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SMITHSONIAN INSTITUTION—BUREAU OF ETHNOLOGY.

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ORIGIN AND DEVELOPMENT  
OF  
FORM AND ORNAMENT IN CERAMIC ART.

BY  
WILLIAM H. HOLMES.

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# ORIGIN AND DEVELOPMENT OF FORM AND ORNAMENT IN CERAMIC ART.

BY WILLIAM H. HOLMES.

## INTRODUCTORY.

For the investigation of art in its early stages and in its widest sense there is probably no fairer field than that afforded by aboriginal America, ancient and modern.

At the period of discovery, art at a number of places on the American continent seems to have been developing surely and steadily, through the force of the innate genius of the race, and the more advanced nations were already approaching the threshold of civilization; at the same time their methods were characterized by great simplicity, and their art products are, as a consequence, exceptionally homogeneous.

The advent of European civilization checked the current of growth, and new and conflicting elements were introduced necessarily disastrous to the native development.

There is much, however, in the art of living tribes, especially of those least influenced by the whites, capable of throwing light upon the obscure passages of precolumbian art. By supplementing the study of the prehistoric by that of historic art, which is still in many cases in its incipient stages, we may hope to penetrate deeply into the secrets of the past.

The advantages of this field, as compared with Greece, Egypt, and the Orient, will be apparent when we remember that the dawn of art in these countries lies hidden in the shadow of unnumbered ages, while ours stands out in the light of the very present. This is well illustrated by a remark of Birch, who, in dwelling upon the antiquity of the fictile art, says that "the existence of earthen vessels in Egypt was at least coeval with the formation of a written language."<sup>1</sup> Beyond this there is acknowledged chaos. In strong contrast with this, is the fact that all precolumbian American pottery *precedes* the acquisition of written language, and this contrast is emphasized by the additional fact that it also antedates the use of the wheel, that great perverter of the plastic tendencies of clay.

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<sup>1</sup> Birch: History of Ancient Pottery, 1873, p. 8.

The material presented in the following notes is derived chiefly from the native ceramic art of the United States, but the principles involved are applicable to all times and to all art, as they are based upon the laws of nature.

Ceramic art presents two classes of phenomena of importance in the study of the evolution of æsthetic culture. These relate, first, to *form* and second, to *ornament*.

*Form*, as embodied in clay vessels, embraces, 1st, *useful shapes*, which may or may not be ornamental, and, 2d, *æsthetic shapes*, which are ornamental and may be useful. There are also *grotesque* and *fanciful shapes*, which may or may not be either useful or ornamental.

No form or class of forms can be said to characterize a particular age or stage of culture. In a general way, of course, the vessels of primitive peoples will be simple in form, while those of more advanced races will be more varied and highly specialized.

The shapes first assumed by vessels in clay depend upon the shape of the vessels employed at the time of the introduction of the art, and these depend, to a great extent, upon the kind and grade of culture of the people acquiring the art and upon the resources of the country in which they live. To illustrate: If, for instance, some of the highly advanced Alaskan tribes which do not make pottery should migrate to another habitat, less suitable to the practice of their old arts and well adapted to art in clay, and should there acquire the art of pottery, they would doubtless, to a great extent, copy their highly developed utensils of wood, bone, ivory, and basketry, and thus reach a high grade of ceramic achievement in the first century of the practice of the art; but, on the other hand, if certain tribes, very low in intelligence and having no vessel-making arts, should undergo a corresponding change of habitat and acquire the art of pottery, they might not reach in a thousand years, if left to themselves, a grade in the art equal to that of the hypothetical Alaskan potters in the first decade. It is, therefore, not the age of the art itself that determines its forms, but the grade and kind of art with which it originates and coexists.

*Ornament* is subject to similar laws. Where pottery is employed by peoples in very low stages of culture, its ornamentation will be of the simple archaic kind. Being a conservative art and much hampered by the restraints of convention, the elementary forms of ornament are carried a long way into the succeeding periods and have a very decided effect upon the higher stages. Pottery brought into use for the first time by more advanced races will never pass through the elementary stage of decoration, but will take its ornament greatly from existing art and carry this up in its own peculiar way through succeeding generations. The character of the ornamentation does not therefore depend upon the age of the art so much as upon the acquirements of the potter and his people in other arts.



## ORIGIN OF FORM.

In order to convey a clear idea of the bearing of the preceding statements upon the history of form and ornament, it will be necessary to present a number of points in greater detail.

The following synopsis will give a connected view of various possible origins of form.

Origin of form .....	{	By adventition.	{	Of natural models.
		By imitation.....		Of artificial models.
		By invention.		

## FORMS SUGGESTED BY ADVENTITION.

The suggestions of accident, especially in the early stages of art, are often adopted, and become fruitful sources of improvement and progress. By such means the use of clay was discovered and the ceramic art came into existence. The accidental indentation of a mass of clay by the foot, or hand, or by a fruit-shell, or stone, while serving as an auxiliary in some simple art, may have suggested the making of a cup, the simplest form of vessel.

The use of clay as a cement in repairing utensils, in protecting combustible vessels from injury by fire, or in building up the walls of shallow vessels, may also have led to the formation of disks or cups, afterwards independently constructed. In any case the objects or utensils with which the clay was associated in its earliest use would impress their forms upon it. Thus, if clay were used in deepening or mending vessels of stone by a given people, it would, when used independently by that people, tend to assume shapes suggested by stone vessels. The same may be said of its use in connection with wood and wicker, or with vessels of other materials. Forms of vessels so derived may be said to have an adventitious origin, yet they are essentially copies, although not so by design, and may as readily be placed under the succeeding head.

## FORMS DERIVED BY IMITATION.

Clay has no inherent qualities of a nature to impose a given form or class of forms upon its products, as have wood, bark, bone, or stone. It is so mobile as to be quite free to take form from surroundings, and where extensively used will record or echo a vast deal of nature and of coexistent art.

In this observation we have a key that will unlock many of the mysteries of form.

In the investigation of this point it will be necessary to consider the processes by which an art inherits or acquires the forms of another art or of nature, and how one material imposes its peculiarities upon another material. In early stages of culture the processes of art are closely akin to those of nature, the human agent hardly ranking as more than

a part of the environment. The primitive artist does not proceed by methods identical with our own. He does not deliberately and freely examine all departments of nature or art and select for models those things most convenient or most agreeable to fancy; neither does he experiment with the view of inventing new forms. What he attempts depends almost absolutely upon what happens to be suggested by preceding forms, and so narrow and so direct are the processes of his mind that, knowing his resources, we could closely predict his results.

The range of models in the ceramic art is at first very limited, and includes only those utensils devoted to the particular use to which the clay vessels are to be applied; later, closely-associated objects and utensils are copied. In the first stages of art, when the savage makes a weapon, he modifies or copies a weapon; when he makes a vessel, he modifies or copies a vessel.

This law holds good in an inverse ratio to culture, varying to a certain extent with the character of the material used.

*Natural originals.*—Natural originals, both animal and vegetable, necessarily differ with the country and the climate, thus giving rise to individual characters in art forms often extremely persistent and surviving decided changes of environment.

The gourd is probably the most varied and suggestive natural vessel. We find that the primitive potter has often copied it in the most literal manner. One example only, out of the many available ones, is necessary. This is from a mound in southeastern Missouri.

In Fig. 464, *a* illustrates a common form of the gourd, while *b* represents the imitation in clay.

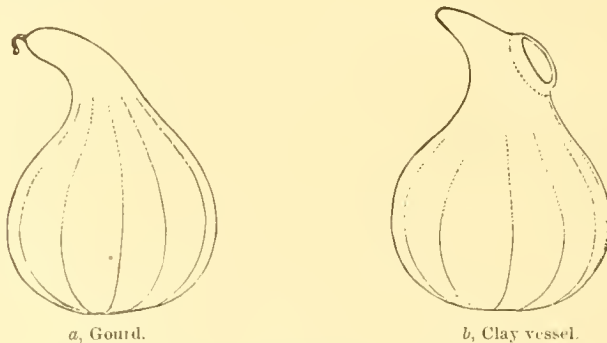


FIG. 464.—Form derived from a gourd.

All nations situated upon the sea or upon large rivers use shells of mollusks, which, without modification, make excellent receptacles for water and food. Imitations of these are often found among the products of the potter's art. A good example from the Mississippi Valley is shown in Fig. 465, *a* being the original and *b* the copy in clay.

In Africa, and in other countries, such natural objects as cocoanut shells, and ostrich eggs are used in like manner.

Another class of vessels, those made from the skins, bladders, and stomachs of animals, should also be mentioned in this connection, as it is certain that their influence has frequently been felt in the conformation of earthen utensils.

In searching nature, therefore, for originals of primitive ceramic forms we have little need of going outside of objects that in their natural or slightly altered state are available for vessels.

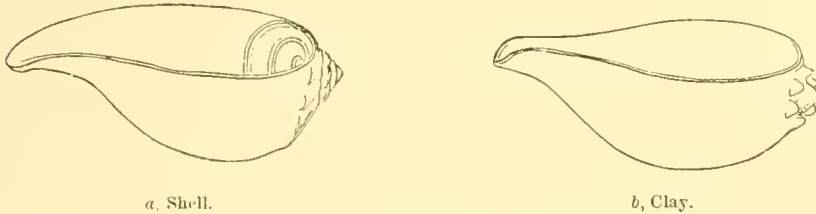


FIG. 465.—Form derived from a conch shell.

True, other objects have been copied. We find a multitude of the higher natural forms, both animal and vegetable, embodied in vessels of clay, but their presence is indicative of a somewhat advanced stage of art, when the copying of vessels that were functionally proper antecedents had given rise to a familiarity with the use of clay and a capacity in handling it that, with advancing culture, brought all nature within the reach of the potter and made it assist in the processes of variation and development.

*Artificial originals.*—There is no doubt that among most peoples art had produced vessels in other materials antecedent to the utilization of clay. These would be legitimate models for the potter and we may therefore expect to find them repeated in earthenware. In this way the art has acquired a multitude of new forms, some of which may be natural forms at second hand, that is to say, with modifications imposed upon them by the material in which they were first shaped. But all materials other than clay are exceedingly intractable, and impress their own characters so decidedly upon forms produced in them that ultimate originals, where there are such, cannot often be traced through them.

It will be most interesting to note the influence of these peculiarities of originals upon the ceramic art.

A nation having stone vessels, like those of California, on acquiring the art of pottery would use the stone vessels as models, and such forms as that given in Fig. 466 would arise, *a* being in stone and *b* in clay, the former from California and the latter from Arizona.

Similar forms would just as readily come from gourds, baskets, or other globular utensils.

Nations having wooden vessels would copy them in clay on acquiring the art of pottery. This would give rise to a distinct group of forms, the result primarily of the peculiarities of the woody structure.

Thus in Fig. 467, *a*, we have a form of wooden vessel, a sort of winged trough that I have frequently found copied in clay. The earthen vessel given in Fig. 467, *b*, was obtained from an ancient grave in Arkansas.

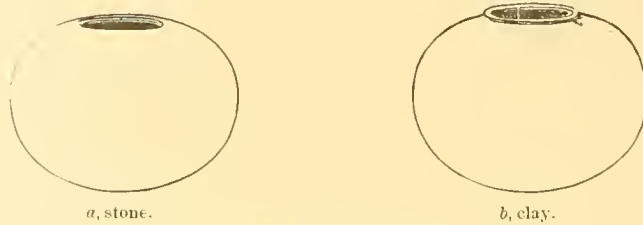
*a*, stone.*b*, clay.

FIG. 466.—Form derived from a stone pot.

The carapace of some species of turtles, and perhaps even the hard case of the armadillo, could be utilized in a similar way.

The shaping of a knot of wood often gives rise to a dipper-shaped

*a*, wood.*b*, clay.

FIG. 467.—Form derived from a wooden tray.

vessel, such as may be found in use by many tribes, and is as likely an original for the dipper form in clay as is the gourd or the conch shell; the familiar horn vessel of the western tribes, Fig. 468, *a*, would have

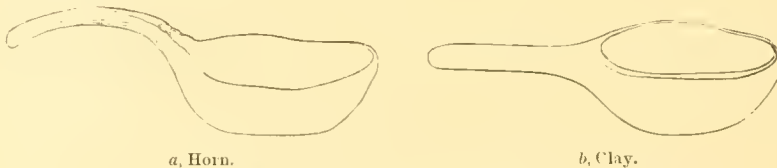
*a*, Horn.*b*, Clay.

FIG. 468.—Form derived from a horn spoon.

served equally well. The specimen given in *b* is from Arkansas. As a rule, however, such vessels cannot be traced to their originals, since

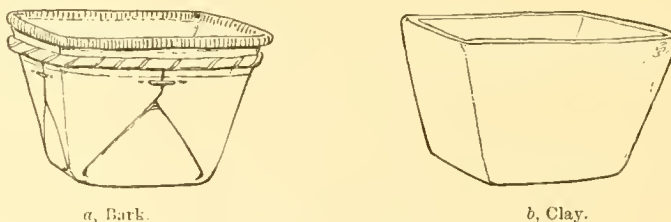
*a*, Bark.*b*, Clay.

FIG. 469.—Form derived from a bark vessel.

by copying and recopying they have varied from the parent form, tending always toward uniform conventional shapes.

A vessel of rectangular outline might originate in wood or bark. In Fig. 469, *a*, we have a usual form of bark tray, which is possibly the prototype of the square-rimmed earthen vessel given in *b*.

Basketry and other classes of woven vessels take a great variety of forms and, being generally antecedent to the potter's art and con-

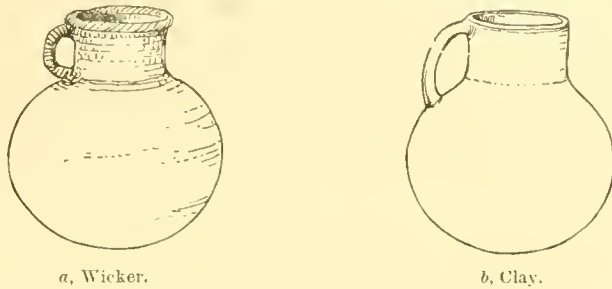


FIG. 470.—Form originating in basketry.

stantly present with it, have left an indelible impression upon ceramic forms. This is traceable in the earthenware of nearly all nations. The clay vessel is an intruder, and usurps the place and appropriates the

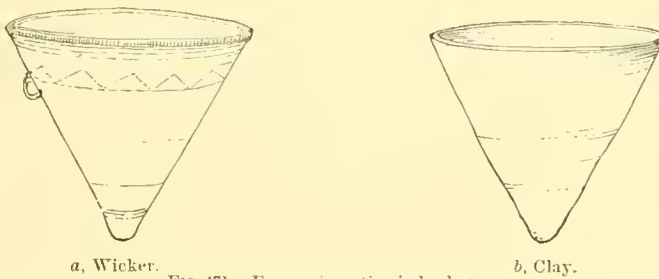


FIG. 471.—Form originating in basketry.

dress of its predecessor in wicker. The form illustrated in Fig. 470, *a*, is a common one with the Pueblo peoples, and their earthen vessels often resemble it very closely, as shown in *b*. Another variety is given

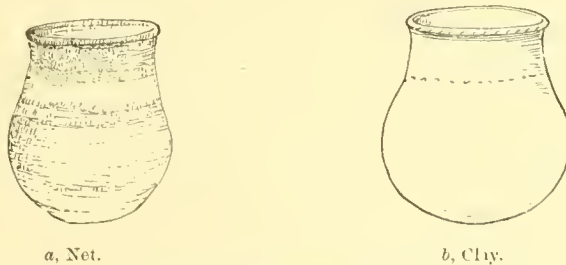


FIG. 472.—Form originating in basketry

in Fig. 471, *a* and *b*. These specimens are from southwestern Utah. Fig. 472, *b*, illustrates a form quite common in the Southern States, a

section in which pouch-like nets and baskets, *a*, were formerly in use and in which the pots were often modeled.

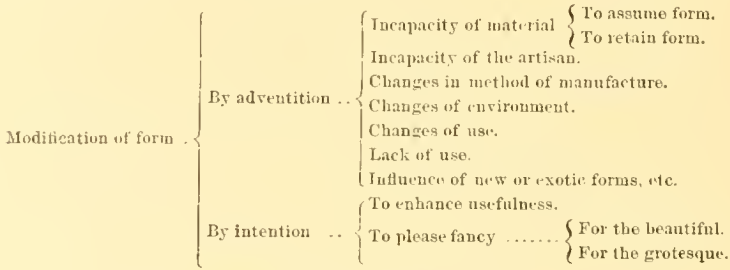
INVENTION OF FORM.

In the early stages of art, forms are rarely invented outright and I shall not stop to consider the subject here.

MODIFICATION OF FORM.

The acquisition of new materials, the development of new uses, the employment of new processes of manufacture, and many other agencies lead to the multiplication of forms through modification. The processes by which highly differentiated forms are reached are interesting throughout and repay the closest study.

A preliminary classification of the various causes that lead to modification is given in the following synopsis:



MODIFICATION BY ADVENTITION.

*Incapacity of material.*—It is evident at a glance that clay lacks the capacity to assume and to retain many of the details of form found in antecedent vessels. This necessarily results in the alteration or omission of these features, and hence arise many modifications of original forms.

The simple lack of capacity on the part of the potter who undertook to reproduce a model would lead to the modification of all but the most simple shapes.

The acquisition of the art by a superior or an inferior race, or one of different habits would lead to decided changes. A people accustomed to carrying objects upon the head, on acquiring earthen vessels would shape the bases and the handles to facilitate this use.

Improvements in the methods of manufacture are of the greatest importance in the progress of an art. The introduction of the lathe, for example, might almost revolutionize form in clay.

As arts multiply, clay is applied to new uses. Its employment in the manufacture of lamps, whistles, or toys would lead to a multitude of distinct and unique forms.

The acquisition of a new vessel-making material by a nation of potters and the association of the forms developed through its inherent qualities or structure would often lead ceramic shapes into new channels.

The contact of a nation of potters with a nation of carvers in wood would tend very decidedly to modify the utensils of the former. One example may be given which will illustrate the possibilities of such exotic influences upon form. In Fig. 473, *a*, we have an Alaskan vessel

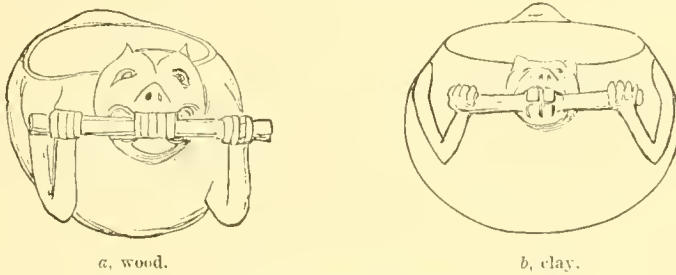


FIG. 473.—Coincident forms.

carved in wood. It represents a beaver grasping a stick in its hands and teeth. The conception is so unusual and the style of vessel so characteristic of the people that we should not expect to find it repeated in other regions; but the ancient graves of the Middle Mississippi Valley have furnished a number of very similar vessels in clay, one of which is outlined in *b*. While this remarkable coincidence is suggestive of ethnic relationships which do not call for attention here, it serves to illustrate the possibilities of modification by simple contact.

A curious example illustrative of possible transformation by adventitious circumstances is found in the collection from the province of ancient Tusayan. A small vessel of sphynx-like appearance, possibly derived more or less remotely from a skin vessel, has a noticeable resemblance to some life form, Fig. 474, *a*. The fore-legs are represented

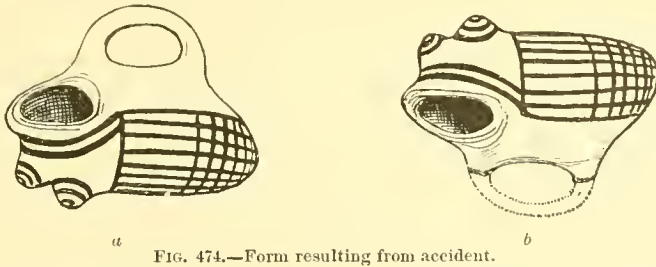


FIG. 474.—Form resulting from accident.

by two large bosses, the wide-open mouth takes the place of the severed neck, and a handle connects the top of the rim with the back of the vessel. The handle being broken off and the vessel inverted,

*b*, there is a decided change; we are struck by the resemblance to a frog or toad. The original legs, having dark concentric lines painted around them, look like large protruding eyes, and the mouth gapes in the most realistic manner, while the two short broken ends of the handle resemble legs and serve to support the vessel in an upright position, completing the illusion. The fetich-hunting Pueblo Indian, picking up this little vessel in its mutilated condition, would probably at once give to it the sacred character of the water animal which it resembles, and it might readily transmit its peculiarities of form to other generations of vessels.

It is not necessary in this study to refer at length to the influence of metallic vessels upon ceramic forms. They do not usually appear until the ceramic art is far advanced and often receive a heritage of shape from earthen forms. Afterwards, when the inherent qualities of the metal have stamped their individuality upon utensils, the debt is paid back to clay with interest, as will be seen by reference to later forms in many parts of the world.

#### MODIFICATION BY INTENTION.

*To enhance usefulness.*—There can be no doubt that the desire upon the part of the archaic potter to increase the usefulness and convenience of his utensils has been an important agent in the modification of form. The earliest vessels employed were often clumsy and difficult to handle. The favorite conch shell would hold water for him who wished to drink, but the breaking away of spines and the extraction of the interior whorl improved it immeasurably. The clumsy mortar of stone, with its thick walls and great weight, served a useful purpose, but it needed a very little intelligent thought to show that thin walls and neatly-trimmed margins were much preferable.

Vessels of clay, aside from the forms imposed upon them by their antecedents and associates, would necessarily be subject to changes suggested by the growing needs of man. These would be worked out with ever-increasing ease by his unfolding genius for invention. Further investigation of this phase of development would carry me beyond the limits set for this paper.

*To please fancy.*—The skill acquired by the handling of clay in constructing vessels and in efforts to increase their usefulness would open an expansive field for the play of fancy. The potter would no sooner succeed in copying vessels having life form than he would be placed in a position to realize his capacity to imitate forms not peculiar to vessels. His ambition would in time lead him even beyond the limits of nature and he would invade the realm of imagination, embodying the conceptions of superstition in the plastic clay. This tendency would be encouraged and perpetuated by the relegation of vessels of particular forms to particular ceremonies.



ORIGIN OF ORNAMENT.

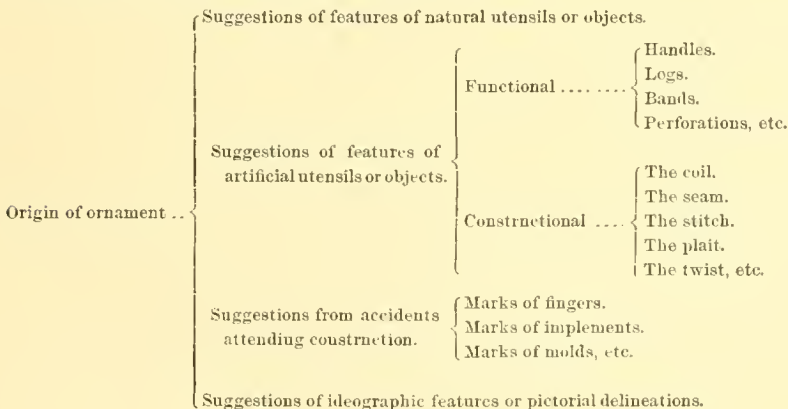
The birth of the embellishing art must be sought in that stage of animal development when instinct began to discover that certain attributes or adornments increased attractiveness. When art in its human sense came into existence ideas of embellishment soon extended from the *person*, with which they had been associated, to all things with which man had to deal. The processes of the growth of the aesthetic idea are long and obscure and cannot be taken up in this place.

The various elements of embellishment in which the ceramic art is interested may be assigned to two great classes, based upon the character of the conceptions associated with them. These are *ideographic* and *non-ideographic*. In the present paper I shall treat chiefly of the non ideographic, reserving the ideographic for a second paper.

Elements, non-ideographic from the start, are derived mainly from two sources: 1st, from objects, natural or artificial, associated with the arts; and, 2d, from the suggestions of accidents attending construction. Natural objects abound in features highly suggestive of embellishment and these are constantly employed in art. Artificial objects have two classes of features capable of giving rise to ornament: these are *constructional* and *functional*. In a late stage of development all things in nature and in art, however complex or foreign to the art in its practice, are subject to decorative treatment. This latter is the realistic pictorial stage, one of which the student of native American culture needs to take little cognizance.

Elements of design are not invented outright: man modifies, combines, and recombines elements or ideas already in existence, but does not create.

A classification of the sources of decorative motives employed in the ceramic art is given in the following diagram:



## SUGGESTIONS OF NATURAL FEATURES OF OBJECTS.

The first articles used by men in their simple arts have in many cases possessed features suggestive of decoration. Shells of mollusks are exquisitely embellished with ribs, spines, nodes, and colors. The same is true to a somewhat limited extent of the shells of the turtle and the armadillo and of the hard cases of fruits.

These decorative features, though not essential to the utensil, are nevertheless inseparable parts of it, and are cast or unconsciously copied by a very primitive people when similar articles are artificially produced in plastic material. In this way a utensil may acquire ornamental characters long before the workman has learned to take pleasure in such details or has conceived an idea beyond that of simple utility. This may be called unconscious embellishment. In this fortuitous fashion a ribbed variety of fruit shell would give rise to a ribbed vessel in clay; one covered with spines would suggest a noded vessel, etc. When taste came to be exercised upon such objects these features would be retained and copied for the pleasure they afforded.

Passing by the many simple elements of decoration that by this unconscious process could be derived from such sources, let me give a single example by which it will be seen that not only elementary forms but even so highly constituted an ornament as the scroll may have been brought thus naturally into the realm of decorative art. The sea-shell has always been intimately associated with the arts that utilize clay and abounds in suggestions of embellishment. The *Busycon* was almost universally employed as a vessel by the tribes of the Atlantic drainage of North America. Usually it was trimmed down and excavated until

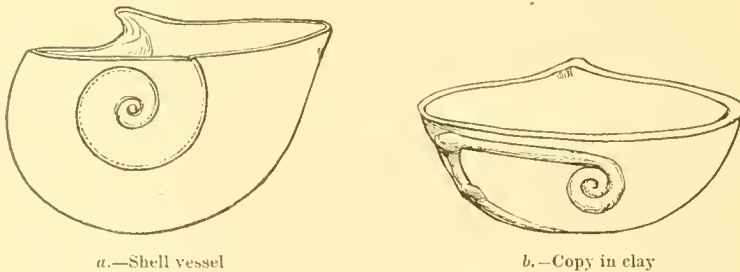


FIG. 475.—Scroll derived from the spire of a conch shell

only about three-fourths of the outer wall of the shell remained. At one end was the long spike-like base which served as a handle, and at the other the flat conical apex, with its very pronounced spiral line or ridge expanding from the center to the circumference, as seen in Fig. 475 *a*. This vessel was often copied in clay, as many good examples now in our museums testify. The notable feature is that the shell has

been copied literally, the spiral appearing in its proper place. A specimen is illustrated in Fig. 475 *b* which, although simple and highly conventionalized, still retains the spiral figure.

In another example we have four of the noded apexes placed about the rim of the vessel, as shown in Fig. 476 *a*, the conception being that of four conch shells united in one vessel, the bases being turned inward and the apexes outward. Now it is only necessary to suppose the addition of the spiral lines, always associated with the nodes, to have the result shown in *b*, and by a still higher degree of convention we have

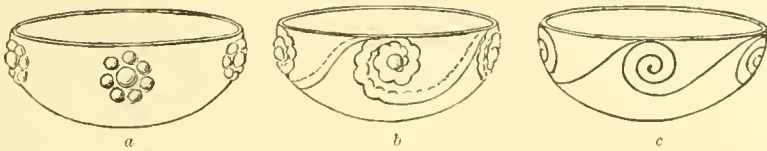


FIG. 476.—Possible derivation of the current scroll.

the classic scroll ornament given in *c*. Of course, no such result as this could come about adventitiously, as successful combination calls for the exercise of judgment and taste; but the initiatory steps could be taken—the motive could enter art—without the conscious supervision of the human agent.

#### SUGGESTIONS BY FEATURES OF ARTIFICIAL OBJECTS.

*Functional features.*—Functional features of art products liable to influence ornament comprise handles, legs, feet, rims, bands, and other peculiarities of shape originating in utility. Handles, for instance, may have been indigenous to a number of arts; they are coeval and coextensive with culture. The first load, weapon, or vessel transported by man may have been suspended by a vine or filament. Such arts as have fallen heir to handles have used them according to the capacities of the material employed. Of all the materials stone is probably the least suited to their successful use, while clay utilizes them in its own peculiar

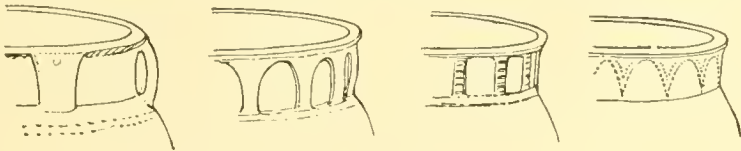


FIG. 477.—Ornament derived through the modification of handles.

way, giving to them a great variety of expression. They are copied in clay from various models, but owing to the inadequate capacities of the material, often lose their function and degenerate into mere ornaments, which are modified as such to please the potter's fancy. Thus, for example, the series of handles placed about the neck of the vessel become,

by modification in frequent copying, a mere band of ornamental figures in relief, or even finally in engraved, punctured, or painted lines, in the manner suggested in Fig. 477. Legs, pedestals, spouts, and other features may in a like manner give rise to decoration.

*Constructional features.*—Features of vessels resulting from construction are infinitely varied and often highly suggestive of decoration. Constructional peculiarities of the clay utensils themselves are especially worthy of notice, and on account of their actual presence in the art itself are more likely to be utilized or copied for ceramic ornament than those of other materials. The coil, so universally employed in construction, has had a decided influence upon the ceramic decoration of certain peoples, as I have shown in a paper on ancient Pueblo art. From it we have not only a great variety of surface ornamentation produced by simple treatment of the coil in place, but probably many forms suggested by the use of the coil in vessel building, as, for instance, the spiral formed in beginning the base of a coiled vessel, Fig. 478 *a*,



FIG. 478.—Scroll derived from coil of clay.

from which the double scroll *b*, as a separate feature, could readily be derived, and finally the chain of scrolls so often seen in border and zone decoration. This familiarity with the use of fillets or ropes of clay would also lead to a great variety of applied ornament, examples of which, from Pueblo art, are given in Fig. 479. The sinuous forms as-

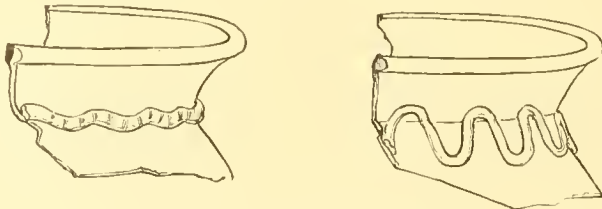


FIG. 479.—Ornamental use of fillets.

sumed by a rope of clay so employed would readily suggest to the Indian the form of the serpent and the means of representing it, and might thus lead to the introduction of this much revered creature into art.

Of the various classes of utensils associated closely with the ceramic art, there are none so characteristically marked by constructional feat-

ures as nets and wicker baskets. The twisting, interlacing, knotting, and stitching of filaments give relieved figures that by contact in manufacture impress themselves upon the plastic clay. Such impressions come in time to be regarded as pleasing features, and when free-hand methods of reproducing are finally acquired they and their derivatives become essentials of decoration. At a later stage these characters of basketry influence ceramic decoration in a somewhat different way. By the use of variously-colored fillets the woven surface displays figures in color corresponding to those in relief and varying with every new combination. Many striking patterns are thus produced, and the potter who has learned to decorate his wares by the stylus or brush reproduces these patterns by free-hand methods. We find pottery in all countries ornamented with patterns, painted, incised, stamped, and relieved, certainly derived from this source. So well is this fact known that I need hardly go into details.

In the higher stages of art the constructional characters of architecture give rise to many notions of decoration which afterwards descend to other arts, taking greatly divergent forms. Aboriginal architecture in some parts of America had reached a development capable of wielding a strong influence. This is not true, however, of any part of the United States.

#### SUGGESTIONS OF ACCIDENTS.

Besides the suggestions of surface features impressed in manufacture or intentionally copied as indicated above, we have also those of accidental imprints of implements or of the fingers in manufacture. From this source there are necessarily many suggestions of ornament, at first of indented figures, but later, after long employment, extending to the other modes of representation.

#### IDEOGRAPHIC AND PICTORIAL SUBJECTS.

Non-ideographic forms of ornament may originate in ideographic features, mnemonic, demonstrative, or symbolic. Such significant figures are borrowed by decorators from other branches of art. As time goes on they lose their significance and are subsequently treated as purely decorative elements. Subjects wholly pictorial in character, when such come to be made, may also be used as simple decoration, and by long processes of convention become geometric.

The exact amount of significance still attached to significant figures after adoption into decoration cannot be determined except in cases of actual identification by living peoples, and even when the signification is known by the more learned individuals the decorator may be wholly without knowledge of it.

## MODIFICATION OF ORNAMENT.

There are comparatively few elementary ideas prominently and generally employed in primitive decorative art. New ideas are acquired, as already shown, all along the pathway of progress. None of these ideas retain a uniform expression, however, as they are subject to modification by environment just as are the forms of living organisms. A brief classification of the causes of modification is given in the following synopsis:

Modification of ornament.....	.....	{ Through material. { Through form. { Through methods of realization.
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*Through material.*—It is evident at a glance that *material* must have a strong influence upon the forms assumed by the various decorative motives, however derived. Thus stone, clay, wood, bone, and copper, although they readily borrow from nature and from each other, necessarily show different decorative results. Stone is massive and takes form slowly and by peculiar processes. Clay is more versatile and decoration may be scratched, incised, painted, or modeled in relief with equal facility, while wood and metal engender details having characters peculiar to themselves, producing different results from the same motives or elements. Much of the diversity displayed by the art products of different countries and climates is due to this cause.

Peoples dwelling in arctic climates are limited, by their materials, to particular modes of expression. Bone and ivory as shaped for use in the arts of subsistence afford facilities for the employment of a very restricted class of linear decoration, such chiefly as could be scratched with a hard point upon small irregular, often cylindrical, implements. Skins and other animal tissues are not favorable to the development of ornament, and the textile arts—the greatest agents of convention—do not readily find suitable materials in which to work.

Decorative art carried to a high stage under arctic environment would be more likely to achieve unconventional and realistic forms than if developed in more highly favored countries. The accurate geometric and linear patterns would hardly arise.

*Through form.*—Forms of decorated objects exercise a strong influence upon the decorative designs employed. It would be more difficult to tattoo the human face or body with straight lines or rectilinear patterns than with curved ones. An ornament applied originally to a vessel of a given form would accommodate itself to that form pretty much as costume becomes adjusted to the individual. When it came to be required for another form of vessel, very decided changes might be necessary.

With the ancient Pueblo peoples rectilinear forms of meander patterns were very much in favor and many earthen vessels are found in

which bands of beautiful angular geometric figures occupy the peripheral zone, Fig. 480 *a*, but when the artist takes up a mug having a row of hemispherical nodes about the body, *b*, he finds it very difficult to apply his favorite forms and is almost compelled to run spiral curves about the nodes in order to secure a neat adjustment.

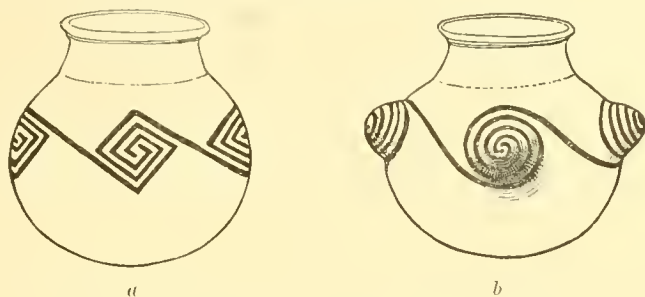


FIG. 480.—Variations in a motive through the influence of form.

*Through methods of realization.*—It will readily be seen that the forms assumed by a motive depend greatly upon the character of the mechanical devices employed. In the potter's art devices for holding and turning the vessel under manipulation produce peculiar results.

In applying a given idea to clay much depends upon the method of executing it. It will take widely differing forms when executed by incising, by modeling, by painting, and by stamping.

Intimately associated with methods of execution are peculiarities of construction, the two agencies working together in the processes of modification and development of ornament.

I have previously shown how our favorite ornament, the scroll, in its disconnected form may have originated in the copying of natural forms or through the manipulation of coils of clay. I present here an example of its possible origin through the modification of forms derived from constructional features of basketry. An ornament known as the guilloche is found in many countries. The combination of lines resembles that of twisted or platted fillets of wood, cane, or rushes, as may be seen at a glance, Fig. 481 *a*. An incised ornament of this character, possibly derived from basketry by copying the twisted fillets or their impressions in the clay, is very common on the pottery of the mounds of the Mississippi Valley, and its variants form a most interesting study. In applying this to a vessel the careless artist does not properly connect the ends of the lines which pass beneath the intersecting fillets, and the parts become disconnected, *b*. In many cases the ends are turned in abruptly as seen in *c*, and only a slight further change is necessary to lead to the result, *d*, the running scroll with well-developed links. All of these steps may be observed in a single group of vessels.

It may be thought by some that the processes of development indicated above are insufficient and unsatisfactory. There are those who,

seeing these forms already endowed with symbolism, begin at what I conceive to be the wrong end of the process. They derive the form of symbol directly from the thing symbolized. Thus the current scroll is, with many races, found to be a symbol of water, and its origin is attributed to a literal rendition of the sweep and curl of the waves. It is more probable that the scroll became the symbol of the sea long after its development through agencies similar to those described above, and that the association resulted from the observation of incidental resemblances. This same figure, in use by the Indians of the interior of the continent, is regarded as symbolic of the whirlwind, and it is probable that any symbol-using people will find in the features and phenomena of their environment, whatever it may be, sufficient resemblance to any of their decorative devices to lead to a symbolic association.

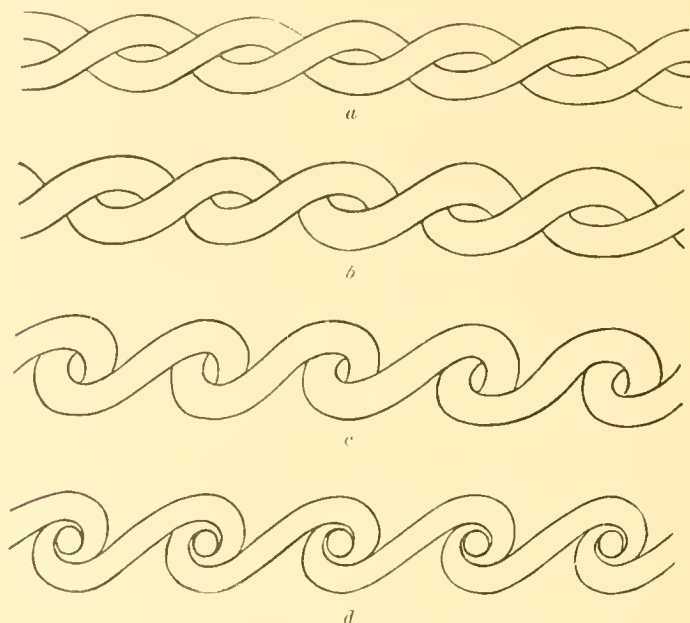
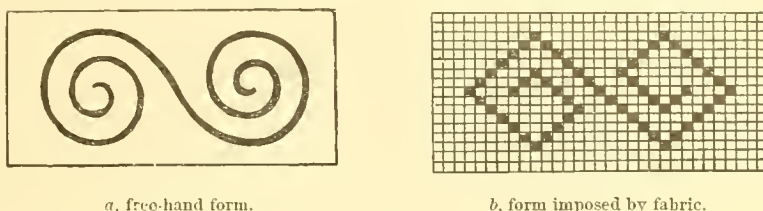


FIG. 481.—Theoretical development of the current scroll.

One secret of modification is found in the use of a radical in more than one art, owing to differences in constructional characters. For example, the tendency of nearly all woven fabrics is to encourage, even to compel, the use of straight lines in the decorative designs applied. Thus the attempt to employ curved lines would lead to stepped or broken lines. The curvilinear scroll coming from some other art would be forced by the constructional character of the fabric into square forms, and the rectilinear meander or fret would result, as shown in Fig. 482, *a* being the plain form, painted, engraved, or in relief, and *b* the same idea developed in a woven fabric. Stone or brick-work would lead to like results, Fig. 483; but the modification could as readily move in the



other direction. If an ornament originating in the constrictional character of a woven fabric, or remodeled by it, and hence rectilinear, should be desired for a smooth structureless or featureless surface, the difficul-

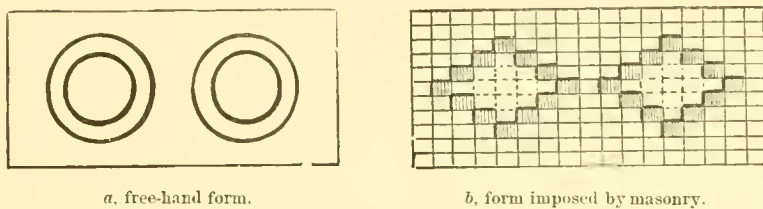


*a*, free-hand form.

*b*, form imposed by fabric.

FIG. 482.—Forms of the same motive expressed in different arts.

ties of drawing the angular forms would lead to the delineation of curved forms, and we would have exactly the reverse of the order shown in Figs. 482 and 483. The two forms given in Fig. 484 actually

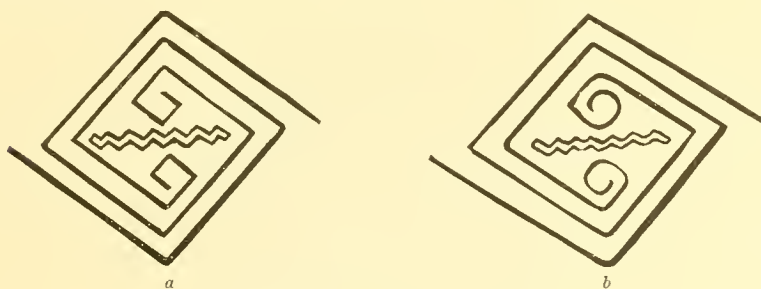


*a*, free-hand form.

*b*, form imposed by masonry.

FIG. 483.—Forms of the same motive expressed in different arts.

occur in one and the same design painted upon an ancient Pueblo vase. The curved form is apparently the result of careless or hurried work, the original angular form having come from a textile source.



*a*

*b*

FIG. 484.—Variations resulting from change of method.

Many excellent examples illustrative of this tendency to modification are found in Pueblo art. Much of the ornament applied to pottery is derived from the sister art, basketry. In the latter art the forms of decorative figures are geometric and symmetrical to the highest degree, as I have frequently pointed out. The rays of a radiating ornament, worked with the texture of a shallow basket, spring from the center and take uniform directions toward the margin, as shown in Fig. 485. But

when a similar idea derived from basketry (as it could have no other origin) is executed in color upon an earthen vessel, we observe a tendency to depart from symmetry as well as from consistency. I call atten-

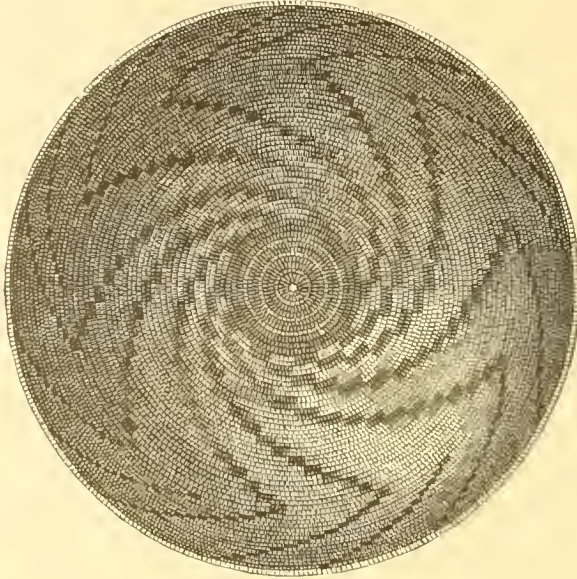


FIG. 485.—Geometric form of textile ornament.

tion here to the *arrangement* of the *parts* merely, not to the motives employed, as I happen to have no examples of identical figures from the two arts.



FIG. 486.—Loss of geometric accuracy in painting.

It will be seen by reference to the design given in Fig. 486, taken from the upper surface of an ancient vase, that although the spirit of the decoration is wonderfully well preserved the idea of the origin of all the rays in the center of the vessel is not kept in view, and that by

carelessness in the drawing two of the rays are crowded out and terminate against the side of a neighboring ray. In copying and recopying by free-hand methods, many curious modifications take place in these designs, as, for example, the unconformity which occurs in one place in the example given may occur at a number of places, and there will be a series of independent sections, a small number only of the bands of devices remaining true rays.

A characteristic painted design from the interior of an ancient bowl is shown in Fig. 487, in which merely a suggestion of the radiation is preserved, although the figure is still decorative and tasteful. This process of modification goes on without end, and as the true geometric

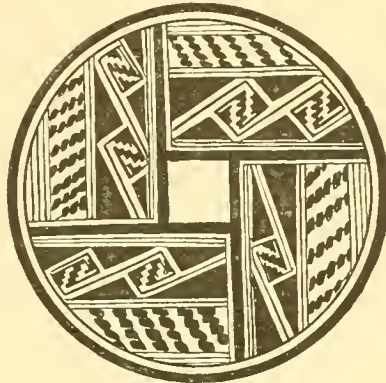


FIG. 487.—Design painted upon pottery.

textile forms recede from view innovation robs the design of all traces of its original character, producing much that is incongruous and unsatisfactory.

The growth of decorative devices from the elementary to the highly constituted and elegant is owing to a tendency of the human mind to elaborate because it is pleasant to do so or because pleasure is taken in the result, but there is still a directing and shaping agency to be accounted for.

I have already shown that such figures as the scroll and the guilloche are not *necessarily* developed by processes of selection and combination of simple elements, as many have thought, since they may have come into art at a very early stage almost full-fledged; but there is nothing in these facts to throw light upon the processes by which ornament followed particular lines of development throughout endless elaboration. In treating of this point, Prof. C. F. Hartt<sup>2</sup> maintained that the development of ornamental designs took particular and uniform directions owing to the structure of the eye, certain forms being chosen and perpetuated because of the pleasure afforded by movements of the eye in following them. In connection with this hypothesis, for it is nothing more, Mr. Hartt advanced the additional idea, that in unison with

<sup>2</sup> Hartt: Popular Science Monthly, Vol. VI, p. 266.

the general course of nature decorative forms began with simple elements and developed by systematic methods to complex forms. Take for example the series of designs shown in Fig. 488. The meander *a* made up of simple parts would, according to Mr. Hartt, by further elaboration under the supervision of the muscles of the eye, develop into *b*. This, in time, into *c*, and so on until the elegant anthemium was achieved. The series shown in Fig. 489 would develop in a similar way, or otherwise would be produced by modification in free-hand copying of the rectilinear

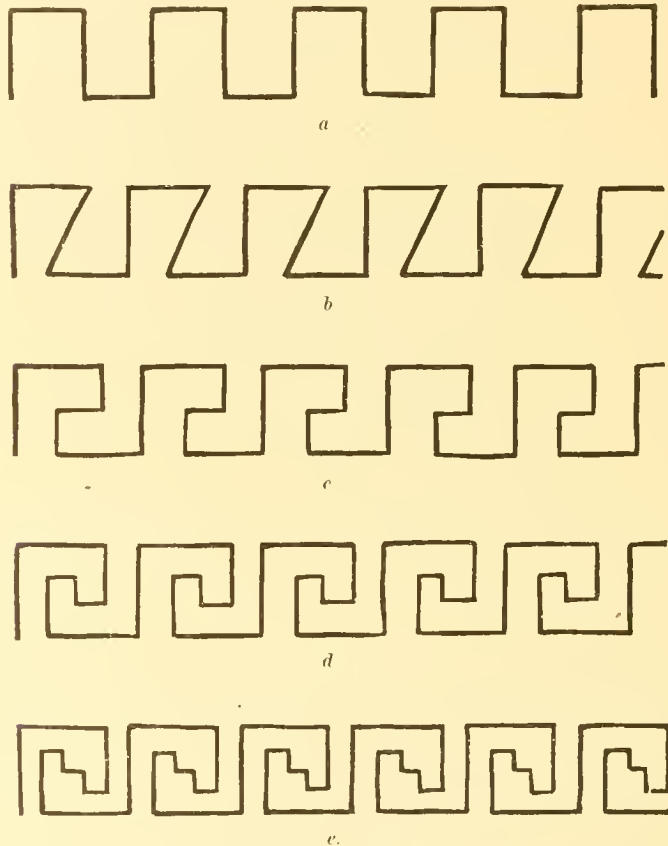


FIG. 488.—Theoretical development of fret work.

series. The processes here suggested, although to all appearances reasonable enough, should not be passed over without careful scrutiny.

Taking the first series, we observe that the ornaments are projected in straight continuous lines or zones, which are filled in with more or less complex parts, rectilinear and geometrically accurate. Still higher forms are marvelously intricate and graceful, yet not less geometric and symmetrical.

Let us turn to the primitive artisan, and observe him at work with rude brush and stylus upon the rounded and irregular forms of his

utensils and weapons, or upon skins, bark, and rock surfaces. Is it probable that with his free hand directed by the eye alone he will be able to achieve these rhythmic geometric forms. It seems to me that the whole tendency is in the opposite direction. I venture to surmise that if there had been no other resources than those named above the typical rectilinear fret would never have been known, at least to the primitive world; for, notwithstanding the contrary statement by Professor Hartt, the fret is in its more highly-developed forms extremely

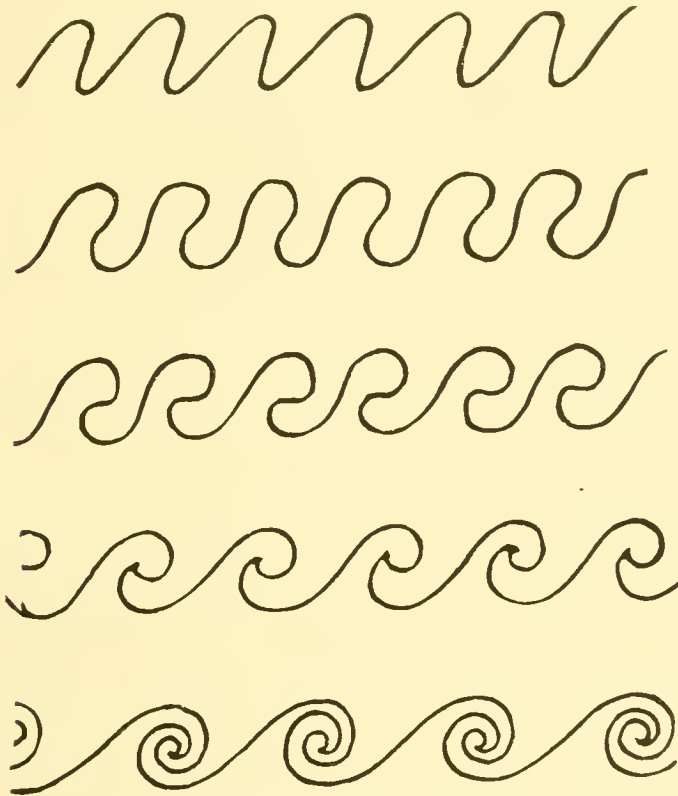


FIG. 489.—Theoretical development of scroll work.

difficult to follow with the eye and to delineate with the hand. Until arts, geometric in their construction, arose to create and to combine mechanically the necessary elements and motives, and lead the way by a long series of object-lessons to ideas of geometric combination, our typical border ornament would not be possible. Such arts are the textile arts and architecture. These brought into existence forms and ideas not met with in nature and not primarily thought of by man, and combined them in defiance of human conceptions of grace. Geometric ornament is the offspring of technique.