevertheless of considerable antiquity. Their origin is attributed to the priest-gods, and they show that it must have once been a common practice to encase gourds, as above described, in osiery.

POTTERY ANTICIPATED BY BASKETRY.

This crude beginning of the wicker-art in connection with water-vessels points toward the development of the wonderful water-tight basketry of the southwest, explaining, too, the resemblance of many of its typical forms to the shapes of gourd-vessels. Were we uncertain of

this, we might again turn to language, which designates the impervious wicker water-receptacle of whatever outline as *tóm ma*, an evident derivation from the restricted use of the word *tóm me* in connection with gourd or cane vessels, since a basket of any other kind is called *tsí ì le*.

It is readily conceivable that water-tight osiery, once known, however difficult of manufacture, would displace the general use of gourd-vessels. While the growth of the gourd was restricted to limited areas, the materials for basketry were everywhere at hand. Not only so, but basket-vessels were far stronger and more durable, hence more readily transported full of water, to any distance. By virtue of their rough surfaces, any leakage in such vessels was instantly stopped by a daubing of pitch or mineral asphaltum, coated externally with sand or coarse clay to harden it and overcome its adhesiveness.

We may conclude, then, that so long as the Pueblo ancestry were semi nomadic, basketry supplied the place of pottery, as it still does for the less advanced tribes of the Southwest, except in cookery. Possibly for a time basketry of this kind served in place of pottery even for cookery, as with one of the above-mentioned tribes, the *Havasupai* or *Cogoninos*, of Cataract Cañon, Arizona. These people, until recently,

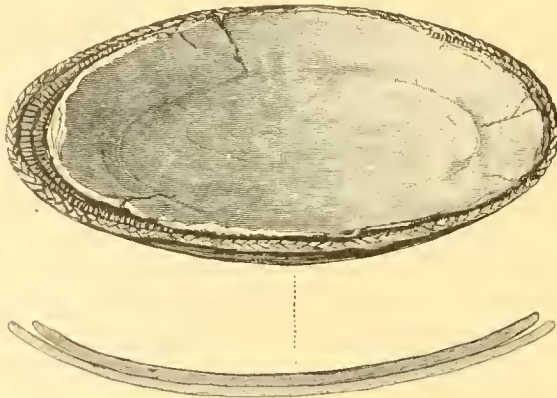


FIG. 501.—Havasupai clay-lined roasting-tray.

were cut off from the rest of the world by their almost impenetrable cañon, nearly half a mile in depth at the point where they inhabit it. For example, when I visited them in 1881, they still hafted sharpened bits of iron, like celts, in wood. They had not yet forgotten how to boil food in water-tight basketry, by means of hot stones, and continued to roast seeds, crickets, and bits of meat in wicker-trays, coated inside with gritty clay. (See Fig. 501.) The method of preparing and using these roasting-trays has an important bearing on several questions to which reference will be made further on. A round basket-tray, either loosely or closely woven, is evenly coated inside with clay, into which has been kneaded a very large proportion of sand, to prevent contraction and

consequent cracking from drying. This lining of clay is pressed, while still soft, into the basket as closely as possible with the hands and then allowed to dry. The tray is thus made ready for use. The seeds or other substances to be parched are placed inside of it, together with a quantity of glowing wood-coals. The operator, quickly squatting, grasps the tray at opposite edges, and, by a rapid spiral motion up and down, succeeds in keeping the coals and seeds constantly shifting places and turning over as they dance after one another around and around the tray, meanwhile blowing or puffing the embers with every breath to keep them free from ashes and glowing at their hottest.

That this clay lining should grow hard from continual heating, and in some instances separate from its matrix of osiers, is apparent. The clay form thus detached would itself be a perfect roasting-vessel.

POTTERY SUGGESTED BY CLAY-LINED BASKETRY.

This would suggest the agency of gradual heat in rendering clay fit for use in cookery and preferable to any previous makeshift. The modern Zuñi name for a parching-pan, which is a shallow bowl of black-ware, is *thlé mon ne*, the name for a basket-tray being *thlä' lin ne*. The latter name signifies a shallow vessel of twigs, or *thlä' ne*; the former etymologically interpreted, although of earthenware, is a hemispherical vessel of the same kind and *material*. All this would indicate that the *thlä' lin ne*, coated with clay for roasting, had given birth to the *thlé mon ne*, or parching-pan of earthenware. (See Fig. 502.)

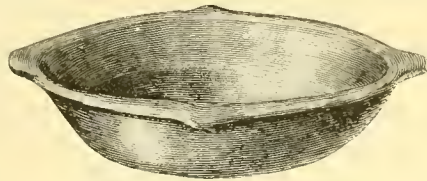


FIG. 502.—Zuñi earthenware roasting tray.

Among the Havasupai, still surviving as a sort of bucket, is the basket-pot or boiling-basket, for use with hot stones, which form I have also found in some of the cave deposits throughout the ancient Zuñi country. These vessels (see Fig. 503) were bottle-shaped and provided near the rims of their rather narrow mouths with a sort of cord or strap-handle, attached to two loops or eyes (Fig. 503 *a*) woven into the basket, to facilitate handling when the vessel was filled with hot water. In the manufacture of one of these vessels, which are good examples of the helix or spirally-coiled type of basket, the beginning was made

at the center of the bottom. A small wisp of fine, flexible grass stems or osiers softened in water was first spirally wrapped a little at one end



FIG. 503.—Havasupai boiling-basket.

with a flat, limber splint of tough wood, usually willow (see Fig. 504). This wrapped portion was then wound upon itself; the outer coil thus formed (see Fig. 505) being firmly fastened as it progressed to the one already made by passing the splint wrapping of the wisp each time it was wound around the latter through some strands of the contiguous inner coil, with the aid of a bodkin. (See Fig. 506.) The bottom was



FIG. 504.



FIG. 505.

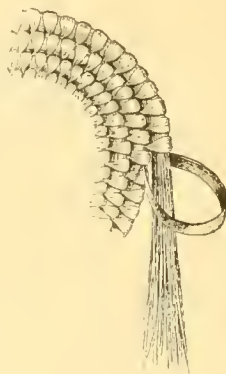


FIG. 506.

Sketches illustrating manufacture of spirally-coiled basketry.

rounded upward and the sides were made by coiling the wisp higher and higher, first outward, to produce the bulge of the vessel, then inward, to form the tapering upper part and neck, into which the two little twigs or splint loop-eyes were firmly woven. (See again Fig. 503 *a*.)

These and especially kindred forms of basket-vessels were often quite elaborately ornamented, either by the insertion at proper points of dyed wrapping-splints, singly, in pairs, or in sets, or by the alternate painting of pairs, sets, or series of stitches. Thus were produced angular devices, like serrated bands, diagonal or zigzag lines, chevrons, even terraces and frets. (See Figs. 507, 508, 509.) There can be no doubt that

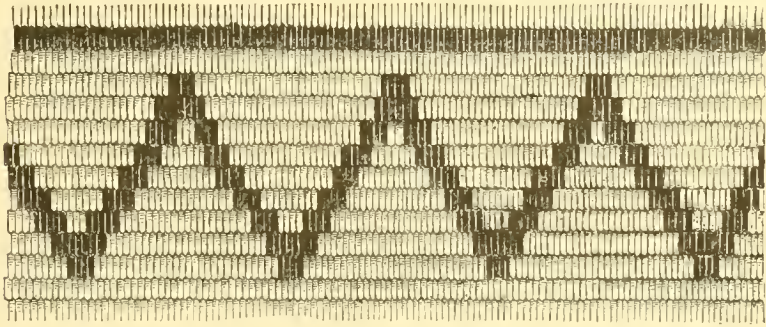


FIG. 507.—Typical basket decoration.

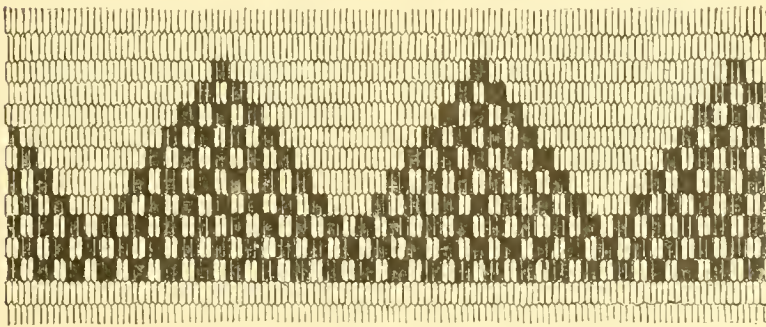


FIG. 508.—Typical basket decoration.

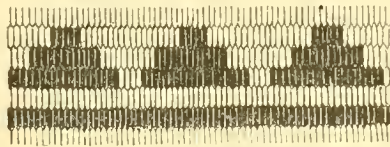


FIG. 509.—Typical basket decoration.

these styles and ways of decoration were developed, along with the weaving of baskets, simply by elaborating on suggestions of the lines and figures unavoidably produced in wicker-work of any kind when strands of different colors happened to be employed together. Even slight discolorations in occasional splints would result in such suggestions, for the stitches would here show, there disappear. The probability of this view of the accidental origin of basket-ornamentation may

be enhanced by a consideration of the etymology of a few Zuñi decorative terms, more of which might be given did space admit. A terraced lozenge (see Figs. 510, 511), instead of being named after the abstract

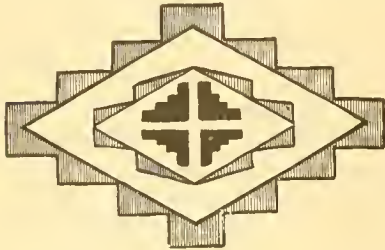


FIG. 510.

Terraced lozenge decoration, or "double-splint-stitch-forms."

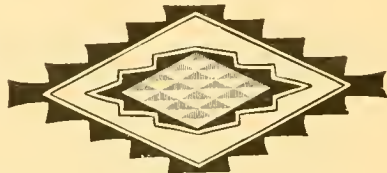


FIG. 511.

word *a wi thlui ap í pü tchi na*, which signifies a double terrace or two terraces joined together at the base, is designated *shu k'u tu li a tsí' nan*, from *shu e*, splints or fibers; *k'u tsu*, a double fold, space, or stitch (see

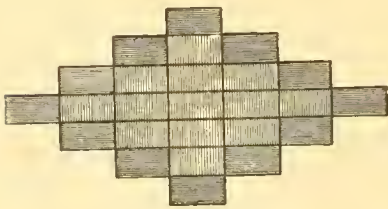


FIG. 512.

Double-splint-stitch.

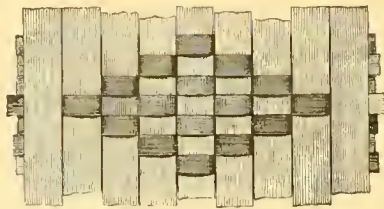


FIG. 513.

Figs. 512, 513); *li a*, an interpolation referring to form; and *tsí' nan*, mark; in other words, the "double splint-stitch-form mark." Likewise, a pat-

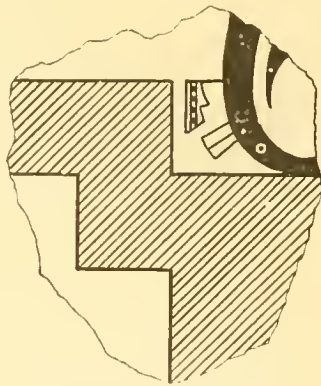


FIG. 514.—Diagonal parallel-line decoration.

tern, composed principally of a series of diagonal or oblique parallel lines *en masse* (see Fig. 514), is called *shu' k'ish pa tsí' nan*, from *shu e*,

splints; *k'ish pai e*, tapering (*k'ish pon ne*, neck or smaller part of anything); and *tsi nan*, mark; that is, "tapering" or "neck-splint mark." Curiously enough, in a bottle-shaped basket as it approaches completion the splints of the tapering part or neck all lean spirally side by side of one another (see Fig. 515), and a term descriptive of this has come

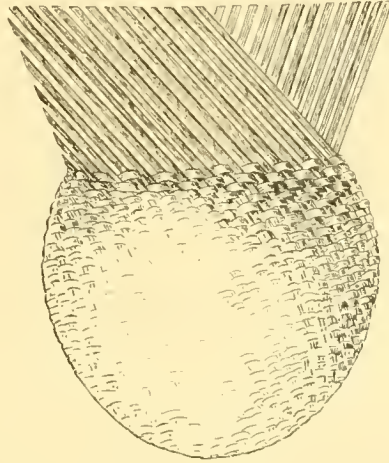


FIG. 515.—Splints at neck of unfinished basket.

to be used as that applied to lines resembling it, instead of a derivative from *ü's sël lai e*, signifying an oblique or leaning line. Where splints variously arranged, or stitches, have given names to decorations—applied even to painted and embroidered designs—it is not difficult for us to see that these same combinations, at first unintentional, must have suggested the forms to which they gave names as decorations.

Pueblo coiled pottery developed from basketry.—Seizing the suggestion afforded by the rude tray-molded parching-bowls, particularly after it was discovered that if well burned they resisted the effects of water as well as of heat, the ancient potter would naturally attempt in time to reproduce the boiling-basket in clay. She would find that to accomplish this she could not use as a mold the inside of the boiling-basket, as she had the inside of the tray, because its neck was smaller than its body. Nor could she form the vase by plastering the clay outside of the vessel, not only for the same reason, but also because the clay in drying would contract so much that it would crack or scale off. Naturally, then, she pursued the process she was accustomed to in the manufacture of the basket-bottle. That is, she formed a thin rope of soft clay, which, like the wisp of the basket, she coiled around and around a center to form the bottom, then spirally upon itself, now widening the diameter of each coil more and more, then contracting as she progressed upward until the desired height and form were attained. As the clay was adhesive, each coil was attached to the one already

formed by pinching or pressing together the connecting edges at short intervals as the winding went on. This produced corrugations or indentations marvelously resembling the stitches of basket-work. Hence accidentally the vessel thus built up appeared so similar to the basket which had served as its model that evidently it did not seem complete until this feature had been heightened by art. At any rate, the ma-

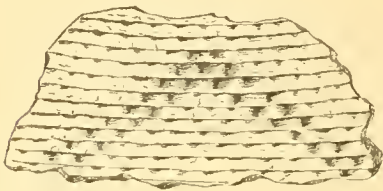


FIG. 516.

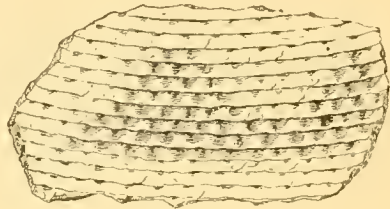


FIG. 517.

Examples of indented decoration on corrugated ware.

majority of specimens belonging to this type of pottery—especially those of the older periods during which it was predominant—are distinguished by an indented or incised decoration exactly reproducing the zigzags, serrations, chevrons, terraces, and other characteristic devices of water-tight basketry. (Compare Figs. 516, 517 with Figs. 507, 508.) Evi-

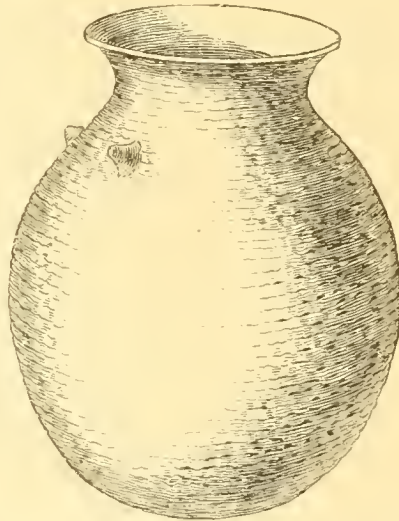


FIG. 518.—Cooking-pot of corrugated ware, showing conical projections near rim.

dently with a like intention two little cone-like projections were attached to the neck near the rim of the vessel (see Fig. 518) which may hence be regarded as survivals of the loops whereby it has been seen the ends of the strap-handle were attached to the boiling-basket. (See again Fig. 503, *a*.) Although varied in later times to form scrolls,

rosettes, and other ornate figures (see Fig. 519), they continued ever after quite faithful features of the spiral type of pot, and may even sometimes be seen on the cooking-vessels of modern Zuñi. To add yet another link to this chain of connection between the coiled boiling-basket and the spirally-built cooking-pot, the names of the two kinds

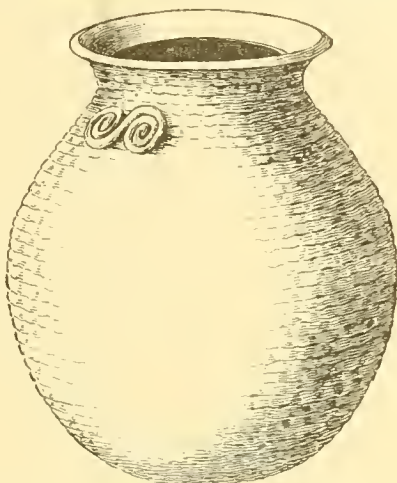


FIG. 519.—Cooking-pot of corrugated ware, showing modified projections near rim.

of vessels may be given. The boiling-basket was known as *wó li a k'ia ní tu li a tom me*, the corrugated cooking pot as *wo li a k'ia te' ní tu li a ton ne*, the former signifying "coiled cooking-basket," the latter "coiled earthenware cooking-basket."

Other very important types of vessels were made in a similar way.

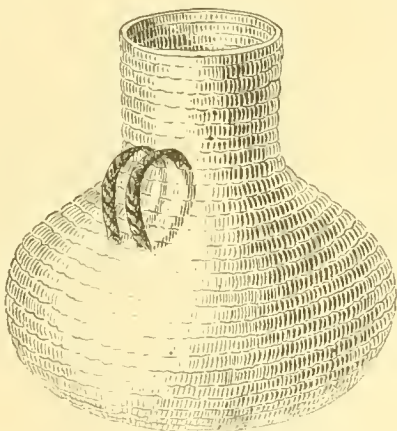


FIG. 520.—Wicker water-bottle, showing double loops for suspension.

I refer especially to canteens and water-bottles. The water-bottle of wicker differed little from the boiling-basket. It was generally rounder-

bodied, longer and narrower necked, and provided at one side near the shoulders or rim with two loops of hair or strong fiber, usually braided. (See Fig. 520.) The ends of the burden-strap passed through these loops made suspension of the vessel easy, or when the latter was used simply as a receptacle, the pair of loops served as a handle. Some-

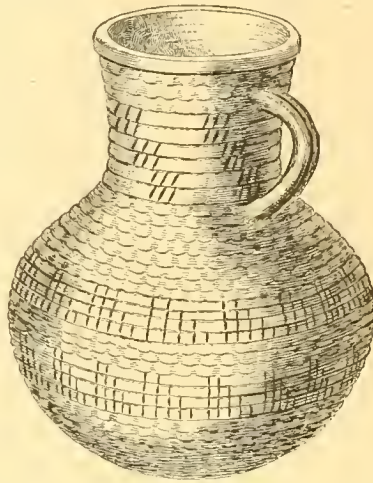


FIG. 521.—Water-bottle of corrugated ware, showing double handle.

times these basket bottles were strengthened at the bottom with rawhide or buckskin, stuck on with gum. When, in the evolution of the piteber, this type of basket was reproduced in clay, not only was the general form preserved, but also the details above described. That is,



FIG. 522.—Water-bottle of corrugated ware, showing plain bottom.

without reference to usefulness—in fact at no small expense of trouble—the handles were almost always made double (see Fig. 521); indeed, often braided, although of clay. Frequently, especially as time went on, the bottoms were left plain, as if to simulate the smooth skin-bottoming of the

basket-bottles. (See Fig. 522.) At first it seems odd that with all these points of similarity the two kinds of water-vessel should have totally dissimilar names; the basket-bottle being known as the *k'íá pu k'ia tom me*, from *k'íá pu k'ia*, "for carrying or placing water in," and *tóm me*; the handled earthen receptacle, as the *í mush ton ne*. Yet when we consider that the latter was designed not for transporting water, for which it was less suited than the former, but for holding it, for which it was even preferable, the discrepancy is explained, since the name *í mush ton ne* is from *í mu*, to sit, and *tóm me*, a tube. This indicates, too, why the basket-bottle was not displaced by the earthen bottle. While the former continued in use for bringing water from a distance, the latter was employed for storing it. As the fragile earthen vessels were much more readily made and less liable to become tainted, they were exclusively used as receptacles, removing the necessity of the tedious manufacture of a large number of the basket-bottles. Again, as the pitcher was thus used exclusively as a receptacle, to be set aside in household or camp, the name *í mush ton ne* sufficed without the interpolation *te*—"earthenware"—to distinguish it as of *terra cotta* instead of osiery.

POTTERY INFLUENCED BY LOCAL MINERALS.

Before discussing the origin of other forms, it may be well to consider briefly some influences, more or less local, which, in addition to the general effect of gourd-forms in suggesting basket-types and of the latter in shaping earthenware, had considerable bearing on the development of ceramic art in the Southwest, pushing it to higher degrees of perfection and diversity in some parts than in others.

Perhaps first in importance among these influences was the mineral character of a locality. Where clay occurred of a fine tough texture, easily mined and manipulated, the work in *terra cotta* became proportionately more elaborate in variety and finer in quality. There are to be found about the sites of some ancient pueblos, potsherds incredibly abundant and indicating great advancement in decorative art, while near others, architecturally similar, even where evidence of ethnic connection is not wanting, only coarse, crudely-molded, and painted fragments are discoverable, and these in limited quantity.

An example in point is the ruined pueblo of *A' wat u i* or *Aguatóbi*, as it was known to the Spaniards at the time of the conquest, when it was the leading "city of the Province of Tusayan," now Moki. Over the entire extent of this ruin, and to a considerable distance around it, fragments of the greatest variety in color, shape, size, and finish of ware occur in abundance. In the immediate neighborhood, however, are extensive, readily accessible formations producing several kinds of

clay and nearly all the color minerals used in the Pueblo potter's art. Yet at the greatest ruin on the upper Colorado Chiquito (in an arm of the valley of which river *A'wat ú i* itself occurs), where the fallen walls betoken equal advancement in the status of the ancient builders and indicate by their vast extent many times the population of *A'wat u i*, the potsherds are coarse, irregular in curvature, badly decayed, and exceptionally scarce. In the immediate neighborhood of this ruin, I need not add, clay is of rare occurrence and poor in quality.

A more reliable example is furnished by the farming pueblos of Zuñi. At *Hé sho ta tsí nan* or Ojo del Pescado, fifteen miles east of Zuñi, clays of several varieties and color minerals are abundant. The finest pottery of the tribe is made there in great quantity, while, notwithstanding the facilities for transportation which the Zuñis now possess, at the opposite farming town of *K'íáp kwai na kwín;* or Los Ojos Calientes, where clay is scarce and of poor texture, the pottery, although somewhat abundant, is of miserable quality and of bad shape.

In quality of art quite as much as in that of material this local influence was great. In the neighborhood of ruined pueblos which occur near mineral deposits furnishing a great variety of pigment-material, the decoration of the ceramic remains is so surprisingly and universally elaborate, beautiful, and varied as to lead the observer to regard the people who dwelt there as different from the people who had inhabited towns about the sites of which the sherds show not only meager skill and less profuse decorative variety, but almost typical dissimilarity. Yet tradition and analogy, even history in rare instances, may declare that the inhabitants of both sections were of common derivation, if not closely related and contemporaneous. Probably, at no one point in the Southwest was ceramic decoration carried to a higher degree of development than at *A'wat u i*, yet the Oraibes, by descent the modern representatives of the *A'wat u i* ans are the poorest potters and painters among the Mokis. Near their pueblo the clay and other mineral deposits mentioned as abundant at *A'wat u i* are meager and inaccessible. Still, it may be urged that time may have introduced other than natural causes for change; this could not be said of another example pertaining to one period and a single tribe. I refer again to the Zuñis. The manufactures of Pescado probably surpass in decorative excellence all other modern Pueblo pottery, while both in their lack of variety and in delicacy of execution of their painted patterns the fictiles of Ojo Caliente are so inferior and diverse from the other Zuñi work that the future archæologist will have need to beware, or (judging alone from the ceramic remains which he finds at the two pueblos) he will attribute them at least to distinct periods, perhaps to diverse peoples.

POTTERY INFLUENCED BY MATERIALS AND METHODS USED IN BURNING.

Other influences, to a less extent local, had no inconsiderable effect on primitive Pueblo pottery: materials employed and methods resorted to in burning.

Only one kind of fuel, except for a single class of vessels, is now used in pottery-firing; namely, dried cakes or slabs of sheep-dung. Anciently, several varieties, such as extremely dry sage-brush or grease-wood, piñon and other resinous woods, dung of herbivora when obtainable, charcoal, and also bituminous or cannel-coal were employed. The principal agent seems, however, to have been dead-wood or spunk, pulverized and moistened with some adhesive mixture so that flat cakes could be formed of it. I infer this not alone from Zuñi tradition, which is not ample, but from the fact that the sheep-dung now used is called, in the condition of fuel, *kú ne a*, while its name in the abstract or as sheep-dung simply is *mú he*. Dry-rot wood or spunk is known as *kú me*. In the shape of flat cakes it would be termed *kú mo we* or *kú me a*, whence I doubt not the modern word *kú ne a* is derived.

Of methods, four were in vogue. The simplest and worst consisted in burying the vessel to be burned under hot ashes and building a fire around it, or inverting it over a bed of embers and encircling it with a blazing fire of brush-wood, as is still the practice of the Maricopas and other sedentary tribes of the Gila. The most common was building a little cone or dome of fuel over the articles to be baked and firing; the most perfect was to dig or construct under ground a little cist or kiln, line it evenly with fuel, leaving a central space for the green ware, and slowly fire the whole mass.

Irrespective of the kind of fuel used, the baking by ash-burial made the ware gray, cloudy, or dingy, and not very durable. Pottery burned with sage or grease-wood was firm, light gray unless of ochreous clay, less cloudy than if ash-baked, yet mottled. Turf and dung, although easily managed, did not thoroughly harden the pottery, but burned it very evenly; dead wood or spunk-cakes baked as evenly as any of the materials thus far mentioned, and more thoroughly than the others. Resinous or pitchy woods, while they produced a much higher degree of heat, could be used only when color was unimportant, as they still are used to some extent in the firing of black-ware or cooking pots. The latter, while still hot from a preliminary burning, if coated externally with the mucilaginous juice of green cactus, internally with piñon gum or pitch, and fired a second or even a third time with resinous wood-fuel, are rendered absolutely fire-proof, semi-glazed with a black gloss inside, and wonderfully durable. Tradition represents that by far the most perfect fuel was found to be cannel coal, and that, where abundant, accessible, and of an extremely bituminous quality, it was much used.

The traces of little pit-kilns filled with cinders of mineral coal about many of the ruins in the northwestern portion of the Pueblo region, coupled with the semi-fusion and well-preserved condition of most of the ancient jars found associated with them, certainly give support to this tradition. Happily I have additional confirmation. When, two years ago, I was engaged in making ethnologic collections at Moki for the United States National Museum, some Indians of the *Te wa* pueblo brought me a quantity of pottery. It had been made with the purpose of deceiving me, in careful imitation of ancient types, and was certainly equal to the latter in lightness and the condition of the burning. I paid these enterprising Indians as good a price as they had been accustomed to getting for genuine ancient specimens, but told them that, being a Zuñi, I was almost one of themselves, hence they could not deceive me, and asked them how they had so cleverly succeeded in burning the ware. They laughingly replied that they had simply dug some bituminous coal (*u á ko*) and used it in little pits. When I further asked them why they did not burn their household utensils thus, they said it was too uncertain; representing that the pots did not like to be burned in the *u á ko*, probably because it was so hot, hence they broke more frequently than if fired in the common way with dried sheep-dung; furthermore the latter was less troublesome, requiring only to be dug from the corrals near at hand and dried to make it ready for use.

This partially explains why the art of water-tight basket-making has here gradually declined since the Spanish conquest, as the ceramic industry has increased with the introduction of the sheep, which furnishes fuel for the burning, and the horse, before unknown, has facilitated transportation, whereby trade for this class of basketry with the distant nomadic tribes who still make it is rendered easy. Withal, however, the quality of pottery has not improved, but has deteriorated; as sheep-dung is but an inferior fuel for firing.

EVOLUTION OF FORMS.

Bearing these statements in mind, the discussion of the evolution as well as of the distribution of form, and later of the evolution of decoration, in pottery will become easier. By lingering steps there was early developed a method of building up vessels by a process differing in part from the spiral. As the parching-bowl had been evolved from the roasting-tray, so, we may infer, the food-bowl was suggested by the hemispherical food-trencher of wicker-work. (See Fig. 523.) Yet, curiously

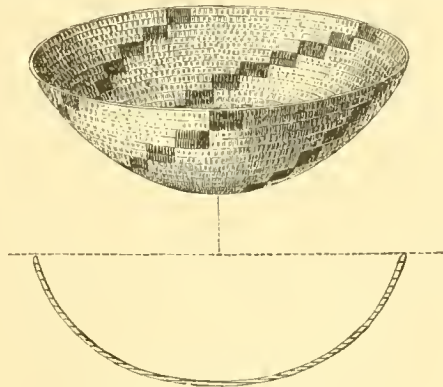


FIG. 523.—Food trencher of wicker-work.

enough, the inside of the latter seems not at first to have been used in molding the food-bowl, as, it will be remembered, the tray had been in forming the parching-pan. On the contrary, the clay was coiled around

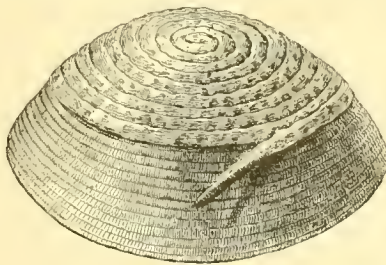


FIG. 524—Food trencher of wicker-work inverted as used in forming food-bowls of earthenware.

and around the *outside* of the bottom of an inverted basket bowl (see Fig. 524), instead of being pressed evenly into it. As with the cooking pot, so with this; as the coiling progressed it was corrugated, not so much,

however from necessity, as from habit. In consequence of the difficulty experienced in removing these bowl-forms from the bottoms of the baskets—which had to be done while they were still plastic, to keep them from cracking—they were made very shallow. Hence the specimens found among the older ruins and graves are not only corrugated outside, but are also very wide in proportion to their height. (See Fig. 525.) As time went on it was found that bowls might be made deeper,

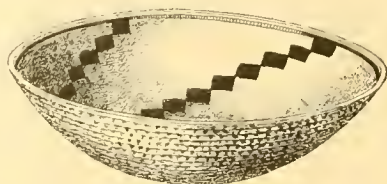


FIG. 525.—Ancient bowl of corrugated ware.

and yet readily be taken off from the basket bottoms, if slightly moistened outside and pressed evenly all around, or, better still, scraped; for, being plastic, this proceeding caused them to grow thinner, consequently larger, thereby to loosen from the basket over which they had been molded. As a result of this scraping, however, the corrugated surface was destroyed, nor could it easily be restored. Therefore bowls when made deep were, as a rule, smooth on the outside as well as on the interior surface. When by a perfectly natural sequence of events—as will be shown further on—ornamentation by painting came to be applied first to the plain interiors of the bowls, the smooth outer surface was found preferable to the corrugated surface, not only because it took paint more readily, but also because the bowl, when painted outside as well as inside, formed a far handsomer utensil for household use than if simply decorated by the older methods. As a consequence, we find that, while the larger vessels continued to be corrugated and indented, the smoothed and painted bowl came into general use. Associated later on with this secondary type of bowls occurred the larger vessels plain at the bottoms, still corrugated at the sides. Nor is this surprising, as the bowl, molded on the basket bottom and there smoothed, could be afterward built up by the spiral process. When in time the huge hemispherical eanteens or water carriers of earthen-ware replaced the basket bottles, so also the water jar or *olla* replaced the handled sifter or pitcher, since it could be made larger to receive more copious supplies of water than the strength of the trail handles on the pitchers would warrant.

The water jar, like the food-bowl, is a conspicuous household article; for which reason the Zuñi woman expends all her ability to render them handsome. Judging by this, the desire to decorate the water-vessel with paint, like its constant companion the food-bowl, would early lead to the attempt to make its surface smooth. This would need to be effected while the article was still soft; which necessity probably led to the discovery that a jar of the corrugated or simply coiled type may be

smoothed while still plastic without danger of distortion, no matter what its size, if supported at the bottom in a basket or other mold so that it may be shifted or turned about without direct handling. (See Fig. 526.)



FIG. 526.—Basket-bowl as base-mold for large vessels.

After this discovery was made, the molding of large vessels was no longer accomplished by the spiral method exclusively. A lump of clay,

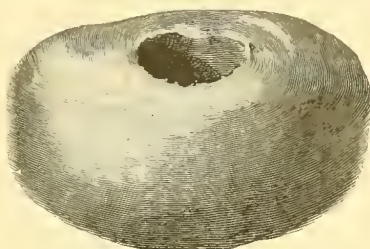


FIG. 527.—Clay nucleus for a vessel.

hollowed out (see Fig. 527), was shaped how rudely so ever on the bottom of the basket or in the hand (see Fig. 528), then placed inside of a

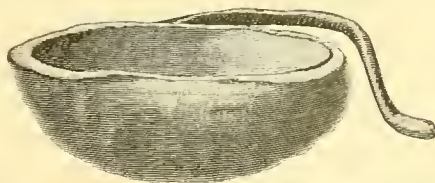


FIG. 528.—Clay nucleus shaped to form the base of a vessel.

nemispherical basket-bowl and stroked until pressed outward to conform with the shape, and to project a little above the edges of its tem-

porary mold, whence it was built up spirally (see Fig. 529) until the desired form had been attained, after which it was smoothed by scraping (see Fig. 530).

The necks and apertures of these earliest forms of the water jar were made very small in proportion to their other dimensions, presumably on account of the necessity of often carrying them full of water over steep and rough *mesa* paths, coupled perhaps with the imitation of

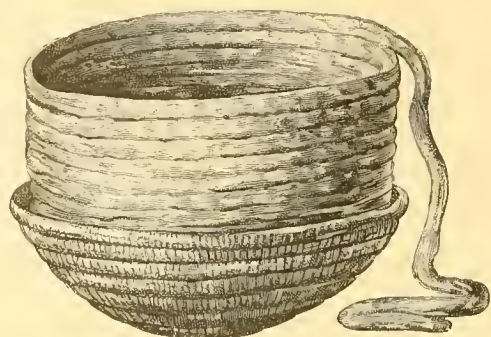


FIG. 529.—Clay nucleus in base-mold, with beginning of spiral building.

other forms. To render them as light as possible they were also made very thin. One of the consequences of all this was that when large they could not be stroked inside, as the shoulders or uttermost upper peripheries of the vessel could not be reached with the hand or scraper through the small openings. The effect of the pressure exerted in smoothing them on the outside, therefore, naturally caused the upper parts to



FIG. 530.—First form of vessel.

sink down, generating the spheroidal shape of the jar (see Fig. 531), one of the most beautiful types of the olla ever known to the Pueblos. At Zuñi, wishing to have an ancient jar of this form which I had seen, reproduced, I showed a drawing of it to a woman expert in the manufacture of pottery. Without any instructions from me beyond a mere statement of my wishes, she proceeded at once to sprinkle the inside of

a basket-bowl with sand, managing the clay in a way above described and continuing the vessel-shaping upward by spiral building. She did not at first make the shoulders low or sloping, but rounded or arched

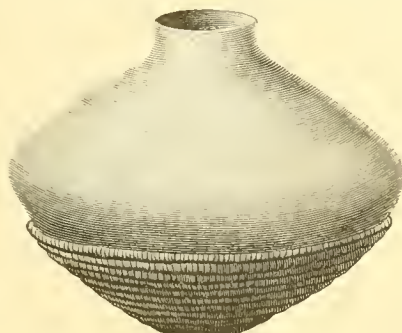


FIG. 531.—Secondary form in the mold.

them upward and outward (see again Fig. 529). At this I remonstrated, but she gave no heed other than to ejaculate "*wá na ní, ànú!*" which meant "just wait, will you!" When she had finished the rim, she easily caused the shoulders to sink, simply by stroking them—more where uneven than elsewhere—with a wet scraper of gourd (see Fig. 532, *a*) until



FIG. 532.—Scrapers of gourd and earthenware for smoothing pottery.

she had exactly reproduced the form of the drawing. She then set the vessel aside *in* the basket. Within two days it shrank by drying at the rate of about one inch in twelve, leaving the basket far too large. (See Fig. 533.) It could hence be removed without the slightest difficulty.

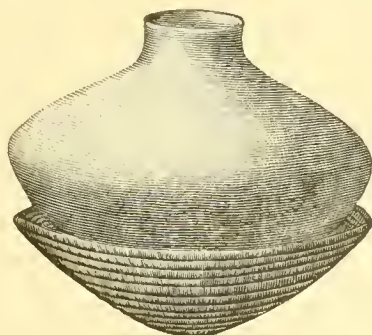


FIG. 533.—Finished form of vessel in mold, showing amount of contraction in drying.

The sand had prevented contact with the basket which would have caused the clay vessel to crack as the latter was very thin. This process

exists in full force to-day with the Oraibes in the modeling of convex-bottomed vessels, and the Zuñis thus make their large bowls and huge drum-jars.

Upon the bottoms of many jars of these forms, I have observed the impressions of the wicker bowls in which they had been molded—not entirely to be removed, it seems, by the most assiduous smoothing before burning; for, however smooth any exceptional specimen may appear, a squeeze in plaster will still reveal traces of these impressions.

A characteristic of these older forms of the water-jar is that they are invariably flat or round-bottomed, while more recent and all modern



FIG. 534.—Profile of olla, or modern water-jug.

types of the olla (see Fig. 534) are concave or hollowed at the base (see Fig. 535) to facilitate balancing on the head. Outside of this concavity and entirely surrounding it (Fig. 536, *a*) is often to be observed an indentation (see Fig. 536, *b*) usually slight although sometimes pronounced.

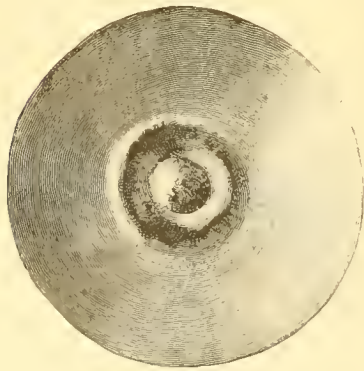


FIG. 535.—Base of olla.

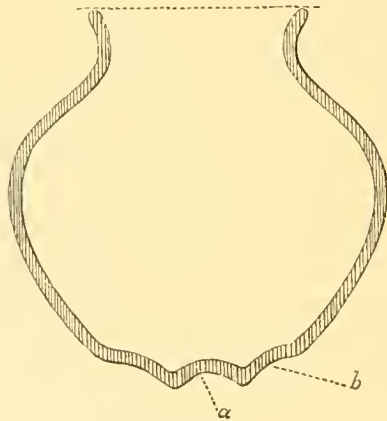


FIG. 536.—Section of olla.

This has no use, but there is of course a reason for its occurrence which, if investigated, may throw light on the origin of the modern type of the

olla itself. The older or round-bottomed jars were balanced on the head in carrying, by means of a wicker-work ring, a kind of "milk-maid's boss." (See Fig. 537.) These annular mats are still found among the ruins and cave-deposits, and continue in use with the modern Pueblos for

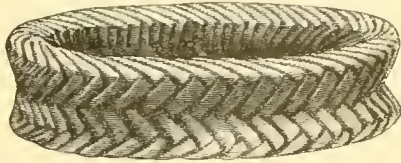


FIG. 537.—Annular mat of wicker, or "milkmaid's boss."

supporting convex bottom cooking pots on the floor as well as for facilitating the balancing of large food-bowls on the head. (See Fig. 538.) Obviously the latter dishes have never been hollowed as the ollas have been, because, since they were used as eating-bowls, the food could be removed from a plain bottom more easily than from a convex surface, which would result from the hollowing underneath. Supposing that a



FIG. 538.—Use of annular mat illustrated.

water-jar chanced to be modeled in one of the convex-bottom bread-baskets (see Fig. 539), it would become necessary, on account of the thickness of these wicker bowls, to remove the form from the mold before it dried. By absorption it would dry so rapidly that it would crack, especially in contracting against the convexity in the center of the basket-bottom. (See Fig. 539, *a*.) In order that this form might be supported in an upright position until dry, it would naturally be placed on one of the wicker-rings. Moreover, that the bottom might not sink down or fall out, a wad of some soft substance would be placed within the ring. (See Fig 540, *a*.) As a consequence the weight of the plastic vessel would press the still soft bottom against the central wad, (Fig. 540, *a*) and the

wicker ring (Fig 540, *c*) sufficiently to cause the rounding upward of the cavity (Fig. 540, *b*) first made by the convex-bottom of the basket-mold, as well as form the encircling indentation (Fig. 540, *e*). Thus by accident, probably, only possibly by intention, was evolved the most useful and distinctive feature of the modern water-jar or olla, the *concave bottom*. This, once produced, would be held to be peculiarly con-

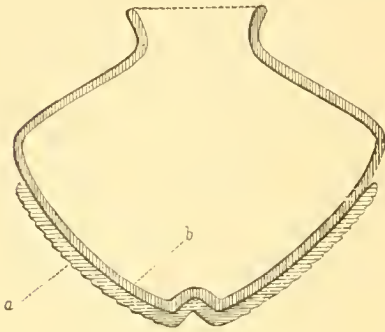


FIG. 539.—Section of incipient vessel in basket-mold.

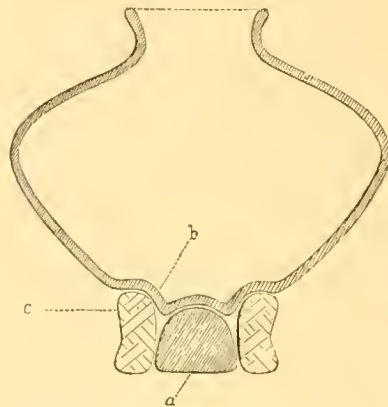


FIG. 540.—Section of vessel supported for drying.

venient, dispensing with the use of a troublesome auxiliary. Its reproduction would present grave difficulties unless the bottom of the first vessel, thickly coated with sand to prevent cracking, was employed as a mold, instead of the absorbent convex-centered basket-bowl.

I infer this because, to-day, a Zuñi woman is quite at a loss how to hollow the bottom of a water-jar if she does not possess a form or mold made from the base of some previously broken jar of the same type. She therefore, carefully preserves these precious bottoms of her broken ollas, even cementing together fractured ones, when not too badly shattered, with a mixture of pitch or mineral asphaltum and sand. I



FIG. 541.—Base-mold (bottom of water-jar).

have seen as many as a dozen or more of these molds (see Fig. 541) in a single store room.

As the practice of molding all new vessels of this class in the bottoms of older ones was general—I might say invariable—any peculiarities of form in the originals must have been communicated to those ensuing; from the latter to others, and so on, though in less and less

degree, to the present time. This theory is but tentative, yet it would also explain, on the score of association, why the Pueblo women slightly prefer the jars showing the indentation in question to more regular ones. With the change from elevated cliff or *mesa* habitations to more accessible ones, the Pueblo Indians were enabled to enlarge the apertures of their water-jars, since not only did the concave bases of the latter make the balancing of them more secure, but the trails over which they had to be carried from watering place to habitation were less rugged. A natural result of this enlargement of the openings, which admitted access with the scraper to the interior peripheries of the thin-walled jars, was the rounding upward of their shoulders, making them taller in proportion to their diameters. This modification of form in the water-jar, taken in connection with the fact that thus changed, it displaced the daily use of the cauteen, explains the totally dissimilar names which were applied to the two types. The older, or spheroidal olla, was known as the *k'íáp ton ne*, from *kiá pu*, to place or carry water in, and *tóm ne*; while the newer olla is called *k'íá wih na k'ia té èle*, from *k'íá wih na k'ia na k'ia*, for bringing of water: *té*, earthen-ware, and *è' le* or *è' lai e*, to stand or standing. The latter term, *té è le*, is generic, being applied to nearly all *terra cotta* vessels which are taller than they are broad. *Té*, earthen ware, is derived from *t'eh'*, the root also of *té ne a*, to resound, to sound hollow; while *è le*, from *è' le* or *è' lai è*, to stand, is obviously applied in significance of comparative height as well as of function.

Thus I have thrown together a few conjectures and suggestions relative to the origin of the Southwestern pottery and the evolution of its principal forms.

EVOLUTION OF DECORATION.

I might go on, appealing to language to account for nearly every variety of pottery found existing as a *type* throughout the region referred to; but a subject inseparably connected with this, throwing light on it in many ways, and possessing in itself great interest, claims treatment on the few remaining pages of this essay. I refer to the evolution and significance or symbolism of Pueblo ceramic decorations.

Before proceeding with this, however, I must acknowledge that I am as much indebted to the teachings of Mr. E. B. Tylor, in his remarkable works on *Man's Early History and Primitive Culture*, to Lubbock, Daniel Wilson, Evans, and others, for the direction or *impetus* of these inquiries, as I am to my own observations and experiments for its development.

The line of gradual development in ceramic decorations, especially of the symbolic element, treated as a subject, is wider in its applicability to the study of primitive man, because more clearly illustrative of the growth of culture. I regret, therefore, that it must here be dealt with only in a most cursory manner. Large collections for illustration would be essential to a fuller treatment, even were space unlimited.

Decoratively, Pueblo pottery is characterized by two marked features: angular designs predominate and ornamental effect depends as much

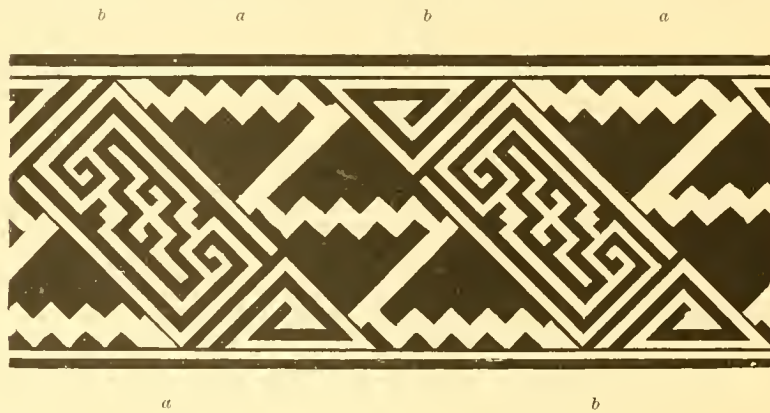


FIG. 542.—Example of Pueblo painted ornamentation.

on the open or undecorated space as on the painted lines and areas in the devices. (See Fig. 542.) While this is true of recent and modern wares, it is more and more notably the case with other specimens in a ratio increasing in proportion to their antiquity.

We cannot explain these characteristics, and the conventional aspect of the higher and symbolic Pueblo ceramic decorations which grew out of them, in a better way than to suppose them, like the forms of this pottery, to be the survivals of the influence of basketry. (See, for comparison, Figs. 543, 544.) I shall be pardoned, therefore, for elaborating

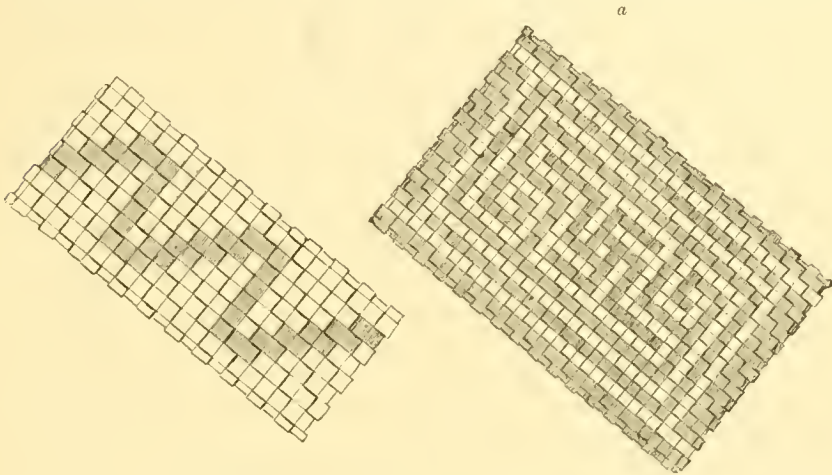


FIG. 543.

FIG. 544.

Amazonian basket decorations.

suggestions already made in this direction, in the paragraphs which treated of the ornamentation of spiral ware, and of the derivation of basket decorations from stitch- and splint-suggested figures. All students of early man understand his tendency to reproduce habitual forms in accustomed association. This feeling, exaggerated with savages by a belief in the actual relationship of resemblance, is shown in the reproduction of the decorations of basket vessels on the clay vessels made from them or in imitation of them.

In entire conformity with this, the succession in the methods of the ornamentation of Pueblo pottery seems to have been first by incision or indentation; then by relief; afterward by painting in black on a natural or light surface; finally, by painting in color on a white or colored surface.

As before suggested, the patterns on the coiled, regularly indented pottery (which came to be first known to the world as a type, the "corrugated," through the earlier explorations and reports of Mr. William H. Holmes) were produced simply by emphasized indentation, more rarely by incision, and were almost invariably angular, reproducing exactly the designs on wicker work. Even in comparatively recent examples of the corrugated ware this is true; for, once connected with a type, a style of decoration, both seem to have been ever after inseparable, with at most but slight modification of the latter. One of these modifications, in both method and effect, was in the adoption of the raised or

relief style of ornamentation found, with rare exceptions in the Southwest, only on corrugated ware, and on the class which in modern times has replaced it there, vessels used in cookery. Although never universal, this style deserves passing attention as the outgrowth of an effort to attain the effect of contrast produced by dyed or painted splints on wicker work before the use of paint was known in connection with pottery. The same kind of investigation indicates that the Pueblos largely owed their textile industries and designs, as well as their potter's art, to the necessity which gave rise to the making of water-tight basketry. The terms connected with the rudimentary processes of weaving and embroidery, and the principal patterns of both (on, for example, blankets, kirtles, sacred girdles, and women's belts), are mostly susceptible of interpretation, like the terms in pottery, as having a meaning connected with the processes of basket plaiting and painting. This renders the conventional character of Pueblo textile ornaments easy of comprehension, as well as the very early, if not the earliest, origin of loom-weaving among our Indians in the desert regions of America.

Henceforward, then, we have only to consider decoration by painting. The probability is that this began as soon as the smooth surface in pottery was generally made; evidence of which seemingly exists; as eating bowls are, even to the present day, decorated principally on the interior; not, as may be supposed, because the exterior is more hidden from view, but because, as we have seen on a former page, bowls were made plain inside before the corrugated type formed on basket bottoms had been displaced by the smoothed type; and were naturally first decorated there with paint. It must be constantly borne in mind that a style of decoration once coupled with a kind of ware, or even a portion of a vessel, retained its association permanently.

It must have been early observed that clay of one kind, applied even thinly to the exterior of a vessel of another kind, produced, when burned, a different color. With the discovery that clays of different kinds burned in a variety of colors, to some extent irrespective of the methods and the materials used in firing, there must likewise have been hinted, we may safely conclude, the efficacy of clay washes as paint, and of paint as a decorative agent.

Among the ceramic remains from the oldest pueblo sites of the Southwest, pottery occurs, mostly in four varieties: the corrugated or spiral; the plain, yet rough gray; white decorated with geometric figures in black; and red, either plain or decorated with geometric devices in black and white. The gray or dingy brown, rough variety, resulted when a corrugated or coiled jar had been simply smoothed with the fingers and scraper before it was fired. A step in advance, easily and soon taken, was the additional smoothing of the vessel by slightly wetting and rubbing its outer surface. Even this was productive only of a moderately smooth surface, since, as learned by the Indian potters long before, in their experience with the clay-plastered parching-tray,

it was necessary to mix the clay of vessels with a tempering of sand, crushed potsherds, or the like, to prevent it from cracking while drying; this, of course, no amount of rubbing would remove. Hence, by another easy step, clay unmixed with a grit-tempering, made into a thin paste with water, and thickly applied to the half-dried jar with a dab or brush of soft fiber, gave a beautifully smooth surface, especially if polished afterward by rubbing with water-worn pebbles. The vessel thus prepared, when burned, assumed invariably a creamy, pure white, red-brown or, other color, according to the quality or kind of the clay used in making the paste with which it had been smoothed or washed.

Thus was achieved the art of producing at will fictiles of different colors, with which simple suggestion painting also became easy. Black, aside from clay paste, was almost the first pigment discovered; quite likely because the mineral blacks from iron ores, coal, and the various rocks used universally among Indians for staining splints, etc., would be the earliest tried, and then adopted, as they remained unchanged by firing. Thus it came about, as evidenced by the sequence of early remains in the Southwest, that the white and black varieties of pottery were the first made, then the red and black, and later the red with white and black decoration. Take, as an example, the latter. Of course it was a simple mode to employ the red (ocherous) clay for the wash, the blue clay (which burned white) for the white pigment in making lines, and any of the black minerals above mentioned for other marking.

In these earliest kinds of painted pottery the angular decorations of the corrugated ware or of basketry were repeated, or at the farthest only elaborated, although on some specimens the suggestions of the curved ornament already occurred. These resulted, I may not fear to claim, from carelessness or awkwardness in drawing, for instance, the corners of acute angles, which "cutting across-lot" would, it may be seen, produce the wavy or meandering line from the zigzag, the ellipsoid from the rectangle, and so on.

Precisely in accordance with this theory were the studies of my preceptor, the lamented Prof. Charles Fred. Hartt. In a paper "On Evolution in Ornament," published in several periodicals, among them the *Popular Science Monthly* of January, 1875, this gifted naturalist illustrated his studies by actual examples found on decorated burial urns from Marajó Island. I must take the liberty of suggesting, however, that upon some antecedent kind of vessel, the eyes of the Amazonian Islanders may have been, to give Professor Hartt's idea, "trained to take physiological and aesthetic delight in regularly recurring lines and dots"; not on the pottery itself, as he seemed to think, for decoration was old in basketry and the textiles when pottery was first made.

DECORATIVE SYMBOLISM.

On every class of food- and water-vessels, in collections of both ancient and modern Pueblo pottery (except, it is important to note, on pitchers and some sacred receptacles), it may be observed as a singular, yet almost constant feature, that encircling lines, often even ornamental

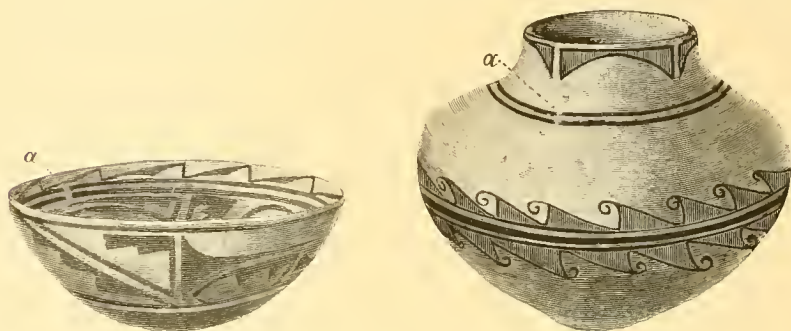


FIG. 545.—Food-bowl.

FIG. 546.—Water-jar.

(Showing open or unjoined space in line near rim.)

zones, are left open or not as it were closed at the ends. (See Figs. 545,*a*, 546,*a*.) This is clearly a conventional quality and seemingly of intentional significance. An explanation must be sought in various directions, and once found will be useful in guiding to an understanding of the symbolic element in Pueblo ceramic art. I asked the Indian women, when I saw them making these little spaces with great care, why they took so much pains to leave them open. They replied that to close them was *a'k ta ni*, "fearful!"—that this little space through the line or zone on a vessel was the "exit trail of life or being", *o' ne yäthl kwäi na*, and this was all. How it came to be first left open and why regarded as the "exit trail," they could not tell. If one studies the mythology of this people and their ways of thinking, then watches them closely, he will, however, get other clews. When a woman has made a vessel, dried, polished, and painted it, she will tell you with an air of relief that it is a "Made Being." Her statement is confirmed as a sort of article of faith, when you observe that as she places the vessel in the kiln, she also places in and beside it food. Evidently she vaguely gives something about the vessel a personal existence. The question arises how did these people come to regard food-receptacles or water-receptacles as possessed of or accompanied by conscious existences. I have found that the Zuñi argues actual and essential relationship from simi-

larity in the appearance, function, or other attributes of even generically diverse things.²

I here allude to this mental bias because it has both influenced the decoration of pottery and has been itself influenced by it. In the first place, the noise made by a pot when struck or when simmering on the fire is supposed to be the voice of its associated being. The clang of a pot when it breaks or suddenly cracks in burning is the cry of this being as it escapes or separates from the vessel. That it has departed is argued from the fact that the vase when cracked or fragmentary never resounds as it did when whole. This vague existence never cries out violently unprovoked; but it is supposed to acquire the power of doing so by imitation; hence, no one sings, whistles, or makes other strange or musical sounds resembling those of earthenware under the circumstances above described during the smoothing, polishing, painting, or other processes of finishing. The being thus incited, they think, would surely strive to come out, and would break the vessel in so doing. In this we find a partial explanation of the native belief that a pot is accompanied by a conscious existence. The rest of the solution of this problem in belief is involved in the native philosophy and worship of water. Water contains the source of continued life. The vessel holds the water; the source of life *accompanies* the water, hence its dwelling place is in the vessel with the water. Finally, the vessel is supposed to contain the treasured source, irrespective of the water—as do wells and springs, or even the places where they have been. If the encircling lines inside of the eating bowl, *outside* of the water jar, were closed, there would be no exit trail for this invisible source of life or for its influence or breath. Yet, why, it may be asked, must the source of life or its influence be provided with a trail by which to pass out from the vessel? In reply to this I will submit two considerations. It has been stated that on the earliest Southwestern potteries decoration was effected by incised or raised ornamentation. Any one who has often attempted to make vessels according to primitive methods as I have found how difficult it is to smoothly join a line incised around a still soft clay pot, and that this difficulty is even greater when the ornamental band is laid on in relief. It would be a natural outgrowth of this predicament to leave the ends unjoined, which indeed the savage often did. When paint instead of incision or relief came to be the decorative agent, the lines or bands would be left unjoined in imitation. As those acquainted with Tylor's "Early History" will realize, a "myth of observation" like the above would come to be assigned in after ages.

² I would refer those who may wish to find this characteristic more fully set forth, to the introductory pages of my essay on Zuñi Fetiches, published in the second volume of Contributions to North American Ethnology by the Bureau of Ethnology; also to a paper read before the American Academy of Sciences on the Relations to one another of the Zuñi Mythologic and Sociologic Systems, published, I regret to say, without my revision, in the Popular Science Monthly, for July, 1882.

This may or may not be true of the case in question ; for, as before observed, some classes of sacred receptacles, as well as the most ancient painted bowls, are not characterized by the unjoined lines. Whether true or not, it is an insufficient solution of the problem.

It is natural for the Pueblo to consider water as the prime source of life, or as accompanied by it, for without the presence of living water very few things grow in his desert land. During many a drought chronicled in his oral annals, plants, animals, and men have died as of a contagious scourge. Naturally, therefore, he has come to regard water as the milk of adults, to speak of it as such, and as the all-sufficient nourishment which the earth (in his conception of it as the mother of men) yields. In the times when his was a race of cliff and mesa dwellers, the most common vessel appertaining to his daily life was the flat-bellied canteen or water carrier. (See Fig. 547.) This was suspended by a band across the

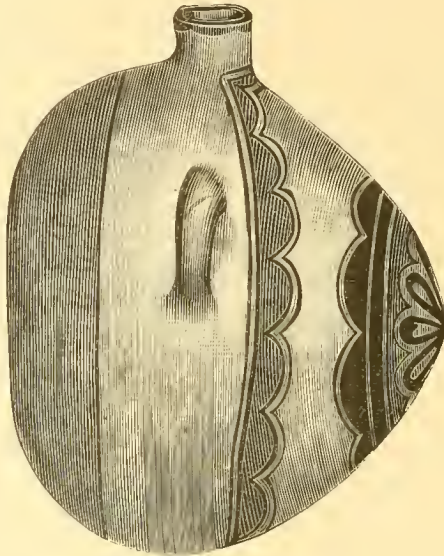


FIG. 547.—Conical or flat-bellied canteen.

forehead, so as to hang against the back, thus leaving the hands as well as the feet free for assistance in climbing. It now survives only for use on long journeys or at camps distant from water. The original suggestion of its form seems to have been that of the human mammary gland, or perhaps its peculiar form may have suggested a relationship between the two. (Compare Figs. 548, 549.) At any rate, its name in Zuñi is *me' he ton ne*, while *me' ha na* is the name of the human mammary gland. *Me' he ton ne* is from *me' ha na*, mamma, *e' ton nai e*, containing within, and *to'm me*. From *me' ha na* comes *wo' ha na*, hanging or placed against anything, obviously because the mammaries hang or are placed against the breast ; or, possibly, *me' ha na* may be derived

from *uó ha na* by a reversal of reasoning, which view does not affect the argument in question. It is probable that the *me' he ton* was at first left open at the apex (Fig. 549, *a*) instead of at the top (Fig. 549, *b*); but, being found liable to leak when furnished with the aperture so low, this was closed. A surviving superstition inclines me to this view. When a Zuñi woman has completed the *me' he ton* nearly to the apex, by the coiling-process, and before she has inserted the nozzle (Fig. 549, *b*), she prepares a little wedge of clay, and, as she closes the apex with it, she turns her eyes away. If you ask her why she does this, she will tell you that it is *a'k ta ni* (fearful) to look at the vessel while closing it at this



FIG. 548.

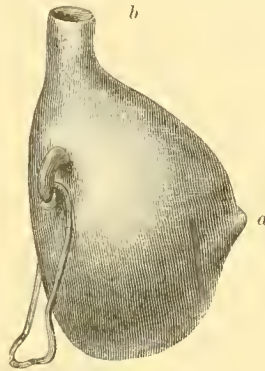


FIG. 549.

Conical canteen compared with human mammary gland.

point; that, if she look at it during this operation, she will be liable to become barren; or that, if children be born to her, they will die during infancy; or that she may be stricken with blindness; or those who drink from the vessel will be afflicted with disease and wasting away! My impression is that, reasoning from analogy (which with these people means actual relationship or connection, it will be remembered), the Zuñi woman supposes that by closing the apex of this *artificial* mamma she closes the exit-way for the "source of life;" further, that the woman who closes this exit-way knowingly (in her own sight, that is) voluntarily closes the exit-way for the source of life in her *own* mamma; further still, that for this reason the privilege of bearing infants may be taken away from her, or at any rate (experience showing the fallacy of this philosophy) she deserves the loss of the sense (sight) which enabled her to "*knowingly*" close the exit-way of the source of life.

By that tenacity of conservative reasoning which is a marked mental characteristic of the sedentary Pueblo, other types of the canteen, of later origin, not only retained the name-root of this primeval form, but also its attributed functions. For example, the *me' wi k'i lik ton ne* (See Fig. 550) is named thus from *me we*, mammaries, *i k'i lik to'è e'*, joined together by a neck, and *to'm me*.

Now, when closing the ends (Fig. 550, *c, c*) of this curious vessel in molding it, the women are as careful to turn the eyes away as in closing the apex of the older form. As the resemblance of either of the ends of this vessel to the mamma is not striking, they place on either side of the nozzle a pair of little conical projections, resembling the teats, and so called. (Fig. 550, *b*.) There are four of these, instead of, as we might reasonably expect, two. The reason for this seems to be that the *me' wi ki lik ton ne* is the canteen designed for use by the hunter in preference to all other vessels, because it may be easily wrapped in a blanket and tied to the back. Other forms would not do, as the hunter must have the free use not only of his hands but also of his head, that he may turn quickly this way or that in looking for or watching game. The proper nourishment of the hunter is the game he kills; hence, the source of his life, like that of the young of this game, is symbolized in the canteen by the mammaries, not of human beings, but of game-animals. A feature in these canteens dependent upon all this brings us nearer to an understanding of the question under discussion. When

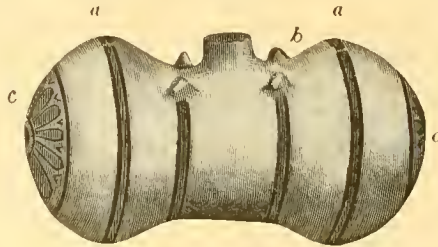


FIG. 550.—Double lobed or hunter canteen.

ornamental bands are painted around either end of the neck of one of them (Fig. 550, *b*), they are interrupted at the little projections (Fig. 550, *b*). Indeed, I have observed specimens on which these lines, if placed farther out, were interrupted at the top (Fig. 550, *a a*) opposite the little projections. So, by analogy, it would seem the Pueblos came to regard paint, like clay, a barrier to the exit of the source of life. This idea of the source of life once associated with the canteen would readily become connected with the water-jar, which, if not the offspring of the canteen, at least usurped its place in the household economy of these people. From the water-jar it would pass naturally to drinking-vessels and eating-bowls, explaining the absence of the interrupted lines on the oldest of these and their constant occurrence on recent and modern examples; for the painted lines being left open at the apexes, or near the projections on the canteens, they should also be unjoined on other vessels with which the same ideas were associated.

So, also, it will be observed that in paintings of animals there is not only a line drawn from the mouth to the plainly depicted heart, but a

little space is left down the center or either side of this line (see Figs. 551, 552), which is called the *o ne yäthl kica' to na*, or the "entrance trail" (of the source or breath of life).



FIG. 551.—Painting of deer.



FIG. 552.—Painting of sea-serpent.

By this long and involved examination of *one* element in the symbolism of Pueblo ceramic decoration, we gain some idea how many others not quite so striking, yet equally curious, grew up; how, also, they might be explained. Their investigation, however, would be attended with such intricate studies, involving so many subjects not at sight related to the one in hand, that I must hasten to present two other points.

Much wonder has been expressed that the Pueblos, so advanced in pottery decoration, have not attempted more representations of natural objects. There is less ground for this wonder than at first appears. It should be remembered that the original angular models which the Pueblo had, out of which to develop his art, bequeathed to him an extremely conventional conception of things. This, added to his peculiar way of interpreting relationship and personifying phenomena and even functions, has resulted in making his depictions obscure. In point of fact, in the decoration of certain classes of his pottery he has attempted the reproduction of almost everything and of every phenomenon in nature held as sacred or mysterious by him. On certain other classes he has developed, imitatively, many typical decorations which now have no special symbolism, but which once had definite significance; and, finally, he has sometimes relegated definite meanings to designs which at first had no significance, except as decorative agents, afterward using them according to this interpretation in his attempts to delineate natural objects, their phenomena, and functions. I will illustrate by examples, the last point first.

Going back to basketry, we find already the fully developed fret. (See Fig. 553.) I doubt not that from this was evolved, in accordance with Professor Hartt's theory, the scroll or volute as it appears later on pottery. (See Figs. 554, 555.) To both of these designs, and modifications of them ages later, the Pueblo has attached meanings. Those who have visited the Southwest and ridden over the wide, barren plains, during late autumn or early spring, have been astonished to find traced on the sand by no visible agency, perfect concentric circles and scrolls or volutes yards long and as regular as though drawn by a skilled artist.

The circles are made by the wind driving partly broken weed-stalks around and around their places of attachment, until the fibers by which they are anchored sever and the stalks are blown away. The volutes are formed by the stems of red-top grass and of a round-topped variety of the *chenopodium*, drifted onward by the whirlwind yet around and around their bushy adhesive tops. The Pueblos, observing these marks, especially that they are abundant after a wind storm, have wondered at their similarity to the painted scrolls on the pottery of their ancestors. Even to-day they believe the sand marks to be the tracks of the whirlwind, which is a God in their mythology of such distinctive personality

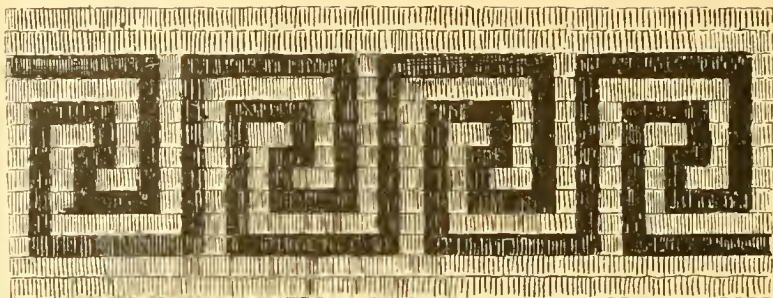


FIG. 553.—The fret of basket decoration.



FIG. 554.—The fret of pottery decoration.

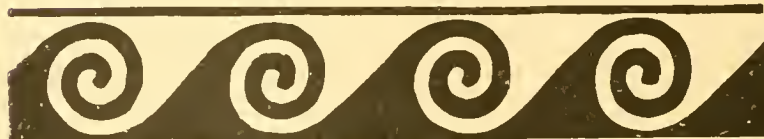


FIG. 555.—Scroll as evolved from fret in pottery decoration.

that the circling eagle is supposed to be related to him. They have naturally, therefore, explained the analogy above noted by the inference that their ancestors, in painting the volute, had intended to symbolize the whirlwind by representing his tracks. Thenceforward the scroll was drawn on certain classes of pottery to represent the whirlwind, modifications of it (for instance, by the color-sign belonging to any one of the "six regions") to signify other personified winds. So, also, the semicircle is classed as emblematic of the rainbow (*a' mi to lan ne*); the obtuse angle, as of the sky (*a' po yan ne*); the zigzag line as lightning (*wi' lo lo an ne*); terraces as the sky horizons (*a'wi thlui a we*), and modi-

fications of the latter as the mythic "ancient sacred place of the spaces" (*Te' thlä shi na kw'in*), and so on.

By combining several of these elementary symbols in a single device, sometimes a mythic idea was beautifully expressed. Take, as an example, the rain totem adopted by the late Lewis H. Morgan as a title illumination, from Maj. J. W. Powell, who received it from the Moki Pueblos of Arizona as a token of his induction into the rain gens of

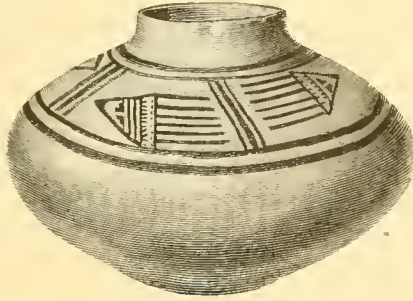
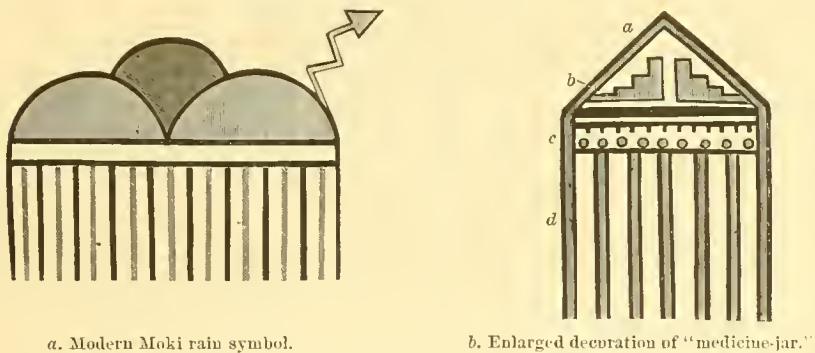


FIG. 556.—Ancient Pueblo "medicine-jar."

that people. (See Fig. 557, *a*.) An earlier and simpler form of this occurs on a very ancient "sacred medicine jar" which I found in the Southwest. (See Fig. 556.) By reference to an enlarged drawing of the chief decoration of this jar (see Fig. 557), it may be seen that the sky, *a*, the ancient place of the spaces (region of the sky gods), *b*, the cloud lines, *c*, and the falling rain, *d*, are combined and depicted to symbolize



a. Modern Moki rain symbol.

b. Enlarged decoration of "medicine-jar."

FIG. 557.—Decoration of ancient medicine-jar compared with rain symbol of modern Moki totem.

the storm, which was the objective of the exhortations, rituals, and ceremonials to which the jar was an appurtenance.

Thus, upon all sacred vessels, from the drums of the esoteric medicine societies of the priesthood and all vases pertaining to them to the ceramic appurtenances of the sacred dance or *Ká' ká*, all decorations were intentionally emblematic. Of this numerous class of vessels, I will choose but one for illustration—the prayer-meal-bowl of the *Ká' ká*.

In this, both form and ornamentation are significant. (See Fig. 558.) In explaining how the form of this vessel is held to be symbolic I will quote a passage from the "creation myth" as I rendered it in an article on the origin of corn, belonging to a series on "Zuñi Breadstuff," published this year in the "Millstone" of Indianapolis, Indiana. "Is not the bowl the emblem of the earth, our mother? For from her we draw both food and drink, as a babe draws nourishment from the breast of its mother; and round, as is the rim of a bowl, so is the horizon, terraced with mountains whence rise the clouds." This alludes to a medicine bowl, not to one of the handled kind, but I will apply it as far as it goes to the latter. The two terraces on either side of the handle (Fig. 558, *a a*) are in representation of the "ancient sacred place of the spaces," the handle being the line of the sky, and sometimes painted with the rainbow figure. Now the decorations are a trifle more complex. We may readily perceive that they represent tadpoles (Fig. 558, *b b*), dragon-flies (Fig. 558, *c c*), with also the frog or toad (Fig. 558); all this is of

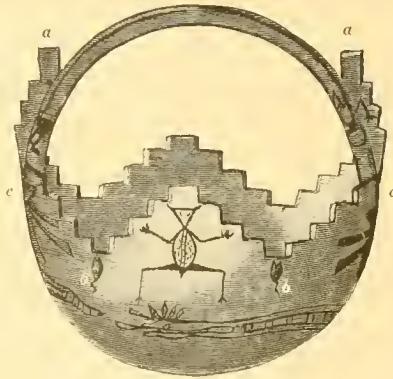


FIG. 558.—Zuñi prayer-meal-bowl.

easy interpretation. As the tadpole frequents the pools of spring time he has been adopted as the symbol of spring rains; the dragon-fly hovers over pools in summer, hence typifies the rains of summer; and the frog, maturing in them later, symbolizes the rains of the later seasons; for all these pools are due to rain fall. When, sometimes, the figure of the sacred butterfly (see Fig. 559, *a b*) replaces that of the dragon-fly, or alternates with it, it symbolizes the beneficence of summer; since, by a reverse order of reasoning, the Zuñis think that the butterflies and migratory birds (see Fig. 560) *bring* the warm season from the "Land of everlasting summer."

Upon vessels of special function, like these we have just noticed, peculiar figures may be regarded as emblematic; on other classes, no matter how evidently conventional and expressive decorations may seem, excepting always, totemic designs, it is wise to use great caution in their interpretation as intentional and not merely imitative.

A general examination, even of the most modern of Pueblo pottery,

shows us that certain types of decoration have once been confined to certain types of vessels, all which has its due signification but an examination of which would properly form the subject of another essay.



FIG. 559.—Paintings of sacred butterfly.



FIG. 560.—Painting of "summer-bird."

Happily, a work collateral to the one which I have here merely begun, will, I have reason to hope, be carried to a high degree of perfection in the forthcoming monographs on the exhaustless ceramic collections of the United States National Museum by Mr. William H. Holmes. This author and artist will approach his task from a standpoint differing from mine, reaching thereby, it may be, conclusions at variance with the foregoing; but by means of his wealth of material and illustration students will have opportunity of passing a judgment upon the merits of not only his work, but of my own.

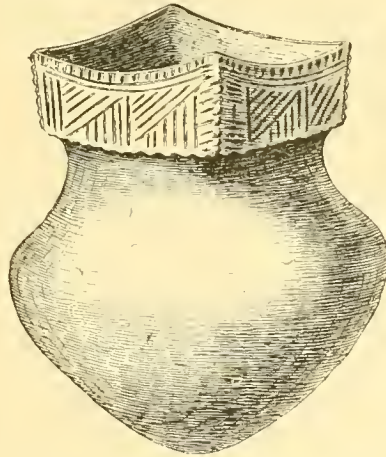


FIG. 561.—Rectangular type of earthen vessel.

In conclusion, let me very briefly refer to two distinctive American types of pottery, unconnected with the Southwestern, which, considered

in conjunction with those of the latter region, seem to me to indicate that the ceramic art has had independent centers of origin in America. For the sake of convenience, I may name these types the rectangular (see Fig. 561) or Iroquois, and the bisymmetrical or kidney-shaped (see Fig. 562), of Nicaragua. The one is almost constant in the lake regions of the United States, the other equally constant in sections of Central America. In collections gathered from any tribe of our Algonquin or Iroquois

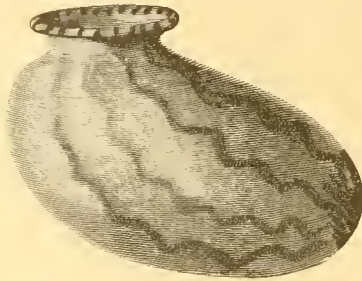


FIG. 562.—Kidney-shaped vessel, Nicaragua.

Indians, one may observe vessels of the tough birch- or linden-bark, some of which are spherical or hemispherical. To produce this form of utensil from a single piece of bark, it is necessary to cut pieces out of the margin and fold it. Each fold, when stitched together in the shaping of the vessel, forms a corner at the upper part. (See Fig. 563.) These corners and the borders which they form are decorated with short lines

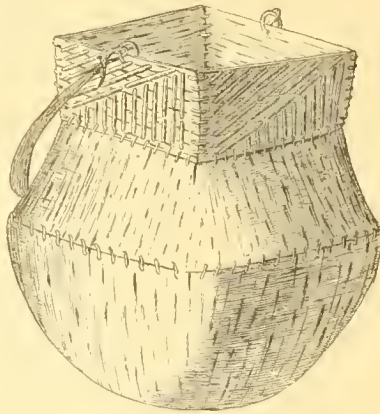


FIG. 563.—Iroquois bark-vessel.

and combinations of lines, composed of coarse embroideries with dyed porcupine quills. (See Fig. 564.) May not the bark vessel have given rise to the rectangular type of pottery and its quill ornamentation to the incised straight-line decorations? (Compare Fig. 561.)

So, too, in the unsymmetrical urns of Central and Isthmean America, which are characterized by the location of the aperture at the upper part

of one of the extremities and by streak-like decorations, we have a decided suggestion of the animal paunch or bladder and of the visible veins on its surface when distended.

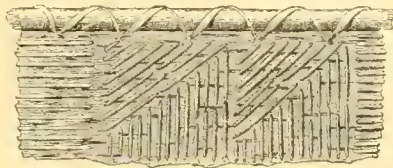


FIG. 564.—Porcupine-quill decoration.

If these conjectures be accepted as approximately correct, even in tendency, we may hope by a patient study of the ceramic remains of a people, no matter where situated, to discover what was the type of their pre-ceramic vessels, and thereby we might also learn whether, at the time of the origin of the potter's art or during its development, they had, like the Pueblos, been indigenous to the areas in which they were found, or whether they had, like some of the Central Americans, (to make a concrete example and judge it by this method) apparently immigrated in part from desert North America, in part from the wilderness of an equatorial region in South America.