



DR. COLLINGWOOD BRUCE AT THE BATH-HOUSE.

X.—THE BATH-HOUSE AT THE FORT OF CHESTERS (CILURNUM).

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I. INTRODUCTORY.

Last summer the Committee in charge of the arrangements for the decennial pilgrimage along the Wall of Hadrian did me the honour of asking me to describe to the Pilgrims the imposing ruin on the banks of North Tyne at Chesters. As it happened, I had recently been giving some attention to the plans of Roman military bath-houses, and I had been specially interested in the published accounts of this particular example. I therefore welcomed the opportunity of examining it afresh. Probably I should have hesitated if I had foreseen how difficult the task of interpretation was to prove. It is notorious that, as a result of the alternations of temperature to which their masonry was subjected, the bath-houses attached to Roman forts called for frequent repair, and that the repair was not seldom accompanied by more or less extensive modifications of plan. The Chesters building had a long life and has suffered much in consequence. Although its outer walls are in some places still 12 feet high, change and decay combined have wrought sad havoc on its internal arrangements. Not a few important details have been so hopelessly obscured that at first sight the confusion seems inextricable.

Up till now two different plans, with their accompanying letterpress, have been available for guidance. The first (fig. 1) originally appeared in the third edition of Collingwood Bruce's *Handbook* in 1885, a few months after the existence of the Bath-house had been discovered. Despite the fact that it was drawn before the north-east corner of the building had been exposed, it has reappeared without change in every edition since. The second (fig. 2), which was published by Sheriton Holmes in *Arch. Ael.* (N.S.) XII, is dated "July, 1886," and is at once complete and much more detailed than its predecessor. Nevertheless it still leaves something to be desired. The north wall, for instance, is shown as only partially cleared of earth, an indication that the work was not yet quite finished, while at one or two points elsewhere the phenomena have been more or less seriously misunderstood.

Bruce was sorely puzzled by these "suburban buildings," as he calls them. After remarking on the small number of "coins, weapons, vases, ornaments, and articles of domestic use," which their excavation had yielded, he proceeds:

"The dearth of these things leads to the idea that these halls have not been used as ordinary barracks, but have been put to some special service. What that use has been, conjecture has as yet failed to find out. Can they have been intended to defend the passage of the river?"

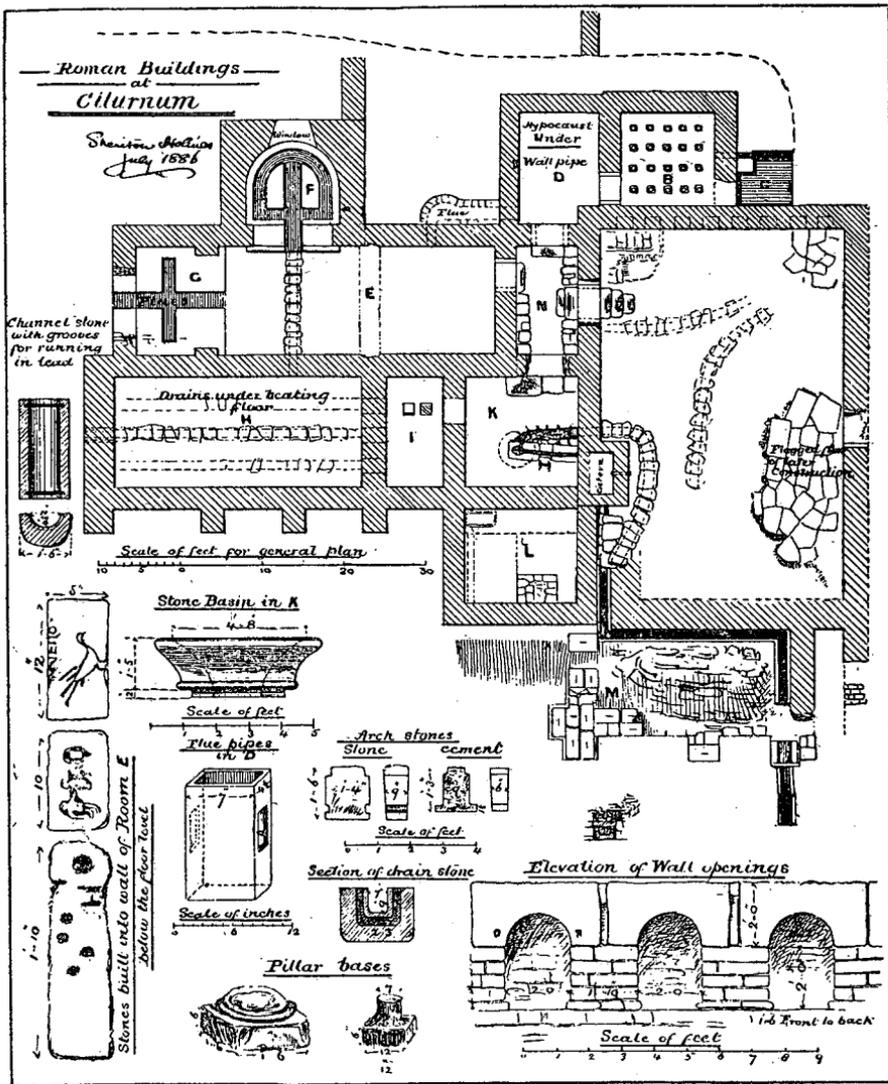
It is easy enough for the present generation of *Handbook* readers to smile at this guess. Let them turn, however, to plate XLII, where the very garb of the veteran author will suffice to remind them that the words were penned nearly half a century ago, when our knowledge of Roman forts and their surroundings was much less full than it is to-day. All the more honour to Holmes who, "after carefully considering the relation of the various apartments and their heating arrangements," came to the conclusion that they had been "a set of baths." He was confirmed in his

opinion by what he had heard from a friend about the baths at Pompeii. He also makes appeal to "a wall painting, representing a section elevation of a Roman bath," which had been found "in the ruins of the *Thermae* of Titus, at Rome." Twenty years earlier (1864) Marquardt¹ had demonstrated that the story of the discovery of the wall-painting was apocryphal and that the engraving which purported to reproduce it, was an imaginary sketch by a sixteenth-century Italian architect. That Holmes should have been misled is not surprising, for it was some time before Marquardt's account of the matter had its proper repercussion in the ordinary English text-books. But it is hardly creditable to British (or American) scholarship that the drawing should still masquerade as authentic in the fourteenth edition of the *Encyclopædia Britannica* (1929),² with no word of warning as to its true character.

In endeavouring to unravel the tangled skein, I have had the great advantage of discussing practically all of the most puzzling features on the spot with Mr. Parker Brewis, whose criticisms and suggestions have been extremely valuable. Apart from advice on technical points, I am indebted to him for the Plan and measurements, as well as for a number of the illustrations. Mr. Gerald Simpson, too, has been, as always, generous with his help. In particular, he was instrumental in bringing to light a half-forgotten series of admirable photographs by the late J. P. Gibson, taken very shortly after the Bath-house was uncovered, some of them indeed while the excavation was still in progress. These records, the handiwork of one who united in himself a whole-hearted enthusiasm for things Roman and a genuine *flair* for artistic photography, are in many ways illuminating. With the kind permission of Mr. John Gibson, the majority of them are reproduced here. So far as I can ascertain, only one has previously been published.

¹ *Privatleben der Römer*, pp. 277 f. (ed. 1886), and *Handbuch der römischen Altertümer*, V (1864), pp. 283 f.

² Vol. III, p. 203.



James Akerman, Photo-lith, London, W.C.

Fig. 2. Sheriton Holmes's Plan of the Bath-house.

Finally, Captain Keith willingly consented to my doing a little exploration with the spade, and the North of England Excavation Committee were good enough to put the services of their foreman, Mr. Thomas Hepple, at my disposal for several days. Mr. Hepple's skill and care need no commendation from me, but I ought to say that I profited much by his long and intimate acquaintance with the structure itself, and by his knowledge of the various rebuildings which the deteriorating influence of the weather has from time to time made necessary. The digging was, however, deliberately restricted to the minimum that was required for disposing of certain insistent doubts. As little as possible was touched, and I made it a rule not to move anything that could not be replaced exactly where it was found: it did not seem justifiable to run the risk of destroying evidence that might be important, should a more thorough investigation ever prove practicable. It must therefore be understood that this paper is in no sense an excavation report. At the best, it cannot claim to be more than a preliminary survey. Its conclusions are to be regarded as tentative only, and it is on that understanding that I have acceded to the request that I should publish them in *Archæologia Aeliana*.

It will save time and trouble at a later stage if I am allowed to do as I did on the occasion of the Pilgrimage, and preface what I have to say by a short sketch of a military *balneum* or bath-house, beginning with a brief explanation of the methods by which all establishments of the kind were heated.

Charcoal braziers, such as were in common use for keeping the living-rooms of houses comfortable, were occasionally employed for producing a dry heat. As a rule, however, the hypocaust or suspended-floor system (*suspensura*) was in vogue. This meant that underneath each of the heated rooms there was a *hypocaustum* or underground chamber, some 2½ feet high, roofed with slabs which rested either upon rows of short pillars or, much more rarely, upon solid masses of masonry separated from

each other by narrow passages or channels. In the case of the pillared hypocaust there was spread on the top of the slabs a layer of concrete, which might be as much as 9 inches or 10 inches thick and which, in its turn, served as a bed for the pavement of the room above. This thick floor was designed for the absorption and storage of heat. In the case of the channelled hypocaust a thinner floor might suffice, as there the work of absorption and storage was done by the masses of masonry themselves.

Opening into the underground chamber from an adjoining *præfurnium* there was in both cases a *hypocaustis* or stoke-hole, which was fuelled with wood or, less frequently, with charcoal, and by means of which the temperature of the air in the *hypocaustum* could be raised to any desired degree. The literary authorities mention three ways in which the heat thus generated might be utilized. Firstly, it might be conveyed upwards through the medium of the slabs and concrete to the pavement, from the surface of which it was diffused by radiation. This was the idea originally underlying the invention, which is generally attributed to Sergius Orata, an older contemporary of Cicero.³ Orata, however, seems to have used the device only for the warming of water, whereas by the time of Vitruvius it had become customary to apply it to the warming of rooms.⁴ In the second place, the radiation from the floor might be reinforced by radiation from the walls, up the sides of which the hot air was conducted in hollow box-tiles, arranged after the manner of those found *in situ* at Binchester.⁵ Whether this development was known to Vitruvius is uncertain, but Seneca was familiar with it,⁶ and so was the younger Pliny.⁷ Finally, the hot air from the hypocaust might be admitted direct to the chamber by shafts, the apertures of which could be opened and closed at will, thus allowing the temperature to be

³ Valerius Maximus, IX, 1, 1.

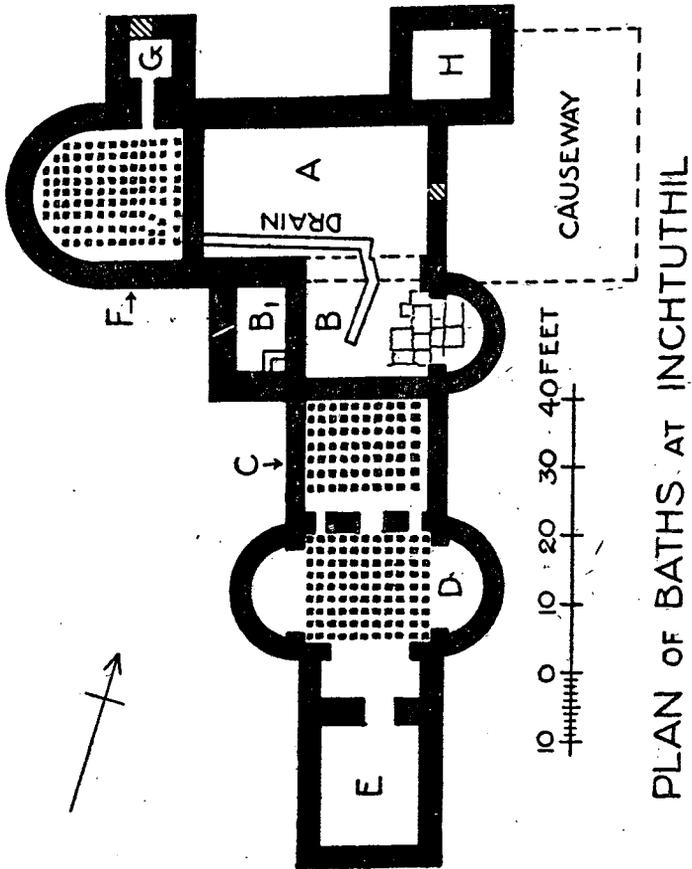
⁴ *De Architectura*, V, 10, 2 (p. 125, 15 ff.).

⁵ *Arch. Ael.*, N.S., IX, pp. 198 ff.

⁶ *De Providentia*, IV, 9.

⁷ *Ep.* II, 17, 9.

regulated. There was at least one installation of the sort in Pliny's villa at Laurentum.⁸ It is obvious that this third method was suitable only for hot air that was uncontaminated by smoke and soot. For that reason I have elsewhere suggested a special connexion between it and the use of charcoal for fuelling.⁹



PLAN OF BATHS AT INCHTUTHIL

Fig. 3.

⁸ *Ep.* II, 17, 23.

⁹ And also between it and channelled hypocausts. See the Mumrills Report (*Proc. Soc. Ant. Scot.*, LXIII, pp. 457 ff.), where I have acknowledged my obligation to Fusch's dissertation *Ueber Hypokausten-Heizungen* (Hannover, 1910).

The elaborate devices I have described will have made it evident that the ritual of the Roman bath closely resembled that of the Turkish bath, its lineal descendant. With the aid of a plan of the typical example discovered by the Society of Antiquaries of Scotland in 1901 at Inchtuthil in Perthshire (fig. 3), we may now try to follow the footsteps of the bather. After indulging in active exercise in the Courtyard, he would divest himself of his clothing in the Apodyterium or Dressing-room (A), the small apartment (H) at the north-east corner of which was probably the Latrine. Disrobed, he would pass through B, which was unheated, into the Tepidarium or Warm Room, the nearer of two hypocausted apartments communicating with one another by a door. The temperature here was only moderately high, since the hot air that entered the hypocaust beneath was not admitted directly from the Furnace Room (E) through the stoke-hole, but had to traverse the hypocaust underlying the adjacent apartment (D) before making its way through the three gaps left in the partition-wall to give it passage. When sufficient time had been spent in the Tepidarium to permit of the pores being opened, a move was made into the Caldarium or Hot Room (D), where the temperature was at its maximum. In the *scholæ* or apses at the opposite ends of this were, respectively, the *alveus* or hot bath and the *labrum* or warm-water basin, both fed from metal cauldrons which stood or were suspended in the oblong space, sometimes called the Vasarium, immediately beyond the mouth of the stoke-hole.

A sojourn in the moist heat of the Caldarium, with its bath and basin conveniently at hand, soon brought on a copious perspiration and made the skin ready for vigorous scraping with the strigil. When the bather was satisfied that he had had enough of it, he returned through the Tepidarium to the Frigidarium or Cooling Room (B), the first which he had entered after quitting the Apodyterium. There he was douchéd with cold water from a basin, which was fixed in the middle of the room and the position of

which is indicated by the drain that carried the waste water away under the floor of the neighbouring Apodyterium. To redress the balance further, he would proceed to the Cold Bath (B1), descend into it by the steps which can be seen at the lower left-hand corner, and sit for a while on the edge or on a low seat in front, with his feet and legs in the water. More than that was not possible, as the depth was only about 18 inches, if so much.

The bout of perspiration induced by moist heat was often followed by a second bout induced by dry heat. Provision was made for this in a special Sweating Chamber, known as the Sudatorium or Laconicum¹⁰ (F), which was placed in such a way as to be immediately accessible from the Apodyterium and yet as far removed as possible from the vapour that would rise from the hot bath and its accessories. In point of size the Furnace Room (G) attached to the Sudatorium presents a marked contrast to E, by which the other two heated rooms were served. I take this to mean that there was a difference in the material used for fuelling, wood being burned in E but charcoal in G,¹¹ and that at Inchtuthil the hot air was admitted direct to the Sudatorium. It should be added that some bathers contented themselves with the dry-heat process alone, supplemented of course by the use of the strigil and the application of cold water. The two processes, in other words, were not interdependent. Indeed, while the Sudatorium as a rule formed part of the main building, as it did at Inchtuthil, it was occasionally entirely detached, as we know that it was at Hardknott and elsewhere.¹²

In its general plan, as well as in many of its details; fig. 3 is an admirable illustration of the commonest type of military bath-house—appropriately called the "Reihentyp" in Germany, because it has Frigidarium, Tepidarium and Caldarium arranged in a single line.

¹⁰ *Siccus calor est . . . laconici* (Celsus II, 17.)

¹¹ Cf. L. Jacobi, *Das Römerkastell Saalburg*, p. 248.

¹² See *J.R.S.*, XVII, pp. 222 f.

Variations, however, are numerous. Thus, there may be a duplication of one or more of the hypocausted rooms, and in these cases the additional tepidarium has often a furnace room and a stoke-hole of its own.¹³ Again, in place of the "Reihentyp," there is sometimes found a scheme under which the principal apartments, instead of being disposed in a single line, were grouped into a rectangular block. There was, in short, no such stereotyped lay-out as existed for, say, the Headquarters Building. Architects had a freer hand, and consequently no two bath-houses are exactly alike. At the same time, as all had to serve the same purpose, the governing principles of construction are everywhere identical. These having been (I hope) made plain, we have now to see how far they help towards a solution of the formidable legacy of riddles, which the Romans have bequeathed to us at Chesters. Where letters or numbers are printed in Clarendon type, the reference is to plate LVII, the clearness, comprehensiveness and accuracy of which entitle it to supersede the earlier efforts.¹⁴

II. THE SITE.

Let us look, first of all, at the situation of the Bath-house and its relation to the fort (fig. 4). Proximity to the river, from which it was less than thirty yards distant, was an obvious convenience from the point of view of drainage. But there are other respects in which its position is characteristic. As was usual with establishments of the kind when attached to military stations, it lay outside the walls and within an area that was presumably an annexe.

¹³ Possibly for use in emergencies, as is suggested in *O.R.L.*, Bd. V¹, Nr. 60, *Kastell Köngen* (Lief. 30), p. 17.

¹⁴ To avoid confusion, the lettering has, as far as possible, been made uniform with that in Sheriton Holmes's plan. Unfortunately this could not always be done. But the differences are trifling and are unlikely to cause any trouble. For the sake of brevity, plate LVII is cited throughout as the Plan.

Moreover, it was so placed and so planned that the entrance was close to the Military Way. The map shows the road as it runs past it on the north, issuing from one of the east gates of the fort and heading for the bridge across North Tyne. The difference in the levels is, however, so considerable as to leave no room for doubt that the porch (O) must have been approached by descending a flight of steps, just as it is to-day.

While the hollow within which the building lies may be to some extent natural, it is certain that there was a good deal of excavation before the foundations were laid. The two fragmentary walls that can be seen on the right of plate L, running westwards in the direction of the fort, suggest that further structural remains may be concealed within the bank. Bruce thinks that the nearer of them is mediæval, but I can discover nothing to justify acceptance of that opinion. If it is Roman, a substantial slice of the hill-side must certainly have been cut away when the Bath-house was erected. We shall see by and by that there may have been a special reason for this. But the site so obtained was less satisfactory than could have been wished. The downward thrust, whose force is attested by the buttresses projecting at intervals along the east side (plate LIII), was very possibly contemplated by the architect at the outset. He can hardly have been prepared, however, for the patch of soft ground which he struck at the north-east corner. Holmes states that the foundation here rests upon "quicksand and deep loam," and he supposes that the heavy masonry, whose massive character contrasts so strikingly with that of the rest of the Bath-house, has been a "casing wall," added at some later time when the primary structure threatened to collapse.

As plate XLIII shows, that was a plausible enough suggestion to make at the stage which the opening up of the building had reached when Holmes surveyed it. He would hardly have put it forward if he had seen the superincumbent earth cleared away to the extent that appears in plate XLIV. There the heavy masonry is revealed as a

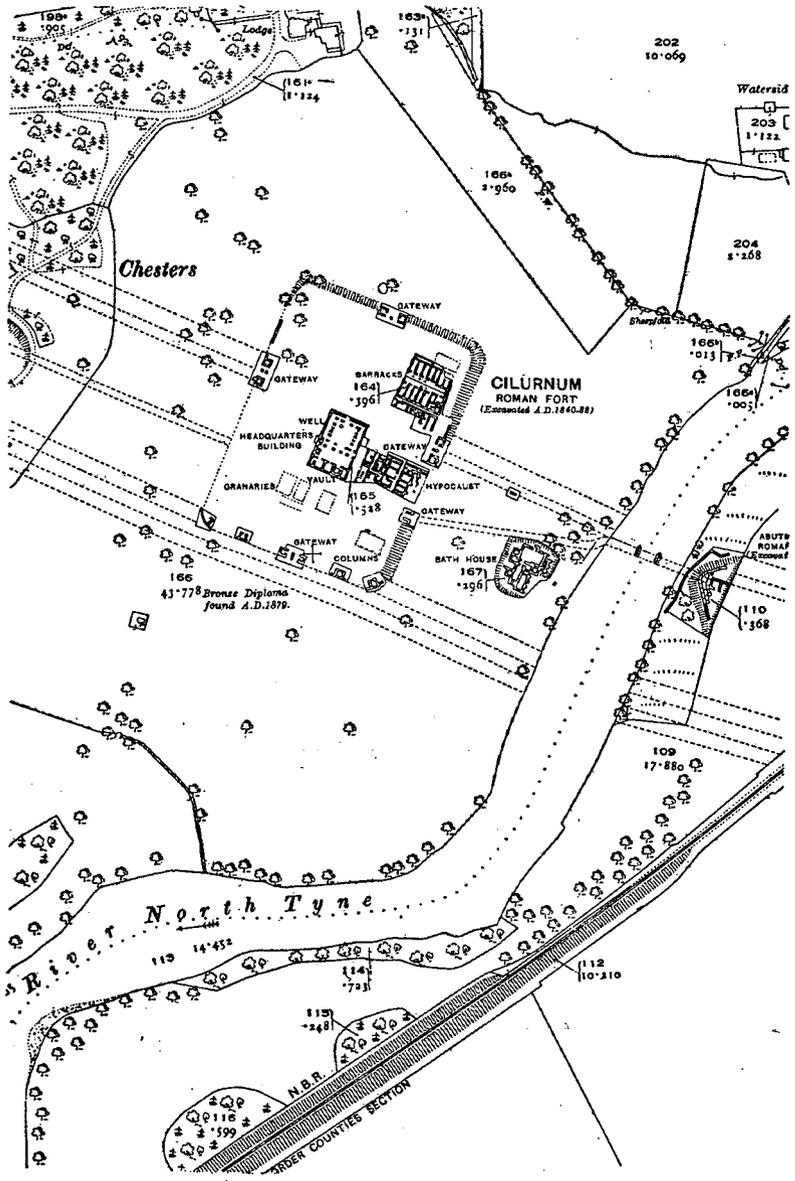


Fig. 4. Map of Site.

Reproduced from the Ordnance Survey Map with the sanction of the Controller of H.M. Stationery Office.

platform of exceptional solidity, designed to support the ordinary walls. That it was original rather than secondary does not admit of question. Nor is the softness of the soil beneath the only justification for its presence. The rooms above are carried farther to the east than any other part of the building, so far indeed as to encroach on a slope that inclines rather sharply to the river. The substructure was necessary to provide a base that should be not merely firm but horizontal. Note that it is buttressed. Note, too, that the walls which rested upon it would seem to have required even more support than the platform alone could give. On the top of the buttress at the south-east corner is a well-defined rectangular depression (plate XLIII) which may be either (as Mr. Brewis suggests to me) the "check" for a wooden pad, on which has rested the end of a beam placed at an angle to shore up the masonry on the west, or (as others may prefer to think) a bed for the reception of another heavy stone.

The workmanship here is excellent. Holmes well compares it to that displayed in the bridge abutment on the opposite side of the river. Thanks to the size of the stones that composed it, the platform has been allowed to remain very much as it was when it was laid by the Romans. The only large block that is certainly displaced is the one which stands out prominently on the left in plate XLIII, with bones and other relics lying on the top. It has long been a familiar object there, and the fact that it was set square to the walls conveyed the impression that it was in its original position. Believing this to be so, I found it very hard to account for. Last October, however, in tracing the footings of the wall which I have numbered **11** we discovered that it must have been moved from somewhere else by the excavators of the "eighties"; it lay right above one of their own exploratory trenches.¹⁵ After consultation with Mr. Brewis and Mr. Simpson, I decided to move it

¹⁵ It seems to have been placed there when the trench was filled in, for it appears both in plate XLII and in Holmes's plan (fig. 2).



VIEW OF THE LATRINE IN 1886, LOOKING N.



LATER VIEW OF THE LATRINE IN 1886, LOOKING W.

again, lest future observers should be similarly misled. This was our one departure from the rule of leaving things as we had found them.

If the platform has been but little disturbed by depredators, the same cannot be said of the structure above. Many of its stones have been carried away, and others have been thrown about in confusion. Thus, it is hardly likely, although perhaps possible, that the channel-stone in the foreground of plate XLIV is *in situ*. The grooved block directly behind is quite certainly not. It is a cover-stone for the drain, but has been turned upside down, while all its companions are amissing. A statement of the dimensions of these two may serve as a scale by which the whole illustration can be brought into proper focus. The breadth of the cover-stone is 3 feet 3 inches, its length is 2 feet 6 inches, its height is 10 inches, and the depth of the groove is 3 inches. The channel-stone, again, is 6 inches deep and has a total breadth of 1 foot 10 inches, of which 1 foot 2 inches represents the width of the channel, leaving 4 inches for each of the margins. The workmanship of these stones is every whit as good as that of the platform. I will return to the superstructure later. But, before we part from the platform, there is another point to be noticed.

Solid and substantial as the heavy masonry was, it did not quite fulfil its primary purpose of securing stability. It sank a little at its southern end. That the tendency had manifested itself as early as Roman times is evident from the manner in which the upper surface has been chiselled away in places to counteract the effect of the subsidence.¹⁶ This must presumably have been done on the occasion of a rebuilding of the superstructure, and it is thus one among many indications of the vicissitudes that the Bath-house has witnessed. Since the final abandonment the downward tilt towards the south has been further accentuated. Levels taken by Mr. Brewis show that it now

¹⁶ Along the line which is marked in the Plan as crossing the heavy masonry to the west of 12, the chiselling extends to a depth of 3 inches. It can readily be made out on plate XLIII.

amounts to as much as $7\frac{1}{2}$ inches from west to east, and 7 inches in the last 11 feet from north to south. There must be some special explanation of the sponginess of the subsoil at this particular spot, and I am disposed to think that, before the site was utilized for building, a streamlet had found its way into the river here.¹⁷ We shall presently encounter other subsidences which may be regarded as lending colour to that view.

III. THE APODYTERIUM.

By far the most imposing room in the whole suite has been the Apodyterium or Dressing-room (A). It is entered through a small porch (O) measuring 8 feet by 5 feet 4 inches internally, with walls nearly 2 feet thick. This porch, which must have stood at the foot of the steps leading down from the Military Way, is a very unusual feature—I cannot recall another example anywhere—and there is little to be said about it except that it is a very late addition: its wall is not bonded into that of the main building, and examination proved that there was no foundation-trench, the foundations, such as they are, being simply laid upon the surface. So ramshackle indeed is its whole appearance, that, prior to the recent investigations, it was seriously suggested that it was not genuine Roman work at all but a purely fanciful excrescence, erected by the nineteenth century excavators to utilize the odd stones they had uncovered. Confirmation seemed to be forthcoming when it was observed that there was no sign of the porch either on Bruce's plan (fig. 1) or on that of Holmes (fig. 2). Both of these, however, were, as we know, completed before the excavation was finished, and Mr. Gibson's contemporary photograph (plate XLIV) dispelled any lingering doubts by showing the top of the porch as it

¹⁷ It may have run underground. In describing the excavations of 1900, Haverfield wrote: "The subsoil at Chesters contains much water, which flowed into our trenches with great rapidity" (*Arch. Ael.*, N.S., XXIII, p. 19).



THE APODYTERIUM IN 1885, LOOKING S.W.



FIG. 1.—THE APODYTERIUM IN 1886, LOOKING W.



FIG. 2.—THE APODYTERIUM IN 1930, LOOKING W.

emerges from the bank, just beyond the wooden steps on the right.

The Apodyterium itself has been a stately apartment, 46 feet long and 29 feet broad within walls. When first uncovered (plate XLV) it had a much more impressive appearance that it can boast of to-day. It was paved from end to end with stone slabs, while in the centre were the stone bases of the pillars that had supported the roof. That was probably the condition in which it was when Bruce's plan was drawn. By the time that Holmes came upon the scene the excavators had discovered that the floor they had first cleared was secondary, and in order to ascertain exactly what lay below they had lifted the paving slabs over the greater part of the area and removed the rubble packing which formed the substructure (plate XLVI, 1). Holmes's plan (fig. 2) and the second of these two illustrations are of about the same date, although the latter is probably a little earlier. Deterioration since then has been continuous, if slow. Now (plate XLVI, 2) very few of the slabs survive and the pillar bases have long ago disappeared. Only the stone-trough—as to the original position and purpose of which I do not venture to guess—stands much where it did in 1886.

Fortunately there was no temptation to interfere with the interesting row of seven recesses along the face of the western wall, and they have been able to offer a stout resistance to time and to the weather. They seem to be unique, so far as this country is concerned, and none of the various theories that have been advanced as to their use has succeeded in winning universal approval. Bruce was unquestionably right in rejecting the idea that they had been niches for holding statues. Very much more plausible is the view, which Holmes was apparently ready to accept, that they were for the bathers to deposit their clothes in. Even this, however, does not commend itself to Mr. Brewis, who believes it to be more likely that they were for storing strigils and unguents. That they were somehow or other associated with the individuals who frequented the Bath-

house may, I think, be inferred from a comparison between the analogous rows of recesses in the Men's and Women's Baths at Stabiae near Pompeii.¹⁸ There the row in the Women's Baths is set 9 inches lower down the wall than the corresponding row in the Men's Baths, an evident concession to the shorter average reach of the female arm.

I have called the Italian examples "analogous," and the use of the term seems to be justified. But it is fair to mention an important difference. The sill-level in the Baths at Stabiae is a good deal higher, being 5 feet 9 inches above the floor in the Men's Baths and 5 feet in the Women's Baths, whereas at Chesters it is barely 1 foot above the latest floor and not much more than 3 feet above that older floor of whose existence the enthusiasm of the explorers of 1885-86 has left such devastating proof. It is plain that the recesses at Chesters must have been already there when the latest floor was laid down. That, however, does not altogether remove the difficulty, and the anomaly is emphasized by the evidence of a similar set of recesses in the walls in a room of the Baths at Lugo (Lucus Augusti) in North-West Spain, identified from their presence as the apodyterium. The only illustration accessible to me¹⁹ does not show the whole height of the walls, but it does show enough to suggest a relatively high level for the sill. It reveals another interesting feature. The heads of the recesses at Lugo resemble those at Chesters in being arched, while the heads of the recesses at Pompeii and Stabiae are square. Is it more than a coincidence that a Spanish regiment of auxiliaries, the Ala II Asturum, was long in garrison at Chesters?²⁰

The lowness of their sill-level is not the only peculiarity by which the recesses at Chesters are distinguished. At Lugo the arched heads are built in perfectly normal fashion. At Chesters each is cut out of a single block, the

¹⁸ Mau's *Pompeii* (Kelsey's Trans., 2nd ed., London, 1902), p. 190 with plate v, and p. 205 with fig. 92.

¹⁹ José R. Mélida, *Arqueología Española*, p. 312, fig. 151.

²⁰ See I. A. Richmond in *J.R.S.* XX, p. 105.

surface of which is carefully "picked" on the back as well as on the front. But misfits are numerous. It is only rarely that the weight is evenly distributed between the supporting piers of masonry, and even this frank disregard of nice adjustment has not availed to prevent the occurrence of gaps which have had to be filled with wedges of stone. Are these misfits merely signs of incompetent or over-hasty workmanship? Or may they not rather mean that the blocks were originally hewn for positions quite different from those which they now occupy, and that they are here re-used? In the latter event they testify to an extensive reconstruction, and perhaps to a reconstruction which involved the fort as well as the Bath-house. Such blocks had their uses in fort buildings, as heads for windows or narrow doorways. Two or three can be seen to-day lying among the ruins of the east gateway at Birdoswald and, if I remember aright, there are some at Housesteads. On the other hand, parallels to them are not, so far as I know, met with in bath-houses elsewhere. It is true that in shape they bear a superficial resemblance to the supports for stone seats, which have been found at Trier and of which a single specimen came from the Men's Baths at Mumrills.²¹ But for such a purpose they are much too large: if set on end, as they would require to be, they would be fully 4 feet in height, or about twice as high as would be compatible with comfort.²²

Holmes, while believing that the main use of the

²¹ Krencker-Krüger, *Kaiserthermen in Trier*, Abt. I (Augsburg, 1929) pp. 226 f., figs. 322 and 325; *Proc. Soc. Ant. Scot.* LXIII, p. 453 and fig. 11b (p. 414).

²² Since the above was written, Mr. Brewis has drawn my attention to a footnote in *Archæologia* LXXV, p. 9, where Mr. Knowles mentions the finding, in a hypocaust at Bath, of "a stone with a pierced arch resembling the recesses allocated for clothing in the apodyterium of Chesters." The allusion is only a casual one, so that no dimensions are given. But I suspect that this may have been a support for a stone seat. Anything of the size of the Chesters arch-heads would be much too large to be re-used as a hypocaust pillar. It is not irrelevant to add that, when the Mumrills example first appeared, it was Chesters that we thought of, not Trier.

recesses had been to hold the clothes of the bathers, regarded the two holes that are conspicuous on either side of the most southerly of the series as "indicative of its having been closed by a door," and he thought it "probable that in it were kept the olive oil and spices used in the anointing before bathing." The fact that one of the holes is decidedly higher up than the other is a difficulty in the way of this theory. Possibly they belong to an earlier phase in the history of the block in which they are chiselled. Whether that be so or not, the wall into which it and its fellows are now built is anything but homogeneous. One can see the rear face and the south end of it in plate LIV, respectively to left and to right of the more prominent of the two door-jambs, and its composite and patchy character is apparent. Its total thickness is about 3 feet. That is also the thickness of the north and south walls. The wall on the east, which adjoins the area liable to subsidence, has been made 1 foot thicker. Notwithstanding this precaution and notwithstanding the support of the heavy masonry beyond, its top has developed an outward thrust of some 3 inches.

The return at the south end of the east wall also demands a word of notice. My investigation of it was only pushed far enough to ascertain that the corner has a broken face on the inside. The significance of this becomes fairly clear in the light of the Plan. The return seems originally to have been carried some distance westwards, its purpose being to flank the drain that emerges from beneath the east wall of J and makes straight for the Latrine trench. When this drain was superseded (as we shall presently see that it was) by the drain which sweeps round the outside of J on the north, the greater part of the return was demolished to give the newcomer an unobstructed passage. A thorough examination of the opposite or north wall might be trusted to supply further illuminating evidence of change. At some time the main doorway leading from the porch has been about 3 feet wider than it is now, while the masonry on the east of it,

which is of first-rate construction, goes down fully 3 feet below the original floor.

Regarding this floor I was able to gather some fresh information. In order to verify Holmes's description we dug small holes at several places within the four walls. The stratification was remarkably uniform, but, instead of the two levels we had expected, we found three. The lowest of all contained fragments of lime, and at three widely separated points it had over it a thin spread of burnt matter, black and red. Above came a layer of clay, $3\frac{1}{2}$ inches thick. This was followed by $1\frac{1}{2}$ inches of red material, which served as a bed for the gravel of which the second floor was composed. Between the gravel and the flagstones there had been a loose packing of rubble with a thickness of 1 foot 9 inches. Holmes's estimate of the distance between the flagstones and the original floor ("about 2 feet 6 inches") was therefore approximately correct, although the intermediate floor had escaped his notice. The depth at which the original floor lies, as compared with the ground outside the porch, is at first sight surprising. Indeed, when the burnt matter made its appearance above the lowest stratum in the earliest of the holes that were dug, I was tempted to wonder whether the room had not once had a hypocaust. But the discovery that the burnt matter only occurred sporadically soon put that idea out of court. There is no reason to suppose that **A** was ever anything but an Apodyterium. The impression of depth which the earliest floor produces is in some degree illusory. It is largely the outcome of the rise in the level of the whole building and its immediate surroundings, which has taken place concurrently with each successive reconstruction.

During this digging a careful look-out was kept for any traces of the two drains which Holmes marks in the central and western portions of the room (fig. 2), and which he believes to have underlain the original floor. Not the slightest sign of them was detected. At the best they seem to have been fragmentary, and their remains would

rapidly disintegrate if they were left exposed. One can only hope that better luck may attend some future enquirer. It is not improbable that, if they could be located, they would throw fresh light on the early history of the Bath-house. Holmes calls them "ventilating drains," but it is difficult to understand what he can have meant by the epithet. Their curving course, as laid down in fig. 2, combined with the fact that they are converging, indicates that they were intended to carry off water. And in Roman military establishments of the kind it was the normal practice to lead the waste water out of the building beneath the floor of the Apodyterium, possibly to facilitate the cleansing of that apartment. Inchtuthil is typical for this country, and the same feature has been remarked upon in Germany.²³ The rediscovery of the "ventilating drains" would therefore confirm the view that the original floor of **A** was the floor of an Apodyterium. But there is a further implication. The position of the assumed point of convergence proves that the outflow was towards the north-west corner. It follows that, when these drains were functioning, the whole lay-out of the Bath-house, apart from the Apodyterium, must have been different. Possibly the drain which the Plan shows running eastwards under the porch may have played a much more important part than it does now. Further guessing would be idle.

Before leaving the Apodyterium, however, I must draw attention to an important piece of chronological evidence. It will be seen from plate XLV that the threshold-stone of the door leading from **A** into the small apartment beyond (**N**) bears practically no marks of usage. Very different was the state of things revealed when the flagstones were lifted (plate XLVI, 1). During the period or periods represented by the two lower floors the approach to **N** has been by a flight of steps—the threshold stone of the latest period is, in fact, merely the former top-step

²³ *O.R.L.*, Bd. II², Nr. 22, Kastell Rückingen (Lief. 38), p. 7, where the reference is to the Frigidarium, with which the Apodyterium was so often combined.

turned upside down—and in the centre these steps are deeply worn away. In one case the amount of abrasion is actually as much as $6\frac{1}{2}$ or 7 inches. Compared with what had gone before, then, the latest period must have been of relatively brief duration. Yet we shall learn by and by that it was long enough to have given time for three separate and considerable reconstructions. This index to the term of the earlier periods is thus in perfect harmony with the deduction naturally suggested by the condition of the steps, which must have been trodden by the feet of many generations of bathers.

The wear-and-tear of the steps has an incidental lesson to convey. Holmes, who was rather nonplussed by it, wrote :

“ There is just one circumstance which militates somewhat against the use of the rooms as baths, and that is the excessive wear of the stone steps at the entrances to the various rooms; for the bathers and their attendants would likely be either barefooted or have their feet clothed with soft sandals.”

He endeavours to get round the difficulty by saying that the buildings may have been erected during the early period of the Roman occupation and used for many purposes before they were finally abandoned. But the difficulty is wholly imaginary. The bathers must have worn shoes, and tolerably heavy shoes at that. For bare feet the floor of the Tepidarium would have been uncomfortably warm and the floor of the Caldarium insufferably hot. That should be clear from what was said at the outset as to the method of heating, and it is borne out by references in literature. Pliny, for instance, tells (*Ep.* III, 14) of a certain Largius Macedo, some of whose slaves, stung by his persistent cruelty, attacked him in the baths attached to his Formian villa. After beating him unmercifully they flung him down on the glowing pavement (*fervens pavimentum*) to see whether he was still alive (*ut experirentur an viveret*). If he were, he could not but writhe in agony. Either because he was really unconscious

or because he thought that to feign death was his only chance, he lay without a movement until his assailants, satisfied that they had done their work, carried him outside. Reviving there, he was rescued by a body of loyal attendants, only to die a day or two later.

IV. THE LATRINE.

The Latrine (M1) was entered from the east end of the Apodyterium through a small lobby (M2). This apartment was a usual adjunct of every suite of baths, its name of *la(va)trina* being indeed derived from *lavare*, "to wash." Plate XLIII gives a view of the Latrine trench, looking north, with the stones of the trough at the bottom. These latter are 2 feet broad, and the channel is 9 inches deep. The groove on the end was for fitting-on to the next length, and the joints were made water-tight by cement, the traces of which were noted by Holmes. It will be observed that on the east the trough has formed an integral part of the flanking wall, its side being in fact the lowest course of the face—a desirable precaution to prevent the accumulation of filth on a shelf from which it could not be washed away by the water. On the west it is otherwise. There the outer face of the wall has rested, not upon the margin of the trough, but upon an offset, beneath which there is a solid foundation. The first impression is one of surprise that this margin should have been left unprotected, when its counterpart was so carefully concealed; the danger was the same. But if we turn to plate XLIV the explanation "leaps to the eyes." We are now looking westwards along the east-and-west section of the Latrine trench, and it will be noticed that on one side—that towards the south—the trough has been built into the flanking wall exactly as before. On the opposite side it has been left clear of the wall, also as before, but the upper surface of its margin has been made the base of a casing of stones reared against the wall-face in such a fashion as to mask the projection

effectually. It may be taken as certain that the exposed wall-face in plate XLIII has originally had a similar casing.

Since 1886 the casing shown in plate XLIV has disappeared, and it was Mr. Simpson who directed my attention to it when he first brought me prints of Mr. Gibson's photographs. Thanks to these, we can reconstruct the Latrine almost in its entirety. The walls which were provided with a casing were outer walls. They had to be sufficiently high and sufficiently strong to support the roof. A solid foundation was therefore essential, all the more because of the risk of subsidence at this particular spot. The fact that the foundation afforded by the margin of the trough was deemed substantial enough for the facing courses of the opposite walls makes it plain that the latter had no such strain to bear. They need not have risen very far above the level at which they now stand, for their purpose was merely to carry the planking that was required for seats. The floor of the room would be paved with flags, laid upon the rubble packing whose remains appear in both illustrations.

V. DRAINAGE AND WATER SUPPLY.

Although some anticipation will be involved, this is the most convenient point at which to describe the drainage system. The sewage from the Latrine was conveyed straight into the river from the east end of the trench by a covered conduit, the sorry remnants of which I have already had occasion to mention in connexion with plate XLIV. For flushing purposes there would be available, in the first place, the whole of the waste water from the various parts of the Bath-house. That from the cold-water basin (and latterly also that from the cold bath) in the Frigidarium (K) found its way into the trough, as the Plan indicates, by a drain which discharged at the south-east corner of the Apodyterium. That from the hot bath

(F), as well as that from the cold bath so long as it was located in L, was collected, along with the drippings from the eaves, by a gutter which ran round the outside of the building on west, south and east, finally entering the Latrine trough at its southern end.²⁴ As no part of this gutter was left *in situ*, its course could not be entered on the Plan, but the evidence for its existence is none the less conclusive.

In 1884-86 numerous channel-stones were found scattered about in different places, but chiefly (it would seem) on the outside of the building. One of them, reproduced in plate XLVII, 1, is particularly interesting, because it still retains a strip of sheet lead, which had helped to close the joint between it and its next neighbour. Mr. Brewis's excellent photograph shows the holes for the nails with great clearness, although the single iron nail which has escaped complete corrosion is not, of course, distinguishable. The width of the stone is 1 foot 6 inches, and the depth of the channel is over 4 inches. This is, as it happens, the length which is seen lying near the farther end of E1 in plate XLIX. Another will be noticed on the outside, close to the front wall, in the same illustration. Two more appear in plate L. They can be descried in the distance, set up on end almost directly below the window in the back wall of F, very near 16 where the outflow pipe of the hot bath emerged. A fifth and sixth, one of them L-shaped for use at a corner, will be recognized in plate LIII, tucked away beside the buttress at the southern end of H, while visitors entering that room have to step over a seventh which partially blocks what is now the only approach (plate LI, 1). The cumulative testimony is con-

²⁴ To prevent misunderstanding, it should be added that the drain, shown on the Plan, projecting eastwards from the end of the south wall of L does not belong to the system I am describing. We could not, of course, explore it very thoroughly. But our search, such as it was, failed to disclose a connexion with anything else. It may possibly belong to an earlier layout or, more probably perhaps, it may represent an attempt to dry what we know to have been at one time an exceptionally wet patch of ground.



FIG. 1.—CHANNEL-STONE OF GUTTER.



FIG. 2.—A RUINED FURNACE-ROOM (Q).





vincing, the presence of the corner-length being specially instructive. Nor is there room for doubt as to the direction of the gutter. The lie of the ground puts that beyond question.

During the hours when the basin and baths were in active use, and on days of heavy rain, a fair quantity of water would reach the Latrine trench by the two routes I have described. At other times, if the sources of supply were restricted to those which I have mentioned, there would be the merest trickle or even nothing at all. For effective flushing, however, a steady and abundant flow was needed, and we may be sure that it was forthcoming. I would suggest that, starting from about the north-west corner of the building, a constant stream of fresh water was kept running down the outside gutter, after a manner with which those who know the streets of Cambridge are familiar. Whence did it come? A ready answer would seem to be furnished by a late second-century inscription, which is now in the Clayton Memorial Museum, and which records the construction of an aqueduct by the Ala II Asturum. It is on a tablet discovered in 1897, inside the fort but close to the smaller or more southerly of the two gates in the east wall.²⁵ Reference to fig. 4 will show that it was through this gate that the Military Way passed before descending to the river. If the find-spot can be taken as a rough indication of the position of the structure to which the slab was attached—and the likelihood is that it can—then the aqueduct must have terminated quite close to the Bath-house but on somewhat higher ground. Such a situation would be eminently suitable, not only because it would assure the easy flushing of the Latrine, but also because within the walls the water would rise to any required height by pressure, enabling pumps to be dispensed with. Possibly this helps to account for the

²⁵ *Arch. Ael.*, N.S., XIX, p. 179, and *Ephem. Epigr.* IX, 1171. In Budge's *Catalogue of the Museum* (p. 104) it is erroneously stated that the stone was "found in the Barracks, in the north-east corner of the Station."

depth to which the site was excavated before the erection of the building was begun.

It is hardly necessary to point out that if the aqueduct terminated where I have supposed, it would be equally well placed for serving the suite of baths which we know to have been attached to the Prætorium or Commandant's House inside the fort. Whether its date, as attested by the inscription, is also the date at which the Bath-house was first built, is uncertain. But obviously it may be. If so, one of the reconstructions which have produced the confusion I am trying to disentangle, was probably carried out some thirty years later, in the time of Elagabalus and Severus Alexander, when there appears to have been a good deal of building activity at Chesters.²⁶ It is worth adding that the suggested site for the termination of the aqueduct, hard by the Military Way, has a not unimportant bearing on the view, expressed to me in quite another connexion by Mr. C. R. Peers, that the bridge across the North Tyne had had alongside of it a conduit for water. His opinion was based on an examination of the ruins of the abutment on the eastern bank. May we not find in the inscription a powerful "adminicle" of proof? And may we not think that its testimony is reinforced by that of the iron pipe, which now carries the drinking-water for Chesters over the stream within a stone's throw of the bridge-abutment? The hills on the farther side of the river would be the natural source of supply in Roman just as in modern days.

VI. THE VESTIBULE.

Alike by its size and by its position the small apartment (N), which is entered from the south-west end of the Apodyterium, recalls the narrow room through which the tepidarium of other bath-buildings is not seldom

²⁶ See *Ephem. Epigr.* VII, 1021, which was actually found in the Bath-house. The point is made by Collingwood Bruce.

approached. It has been suggested that such ante-rooms were used for the application of unguents,²⁷ and the suggestion is not at all improbable, for we know from Galen (X, 724 f.) that the body might be anointed before perspiration as well as during perspiration, and again when the bathing process was finished. It is true that Celsus says (I, 4): "*sub veste primum paulum in tepidario insudare, ibi ungi, tum transire in calidarium.*" But too much must not be made of the apparent contradiction between him and Galen. They were not prescribing for the same patient. Those who interpret the words "*ibi ungi*" as implying that the tepidarium was *the* room for anointing, overlook the context which shows that a regimen was being laid down for the physically weak.²⁸ In this instance, however, we seem to be dealing with a Vestibule, pure and simple. It gave access, not merely to the Tepidarium (E1) in front, but also to a Sudatorium (D) on the right and to the Frigidarium (K) on the left. When we remember that there would be traffic both in and out, it will be plain that even for a passage-room the space would be none too ample.

The same consideration rules out Bruce's description of what he calls the "low wall on each side of its main walls" as "intended, perhaps, for seats," a view to which there are other objections. Adults would have found the "low walls" extremely uncomfortable as seats. The maximum height is only 1 foot 4 inches, so that a squatting posture would have been necessary. Nor is this the natural place for a waiting-room. If it did so happen that the Baths were crowded, the formation of a queue would surely not have been postponed until the would-be bathers had thrown off their clothes. Rather, the very spaciousness of the Apodyterium may be taken as indicating that it was something more than a place for undressing. It was a lounge, where time could be passed agreeably until the moment for undressing arrived.

²⁷ O.R.L., Bd. VII, Nr. 73a, Kastell Böhming (Lief. 29), p. 5.

²⁸ That is why they were not to disrobe until the pores had been opened ("*sub veste . . . paulum . . . insudare*").

As a matter of fact, the "low wall" on the south, surmounted as it is by a layer of the tufa voussoirs of which more will be said by and by, looks as if it may have been built up, under a misapprehension, in 1884 or 1885, after the earth was cleared away. That on the north, on the other hand, has all the appearance of being the remains of a floor, which had been laid a foot or so higher than the present one.²⁹ The secondary floor of the Vestibule would thus correspond to the latest floor of the Apodyterium (where the difference in level was about 2 feet), while the flags that form the existing surface would be contemporary with the flight of worn steps. In its bearing upon this, peculiar significance attaches to the contrast between the threshold-stone of the doorway leading into **D** and the flag-stone immediately in front of it. The latter has been much abraded by feet entering **N** from the west. The former betrays hardly any sign of deterioration, and that in spite of its having been long enough in use to have had the door hung first on the one side and then on the other, as is proved by its having two pivot-holes, one just inside each of the grooves in which the vanished jambs have rested. This last feature should be specially noted. I shall have occasion to return to it later.

VII. THE FRIGIDARIUM.

That the room (**K**) lying to the east of the Vestibule was the Frigidarium is certain. Here the marks of change are, if anything, more striking than they were in the Apodyterium, and the import of some of them is very similar. Half-way across the room the drains which appear in plate XLVIII rise so high above the existing floor as to make it clear that when they were in working order there must have been another floor above them. With

²⁹ Mr. Simpson tells me that this has always been his view.

their cover-stones they would have been an intolerable obstacle to freedom of movement had they been left exposed. If the evidence from this room had stood alone, it might have been an open question whether the floor which has disappeared had or had not concealed the flagstone on to which the visitor steps as he enters from **N**, and which attracts immediate attention from being deeply worn on the right hand side. The top of the flagstone is to-day some 6 or 7 inches higher than the top of the drains, so that the former might conceivably have formed part of a pavement lying above the latter. Having regard, however, to the analogy of the Apodyterium and the Vestibule, I do not think we can hesitate to conclude that the latest floor has overlain both.

I will come back to plate XLVIII presently. Meanwhile it will be convenient to proceed to **L**, the walled-off space to the east of **K**. This has undoubtedly been a cold bath. Its position agrees exactly with that of the cold bath at *Æsica* (**D** in fig. 5), which it further resembles in being rectangular, instead of having the apsidal shape which occurs not infrequently, as at Newstead and Mumrills. On removing the vegetation from its surface, we found that the bottom consisted of a floor of the characteristic reddish concrete, fully 1 foot thick. Embedded in it at the north-west corner was a portion of a flagstone, measuring 1 foot 3 inches by 1 foot 2 inches, which may be unhesitatingly set down as a fragment of the steps. Above the floor-level the walls are largely destroyed. Mr. Hepple is of opinion that the one at the back, which is the outside wall, must have collapsed when it was uncovered, and have been rebuilt then. In the interval the softness of the ground below and the pressure of the ground behind have caused it to sag outwards, leaving a gap of more than 6 inches at the top. Notwithstanding the dilapidation, enough of the curved edging remains to prove that the concrete has been carried upwards on all four sides. We looked for the aperture which had given passage to the lead pipe for emptying the bath. No trace of it was detected.

Probably, however, it was, as at Inchtuthil (fig. 3) and Mumrills, in the centre of the back wall, the water being discharged into the stone gutter which has been already described as running round the outside of the building.

As a rule, owing to the hardness of the material of which

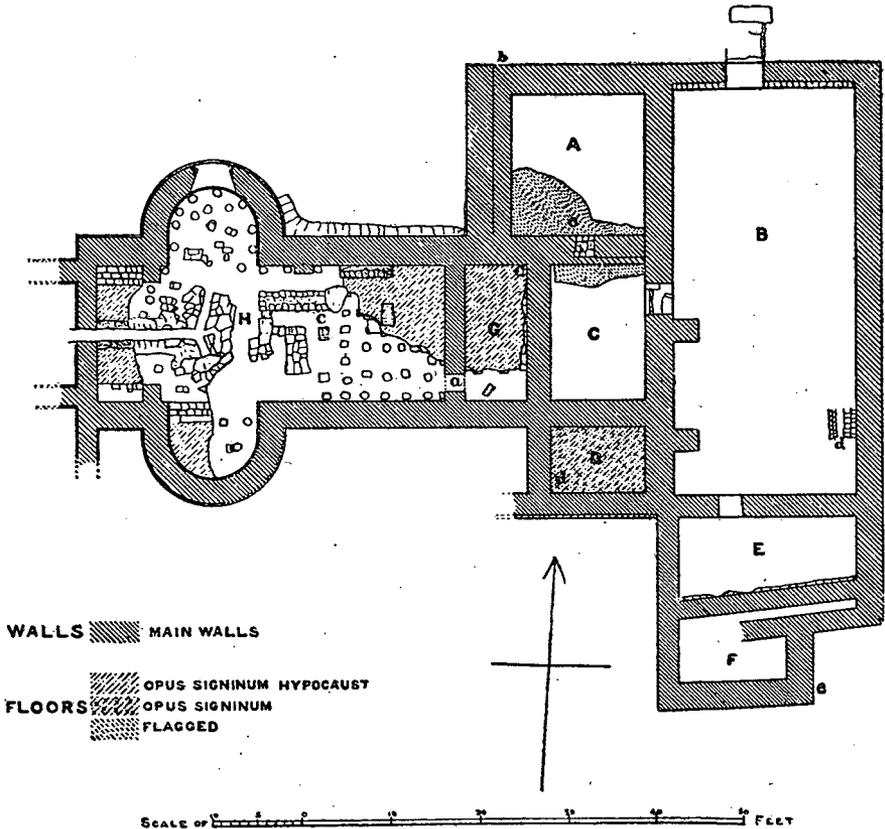


Fig. 5. Plan of the Bath-house at Æsica.

it was constructed, the cold bath is one of the best preserved portions of a ruined Roman bathing-establishment. Taken by itself, therefore, the poor condition of this particular example would almost justify the inference that it had ceased to be used as a bath before it was buried

under the accumulation of débris from which it was relieved in 1885 or 1886. But there was confirmatory evidence. Holmes reports that "against the eastern wall is a square block of masonry, which appears to have formed a base upon which some object might have stood." The "block of masonry" is now gone, but it has left an indubitable record of its intrusion behind it, in the oblong patch of earth (5 feet by 3 feet) which we encountered precisely where fig. 2 had led us to expect it, spread upon the concrete and overlaid with broken flags. I have no suggestion to offer as to its meaning, although I may point to the pedestal in the Frigidarium at Mumrills as a possible analogy.³⁰ Still more unintelligible is the manner in which the floor of the bath has been mutilated at the south-west corner. Here the solid concrete has been hacked away to a depth of fully 6 inches for an oblong space which measures, roughly, 4 feet by 3 feet, and in the middle of which there is embedded a brick about $6\frac{1}{2}$ inches square. The hollow can hardly have been intended to contain water, for there is no outlet. On the other hand, I suspect that the brick may have been inserted to cover a hole like the hole which was found in exactly the same position in the cold bath at Mumrills.³¹ The erection of the "block of masonry" would throw the whole of the northern half of the bath out of action. The remainder might nevertheless have continued to be used. Indeed, fig. 2 shows markings that may indicate a line of partition. If, however, as I have hinted, the insertion of the brick coincided with a complete and permanent stoppage of the inflow, then the southern half too must have been rendered useless when the south-west corner was mutilated.

Both of these changes, which may have been successive

³⁰ *Proc. Soc. Ant. Scot.* LXIII, p. 477.

³¹ "In the south-west corner a hole in the floor, 6 inches in diameter, was carried in neatly circular fashion right through the bed of cement to the cobbles below. It may be surmised that the object for which it had served as a socket had been connected with the water supply—possibly a pump."—*Proc. Soc. Ant. Scot.* LXIII, p. 475.

rather than simultaneous, appear to date from Roman times. If they do, the abandonment of the original cold bath must have preceded the abandonment of the Bath-house as a whole. How, then, were the needs of later bathers met? The question admits, I think, of at least a partial answer. It is hardly doubtful that, during the last phase of all, the place of the cold bath was taken by the small tank marked **J** on the Plan. That this is an addition is evident from the manner in which its east and west walls abut against the inner side of the south wall of **A**. That it has been a miniature cold bath is irresistibly suggested by the fragments of red cement that still adhere to the bottom and sides of the interior, as well as by the position of the leaden outflow pipe, which is still to be seen beneath the north wall, where it issues at a point (10) convenient for the drain beyond. Its small size (5 feet by 2 feet 10 inches) is, no doubt, exceptional; it would be little more than a foot-bath. Even in ordinary circumstances, however, the cold bath was mainly for the feet. Besides, **J** belongs *ex hypothesi* to a period when the Bath-house had lost much of its importance, either because the garrison had been reduced in numbers, or because the barbarization of the fourth-century army had dealt a fatal blow at the wholesome Italian tradition of regular bathing.

Holmes calls **J** a "cistern," regarding it as the supply-tank for the basin at which the bathers were doused with cold water. He rightly identified two portions of the basin itself which were (and still are) lying on the floor of the room, and calculated from their dimensions that its diameter within the rim would be about 4 feet 8 inches. He was also right in recognizing as its base the circular depression (8) cut in the large stone in the foreground of plate XLVIII. But I am unable to accept his interpretation of the channel (9) into which the circular depression merges at its northern end. This can best be stated in his own words:

"A channel, deeply cut in large stones, leads by a considerable declivity from underneath the cistern to the fountain



DRAINS FROM BASIN IN FRIGIDARIUM, LOOKING N.E.

base, and must have had communication with the cistern, though at present it is difficult to see how. From the fountain basin there is a built waste drain, running through the wall into the room A, then curving round the tank, and discharging into the main stone drain of the building. There is a clumsiness about this arrangement of waste drain which seems to be the result of an afterthought, or an alteration from the original design of the building."

The implication, it will be observed, is that the water which fed the basin was conveyed from **J** along **9** to **8**. The diagnosis is quite unsound. The two channels which radiate northwards from the circular depression (plate XLVIII) have no connexion with the tank. Nor are they a supply channel and a waste drain respectively. Both are waste drains. But they were never in use simultaneously, for the one superseded the other. The channel on the east, which is cut, is older than the tank, while the channel on the west, which is built, is of the same period as the tank, although it has nothing whatever to do with it. The key to the relation between the two channels lies in the situation that had been chosen for the fountain. It was in the heart of the area exposed to the danger of subsidence, standing indeed very much on the line that possibly represents the bed of a small stream. Once that fact has been grasped, everything is plain. The more easterly of the channels, the first length of which is actually cut in the same stone as the circular depression, was designed to carry the waste water northwards from the basin through the wall of **A**, immediately beyond which—the tank not being yet in existence—it or, rather, its continuation turned east and headed straight for the Latrine trough. Except for that portion of it which is now concealed beneath **J**, its course can be followed on the Plan, and some of the cover-stones can be seen in plate XLVIII, peeping round the south-east corner of **J**, just beyond the wall of **A**.

In course of time the weight of the fountain, pressing upon its base, caused the soft ground below to sink. Something a good deal less than the "settlement" of at least 6 inches which has developed at the east wall of **L**,

probably within the last half-century, would be sufficient to throw **9** out of gear by giving it the southward inclination, which has misled Holmes and others after him, and which he speaks of as "a considerable declivity." The subsidence would, of course, be gradual. In Roman times it may have been less pronounced than it is to-day, although it is also possible that, when the final reconstruction was undertaken, there was already a tilt in a southerly direction. But, even if matters had not yet gone so far amiss, there was abundant reason for the laying of a new waste-drain. The reconstruction included the insertion of the tank (**J**), which was thereafter to serve as the cold bath. Had the waste drain still followed the old line, its "elbow" would have been completely hidden by the new bath and would have been difficult or impossible to get at for cleansing purposes in the event of a block. A breach was accordingly made in the west side of the circular depression—it is distinctly visible in plate XLVIII—and from the outlet so formed a built drain was led through the wall of **A** and round the outside of **J** along the line marked on the Plan, ultimately coalescing with the earlier waste-drain shortly before the Latrine trough was reached.

It may seem strange that new and old should have persisted side by side. But two things have to be remembered. In the first place, the circular depression was an integral part of the new scheme just as it had been of the old. It had in any case to be left *in situ*, and the stone in which it was cut was also the bed of the first length of the earlier channel. That being so, there was nothing to be gained by removing the other lengths, unless the stones could have been used to advantage elsewhere. In the second place, there was no need to consider appearances. Both channels would be below the level of the latest pavement. I have already suggested that this was so, and I would now add that, if I am right on that point, the penultimate phase of the Frigidarium, no less than its final phase, must be contemporary with the flag-stones removed from the Apodyterium in 1885 or 1886. On the other hand,

the circular depression that appears in plate XLVIII must have had at least one predecessor, very possibly more. That is proved by the abraded stone which I mentioned at the outset of this section. As Holmes well says :

“ The peculiar manner in which the step leading from the corridor to the room K is worn, shows that the people entering had to turn sharply to the right to avoid the fountain basin.”

This step may or may not have been covered by the floor which concealed the waste drains of plate XLVIII. On either hypothesis, however, during the many years that must have elapsed while the stone was being rubbed away, there must have been a fountain basin standing very much where the fragments of the last of the series are to be seen lying to-day.

I have expressed the belief that, during the period which these fragments represent, the tank (J) was used as the cold bath. But where was the cold bath during the period immediately before the reconstruction to which J undoubtedly belongs? May it not have been in the southern half of L, the northern half being now partly occupied by the “ block of masonry ”? Certainly the original cold bath could easily have afforded the loss of a substantial slice of its area without being thereby rendered unserviceable for its purpose. It was exceptionally large, measuring 13 feet 6 inches by 10 feet 8 inches, dimensions which may be compared with 14 feet 5 inches by 7 feet 3 inches for one of the two cold baths at Hunnum and 10 feet 5 inches by 7 feet 3 inches for the other,³² with 13 feet by 6 feet 6 inches for the cold bath at Inchtuthil, and with 13 feet by 5 feet for that in the Fort Bath-house at Balmuildy. Even after such a reduction as I have postulated, it might have measured as much as 10 feet 8 inches by 6 feet, which would be very nearly the same size as the cold bath at Æsica. No one could pretend that the evidence was convincing. But I think it can at least be

³² Hodgson's *History of Northumberland*, Pt. II, Vol. III, p. 318.

said that there is nothing in it which is inconsistent with the view I have suggested as a possibility.

VIII. THE CALDARIUM, THE TEPIDARIA AND THEIR ADJUNCTS.

I come now to the group of apartments which constitute the southern portion of the Bath-house. Plate XLIX preserves a picture of the greater part of them as they appeared when first uncovered. The loose stones, such as the hypocaust pillar in the foreground, have of course been placed where they are for the sake of tidiness. But the masses of earth on the top of the walls show that in other respects things are very much as they were found, and it is surprising how little it has been necessary to add in order to produce the impression of stability which the visitor receives to-day. The quantity of lime that can be seen adhering to the outside of the wall on the left is remarkable, nor have forty or fifty years of exposure to the elements altogether succeeded in obliterating its traces yet. As Mr. Simpson pointed out to me, the evidence of the photograph suggests that the whole of the outside of the building was once coated with plaster. To those who have for years been familiar with the present aspect of the Bath-house, the suggestion may well seem novel. But a striking piece of corroborative testimony will be noted later on and, after all, the use of plaster on the outer walls would be anything but unprecedented.³³

Although there is little or no uncertainty as to the general character of these rooms or as to their relation to one another, the details are sometimes exceedingly hard to understand. This is due partly to the numerous changes

³³ An example from the North of England is the south face of the Roman building discovered in Newcastle, near the Keep, in 1929: see *Northumberland County History* XIII, p. 504. In Southern Britain parallels abound. Dr. Mortimer Wheeler, who tells me he is disposed to think that the practice was normal, cites the amphitheatre at Caerleon, the basilica at Caerwent, and the temple and baths at Lydney.



THE BATH-HOUSE IN 1885, LOOKING N.

which the building underwent before it ceased to be used, and partly to the natural process of degeneration. But it is also to some extent due to the conditions under which it was opened up in 1884-86. Working, as they were, in the dark and without a full appreciation of the importance of stratification, the excavators in their natural anxiety to get to the bottom have sometimes ignored distinctions of level in an extremely disconcerting fashion. An upper layer so solid as the latest pavement in the Apodyterium could not possibly escape their notice. It is to be feared, however, that where the material was earth they have too often thrown it ruthlessly aside, particularly if there were any indications of structural remains lower down. This would in any event be most likely to happen when they were clearing the outer wall-faces, and presumably that would be done before the interior was attacked. Had it been otherwise, their discovery of the rise in the level of the floor of the Apodyterium might conceivably have led them to suspect the existence of a similar rise in the level outside. As it is, in making the circuit of the walls, there are not many places where we can be confident that we are treading exactly where the last of the Romans trod, and there are some where we can be quite sure that we are not.

The effects of such over-energetic excavation are manifest at various points. As we shall see, the Romans themselves may not be without responsibility for the obvious disturbance of levels at the eastern end of the south wall, where the downward slope is now rapid and where the wall-face as exposed shows two offsets, one 2 feet 5 inches higher up than the other. But it is beyond doubt that in 1884 too much earth was removed from the re-entrant angle between **D** and **E1**, with the result that the real character of **Q** has been entirely misapprehended. Similarly, the broken-down wall which projects westwards from the north-west corner of **F** has been uncovered with a thoroughness that is seriously misleading. This is well brought out in plate L, a view of **C**, **B**, **D** and **F**, taken from the north-west.

Here the fragmentary wall, which unquestionably belongs to an earlier lay-out, seems to lie right athwart the course of the stone channel which brought from the aqueduct the water that kept the Latrine flushed. As a matter of fact, it must have been concealed beneath the later Roman surface—the surface, that is, on which the stone channel was laid. There was no such obstruction as the illustration might lead one to suppose.

In the interior the face of things has been even more completely altered, although it is doubtful whether greater caution and fuller knowledge would have availed the excavators here. The destructive hand of Time had probably anticipated their efforts. All of the six rooms I am describing now were hypocausted. But only in **F** and **G**, where the floor was supported by masses of masonry, has any direct evidence of its actual height been preserved. In **E1**, **E2**, **H** and **I**, where it rested upon pillars, there is not a vestige of it left and not one of the pillars remains in position. If we wish to know how high it was, we have to look for other indications.

In **H** the pavement must once have been as high as the lintels over the two openings which appear in the middle distance on the right of plate XLIX, since the only purpose which these openings could have served was to allow the hot air from the chamber under **H** to pass into the chamber under **I**. To judge from the comparative levels of the thresholds of the two built-up doorways (14 and 15) in the western walls of the rooms, the pavement of **I** was about 1 foot 2 inches lower. Incidentally, the more easterly of the two lintels bears witness to an extensive reconstruction; it is obvious from the illustration that it has previously done duty as a door-jamb. In the case of **E1**, again, we are able to infer the height of the latest pavement from the level of the threshold of the entrance which is seen in the north wall in plate XLIX, confirmed as its testimony is by the level of the threshold of the built-up doorway (14) in the wall that divides **E1** from **I**. So far as **E2** is concerned, we have nothing to guide us save the second of the two

built-up doorways (15). That, however, is sufficient. It suggests that the pavement of **E2** was about 1 foot 2 inches higher than the pavement of **E1**, and this level, as it happens, corresponds as nearly as may be to the level of the floor that must have rested on the masses of masonry in **G**.

The evidence of the built-up doorways is important from another point of view. It shows that at one period the four rooms were closely connected, the bathers moving from one into another at successive stages of the bathing process, but that at some later time, for reasons which can only be conjectured, the system was changed and direct communication between the two halves of the block effectually interrupted. The fact of the alteration adds considerably to the difficulty of intelligible description, and an even more serious complication results from the presence of the underground channels which are marked with broken lines on the Plan. I propose to reserve the detailed discussion of the latter for a separate section, and meanwhile to give some account of the individual apartments, taking them in the order which I believe to have been followed by the bathers before the doorways were built up.

The First Tepidarium: The first room to be visited was **E1**, which was entered directly from the Vestibule. As things are now, there is nothing to indicate that it has not formed a single apartment with **E2**. Both Collingwood Bruce and Holmes, however, tell us quite definitely that signs of a dividing wall were still visible in their time. Before authorizing Mr. Brewis to put this (13) on the Plan, I got Mr. Hepple to lift the turf at a likely point, when he duly struck the expected foundations of the partition at some distance beneath the surface. Had Mr. Gibson's photograph come into my hands sooner, it would hardly have seemed necessary to dig. Just beyond the patch of sunlight that is thrown across the floor in plate XLIX, one can see, running from top to bottom of the west wall, a break which shows where the partition has been torn away. Holmes says that there was a similar break in the east wall.

Both have been effaced by rebuilding. At first sight it seems remarkable that the partition itself should have disappeared so completely. Mr. Simpson, indeed, was led to wonder whether it might not have consisted simply of an arch with a curtain. That, however, is *a priori* unlikely, in view of the difference which it would be desirable to maintain between the temperature of the two rooms. And the positive evidence I have cited—evidence which was not yet available when I discussed the point with Mr. Simpson—makes it certain that there must have been a wall of some kind. If we suppose that it was comparatively slight, its complete disappearance will appear less astonishing than the absence of any fragment of the thick bed of concrete which must have helped to compose the floor. There has plainly been much destruction in the interior during the years that ensued upon the withdrawal of the garrison.

The area of **E1**, as defined by the partition, was about 13 feet 6 inches by 13 feet 6 inches. The present floor, it will be remembered, is not the floor of the room itself but of the hypocaust which underlay it. Nor is it the earliest floor of the hypocaust. On examining the underground channels, whose covering slabs are nearly flush with the existing surface, I was led to suspect that they rested on an older floor of concrete. This proved to be the case. Holes dug here and there in **E1** and **E2** revealed the concrete at a uniform depth of about 1 foot. That the pavement above it should have been 1 foot 2 inches lower than the pavement of **E2** will seem only natural, if we bear in mind that the latter was the Caldarium, in which a much higher temperature was necessary. It is not merely that the air in the hypocaust of **E1** would be appreciably less in volume per square foot of the pavement. There would also be a difference in temperature. As the stream of heated air from the stoke-hole (17) entered the hypocaust of **E2**, it would rise at once to the top. It would not pass into the hypocaust of **E1** until it was cool enough to fall below the 1 foot 2 inch level to where it could make its way through the gaps in the partition wall. These, of

course, are not shown on the Plan as their exact position is unknown.

In the general description prefixed to this paper I mentioned that, where there was more than one tepidarium, it was not uncommon to find an extra furnace-room and stoke-hole attached to the second, possibly for use in emergencies. At Chesters the First Tepidarium has been at some time similarly equipped. For evidence we have to go outside the building to the re-entrant angle which **E1** forms with **D**. There the corner (**Q**) enclosed by a broken line on the Plan, is filled with a confused pile of stones, about 2 feet high, which since the Pilgrimage has been given a protective covering of turf (plate XLVII, 2). Whether it had more semblance of shape in 1886 cannot now be determined, although it may be noted that Bruce speaks of it as "a rough piece of masonry." Both he and Holmes were clearly aware that the interior was hollow and that it bore marks of fire, and they are in substantial agreement as to the interpretation which they place on those facts. I will quote Holmes, as his language is rather more precise :

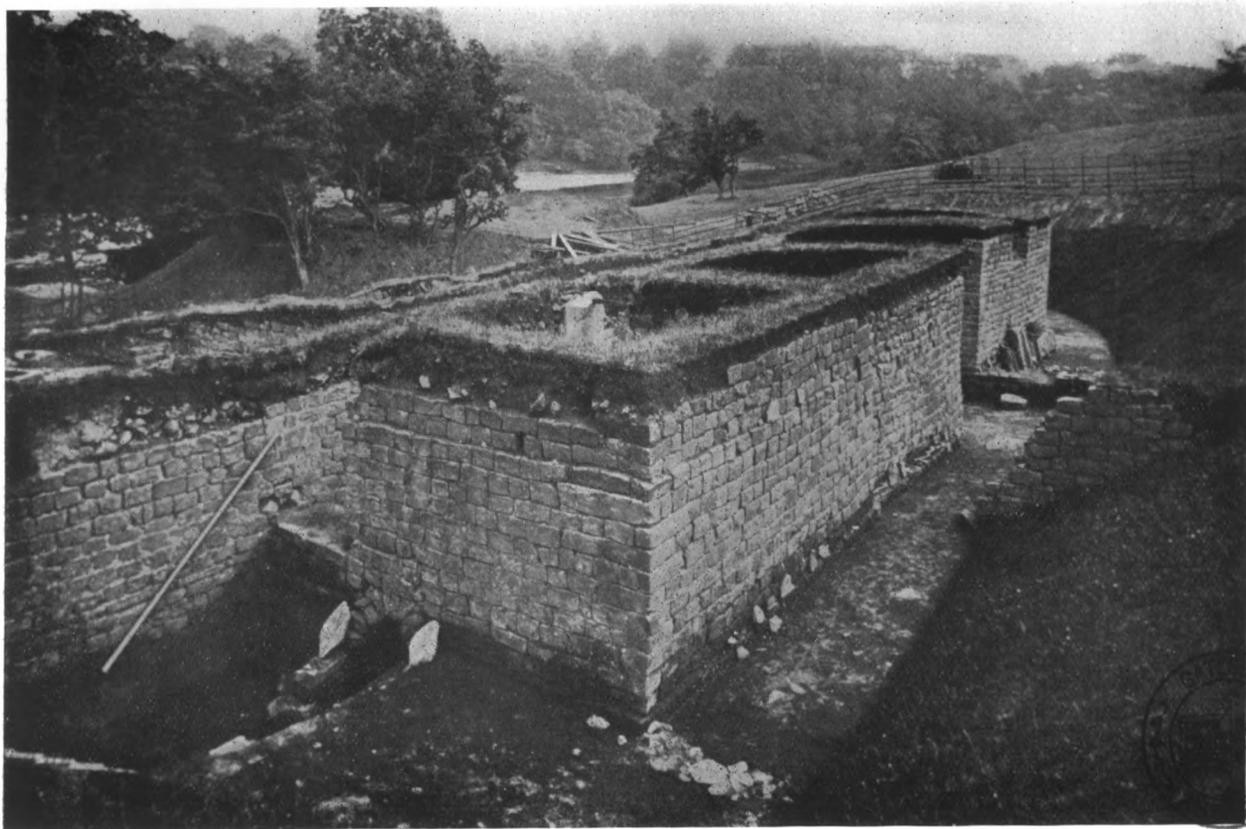
"From the hypocaust, under room D, a flue passes to the outside of the building, and swells out to form a small hot air chamber, from which the flue is continued through the wall into the room E."

On investigation this description turned out to be largely imaginary : it is one of the few points in regard to which Holmes has gone seriously astray. There is no hypocaust under **D**, nor has there ever been any breach in its southern wall below the level of the floor. Moreover, whatever may have been the case once, there is now no communication between the "flue" and the hypocaust under **E1**.

We removed (and subsequently replaced) a sufficient number of the stones to enable us to see that the collapsed walls of the interior were reddened by intense heat. That was as far as it was possible to go without disturbing what could not have been restored. What the appearances sug-

gested was that the remains were those, not of a flue, but of a furnace or stoke-hole. If this be so, it is hard to see what purpose it can have had except to feed the hypocaust under **E1**. It is true that the wall against which it abuts is solid. In examining the hollow, however, we noted that exactly opposite the end of it there seemed to be a built-up aperture. The mortar was so fresh and white that I was at first inclined to think it must be modern. But Mr. Hepple, whose opinion on these practical matters is of much greater value than my own, was convinced that in consistency and character it was Roman, and that its apparent freshness was to be explained by the completeness with which it had been protected from the atmosphere. On that assumption I can only conclude that the furnace has been abandoned and the stoke-hole built up at the beginning of one of the later phases in the history of the Bath-house. No corresponding signs of rebuilding can be discerned on the other side of the wall. But the inner face has been restored since 1886, and Holmes's plan (fig. 2) certainly conveys the idea that in his day there was something visible. Indeed, I am far from sure that his markings are not definitely confirmed by plate XLIX, despite the unfortunate intervention of the stones that have been set on end in front.

But (it may be objected) if these ruins represent a furnace that was abandoned before the Bath-house itself ceased to be used, is it not in the last degree unlikely that the Romans would have allowed the outer wall to be disfigured by such a formless mass? And in any event would not the stones inevitably have become more scattered? I agree. In fact, I find in these objections one of the strongest arguments in favour of the explanation I have advanced. When the furnace was still operative, the furnace-room would be below the normal ground-level, just as was **C** (plate L). When it was abandoned, the furnace-room would be deliberately filled up and the furnace itself buried beneath the débris. That is by far the most satisfactory way of accounting for its present condition of half-



W. WALL OF THE BATH-HOUSE IN 1885, LOOKING S.E.





destruction, half-preservation. And there is corroborative evidence which seems to me singularly convincing. The safest guide to the latest ground-level which we can associate with the Romans in the immediate neighbourhood, is the floor-level of **D**. Along the west wall the floor of **D** is only 6 or 7 inches higher than the ground outside. Along the south wall the difference increases rapidly, rising to as much as 2 feet 2 inches beneath the rectangular opening at the eastern end, directly above **Q** (plate XLVII, 2). Who can doubt that the surface-line of to-day is a blend of ancient levels and that it dates from 1884? When the excavators struck the top of the heap of stones, they concluded, rightly enough, that it was structural, and forthwith cleared it to the bottom, regardless of stratification. It is, I think, significant that, as we learn from Bruce, there were found on this very spot "a number of carefully dressed stones, slightly wedged-shaped and furnished with a groove." He adds the suggestion that they had "formed an arch which may have stood in this vicinity, but with what object does not appear." It seems to me more likely that they had been originally used elsewhere, but were discarded in the course of reconstruction and thrown in here to fill up the furnace-room.

The Unctorium: If I am right in my view as to the routine followed by the bathers, they would spend but little time at this stage in the First Tepidarium, and would pass on almost at once through the now built-up **14** into **I**. For an analogy to **I** we must go to *Æsica*. As will be seen from the plan (fig. 5), the Bath-house there, like that at Inchtuthil, differed from that at Chesters in belonging to the "Reihentyp." In other respects, however, it resembled it closely. The positions of the Apodyterium (**B**), the Latrine (**E** and **F**), the Frigidarium (**C**) and the cold bath (**D**) are identical, while I am fairly confident that, if **A** had been excavated, it would have proved to be a sudatorium, the position of which would then correspond to that of the two Sudatoria (**B** and **D**) at Chesters. I am less sure that the remainder of the plan has so far been

correctly interpreted, even by Mr. Knowles in his full and judicious account, the best that has yet been published.³⁴ He thinks that G was the Tepidarium and H the Caldarium. This makes the respective dimensions of the two rooms inexplicably disproportionate. As a rule, they are much more nearly of a size.

Accordingly I believe that at Æsica the dilapidated condition of the floor and walls must have prevented the excavators from observing the traces of a partition—possibly a light one—crossing H from north to south, a little to the east of the two apses. The space to the east of this partition would be the Tepidarium, the space to the west of it the Caldarium, and the proportion between their sizes would then be normal. What, in that case, about G? For answer I would fall back on the suggestion to which I referred in discussing the Vestibule at Chesters. I think it may very well have been used for the applying of unguents. If this was so, the same must have been true of I. In shape the one room is virtually a replica of the other, and there is very little to choose between their dimensions, I (13 feet 6 inches by 7 feet) being a trifle smaller than G (15 feet by 7 feet). Moreover, both were hypocausted and the bathers would step from each into a tepidarium. I have therefore ventured to call I the Unctorium. As they would not have to linger so long here as in the Tepidarium and Caldarium, a comparatively small room would be adequate. The presence of the hypocaust beneath makes the idea all the more attractive, since it might be held to furnish an illuminating commentary on the *unctorium hypocauston* of Pliny (*Ep.* II, 17, 11), which has always been something of a puzzle.³⁵ A room of the sort was not an indispensable element in a bath-house; there was, for instance, nothing of the kind at Inchtuthil.

³⁴ *Proc. Soc. Ant. Lond.*, 2nd Ser., XVII, pp. 29 ff., where the rooms are designated by numbers, not by letters. Here they are naturally referred to by the lettering used in fig. 5.

³⁵ See Mau in Pauly-Wissowa, *Realencycl.* II, 2757, where the comma that is often printed between the two words is rightly omitted.

But that is no reason why we should not find it at *Æsica* and at Chesters.

When it was uncovered half a century ago, **I** was structurally in a more ruinous condition than any of the other rooms, largely (it would seem) as the result of more or less deliberate action by the Romans themselves. Its evidence is at once interesting and unsatisfactory, giving tantalizing glimpses of important alterations, without being definite enough to enable us to determine with certainty and completeness what the alterations were. Roughly, it may be said that two main periods can be distinguished and that within the earlier of these there are clear indications of a subdivision into two phases. Further, it is fairly plain that these periods and phases must be reflected not only in the history of **H**, which was heated from the same furnace and whose fortunes have obviously been from first to last linked closely with those of **I**, but also in the history of **E1** and **E2**, the rooms immediately adjoining. Finally, it is conceivable, though I am not prepared to say it is likely, that a thorough excavation might reveal the existence of a period even earlier than the first of the two which I have mentioned above. I will begin by dealing with this last point. It is too speculative to merit detailed discussion, and can therefore be disposed of quickly.

If we turn to the Plan, is there not something in the lay-out to suggest that the whole group which consists of **E1**, **E2**, **F** and **G**, may be later than **H** and **I**? The lack of alignment between the south walls of **E2** and **H** seems odd, and, if the four rooms that make up the group were omitted, the result would be a much closer approximation to the plan of the baths at *Æsica* (fig. 5). **H** is no doubt appreciably smaller than is **H** at *Æsica*, being only 30 feet long and 13 feet 6 inches broad, as against 39 feet and 15 feet 3 inches. Nevertheless, it is large enough to have been subdivided into a caldarium and tepidarium, each of which would have had more floor-space than its analogue in, for example, the Men's Baths at Mumrills. More serious perhaps, although here again one might appeal to

the Men's Baths at Mumrills, is the absence of any recess for the hot bath. On the other hand, who can say that the foundations of an apse might not be found buried beneath the lowest floor of **E2**? Nor is the general character of the lay-out the sole argument that could be brought forward in support of the hypothesis I have outlined. During both of the phases of the early period **H** was, as we shall see presently, a Tepidarium. But for such a purpose its dimensions are quite out of proportion to those of the Caldarium (**E2**). Save for the Apodyterium, it is much the largest apartment in the Bath-house. The anomaly would be easily accounted for by the supposition that an older design had been modified when **E1** and **E2** were constructed. It is, however, fair to remember that a different explanation is equally possible. The exceptional size of the room might be set alongside the exceptional size of the cold bath and the spaciousness of the Apodyterium, and the inference drawn that various parts of the establishment had been planned on an unusually ample scale.

Thus much for speculation. Coming back to facts, I would point out that throughout the whole of the early period the Unctorium (**I**) was entered from **E1** through the now blocked-up doorway (**14**) in the dividing wall. The threshold-stone, which remains in its original position, gives an approximate indication of the height of the floor-level. It is about 4 feet above the floor on which the visitor must stand, and its testimony is confirmed by that of the lintels which bridge the gaps in the partition separating the hypocaust chamber of **I** from the hypocaust chamber of **H** (plate XLIX). The lintels are about 1 foot lower than the threshold-stone, but that is exactly what one would expect, since they would be beneath the pavement. As the portion of the wall above them is standing four courses high with no sign of a break in its continuity, the door through which the bathers made their exit must have been at the eastern end, which is now ruinous. The heat for the hypocaust was received, by way of the gaps,

from **18**, the stoke-hole which fed the hypocaust under **H**. Holmes, indeed, says that **I** "has been under-heated by a flue leading through the wall from room E." But he shows no flue here on his plan (fig. 2), nor is there any trace of it in the wall. Perhaps he has misunderstood the filled-in doorway, of which he makes no mention.³⁶

That the floor whose level is indicated by the filled-in doorway and the lintels, should have disappeared in **I** is in no way surprising, seeing that a like fate has befallen the corresponding floor of **H** as well as the corresponding floors of **E1** and **E2**. It is more remarkable that the floor of the hypocaust chamber beneath it should have been entirely removed. Apparently this was the work of the Romans themselves, for both Bruce and Holmes record that the space below, down to the present bottom, had a filling of clean sand about 2 feet deep. In pursuance of the policy they regularly followed, the nineteenth-century excavators cleared the whole of the sand away, finding nothing below it except a couple of keyed tiles. Incidentally, however, their work has supplied interesting evidence as to the first phase of the early period. Its effect has been to transform the south side of the room into a cross-section of what underlies the present surface of **H** and has presumably once underlain the missing hypocaust floor of **I** itself. This has apparently been an older hypocaust, for the gaps in the partition wall extend right down to the level of the floor on which the filling of sand was laid, and they would be meaningless except as connecting links between two hypocaust chambers. When the rooms were reconstructed, the raising of their level was naturally accompanied by a heightening of the gaps, the now useless spaces below being allowed to remain unfilled.

On the information so far available, there is nothing more that can usefully be said as to the history of **I** during

³⁶ As a rule, his plan reflects the facts very accurately. The most notable lapse is at the west end of the Apodyterium, where he shows eight arched recesses, although in his text the number is correctly given as seven.

the early period. But I should add that, in investigating the gaps, I got Mr. Hepple to clear the face of the wall underneath them. He found six courses of masonry, excellently built, going down to a depth of 2 feet 6 inches. Its history during the later period can more appropriately be dealt with in connexion with the history of **H**. That is why I have not yet made any reference to the doorway in the north wall, giving communication with **K**. I do not believe that this was opened up until **14** was blocked. For such a small room as **I** three doors would have been an unduly generous allowance.

The Second Tepidarium: If I am right in my view as to the purpose of **I**, the bather, after being anointed, would proceed thence into **H**, which I propose to call the Second Tepidarium. On the evidence of **14** and **15** he would have to mount one or two steps in order to do so. He would then find himself in a room which was not only much larger than the Unctorium but also considerably warmer, partly because the heat was admitted directly to its hypocaust from the furnace through the stoke-hole (**18**), and partly because, as in the case of **E1** and **E2**, there was a difference of 1 foot 2 inches in the floor-level. In all likelihood the roof was vaulted. Hence the need for buttresses along the east wall, where, as we know from what we have learned about **L** and **M1**, the sub-soil was none too firm. There would seem to have been a special danger of subsidence on the south, for at that end the thickness of the east wall is increased from 3 to 4 feet, while the south wall itself is no less than 4 feet 6 inches thick throughout.

Nowhere are the difficulties of rational explanation more formidable than at this particular corner of **H**. I was at first disposed to assign the responsibility to over-excavation in 1884, with the consequent loss of what might have been helpful clues. On further consideration, however, I am inclined to think that the confusion may have been introduced long before. The one fact that is beyond dispute is that **18** has originally been a *hypocaustis*

or stoke-hole. Although there is no trace of a furnace-room visible above the surface now, the "cheeks" or inner sides of the passage bear on their masonry unmistakable marks of fire, and examination showed that the soil immediately beneath the turf outside is burnt red. For a mere *hypocaustis*, however, the height of the opening (plate LI, 1) is impossibly excessive, the bottom of the lintel being as much as 3 feet 10 inches above the level of the floor of **H**. While, therefore, we may—or, rather, must—believe that the lower portion was the stoke-hole which fed the hypocaust under **H**, it is inconceivable that the upper portion should have also been open then. To suppose that it was would mean that the heated gases were driven not only into the hypocaust but into the room itself. Whatever the fuel used, such an arrangement would have been intolerable.

Were we to concentrate our attention entirely on the south wall, we might be tempted to conjecture that at the beginning of the later period the floors of **H** and **I** had again been raised, this time by about 2 feet. But, not to mention other objections, the negative evidence from the interior is conclusive against such a theory, in particular the absence from the dividing wall between **H** and **I** of any gaps higher than those which connected the hypocausts of the early period (plate XLIX). What, then, is the solution? The most promising line of approach is, I think, to see whether we can discover what actually happened to **H** and **I** during the later period—that is, after the doorways communicating with **E1** and **E2** were filled in. The indications are faint, but they are by no means negligible.

In describing the Unctorium (**I**) I mentioned that the two contemporary accounts concur in stating that, when it was opened up in 1884, it proved to be full of clean sand. Bruce, however, takes us a little further. Speaking of **I**, he tells us that "this smaller room was filled with sand up to the level of the floor of the other, which also had a covering of sand over it." It is the last words that are of importance at this juncture. They seem to imply

that, when **I** and **H** were shut off from **E1** and **E2**, they ceased to be heated rooms, their floors and the hypocausts beneath them being removed, with the result that the difference in level disappeared. For some obscure reason, perhaps through a mere misunderstanding of instructions, the process of demolition was carried farther in **I** than in **H**, so that a deeper filling of sand was required as compensation. The building up of the doorways in the west walls made the provision of at least one other entrance imperative. Accordingly it was, I believe, now that there was inserted in the north wall of **I** the door which communicates with **K** and the former existence of which is attested by the survival of the western part of its sill.

But there is something else. The stoke-hole (**18**) had become unnecessary, and the appearance which it wears to-day (plate LI, 1) is not inconsistent with the idea that it may have been converted into a small doorway, the width of the opening being left unaltered, while the height was raised to 3 feet 10 inches, and a couple of flags laid across the top to form a lintel. This would, of course, mean the destruction of the furnace-room and a concomitant lowering of the surface outside the wall to its present level. The idea that **18** was transformed into a doorway is the readiest way of accounting for the fact that the under side of the lintel does not betray the faintest sign of ever having been exposed to the influence of heat. It is true that one or two of the stones high up in the "cheeks" do bear very distinct marks of corrosion by fire. That, however, serves only to emphasize the testimony of the lintel. How could it have escaped scot-free, when they suffered so seriously? What seems to me the simplest explanation is that these stones are no longer in their original positions, but have been re-used when the doorway was built. The damage that had been inflicted on them—possibly in one or other of the walls of the furnace-room—was not then apparent and has only been revealed by the play of wind and weather. In corroboration of this it may be pointed out that the two which have been eaten into most deeply are



FIG. 1—OPENING AT S. END OF **H**, LOOKING N.



FIG. 2—W. JAMB OF DOORWAY INTO **B**, SHOWING THREE HOLES FOR BOLT.

at the inner end of the opening, just where it would have been most difficult for the flames to reach them.

Even after it had been thus enlarged, **18** would be both somewhat low and somewhat narrow as an entrance. Still, like *Mercutio's* wound it would serve, if only as a postern. To-day, indeed, when the floor of **I** has gone, it is the only means by which visitors can get access to **H** at all. But what place are we to assign to **H** and **I** in the general arrangement of the Bath-house as remodelled? Meanwhile I see no better answer than the one which I gave on the spur of the moment at the Pilgrimage—that, in the reconstruction which preceded the final abandonment, **H** had become the Apodyterium, while **I** continued to serve as the Unctorium, although it was now unheated. It may seem strange that, if this were so, the gaps in the wall that separated the two rooms (plate XLIX) should have been allowed to remain open. In view, however, of what happened elsewhere, it is impossible to be certain that a rough-and-ready filling was not removed in 1884. From **I** there would, of course, be immediate access through the newly-constructed doorway to the Frigidarium (**K**) and thence through the Vestibule (**N**) to **E1** and **E2**, which still retained their hypocausts. What part, if any, the original Apodyterium (**A**) had to play in the new scheme, one cannot tell. The obviously late date of the porch (**O**) may indicate that it was kept in use, perhaps for the exercises that usually preceded the ritual of the bath. On the other hand, if it were already abandoned and overgrown, the fine state of preservation of its pavement (plate XLV) is more easily understood.

A strong argument in favour of the suggestion that **H** may have been the Apodyterium during the latest period, is the fact that, as we learn from Bruce, the altar to Fortune,³⁷ now in the Clayton Memorial Museum, was found lying in this room, close to the postern. An altar to Fortune seems to have been a normal feature of every military bathing-establishment. I do not think its presence there had

³⁷ *Ephem. Epigr.* VII, 1015.

anything to do with gambling, as has sometimes been supposed. The goddess is occasionally called Fortuna Balnearis, showing that she was the presiding deity of the bath. But the point I wish to make now is that analogies from other sites go to prove that it was in the Apodyterium that the dedication ordinarily stood. Familiar examples from the German Limes are Jagsthausen and Miltenberg. Nor do we need to go so far afield. *Æsica*, Netherby, and Balmuildy are nearer home.³⁸ The contracted space of **H** and its sanded floor would certainly be a poor substitute for the ample proportions of **A** and its solid and well-laid pavement. But, after all, the contrast is in strict keeping with that between the first and the last states of the cold bath in the Frigidarium. Whether it represents the requirements of an attenuated garrison or reflects the habits of soldiers less thoroughly Romanized in their ways than the earlier occupants of the fort, the change in the Apodyterium, taken in conjunction with the reduction in the number of heated rooms and the shrinkage of the cold bath, conjures up a picture of degeneration or even of decrepitude.

The Vasarium: Until the doorway (**15**) in the partition wall was built up, the bathers used it to pass from the Second Tepidarium into the Caldarium (**E2**), off which opened a recess (**F**) containing the hot bath. The arrangements for maintaining a high temperature here are not hard to make out. The stoke-hole was at the point marked **17** on the Plan. As will be seen from plate XLIX, the upper part of it has disappeared, so that we are unable to say whether it was lintelled, like **18**, or covered with an arch, like the stoke-hole in **C**. Outside there is no apparent trace of any provision for firing. But, on lifting the turf and digging a little way down, we found that the soil was burnt a deep red. Following the burnt soil westwards, we encountered,

³⁸ For the "find-spot" of *Ephem. Epigr.* IX, 1191 (*Æsica*) see *Arch. Ael.*, 3rd Ser., V (1909), p. 159; of *C.I.L.* VII, 954 (Netherby), Roy's *Military Antiquities*, plate XLVI, note E; and of the Balmuildy example, Miller, *Balmuildy*, p. 43.

at a distance of 3 feet and a depth of 2 feet 6 inches, the foundation of a wall projecting southwards, evidently representing one side of the furnace-room. As the reddened soil ran on for at least 3 feet beyond the projecting wall, it would seem that the furnace-room must at one time have been a good deal larger. Again, it does not look as if there had been any great rush of smoke or flame up the narrow passage, the discoloration of the stones being less well marked than usual. Slight as the evidence is, I am inclined to think that these two features—the reduction in size and the absence of excessive discoloration—may indicate that during the latest period the fuel employed was charcoal. By way of possible confirmation I would point out that the hypocaust which was directly fed from **17** was of the channelled variety. I have elsewhere suggested that there was a close connexion between channel-hypocausts and fuelling with charcoal.³⁹

I do not remember noticing any other case in which the Vasarium or boiler-room has been heated by a hypocaust of this type. Nevertheless that it was in **G** that the water for the hot bath was warmed in metal cauldrons is made certain by its position. The Vasarium was invariably, and for obvious reasons, placed immediately beside the stoke-hole nearest to the hot bath. Holmes's notion that **G** "might have been a music-room, or a place where poems were recited" does not need to be seriously considered. While it was not spacious, it would be sufficient for its purpose, having a breadth of 13 feet 6 inches, and a length of 7 feet 8 inches, measured to the inner side of the two piers on which rested the arch that separated it from **E2**. Below what has been the floor-level the interior is filled by masses of masonry, projecting about 1 foot into **E2** and (as is well seen in plate XLIX) carefully faced along the sides of the flues or channels that divide them. The main channel, which is about 11 feet long and 2 feet broad, runs straight up the centre from the stoke-hole, while two subsidiary channels, each rather more than 4 feet long and

³⁹ See *supra* p. 226, footnote 9.

rather more than 1 foot broad, diverge from it at right angles at a point about 3 feet 6 inches from its southern end, producing the cruciform effect which is shown on the Plan. The masses of masonry could thus be thoroughly warmed, and would then become a veritable reservoir of heat.

As finally corroborating the identification of **G** as the Vasarium, I may direct attention to the hole which is conspicuous about half-way up the wall in the left foreground of plate XLIX. It passes right through to the interior of the room and was clearly intended to accommodate the lead pipe through which fresh water was supplied to the cauldrons. It will be observed that its height above the floor-level has been carefully adjusted for the purpose. It is hardly necessary to recall that the water would rise by pressure.

The Hot Bath: There is as little room for doubt regarding the use of the apsidal-ended recess (**F**) as there was regarding the use of **G**. It contained the hot bath, and was separated from **E2** by an arch resting upon piers which still survive. Plate LII gives a good view of the interior, not indeed as it was when first uncovered, but rather as it appeared a season or two later, after the walls had been repaired and the grass and daisies had had time to grow. Its situation with reference to the Vasarium, and therefore with reference to the stoke-hole, is perfectly normal and could be readily paralleled from many other sites. But it shares with the former the peculiarity of being heated by a channel-hypocaust. The maximum breadth of the recess is 11 feet 6 inches, and the greatest distance from the inner face of the wall at the back to the outer face of the masses of masonry between which the channels run, is 2 feet more. The lay-out and dimensions of the channels themselves can most easily be gathered from the Plan. It will be noted that their arrangement is differentiated from the arrangement of those in **G** by the presence of an additional channel, which follows the course of the apse and links up the extremities of the arms of the cross with the inner end



RECESS FOR THE HOT BATH (F) IN 1886.



of its shaft, giving the whole the shape of a short-handled spade.

The inner wall has been covered with a reddish plaster, fragments of which can be seen adhering to the stones, especially in the neighbourhood of the archway at the entrance. In the centre is a splayed window, the arris beneath the sill of which is 6 feet above the offset for the support of the floor. There was a similar window in a corresponding position in the baths at *Æsica* (fig. 5), and in both cases fragments of the glass were picked up on the ground outside. Beneath the window and just above the offset, the wall is pierced from back to front by a hole (16). Unfortunately this is not immediately visible in plate LII. When the stage was being set for the photograph, it has been purposely closed, under the mistaken impression that it was accidental. Its position, however, is marked by the two stones that have been thrust in endways to block it up. These have as little right to be in the picture as have the two tufa voussoirs which figure so prominently in the foreground. The hole (from which the obstruction has now been removed) is certainly original and has been designed for the passage of the lead pipe through which the waste water from the bath was discharged into the outside gutter already described. It should be added that, while there are several other holes to be seen at various parts of the outer walls on the west, only this one and that leading into the *Vasarium* are genuine structural features. Examination showed that the remainder are due to the chance loss of stones; none of them penetrate the wall, and there is always mortar inside. A further point to notice is that the floor-level of **F**, as indicated by the offset round the apse, was distinctly lower than the floor-level of **G**, the object being, of course, to facilitate the flow of warm water from the cauldrons into the bath.

Although **F** was heated by a channel-hypocaust during the latest phase of its development, it by no means follows that it had always been so. It is significant that, in the course of the very little probing which we felt free to do,

we should have found embedded in the floor a large portion of a red brick of the type so often used in the construction of hypocaust pillars. That changes have taken place since the floor of the hypocaust chamber was fixed at its present level seems obvious from even a cursory examination. The masses of masonry have been piled up on an earlier surface of red cement, which has in its turn been spread above the covering slabs of the underground channel. At least two, if not three, different stages would appear to be represented, and it is permissible to believe that with the last of these there was associated a complete reconstruction of the hypocaust system. I can suggest no better reason for the change than that it would be a natural enough concomitant of the corresponding change that was made in **G**, probably at the time when the furnace-room was reduced in size. And for the change in **G** it is possible to conjecture an intelligible motive.

The introduction of the new system into the Vasarium would remove all danger of the cauldrons being damaged by coming into contact with the flames that would be forced through the stoke-hole when the furnace was fuelled with wood. The Romans knew enough about the conductivity of metals to be aware that the danger was non-existent if the exposed surface was protected by the presence of water inside. Boscoreale has actually yielded an example of a lead cauldron being used for the heating of water in a pillared hypocaust.⁴⁰ But there was always the possible carelessness of an attendant to be reckoned with. If the necessary temperature could be obtained with charcoal firing—and the very circumstances of the case, we are considering show plainly that it could—the architect who reconstructed the Chesters Bath-house may very well have thought it desirable to take precautions against a type of accident which is not unknown in even the best-regulated of modern households, when a cook or a kitchenmaid is forgetful enough to allow the water in a pan to evaporate completely.

⁴⁰ See Fusch, *Hypokausten-Heizungen*, pp. 83 ff.

The Caldarium: The Caldarium (**E2**) was rather larger than **E1**, its dimensions within walls being 17 feet by 13 feet 6 inches. We know that the hypocaust beneath it, which was fed from **17**, was pillared, and we may safely infer that the room itself was warmed by radiation from the floor. The combination of a pillar-hypocaust with the channel-hypocausts in **F** and **G**, all three receiving their heat from the same stoke-hole, is an odd arrangement which can hardly represent a homogeneous design. Rather, it indicates that the hypocausts under **F** and **G** were also originally pillared, and thus confirms the conclusion which the internal evidence suggested. Nor would the effects of the change be limited to **F** and **G**, if the introduction of the new system there was, as I have supposed, accompanied by the adoption of charcoal fuelling. The heated air under **E2** and **E1** would now be free from contamination by smoke and soot and would be fit for direct admission to the rooms. Whether it was so admitted, we cannot tell. There is nothing to show that it was. On the other hand, the floor, which would have been the sole repository of evidence, has been completely destroyed. All that can be said, therefore, is that it would be unwise to ignore the possibility, more especially as we shall presently find the method of direct admission strikingly exemplified in another part of the Bath-house.

We are on safer ground when we come to radiation from the walls. It is, I think, certain that this way of supplementing radiation from the floor was operative in **E2** and **E1**, at all events before the advent of charcoal fuelling and probably afterwards too. Nothing, indeed, remains by which we can judge how the wall-surfaces were treated. Although two or three of the stones in the immediate neighbourhood of **F** are marked here and there with red plaster, Mr. Hepple assures me that these are not in their original position, and that they found their way to where they now are in the course of a comparatively recent restoration. He is positive that, while red plaster was used in one or two of the other rooms, notably in the Frigidarium,

it was not employed either in **E2** or in **E1**. Holmes, moreover, gives us a helpful clue. He believed that the walls of these two rooms had been "cased with slabs of stone or other material," and he proceeds to suggest that "the flags forming the later floor of the room A had been used for the purpose." This is extremely unlikely. But when he adds that "a number of the holdfasts yet remain in the wall, by which the wall slabs had been secured in their position," he preserves a valuable record of an illuminating piece of evidence, which has now wholly vanished. The presence of iron holdfasts in all probability connotes the employment of box-tiles, such as the walls of hypocausted rooms were so frequently lined with. Holmes says nothing as to iron holdfasts being found in the walls of **H** or **I**. But it would be idle to look for them there, since the entire heating apparatus would be dismantled when the hypocausts were removed.

There is reason to believe that a further precaution was

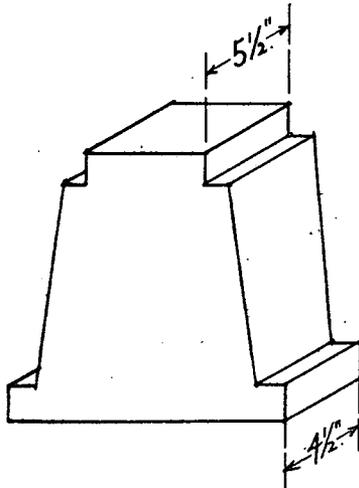
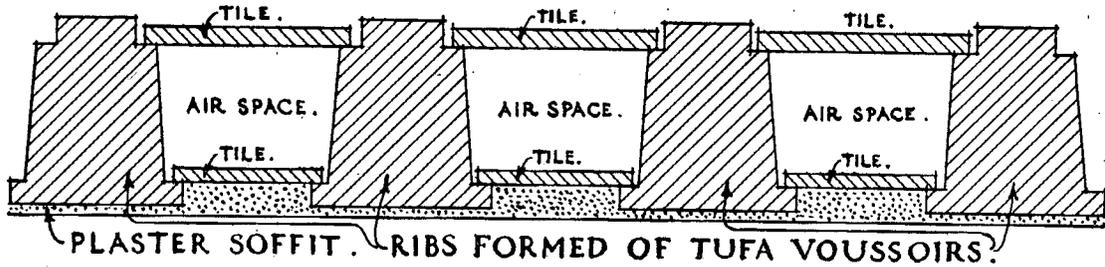


Fig. 6. Tufa voussoir.

taken to ensure the maintenance of a high temperature in the Caldarium. Among the objects discovered lying inside



LONGITUDINAL SECTION OF NON-HEAT CONDUCTING
 BARREL VAULT CEILING, SHOWING SUGGESTED USE OF
 TUFA VOUSOIRS.



Fig. 7.

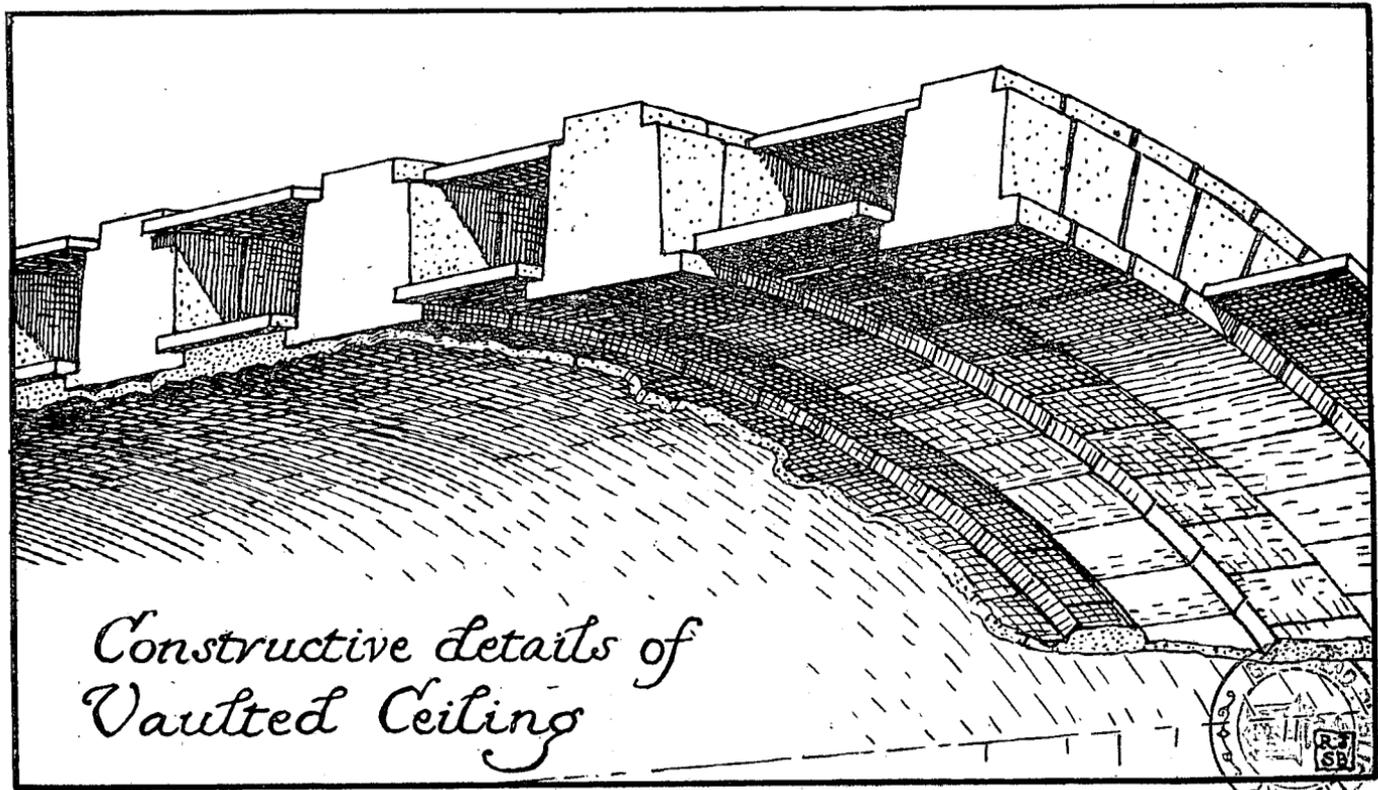


E1 and **E2** in 1884 were a number of peculiarly shaped blocks of a material which Collingwood Bruce and Holmes describe as concrete, but which is really calcareous tufa, a variety of stone not unknown in Northumbrian geology.⁴¹ I have already referred incidentally to two of them, which can be seen in the foreground of plate LII. The majority have now been heaped up in the north-east corner of **E1**, but a few may be observed on the top of the more southerly of the "low walls" in **N**. Holmes calls them "arch voussoirs," and the name accords well with their general appearance (fig. 6). The peculiarity which they present is a ledge at top and bottom of each side. This, combined with their exceptionally light weight, has suggested to Mr. Brewis a most interesting, and to me convincing, theory as to their purpose. He believes that they were used in the construction of a non-heat-conducting ceiling, in some such manner as is indicated in the accompanying longitudinal section (fig. 7) and sketch (fig. 8), for the latter of which I am indebted to the kindness of Mr. R. J. S. Bertram. I will leave the verbal description to Mr. Brewis himself :

"Had the rooms **E1** and **E2** not been ceiled, the heated air would have ascended to the roof and escaped at the numerous joints between the slabs or tiles.⁴² A plain brick barrel-vaulted ceiling could have been constructed under the roof to prevent the escape of hot air, but the thrust of such a vault upon the comparatively thin and unbuttressed walls would have been detrimental. Had the walls not been thickened or buttressed, the expansion and contraction of the vault, due to daily extremes of temperature, would have ended in destruction. The arch never rests, but this difficulty can be dealt with in two ways: either a sufficient abutment can be provided to take the thrust of a given arch or, when no weight is to be carried and the arch merely acts to prevent the escape of air, the arch may be constructed so lightly as to exert a thrust that is not beyond the resisting power of given walls. The eastern wall of room **E2** is an interior wall; it forms the western side of room **H**. To put

⁴¹ Mr. Hepple tells me it can be quarried near Haltwhistle.

⁴² Buildings on the line of the wall were usually roofed with stone slabs, but some were tiled. See *Arch. Ael.*, 4th Ser., I, p. 102, and IV, p. 183 with plate XXXVIII.



*Constructive details of
Vaulted Ceiling*

Fig. 8.



buttresses in room **H** might not have been convenient, and certainly would have been bad construction. Therefore, instead of a continuous brick vault being built over rooms **E1** and **E2**, they were probably spanned by arched ribs constructed by tufa voussoirs, the light weight of which had a proportionately light thrust. These ribs were spaced a foot or so apart, and the intermediate spaces were spanned by a double set of tiles carried by the ribs. Between the tiles was left a space of stagnant air, which had no thrust and like a hollow wall was a poor conductor of heat."

Apart from the gain in lightness, then, the effect of providing a cushion of air would be to maintain the temperature of the room below at a higher level than would be possible with any ordinary ceiling. The same result was achieved elsewhere by the use of hollow box-tiles for vaulting—at Chedworth, for instance, and in the great caldarium at Bath.⁴³ But the device employed at Chesters would seem to have been popular along the line of the Wall. Mr. Brewis's explanation, in fact, although formulated quite independently, is virtually identical with that put forward nearly a century ago by Hodgson to account for the presence of a number of somewhat similar blocks in the ruins of the baths at Chesterholm.⁴⁴ The Chesterholm blocks were of sandstone and, instead of a ledge at top and bottom, they have a groove at the bottom only. Nevertheless, as Hodgson shows, they were capable of being utilized in the construction of a vault closely resembling fig. 8. In the original statement of his view he expressed the opinion that "the space above, between the ribs, [had been] filled with sand to retain the heat," but this idea was abandoned on further consideration.⁴⁵ At *Æsica*, again, a good many blocks, which obviously belonged to the same general class, were found lying on the floor of Room H (fig. 5).⁴⁶ The excavators say nothing as to the material, but Mr. Brewis is under the impression

⁴³ *Archæologia* LX, pp. 442 and 444. The illustration in Middleton's *Remains of Ancient Rome*, II, p. 120, is also relevant.

⁴⁴ *History of Northumberland*, Pt. II, Vol. III, p. 195.

⁴⁵ *Ibid.*, p. 320, footnote (y)

⁴⁶ *Arch. Ael.*, N.S., XXIV (1903), p. 48.

that he has heard that it was tufa. From an illustration published by Mr. Knowles we learn that in shape the *Æsica* examples were very like the tufa voussoirs from Chesters, but that they differed in having a ledge at the bottom only.⁴⁷ The upper tile must therefore have rested on the edge of the actual top.

To these three varieties of shape Chesters adds a fourth. The woodcuts in Bruce's *Handbook* inform us that the "carefully dressed stones, slightly wedge-shaped," which were recovered from the neighbourhood of **Q**, had on either side a ledge at the top and a groove at the bottom. That the representation is accurate and that the material was sandstone, we know from the two survivors which have been moved into **E1**, where they can be seen doing duty as steps leading to and from the doorway in the north wall. In speaking of **Q**, I set aside the supposition that the blocks found there had "formed an arch which may have stood in this vicinity."⁴⁸ After what has been said above, we need hardly hesitate to recognize in them the remains of a dismantled barrel-vaulted roof, thrown in as a filling when the furnace-room at **Q** was put out of action in the course of some reconstruction. But, if this be so, it would seem to follow that the reconstruction included the dismantling. Accordingly I suggest that the building-up of the stoke-hole at **Q** coincided with the sanding of the floors of **H** and **I**, and that the "carefully dressed stones" represent all that is left of a non-heat-conducting ceiling which had once spanned those rooms, but which ceased to serve any good purpose when the hypocausts beneath were removed.

By way of postscript let me add that the view of the tufa voussoirs as belonging to the ribs of a vaulted ceiling is in no way invalidated by the fact that one or two of them have been made to serve as building-stones quite low down in the walls. These can most simply be explained as "wasters"—blocks which have been slightly damaged

⁴⁷ *Proc. Soc. Ant. Lond.*, 2nd Ser., XVII, p. 33; where the block has inadvertently been drawn upside down.

⁴⁸ See *supra*, p. 263.

either during the process of hewing or in transit from the quarry.

The First Tepidarium Revisited: On leaving the Caldarium the bather would descend a couple of steps to the First Tepidarium (**E1**), through which he had originally passed on his way to the Unctorium. This time he would remain until he was sufficiently cool to move into the Frigidarium without provoking too violent a reaction. I have nothing to add to the description which I have already given of the room. But it may be well to recall that during the latest period, after the building up of **14** and **15**, this was the only tepidarium in the suite. The Bath-house, which had previously been laid out on the block-system, approximated henceforward to the "Reihentyp," and it will be evident that the change must have entailed a certain loss in practical convenience, a loss for which, however, compensation was probably provided by the reduction in the number of bathers. During the earlier period those entering the heated rooms and those quitting them for the Frigidarium would encounter one another only in the Vestibule and, for a brief moment, in the First Tepidarium. Through the Unctorium, the Second Tepidarium and the Caldarium there would be but a single procession and a single line of advance. After the Second Tepidarium had been done away with, the remaining Tepidarium and the Caldarium would have two streams flowing through them, side by side, in opposite directions, and it would not always be easy to avoid confusion. The disadvantage was, of course, inseparable from the "Reihentyp," and it is not hard to believe that it may have been one of the motives which stimulated the evolution of the alternative system.

IX. THE UNDERGROUND CHANNELS.

The Report on the excavation of Mumrills contains a description of a series of carefully constructed channels which were found underlying the hypocausts of the

caldarium and the two tepidaria in the large Bath-house there.⁴⁹ They were characterized by certain features which put it beyond question that they had not been drains for carrying off water, and which rather pointed to their having been designed for the conveyance of fresh air into the heated rooms above. As the system had obviously been "scrapped" before the opening of the last phase in the history of the building, it was impossible to obtain a clear idea of how it had worked. Traces of similar channels had, however, been observed at other bath-houses in different parts of the country, and one of these was Chesters. Accordingly, when I accepted the invitation of the Pilgrimage Committee, I was hopeful that a closer examination of the remains there might throw light on a baffling problem. As it turned out, circumstances were no more propitious at Chesters than they had been at Mumrills. The inquiry has whetted curiosity, but has done little or nothing to satisfy it. Only in one respect has it advanced matters at all: it has enabled the older records to be supplemented and corrected.

Collingwood Bruce says that underneath the concrete floor of **H** there are "appearances of a channel, which may be a flue," and in fig. 1 the channel is marked, running in a straight line from the inside of the stoke-hole (**18**) to the central gap in the wall that divides **H** from **I**, or **J** from **K**, if Bruce's nomenclature be followed. What he saw is plainly visible in plate XLIX, where the covering slabs show up distinctly in the middle of the floor as they approach the central gap. Holmes has a good deal more to tell us, doubtless because the ground had been further cleared in the interval. According to his account, there were "three ventilating drains" in **H**. The epithet seems to imply that he believed they were for the transmission of air. From his plan (fig. 2) we can gather that one of the three, the covering slabs of which were all in place, was identical with the channel mentioned by Bruce. The other two are shown running parallel to it, one on each side,

⁴⁹ *Proc. Soc. Ant. Scot.* LXIII, pp. 481 ff.

and almost wholly denuded of covering slabs. Further, although he does not allude to it in his text, what appears to be an exactly similar "ventilating drain" is marked on his plan in **E2**, starting immediately opposite the outer end of the main hypocaust-channel in **F** and running eastwards to the opposite wall, into the body of which it passes, without, however, emerging on the farther side.

When considering the published plans of Chesters in connexion with the preparation of the Mumrills Report, I had felt extremely doubtful whether Holmes's representation of the "ventilating drains" was either accurate as regards **H** or complete as regards **E2**. In both respects my doubts were fully confirmed when I revisited the site a few days before the Pilgrimage in order to refresh my recollection of the general appearance of the Bath-house. For the two or three preceding weeks the weather had been abnormally dry, and the reserve of moisture in the thin layer of earth that concealed the covering slabs of the channels had been completely exhausted. As a result, the grass above them had withered, leaving the outline of the whole system mapped out by the hand of Nature. The picture corresponded almost exactly to what my experience at Mumrills had led me to anticipate. Any details that were still obscure were subsequently verified by the spade.

As indicated on the Plan, the most important feature not hitherto observed was a long channel which ran in a straight line from north to south through **G**, **E2** and **E1**, against the farther wall of the last of which it terminated. At **17**, which was its apparent starting-point, it was open to the air and could be seen passing in underneath the stoke-hole. In conformity with the level so set, the covering slabs were only a little way below the floors of the rooms throughout.

Some distance south of the mid-point of its course the long channel was crossed by a shorter east-and-west channel, running almost exactly at right angles to it. This transverse channel was obviously the one that had been noticed by Holmes, although his plan of it requires to be

amplified in two respects. In the first place the "ventilating drain" began, not on the outside of **F**, but well within the apse, where it emerges from beneath the cemented floor a foot or two from the inner end of the main hypocaust-channel. In the second place, after passing through the eastern wall of **E2** it ran straight on through **H** until it met the central longitudinal channel, of whose existence both Bruce and Holmes were aware. Beyond the point of intersection it changed its course, the very slight northerly trend, which was all that had up till now been perceptible, becoming much more pronounced as it passed through the eastern half of the room to strike the opposite wall at an angle which was presumably intended to keep its termination clear of the obstruction that would have been formed by the buttress outside. This change of direction has been responsible for Holmes's most serious inaccuracy. Apparently he saw two of the covering slabs, one on each side of the north-and-south channel. As they were not in alignment he very naturally, but none the less erroneously, supposed that they belonged, not to one and the same transverse channel, but to two flanking channels, the remaining cover-stones of which had disappeared.

Mr. Brewis and I were much impressed with the extremely careful manner in which the channels had been constructed. They were considerably larger than their counterparts at Mumrills, the passage-way, where we measured it, being 12 inches wide and 10 inches high, as against corresponding dimensions of $7\frac{1}{2}$ —9 inches and 5—6 inches. The concrete floor, which belonged to an earlier period, provided a bottom, and the sides consisted of two courses of masonry, mortar-jointed and covered with cement, while the slabs on the top were 3 inches thick. Common to Chesters and to Mumrills, and pointing unmistakably to a common purpose, were the cruciform arrangement under the rooms and the fact that the main channels at their entrance were carried underneath the stoke-holes. With regard to this latter feature, however, a very important piece of evidence, which has been

destroyed at Chesters, had fortunately survived at Mumrills. There the channel could be traced running back through the furnace-room towards a gap in the outer wall, which had been opened and closed by a movable slab. This confirms the view that the object to be served was ventilation, and also justifies the inference that the openings to be seen to-day beneath **17** and **18** are not the true mouths.

But, if the channels were really ventilating flues, there must have been at their inner ends some arrangement by which the supply of fresh air, received at their outer ends, was conveyed up the walls into the rooms above. No light could be got upon this from **H**, because in that room the eastern end of the transverse channel proved to have been broken up and destroyed before contact with the wall was established, while the northern end of the longitudinal channel simply opened into vacancy, as a result of the demolition that had taken place in **I** into which it must originally have passed. In **E1**, on the other hand, the northern branch of the channel-system appeared to be intact up to the point of junction with the wall. Accordingly it was cautiously uncovered here. To our great disappointment it failed to give us any help. The channel came to a dead end against the wall-face, nor was there the slightest indication that it had ever done anything else. In particular, the most northerly of the covering-slabs, which was the only one that we lifted, seemed to be as much a part of the original construction as any of the others. There was nothing for it but to take refuge in the somewhat lame conclusion that the wall was later than the channel and that it had been built across the mouth of it in the course of a reconstruction which had involved the "scraping" of the channel system. This does not mean that the area of the room had been reduced, for a trial pit dug in **N** showed that the channel had never extended farther north than it does now. On the other hand, there may have been a ventilating contrivance in the thickness of a wall which the present wall has replaced. And something of the same



EAST WALL OF **H**, LOOKING S.W.

sort would seem to have happened in **H**. As I have already indicated, the deflection of the eastern area of the channel system there is most easily explained as due to a desire to avoid the buttress. Why, however, should the buttress have been avoided, unless the channel were designed to vent into the open air? But in the wall as we see it (plate LIII) there is nothing to suggest that there has ever been an outlet here. Does it not look as if there had been a rebuilding from its foundations?

So far, then, Chesters has brought us no nearer an answer to the enigma offered by the underground channels. The mystery attaching to them remains almost as deep as that surrounding the thirty-three human skeletons, "all of them in a remarkably perfect condition," which, as Bruce tells us, were found "on clearing away the soil from the eastern and southern faces of these chambers." The difference is that there is more hope of a solution. It may be that the clue lies buried beneath the concrete floor of **F**. Any attempt to discover what happens at the point of junction there would have carried us beyond what I regarded as the limit of legitimate interference with the structure: we should have had to remove what we could not restore. I have therefore had to rest content with registering the facts as I observed them. It is at least some satisfaction to feel that this represents a not unsubstantial addition to the material that will be at the disposal of anyone who has to deal with the problem in future, whether at Chesters or elsewhere. My contribution would, however, be incomplete if I refrained from mentioning a circumstance which at first blush seemed to make it doubtful whether the channels had been ventilating flues at all.

When the covering-slab at the northern end of the channel in **E1** was lifted, its under side was found to be decidedly blackened, as if it had been discoloured by smoke. Had the air which passed through the channels been laden with soot, it would have been quite unfitted for ventilation purposes and could only have been meant for warmth. Were the channels, after all, for the transmission

of heat? Reflection suggested a more likely explanation. The evidence from Mumrills makes it virtually certain that the true starting-point of this particular channel, the flow of air into which was regulated by an adjustable slab of stone, lay at some distance to the south of the entrance into **G**, and that the channel was carried under the floor of the furnace-room to **17**, where it first becomes visible to-day. When the reconstruction that followed the abandonment of the channel system took place, the furnace-room was reconditioned. This involved the removal of the whole of that part of the channel which lay below, and also the exposure of the apparent mouth that is still visible. Even if an attempt were made to block the opening—and of that there is not the slightest evidence—smoke would inevitably be attracted into it when the reconditioned furnace-room came into use. The blackening of the under-surface of the covering-slabs need therefore have no more connexion with the character of the channel system proper than have the rabbit-bones with which, as Mr. Hepple tells me, the passages are cumbered. Its real significance is the proof it affords of a period when the stoke-hole at **17** was fuelled with wood. With charcoal there would have been no such discoloration.

X. THE SUDATORIUM.

I have left to the last the self-contained suite which projects towards the west at the north end of the main building. It consists of two small apartments (**B** and **D**) with a furnace-room (**C**) attached. The general purpose to which it was devoted is not open to doubt. It was a sudatorium, designed for those who preferred the process of perspiration by dry heat. Some of the details which it illustrates are instructive. But it is specially interesting for the evidence it provides of successive reconstructions. Although the earlier part of the story is so blurred as to be wholly illegible, some of the later chapters can, I

think, be deciphered with a reasonable approach to certainty. It will be best to begin with a description of the furnace-room.

Anyone who looks at **C**, as it is represented on the Plan, will at once note two features that call for remark. The first is that the north-west angle appears to be rounded. The seeming irregularity of shape is, however, of no importance. Reference to figs. 1 and 2 indicates that it has developed since the ruins were uncovered, and the testimony of the earlier plans is confirmed by the photograph reproduced on plate L, where the north and west walls can be seen meeting one another at a right angle. The second feature is more worthy of notice. The room seems abnormally small. The internal area is only some 8 feet 6 inches by 6 feet 9 inches. The actual furnace, the position of which is marked by the two white stones that have been set up in the foreground of the illustration, is proportionately smaller. The arched opening (5), by which the heated air was conveyed into the adjoining hypocaust, was 2 feet 2 inches high in the centre and 1 foot 11 inches wide.⁵⁰ It hardly needs to be pointed out that the space available for firing must have been very restricted. Combined with the absence of discoloration, this appears to justify the inference that the fuel employed was charcoal.⁵¹

The walls of **C** are too much destroyed to admit of any opinion as to whether the room was accessible from the outside. Probably it was. In any event, through the opening marked **6** on the Plan, it was in direct communication with **B**, for which it supplied the heat. This opening is about 2 feet 6 inches wide, but there is no means of judging how high it has been, as the wall above it has gone. It shows no trace of a door, although there must clearly have been some means of closing it, if only by a movable slab. Nor are there any signs of the steps which

⁵⁰ It has recently been repaired and strengthened by an iron band.

⁵¹ Cf. *supra*, p. 228.

would be necessary for ascent and descent, if it were used as a passage way. We may guess that the steps, if steps there were, have been of wood, in which case the rod seen fastened to the wall in plate L is set at rather too generous an angle. Incidentally, the existence of wooden steps, if it can be assumed, would furnish another argument in favour of charcoal-fuelling. In a furnace-room so small the sparks from an ordinary wood-fed fire would have been a constant source of danger. On the whole, however, I feel very doubtful as to whether **6** was ever an entrance. It may have been merely an opening for ventilation like **4**, which will be referred to presently.

In any event the real approach to **B** was from **D** through the doorway which appears in plate LIV. This view, taken from outside **B**, speaks for itself in a fashion that makes verbal description superfluous, so long as it is borne in mind that the tall slabs, which form the "upstart" jambs, stand about 6 feet high. It should, however, be added that the inner face of the left-hand jamb displays, not one, but three holes for receiving the bolt (plate LI, 2).⁵² These cannot have been in use simultaneously. Rather, they must indicate three phases in the life of the door and presumably, therefore, of the rooms which it served to connect.

Here and there the floor of **B** is broken, the gaps being sufficiently large to reveal its general structure. The flagstones which form the pavement, some of them fully 3 inches thick, rest upon a bed of concrete, spread upon other and even more substantial flagstones, which are in their turn supported by sixteen hypocaust pillars, 2 feet high, arranged in four rows, and partly by an offset about 1 foot broad, running round three of the walls. In the case of the fourth or east wall the place of the offset is taken by four projections, one opposite the end of each row of pillars. The thickness of the layer of concrete is

⁵² The fourth mark, which is visible some distance below, represents a hole which has been begun but never completed, doubtless because it was realized that its position was unsuitable.



DOORWAY INTO THE SUDATORIUM (B), LOOKING N.E.

not uniform, but depends upon the thickness of the superincumbent and supporting slabs. Its average, however, appears to be about $4\frac{1}{2}$ inches.

Holmes conjectured that **B** had been one of the rooms "where they would undergo the sweating process," and the conjecture is certainly right. Where a sudatorium was attached, as it often was, to the main building, it was invariably placed as far away from the hot bath as was compatible with ready access from the apodyterium. The heat required was a dry heat, and every effort was therefore made to prevent contamination with moisture.⁵³ It will be apparent from the Plan that **B** conforms strictly to this condition. But there is something more. I may once again recall two suggestions that had at least the merit of novelty when they were put forward in the Mumrills Report. Reasons were there given for believing, in the first place, that sudatoria were, generally at all events, fuelled with charcoal and, in the second place, that the temperature within them was raised and maintained, not by radiation from the floor and walls as in caldaria and tepidaria, but by the direct admission of hot air from the hypocaust. The motives for such an arrangement are as obvious as the connexion between the two aspects under which it presents itself: direct admission would give a higher temperature than radiation and would give it more speedily, while the substitution of charcoal for wood would ensure the absence of smoke and soot. At Chesters, **C** supplies, as we have just seen, confirmatory evidence for the first of the two suggestions. The tale has still to be completed by **B**, which supplies confirmatory evidence for the second.

At the time of the Pilgrimage I was tempted to follow Holmes and find this evidence in the flue-pipe which had been embedded in the wall of **D** at the point which is numbered **3**. He says that "the pipe reaches up to about

⁵³ To the phrase of Celsus quoted above (p. 228, footnote 10) I may add Seneca, *Ep.* LI, 6, "*sudatoriiis in quae siccus vapor . . . includitur.*"

3 feet above the level of the floor, and there may have been means of opening it and letting the heated air direct into the room when proper incandescence had been obtained at the furnace." Reflection, however, soon convinced me that the idea must be set aside, not only because a single pipe could hardly have produced more than a very moderate degree of warmth, but also because, in the few instances where the remains of a system of the kind have survived in Roman buildings, it seems to have been at the level of the floor that the hot air was admitted—a very natural expedient, as its tendency would always be upwards.⁵⁴ I therefore decided to examine **B** as carefully as the conditions of my survey permitted, and I accordingly directed Mr. Hepple to clear the vegetation away for 2 or 3 feet along the junction between the west wall and the floor. At first it looked as if we were going to draw a blank. I noticed, however, at one point a length of several inches to which the earth clung obstinately. A suggestion that this was due to the accidental scaling-off of part of the paving slab did not satisfy me, and on going beneath the surface the very first "dip" of the trowel yielded a T-shaped holdfast of iron—a highly significant find, since it indicated that there had at one time been something there for it to hold. Further probing revealed a regular opening which extended all the way through the thickness of the floor, the layer of concrete being cut back for a distance of 4 inches from the wall. At this juncture, I asked Mr. Hepple to crawl into the hypocaust and ascertain exactly how things looked from below. His report gave me all that I had hoped for.

Immediately beneath the aperture the stone in the uppermost layer of the offset was awaiting—not because it had been removed, but because it had never been laid.

⁵⁴ A very interesting illustration from Britain, for which I am indebted to Miss M. V. Taylor, F.S.A., will be found in the account of Woodchester by Samuel Lysons (*Reliquiæ Britannico-Romanæ* II (1817), plate xxii), where the symmetrical arrangement of the openings in the tessellated floors of rooms A, H and I leaves no doubt as to their significance.

The result was to provide an unobstructed passage from the interior of the hypocaust into the room above. There can hardly be a doubt but that the iron holdfast had kept in place a small box-tile, the top of which would be flush with the floor and the hollow part of which would give passage to the hot air.⁵⁵ Any suggestion that the absence of the stone from the offset can be accounted for by chance or carelessness may be dismissed at once. The blank and the aperture above it lay exactly opposite the west end of one of the avenues formed by the hypocaust pillars while, as will be seen on turning to the Plan, there were similar blanks at the west end of each of the other avenues, and blanks, less numerous but in similar positions, in the offsets on the north and south walls. The blanks were of different sizes, the size of each being determined by the space that the missing stone would have filled. In length they varied from 5 inches up to 1 foot. The height was naturally more uniform, being from $4\frac{1}{2}$ to 5 inches. Eleven of them are marked on the Plan, where they are distinguished by the number 7, and there may have been at least one other, as the offset is not quite complete.⁵⁶ By far the most striking feature about them is the symmetrical manner in which they are disposed.⁵⁷ It appears to me plain that they have been vents for the admission of hot air. Whether they were all so utilized during the period represented by the present floor, and whether any of them retain remnants of the box-tiles, are questions which I could not have attempted to answer without going beyond my commission.

⁵⁵ Such tiles were actually found *in situ* in a sudatorium at Neckarburken on the German Limes. See *O.R.L.*, Bd. V¹, Nr. 53 (Lief. 9), p. 18, where the excavators remark upon the precision with which the tops of the tiles were adjusted to the level of the floor.

⁵⁶ There may also have been openings in the floor along the east wall. But, as there was no offset between the projections, there are no blanks to indicate their positions.

⁵⁷ At Neckarburken the arrangement seems to have been exactly similar. There, too, the openings in the floor were opposite the ends of the avenues between the hypocaust pillars. See *O.R.L.*, *l.c.*

A thorough-going exploration of **B** would doubtless reveal traces of the successive periods, whose existence is attested by the holes in the door-jamb. In **D** such traces, though hitherto unobserved, are writ large on the walls. During, at all events, the last phase of its active history **D** has apparently served as an ante-room, connecting the Vestibule (**N**) with the Sudatorium proper (**B**). It is of somewhat irregular shape, with a maximum length of 14 feet 6 inches and a maximum breadth of 12 feet 6 inches, and has a paved floor, regarding the level of which I have already had something to say in connexion with the level of the ground outside.⁵⁸ Bruce and Holmes are at one in describing it as hypocausted, the latter adding that the hypocaust beneath it remains "in good order." It was a surprise to find that they had been mistaken. They have been misled by appearances. The ground beneath the pavement had certainly been excavated to the depth of the hypocaust under **B**, and there is communication between the two subterranean chambers by means of a square-headed opening in the partition wall. Nevertheless there is no hypocaust. The opening (which is indicated, but not numbered, on the Plan) measures 1 foot 8 inches by 1 foot 3 inches, and is not only visible but accessible through the broken pavement of **B**. Notwithstanding its small size, Mr. Hepple was able to make his way into it for a certain distance. It was the account which he brought back which first roused my suspicions as to the room being hypocausted at all.

The opening, he ascertained, was really the mouth of a built flue, which ran straight on towards a point immediately beneath the flue (**3**) which is embedded in the south wall of **D**. He could see no trace of any branch going eastwards, such as there must have existed if Holmes's idea of a flue passing from **D** to **E1** were correct. The next step was to lift one of the flags of the pavement (which is intact) close to the west wall of **D**. The space beneath was found to be packed with rubble, out of which

⁵⁸ See *supra*, p. 263.

was picked a small fragment of pottery, assigned by Mr. Birley to the late third or early fourth century. The same rubble-packing was revealed when a second flag was lifted, this time in the south-east corner. One could only conclude that, while the room had once been hypocausted, the hypocaust had been done away with by the Romans themselves. The empty chamber had then been filled with rubble, saving only so much of it as was required for the passage of the built flue. The fragment of pottery tells us that the change was probably made in the course of the fourth century.

Moreover, the purpose of the wall-flue (3) is now clear. It has had nothing to do with the admission of hot air to **D**, but is merely the vertical part of the chimney which has provided a draught and a vent for the furnace in **C**. While the horizontal part of the chimney was of masonry, the fumes had been carried upwards through the thickness of the wall by a series of box-tiles, measuring about 7 by 8 inches and placed one above another. It will be remembered that, when Holmes saw it, the pipe thus formed reached up "to about 3 feet above the level of the floor"—that is, to the top of the portion of the flue that remains exposed to-day (plate LVI, 1). It is now largely destroyed, only the tile close to the floor-level being visible, while the wall above the break, as will be seen from the illustration, gives a superficial impression of solidity. More careful examination, however, shows that the mortar is modern, and Mr. Hepple tells me that, within his own recollection, the passage for the box-tiles—in other words, the chimney—extended right up to the top of the wall, whence we may presume that it continued to the roof. It was built up because the wall threatened to collapse.

The lifting of the pavement at the south-east corner of **D** was instructive in other ways. The particular spot selected was chosen in order to test the truth of Holmes's theory of a flue passing out through the south wall of **D** into **Q** and thence into **E1**. When the rubble was removed, the wall was found to be solid. It had never

been pierced by a flue. On the other hand, its structure was remarkable. Beginning from the bottom, it showed (a) a foundation, (b) an offset, (c) a single course of masonry laid at a normal distance back from the face of the offset, and (d) a projecting course of masonry which had served as an offset for (e) the existing wall. It was plain that (a), (b) and (c) had belonged to an original wall on which the existing wall, of which (d) and (e) formed part, had been superimposed. At the same time the east wall, which was also the west wall of the main building, presented two features calling for remark. In the first place, the foundation was exceptionally deep, going at least 3 feet down, perhaps because it happens to be set astride of the belt of soft ground,⁵⁹ which we know to have been responsible for subsidences in **K** and farther east. In the second place, for 1 foot 2 inches immediately below the level of the floor it was covered with plaster, a fairly certain indication that it had been exposed to the air.⁶⁰ Moreover, it had been so exposed before the building of the present south wall of **D**, for it was clear that the plaster had extended beyond the line of junction. On the other hand, the protective covering did not come so far down as the level of the highest remaining portion of the original south wall, its relation to which accordingly remains undetermined. But we were inevitably reminded of Mr. Simpson's suggestion that the whole of the outer wall of the main building may once have been plaster-coated.⁶¹

The discovery that the present wall of **D** was not the original wall at once removed a difficulty of which even casual visitors to the ruins can hardly fail to be sensible. Whether it be looked at from the outside (plate L) or from

⁵⁹ A puzzling line of stones, projecting westwards at the lowest level, may have been the remains of a drain.

⁶⁰ It is true that at Lydney there was a hypocaust chamber which had been plastered inside. There, however, all four walls had been similarly treated. Here there is only a single wall in question.

⁶¹ See *supra*, p. 256.

the inside (plate LV, 2), this wall makes a perfectly straight joint with the immediately adjacent wall of **B** and is obviously later. **D** thus gives the impression of being an afterthought, in which case there must have been a period when the bather who wished to pass from the Vestibule (**N**) into the Sudatorium (**B**) could only do so through the open air. Why adopt such an awkward arrangement, when it would have been just as easy to place the Sudatorium where **D** now stands and so provide for direct access from **N**? The question is seen to be idle, now that we know that the present walls of **D** are reared upon those of an older room, which was in all probability hypocausted and which may well have been an earlier Sudatorium, the real afterthought, if any, being **B**. It does not, however, follow that the erection of this earlier Sudatorium was contemporary with the erection of the main building; the evidence of the plastered wall is at least sufficient to suggest a doubt as to whether it may not have been an addition. Nor does it follow that there was direct communication between it and the Vestibule (**N**). Indeed, the story of the room which succeeded it rather goes to show that it was entered from the outside.

The main outlines of that story can be recovered by a careful scrutiny of the west wall. Three stages are distinguishable. The first is represented by a built-up doorway (**1**) near the centre, about 4 feet wide: its threshold stone can be seen on plate LV, 1, opposite the middle portion of the measuring rod. This must have been the entrance, and it seems very unlikely that both it and the present approach from **N** were in simultaneous use. In point of fact, the sides of the latter tend to be ragged, as if it had been broken through a pre-existing wall—a feature to the significance of which Mr. Simpson drew my attention before the built-up doorway opposite was brought to his notice. The building-up of this doorway marks the beginning of the second stage. The whole of the space which it occupied was not, however, at once blocked with masonry. The upper part of it was utilized for a splayed

window (2), the sill of which was about 4 feet 6 inches above the level of the pavement. At the outset of the third stage the window was filled in (plate LV, 2) and the wall made continuous from the floor upwards. It is not, I think, unreasonable to find an echo of these three stages in the three holes for the bolt which were noted in the face of the west jamb of the doorway leading into **B** (plate LI, 2).

A parallel to the blocking of the doorway can be cited from a bath-house outside of the more westerly of the two forts at Neckarburken on the German Limes, where a sudatorium, which now shows two entrances in the front, has a built-up doorway in the back wall.⁶² In this connexion it may be recalled that the sudatorium, although an almost invariable adjunct, was not really an integral part of a Roman bath-house. The dry-heat and the moist-heat process could be indulged in quite independently of each other. Apparently the former was regarded as less enervating than the latter. The words of Martial (VI, 42):

*Ritus si placeant tibi Laconum,
Contentus potes arido vapore
Cruda Virgine Martiave mergi*

seem to show that bathers who were satisfied with a perspiration induced by dry heat were free to plunge at once into the coldest of cold water. Is it possible that the architect of the first stage intended that the users of the Sudatorium should cool themselves in the North Tyne? There is an apposite passage in the *Mosella* of Ausonius:

*Vidi ego defessos multo sudore lavacri
Fastidisse lacus, et frigora piscinarum,
Ut vivis fruarentur aquis; mox amne refotos
Plaudenti gelidum flumen pepulisse natatu.*

(l. 341 ff.)

But the valley of the North Tyne is not the valley of the Moselle; and, if that were really the original inten-

⁶² *O.R.L.*, Bd. V¹, Nr. 53 (Lief. 9), p. 17.

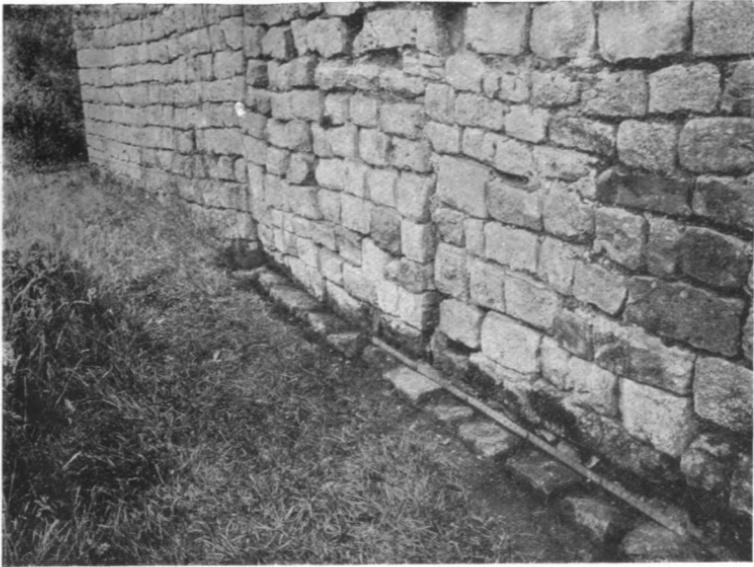


FIG. 1—OUTER FACE OF W. WALL OF D, LOOKING N.E., SHOWING BUILT-UP DOOR.



FIG. 2—INNER FACE OF W. WALL OF D, SHOWING BUILT-UP WINDOW.



FIG. 1—INNER FACE OF S. WALL OF **D**, SHOWING OPENING FOR VENTILATION AND REMAINS OF CHIMNEY.



FIG. 2—S.W. CORNER OF FLOOR OF **D**.

tion, it was departed from in the reconstruction which inaugurated the second stage. Thenceforward the bathers could pass direct from the Sudatorium into the ordinary Frigidarium.

What the condition of the west wall has taught us as to the later history of **D**, can be supplemented by three further pieces of evidence, seemingly detached and yet falling readily into place if looked at in the light of what we have learned from the west wall. The first of these is the curious opening (4) which appears at floor-level in the east corner of the south wall of the room (plate LVI, 1 and plate XLVII, 2). Exclusive of a lintel-stone 4 inches thick, it measures 3 feet in height, while it is 2 feet 4 inches wide, exclusive of an "upstart" jamb on the east, which is 4 inches broad. Obviously it cannot have been intended for a door, and it is most awkwardly placed for a window. I believe it should be assigned to the last of the three stages which I have described, and that we may see in it a proof that, despite the removal of its hypocaust, **D** continued to be something more than a mere ante-room to **B**. In it the sweating process was begun. After the space beneath the floor was filled with rubble, the necessary heat must have been supplied by charcoal braziers, a method which, as we know from the literary authorities, was sometimes employed for heating sudatoria. For the application of such a method an abundance of fresh air was essential. Poisonous fumes are generated when, but only when, there is an insufficient supply of this during the process of combustion. Doubtless that was one reason why, as we learn from Vitruvius, Laconica or sweating-chambers, constructed on the scale which he envisages, had always an opening in the roof which could be wholly, or partially closed by a brass cover worked by chains from below. The hitherto enigmatic opening in the wall of **D** can, it seems to me, be very simply explained as the humble counterpart of the ampler openings in the domed roofs such as Vitruvius knew. Its complete or partial closing would be effected by means of a movable stone

slab. Three examples of such slabs were found in position at Mumrills.⁶³

Thus much for the purpose of the opening. But why do I believe that it should be assigned to the final stage? The answer is provided by the second fragment of evidence. I have already mentioned that the sill of the doorway leading from **N** into **D** has two pivot-holes, one on each side.⁶⁴ If the record on the opposite wall has been correctly read, these must belong to the second and third stages, seeing that during the first stage there was no entrance here at all. As I interpret the facts, what happened was that, when an entrance was made into **D** from the east at the beginning of the second stage, the new door was so adjusted as to open inwards on the left or south side. That was clearly the most convenient plan, so long as the wall towards which it swung was blank. But at the beginning of the third and last phase, when the window in the west wall was built up, the opening (4) was broken through the south wall and furnished with a movable slab. The original arrangement of the door now became highly inconvenient, if not impossible. A new pivot-hole was accordingly made on the north or right-hand side of the sill, and henceforward the door turned on this, swinging outwards. As the sill is obviously later than the worn pavement of the Vestibule and the Apodyterium, it follows that the second and third stages must have fallen within the latest of the three main periods which have left their impress on the floor of the latter apartment.⁶⁵ The same is, I think, true of the first stage. Of the earlier history of **D** the lifting of the south-east corner of the pavement gave us no more than a glimpse.

The third of the detached fragments of evidence is of more doubtful import. On the whole, however, it goes to support the view that it is with the third stage that the rubble packing under the floor of **D** should be associated.

⁶³ *Proc. Soc. Ant. Scot.* LXIII, pp. 485 and 493.

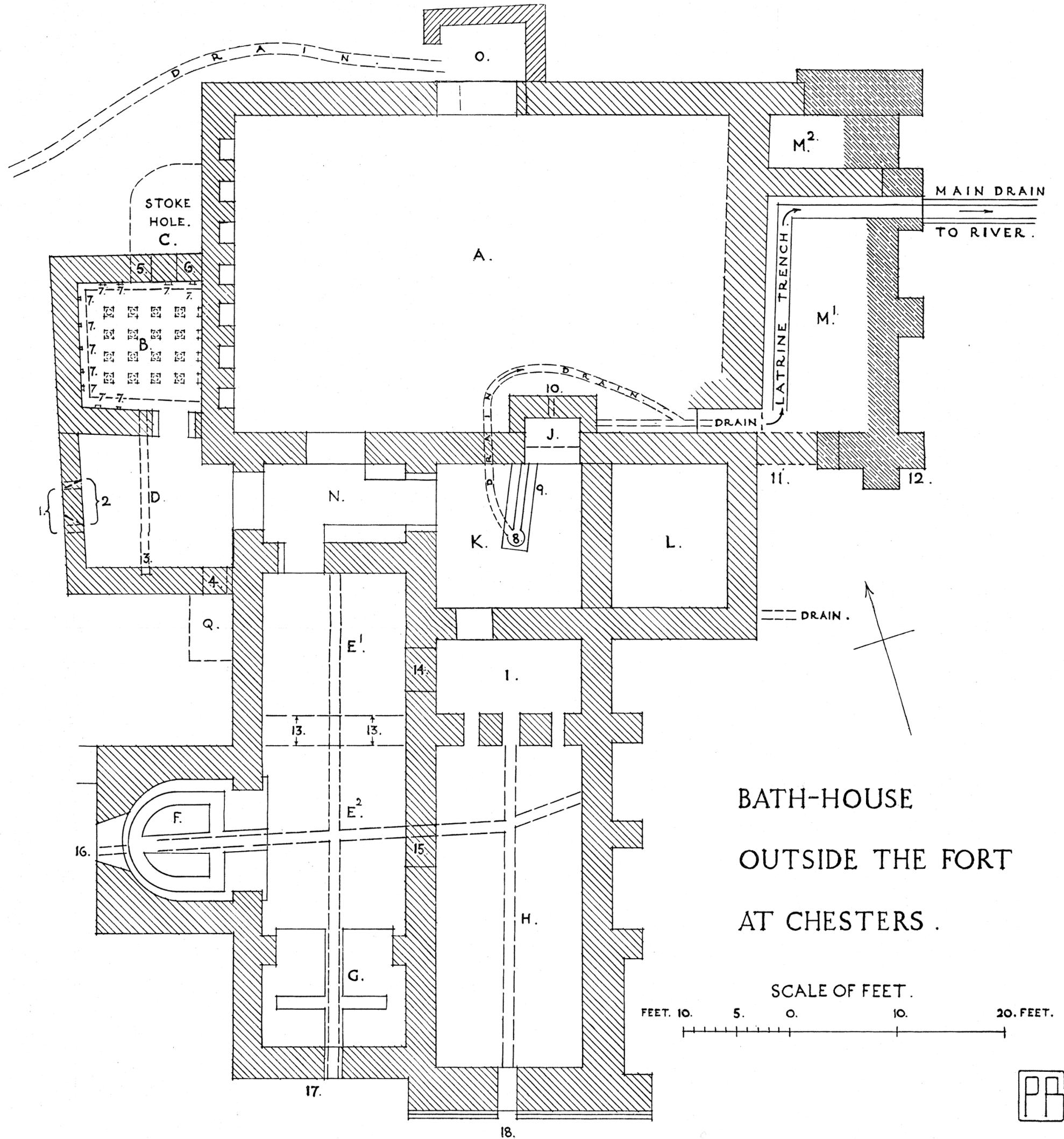
⁶⁴ See *supra*, p. 248.

⁶⁵ Cf. *supra*, p. 239.

When the vegetation was cleared from the surface, the pavement beneath presented a somewhat remarkable spectacle. It had the appearance of having been originally laid with flag-stones, measuring on an average about 3 feet 4 inches by 1 foot 11 inches. But at various points the regularity of the pattern was interrupted by a patchwork of odd stones, while not a few of the flags, which had seemingly been intact when laid in position, were cracked and split into small pieces (plate LVI, 2). This can best be accounted for on the hypothesis that the existing floor, which undoubtedly belongs to the third stage, was constructed out of such serviceable material as remained after the removal of the hypocaust and the insertion of the rubble. The unbroken flags were sufficiently numerous to cover a large portion of the area. Elsewhere recourse was had to patchwork. Some of the flags, however, which seemed to be in a sound enough state—perhaps those which had done duty during the first as well as during the second stage—had really deteriorated considerably through the heat to which their lower sides had been exposed. They served fairly well for the time being. But, when the building became roofless and its interior was left at the mercy of the elements, their weaknesses developed with a rapidity which quickly reduced the floor to its present sorry condition.

The picture which it has left forms a not inappropriate conclusion to this survey. The fate which has overtaken the floor of **D** is a reflection of the fate which has overtaken the establishment as a whole. Originally laid out, we may be sure, on a homogeneous and consistent plan, it has from time to time undergone alterations, occasionally of a far-reaching character and not always executed with the workmanlike thoroughness that the first builders displayed. The contrast between the flimsy porch at the entrance to the Apodyterium and the solid platform underlying the Latrine is typical. Even without the disfigurements that have been wrought by natural decay, the Chesters Bath-house would have been a palimpsest which it would have

been extremely hard to decipher. I should be the last to claim finality for all of the readings I have proposed. But I venture to think that some of the more important of them are fairly certain and that the rest are sufficiently probable to be accepted on a provisional basis, pending the more searching examination which is so desirable. In the meantime, my paper will, I hope, fulfil the purpose which the Pilgrimage Committee had in view in their original invitation—that of making the more conspicuous features of these striking remains less unintelligible than they now are to the ordinary visitor.



BATH-HOUSE
OUTSIDE THE FORT
AT CHESTERS .

