NOTES ON THE INTERIOR OF THE HEPHAISTEION

THE Hephaisteion in Athens, though by far the best preserved building of the Perikleian age, presents certain structural details which make a restoration of its interior peculiarly difficult. In the recent study by W. B. Dinsmoor [1] the evidence for the arrangement of the cella is discussed in great detail, and on the basis of the tantalizingly scant remains a restoration of the interior is presented. The observations made in the course of the excavation and the results of the author's study of the building are set forth with clarity and objectivity, so as to make it possible without visiting the site to pass independent judgment on the validity of his conclusions. Two peculiarities of the building invite further discussion.

I. THE INTERIOR COLONNADE

By far the most significant clue to the interior arrangement is furnished by a marble beam, convincingly identified as an epistyle of the superimposed order of columns. This block,[2] the sole surviving member of the interior colonnade, preserves several peculiar features of special importance for the restoration. One end has a square joint with anathyrosis. In the top at that end are cuttings for two double-T clamps and a shifting-notch, and at the bottom another shifting-notch and a dowel hole. The other end has two setbacks: a shallow rebate, 0.074 m. long and 0.029 m. deep, and a larger recess, 0.23 m. deep and of unknown length. The resulting tongue, half as wide as the block, is broken away a little beyond the beginning of the second setback. At the end of the recess there was a clamp for fastening the epistyle to the adjoining block, and a little below the top is a shifting-notch. There may have been a clamp-cutting also in the missing portion of the tongue. In the top of the block near the middle are two cuttings, one for a dowel, the other a pry-hole. One face, that with the shallow rebate, is plain, the other has a taenia at the upper edge 0.097 m. high and projecting 0.011 m. from the face. On the top of the block above the taenia is a rough band, *ca.* 0.08 m. wide, which is explained as the result of exceptionally severe weathering and perhaps also of more careless tooling. The soffit has an unpolished bearing surface, 0.235 m. wide, at the square end; at the stepped-back end it is smoothly polished well beyond the end of the larger recess, but close to the break across the tongue the surface is roughened, showing that the missing portion was not exposed. The total height of the block measures 0.409 m.; the width of the soffit is 0.514 m.

[1] *Observations on the Hephaisteion, Hesperia*, Suppl. V, 1941. Professor Dinsmoor has kindly enlightened me on certain points in his publication on which I had drawn erroneous conclusions.

[2] W. B. Dinsmoor, *op. cit.*, pp. 74 ff., and figs. 30, 32, 33.

The position assigned to this block is the southeast corner of the cella in the second story, where it spans the distance between the east cella wall and the first column of the south colonnade. The square end is placed over the column, the other is fitted into the wall. From his study of this block Dinsmoor has further deduced that there was no anta facing the column, that the span indicated by the preserved block was shorter than the normal intercolumniation in the cella, and that the ceiling over the nave was at a higher level than the ceilings over the aisles.

The placing of the block in this position involves serious difficulties. The taenia, which would normally be on the front face, is turned toward the wall where it could hardly have been visible from below. This anomaly has been disposed of by restoring a low course above the epistyle with appropriate mouldings toward the nave. It is difficult to appreciate the necessity for such an arrangement which would merely serve to raise the height of the epistyle, making it higher than that over the lower order of columns.[3] Furthermore, " the face containing the taenia exhibits no sign of contact with the wall at 1.296 m. from the square end," that being the distance from the square end to the large recess, nor was the taenia cut away, as would be expected, along the upper edge of the tongue extending into the wall. Although other instances of similar waste of labor are cited, it seems inexplicable that the mason who cut the recesses on the other side in order to fit the block neatly into the wall should have chosen the more laborious process of cutting a slot in the wall block rather than remove the moulding along the joint. This lack of practical sense becomes even more remarkable in view of the complete uselessness of the two recesses as explained by Dinsmoor. A glance at his drawings in figures 32 and 33 is sufficient to show that, as the block is there placed in the wall, the recesses can have served no practical purpose whatever. An attempt is made to show that the jointing of the blocks in the east cross wall necessitated this peculiar treatment of the epistyle joint. It must be borne in mind that the jointing of the missing wall, as Dinsmoor admits, is largely conjectural, nor is it possible to determine the exact distance from the epistyle to the flank wall. But even if these conjectures are correct the reason for weakening the epistyle by cutting away half its width is far from evident. The epistyle might have been inserted anywhere irrespective of the jointing in the wall. Structurally it would be of slight importance where the joint came with respect to the wall blocks, whereas the weakening of the epistyle itself would be a serious matter.[4] Furthermore the shallow rebate, which becomes an important point in the argument, is explained as " a special device for the purpose of concealing any miscalculation in the width of the beam socket." This explanation can hardly carry much weight.

[3] See section of temple in Dinsmoor's drawing, figure 35, page 87.

[4] The parallel furnished by the joint between the east and north walls in course XIII (see Dinsmoor, p. 83) is more apparent than real. In such a joint between two solid walls, it was merely a question of concealing the edges of the marble, whereas the architrave with no support underneath, except at the two ends, would have been dangerously weakened by the cutting away of half its width.

The unpolished bearing-surface on the soffit at the square end, sufficiently distinct to be measured, is 0.235 m. wide, and this Dinsmoor logically enough takes to represent half the width of the capital. But in his calculation of the diameter and height of the columns this concrete evidence is completely ignored. The reason is obvious. An epistyle with a soffit 0.514 m. in width cannot have rested on an abacus measuring only $2 \times 0.235 = 0.47$ m. A slight discrepancy might be accounted for by adding the width of a protective surface along the edge of the abacus, since the polished surface of the soffit may have extended over this band, but this cannot make up for so large a difference. An epistyle of that width calls for an abacus some 60 cm. square, or nearly a fourth larger than that indicated by the bearing-surface on the soffit. This discrepancy is sufficient to show that the proposed restoration cannot be accepted.

Quite apart from the indications furnished by the extant block, the restoration of the interior colonnade is structurally unacceptable. The two stories of Doric columns with their epistyles are not anchored to the rest of the building except in the east wall.[5] The rest is completely free-standing. The wooden ceiling without beams over the nave offers no proper anchorage. A slight earthquake, such as frequently occurs even in Athens, would be sufficient to set the whole interior colonnade in motion, and thus cause damage both to the carved ceiling and to the marble construction. Furthermore, as if to flaunt his disregard for structural exigencies, the architect needlessly reduced the thickness of the upper epistyle at the two points where it ties into the wall, leaving only a narrow tongue in each case as the sole connection with the rest of the building. The walls of the cella, preserved to a height well above that of the lower columns, show clearly that there was no anchorage at that height, except perhaps in the missing east wall. That being the case, we must assume that the upper order of columns was structurally connected with the flank walls and possibly with the west wall as well.

Dinsmoor has demonstrated that the upper epistyle corresponded with course XVII in the walls. At that height the flank walls consisted of two faces, a low outer face, 0.207 m. high, carrying the epikranitis moulding, and an inner face probably of the same height as the epistyle. Only the outer face is preserved. On the inside the mediaeval vault rests upon the inner half of course XVI.

It would have been possible to anchor the interior colonnade to the side walls by extending the wooden ceiling beams clear across the whole cella.[6] They could have been doweled to the top of the epistyle and their ends fitted into the side walls so as to obtain proper anchorage. For some reason this procedure was not followed. Proba-

[5] Dinsmoor (p. 77) assumes that the lower epistyle was housed in the missing east cross wall, and he goes on to say (p. 78): "Consequently the upper epistyle, likewise, could have been housed in a cross wall only at *one* of the east corners of the cella." This must be a slip. He seems to have had in mind only the preserved epistyle block, though he does not say so.

[6] This was the case in the Aphaia temple on Aigina, according to the restoration of E. R. Fiechter, which, however, rests largely on conjectures, as the author admits, *Aigina*, p. 39, and plates 36 and 39.

bly the wood, always liable to shrinkage and warping, was not considered sufficiently safe for securing the marble colonnade to the cella walls. The dowel-cutting and the pry-hole in the top of the preserved block, which cannot have been made for fastening a wooden ceiling beam, offer positive evidence that another stone course rested upon the epistyle. Dinsmoor has used these cuttings as proof for the existence of a moulded cornice course facing the nave. But in order to make room below the purlins he has restored the ceilings over the aisles at a lower level than that of the ceiling over the nave. He finds further evidence for such an arrangement in the rough band on the epistyle block above the taenia. On this band he places the edge of the wooden planks by which the aisles were ceiled, and suggests that this ceiling, " presumably

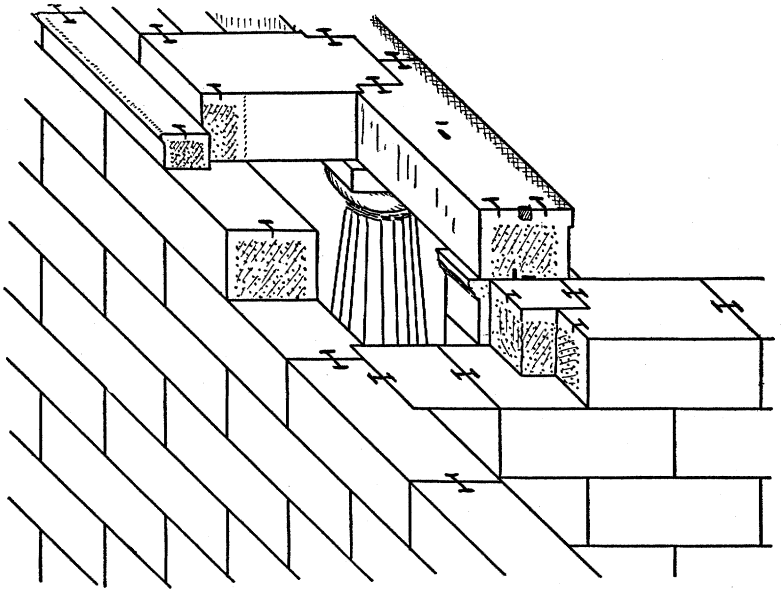

Fig. 1. Sketch Showing Position of Architrave

of wood, collapsed long before the removal of the marble interior cornice slab which covered most of the epistyle."

To obviate the difficulties involved in Dinsmoor's restoration, it is sufficient to turn the block around in the same position, so as to place the square end toward the wall and the recessed end over the column. The result is shown in the sketch Figure 1, which is not drawn to scale but merely indicates the position of the block in question.

The bearing-surface on the soffit now rests upon an anta, the capital of which, projecting 0.235 m., may have been morticed into the east wall as indicated in the drawing. The epistyle abuts against the wall, where it is doweled to the anta block at the bottom and fastened to the wall by means of two clamps. The shallow notch at the top of the square end [7] appears to have originated from the dismantling of the

[7] Dinsmoor, figure 30.

colonnade. It is roughcut in the anathyrosis in a manner wholly at variance with fifth-century practices. Whether the cutting in the recess at the other end originated in the same way cannot be determined from the available photographs. Thus, far from showing the absence of an anta, the preserved epistyle block offers positive proof of its existence and indicates the extent of its projection from the wall.

In this position the profiled side of the beam faces the nave, as would normally be the case [8] and the double recess, now placed above the column, finds a logical explanation. It must be assumed that the adjoining epistyle block had similar cuttings. On the side toward the aisle the large recesses in the two adjoining blocks make room for the tongue of a short marble beam extending from the column to the wall. The shallow rebate was made to permit the full width of this beam to rest firmly on the capital and to remove its weight from the projecting corners of the abacus. The triple joint above the capital was most carefully conceived so as to distribute the weight of the three beams equally on the abacus and to secure the colonnade firmly to the wall.

The anomaly of having the ceiling beams on the same level as the epistyle is accounted for by the necessity of a low ceiling over the aisles. There would not have been room beneath the roof construction for ceiling beams to be placed above the epistyle. This may be less anomalous than appears at first sight, for very little is known about the construction of interior ceilings in Greek temples. In view of the narrowness of the aisles this arrangement would have the effect of semi-engaged columns.[9] Similar ceiling beams may have spanned the greater distance between the rear columns and the west wall, but in the absence of material evidence this must be left to conjecture.

It remains to discuss the cuttings and the rough border on the top of the epistyle block. The border will now be turned toward the cella.[10] Dinsmoor's interpretation that the roughness indicated contact with wood seems most probable, but it is difficult without examining the block to determine whether this was caused chiefly by cutting or by subsequent weathering. I would suggest that a wooden sheathing carrying the same decoration, carved or painted, as the ceiling beams, filled the space between the beams over the nave. This would in effect serve as the crowning member of the entablature set off from the epistyle by the plain taenia. The latter may have had painted decorations.

The epistyle supported at least one stone course, as is indicated by the dowel hole

[8] See Dinsmoor, p. 84.

[9] If the level of the upper epistyle is correctly calculated as corresponding to course XVII in the wall, it should be possible, by laying bare a section of course XVI, to ascertain the correctness of the arrangement proposed here. The marble ceiling beams over the aisles were probably doweled to the top of course XVI. Such an investigation, if successful, should also reveal the spacing of the interior colonnades.

[10] It does not show on the published photographs, but it is clearly indicated in Dinsmoor's drawing in figure 33.

and the pry-cutting in its top. This was probably a low course of the same height as the ceiling beams, and with notches in which the ends of the beams were held in place. No traces of the beams are indicated in Dinsmoor's drawing (fig. 32), but the top of the block is much weathered. How the narrow aisles were ceiled can only be conjectured. It may have been done, as Dinsmoor suggests, by wooden planks, or possibly by marble slabs resting on the cross beams alone, thus leaving no traces on top of the epistyle block. Since in any case the ceiling must have been practically invisible from below, it was probably a very simple affair.

The problem of the number and spacing of the interior columns is only slightly affected by the proposed change in the position of the epistyle block, but the anta in the second story, the existence and projection of which can now be determined with accuracy, should be taken into account in the final restoration of the colonnades. A corresponding anta has to be restored for the lower story.

II. TREATMENT OF WALL SURFACES

A peculiar feature of the Hephaisteion is the treatment of the interior surfaces of the walls. The marble blocks were first smoothed and then " stippled with a single point driven in vertical strokes seldom more than 0.005 m. long," but an unstippled border of varying width was left around the edges of each block. Dinsmoor subscribes to " the logical deduction " frequently made in the past " that the stippling was a preparation for the effective adherence of stucco—which in turn would have been painted." This obvious explanation is, however, less logical than at first appears.

It is important to bear in mind that the numerous articles on this subject by former generations of scholars were written chiefly for the purpose of showing that the walls of the temple—then thought to be the Theseion—carried the paintings of Mikon which Pausanias saw and described. Today few scholars adhere to this view. Now, since there are no references to paintings in the temple of Hephaistos and Athena, we have nothing to consider but the walls themselves in trying to determine whether paintings were or were not intended by the architect of the building. Dinsmoor does not believe that the paintings were executed, but merely that the walls were prepared for this purpose.

In the first place the stippling covers not only the side walls up to the top of the lower story, which might have been expected to carry paintings; it extends over the entire surface of the interior walls, with the exception of the dado formed by the projecting course of the orthostates. Moreover, it covers the inner wall surfaces of the opisthodomos as well as the two preserved side walls of the pronaos; and, without doubt, the missing east cross wall was similarly treated. Dinsmoor does not state in his treatise whether all these walls were intended to be stuccoed and covered with paintings, but in a note on my manuscript he has made this clear. In his opinion the

interior walls of the cella, pronaos, and opisthodomos from the dado to the epikranitis, were prepared to receive stucco and paintings. The implications of this statement will appear later.

The problem will be definitely solved if we can determine whether the stippling was executed before or after the blocks were built into the walls. Dinsmoor, who accepted the first of these alternatives, points to the presence of a paper-thin relieving margin on the bottom of the wall blocks, along both the interior and the exterior faces and even across the transverse joints. This seems to imply that the blocks, when built into the wall, lacked the usual preliminary surfaces to be removed later. On this assumption, the smooth margins surrounding the stippled panel were intended to facilitate accurate setting of the blocks.

It is, I believe, possible to show that the stippling was executed after the erection of the walls. At the two ends of the missing east cross wall every other course was bonded into the flank walls, and for the alternate courses an anathyrosis was prepared. The contact surface consists of a broad band left unstippled, whereas in the rest of the joint the marble has been roughly cut away in the usual manner. In each case the anathyrosis extends across a joint in the flank walls. It is unthinkable that this preparation took place on the ground, where it would have been difficult to match the two blocks together, while it could be done so much more easily in the wall. Moreover, the first wall course above the orthostates has a peculiar joint consisting of the usual contact surface set off by a narrow rough band, but the interior surface has not been removed as in the other courses. Here, too, the surface is smooth, indicating that the blocks when set in the wall were finished except for the stippling.

As final proof we may point to the condition of the rear wall of the opisthodomos, where " the lowest wall course (IV) above the orthostates is exceptional in being smoothed (not polished), as if [11] preparatory to being stippled, and was so left, probably through oversight. The outer faces of the flank walls were smoothly polished " (p. 94). The observation that this lowest course was left smooth is of the utmost importance for our problem, but the explanation offered by Dinsmoor is not convincing. " These five blocks," he says (p. 101), " obviously intended for the flank walls with the smooth outer face, were used by mistake in the cross-wall because the blocks were interchangeable in length, height, and thickness." But he states in the same paragraph " that the walls were erected, not with the usual preliminary surfaces to be dressed down afterwards, but rather in their final finished form." [12] These misplaced wall blocks should then have the smoothly polished outer surface of the flank walls, rather than the surface prepared for stippling.

[11] The modifying words (as if) are not in Dinsmoor's text but were inserted by him on my manuscript with the following explanatory note: " This (the description of the unstippled blocks) is a statement of what one sees, not a deduction. The deduction is a different interpretation. I admit it would have been clearer if I had inserted ' as if '."

[12] To this quotation Dinsmoor has penned the following note: " Probably the outer wall surfaces were wiped over after erection. They might have been ' sand papered,' so to speak."

Furthermore, one would like to know what happened to the five blocks prepared for the opisthodomos wall. If the two sets of blocks were interchanged, they ought to have been used to take the place of the misplaced blocks in the flank wall. But if the stippling, which cannot have been removed without reducing the total thickness of the blocks, had been applied before the blocks were built into the walls, the blocks from the west cross wall would have been stippled on both sides, and the mistake should be discernible in both places. In fact it would have been so obvious to the masons that it could never have been made.[13]

Apart from these difficulties it is most unlikely that all the blocks of one course should have been replaced with blocks of the flank walls, whereas no such mistake has been observed in the rest of the building. A much simpler explanation is at hand if we assume that the stippling was done after the walls were erected. The workmen, beginning at the top, would have used scaffolds, lowering these from time to time as each section of the wall was finished. The last course above the orthostates, which could be reached from the floor, was then left unfinished after the last scaffold was removed. It is quite possible, moreover, that this omission was intentional. Some permanent furniture of marble, a high bench or table, may have been placed against the wall so as to cover the unstippled wall course.[14]

The inevitable conclusion from these observations is that the stippling, like the polishing on the outside, was done after the walls were constructed. We may assume that the inner and outer surfaces of the blocks were similarly smoothed and thus indistinguishable until placed in the walls. Neither the stippling nor the polishing would have altered the thickness of the blocks, hence the necessity for the relieving surface to prevent chipping at the edges. But if the walls received their final dressing after erection, the stippled panels within smoothed frames cannot have been put on as a preparation for stucco. The unstippled border can then have served no purpose but would, on the contrary, have weakened the adhesion of the plaster. That being the case, we can only conclude that this treatment of the wall surfaces was part of the decoration and intended to be seen, and thus offers positive proof that the walls—at this stage of the work—were not intended to receive paintings.

This leads to the consideration of another peculiarity of the walls, which has also been interpreted by Dinsmoor as evidence that paintings were intended for the cella of the Hephaisteion. In the anathyroses of the vertical joints there is a narrow

[13] In his notes on my manuscript Dinsmoor suggests that the misplaced blocks of the west wall were not used at all, but that some extra blocks, ordered for the flank walls, were by mistake inserted in the west wall. There are, he points out, other instances of left-over material in ancient buildings.

Mistakes are, of course, possible in any product of human hands, but recourse to such interpretations should be had only where no other explanation is possible.

[14] Such a table is still *in situ* in the opisthodomos of the Aphaia temple; E. R. Fiechter, *Aigina*, pp. 44-45.

channel, square in section and turned so that the wall joint cuts diagonally through the square. In undisturbed sections of the walls this channel has a filling of lead poured from above. Though obviously it can be observed only in a limited number of places,[15] there seems to be no doubt that all the vertical joints of the walls above the orthostates were similarly leaded. In most instances the lead is near the inner wall face, but in the two cross walls it is sometimes near the outer face. In three observable cases the leaded channel stops short before reaching the bottom of the block.

Dinsmoor, without discussing the difficulties involved, calls this treatment of the joints waterproofing, and adds (p. 103) that " the stippled surfaces and the lead waterproofing must be equally decisive evidence, unaccompanied by literary allusions, that mural paintings were planned inside the Hephaisteion." Now, in view of the contrary explanation for the stippling, presented in the preceding pages, it becomes necessary to inquire further into the significance of the leaded joints.

This feature, like the stippling, is not limited to particular sections of the walls. It extends to the highest course that can now be examined, and is found also in the walls of the pronaos and the opisthodomos.

On the supposition that it was intended as waterproofing, the purpose would presumably be to keep rain water from seeping through the joints and thus damage the painted plaster. The objection may here be raised that the walls are already protected from rain by the peristyle. In a driving rainstorm it is conceivable that some water might splash up from below so as to wet the lower section of the wall—the only part in which the joints are not waterproofed.[16] Under no conditions could rain beat against the upper part of the walls, which would be in no need of waterproofing even if intended to carry painted decoration. Nevertheless the leaded joints continue all the way up to the top.

Even more inexplicable is the waterproofing of the two cross walls, protected as they are by a double colonnade and removed from the eaves of the roof by a distance of about nine and eleven meters respectively. The opisthodomos of most temples was used as a repository for treasures and works of art of ivory, wood, and other perishable material, no less in need of protection than paintings on the walls. Moreover, as Dinsmoor now holds the view that both faces of the two cross walls were to be stuccoed and decorated, the waterproofing in these instances lacks all reasonable explanation. One gets the impression that the architect, throughout the construction, was unable to decide how the walls were to be treated and thus made preparation for any eventuality.

But, even if we assume that the walls in view of the intended decoration needed special protection how would the leading of the vertical joints prevent the water from

[15] Dinsmoor (p. 102) lists the instances exposed to view, and these are distributed over all the walls of the building, including the missing cross wall.

[16] The orthostates were, of course, not intended to carry paintings.

seeping through to the inside? Such seepage would be far more likely to follow the horizontal joints. Only at the very bottom of the vertical joints could water penetrate to the inside, and there we find the lead sometimes missing. It is a well known fact that a joint carefully fitted with anathyrosis is ordinarily airtight, and would thus be in no need of waterproofing. The horizontal surfaces of the blocks, being without anathyroses, are less smoothly finished, and in the Hephaisteion each block had a relieving surface at either end, leaving an open space extending through the whole thickness of the wall. Thin as this band is, if it was to serve its purpose to relieve the weight from the edges of the block, it would have to be sufficiently large to leave an open air space. If the vertical joints, already air tight, needed leading, why were these partly open horizontal joints neglected?

It may be argued that the waterproofing was not intended primarily to protect against driving rain, but rather to keep out the moisture in the atmosphere during the wet season. If so, the lead must have been poured into the joints to make them air-tight rather than water-tight. But in that case the neglect of the horizontal joints becomes even more inexplicable. Moreover, in nearly contemporary buildings specifically prepared for paintings, like the northwest wing of the Propylaia and the east cella of the Erechtheion, which were unprotected—one on three sides, the other on two—by outside colonnades, not only were the wall joints made without waterproofing, but open windows were provided through which the air could freely circulate.

There is one further link in the chain of evidence, which will strengthen the contention that mural paintings cannot have been intended for the cella of the Hephaisteion. In presenting his case Dinsmoor is fully aware of the obvious incompatibility of interior columns with mural decoration,[17] but since these columns were not part of the original plan the objection appears to be without validity. It is desirable here to examine more closely the succession of changes in plan and in details, as presented by Dinsmoor.

The cella, originally planned to be six Doric feet longer, was shortened twice, as indicated by the existing foundations. In scheme A, which called for a long, narrow cella, no interior columns were contemplated. These were introduced with the first alteration, scheme B, and both this and the later change, scheme C, came at an early stage of the construction. " The absence of any signs of alteration above the foundation courses suggests that the change of scheme occurred before the laying of the lowest marble course but after the completion of the foundations " (Dinsmoor, pp. 39 and 93). Thus before the foundations were finished, it was already decided to construct an interior colonnade.

If at this stage it was foreseen that no paintings were to be applied, how did it

[17] See p. 155: " The presence of the internal colonnade, so close to the walls, bisecting them vertically and subdividing them into many panels laterally, would have been thoroughly incompatible with such paintings."

happen that the walls were still constructed in preparation for paintings? It must have been a costly process to stipple all the blocks, since this, as Dinsmoor asserts, was done " with a single point driven in vertical strokes seldom more than 0.005 m. long." (Surely a less laborious process of roughening the marble surface would have been invented if the walls were later to be covered with stucco.) The leading of the wall joints, even more costly, could also have been omitted as soon as it was decided that the walls were not to be painted. Instead of that the architect continued to construct the walls as if the first plan were to be executed.

The objection might here be raised that the blocks—at least a large number of them—were already finished and ready for use. This, however, was not the case, as is implicit in Dinsmoor's statement that there are no signs of alteration above the foundation. In the juncture between the east cross wall and the two flank walls, the smooth unstippled surface of the marble is left as anathyrosis, which would not have been the case had the blocks been prepared to fit the original scheme.

Dinsmoor (p. 154) regards it as probable that the blocks " may have been ordered and delivered long before the final position of the cross walls was determined," and further " that they were even finished on the ground with the stippled panels and smooth margins long before erection." Such a procedure would be sufficiently contrary to common practice to throw suspicion on the whole theory of intended wall paintings, and Dinsmoor is forced to admit that much of the preparation for paintings was done during erection. Thus he gives with one hand and takes away with the other, for he offers a second explanation inconsistent with the first, to the effect that " the stippling was done on the ground and the water proofing *during erection*, either in accordance with the earlier contract and specifications which were no longer valid, or because it was still hoped in some quarters that the mural painting would not be incompatible with the interior colonnades."

The whole discussion about the treatment of the wall surfaces would seem more to the point if the process involved were otherwise known. Dinsmoor admits that the marble walls " would not actually have required stucco as a background for painting." That painting on marble was practised by Athenian artists is testified by extant examples, but he assumes that the stucco was applied for the purpose of concealing the joints, although he can point to no other examples of such procedure. The closest analogy he finds in the Stoa of Zeus Eleutherios, the walls of which carried the paintings of Euphranor. Five blocks, re-used in a later structure, were identified by Homer Thompson [18] as belonging to the rear wall of the stoa. One face of these is stippled, and in the joints, close to the other face, are shallow grooves comparable to the lead channels in the walls of the Hephaisteion. Significantly enough these grooves extend only to within 9.5 cm. above the bottom. So far as the stippling goes the blocks from the Stoa do not present a parallel case, since they are of poros which

[18] *Hesperia*, VI, 1937, pp. 23-24.

was always stuccoed when paintings were applied. The significance of the grooves in the joints is also ambiguous, in view of the fact that the paintings by Euphranor were made about half a century later than the construction of the building. As in the case of the Hephaisteion, Dinsmoor explains the discrepancy by the irrefutable theory of "unfulfilled intention."[19]

That such intention played no role in determining the wall construction of the Hephaisteion has been sufficiently demonstrated above, but quite apart from the material evidence there are other objections to the supposition that wall paintings were planned for the temple. Even without interior columns the cella of a peripteral temple, inadequately illuminated, is ill fitted for mural decorations. It is no accident that none of the famous paintings in Athens, of which many are known from literature, were—so far as can now be determined—applied to the walls of such a temple. They were placed either in rooms specially designed with windows to admit a maximum amount of light, as in the Pinakotheke and the east cella of the Erechtheion, or in stoas, like the Stoa of Zeus and the Stoa Poikile, adequately lighted through colonnades in front. No measures of waterproofing could have availed to shut out atmospheric dampness from buildings of that kind. The only other building in Athens, for which paintings are attested, is the Theseion, the plan of which is still unknown.

What purpose the stippling was intended to serve is not difficult to suggest. Rustication of a similar nature if not identical in detail was a common form of decoration in fifth-century Athens. It was used on pedestals and statue bases of marble as well as on walls of poros clearly intended to be visible. That no interior marble walls are known with such decoration is hardly sufficient reason for rejecting so obvious an explanation.[20]

It is more difficult to suggest a convincing reason for the use of lead in the wall joints. The fact that it does not occur in any of the other Periklean buildings, not even in those specifically designed for paintings—except in the Stoa of Zeus—is an indication that it was never adopted as an essential measure in Attic building technique.[21] It is possible that it was regarded as part of the system of doweling. The

[19] The unexecuted wall paintings in the Pinakotheke of the Propylaia are cited as examples of such unfulfilled intentions, but this is begging the question since it is by no means clear whether paintings were intended to be applied directly on the walls. Even if they were so intended the case is hardly parallel, inasmuch as the Propylaia unlike the Hephaisteion remained unfinished throughout antiquity.

[20] So Homer Thompson, to whom I am indebted for many valuable suggestions, regards the stippling as purely decorative both in the Stoa of Zeus and in the Hephaisteion: see Dinsmoor, p. 100, note 217, and Thompson's review of Dinsmoor's treatise in *A.J.P.*, LXXV, 1944, p. 190.

[21] The leading of the joints in the roof over the Porch of the Caryatides, to which Professor G. W. Elderkin has kindly called my attention, is somewhat similar in technique, but is hardly an analogous case. The roof blocks, which on the under side carry the carved ceiling decorations, are so nearly horizontal that special precaution was necessary to prevent seepage and erosion through the joint. See Gorham P. Stevens, *Erechtheum*, p. 114 and pl. XXVII, 1, 2. It takes the place of cover tiles in a sloping roof.

iron clamps in the top of each block were designed to counteract lengthwise tension, whereas the dowels at the bottom prevented lateral shifting along the horizontal joints. But these dowels could secure only one end of each block, and this created a theoretical weakness which could be remedied by the strip of lead poured through the channel in the joint. Such a use of lead alone for doweling, though not unknown in statuary and small monuments, is certainly very rare in architecture.

This suggestion is offered with all due reserve. If correct, it must be admitted that the procedure displays excessive caution and ignorance of structural principles on the part of the architect, and such limitations are attested by other peculiarities in Perikleian buildings. The real reason may be even less flattering. It looks very much as if the architect—or the chairman of the building commission, or some of their friends—with an interest in lead production had succeeded in selling a useless idea to the unsuspecting Demos. But whatever reason may have been adduced for the necessity of such needless precaution, the measure was never repeated except, as it seems, in the Stoa of Zeus.

In this connection attention should be called to the comparative dates of this Stoa and of the Hephaisteion, the only buildings in Athens in which this kind of wall joint occurs. Homer Thompson has dated the Stoa in the last quarter of the fifth century,[22] while the Hephaisteion, according to Dinsmoor, was erected some three decades earlier. A consideration of this feature alone would seem to indicate closer contemporaneity of the two buildings.

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[22] *Hesperia*, VI, 1937, pp. 45, 73.