PLATE III.

A. B. C. Showing the effect of gradated tone upon a flat architectural member.
D. Illustrating the effect of color alternation upon mutually antagonistic tones.
E. F. H. Examples of color alternation from Greek terra cotta moldings.
G. Terra cotta Anthemion.
I. The great gable akroterion of the Heraion at Olympia, colors arranged in alternation.

ARCHITECTVRAL POLYCHROMY

BY LEON V SOLON

PART III

The Technique of Color Effect
Structural Materials Available

IN attempting to establish the basis for technique in architectural polychromy it is necessary first to recognize the effect-value of a physical property of color known as its "radiant energy." The "wave-length" of a color is the scientific expression which describes the degree to which this form of energy asserts itself in our vision. A simple observation which can be made any day in our streets enables us to appreciate the operation of this force. If we fix our gaze upon any distant multi-colored poster or painted sign, we find that certain colors assert themselves; some are not so easily determined; while, others are indeterminate. As we walk toward the sign the in determinate colors gain identity. On checking up our observation, we find that the colors seen distinctly at the longest range are those of the greatest prismatic purity; the others being colors of a composite character. The progressive degree of visibility corresponds directly to the degree of radiant energy in each color in the group. Such an active property in color naturally calls for aesthetic adjustment in artistic effect. If colors of contrasting degrees of radiance be applied injudiciously to items of a façade, the prominence of each item will be proportionate to the color-activity of the tints upon it, regardless of its relative architectonic importance. Such a result would obviously be disastrous. A medium of effect which is attended with such dangerous hazards in its employment must surely have been thoroughly controlled by the Greeks, who left nothing to chance in art, and who habitually used color upon their buildings. A method of adjustment between disturbing color elements in an architectural scheme was actually devised by them. When the theory is explained its application will he recognized in one of their most freely adopted conven-

tions, that of color alternation, upon repeating detail. This practice has hitherto been credited with no particular significance other than decorative interest.

EFFECT OF ALTERNATION UPON CONTRASTING COLORS.

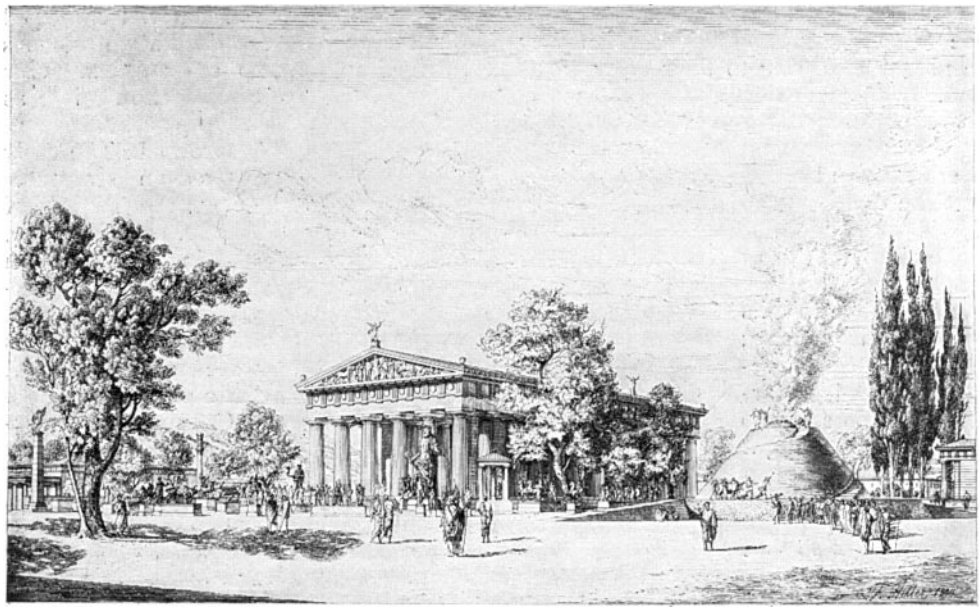
To realize a quality of effect in architectural polychromy that is appropriate to the massiveness of structures it is advisable in the majority of cases to select colors possessing a pronounced degree of radiant energy or prismatic purity. The intensity of light out in the open, and the distance at which many items of a façade are placed from the eye, preclude the satisfactory employment of delicate or subdued colors, owing to their lesser degree of visibility. This point was appreciated by the Greeks, who established an architectural palette of strong colors. They recognized the danger inherent in tones of such quality, and counteracted detrimental color-activity by decorative treatment. The explanation of the principles upon which they proceeded is as follows:

In plate III, diagram D, a color chart is shown in which bright red and blue are arranged in checker form. These colors were chosen by reason of their mutual antagonism; they possess no common tone factor which might serve as a harmonizing link; placed side by side in equal areas these colors clash. The chart is divided into sections, the size of the color-unit decreasing progressively. In examining the quality of color effect through these progressive stages, it will be observed that, as the frequency of alternation increases, mutual antagonism between the two colors apparently diminishes. If this process be continued to a stage at which the unit is of minute dimension, the resultant effect is that the two colors are unified in a composite tone. In the case of the colors selected in our experiment, a purplish color is obtained, which assumes a reddish or bluish character according to the superior degree of radiant energy existing in either of its component elements.

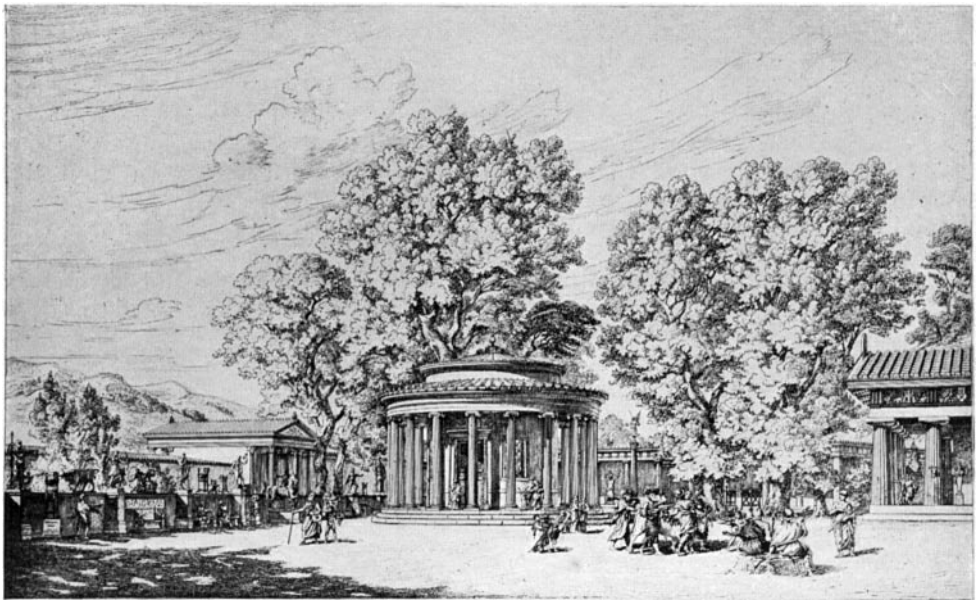
In applying this experiment to other colors, it will not infrequently be found that owing to varying degrees of radiant energy, one color will apparently lie in a different plane to that occupied by its companion; this disparity is neutralized by increased frequency in alternation over a given area. The estimation in which color alternation was held by the Greeks as a means for adjusting those phenomena can be appreciated by the most casual observer examining Greek colored detail. The leaf mold (E) which we illustrate from the Parthenon (also used in the Akropolis temples, at Olympia, and on many other structures) is a typical example; by this method they developed decorative interest and beauty from elements which have no natural affinity. The colors in this member apparently occupy the same plane, but had the upper part of the leaf been treated uniformly in red and the lower part in blue (or in juxtaposition) the disparity in color activity would have asserted itself detrimentally. This principle of alternation is invariably applied to the palmette when it is used in a motif on which two or more colors figure.

The next question, in order of importance, to that of decorative tone adjustment, is that of tone development. It is necessary to determine whether ornamental or, architectural detail be treated exclusively with flat* tones; or, whether gradated color is advantageous under certain circumstances. In the preceding part of this treatise it was demonstrated that the latter form of treatment was incompatible with good architectural effect in a façade. The following argument will explain our reasons for this opinion. A simple experiment will elucidate the action of gradated color in its architectural relation. In color plate Ill, diagrams A, B, C, three bands are shaded with gradated blues, modulated from a deep indigo to a cerulean. As we view this shaded color, we experience the impression

*When we refer to "flat" colors as apart from "gradated" tones, we do not naturally include in the latter category such color quality as is found in marbles, and such other naturally colored materials as patined bronze, etc., as these have an aggregate tone value in a scheme. We refer to a specific form of color manipulation made with definite ornamental intent, in which "shading" is eliminated.

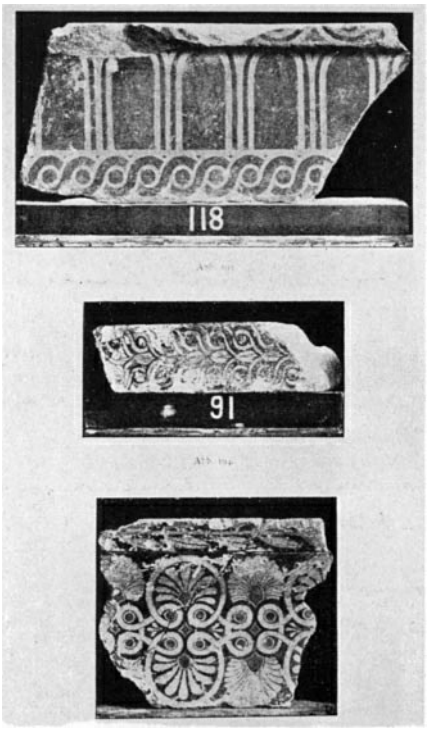


PERSPECTIVE SHOWING THE TEMPLE OF ZEUS, WITH THE GREAT ALTAR ON THE RIGHT.



PERSPECTIVE OF GROUPS OF POLYCHROME BUILDINGS SURROUNDING THE TEMPLE OF ZEUS. THE PHILIPPEION IN CENTER, THE HERAION ON THE RIGHT AND THE GYMNASIUM ON THE LEFT.

that the areas so treated are curved; that certain parts project and others recede from the ground upon which they are placed according to their color treatment. Let us transfer this experiment to a flat vertical fillet upon an architectural member. The disadvantage of this form of color application will at once be obvious, as the fillet will have lost its characteristic flatness; the shaded color creates an illusion corresponding in effect to that produced by light and shade upon a curved surface. There is an elemental property which every ornamental architectural detail must possess; it must be part of, incorporated with, the item it embellishes; any decorative process which destroys or discounts that impression is pernicious. Consequently, the illusion produced by the use of shaded color, which apparently causes surfaces to have a different relation to actual surfaces than that which exists, must necessarily detract from the architectural integrity of those structural ornamental features upon which it figures. Gradated color makes an illusion which is an artificial equivalent for an effect of relief, and as such must be condemned, being contrary to the elementary requirement of substantiality in architectural treatment. In the art of architecture the illusory claims no legitimate place; a decorative method which counterfeits substance is In opposition to the dictates of artistic taste.



PAINTED DECORATION IN MONOTONE (RED) UPON STONE; ISLAND OF AEGINA

DECORATIVE METHODS IN GREEK POLYCHROMY

Greek polychrome buildings may be grouped into three classes, each class being determined by the material employed in structure, and the decorative methods contrived to develop color effect. Our classification is as follows:

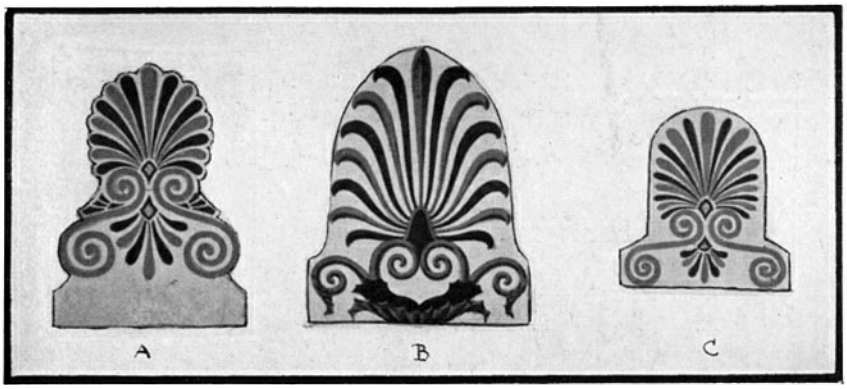
Group I: The early wooden structures (e.g., the Temple of Apollo, part I, ill. No. 2) in which such items as roofs, gargoyles, anthemions, cornices, and metopes were of terra-cotta variously colored.

Group II: Structures of tufaceous stone. With this material it was not possible to produce that unbroken continuity of plane and arris which their sense of fitness demanded. To rectify this, the face of certain members was finished with a veneer of finely textured stucco, upon which ornamentation was painted after the manner of fresco. Polychrome terracotta is also used for certain decorative features in buildings of this type in combination with the painted stucco.

The terra-cotta is made to serve as a casing for roughly hewn stories in certain moldings. The pediment and cornices in this and other examples are made entirely of terra-cotta.

Group Ill: Marble structures on which polychromy was developed by the "encaustic" process. By this process pigment was mixed with melted wax and the ornament painted on with the mixtures. To make the color penetrate the pores of the marble, hot irons were applied to the parts so treated.

We can not avail ourselves of all these alternates for many reasons. The above methods were not all in rise simultaneously, but are identified with successive stages of development extending over four centuries. In many populous sections of this country, climatic extremes narrow the range of suitable media



COLOR ALTERNATION OF THE PALMETTE. (A) AEGINA; (B) PARTHENON; (C) PHIGALIA

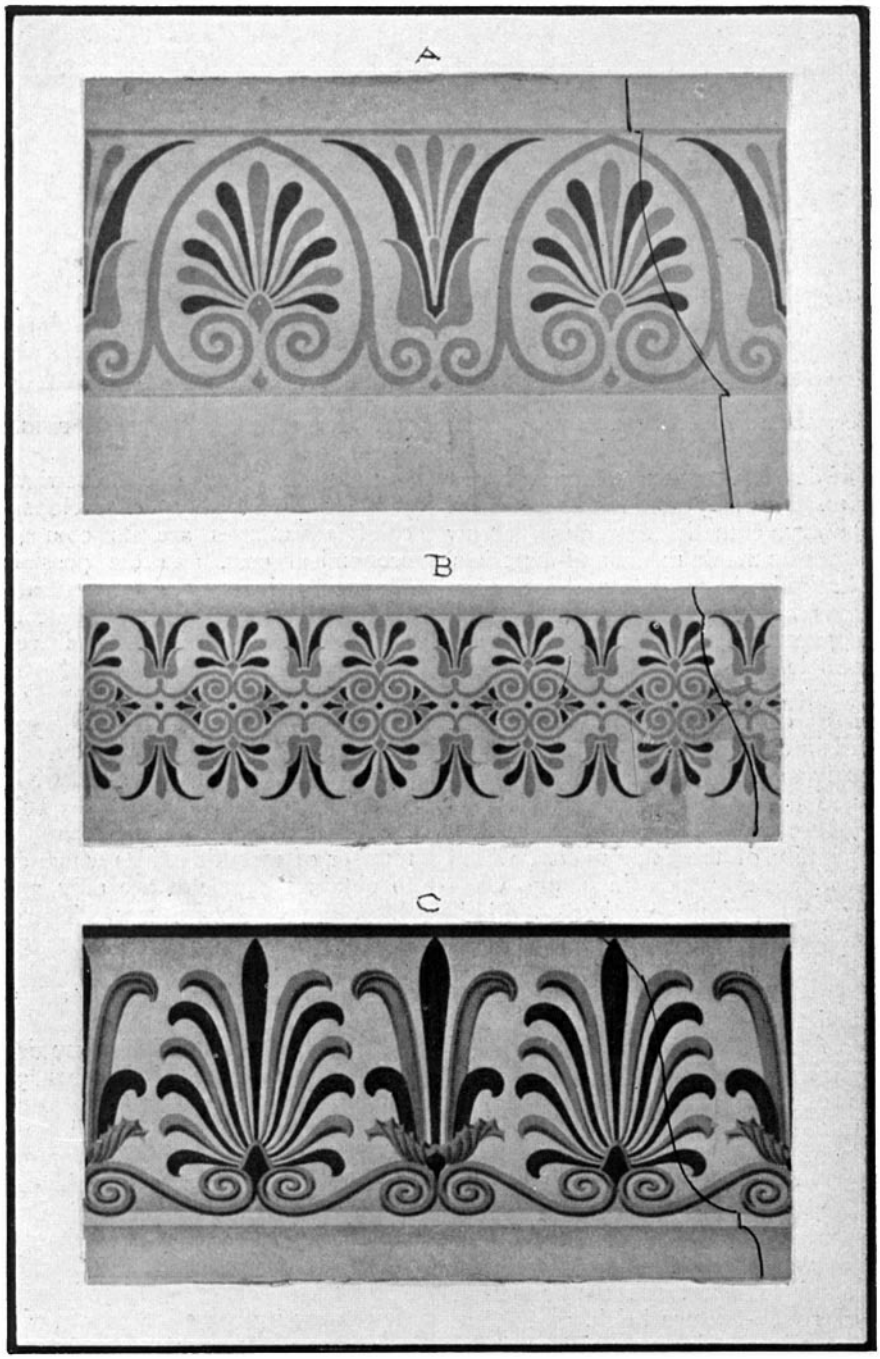
and materials. The chemically charged atmosphere of urban areas has a disastrous action upon most pigments. The frescoing of stucco, for example, would hardly be considered by any architect who recalls sgraffito façades of comparatively recent making. Their disintegration has been very rapid, due partly to atmospheric conditions, and largely to the so-called technical perfection of the cement material and the scientific ingenuity of the color maker, which produces results which in many ways are inferior to primitive methods. Similar considerations also eliminate any prospect of a satisfactory revival of the encaustic process. The combination of wood and terra-cotta is not one which is likely to fire the imagination of the average American architect. Apart from this process of elimination, modern sympathies would naturally lead to the combination of glazed clay with a structural material, either natural or artificial; the latter product now offers many excellent variations in texture and tint. Other materials which promise good results as background to color, are the numerous types of rough-texture brick, cast stone, and stuccos in certain tones and surfaces.

TERRA-COTTA AND FAIENCE

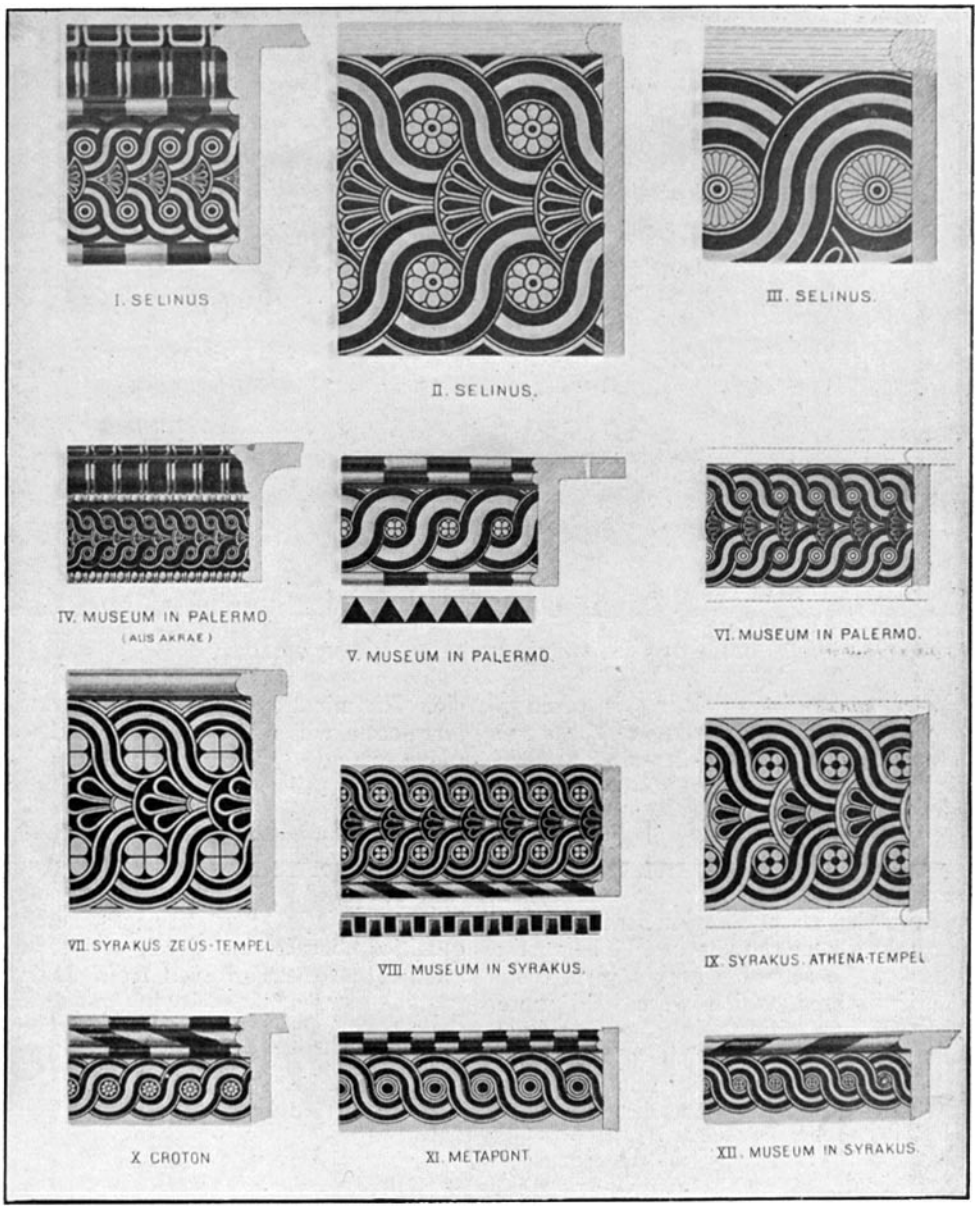
These two glazed-clay materials will undoubtedly be the general media for polychrome effect in modern architecture. Terra-cotta today is a somewhat crude product, artistically undeveloped. Its chief advantages are its comparatively economical cost, and the possibility of producing large-sized structural units. Owing to controlling economic considerations the terra-cotta palette is restricted and it present not very adaptable to structural effect. *Faience is a highly refined material of the same technical character; the palette is practically without limit in its range of tone and quality of texture. The temperatures at which the colors are developed are very varied, as the great number of metallic oxides which are used to obtain the palette are only attainable at different temperatures. There is no comparison between the range of color effects realizable with faience glazes, and those available in terra-cotta at the present time.

If architectural polychromy is to be successfully practiced in this country, architects must bear in mind a very important consideration, which so far is ignored, and is responsible for the comparatively low rating of clay-products among structural materials. Clay possesses an individual and characteristic quality in its plasticity, which, in the hand of an accomplished sculptor is capable of expressing a distinctive beauty of an exalted form. Yet, this material has been commercially debased into a poor counterfeit of stone; its modeling is often a servile copy of the chiseling of the stone mason; in its attempt to simulate a sawn block of stone its plastic

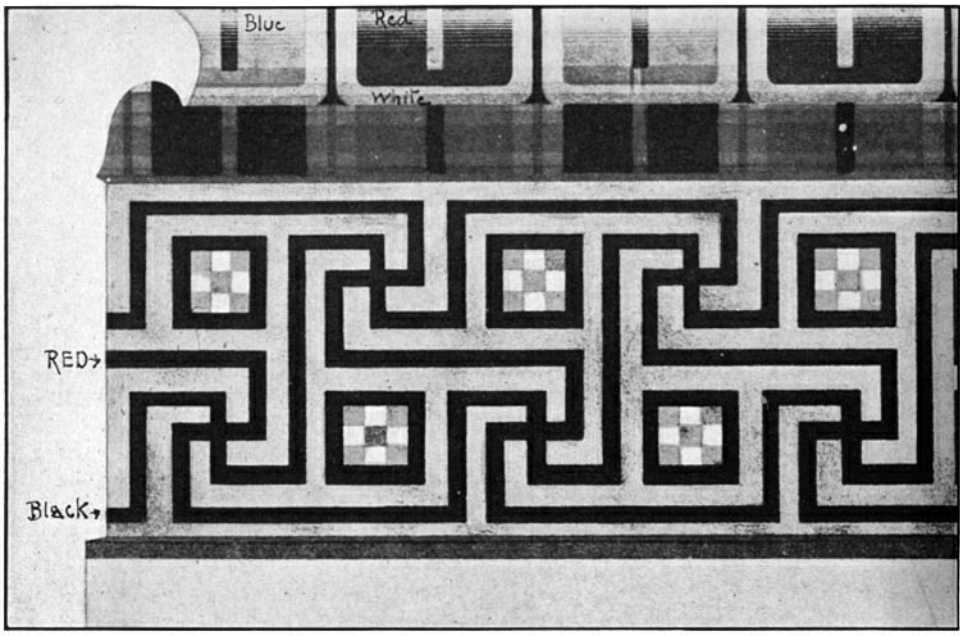
*The term "Faience" originated in France in the seventeenth century to describe native products corresponding technically to those of the Italian potters of Faienza during the sixteenth century.



COLOR ALTERNATION OF CYMA DECORATIONS: (A) PARTHENON; (B) TEMPLE OF APHAEA; (C) TEMPLE OF PHIGALIA.



POLYCHROME MOLDINGS DESIGNED WITH ALTERNATING COLORS.



CYMA OF TREASURY OF SICYON, OLYMPIA GROUP.

character causes it to fall signally. The Greeks appreciated the capacity in plasticity to expressing beauty, and to that end contrived a technique and a distinct form. Clay was not regarded as an inferior medium suitable only for baser purposes. The rarest prizes at the Olympic games were their beautiful vases, which were held more precious than objects in costly metals; their aesthetic perception attaching higher value to the beauty they wrought, than to values which were merely intrinsic. Examination of Greek architectural terra-cotta will reveal an individual technique evolved through their appreciation of plasticity; its treatment is as different from the technique of stone-carving III feeling, as is the technique of their admirable terra-cotta figurines from contemporary works of sculptured art in marble or bronze. Distinct decorative interest and qualities characterize Greek architectural terra-cotta; these evolved from their attraction towards plasticity in the material; their technique is the natural outcome of an appreciation of inherent capacities in material, decoratively developed.

(To be continued)