There are few subjects in the field of ancient art that have aroused such heated and pro-
longed controversy as polychromy in Greek sculpture. In looking over the archaeological lit-
erature of the past century we find the theme taken up again and again from different
points of view, and we realize how long it was before the fact became established that the
Greeks colored their sculptures. The idea of painted statues somehow filled people with
horror, and only after the evidence in its favor had become overwhelming did the supports-
ers of white, unpainted sculpture give up their case.

This strong prejudice was of course natural. Ever since the Renaissance, artists had pro-
duced white marble sculpture, in imitation, oddly enough, of the Greek and Roman ex-
amples known to them, which in the course of time had lost their coloring. It was not easy
to give up a belief that had been held for generations and one that had, moreover,
started a new practice; for previous to the Renaissance colored sculpture had been the
rule. However, as soon as the problem was attacked in the modern scientific spirit the re-
sult was inevitable. The statements of ancient writers and the actual traces of color on extant
Greek and Roman sculptures were too strong evidence to admit of further doubt that
throughout antiquity marble as well as lime-
stone statues and reliefs were painted divers
shades. That the colors have so often disap-
peared is not surprising when we remember
the vicissitudes the sculptures have undergone
—exposure to the elements, burial for over two
thousand years, and often a thorough cleaning
on rediscovery. In many cases, moreover,
in which color was noted on the sculptures
when they came out of the ground, it vanished
soon afterwards on contact with light and air.
The fact that any color at all now remains is
really more remarkable than that it has dis-
appeared in the majority of cases.

The Metropolitan Museum has an impor-
tant collection of early Attic gravestones1 on
several of which remains of the original color-
ing are still visible. On some the traces are so
considerable that they have enabled us to re-
construct the original scheme. They not only
amplify our comparatively scanty knowledge
of early Greek painting and of polychrome
sculpture but shed fresh light on several moot
points.

The monuments are of the two types that
were evidently current in Attica during the
sixth century—an earlier one with a cavetto
or a double-volute capital carved in a separate
piece from the shaft and surmounted by a
sphinx and a later one with a palmette finial
carved in the same piece with the shaft. Only
one monument of the earlier, elaborate form
has survived more or less complete, the one il-
ustrated on the following page. The others are
mere fragments, consisting of parts of crown-
ing sphinxes, capitals, shafts, and inscribed
bases (see pp. 235, 238, and pls. I-iv). They
are of marble or limestone. The representa-
tions on the shafts and capitals are in relief,
incised, or merely painted. Architects, sculp-
tors, and painters apparently collaborated to
produce these monuments, which must have
been made chiefly for the wealthy, aristocratic
families of early Athens; for it is only they
who could have afforded such sumptuous me-

1 For a discussion of the style and chronology of these
and related monuments see my forthcoming Archaic
Attic Gravestones (Martin Classical Lectures, vol.
XI).
Gravestone of a youth and his sister, about 540 B.C. The sphinx is shown in plate 1

morials at a time when wealth was not widespread and the art of monumental sculpture in stone comparatively new.

Lindsley F. Hall's restorations of some of these monuments are shown here in four drawings and four colored plates. The stones were examined by several of us—Miss Alexander, Mr. Hall, Mr. Hauser, and myself—and the restorations are based on our joint findings. The reproductions speak for themselves. One need not enlarge on the distinction of the designs and the harmonious and vivacious color effects. A few flat washes, effectively correlated, have produced rich and gay compositions, not necessarily based on nature. They give us a vivid realization of archaic Greek polychrome sculpture and painting before the introduction in the fifth and fourth centuries of a larger palette and—in the case of paintings—of modeling by light and shade.

Mr. Hall, in the notes at the end of this article, describes the actual remains of color that have enabled him to make his restorations. I shall first discuss the new evidence presented by this material and then review the general subject of polychromy in Greek sculpture in the light of this evidence.

The colors that occur on these stones—red, black, blue, and green—belong to the regular palette of the archaic Greek artist, which was the same as the Egyptian and Minoan. It included also yellow, of which, however, there is no trace on our stones. The commonest shade is red, which appears to have withstood best the ravages of time. Blue often turned to green, but brilliant blue and malachite green occur side by side on separate bands of a guilloche pattern (pl. iii). Black evidently played an important part, alternating with red in effective patterns. In the capitals on page 238 and in two of our finials (pp. 239 and 240), the scheme was red and black—not red and blue, as we once thought. The black background in plate 11, which recalls red-figured vase paintings, is unusual in stone reliefs, the prevalent shades for such backgrounds being red or blue. In marble sculpture the "reserved" white surface of the stone took the place of the white pigment used on limestone and terracotta.
Though it is now an accepted fact that Greek sculpture was painted, there is still considerable controversy about the nude areas. For it is undoubtedly true that on the great majority of marble sculptures on which traces of color have survived on the drapery or hair none has been found on the flesh. And many people hesitate to believe that the Greeks would have obscured the whole surface of their beautiful marbles with paint—as would have been the case, for instance, in nude statues. Before discussing this important problem we must call attention to a piece of evidence presented by one of our gravestones.

Mr. Hall was not able completely to restore the original colors on the chariot scene in plate ii for lack of actual color traces on certain areas. He had to leave the warrior’s helmet and spear white, though they were undoubtedly red or black, and to make the charioteer a ghostlike white figure, though here, too, there must have been some color. Let us examine this charioteer more closely. He wears a helmet, like the charioteer of Amphiaraoa on a vase in Berlin, and a tunic, which he has pulled over his belt to form a kolpos, or pouch. The pouch is represented in profile to the right, the folds it causes in full front. We are familiar with such renderings from contemporary vase paintings. But in our charioteer the bounding lines of the tunic on neck and shoulder are not marked by incised lines and were therefore presumably indicated by the contrasting tones of flesh and tunic. (We may compare the well-known torso no. 599 from the Akropolis, where the bottom of the cuirass is shown in relief but the bounding line at the top is omitted.) As charioteers regularly wear long white tunics in black-figured vase paintings—contemporary with our marble panel—it is likely that our charioteer’s tunic was also white. And if the tunic was “reserved” white, it would follow that the contrasting shade on his arm and neck was a flesh color.

How does this observation fit into the general picture? The cumulative evidence that the flesh in Greek sculpture was not left in the snow-white color of marble, at least in the case of male figures, is strong. Both in Egypt and
in Crete colored flesh for male figures, both in the round and in relief, was the rule for white limestone (white marble was not used). One would not expect the Greek artists to break with a long tradition in this respect. And we have definite evidence that they did not. In the archaic limestone pediments from the Akropolis, Herakles, Iolaos, Typhon, and others have rose-colored flesh. On some of the archaic metopes from Selinus a reddish color survived on the flesh when the reliefs first came out of the ground (1822-1823). Naturally on porous limestone color would survive longer than on the closer-grained marbles. But also in marble sculptures we have undoubted examples with colored flesh, of male figures in the early periods and of male and female in the later: for instance, the archaic head B 93 in the British Museum; the relief no. 55 from the Akropolis (about 470 B.C.); the figures on the Mausoleion frieze, on a rock tomb at Myra (fourth century B.C.), and on the Alexander sarcophagus (early Hellenistic period); the Graeco-Roman head no. 1597 in the British Museum. These marbles, which include examples in the round and in relief, from archaic to Roman times, can hardly be isolated instances, but doubtless follow an accepted convention.

Ancient writers, though they supply notoriously little information regarding technical matters, give some help in this problem of how the nude portions in marble figures were treated. In a well-known passage about the application of red color to the exposed parts of a building Vitruvius says: “Though it [red] keeps its color perfectly when applied in the polished stucco finish of closed apartments, yet in open apartments, such as peristyles and exedrae or other places of the sort, where the bright rays of the sun and moon can penetrate, it is spoiled by contact with them, loses the strength of its color, and becomes black. And if anyone should . . . wish the red finish to retain its color he must, when the wall is finished and dry, rub over it with a stiff brush Punic wax melted and diluted with a little oil; and afterwards with live coals in an iron vessel heat the wall so thoroughly as to dissolve the wax and make it smooth; then rub it down with a candle and clean cloths, just as nude marble figures are treated. This process is termed ganosis in Greek. The protecting coat of Punic wax prevents the light of the moon and the rays of the sun from licking up and drawing the color of such polished finishing.” This description is repeated by Pliny, who ends “as one treats marble figures to make them brilliant.” Perhaps an echo of these descriptions is found in Plutarch’s statement, “The ganosis of the statue [of Jupiter Capitolinus] was necessary, for the red ochre with which they used to color statues in olden times soon fades.”

To explain this evidence a belief became current and is still widely held that an application of wax and oil on the marble gave it an ivory tone approximating the color of flesh. However, practical experiments have shown the fallacy of this belief. Wax, heated and applied according to Vitruvius’s receipt, does not change the color of marble, but leaves it white. Moreover, that the purpose of the wax application was to preserve the color is clearly implied in Vitruvius’s description of ganosis and in the fact that Punic wax, known for its purity, was used.

We must therefore find another way out of the dilemma—we must accept the fact of colored flesh in Greek sculpture, but we must find some means of coloring which did not obscure the surface of the marble and was not long-lived. Practical experiments in this Museum have shown (1) that a flesh color, if applied as a thinnish wash, does not obscure the surface of the marble, and (2) that a wax coating—the ganosis referred to by Vitruvius—is necessary to prevent such an application from being affected by water. Without a wax coating the thinly applied color could easily be removed with a wet rag; when protected by a wax coating, it could not. In sculpture placed out of doors a wax coating was therefore a necessity. In the course of time the wax would, of course, disintegrate. A thinly applied color would then naturally disappear more quickly than a more thickly applied one, especially if put on the smooth, polished sur-
face favored for nude areas, instead of the slightly rough ones used for hair, drapery, and backgrounds of reliefs.

The exact procedure can only be conjectured, for we know little about ancient media and vehicles. In our experiments we used red and yellow ochers for our colors, egg for the medium. For the wax coating we heated beeswax and added a small amount of olive oil (as Vitruvius and Pliny prescribe), rubbed the solidified mixture lightly over the dried painted surface, and then applied heat sufficient to remelt the wax by holding a hot flatiron close to the surface; after wax and marble had cooled, the wax was lightly polished and the whole acquired the sheen of flesh. In another experiment we added the color to the liquid wax, applied the mixture while still warm with a stiff-bristle brush, and later applied heat with the iron. We found the former experiment easier to manipulate.

That wax was used in the application of color on ancient sculptures and buildings is known not only from the description in Pliny and Vitruvius but from other literary and epigraphical evidence. In the building inscription of the Erechtheion (408-407 B.C.) "encaustic painters" are mentioned as having decorated a marble molding. The term "encaustic statue maker" occurs in a Roman inscription. Plutarch speaks of "encausters, gilders, and colorers of statues." In the Hellenistic temple inventories of Delos purchases of wax and oil are listed for the treatment of statues, sometimes for the same statue in different years, indicating that the wax application had to be periodically renewed.

Moreover, traces of wax have been found in actual examples: for instance, together with a flesh color, on the face and neck of the marble head of a woman in the British Museum (no. 1597) and on some of the painted ornaments of Greek marble temples. Furthermore, we know from the statements of ancient writers and from inscriptions that in paintings an "encaustic" technique was used from the fifth century B.C. down. And the dry climate of Egypt has preserved for us Graeco-Roman examples of such paintings in the mummy portraits from the Fayûm. There is therefore no difficulty in supposing that the techniques postulated by us—or similar ones—were used in ancient times.

In our discussion we have been chiefly concerned with predicating a flesh color for male figures. Whether the flesh of female figures was also tinted is another question. To judge from the present evidence it was perhaps left white in the archaic period, colored in the later periods. We must remember that in the sixth and fifth centuries B.C. female figures were regularly draped and that the undraped portions were therefore not extensive. Though in Egyptian paintings the flesh of women is generally yellow or light brown and only exceptionally white, in Minoan paintings it seems to have been regularly white. On black-figured Corinthian and Athenian vases of the seventh to the fifth century the convention is white for the flesh of women, black for that of men. In a sacrificial scene on a recently discovered sixth-century wooden panel the women have white flesh, the boys brown. In archaic terracotta statuettes and plaques the flesh of women is white, that of men yellow or brown. The same applies to early Etruscan mural paintings. And on a late seventh-century limestone sphinx in this Museum white pigment is preserved on the flesh. The accepted convention in the archaic period seems therefore to have been white flesh for female figures, with color only on lips and eyes (and possibly occasionally on cheeks).

By the fourth century, however, when nude statues of women were common and a naturalistic rendering had taken the place of the earlier conventions, it seems likely that the flesh of women was regularly tinted. We have important witnesses of color application on the flesh in the Hellenistic marble gravestones from Thessaly in which the flesh of the women as well as that of the men is naturalistically colored, in the Graeco-Roman marble head in the British Museum, which has a pinkish color preserved on the face, in a Hellenistic marble sarcophagus in Florence where the Amazons have light-colored flesh, in the later Greek and Etruscan terracottas and mural paintings
Cavetto capital from a gravestone, about 560-540 B.C.

In these drawings by Lindsley F. Hall the black areas are shown solid, the red dotted. The black areas above are conjectural.

where the women have pinkish flesh, and in the pinkish female statues which are occasionally represented in Graeco-Roman murals.

To impart the delicate, variegated tones that in the later periods had taken the place of the archaic flat washes was evidently a fine art, and great painters were engaged to color the statues. According to Pliny, when Praxiteles was asked “which of his marble statues he prized most highly he replied ‘those to which Nikias [a famous painter] had put his hand,’ so much did he prize the circumlito of that artist.” And Lucian, in his description of an imaginary portrait of an ideally beautiful woman, calls in first Pheidias, Alkamenes, and Praxiteles to impart the form, and then the great painters Polygnotos, Euphranor, and Apelles to add the colors and to apply to the flesh a tint “not too white, but just suffused with red.”

To sum up our findings: Marble as well as limestone sculptures were regularly colored throughout antiquity. We have strong evidence that this coloring included the flesh of male figures from archaic times down. In the case of female figures the evidence at present available favors colored flesh in the later periods, possibly white flesh in archaic times. In trying to visualize the original appearance of Greek and Roman sculptures we must, therefore, bear this evidence in mind and add the vanished colors in our imagination.

NOTES ON THE PLATES

The principle followed in the water-color copies reproduced here was to restore a given area from existing traces of color however slight. Corresponding areas, even where no trace remains, have also been colored, for example many of the twists and dots in the guilloche in plate III. In the record of colors given below, the following terms are used: “Abundant” color describes an area on which the color is preserved in a wash or in mottling so extensive as to suggest the original effect. “Traces” are small, easily discernible patches. “Faint traces” are patches readily found and identified with the magnifying glass. “Very faint traces” are particles of color which were discovered and identified only after careful

Volute capital from the gravestone shown on page 234. About 540 B.C.
scrutiny with a strong glass. In the drawings the areas shown as in reserve have been given a color to approximate that of the weathered surface of the stone.

Plate I. Sphinx from the gravestone shown on page 234. About 540 B.C. Painted marble. Red is abundant on the hair, diadem, necklace, some of the alternate breast feathers and and flight feathers, the end of the pisiform bone, and the border of the abacus. There are traces of red on the remainder of the alternate feathers and on the irises of the eyes. Traces of blue are on alternate flight feathers, except one or two, and were also found on a sufficient number of alternate breast feathers to indicate that they too were painted blue. There are traces of blue on the tuft of the tail. Abundant black paint outlines the flight feathers, and faint traces of black appear on the eyebrows. There are no other color traces on the areas shown in the drawing. Red has been arbitrarily added to the lips, and black to the pupils of the eyes. It is obvious that there is a meander on the red diadem, but the surface is much encrusted, and the exact pattern, as well as any color traces that might be on it, is obscured.

Plate II. Warrior mounting a chariot, from the gravestone shown on page 235, about 535-525 B.C. Incised and painted marble. Black is preserved in extensive mottling over the whole background and is also well preserved on the horses' hoofs and on the manes of the white pair. Faint traces are discernible on the eyes of all the horses, and the hub of the chariot wheel is black. From faint traces of black found on the lappets of the warrior's cuirass the whole garment has been restored. There are traces of black on the central part of the crest. Red shows in abundance on the bands above and below the scene and also on the mane, legs, and tail of the tallest horse; on its face there are very faint traces. Traces of red are found on the mane, face, chest, belly, and legs of another horse and faint traces on its tail. There are faint traces on the chariot, chariot pole, harness, and reins, and on the charioteer's goad and the warrior's shield, and very faint traces on the chariot wheel and on the sleeve and skirt, the crest, and the crest support of the warrior. The yoke, red in the illustration, shows no trace of color except where the reins cross it. The warrior's left foot, though properly sculptured, was painted black like the background; in the copy it has been left in reserve. Certain areas, such as the helmets, where we should expect color, have been shown in reserve for lack of evidence.

Plate III. Part of the gravestone of a warrior shown on page 235. About 535-525 B.C. Painted marble relief. Red in abundance covers the background of the relief and the face of the ledge on which the figure stands; there
are plentiful traces of it on one of the three strands of the right-hand guilloche border. The left border shows only two very faint traces at the bottom. Traces of blue occur on the greaves and on the warrior's spear and on one of the guilloche strands in the right border, and traces of green in several places on the third strand of this border. Though no trace remains, in the drawing blue and green have been applied to the left border in the same order as on the right. There is abundant black on many of the dots of both borders.

**PLATE IV.** Part of a sphinx, perhaps from a gravestone. About 560 B.C. Painted limestone. Red is abundant on the narrow raised bands outlining the breast and the wing coverts. A blob of red is preserved at the center of most of the feathers of the wing coverts. On the breast no color is preserved, except that a red spot occupies the center of each feather of the top row. On the flight feathers abundant red occurs as a heavy central stripe on the primaries. Traces of black are found only on the flight feathers. Black above and below the red stripe appears on the primaries, and there are faint traces of black on the secondaries. Both are outlined in reserve.

_The archaic gravestones discussed here together with Mr. Hall's colored restorations are shown in the current Exhibition of Greek Paintings in Galleries D 8-10. A tentative reconstruction of the chariot scene shown in plate ii (with helmets, spear, belt, and flesh also colored) is used on the cover of the Picture Book illustrating the exhibition. In the practical experiments of applying colors to marble I have had the expert help of Murray Pease, Gordray Simmons, and Charles Wilkinson._—G. M. A. R.