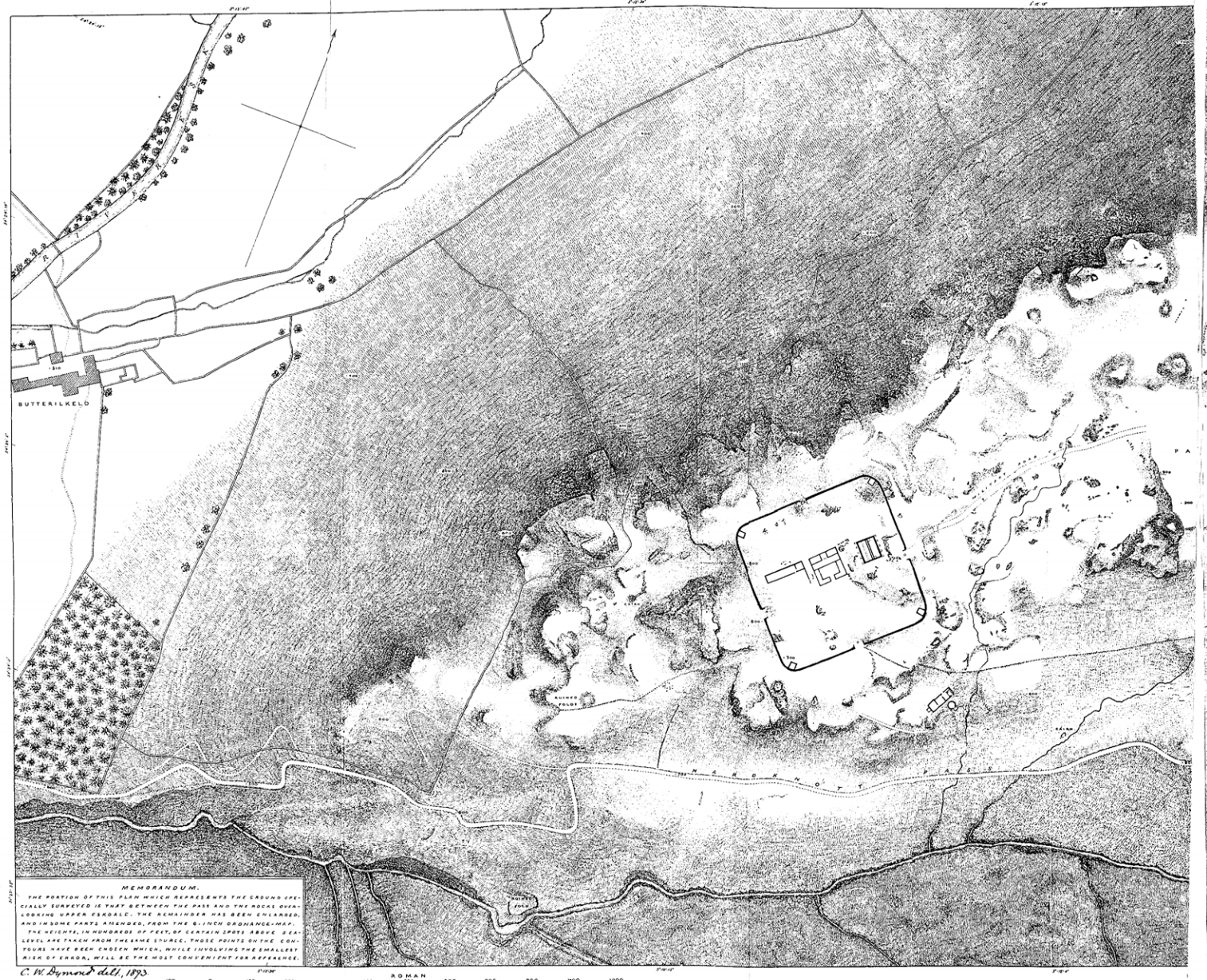
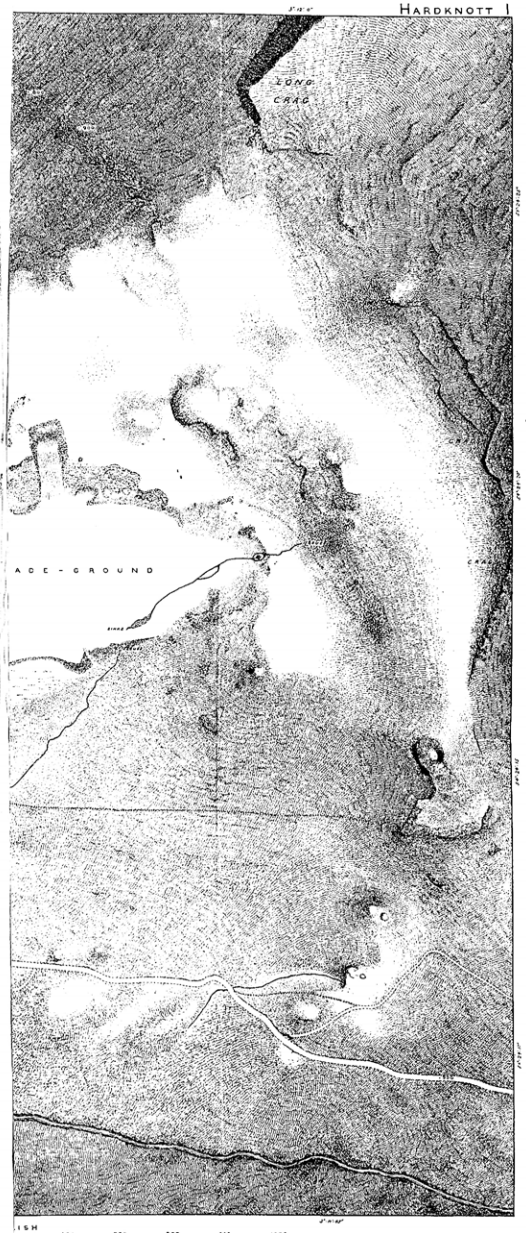
PLAN OF THE POSITION OF THE ROMAN CAMP ON HARDKNOTT, CUMBERLAND.

SURVEYED IN AUGUST AND SEPTEMBER, 1892, BY C.W.DYMOND, F.S.A.





ART. XXXV.—*The Roman fort on Hardknott known as Hardknott Castle.*

PART I.—*PROLEGOMENA.*

SEVERAL members of the Council of this Society had long nourished the intention of thoroughly exploring Hardknott Castle, and of making a new and correct survey thereof.

As a needful preliminary it was determined, in the Summer of 1889, to have it explored by the spade. The chief object was to ascertain the original plan of the works, by freeing the yet unruined portions from the masses of fallen rubbish under which they were buried; but it was intended also, as opportunity might serve, to hunt for relics likely to yield information about the camp and its occupants.

In the autumn of the same year a good beginning was made by Mr. H. Swainson-Cowper, F.S.A., who spent two days, September 20th and 21st, in clearing the north tower. Notes of the results were printed in these *Transactions*, vol. xii., part i., p. 228.

Circumstances prevented anything more being done until the following year, when Sir Herbert E. Maxwell, M.P., on the 28th, 29th, and 30th May, completed the excavation of the north tower; turned over a good deal of earth in the entrance and court of the central block of buildings; and dug a pit in the lower part of the area within the postern gate. His list of the objects found on that occasion, with a short dissertation on the camp, will be found on p. 229 in the same volume.

In the summer of 1891, Sir H. Maxwell returned to the scene of operations, and gave a couple of days to partially clearing

clearing the north-east gateway, exposing its side walls, and finding a large, flat block of freestone, nearly midway on the floor of the passage. Such desultory and intermittent attacks proved of little practical utility, and the Council of the Society so represented to the noble owner of the Castle, Lord Muncaster, and urged the necessity of continuous operations. To this Lord Muncaster readily agreed, and proposed to find the labour, if the Society would find archæological experts for proper supervision. Under these circumstances the Council secured the services of Mr. C. W. Dymond, F.S.A., as resident engineer and surveyor, and director of a continuous and thorough investigation. This was begun on Tuesday, 31st May, 1892, with four men, afterwards increased to six, and, weather favouring, was practically completed on Saturday, the 9th July. From the 13th June onward, the Rev. W. S. Calverley, F.S.A., took part in the work, and remained, with the two extra men, for a little longer to work at the outbuildings, east of the camp. Mr. Dymond returned in the autumn to complete the survey. The President of the Society was a frequent visitor. The headquarters were at the Woolpack Inn, where a large sleeping van, lent by Mr. J. G. Goodchild, F.G.S., F.Z.S., formed an office and a museum. An old military tent was pitched within the area of the Castle as a shelter; the labourers themselves were boarded at Butterelkeld.

PART II.

By the President, the WORSHIPFUL CHANCELLOR FERGUSON, F.S.A.

Hardknott Castle is a small mountain fort built by the Romans in Upper Eskdale, in the south-west of Cumberland. Its ruins may still be seen on a broad, grassy ledge, 800 feet above the sea level, half way up the side of the massive Hardknott Fell, in a striking and significant

cant position. North is a precipice with the Esk some hundred feet below,* and beyond it the Scawfell mountains; east is Hardknott, as many hundred feet above; westwards you see down Eskdale to the sea, and, even under certain atmospheric conditions, to the Isle of Man; while to the south, a road laboriously climbs the only direct carriage road between the Roman camp at the head of Windermere, distant from Hardknott by road 10¾ miles, and the west coast, starting from the camp and harbour at Ravenglass,† distant 9¼ miles; the highest point of the *col* or pass over which this road goes is 1291 feet above the sea level, and is visible from the Castle. Spite of its height, and owing to its openness to the sea breezes, the road is rarely, if ever, closed by snow. The fort has been known for years, but it has no history; its ancient name is unknown. It has been conjectured that it may be *Maia*, a station whose name appears in the cosmography of Ravenna and on the enamelled cup found in Wiltshire and known as the Rudge Cup. *Maia* certainly would appear to be in south-west Cumberland, but Ravenglass is equally with Hardknott likely to be it, except for the jingling guess that Ravenglass is *Ravonia.*‡ The first mention of this camp is in *Camden*; it is as follows:—

One of these rivers (Esk) rises at the foot of Hardknott, a steep, rugged mountain, on the top of which were lately dug up huge stones and the foundations of a castle, which is very strange, considering the mountain is so steep that one can hardly get up it. These are possibly the ruins of some church or chapel which was built upon the mountain.

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* The Ordnance B.M. at the farm of Butterelkeld on the Esk just under the Castle, is 313 feet above sea level. The Castle is above the 800 feet contour line.

† The above account of the Castle is slightly altered from one by Mr. F. J. Haverfield, F.S.A., which appeared in the *Athenæum* of October 22nd, 1892.

‡ *A History of Cumberland*, by Richard S. Ferguson, London, p. 57. (Elliott Stock, 1890).

This

This is a very confused statement. Camden cannot mean that he took the ruins of the castle for a church or chapel; clearly he means that there was a ruined castle, and also a ruined church or chapel, which he probably took some of the buildings inside or outside of the camp to be. In the year 1792 the fort was surveyed by Messrs. Irton and Sergeant. Mr. Sergeant was, we believe, a land agent and surveyor at Whitehaven, and Mr. Irton was Edward Lamplugh Irton, of Irton Hall, in the parish of Irton. Mr. Irton died in 1820, and a fine library, formed by various members of the family, but mainly by him, was sold by auction about 20 years ago at Irton Hall. Among the books was an interleaved copy of the part of Cox's *Magna Britannia* relating to Cumberland. Bound up in this volume was the original survey of Hardknott, titled thus :—

Hardknott Castle; surveyed and measured August 14th, 1792, by Edward Lamplugh Irton and Henry Sergeant.

It is, on the face of it, an unreliable production; it pretends to be drawn to scale; it gives towers at the four corners, and marks them 13 feet square; it shows two turrets at each gate, drawn, each, one quarter of the size of the corner towers, but alike marked 13 feet. It gives all the gates as of the same size, 10 feet, but we shall see they are not. Messrs. Irton and Sergeant also surveyed —all in one and the same day—the vicinity of the camp including the parade ground, and made a plan thereof, which is in the copy of Cox's *Magna Britannia* just mentioned. All this, including coming and going to and from Irton Hall, must have been good work for one day. This plan of the camp is published in Hutchinson's *History of Cumberland*; it is extremely inaccurate in its measurements, as might have been expected from the limited time given to it. Let us turn to *Hutchinson's History*

History, a confused work, which gives two accounts of the camp. The first runs thus:—

The extracts from Camden lead us, in the first instance, to speak of the remains on Hardknott mountain, of which we have given an exact plan, communicated to us by Mr. H. Sergeant, of Whitehaven, who informs us that he and another gentleman took it in the summer of the year 1792. They describe it to us as being situated on the west side of Hardknott hill, about 120 yards to the left of the road towards Kendal, and has evidently been intended for a fortress for the defence of that pass over the mountains. It is, as will appear by the plan, as nearly square as the ground would admit, the sides being 352 (*sic*), 348, 347, and 323 feet respectively. The inequality of the position of the gates or entrances is in like manner, owing to the irregularity of the ground. It is built of the common fell stone, except the corners, which, according to the report of the country people, among whom it is well known by the name of Hardknott Castle, were of freestone, but has all been taken away for buildings in the neighbourhood, there being no freestone nearer than Gosforth. But for that circumstance, it is probable the fortress would have been standing at this day in a state of preservation. In digging to clear the foundations of the inner buildings, Mr. Sergeant says they met with a great many fragments of brick, which must necessarily have been brought from a considerable distance;* also several pieces of slate, and near the entrances some small arching stones, or penstones, of freestone with remains of mortar on them, showing that in all probability these entrances or gateways were arched. The gateway to the east leads to a piece of ground of about two acres, at a distance of 150 yards, which by great labour has been cleared of the stones that encumbered it, and used perhaps for a parade and military exercise. On the north side of that plot is a forced or artificial bank of stones, now slightly covered with turf, having a regular slope from the summit, near which, on the highest ground, are the remains of a round tower. From this the road is continued along the edge of the hill to the pass, where it gains the highest part of the present road to Kendal.†

A few leaves later on a further account of Hardknott

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* More than one tile kilns of Roman date were discoveree a few years ago in making the private drive from Muncaster Castle up Eskdale.

† Hutchinson's *History of Cumberland*, vol. i., p. 569.

Castle

Castle is given, communicated by the Rev. Aaron Marshall, long curate of Eskdale :—

Within the manor of Birker lies Brotherelkeld,* a sheep farm of prodigious extent, which formerly belonged to Furness Abbey, and at the dissolution was granted to the Stanley family. In it is Hardknott ; in the centre of the area of that fort are the remains of two buildings, which seem to have been very considerable. At the far gate lie a larger heap of stones than at any other part of the walls, except at the four corners, where, it is evident, were round towers ; amongst the stones, which are chiefly a rough granite (with which the mountain abounds), are many freestones and some bricks. The freestones must have been brought upwards of 14 miles, through an almost unpassable country, and at last up a mountain—at this time hardly possible for a light cart to be drawn ; and the bricks could not have been obtained nearer than Drigg, the adjacent country affording no materials. Its situation is on the summit of the first ascent of Hardknott, and commands the only pass into Westmorland, and an extensive view of the sea coast and the Isle of Man ; 150 yards above the fort is a level spot, the work of art. A road leading to Ambleside is called the King's Coach Road. Not many years ago, several pieces of a leaden pipe were found in a direction to the fort, leading from a well called Maddock How Well, which indisputably supplied the fort with water.†

The next account which I shall notice was written by the Bishop of Cloyne, Dr. W. Bennett, who with his Chancellor, the Rev. T. Leman, traced on foot most of the Roman roads in England. He says :—

There is a fort at Hardknott hill, in the parish of Muncaster (?), on the left of the present road from Whitehaven to Kendal. It is as nearly square as the ground will permit, and from its situation and form appears evidently to have been made with a view of guarding one of the principal passes from the west coast into the inland country. The walls are of stone of the neighbourhood, with four gates, which appear to have been arched with freestone, brought

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* Called Butterilket in the Ordnance Map, but the correct name is Butter-eldkeld, the spring of Buthar-elldr, of Buthar the elder, a Scandinavian settler. Ferguson's *Northmen in Cumberland and Westmorland*, p. 129.

† Hutchinson's *History of Cumberland*, vol. i., p. 578.

from

from a distance; and beyond the east gate an esplanade, at the distance of 150 yards, has been formed with much trouble for the exercise or review of troops. There seems to be good reason for conjecturing that this spot may have been the site of one of the military posts between Moresby and the certain station at Ambleside, to which an old road from hence over the mountain is still said to lead.

This following is Lyson's footnote on the above:—

The work, which is called by the country people Hardknott Castle, was carefully surveyed in the year 1791 (*qu.* 1792) by E. L. Irton and Mr. H. Sergeant, who communicated a particular account of it to Mr. Hutchinson, by whom it was printed in the first volume of the *History of Cumberland*, p. 569, where a plan of it is introduced. The gates appear to have been flanked with turrets 13 feet square, and there were also turrets of the same dimensions at the four corners. Within the area were the remains of buildings, in which several rooms could be traced. The length of the different sides of the fort were 362 (*sic*; the Irton Hall plan says 362, but Hutchinson in his text says 352), 348, 347, and 323 feet. When we visited the work in the year 1813, we observed that no part of the walls was to be seen standing; the stones have been thrown down on both sides, forming a high ridge, which in a spot more favourable to vegetation would have long since been covered with turf; there did not appear to have been any mortar used in the walls.*

In the *Proceedings of the Society of Antiquaries of London* for the year 1855, is the following notice of Hardknott Castle:—

Mr. Benjamin Williams, F.S.A., mentioned the discovery of a mutilated red sandstone slab near the western gate of Hardknott Castle, on which was "GRIC LA COII." This inscription proves the original castle was erected about the year A.D. 82 by the second cohort of the legion under Agricola, the lieutenant of Vespasian, for we know he subdued the Ordovices before he made his expedition, in the third year of his lieutenancy, so far north as the Tweed. "Positis insuper castellis" (Tacitus' *Life of Agricola*).†

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* Lyson's *Magna Britannia* (*Cumberland*), p. cxlviii.

† *Proceedings S.A.*, 1st series, vol. iii., p. 225. Mr. Williams' communication to the *S.A.* cannot now be found.

What

What became of this slab, or its present whereabouts, is not now known. On this inscription the late Mr. Thompson-Watkins wrote me as follows :—

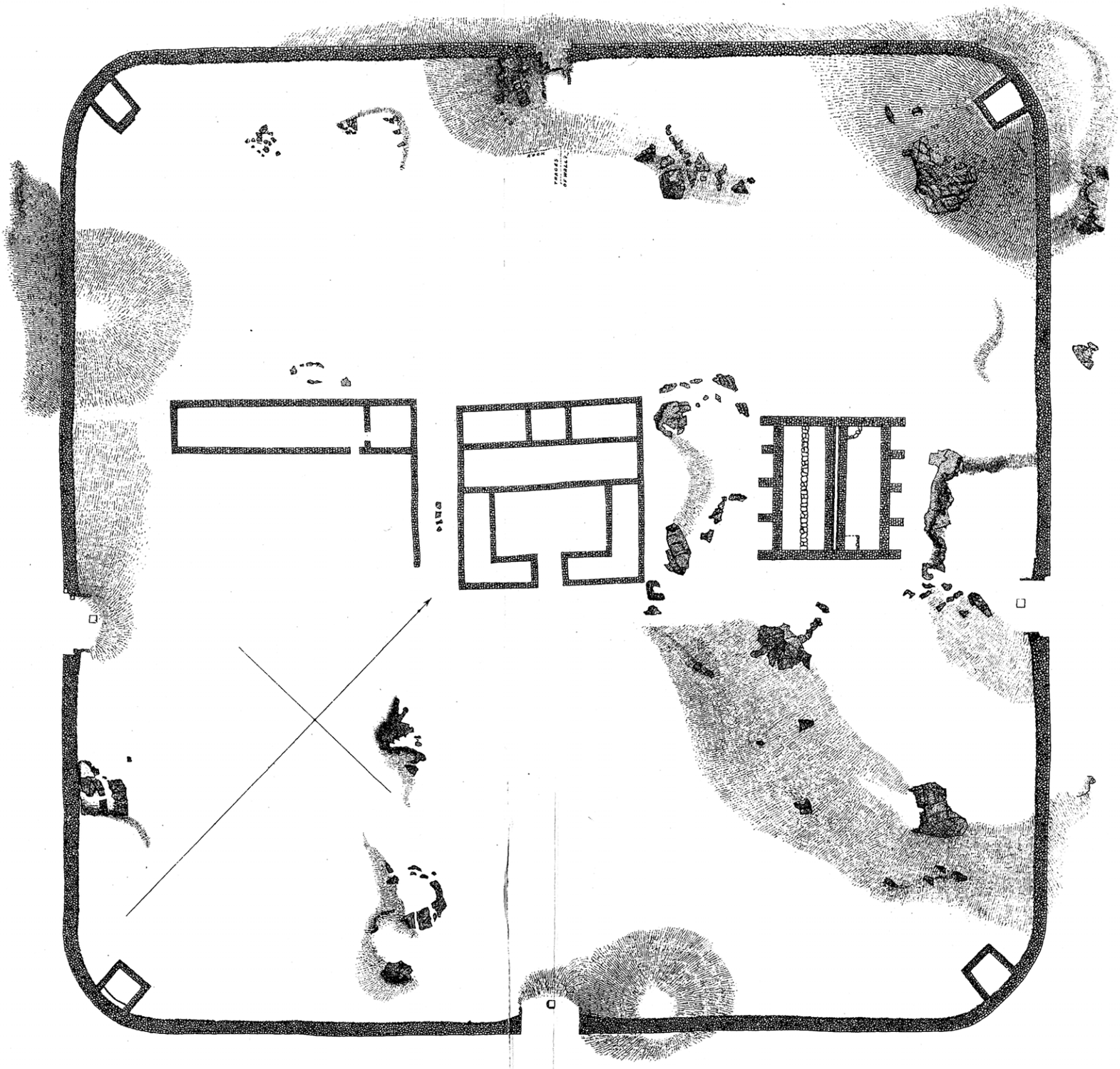
A Mr. B. Willlams described a mutilated fragment of red sandstone found at Hardknott before the Society ot Antiquaries, the letters simply "GRIC LA COII." Professor Hubner and myself refer it to Calpurnius Agricola, legate between A.D. 162 and 169. . . The last letters are probably H. I cannot see that it proves anything as to the erection of the fort. The same legate's name occurs on one or two inscriptions at Magna.

Mr. Watkins was unaware that the slab was found near the western gate, a fact which induces me to think that it formed part of the inscription usually over the gateway of a fort of this class, recording who built it. It probably ran somewhat thus: SUB CALPVRNIO AGRICOLA COH * * * FECIT. If we could only fill up the gap after COH, we might find the key to the great puzzle of Romano-British geography, the route taken by the 10th Iter of the *Antonine Itinerary*. It is tantalising to be "so near and yet so far;" four or five more letters would have done it.

There is yet another account that it is desirable to cite, one by the late Mr. Clifton Ward :—

The Roman camp called Hardknott Castle is perhaps the most interesting belonging to that age in the mountain district. Situated on a fine rocky platform, 800 feet above the sea, it commands the east and west pass through Hardknott and Wrynose. The camp walls are constructed of the stones gathered from the ground around, and in two or three places the bare rock shows out along the ruined walls. At the north-west corner are the remains of a circular tower-like foundation, and on either side of the entrance in the north-east are remains of guard chambers. Within the camp are ruined foundations occupying a rectangular area, and roughly showing traces of various compartments, those at the north-east end being longest in a north-west and south-east direction, and those about the centre more square in form. Springing from the *outside* of the south-east wall of the camp, at about the centre, are the remains of

HARDKNOTT CASTLE, CUMBERLAND.



SURVEYED BY C.W.DYMOND, F.S.A. IN AUGUST, 1892.

C. W. Dymond. delt. 1893.

of an old wall, running across the rough ground outside in an east-north-east direction, but whether this be really connected with the old Roman camp it is difficult to decide. Facing the north-east side is a cleared space of ground—a tract cleared of the many rocky fragments lying about, and called the Bowling Green (probably the old parade ground), while at its north-eastern limit is a large mound of stones, with a southward slope, of 15 yards across. This may very probably represent the material gathered from the cleared ground. Again, a little to the north-east of this great tumulus—for so it may perhaps be called—are what appear to be old pits, and stone-heaps on the steep rocky side of the rising ground beyond.*

Thus much for what has already been put in print about the castle.†

The camp includes an area of 3*a.* o*r.* 3*p.*, which is less than the area of the forum at Silchester. Its corners point to the four airts, and are rounded; each has had a tower about 12 feet square.‡ These towers consisted of a basement of stone, with stories above, *i.e.*, of the same material, which have now collapsed, but whose existence is proved by the amount of fallen material; these possibly may have carried upper structures of wood. There are no doors to the basements, which can only have been used for stores. The north tower stands on a huge rocky knoll, and occupies much the highest part of the camp. The castle, with its walls and gates and towers, must have been a remarkably picturesque feature in the scenery of Eskdale, and visible to a very great distance down the valley. I was astonished to find how far our white tent,

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* *Transactions of the Cumberland and Westmorland Antiquarian and Archæological Society*, vol. iii., p. 250.

† A description of Hardknott Castle as it would appear to a traveller from Lancaster to Ravenglass in the year 300 A.D., will be found in Ferguson's *History of Cumberland*, p. 58.

‡ The exact dimensions, as found by Mr. Dymond's survey, are :—

	ft.	in.		ft.	in.
The north tower	12	9	by	10	9
The east tower	12	4	by	11	8
The south tower	11	9	by	11	3
The west tower	13	3	by	8	8

pitched

pitched by no means in the highest part of the camp, could be seen. I am told it was seen from the sea, near Drigg; certainly the castle, with its walls and towers, would be visible; and to the rude natives it must have looked an enchanted fortress in the air, the work of superhuman powers rather than of mere men. But I expect the rude natives had had to carry up the stone.

The length of the sides of the castle are respectively:—

		ft.
North-east side	...	351
South-east side	...	354
South-west side	...	362
North-west side	...	363

They are built in "coursed rubble" of the rough fell stone of the neighbourhood, but the angles are, or rather were, built of carefully dressed red sandstone, which must have been brought from Gosforth, distant some 11 miles.* These have been a sore temptation to searchers after building materials, and hence the angles are mostly in a very dilapidated condition. The "arching stones or penstones of freestone with remains of mortar on them" seem near the entrances by Messrs. Irton and Sergeant in 1792, and by the Bishop of Cloyne in the beginning of this century have all disappeared but two.† Messrs. Lysons, one or both of whom visited Hardknott Castle in 1813, say "there did not appear to have been any mortar used in the walls."‡ This is a mistake, but has obtained

* This method of making up the angles is common at Silchester where the walls of the houses are of rough flints, with angles of large tiles.

† Besides the searchers after building materials, the ruins at Hardknott, like those of the Roman villa at Ravenglass, have long been and still are resorted to by the makers of hones and strickles (whetstones for scythes), as the freestone found there is, from its dryness, highly suitable for their purposes. One Sunday in the present year (1892) three men came over with a light cart from Ulverston and took away a sackful of pieces of freestone from the *pilæ* and *præfurnium* of the outbuildings, presently to be mentioned.

‡ Lyson's *Magna Britannia* (*Cumberland*), p. cxlviii.

wide

wide acceptance; Messrs. Irton and Sergeant, in 1791, noted mortar adhering to the arching or penstones, and its presence in the walls, though but of poor quality, has been proved during the researches of this year (1892). The standard thickness of the walls is 5½ feet.*

There are four gates, viz., the

	ft.	in.	
porta prætoria	22	3	wide
porta principalis dextra	20	0	,,
porta principalis sinistra	19	7	,,
porta decumana... ...	10	0	,,

The narrowness of the last may be accounted for, from the fact that it opens almost immediately on a cliff, and was probably little used, except by the barrack labourer for the purpose of carrying out the sweepings and rubbish, which were probably pitched over the cliff, as at the camp at Maryport.† The *porta decumana* is in the north-west side of the fort.

The *porta principalis dextra* and *porta principalis sinistra*, are each a little out of the centre of the walls of the fort, thrown out by knolls of rock; each has in front of it a natural traverse or mound of rock, which was probably connected with the right cheek (looking outwards from the camp) of each gateway by a palisade, so that an enemy approaching the gate must approach from the left, with his right shoulder bare to missiles from the camp; the roads from these gates certainly turn, in each case, immediately to the left, in accordance with the maxims of Roman military writers; that from the *dextra* joins the main road west of the Castle; that from the

* The walls of the camps at Cilurnum and Amboglana are 5 feet thick; of Borcovicus, eight feet thick; and of Bremenium, 16½ feet. *Arch. Æliana*, 2nd series, vol. i., p. 70.

† See "The Roman Camp, Maryport." *Transactions of the Cumberland and Westmorland Antiquarian and Archæological Society*, vol. v., p. 237.

sinistra

sinistra goes to the Parade Ground (presently to be described). These gates and the *prætoria* are double gates, divided by *spinæ*, of which little now remains, and are in plan exactly like those of the camps on the Wall, particularly like those at Cilurnum, with the exception that the *spinæ* divide the gates at Hardknott into passages of unequal width, an arrangement found (Mr. Haverfield tells me) in some of the smaller Roman camps in Africa.

We now come to the buildings within the camp. These fall into three groups, of which the central is occupied by the forum.* The forum has been cleared out sufficiently for the whole plan of it to be recovered. It forms a block of about 70 feet square, with an internal open court of about 42 by 24, surrounded by an ambulatory, or covered passage, about 10 feet wide, and having on the north side three rooms; the central one is about 13 feet by 12 feet, and probably was the *ærarium* or treasury, where the military chest and other valuables were kept, and the soldiers paid. The other rooms were larger, about 24 feet each by 12 feet, and were probably orderly and other rooms, where business was transacted. Such markets as were held would be in the open court, or in the ambulatory; probably a few sutlers selling trifles to the soldiers. This building is very similar to that called the forum at Chesters on the Roman Wall, but of course much smaller.† There the *ærarium* has an inner vault, or strong chamber, and the other rooms have small inner retiring rooms.

The eastern group of buildings, measures about 54

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* Some discussion has arisen as to whether this is the *prætorium* or the *forum*; the difference in case of so small a camp is but verbal, as one building probably did double duty; we shall call this building the *forum*. Mr. Dymond and Mr. Haverfield call it the *prætorium*.

† See plan of Cilurnum (Chesters) in Bruce's *Handbook to the Roman Wall*, p. 83.

feet

feet by 44 feet, and is divided by a double or hollow wall into two long rooms. Each of the long sides of this building is supported by five buttresses built against it, a fact which, coupled with the immense amount of fallen building material, leads to the inference that it was a building of some altitude. One of the rooms is again subdivided longways by a dwarf wall, and the other has at either end arrangements for holding setpots. Two buildings, precisely similar to this, are on either side of the *prætorium* at the great camp of Bremenium or High Rochester, which was excavated by the Duke of Northumberland in 1852 and 1855; and one exists at Chesters, or rather did exist, for I believe it has been destroyed.‡ I fancy these buildings have been the barracks. It is to be hoped that next year we may be able to clear them out, and ascertain if they have or have had hypocausts, as those at Bremenium had. The double or hollow wall in the centre was doubtless a flue for heating the rooms. It has been conjectured those at Chesters were granaries.

The western buildings consist of one long room, 70 feet long, running east and west, about 16 feet broad, with a room about 16 feet square at its east end; its eastern wall is continued some way to the south, but we cannot find any cross wall that can be connected with it; it seems a mere screen against east wind. I have conjectured the long room is the stable, with a harness room at the end. To this it is objected that it is too narrow, but the Roman cavalry soldiers rode a very small horse in Britain, a mere pony; a stronger objection is that no provision for drainage has yet been found; another conjecture is, that this is a barrack room for the men, with a separate room for the officers. A third

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* *Ibid*, p. 91. See plan of Bremenium in *Arch. Æliana*, 2nd series, vol. i.

conjecture

conjecture is that it was the quarters of the officers, and was divided into smaller rooms by partitions. The amount of fallen material hardly indicates more than one story of buildings.

By far the most interesting discovery was made, not in the camp, but to the south of it. A road (one reserved probably for troops alone), passed through the camp from west to east by the *portæ principales*, but a duplicate ran to the south of the camp for the general traffic, which could not be allowed to disturb the camp. Close to this road Mr. Calverley found a circular building with walls 2½ feet thick, and still standing nearly 5 feet high. The internal diameter is 15 feet, and it is entered through a door now 4½ feet wide, whose stone jambs are now gone; to this a built-up ramp 8½ feet wide, and once paved with tiles, leads from the road. Two buttresses support it on the lower side. It has been plastered inside with red coloured plaster. This structure exactly resembles the famous King Arthur's Oon on the Carron in Scotland,* whose destruction caused so much bad language to be used by the antiquaries of the last century. Close to this circular building, but quite disconnected from it, Mr. Calverley found a three-roomed house. At the south-end of it, a large *præfurnium* heated hypocausts in two of the rooms, and apparently a large cistern or bath in the third room, but I hope Mr. Calverley (who unearthed these interesting buildings) will himself describe them; indeed I am not sufficiently acquainted with their details.

Many conjectures have been made about the circular building; I need not enumerate them, but my own opinion is that it is the shrine of some god or goddess.

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* Engraved in Gordon's *Itinerarium Septentrionale*, and in General Roy's great work.

Now

Now, as Horace tells us in his account of his voyage to Brundusium that he stayed all night at a *caupona*, a wayside tavern, that next morning he washed at the shrine of the goddess Feronia, I am bold enough to conjecture that these buildings are a wayside tavern and shrine—perhaps of Feronia, the goddess of commerce and traffic. It is certain that the traveller would want refreshment on his journey between Ravenglass and Ambleside camps.

The vicinity of the camp presents some features of interest which it is proposed to investigate more thoroughly next year. From the *porta principalis sinistra* a road, 630 feet in length, leads to a cleared space of about three acres, known locally as the "Bowling Green" and the "Parade Ground," formed both by cutting down and levelling up. A ramp, 110 feet long and 40 wide, leads up to the top of a huge mound on the north side of the Parade Ground. A smaller clearing lies to the north of this and another is near to the circular building, which I have suggested is a shrine. In the same vicinity, and between the shrine and the *porta prætoria*, is what looks like a silted up reservoir, but the investigation of this is work for next year.

A list of the objects found during the work, is given as an appendix: the conclusion that must be drawn from them is that there was not much luxury in the garrison, and that no officer of rank was in command. The explorations have revealed no special *prætorium* or quarters for a commanding officer; but it is evident, from the poverty of the relics found (no Samian, or almost none, the common dinner and cooking ware of a Roman gentleman) that no officer of rank was here in command; probably a *beneficiarius*, certainly no one above the rank of a centurion, *hirsutus et hircosus* as Juvenal contemptuously writes.

Mr. C. W. Dymond, F.S.A., acted as resident engineer and clerk of the works during the survey, and spent some ten

ten weeks on the work, and had four men at work under him; the Rev. W. S. Calverley, F.S.A., was there most of that time with a couple of men, and I was there as often as I could get. In this paper I have made use of notes furnished me by both gentlemen.

To Lord Muncaster the greatest gratitude is due. Lord Muncaster supplied all the labour and gave permission to dig where we liked; he and Lady Muncaster took the greatest interest in the work, and frequently visited the scene of operations. The tenant of Butterelkeld, Mr. Bland, was equally courteous and obliging.

PART III.

By C. W. Dymond, F.S.A.

Position.—This mountain camp, of the class called *castra stativa*, occupies a commanding site, 800 feet above the sea, on the brow of that long westerly spur of Hardknott which ends at the head of the cultivated portion of Eskdale, just where it turns northward into the solitudes of the mountains. The position is naturally a strong one, fenced on the north by a range of craggy steeps overlooking the deep trough of the upper valley, and on the south by Hardknott ghyll—in some parts of its course an almost impassable ravine. In front the ground rapidly sinks by several stages to the level of the river, 500 feet below; while rearward, thickly encumbered with rough hummocks and spongy tracts, it rises 200 feet in about a third of a mile to the foot-cliffs of the upper mountain mass. Along the flank of the spur winds Hardknott pass, a link in the ancient road which was the only direct and convenient means of access to the interior from the lower seaboard of Cumberland. Zigzagging up the breast of the fell, and skirting the declivity below the camp, it climbs the steep face of the dividing ridge (1291 feet) to disappear from view as it crosses into the vale of the Duddon

Duddon; being visible from the station for almost the whole of its length. Other Roman stations, of which there are vestiges at Ravenglass and Ambleside, at either end of this line of communication through the mountain district, were respectively distant from Hardknott, by road, $9\frac{1}{4}$ and $10\frac{3}{4}$ miles—an easy day's march in either case. Though perched, as it were, in mid air, the camp is environed by rocky heights which shut in the view on almost every side but toward the west where, down the long vista of the dale, there is, in clear weather, a prospect of the sea near Drigg, with the Isle of Man resting like a cloud upon the horizon. The position, chosen with admirable judgment, has been skilfully utilised; and the little left lacking by nature has been supplied by art. The *enceinte*—the only unencumbered plot of ground on the fell originally large enough for the intended purpose—was most conveniently situated. It had, too, the advantage of being surrounded by a number of natural sentry-stations commanding every point of every approach: while several protruding rocks happened to be well placed for strengthening important parts of the fortifications.

The Camp.—The camp itself is nearly an exact square, with corners rounded and facing the cardinal points; a tower in each angle; an entrance in each side; and, in the area, a group of buildings erected for barracks. Its date being much nearer to that of Hyginus than of Polybius, the arrangements generally conform, as closely as they could in so small a station, to the practice described by the later writer—adapted, of course, to the circumstances of the site and other local conditions. The *vallum*, inclosing an area of 3*a*. 0*r*. 3*p*. extends to the length of 1431 feet, measured along its outer face: the lengths of the sides respectively, from tower to tower, being, north-west $364\frac{1}{2}$, south-west 362, south-east $353\frac{1}{2}$, and north-east 351 feet. But this apparent inequality in the length of the sides disappears when cross-measurements

ments are made between the outer lines of the *vallum*, clear of the rounded corners. These, taken in both directions, are found to average 375 feet (386¼ Roman feet of 11·65 English inches): the extreme variation either way in any part from a mean line, resulting from flexures in the wall, being not more than 12 inches. On a prominent boss of rock stands the north tower, dominating every other part of the works: a similar but smaller mound flanking each of the entrances. Two of these—the south-western and north-eastern—are farther protected by natural traverses which stand athwart the direct approaches to them.

In estimating the capacity of the fort for accommodating troops, regard must be had to the practice in vogue at the time: for at different periods the intrenched area bore very different relations to the number of troops encamped on it. If the estimate be based on the roomy arrangements of a camp in the days of Polybius (204-122 B.C.), it will be found that there would just be space in Hardknott Castle for one cohort of 450 men. But, with the greatly restricted allowance of camping ground given in the time of Hyginus (say 98-138 A.D.), three cohorts, each of 480 men, could be crowded into it. There need, however, be little doubt that ordinarily the post was held by a comparatively small garrison. Some recent investigations, made on the Continent by Mr. F. J. Haverfield, F.S.A., have shown that in some such cases a garrison of 50 men was found sufficient.* This, however, seems too few for such a place as Hardknott, except in times of profound peace. Perhaps it may safely be assumed that the number of its occupants varied considerably at different times. As to the respective positions occupied by

* Mr Haverfield (*Athenæum*, October 22nd, 1892) estimates the garrisons of the small forts on the Roman bank of the Danube at 50 or 60 men under a *beneficiarius*.—EDITOR.

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the divisions of so small a body of men as even the largest of which the case admits—particularly with reference to the sites of the permanent buildings of the barracks—it seems reasonable to conclude that the rigid rules which it was needful to observe in the encampment of an army, especially when frequently shifting its quarters, might be relaxed in the case of a very small and simply-constituted force occupying a position for a lengthened period. This should be remembered when attributing special purposes to particular buildings: for, in selecting their sites, it would often happen that circumstances of the ground would make it necessary to set aside some of the customary arrangements.

The Vallum was built with vertical faces. Its standard thickness seems to have been 5½ feet,* but in many parts it is from 6 to 12 inches less. To what height it was carried we can but guess; some of the fallen stone, it is reported, having been removed for building purposes. At one place only does the wall stand uninjured to its full present height. Here, half-way between the north tower and the postern gate, where it has been cleared on both sides, the thickness of the section is 5 feet 8 inches at the bottom and 5 feet 6 inches at the top, which is now 5½ feet above the base. Another 5 or 6 feet added on account of fallen material would probably restore it to the original height—say 10 to 12 feet. To so thin a wall there could, of course, be neither rampart nor parapet; and from the almost total absence of pieces of coping, except close to the towers and gateways, it may perhaps be inferred that it was finished very roughly, if at all, on the top. The inner face, which is far inferior to the outer, is as poor as possible. The latter was built, more or less, in regular courses with good hammer-dressed stones got from the

* The wall of the camp at Cilurnum is 5 feet thick.

neighbouring

neighbouring cliffs and screes; and the interstices of the stone hearting, so far as it was exposed, were found to be full of earth, or earth and lime.

The Fosse.—On a cursory inspection, it would appear that, as almost the whole of the banks contiguous to the *vallum* on both sides are formed by its *débris*, the original surface, in most parts of the circuit, was nearly level with the footings—coinciding with the "plane of site." There is nothing like a fosse except on the north-eastern side, which is strengthened by two parallel discontinuous ditches—probably formed by enlarging and deepening natural shakes—which are extended at both ends to cover the north and east towers. But, possibly, if the spongy ground on the south-eastern side of the camp were examined, the inner ditch might be found to have been carried along it, as far as to the south tower, and since to have become obliterated by the growth of the moss. The remaining two sides, at least, were considered strong enough not to need such reinforcement.

The Gates.—As is usual in camps of this shape and size, there are four entrances; the two in the north-western and south-eastern walls—the *porta decumana*, 10 feet,* and the *porta prætoria*, 22 feet 3 inches wide—nearly central; the other two—the *porta principalis dexterior*, 20 feet, and the *porta principalis sinisterior*, 19 feet 7 inches wide—thrown out of the middle by protuberances of rock which occupy the central points. All the gateways have rebates, or what, at first sight, would be taken for such, at the outer quoins; and three of them a gap on either hand, now filled with loose stones, at the inner ends of their side walls. Two socket-stones remain *in situ* in two of the gateways; and, on the present floor of each of the three wider ones, there rests a large flat sandstone block.

* The widths given are those at the narrowest parts.

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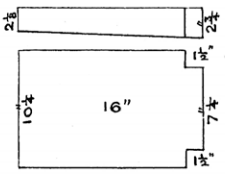
As to the first-mentioned features—which are very irregular, having no uniformity of width or depth—Mr. Calverley, finding in one of the outbuildings two quoins built with sandstone slabs and large tiles, suggested that these rebates also may have been similarly filled up. As to the south-eastern gateway; though everything else in the outer angles has fallen or been torn down, the footings of each of the two side walls continue up to a quoin in the line of the outer face of the *vallum*; leaving no room for doubting that both of these angles were built up solid. The north-eastern gateway presents a similar, though not quite so decisive case, because there are no footings at the points in question. Of the rebate at the south side of the south-western entrance one of the returns is ragged; the other is built as well as are the side walls with which it is parallel. On the north side both are ragged; though an exceptionally fine quoin-stone forms part of the outer angle of one of them. Lastly, there is the postern gate, the rebates of which are so built as to suggest that they were designed to be left very much as they now appear. All are faced nearly, but not quite, into re-entrant angles, as though intended to be seen: and the impression is strengthened by observing how good a quoin one of them has; and that a plinth, formed by the projecting footing-course, is carried around it and along the return. And yet, notwithstanding these indications to the contrary; and in face of the fact that in the whole of the camp there is not a vestige of such a mode of building; it is an almost necessary conclusion that all the angles were thus filled up. How otherwise could there have been unity of method in the construction of the ports—the south-eastern one being taken as a pattern? And, still more to the point, how otherwise could the missing socket-stones at the sides of the postern and south-western entrances have been fixed in positions corresponding with those that remain? It may

may not be easy to see why labour was wasted in facing walls with dressed stones which were immediately to be hidden: but to conclude that they were so built-in seems less difficult than to assume that opposite rebates in the same gateway—which, in two of the cases, for no evident reason, are far from matching—were laid out with such indifference to symmetry, if intended to remain open, as they now are.

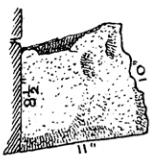
Nothing has been found of any of the large guard-rooms fancifully inserted in the plan of Irton and Sergeant, which is grossly wrong in that as in almost every other particular. It is, however, probable that small guard-rooms, or sentry-boxes, perhaps built with freestone, perhaps wooden, stood at the inner ends of the side walls, in, or behind, the rubbish-choked recesses before mentioned. The rampart thickens a little as it approaches each entrance; and the cheeks of the gateways are prolonged inward for a few feet beyond its inner face. Diligent search has failed in discovering any backing to these projections; and it can only be conjectured how thick they were, or what was the original form and finish of the recesses behind them, which also are now filled with fallen material.

The socket-stone in the south-western gateway, on the left hand as you enter, is built into the side wall at the broken angle at the present ragged rebate. It is 19 inches wide, projects 17 inches from the wall, and is about 6 inches thick. It is set obliquely; its front edge—the only straight one—being in a line meeting the opposite rebate 6 inches behind its outer corner. Into the top has been sunk a hole $4\frac{1}{2}$ inches across from front to back, $4\frac{1}{8}$ inches the other way, with vertical sides from $2\frac{1}{2}$ to $2\frac{3}{4}$ inches deep. Its centre is 8 inches from the side wall and $3\frac{1}{4}$ inches from the outer edge of the stone, which therefore is 1 inch from the nearest side of the hole. An iron stud, $\frac{3}{4}$ inch in diameter—perhaps the stump of a bolt—projects half

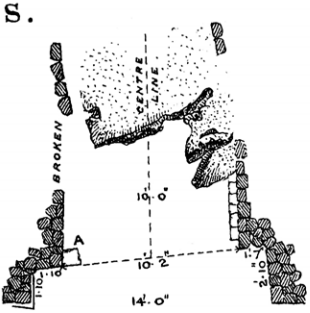
GATEWAYS AND DETAILS.



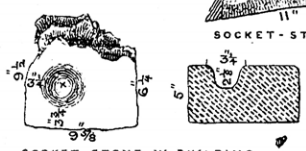
REBATED TILE.



SOCKET-STONE A.

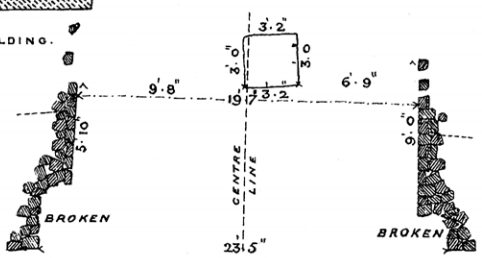


N.W. GATEWAY.

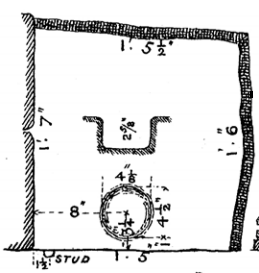


SOCKET-STONE, W. BUILDING.

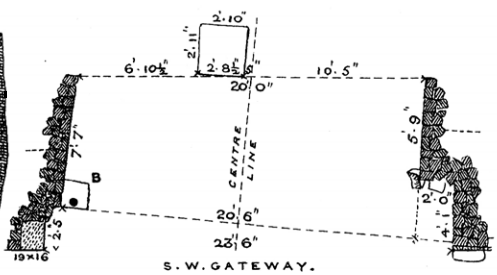
COPING.



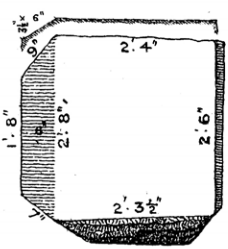
N.E. GATEWAY.



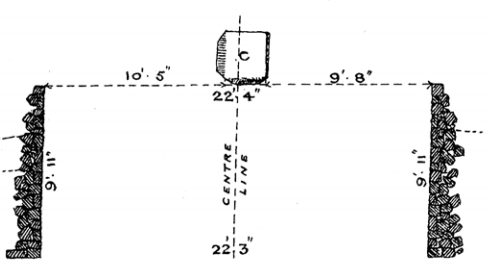
SOCKET-STONE B.



S.W. GATEWAY.



FREESTONE C.



S.E. GATEWAY.

C. W. Dymond delt, 1893.

half an inch from the front side of the stone, 2 inches below its upper edge, and 1½ inch from the side wall. The other socket-stone is on the same side of the postern gate. It, too, is solidly built into the side wall, flush with the inner face of the rebate. Its breadth varies from 8½ inches at the wall to 10 inches at the outer end; it projects 11 inches, and, originally, was 9 inches in thickness. A piece, 3 inches thick, containing the socket, has flaked off, leaving the top very uneven. Its front edge, in line with the inner return of the rebate, is also set obliquely, pointing toward the inner return of the much deeper opposite rebate. It is most likely that the gate-pivots did not work immediately in these holes, but in iron shoes let into them.

It remains to describe the sandstone blocks. That in the prætorian gateway is 11 inches thick; and its flat, evenly-tooled, rectangular upper face measures 2 feet 7 inches from front to back, and 2 feet 3½ inches from side to side. Its west side has a protuberance, splayed at both ends to an angle of 45 degrees (making its straight edge 20 inches long) and similarly tooled on the top to a 6-inch bevel, dipping 3 inches; while in front, also splayed at each end, there is a 5-inch quarry-faced projection, nearly straight on the plan, but round in section. The face of this is in line with the inner ends of the gateway cheeks. The block in the south-western entrance is about 8 inches thick, and nearly rectangular, measuring 2 feet 11 inches from front to back, and 2 feet 9½ inches from side to side. Its top is "picked" to a level surface, bordered by a chisel-draught, 2 to 3 inches broad. The vertical sides are more rudely picked; and the front edge, like the preceding one, is also in line with the inner ends of the side walls. The stone in the north-eastern entrance, which has become slightly displaced, and broken into three parts, since it was discovered in 1891, is 7½ inches thick and rectangular, measuring 3 feet from front

front to back and 3 feet 2 inches from side to side. Its top surface and sides are dressed similarly to those of the last-mentioned stone; and the front edge still ranges nearly with the ends of the standing portions of the side walls, of which a few small detached bottom stones in the same line hint at a probable former prolongation. The seats of all these blocks are either level with, or a little above, the wall-footings abreast of them.* Neither of the stones is in the middle of the way; the breadths of the openings on either hand being—in the prætorian port, 10 feet 5 inches and 9 feet 8 inches;† in the south-western, 6 feet 10½ inches, and 10 feet 5 inches; and in the north-eastern, 9 feet 8 inches and 6 feet 9 inches. It is noteworthy that, in the last two cases, the narrower intervals, which are nearly equal, are both on the north side opposite to one another, looking across the camp. None of the three stones are perceptibly weathered or worn either on their tops or flanks. There were indications suggesting a suspicion that these freestones, now exposed to their full depth, may possibly have been originally buried up to their tops; for small chippings were found packed around the south-western one, as though with some care; yet, as far as could be seen, uselessly: and the front of the south-eastern one, as well as the flanks of all the stones, seem rather too rough to have been intentionally left bare. But these indications are too slight to be of much account; and the conclusions that might be drawn from them seem inconsistent with other facts yet to be noticed.

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* Unfortunately the survey was so much hindered by wet weather that no time was left for taking any levels. Hence such indefinite statements as these must be regarded as only approximately true; being based upon nothing more trustworthy than eye estimates or memory impressions.

† Taken to the front corners of the square top. If the bevel was intended to be included in the width of the stone, as is most likely, the left hand interval will be 9 feet 11 inches instead of 10 feet 5 inches.

As

As the passages do not appear to have been paved, and as much of the lower soil with which they were choked was somewhat homogeneous, there is some uncertainty with respect to their original levels and gradients. The safest indication is undoubtedly given by the footings of the side walls, which are nearly level throughout. That the roadway should have corresponded, would only be in accordance with what will be noted as to the method of laying the courses, under the head of "masonry:" and, if this was so, the sandstone blocks must have stood above the surface of the ground. In two of the cases the ascent from the inner ends of the ports must have been rather steep; for the original surface of the camp was nowhere much below the present one.*

The ruin which these gateways have suffered, and certain peculiarities in their construction, make their ideal restoration much less easy than it may appear to be to one who has not put his theories properly to the test. The problem has many factors: and I must confess that, after repeated attempts, I have not succeeded in solving it entirely to my own satisfaction. The general opinion of antiquaries, who base their conclusions mainly upon an assumption that the works at Hardknott would conform to the arrangements adopted, or supposed to have been adopted, at other Roman forts—especially some of those upon the Border, built either at about the same time, or only a little later—is, that each of the three wider entrances was divided into two by a *spina*, or thin ashlar partition, with piers at its ends,—the sandstone blocks being bases of the inner ones; that a pair of small gates opening inward against recesses in the side and

* The accumulation of soil over the greater part of the area has been very slight—generally not more than sod-deep: but in the wet hollow of the *retentura*, and on the declivity to the prætorian gate, where the ground is boggy, the surface has risen from 9 to 12 inches.

middle

middle walls, closed each port-way; and that the whole was arched over. Of course, the antecedent probabilities are in favour of a mode of construction conforming to the prevalent practice: and, where existing features admit of such a supposition, it is the one most likely to be true. As, however, in this case, some of them seem to have a different significance, it may be well to consider all those critical points which bear upon the question. In doing so, it will be convenient, and perhaps correct, to assume that all the principal entrances were built on an uniform plan.

One thing is fixed, beyond controversy—the position of the gates, indicated by the two socket-stones which remain *in situ*. Were they, then, single, double, or quadruple? The first alternative being inadmissible for all but the postern, our choice lies between the other two: involving also the question whether they opened inward or outward. That the latter was possible, results from what has been observed at the prætorian gate—that the side walls were not recessed, but ran straight to the outer quoins, admitting of movement in either direction: and that it may have been unavoidable, is suggested by the acclivity in some of the entrances. But the adoption of so undesirable—perhaps unprecedented—a plan could be justified only by necessity: and it remains to inquire whether there were any compelling conditions. If, now—to take the postern—the gate could be shown to have been single, this would settle the question for that entrance, which is so encumbered with protruding rock as to leave no alternative to outward opening. But as there is no proof of this, we may preferably assume that the gate was double: and, putting the missing socket-stone exactly opposite to the existing one, it will be found that there is just, though only just, room on the plan for both leaves to have opened inward without striking the rock. Whether or no the gradient of the passage could be

be flattened so as to let the gates swing back without meeting the rock now covered, can be ascertained only by farther excavation and accurate level-taking; but until obstacles shall have been proved to exist, it may provisionally be taken for granted that such was the arrangement in the small gateway. If there were but two valves in each of the other entrances, they could not have opened inward in one or two of the cases unless the ground at the back were lowered so much as to expose some of the footings of the walls; and, when set open, they would have overlapped, by 2 or 3 feet, the supposed doorways of the guard-rooms: moreover, heavy gates of that length would be rather unwieldy. For these reasons, and as nothing at present appears to prescribe the adoption of such a plan, we may proceed to consider what would be the result of fixing two pairs of gates in each entrance. With such an arrangement all doubt as to which way they would open disappears; and the only points to be dealt with are those involved in an adaptation of the usual mode of construction to local circumstances. It is here that the principal difficulties arise: and the only way to remove these, so as to arrive at an explanation of apparent anomalies, is very briefly to state the *pros* and *cons*, with special reference, say, to the typical case of the south-western port. The rudeness of the method of hanging the valves 8 inches from the straight side walls, justifies the supposition that other parts of the structure which have disappeared must have been equally rude. The provision of two pairs of gates involves the erection either of a strong detached central pier, or, as more suitable to the circumstances, a partition-wall dividing the way into two equal passages, founded deep enough to receive two of the lower socket-stones, and raised high enough to carry and firmly hold either projecting freestones, or iron straps, or a wooden lintel, for the upper pivots to turn in. Not to be wholly incongruous

incongruous with the rest of the work, this wall should be built with rubble masonry, quoined like the rebates, and not recessed. If all the sockets were set alike—the opening at that part being 20½ feet—the breadth of each leaf of the gates would be about 4 feet. They would close against either sills of wood or stone, or central blocks of ashlar. There is that in the shape of the socket-stone suggestive of the first-named alternative; the hole being very near the outer edge which is straight, though not set square with the wall: and, in the iron stud, we may have the remains of a sill-bolt. But a wooden threshold in such a situation would not last long, and would pond back water in the passages. So would a continuous threshold of stone: and, to avoid this inconvenience, the doors would probably close against stop-blocks. But before such a scheme of restoration can be accepted, it must be reconciled with several facts which, in different degrees, appear to conflict with it. No traces of intermediate piers or partition-walls have been found; and it is singular, if not rather significant, that, of all that is supposed to have existed in the three wider ports, the three isolated blocks of sandstone, each in the same position, should be the only things, except the socket-stones, remaining *in situ*. If these were the foundation-stones of ashlar piers at the inner ends of the *spinæ*, they must have had their match in front; which has been shown to be improbable: and, without this, their *raison d' être* for such a function would disappear. Allowing for the slight dislocation of one of them, all are set so truly, and the unequal intervals on either side of those at the ends of the principal way so nearly correspond, that I cannot bring myself to believe that they do not occupy their original positions. This eccentricity presents a serious difficulty—whether we suppose these stones to have been placed for some separate purpose, or to have been incorporated with the *spinæ*. In the former case, one of

of the passages in each of the two entrances would be partially blocked: in the latter, these entrances would be divided very unequally—to say the least of it, an improbable and very unusual irregularity for which I can find no good reason. The lop-sided appearance of these would be much aggravated by the addition of arches, which, of course, would have to be double. Were the entrances thus covered? If they really were partitioned, it is natural, though not necessary, to conclude that they were also vaulted. The spreading of the *vallum* at the entrances to thicknesses varying from 5 feet 11 inches to 7 feet 9 inches lends support to the supposition: on the contrary, doubts are raised by the absence of buttresses or backing behind the prolongations of the side walls; by insufficiency of fallen material to account for the ruin of such superstructures; by the fact that, of the forty pieces of freestone found and measured, there were but two with the form of a true *voussoir*; only one of which, found in the prætorian gateway, and cut to a radius of 5 feet, could have been built into any of these arches; and, lastly—though a point of minor consequence—by the south-western entrance being 6 inches wider at the outer than at the inner end.*

Chancellor Ferguson thinks that the gates, as at *Bremenium* and other Roman stations, may have been defended by *ballistæ*. This is not improbable: for they could easily have been mounted upon platforms of earth,

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* Hoping to aid in the elucidation of these questions, Chancellor Ferguson has kindly furnished particulars of stations on and near the Roman Wall, otherwise inaccessible to me at present. But their illustrative value so largely depends upon similarity of local circumstances—of site, size, materials, workmanship and motive—that, without full personal acquaintance with these, it cannot be known how much stress may safely be laid on an apparent identity of forms of construction. It is also necessary to know what is fact and what is only hypothetical.

The industrions inquiries of Mr. Calverley at various farms in the dale have been the means of discovering about half-a-dozen sandstone blocks taken from the camp. They generally measure about 26 inches by 22 inches by 22 inches, and are more likely to have been found in the gateways than in any other part of the works.

stone

stone or wood, raised on the low knotts behind the *vallum*, which itself is much too thin to have carried them.

Before leaving the gateways, it may be well to record that, when excavating two of them—the south-eastern and south-western—we met with a number of large quarry-stones ranging loosely in line across a portion of the right-hand half of the openings, looking inward, and nearly abreast of the freestone blocks. Whether these were grouped accidentally—as is often found to be the case—or whether they were remains of extemporized barriers, such as have been discovered in other Roman stations, closing half the width of the gateways, there was not sufficient evidence to determine.

The Towers, when excavated, proved to be of different depths. The pit in the south tower is from $5\frac{1}{2}$ to 7 feet deep, measured from the tops of the walls: its bottom declining from the north side toward the *vallum*, along the foot of which had been cut a trench, from 20 to 25 inches wide and from 6 to 8 inches deep, edged by a stone kerb, and perhaps intended for a sump or drain. The west tower, which is 5 feet deep from the present top of the highest part of the wall, presented no noteworthy features. The bottom of the east tower is $5\frac{1}{2}$ feet below the top of its wall; and, as to its western and lowest half, seemed to be overlaid with several alternate layers of charcoal and clay; in some parts to the depth of 8 inches or more. The stratification of the soil in the three towers was much the same:—first, a superficial layer of stones: then, about a foot of loose, dry, black soil, composed of decayed bracken: below this was about $2\frac{1}{2}$ feet of brown earth intermingled with wall-stones; and, lastly, a bottom bed of compact light-coloured earth and fallen stones, wet with the moisture percolating into it, and unable freely to escape. The towers are irregular in plan and dimensions. Their walls are 28 inches thick, except the

the inner one of the west tower, most of which is 3 feet 3 inches thick. As there are no doorways, it is clear that what remains in each case is but the basement, on which stood some superstructure. That this was of stone, and the height of one floor, may safely be concluded from the quantity of fallen material thrown out in the excavations. As some of the walls of these towers have gone considerably out, from their footings upward, it is evident that the level of the ground outside was nearly the same as that of the bottom of the basements. The rooms above must, therefore, have been entered by means of freestone steps or wooden ladders. How these rooms were roofed can only be conjectured; for little, if any, roofing-material was found. They seem to have had glazed windows; pieces of window glass having been dug up in them—singularly enough, for what may be supposed to have been look-out stations, frosted on one side.

It has been suggested that these towers did not form parts of the original plan; and were added at a later date. General Roy, in his *Military Antiquities*, states that he had not observed such features in the remains of Roman camps in Scotland; a large number of which he attributes to the period in which it is commonly thought that Hardknott Castle was erected: and that he knew of only a few instances—perhaps of later date—in the southern counties of England. Nothing that can be said for or against the supposition can be regarded as decisive either way. The fact that the wretched inner face of the *vallum* forms one side of each of the towers, seems at first sight to indicate that these were an afterthought: but if the basements, as is probable, were not occupied, this inferiority in the facing of one of the walls would be of no consequence. Again, it does not count for much that some of the tower walls are toothed into the *vallum*: for this could easily have been done at any time when the towers might have been built. Nor does this other fact—that

that, in some parts, the *vallum* has gone a little out, and, to that extent, drawn away from the tower walls—prove anything: for this may have been caused by the *vallum* yielding at a much later period.

The Barracks.—These buildings are separated into three blocks. The central one, about 70 feet square, and nearly in the middle of the inclosure, answered to the *prætorium* in a legionary camp: but Chancellor Ferguson is inclined to think it was a *forum*. Its general plan is that of many a Roman house, with a court surrounded by corridors, one of which communicated with three rooms. A straight line between the centres of the postern and prætorian gates runs close to the centre of the gate of this building. Like many other Roman examples, its plan is not exactly rectangular;—a defect which there is nothing in the conditions of the site to account for. The walls, 2 feet thick, are founded, as are those of the towers, on a bed of cobbles. An open stratum of similar stones was found underlying several rooms, where the excavations went deep enough: and it is probable that most of the spaces built upon were so prepared, with intent to keep them dry. As no doorways can be seen, we are sure that the floors must have been higher than the present surface, which, indeed, is too uneven for that purpose: and as the ground covered by the building rises 5 or 6 feet from front to back, the court and apartments could hardly have been on the same level; and there must have been steps at some of the doorways. Probably all the floors were tiled: for small fragments of tile were seen in many places close to the walls of the court and gateway; and a piece of tiled flooring, 18 inches square, was found in the room in the north corner. No tiles were built into the lower portions of the walls, which are all that remain; and there is nothing distinctively Roman in their workmanship: but several flanged tiles, of various sections, with a few square and rebated ones, were turned out in the

the aforesaid north room—principally near the wall between it and the long corridor. Tiles of all these patterns were used in the hypocausts at Silchester: but there is no sign that in this camp there were any hypocausts, or furnaces which would be their necessary adjuncts. As not much fallen stone was met with in this building, we may conclude that it had no upper storey. It should be recorded that the inner part (7 feet long) of the eastern wall of the entrance, with 2½ feet of the adjoining return, having entirely disappeared, the footing-courses were, during the recent exploration, rebuilt on what must have been the original lines. It may also be as well to mention that to the left, on entering, 3 feet 9 inches from the inner angle of the gateway, where the face of the court wall is gone, several bold quarry-stones projected, like a pier, about a yard from the wall. As there was no appearance of structure, and as it was no uncommon thing to find a few fallen stones accidentally grouped in suggestive forms, these were cleared away: but it is just possible—and more cannot be said of it—that they may have been the ruins of the basis of an altar, mouldings of which were found near by.

The double building, on higher ground toward the east, measures 54 feet by 44 feet 3 inches.* Its outer walls are 3½ feet thick, with five buttresses on each of the longer sides. It was, therefore, intended to be raised to a considerable height; and, probably, it had two floors. A pair of parallel walls, separated by an interval of 2½ feet at top and 15 inches at bottom, divides the building longitudinally into two portions, one 16 feet 4 inches, the other 13 feet 2 inches wide. The interior is choked with a ponderous mass of fallen stones. Time did not suffice for the heavy work of clearing them out: but at both

* In all such cases the average length and breadth of each building or apartment is given—the lengths of their opposite walls being seldom quite equal.

ends

ends they were removed down to the ground, exposing in the western basement (which is 4½ feet deep) a rude dwarf wall, about 2½ feet thick, built partly with cobbles, running along its centre; and, in the eastern one (3½ feet deep), low foundations in two of the corners—one, like the stone-work of a set-pot, quadrantal in shape; the other square. These basements may have been used as cellars. Chancellor Ferguson has drawn my attention to a pair of similar buildings flanking symmetrically both sides of the *prætorium*—or, as he prefers to call it, the *forum*---of *Bremenium*, a Roman hill-station on Watling Street, about 23 miles north of Hexham, with an inclosed area of 4½ acres—half as large again as Hardknott—and walls about 16 feet thick. The *prætorium*, or *forum*, in the midst of the place, measures, on the plan published in *Lapidarium Septentrionale*, about 77 feet by 73 feet; and within it, near one corner, is a square hypocaust. At the distance of 18 feet on either hand stands one of the above-mentioned double buildings. They measure about 77 feet by 42 feet, with walls apparently 2½ or 3 feet thick, strengthened on each of the longer sides by eight buttresses. A pair of parallel walls, with a narrow interval, run down the middle, dividing the interior into two compartments each about 72 feet by 14 feet; and if the dotted lines on the plan (to which no description is attached) are to be so interpreted, each has a partition midway down its length, crossed by seven transverse ones. The only noteworthy differences between the buildings at the two stations are, that doorways, lacking at Hardknott, were found at *Bremenium*; and that the end walls at the former are continuous from side to side; whereas, at the latter, (if the plan can be trusted), the space between the double walls is open at both ends. The duplication of these structures in one station seems to point to some use other than that of quarters for the commanding officer; which has been one of the suppositions

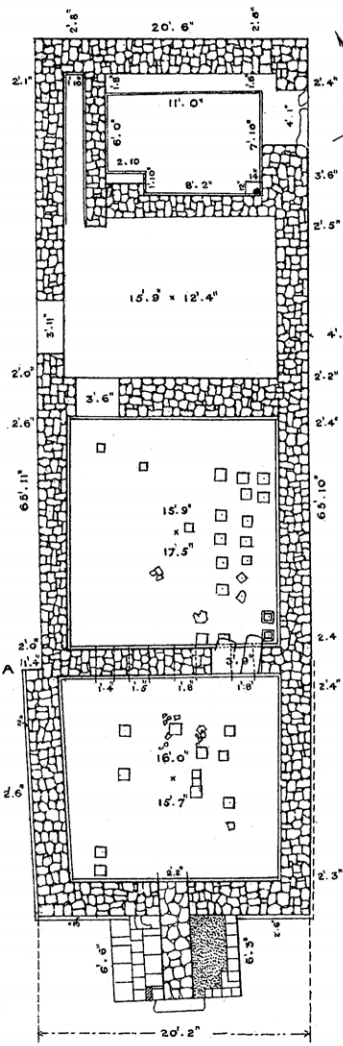
tions entertained with respect to the one at Hardknott. May they not rather have been depôts for food, stores and arms?

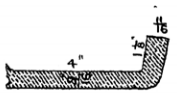
West of the central building, and separated from it by a road 15½ feet in width, is a long range, with walls 2 to 2¾ feet thick, containing two rooms. One, 70 feet 9 inches in length, and of width varying from 16 feet at one end to 14 feet 10 inches at the other, is entered from without through a doorway 3 feet 7 inches wide. Adjoining this, and communicating with it by a doorway, now 4 feet wide but originally narrower, is another room measuring 16 feet by 15½ feet, in which was dug up a socket-stone belonging to one of the doors. The much-worn hole is 3¼ inches in diameter near the top and 2⅛ inches deep. Small patches of tiled flooring were found *in situ* in this room. If the range had an upper storey, there would have been much more ruin. It has been thought that it was designed for stabling and a harness-room: but if so, the floor would have been pitched, and provision made for drainage; and there would have been more than one door. It seems more likely that these may have been lodgings for some of the common soldiers and petty officers, when not under canvas. A wall, the length of which was formerly a few feet more, but is now 41 feet 6 inches, and the thickness 2¼ feet, fences in the remaining portion of the dividing road on its western side.

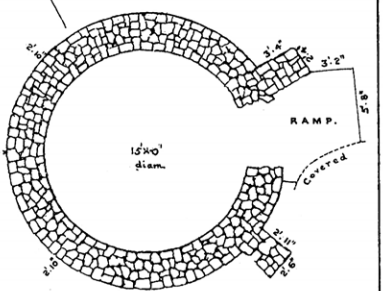
The Outbuildings.—About 200 feet down the slope below the east tower are the ruins of two interesting buildings, with structural features more characteristic of Roman work than any remaining in the camp itself. The greater portion of these was cleared under the more immediate supervision of Mr. Calverley. One of the buildings is rectangular; the other circular. The former measures 66 feet by 20½ feet, and its external walls which, in different parts, vary in thickness from 2 to 3½ feet at ground-level

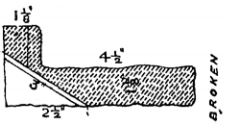
level, have a 2-inch inner set-off, and, outside the walls of the southern room, a 2-in. to 3-in. plinth. It contains a series of apartments, two of which have been provided with pillared hypocausts. The room at the south end is 16 feet by 15 feet 7 inches; and its western wall, 2½ feet thick, is askew on the plan, for some reason which is not apparent. The end wall is of the same thickness; and the eastern one 2 feet 4 inches. The adjoining middle room, 17 feet 5 inches by 15 feet 9 inches, is separated from the former by a 2-ft. wall, with a doorway, 3 feet 9 inches wide, retaining two fragments of thick slating which evidently formed one—apparently the lowest—of the layers of the floor over the hypocausts. Another similar piece of slate, at about the same level, was found embedded under 6 inches of brick concrete in the doorway at the opposite corner of the middle room. The lower part of this partition is pierced by four rectangular apertures connecting the two hypocausts. A number of iron nails were found driven into the joints of the walls of these two rooms, an inch or two below the level of the slates. Assuming that these slates took the place of the large tiles commonly used to bridge over the interspaces of the *pilæ*, it appears that the hypocausts were 2 feet 10 inches in height. Many of the footing-tiles, generally 11 inches square, and portions of two of the *pilæ*, 8 inches square, remain *in situ*. The furnace which heated these two rooms is at the south end. It has been extremely well built with excellent tiles 3 inches thick, and, for the most part, 17 inches square. Its stoke-hole, parallel to the oblique western wall, is 9 feet long, 2 feet 2 inches wide, and floored with flat stones which were found covered with an intensely black deposit—the residue of a charcoal fire. The adjoining ground also is black with ashes. There was no bridge to prevent the fuel from being pushed into the hypocaust. The tiles along the stoke-hole show that they have been exposed to the action

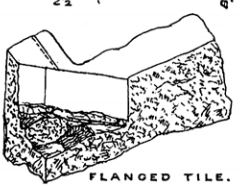
OUTBUILDINGS.

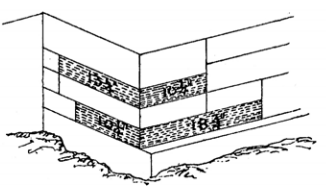


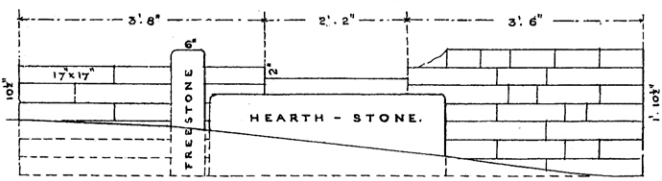












FRONT OF FURNACE.

C. W. Dymond delt, 1893.

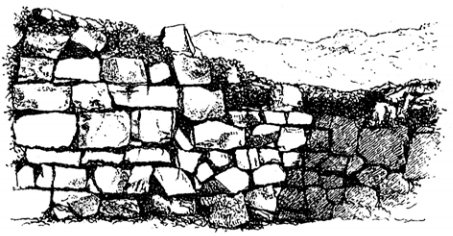
action of fire; for their edges are not only burned away but are discoloured. No outlet to a chimney is anywhere to be seen; nor have any wall-flues been discovered, nor apertures that would have led into them. Perhaps, therefore, the fumes passed off through a vertical tile-flue running up the north-eastern corner of the middle room. Separated from this by a 3-foot wall, in which is a doorway 3 feet 6 inches wide, is the third room, 15 feet 9 inches by 12 feet 4 inches. This had no hypocaust; the floor-level being nearly that of the highest part of the present earth filling; beneath which is the usual bed of cobbles. Entrance to it from without was gained through a doorway 3 feet 11 inches wide, in the external wall facing the camp; which, apparently, was also the common entrance to the building. Leading out of this room, along the inner face of the western wall, here 2 feet thick, is a channel plastered on both sides, 12 feet long and about 22 inches wide, which comes to a blind end against the north wall. Its bottom would be nearly level with the floor of the room. An 18-inch partition along its inner side finishes with a square end projecting 7 inches into the third room. The channel looks like a flue; but it seems too low to have been used for that purpose. Filling the north-east corner, and separated from the channel and the third room respectively by walls 18 inches and 22 inches thick, is a small apartment, 11 feet long by 7 feet 10 inches wide, except at its west end where a thickening of the wall reduces the breadth to 6 feet. The bottom part of its north wall varies in thickness from 4 to 4¼ feet, up to a low set-off,* on which stands the north end wall of the building, 2 feet 6 inches thick. On the east side, the lower part of the

* Upon this, in order to protect it, a dry wall was built with stones got out of the excavations. A few of these have also been set upon the partition, looking now like the jamb of a doorway.

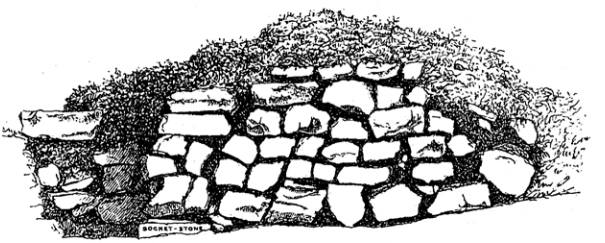
wall

wall is 3½ feet thick up to the sill of a doorway, 4 feet 1 inch wide, which gives access to the apartment. That which seems to be the floor, 21 inches below the door-sill, is made with pounded bricks and earth: and all the walls of the part so sunk are coated with a coarse plaster composed of lime and pounded bricks. In the south-east corner some 12-inch tiles, built up 7 inches from the floor, but perhaps once higher, are broken at the inner corner into a rough deep hole which looks like an overflow. There is an inclined groove, about an inch wide and deep, in the plaster on the north wall, leading down from the level of the door-sill nearly to the bottom at the farther end, as though marking the edge of a ramp: but there can have been no ramp here; for it would have led to nothing; and the wall-plaster is continued below it. The partition on the south side is broken down too low to show whether it had a doorway. Probably not: for that the small apartment could not have been a lobby, is evident from the fact that it was sunk so much below the entrance. The most probable theory is that it was either a cistern or a bath. Its doorway has a rude and well worn stone sill on the outer side; but, for some reason not easy to discover, only small stones, liable to be easily displaced, form the inner edge. Five feet east of the last-named building, and lower down the slope, is a circular structure of 15 feet internal diameter. Its well-built wall, 2 feet 10 inches thick, standing to the height of about 4 feet, is held up on the lower side by two buttresses, between which, looking up the pass, is a doorway, now 4½ feet wide, with ragged sides; the jambs, which probably were of freestone, having been removed. It is reached by a ramp 8½ feet in width, on which remain traces of brick paving. The floor seems to consist of a hard bed of earth and pounded bricks: and that the walls were plastered like those of the cistern, is evidenced by finding within it several pieces of the same kind of wall-covering

EXAMPLES OF WALLING.



N. TOWER. FROM A PHOTOGRAPH.

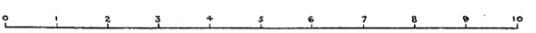


S. W. GATEWAY, — N. SIDE.

S. W. GATEWAY, — S. SIDE.

VALLUM IN HOLLOW, S. OF W. TOWER.

SCALE OF FEET.



C. W. Dymond delt. 1893.

wall-covering.* It should be noted that there was no direct communication between these two outbuildings.

Masonry.—Excepting the wretched inner face of the *vallum*, the masonry generally is such as would be called "coursed rubble"; with these two characteristic differences from modern work,—that the courses everywhere closely conform to the inclination of the ground; and that there is a prevalent disregard of bonding. Striking examples of the latter defect may be seen in the south-western gateway, the south tower, and elsewhere. If the neatest and most regular work be sought, it will be found in the circular outbuilding. The boldest—illustrated in one of the plates—is exemplified by the lower courses of the outer face of the *vallum* in the hollow a little south of the west tower. The only examples of freestone and tile quoins now remaining are those of the west wall of the first hypocaust room in the outbuilding. Many pieces of chamfered freestone coping were found in and near the towers and gateways. They were very rudely picked on the top; and their thickness irregular, but generally about $2\frac{1}{2}$ inches. Only two pieces were turned out having a chamfer on both sides. One of these, found in the square room of the western range, was 14 inches wide; the other, found in the north tower, was 17 inches wide.

It has been an accepted opinion that no mortar was used in building the camp. This was a mistake: for Mr. Calverley discovered traces of what, on examination, undoubtedly proved to be mortar. It is, however, of a very inferior kind—apparently nothing better than a mixture

* Many have been the guesses as to the use of this building. Chancellor Ferguson compares it with another circular structure, called Arthur's Oon, formerly standing at Stonehouse, on the Carron, in Scotland; and by some supposed to have been a Roman temple; though others have thought that it may have been the ruin of a more primitive beehive hut. If the plan in Roy's *Military Antiquities* is to be trusted, its internal diameter was 19 feet 8 inches.

of

of powdered lime with the earth of the sub-soil, from which it is often difficult to distinguish it. Poor as it was, and friable as it now is, it answered its purpose fairly well; and, in the course of the recent diggings, this material was constantly found in the heart of the thinner walls, and in the face-work of the *vallum*. Whether this latter was mortared throughout its thickness has not been so certainly ascertained; for the reason that, where it has fallen, its interstices have been more or less washed out or filled with vegetable mould; and, where found standing, it was not pulled down to examine the hearting. But mortar of a much better kind was used in some parts of the structure;—for example, in setting the copings and freestone dressings: a few lumps of it being seen in the north-eastern gateway and outside the *vallum*, a little south of the west tower;—one of the latter adhering to a fragment of slate coping or flooring.

Materials.—Those most familiar with the locality say that the red sandstone used for the dressings must have been brought from Gosforth, distant about eleven miles; and that a Roman brick-kiln has been found at Muncaster, near the mouth of the valley, which produced bricks and tiles similar to those used in the camp.* Hæmatite is a product of the neighbouring hills; and many ancient grass-grown heaps of iron refuse have been observed here and there in the dale: so it is very possible that the iron objects found at Hardknott may have been made from native ore. All this indicates an assured hold upon, and peaceable occupation of the district;—such as may have been secured very soon after its conquest by Agricola.

Roads.—A military road, 630 feet in length, and about

* The quality of the tiles found in the camp is inferior to that of the tiles in the outbuildings: suggesting that the latter may be of later date than the former.

12 feet wide, led from the north-eastern gate to the parade-ground. There are traces of several other roads traversing the *locus in quo*. One of these—evidently the ancient course of the pass, now grass-grown—may be seen on both sides of the wall just above the plantation, mounting the breast of the hill by zigzags, and running into the present road by a green terrace at the upper end of the first principal bend in the pass. This it appears to have followed, except at one point where there was a short deviation, as far as to the foot of the steeper ascent where, immediately beyond the crossing of a small stream, there is a green knoll. A short cut, clearly defined, ascends the slope between the stream and the knoll: but the main road ran out a few feet farther, on the south side of the knoll; and may be traced, more or less clearly, mounting first toward the left, then to the right, in the direction of the top of the pass; and so onward—in parts over beds of rock, roughly reduced—to a higher level; rejoining the present road by a clearly-marked terrace at the top of the principal and steepest zigzag, crossing the 1,000 feet contour. Hutchinson mentions a shepherds' path leading from the northern part of the parade-ground to this point. Perhaps he may have referred to a narrow stream of stones, 300 feet in length, which, at first sight, looks like the ruins of a road winding up the slopes in a south-easterly direction from a point near the eastern end of the parade-ground. A terraced road, traceable for 150 feet, mounts the slope below the outbuildings—with which it is connected by a short cut—crossing a wet hollow by means of a stone embankment, which possibly may have impounded a small reservoir, now filled with peat. No doubt this was part of a road diverging from the pass, and affording a zigzag approach to the prætorian gate:—perhaps there was also an extension around the south tower to the south-western gate. In addition to the above, there are visible

visible traces of a path, terraced in one part, leading up toward the south-western gate from a hollow in the hill below a circular ruined fold. This must have formed a portion of the usual foot-approach in ancient times, as it does now. All these ways are laid down in the plan of the position.

Parade-ground, &c.—Between the camp and Hardknott cliffs, and 100 feet higher than the south tower, is a triangular plot of ground, $2\frac{3}{4}$ acres in area. It has been cleared of stones, and approximately levelled by cutting on the higher side and embanking on the lower: the stones—no doubt with much more material collected from the neighbouring screes—being used partly in making the embankment and partly in piling up a great mound in the middle of the northern side, having a stone ramp 110 feet long and 40 feet wide leading up to its top. There can be no question that here we have the parade-ground for the garrison; and that the stone mound was designed to be a station for the officers, from which a commanding view might be had, not only over the whole of the field to the south, but also over a smaller level space north of it, opening, on one hand, to the steeps overlooking Eskdale, and, on the other, communicating with the parade-ground, and perhaps extending its capacity for manœuvres. Some have imagined that they saw traces of ruined builings on the top or sides of the mound—even in the middle of the ramp. I have not been able to detect anything of the kind. But the stones along the base of the northern slope of the mound look as though they may be ruins of a low platform. Considering the purpose for which it was raised, it is unlikely that any sheltering structure was provided for the occupants of the mound and ramp. At the foot of the slope west of this there is a slight excavated hollow; and two others, similarly situated, may be seen under the bracken, a little east of the ramp. All are indefinite; and nothing can now be made

made out of any of them. A curious feature of the main embankment, for which it may be difficult to suggest any explanation, is that its line is broken in the middle, just opposite to the grand stand, by a salient angle, with sides of about 40 feet. Immediately east of this there is a slight hollow-way, 5 feet wide, leading up to the parade-ground through a notch in the crest of the embankment. A stream from the uppermost stage of the undercliff, coursing over the eastern part of the ground, sinks, to find its way among the loose stones of the embankment to a point of issue at its foot.

There is another artificial platform, 125 feet long and 100 feet broad, a little to the east of the outbuildings. It was similarly formed partly by excavating and partly by filling. A shallow trench dug in the latter portion showed that many fragments of tiles are dispersed among the soil.

Water-supply.—It has been suggested that the boggy hollow behind the embanked road, 100 feet west of the outbuildings, may have been converted into a reservoir;—water being led into it from a small stream, scanty in dry weather, flowing near the camp. The chief objections to this theory are—(1) that no provision for carrying the water has been observed; (2) that there has been no discovery of the sluice and overflow which would be almost necessary in such a work; and (3) that the hollow receives a portion of the land drainage constantly flowing out through the south-eastern gate. No other means of readily obtaining water than from the stream have been noticed. It may be only an accidental circumstance: but there is a little pond 5 feet long on this stream, just opposite to, and 30 feet from, the door of the round building which facilitates the drawing of water.

Remains, not Roman.—There are many other remains, ancient or otherwise, scattered over the area surveyed, which, not being Roman, must be passed over with brief notice

notice. To take first those which are likely to be the most recent:—The ruins of an old cattle-wall can or could be traced from its commencement in the hollow south of the west tower, along the crest of the *agger*, to the south-eastern gate, from which it strikes off eastward, passing a little above the outbuildings, crossing the earth platform, and ending at the foot of a rocky hill under the mountain crags. Three other short lengths, of recent date, are built for the same purpose—to keep stock from straying—across passages between the upper rocks. On a curve of Hardknott ghyll, at a point where the stream flows between gently-sloping banks, just below the principal bend in the road, are the ruins of a large fold: and, on a level platform, 150 north of the same bend, is a group of cobble-stones, scattered in a ring, now of about 17 feet internal diameter and 8 feet wide, which may be the ruins of another fold. It was tested by digging; but nothing was found below the surface. Lastly, there are several longer or shorter stony banks on the western part of the ground; especially four ranging in a north-west line through a point on the road about 250 feet east of the same bend. A little north of these, at the bottom of the great hollow below the west tower, is a short straight piece of bank connecting a small stony wart with a cairn. Another cairn is on the western bank of the stream flowing from the parade-ground, 120 feet from the point where it crosses the road. These banks and cairns are like those commonly regarded as "British"; and may antedate the Roman works.

Evidences concerning the fate of the works.—During the excavations care was taken to observe all such facts as might indicate how these came to be destroyed. In the south and west towers *striæ* of charcoal were found here and there at different depths in the soil; but not in such quantity, or so collected into one distinct layer as to compel the conviction that they were signs of a conflagration

flagration. The occurrence, too, of several bits of prepared charcoal seemed sufficiently to explain the existence of a few scanty deposits of this kind: and, of the many objects found, none seemed to have been injured by fire. There was more black stuff in the east tower: but here also the evidence of the relics was equally negative. A similar deposit, about 6 inches deep, occurred at the bottom of the hole sunk in the south corner of the double building; but no relics were found at that depth. The hole in the west corner yielded little, if any, charcoal. It was not until some of the rooms in the *prætorium* were excavated that evidence was obtained that some portions, at least, of that building had been consumed. More than 20 lbs. of molten bottle and window-glass were collected within a space of two or three square yards in the north room, which was completely cleared. A nail, with two pieces of charred wood adhering to it, told the same tale; as also fragments of red sandstone, blackened and partially disintegrated by fire. Other fragments, similarly changed, and a few more bits of molten glass, were met with in the trenches sunk around the other two apartments at the back of the same building. No sign of fire was seen in the court, in the entrance, or in the trenched parts of the corridors. It is now impossible to say whether the ramparts, and the buildings generally, were overthrown by one violent act of destruction, or whether their dilapidation has been the work of time, hastened, alas! by the spoiler who, for generations, has worked havoc with the ruins in search of freestone and other materials that would repay the trouble of removal.

PART IV.

By Rev. W. S. Calverley, F.S.A., Aspatria Vicarage.

I WENT to the camp on June 9th (Thursday) and 10th (Friday). On examining the inner walls of the south tower I found that the walling stones had been bedded

bedded with gravelly lime mortar, which was found to be the case in all the buildings. The camp boundary wall was built of stones less carefully dressed than those of the three walls of the towers within the camp, and had to some extent fallen away from the side walls of the towers, which had, of course, been built up to the corners of the rampart at a later date. Small quantities of good hard mortar, concrete, and different kinds of plaster—red and white and brown, were afterwards found ; also slates from different quarries. On Saturday, June 11th, there was a thunderstorm and deluge, which drove everyone home, and I looked about the farm buildings of Butterelkeld for freestone blocks which might show signs of having been plundered from the gateways of the camp. I found three great squared blocks. Mr. Dixon, of Dalegarth Hall, afterwards showed me a similar block close to his house, and told me that there was another like it, but he could not remember its exact whereabouts at the time. A block of similar size has been grooved for use in a cheese press, and stands outside the Woolpack. The sizes were, at Butterelkeld :—22 by 22 by 25 in byer, 22 by 16 by 10 in barn, 22 by ? by ? in house ; at Dalegarth, 22 by 22 by 25 in gateway, and the similar one which we did not find ; at Woolpack 22 by 22 inches. These stones might well have been plundered from the south-western gateway, where the walling of native hard metamorphic rock with hammered face and regular coursing shows the position and width of the original hewn freestone corner and pillar stones of the gateway, and where, as also as at the south-eastern gateway, arch stones were found and hard lime concrete, which show that these gateways were double and arched over, and built with lime mortar.

On June 14th, I, with two new men, attacked the east tower. In the upper soil outside the south wall we found a long lance head with bronze ferule ; the flat blade was $7\frac{1}{2}$ inches long, the ferule ornamented with two double lines

lines $\frac{6}{8}$ inch, and there were two inches of wood still attached, and like hard bog oak. Here was an iron hook with rounded knob and end flattened, and drilled with nail holes to fix it against the wall, as we should nail up a hat peg or a coat hook; a large spear head, which, like the lance, broke in two, and revealed the black crystals—due, I suppose, to carbonization; the lance, on breaking, exposed a core of tough steel, which had not lost its nature. A wedge-shaped chamfered freestone slab appeared to have been so shaped to form the coping stone for a rounded angle of the wall, the thickness and chamfer corresponding with the other coping stones found. Within the tower, pottery and iron were mingled with the upper soil. The north wall had given way a little, and this corner was full of dry sandy stuff, which was the remains of the mortar which had fallen inside. In it was a small piece of glass, the handle of a small bronze vessel (xiv) or the tail of a small bronze animal (at a depth of 3 feet 9 inches), a triangular brooch (xiii), 1 inch long and $\frac{7}{10}$ of an inch broad, containing in the broader part two united triangular pieces of red enamel, and in the point a triangular crystal, or stone, of a bluish green hue, separated from the enamel by a triangular piece of bronze, in which metal the brooch was set. The pin of this brooch was not found, but the place for it at the back was quite perfect; the colour of the enamel was quite fresh; the stone sparkled, but it very soon crumbled, and the enamel edges began to decay, though carefully placed in cotton wool. A bronze spoon-shaped ornament (v) was also found amongst this dry material, which seemed to have preserved the bronze.

At a depth of 3 feet 2 inches there was much charcoal spread over the southern part of the basement, and beneath it coarse pots, brick, black rubbish, and a clay bottom. We bared this clay, and found the footings founded on cobble stones laid dry with small stones between

tween, and the whole packed up with clay, the clay being brought up over the top of the cobbles; an irregular line of cobble stones had been placed from near the east corner to about the middle of the north-west wall, and packed with clay, so that this southern part formed a clay basin which was full of damp refuse, whilst the portion nearest the camp wall, where there was no clay bottom, was quite dry. There were three fragments of different mortaria, or similar vessels, one of them having an ornamental maker's mark near the lip on either side, at almost equal intervals along the south-west wall, and in each case there was a deposit of black, wet refuse. Here we found part of a leaden dish, with its edges turned over, many kinds of pottery, a spear head (xii), dagger, iron handle, nails, iron ring, staples, steel arrow head or dart, pieces of ornamented pseudo Samian ware, glass fragments. There had been three clay floors made at different times, and one above another with, in some places, 8 inches of deposit between the clay, and clay from ½ an inch thick covering the cobbles to 2½ and 3 inches thick in other places. This clay had been properly worked, and was very tenacious. The bottom layer of deposit was as rich as any, and in it was part of a black bowl, ornamented with three lines round the rim. Some of the red pottery had holes in the lips for suspension.

June 16th.—Cleared out the north-west end of upper buildings within the camp, laying open end of dwarf wall built with mortar running along centre of apartment. A little charcoal found, long squared iron nail in almost perfect condition, bits of tile, concrete, a little iron dross, and a few ordinary nails. These buildings should be entirely cleared.

June 17th.—At work at the western range of buildings within the camp, which consisted of a long chamber 70 feet 8 inches long by 15 feet at the bottom, and 16 feet at the top in width, with a square room at the inner end; we bared the

the foundation for the flooring of the square room, which consisted of concrete and pieces of tile. There were many small flue tiles of different sizes, some of them black with smoke on the inner side, but none perfect or in position. A thick paving tile lay near the centre of the room, but it was not in its original position, and the concrete floor bed had been disturbed at some early period. A door, 4 feet wide and 2 feet 3 inches from the south corner, led out of this room into the long chamber, and another doorway led directly out of the long chamber on to an open space laid with gravelly concrete, and protected on the high side—to the east and north, by a straight wall. A piece of freestone, with a circular deep hollow, much blackened, was found in the square chamber. Near the lower end of the long chamber we removed 3 feet 6 inches depth of *debris*, consisting of stones at the top, bracken roots, and turf, 6 inches of dark soil, 6 inches of gravel, as though fallen out of the wall, being the bedding mortar; 1 foot of soily deposit, a layer of charcoal 1 inch thick, 6 to 8 inches of very fine mould, above reddish gravelly mould, which showed much sign of burning all along the end, and especially about the centre of the end, and towards the south corner where the wall has fallen away. At the north-west corner of this long room the floor level appeared clearly to have been made up with gravelly concrete, but there were no signs of this having been made up to receive flooring tiles A few relics were found here; potsherds, portions of fine clear white glass bowl, with lines cut round the rim; a leaden weight (vi) (steelyard), which has lost its bronze casement, and at the south corner $7\frac{1}{2}$-inch and $2\frac{1}{4}$-inch nails, in good state. There were in this range of buildings moulded tiles, thin and thick for flues, for drainage, and for paving; hard burned thick slabs, soft red flat slabs and slates. At the north side of the long room outside, there was a thick layer of charcoal deposit, extending four feet from the wall, as though

though lying on a causeway, for the deposit overlies soft fine soil, which again overlies a gravelly bottom. There was a depth of 6 inches of charcoal deposit, with solid pieces of charcoal 1¼ inches thick. A trench across the middle of the long room appeared to show a gravel concrete floor, made up in three levels, running lengthwise. The lowest level ran along the wall facing the *via principia*, in which was the doorway; the middle and widest portion was raised some inches; the portion running along the north wall was again raised higher than the centre. A little more work is required here to determine the purpose of this building. Other finds in the western range were nails, rusty iron, black, brown, yellow and red potsherds, slates, handletop, and fragments of a large coarse *amphora*, brick of modern shape, strip of lead doubled up as a plumber folds a narrow strip for packing; a broken flanged tile, with one edge of a rectangular moulded opening in the vertical side; a piece of grey pot, ornamented with crossed lines half an inch apart; lower course of tiled floor in three places, on the same level *in situ* in the square chamber; iron spike 7¾ inches long, the greater part of dish bottom of Samian ware outside the doorway, and in the black soil beyond the causeway of gravel, and 4 feet from the wall. The leaden weight mentioned was in the shape of a double cone, joined at the bases, and measuring 1½ inches from point to point, and 1 inch through the middle; it was found close to the north wall, 6 yards from the north corner of the long room.

June 27th.—Cut small trenches across *via prætoria* and *via principia*, to prove roads well made up and gravelled. Cut through dam below south-eastern gate, and found six feet of peat in pond (drain cut three feet deep). To get to bottom of pond some stiff work is required at the dam, which is made of rough stones, &c., and wide enough for a good pathway to pass along the top of it.

June

June 28th.—We attacked the buildings outside the eastern corner of the camp. A road passes round from the *prætorian* gate, between the rock and these buildings. Another road comes up from the pass and runs along the other side of the building. A path appeared to lead from this latter road to the south corner of the ruins. We threw out the stones from the centre of this southern chamber, and cut a way to one of the walls. We then went down to the footings of the wall, and followed these footings round the whole chamber, making a trench of sufficient width to work in only. In the south-west wall was a doorway, 6 feet 3 inches wide. Round the south corner, the west corner, and near the doorway long iron nails were driven into the wall 6 inches above the footing stones, at the same level; one of these came away with wood fibre adhering, whilst another brought a piece of the stone away with it; a third we left in the wall, firmly fixed. Freestone had been used here and there in the walls, and generally for the footings—contrary to the practice followed within the camp. Many pieces of freestone, 10 inches square by 5 or 6 inches or more in thickness, lay amongst the soil. A great lump of hard concrete, made of broken tiles, bricks, lime, and sharp gravel turned out near the east corner. The soil was red with decayed concrete. The north-east wall seemed to be built greatly of freestone, and long rough slates appeared in the walling. Beneath one of these large slates was a mass of red cement, and we found a doorway leading into the middle chamber. On working a little deeper we found wide flues leading into the middle chamber. The squared freestones had been used instead of tiles for the *pilæ* of the hypocaust, above which had been a red cement flooring, still traceable in the doorway, where a great piece of slate bridged over the flue beneath. A piece of ribbed tile was found, but no ornamental flooring tiles. Later on we returned to the doorway in the south-west wall, and found the footing tiles

tiles of the *pilæ* 2 feet 2 inches below the offset, close to the wall, and the top of the flue passing through (under the doorway) from the furnace outside. We uncovered the remains of the furnace itself, consisting of ten courses of large square bricks, 3 feet high, and stretching across the greater part of the end wall. The flue in the centre was 2 feet 6 inches wide. A piece of freestone, built in as a stanchion, stood *in situ* on the left side of the furnace mouth, and some of the foundation of the flooring beneath the flue remained, but the place had plainly been much plundered in the very remote past, and the discovery of these relics was quite unexpected. A piece of sheet lead, 8 inches by 4 inches, lay in front of the furnace wall at the south corner, and a lump of molten lead, some molten glass, and small pieces of molten lead at the other side; two or three nails, a few good red, black, and rough pot-sherds were found in the dark soil outside, and an iron blade inside the chamber.

The angles between the walls of the furnace and the ends of the house have been filled up to a certain height with stones, &c. The southern angle was made up with chippings of the native stone and gravel to above the level of the offset and above the top of the furnace, as though to form a road to the entrance into the room. The outer quoins of this room were built with alternate courses of freestone and long red bricks. Several structural alterations had been made in the building. The flue near the north corner leading into the central chamber had at some time given way, and the wall had been rebuilt or strengthened. The quoins on the outside had here also been built with alternate courses of freestone and brick, and protruded from the right line, so as to make the width across the building a foot greater at this end of the chamber than at the furnace end.

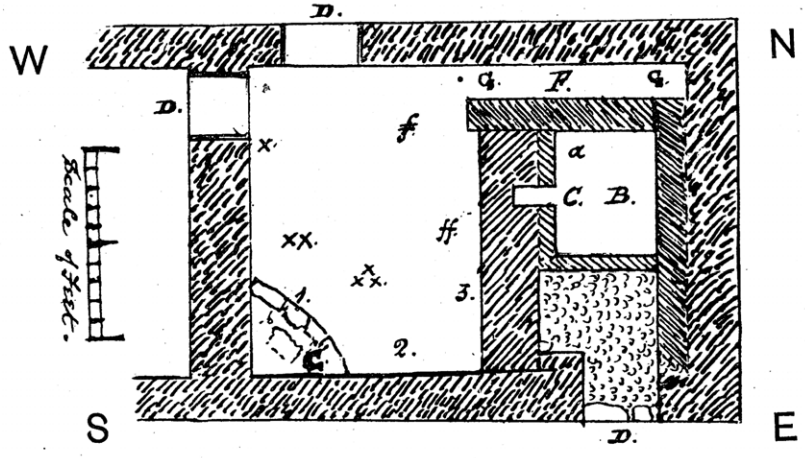
June 29th.—Middle room. Followed walls inside all round to the level of footings. Found squared freestones as

as before; also large slates, and red cement in wall, and near north corner, which proved to be a doorway leading out of middle chamber into eastern chamber. On going deeper there were no flues through the wall, except the one which appeared to have passed beneath this doorway. Along the south-east and south-west walls, however, pillars of seven square tiles were found still standing where the upper concrete floor had been least disturbed; and, in other places, the large footing tile, with one or more smaller ones above in two rows. The floor on which the pillars stood had been made of chippings of native stone, covered with layer of clay with coarse red concrete above. The large bottom tile was always laid with clay upon this concrete, and a very thin layer of tough well-worked clay appeared between each tile of the pillar. The pillars were 4 inches from the wall, and 8 inches apart. The large tiles were 8 inches square, the smaller ones 5 inches square. Between one of the *pilæ* and the south-east wall was found a small silver coin (xx) (with galley and six rowers) and a bit of molten lead; close to another, a black pot rim and molten lead; between the wall and another pillar, a flat piece of iron; also a thick flanged tile, which had fallen down close to the wall. A small coin, which split and flaked away, was found. A nail remained in the wall, 6 inches above offset, as in the first chamber; and one, 7 inches long, was found at the other end of the room. In the north corner, nails, 6 inches and 7 inches long, were found on the bottom 2 feet 6 inches below level of the flat stone beneath concrete in doorway.

The third or north-east chamber was found to consist of a room 15 feet 9 inches by 12 feet 4 inches to the south-east, and a bath or cistern 6 feet 3 inches by 5 feet 6 inches, separated from the north wall by a flue nearly 2 feet wide to the north-east, of which I give a sketch. There appeared to have been a doorway from the outside near

near the west corner, and another near the bath and at the east corner. After clearing out stones and finding the walls, we began work at the western corner, and went down 2 feet 6 inches to the footing stones along the south-western wall. Close to the doorway we found molten lead, and in the south corner stones and cobbles bedded in clay, as for a foundation on which to erect something at a higher level, stretching 5 feet from the corner either way. Along the north wall were some cobbles built in the foundations, and the wall appeared to have given way.

Following along the north wall, in which were some cobbles in the foundations, and which appeared to have been built more roughly than the other walls, we came to a double wall which proved to be a flue, well plastered on both sides, and on the bottom with red cement. This flue was cleaned out to the bottom, which was on a level with the offset, and contained hypocaust and broken flue tiles, charcoal, quantities of soot, and many pieces of window glass. Near the doorway into the middle chamber, and along the south-western side of the room amongst the black deposit below the level of the footings, was found a green porcelain bead (xviii), a small silver consular coin with head on obverse, and the name LONGIN (xvi) (Longinus) vertically placed alongside male figure making a votive offering at an altar, and a bronze coin of Trajan, with portrait and GER DAC, for Germanicus Dacianus, remaining of the legend on the obverse, and a standing figure of *Abundantia* or *Fortuna* with her horn, and the C of *Senatus Consulto*, also a bronze ring (iv). This small room (near the middle of which was a lump of molten lead) was cleared at this level, with the exception of about 2 feet along the south-east wall, where a gravel concrete floor appeared at a higher level along the side of this wall. Several pieces of thick glass were found, and a portion of a wide ($\frac{5}{8}$ inches) lipped glass bottle neck, $\frac{3}{8}$ inch thick, of



D. = Doorways.
F. = Flue.
B. = Bath.
C. = Conduit from bottom of cistern.
x. = Green Bead.
xx. = Two Coins and Bottle neck. } 1st Floor level.
xx. = Lump of Lead.
ff. Beads at lowest level, f. Fish Brooch, Key, Coin &c.
G. Glass. (-lead & iron. a. Animals' remains.

1. Foundation. clay & stone.
2. Gravel concrete floor.
3. Clay bottom 3ft. below gravel.

OUTBUILDINGS, HARDKNOTT.

of a bluish green tint, 3 feet 9 inches below the surface (xvii).

Having found the wall dividing the bath room from room No. 3 to have shrunk from the foundations at about the centre of the room, we went down to see whether any flue existed beneath, but we found that it was roughly built without footings between the wall of the flue, which projected, and the opposite south-eastern wall. The projecting end of the flue wall, as well as the partition wall, had been plastered with red cement, which adhered in places. At a depth of 3 feet 6 inches below a level taken from the footings of the south-east wall, and about 6 feet below the turf we found a thick clayed bottom, 4 inches below which the water stood in dry weather. The point was exactly opposite the outlet from the bath shown in my sketch, and an inch of curved sheet lead was found here, but not enough to *prove* that a lead pipe had been inserted. In the black dry stuff immediately above this clay were found nails and two beads, one of green porcelain, similar to the one found at the upper level and to one since found on the heap, which was thrown out of this room, and one of blue glass (xix). The space between this lower clay level and the upper floor had at sometime been filled in with large boulders and black soil, apparently from a rubbish heap ; there were no square freestones (from *pilæ*) such as had been found in the superincumbent rubbish. We removed this filling up, replacing the stones to support the walls, and found it deepest near the walls named, and running up more than half-way across the room. Near the bath was found a heavy piece of lead, $3\frac{1}{2}$ inches by $1\frac{1}{2}$ inches by $\frac{3}{16}$ inches ; and near the flue, and between it and the doorway leading outside, a plain metal finger ring (ii) (not bronze), two bronze coins, one of which crumbled away almost entirely, the other with head (? Hadrian) on obverse, and *Fortuna* or Plenty, with cornucopia, seated on a prow on reverse (the letters of the legend

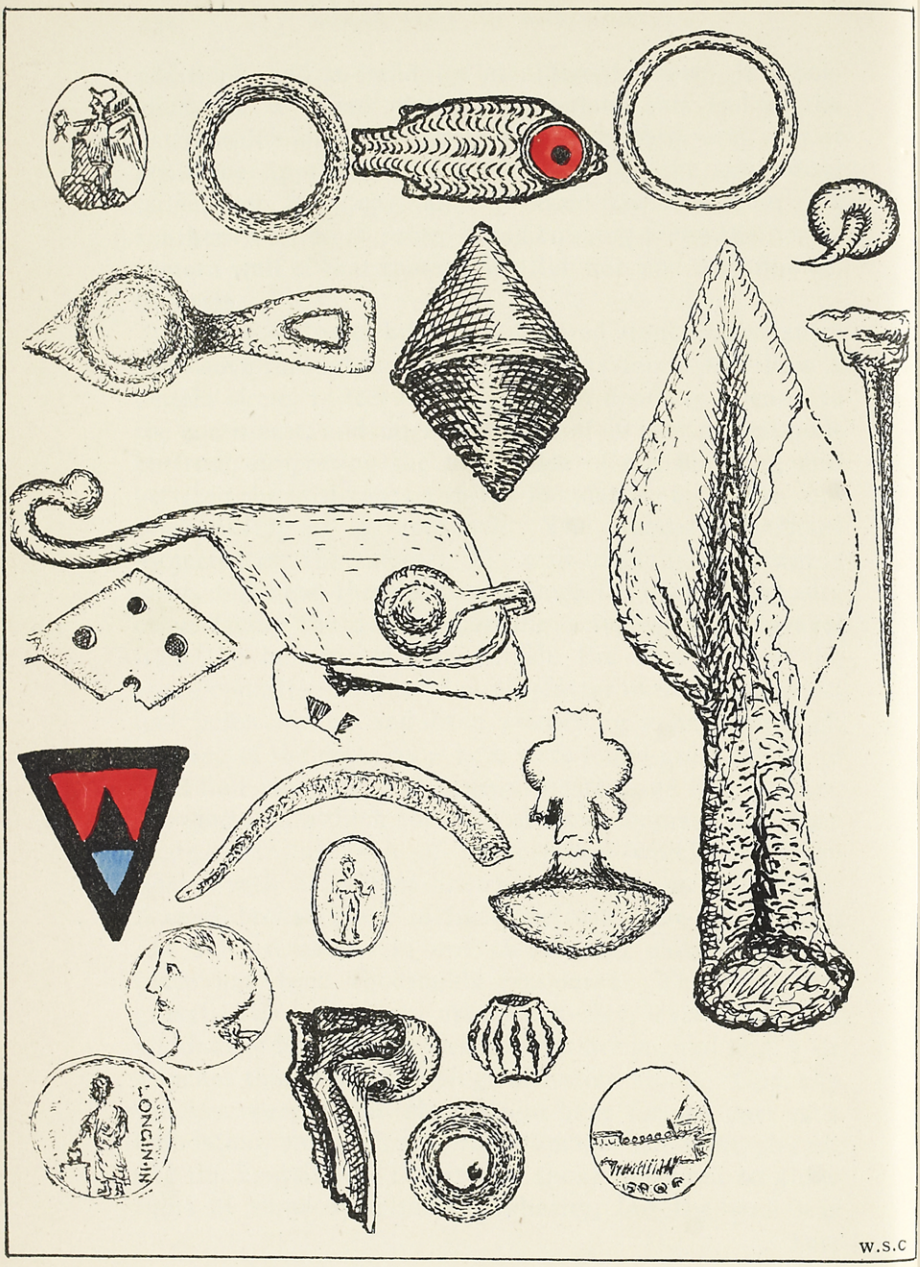
legend were seen on discovery, but the edges crumbled away almost immediately); a heavy piece of iron, nine long iron nails, and others; a large iron key, a finely-pointed steel nail (x) $2\frac{1}{8}$ inches long and only $\frac{1}{8}$ inches square under the head, a small rounded saddle nail with circular head (vii), metal finger ring, of some alloy of silver probably; and a little bright silvery fish brooch (iii), with red enamel eye set in bronze, $1\frac{5}{16}$ inches long, $\frac{1}{2}$ inch across, with its fittings of bronze for the pin at the back perfect. This little ornament shone like burnished silver as it fell out of the fine black dusty earth; the outline of the scales, the circles round the eye, and the setting is of bronze, whilst the eye and the fish scales are of silvery tin and red enamel. Unfortunately the lovely green of the bronze soon changes colour, and the bronze itself begins to crumble, in spite of the greatest care. We found six kinds of glass, and window glass of varying thickness, from $\frac{1}{16}$ inch to $\frac{3}{16}$ inches, and of several shades of olive green, bluish, bluish green tint, and some quite clear colour, some patinated, some showing marks of (sand)bed, and some quite smooth. The north-western wall of these buildings is 5 feet thick; a good deal of the upper part was destroyed in excavating, and we subsequently found that there appeared to have been two walls, but we could not make out whether a flue had passed behind the inner wall; however, we did not come upon any red cement or burnt soot. We left a portion of solid material undisturbed at the south-eastern corner, in order that the structure might be thoroughly tested another year, but this was by mistake removed, and the knowledge of the details of the arrangements of this part of the house must remain lamentably curtailed. We went down five feet and a half from the sod at the north angle to the floor of the bath, and found the inner walls plastered with red cement, the north and west angles being filled by a square moulding of the same material running up the whole

whole height, and a fillet 6 inches wide running round the bottom. The south-eastern wall was much broken down, but we traced the return of the fillet and the red cement plaster all round the bottom. The south-western wall showed a conduit, 10 inches wide, leading out of the bath as far as the middle of the wall, well plastered all round, and from whence I hoped to have found more satisfactory remains of the pipe which conveyed the water away. A thin wall had been built in red cement against the rougher partition wall, and plastered within to form the bath. When the other material was removed by mistake, part of this thin wall was also removed, destroying this particular feature of the structure. The bottom was of the same red cement concrete, so laid as to drain towards the conduit, and it was 13 inches below the level of the footings of the other rooms. The only find of importance here consisted of the remains of a small animal, the size of a small dog or large cat, and its young ones. The bones, which were very dry and brittle, lay with the black earth of the carcases squeezed flat between the mass of fallen plaster and the floor of the place. It was necessary to follow with a trowel the smooth face of the plaster in every part, and to remove carefully what had fallen in order to lay open the original design, and this black substance, with its quota of small pieces of bone, rib-bones of different sizes, and others, aided us considerably towards the west corner, by separating in an unmistakable manner the floor from the fallen mass. The little animals must have lain here since the first falling of the plaster, as they were completely embedded, there never having been any place of entrance through the solid concrete.

It is clear that the doorway near the east corner could not have opened into a water tank, and the whole of the north-eastern wall of this part of the building, as well as other portions, shows signs of alterations, repairs, additions

additions, and re-buildings at different times; it is possible that a raised platform ran along this end of the bath, which may have been a plunge bath, and that it could be approached or left either by the east door outside or by steps, and a raised corridor from the southern corner of room 3 and running along the north-eastern wall of that room. We did not find any flue on this side.

July 1st.—Round building. Cleared stones from centre and drove through to wall, which was found to follow a perfect circle, 15 feet in diameter. A doorway opened to the south-east, and on either side of it was a well-built buttress, supporting the lower side of the building, and between the buttresses a raised foundation for steps, and brick paving as an approach. The foundation courses projected on the outside. The wall had fallen—outwards down hill near the door, and inwards in the opposite curve facing the door, depositing 2 feet of sandy gravel from the building mortar outside the door and in the curve opposite, whereas the red plaster of the inside walls had fallen within, and been pressed in a mass through opening of the doorway; here were found great lumps of hard lime concrete, red cement plaster, and finer plaster, showing that a thick covering of lime concrete had been coated with an inch of red cement, which had been floated with a layer of finer plaster, and smoothly faced. A small broken piece of freestone, with lime adhering on one side, remained in one of the door cheeks, but the place had been thoroughly plundered. The floor was gravelled on red cement upon thick clay, levelled up with all kinds of broken flue tiles and flat bricks, and laid 3 or 4 inches thick upon chippings of native stone. Opposite the door were stones which might have formed part of a foundation, on which an altar or image had been placed, and the coursing of the stones above appeared to show signs of some structural peculiarity, but the wall was here



RELICS FROM HARDKNOTT.

here too much destroyed to allow of any certain statement of purpose. Flat paving bricks, many kinds of tiles, nails, spikes 7 inches long, a piece of flat iron, and a black pot rim at the bottom of the eastern buttress, with a little molten lead, were the chief finds here. Slates from different quarries, one of them being Harter Fell, were found in every part of these buildings.

APPENDIX: List of Finds.*

Finds in West Tower, Hardknott.—The stratification in this tower was roughly as follows :—(1) Loose surface stones, 1 foot ; (2) very light black dusty soil, 1 foot ; garden earth, 1½ foot; heavy light-coloured gravelly soil, 6 to 12 inches ; total, 4 feet. *Pottery*: About half as much pottery was found in this as in the south tower. It was all of similar kinds. There were several pieces of Samian, one with end of maker's name (··· OR · F); also some imitation Samian. *Clay*: A few lumps of tenacious clay were picked up near the bottom; they seem to have been ready for use to plug holes, or make some surface watertight. *Charcoal*: A very little. *Bones*: A fragment of bone, and part of the lower jaw of a small pig (?). *Glass*: Several bits of green glass, not filmed: one of clear white bottle glass, one of the small pieces of green glass is folded. *Lead*: Five small lumps of lead and five pieces of sheet lead, apparently strips cut from a vessel. *Iron*: About half-a-dozen lumps of rusty iron, weighing about as many pounds, and about seven pounds of rusty nails, from 2 inches to 6½ inches long; hooks, forks, &c.; a round bowl-shaped article, like the bottom of a cup, outer diameter, 1½ inch; inner ditto, 1$\frac{3}{16}$ inch; depth, $\frac{3}{8}$ inch to $\frac{3}{8}$ inch; inside depth, ¼ inch; a boss in the middle; also a steel or iron pin, 19¼ inches long, about $\frac{3}{8}$ inch square under the head, $\frac{5}{16}$ inch in the middle, and $\frac{3}{16}$ inch at one inch from the point. It was accidentally bent by a blow from the pick before it was seen. *Bronze*: Two small edging plates, like those found in the south tower; three pieces of bronze of unrecognisable shape; a bronze ring like

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* For this list the Editor is indebted to Mr. Dymond; it consists mainly of extracts from his journal. For the finds made by Mr. Swainson Cowper in the north tower, and by Sir H. Maxwell, see *ante* pp. 228-233.

that

that found in the south tower, $\frac{5}{8}$ inch internal diameter and bare $\frac{1}{16}$ inch thick, with a piece of the circumference missing; part of a lozenge-shaped bronze object (ix),* perforated in the middle of the back (or front) plate, and with three out of four studs, two of them carrying a bridge-piece, $\frac{3}{16}$ inch wide at an interval of $\frac{5}{16}$ inch from the plate, which is $1\frac{3}{8}$ inch long, the holes being $\frac{3}{16}$ inch in diameter. Near it, and perhaps belonging to it, was a lozenge-shaped plate $\frac{15}{16}$ inch in length (viii), $\frac{11}{16}$ inch in breadth, with its corners cut and edges bent upward about $\frac{1}{16}$ inch, and grooved; the plate is pierced by fourholes $\frac{3}{16}$ in diameter, their centres $\frac{7}{16}$ inch apart longitudinally and $\frac{3}{8}$ inch tranversely; also a cruciform object (xi) too much corroded to show the details of the ornament; it is now $\frac{11}{16}$ inch long and $\frac{9}{16}$ inch wide, and has part of a stem at each end, which has been broken off: when found, there was attached to its upper stem, in one piece, a bronze knob or button (xi), $\frac{7}{8}$ inch diameter and $\frac{3}{8}$ inch thick: it came off in cleaning the dirt from the neck. Perhaps the button had originally been upright. *Stone, &c.*: Two stone rubbers or hones, one $3\frac{1}{4}$ inches by 1 inch by $\frac{3}{4}$ inch; the other $3\frac{1}{4}$ inches by $\frac{3}{4}$ inch by $\frac{1}{2}$ inch; also a fractured quartz pebble, and some pieces of slag, &c.; two or three small pieces of freestone and broken bricks. *Engraved Stone Ring*: There was found an iron finger ring (xv), holding an opaque blue stone (or paste?) cut or cast with a design representing a naked man holding in one hand what looks like an arrow, and in the other some undistinguishable object. When found, the upper half of the stone was completely covered by a solid mass of iron, which had to be carefully filed and afterwards flaked away, to expose the face of the stone. This accounts for the dull colour of that part which, with the whole surface, has been somewhat corroded, marring the design, and making the left hand side very dim. The soft rust having been removed as far as was thought safe from the ring, its dimensions are now 1 inch long outside, $\frac{3}{4}$ inch long inside, $\frac{15}{16}$ inch high outside, $\frac{1}{8}$ inch thick; stone nearly $\frac{1}{2}$ inch long, and fully $\frac{3}{8}$ inch wide.

Finds in East Tower.—Pottery: About twenty lbs. of pottery were found in this tower, including many pieces of Samian, plain and ornamented. On one of the former are the first letters of maker's name (AVI · · ·); two pieces of fine thin pottery, one red and about $\frac{1}{10}$ inch thick, the other light red and about $\frac{1}{16}$ inch thick. *Clay*: Spread in several layers near the bottom alternately with layers of charcoal. *Bones*: A few fragments. *Glass*: A few fragments of green bottle

* These numerals refer to the plate of relics from Hardknott.

glass

glass, *Lead*: A few small bits, one about eight square inches, part of a leaden dish. *Iron*: Nails of various sizes: 1¾ inch, 2 inch, 2½ inch, 3 inch, 3½ inch, and 4 inch; also two nails with T heads, 3 inch and 4½ inch; a hook, 2½ inch and 1¾ inch by ¼ inch; a clothes hook, 3¾ inch and 1½ inch; a harness hook, with plate pierced with two nail holes; a piece of strap, 1¾ by ⅝ inch, with an eye $\frac{1}{10}$ inch in diameter; a piece of iron; a javelin head, 2 inches long and ½ inch by $\frac{5}{16}$ inch at thicker end, $\frac{5}{16}$ inch by ¼ inch at the thinner end; a very rusty spike, 5¾ inch; a piece of half-round dagger (?) made of good steel; a part of a dagger or short sword with bronze ferrule, ⅞ inch diameter and ¾ inch long, with remains in it of the wooden handle, partly charred; a spear head 5 inches long and 2⅛ inches wide with a piece of ⅜ inch round iron, sharply bent, sticking out of the socket; two handles (?), one 2½ inches by 1¾ inch, the other 2⅛ inches by 1¾ inch; a curious object, the plate, on one side of which the loop is fixed, looks as though it had been a ring, rusted up, its outside diameter is 2½ inches; a massive, much-rusted spear-like object. *Bronze*: A bent bronze pin with head broken off; a curious bronze spoon-like object (v), 1¾ inch long; a triangular bronze inlaid brooch (xiii), the upper two inlays being of a bright red, the other of an emerald green; it has a longitudinal rib at the back.

Finds in South Tower.—The stratification in this tower may be roughly described:—(1) Loose surface stones, 1 foot; (2) very light black dusty soil, one foot; (3) garden earth, 2½ feet; (4) heavy light-coloured gravelly soil, 2½ feet; total 7 feet. *Pottery*: Pottery occurred here and there at all levels, and the quality varied from very thin unglazed and slightly glazed to the coarsest—a dish 1 inch thick, with rim 1¼ inch wide, of very coarse texture; portions of two or three Samian dishes, one with maker's name (RVFFI · M) and one (imitation Samian) ornamented; one curious fragment with flat bottom—part of a larger vessel; an ornamented piece of smooth cream-coloured pottery; a handle of an *amphora*, and pieces of a *mortarium*. The fragments represent more than twenty vessels, of about as many different qualities; a few pieces of broken bricks and tiles occurred, also a little red sandstone. *Charcoal*: This generally occurred in small *striæ*, about a foot square and an inch thick, at different depths; also in little fragments. The best preserved bits were either flat, and ¾ to 1 inch or 1¼ inch thick, or about ⅜ inch square. Others were of the section of a tree-branch. All these have the appearance of charcoal prepared for use, and not of wood which has been charred in a conflagration. *Bones*: A very few small fragments of bone—some calcined—occurred in the earth. *Glass*: At various depths—even close to the bottom—were found

found bits of glass of several qualities and uses; (1) A flat triangular piece of translucent green (cast ?) * glass, with one straight edge, varying in thickness from $\frac{7}{32}$ inch to $\frac{9}{32}$ inch; one face is quite smooth, the other seems to show the surfacing of the sand-bed on which the plate may have been cast: neither shows any trace of filming; (2) two pieces of flat (cast ?) glass; a piece of light green glass, $\frac{5}{32}$ inch thick, and apparently frosted on one side; (3) a piece of round-edged green glass, made by folding over, and curved in a direction which makes it difficult to see how it could be united to any vessel by the thin broken edge; (4) fragments of green bottle glass; (5) several pieces of a delicate goblet of very thin white glass, ornamented near rim and swell with two bands of double lines; (6) a bottom of another goblet of crystalline white glass, much cracked, but not in the least filmed; (7) bits of another vessel or two of white glass; (8) a small fragment of olive green glass. All these were found well down in the soil; some of the thin white glass very near the bottom. Some vitrified pieces like slag were also met with. *Lead*: In sifting the earth out of the tower there was found a portion of a leaden ring, apparently about $1\frac{1}{4}$ inch inside diameter, and $\frac{3}{8}$ to $\frac{7}{16}$ inch thick, not much oxidized; also several small lumps of oxidized lead. *Iron*: About two feet down in the earth and fallen stones outside the south-west camp wall, ten feet from south-west angle of south tower, was found an iron (or probably steel) mason's trowel, much rusted, except the tang, which seems to have been protected by the handle until the whole was covered up by the earth and preserved from further very rapid corrosion. The blade is $6\frac{3}{4}$ inches long and $2\frac{3}{4}$ inches wide, and of the shape of a modern tool; the tang $1\frac{1}{4}$ inch long. About a quarter of a hundredweight of very rusty iron nails, straps, and lumpy pieces were found in the tower, and probably represent nearly as much weight of clean iron. A few of the least rusted nails were picked out and scraped; some are now about 1 inch long; but most of them are 2-inch wrought clout nails. One rusted piece is about the size and shape of a blade of a dessert knife; two or three pieces are ring-shaped. *Bronze*: Two articles of bronze (ornamental edging of a purse or wallet ?) with three fragments of the inner sheathing, out of which were picked some thin tender flakes which adhered to the plates, and some string-like bits of what may be remains of leather. There was also

* A piece of bottle or goblet-glass, with similar surface on one side, found in one of the other towers, suggests that the dull facing may have been produced by some other process than by casting.

the

the greater portion of a small tube, part of which has been broken away. It is not the shape of the doubled-over part, or saddle, which unites the two side plates of the first-named objects, but it may be such a piece altered in shape. The terminal piece, with a knobbed hook, occurred very near the bottom of the excavation; the corresponding intermediate piece was very little, if any, below the middle depth. A plain bronze ring, $\frac{5}{8}$ inch internal diameter and $\frac{3}{32}$ inch thick, fell out when sifting the earth; also a bronze pin, very little oxidized, about $1\frac{1}{4}$ inch long and $\frac{1}{16}$ inch thick—headed like the old hand-made pins used to be, and bent into a hooked form; the point seemed to have been broken off. Unfortunately it was afterwards lost. There was also sifted out a much-corroded "second brass." *Clay*: Two lumps of very tenacious brick clay lay very near the bottom. *Engraved Stone*: A ring stone (carnelian?) engraved with a (i) very coarsely-designed and executed figure of a winged Victory presenting a wreath. A considerable part of the lower surface of the stone has been chipped. The size is—length, $\frac{21}{32}$ inch, breadth, $\frac{17}{32}$ inch, thickness in middle, full $\frac{3}{32}$ inch. The ring is missing. *Flint*: Among the objects riddled out of the earth (the bottom earth it is believed) was a flint arrow-head $1\frac{5}{16}$ inch long, and nearly $\frac{7}{8}$ inch broad.

Finds around inside of camp walls.—Pottery: Two pieces Samian, one ornamented; several pieces of common pottery, including a large piece of a large jar of coarse red ware; pieces of tiles, one of a flanged tile with edges of square hole in bottom. *Iron*: A headless 5-inch spike; a rusty piece of iron. *Glass*: A piece of clear green bottle glass. *Wood*: A piece of oak, blackened by fire or water, cut diagonally across by an axe.

South-west Gateway.—Pottery: Fragments of five kinds, similar to those before noted. *Iron*: A lump of iron slag.

Western Building.—Pottery: Outside wall, bottom of a Samian dish; inside building, some bits of ordinary pottery, including a piece of "British" quality and pattern, ornamented with crossed lines $\frac{1}{2}$ inch apart. *Iron*: Spike, little rusted, $7\frac{3}{4}$ inches long and $\frac{7}{16}$ inch square under large head, found two feet deep inside wall near west end. *Lead*: A leaden object forming a double cone (vi), about $1\frac{3}{4}$ inch long and $\frac{7}{8}$ inch diameter, the two cones not quite in line; probably a weight.

Court of Forum.—Pottery: One or two small pieces; a hypocaust tile. *Stone*: Two pieces of moulded freestone (probably those unearthed by Sir H. Maxwell) were found lying about; also a third piece, evidently belonging to them. Perhaps they were parts of an altar. Fragment of a millstone (probably the one found by

by Sir H. Maxwell in the same place). It does not belong to the piece mentioned below. *Coins*: A *quinarius* of Domitian, weighing 36 grains. *Obv*: Bust of Domitian with inscription: IMP. CAES. DOMIT. AVG. [GER]M . . . TR . S. *Rev.*: Figure of Minerva with inscription: IMP. XXII. COS. XVII. CENS.P.P.P. (A.D. 91).

Room at north corner of Forum.—Pottery: Several pieces of a Samian dish; a few pieces of common pottery; a hypocaust tile for *pilæ*; a piece of flanged tile with part of three edges of a smooth rectangular hole in vertical side. Nearly all the tiles were found near the partition wall between this room and the long passage. *Stone*: Several pieces of red sandstone blackened by fire; five water-worn pebbles from 1½ inch diameter to the size of a goose's egg (sling stones?); a piece of quartz. *Charcoal*: A stick 1½ inch long and ½ inch diameter. *Bones*: A few fragments, some calcined. *Glass*: More than 20 pounds of molten bottle and window glass; several pieces of flat green (window?) glass, one or two slightly bent by fire, and some frosted. This molten glass was found in the southern quarter of the room, in front of a piece of tile floor, still *in situ*, and down to a depth of two feet below its level. *Lead*: More than one pound weight of pieces of oxidized lead. *Iron*: A nail with two pieces of burnt wood adhering; many rusty nails; lumps of iron and slag.

Central room at back of Forum.—A bent rusty spike 5½ inches long; a curious cup-shaped piece of rusty iron; several nails and rusty lumps; several pieces of burnt sandstone; a piece of Samian; a piece of molten glass; a strip of oxidized lead 4¼ inches long, ⅝ inch wide, and $\frac{3}{32}$ inch thick, doubled up.

Room at west corner of Forum.—Two pieces black pottery; a small lump of lead; a piece of thick flat green glass.

East end of long passage at back of court of Forum.—A small piece of ornamented Samian; a small piece of flat green glass; a piece of a millstone 3⅜ inches thick and about 16½ inches diameter, dressed with radial grooves.

Outbuildings: middle (hypocaust) room.—An amber bead, nearly ⅞ inch diameter, ⅓ inch thick, with central hole $\frac{3}{20}$ inch diameter. A piece of window-glass $\frac{3}{16}$ inch thick, frosted on one side. An iron nail. A small piece of oxidized lead. In one of the hypocaust rooms was found a large fragment of a flanged tile (see Plate iii) with a smooth channel or key-bed moulded across its outer angle.