

THE  
PALESTINE EXPLORATION FUND.

—+—  
PATRON.

HER MAJESTY THE QUEEN.

OFFICE-9, PALL MALL EAST, S.W., LONDON.

*Reports on Progress of Works at Jerusalem and elsewhere in the  
Holy Land, by Lieutenant Warren, R.E.*

XLIII.

11th June, 1869.

*Interesting Discovery at the N.E. angle, Haram area.*—We have, during the last few days, succeeded in driving a gallery up to the great block of masonry forming the north-east angle, and have found the wall to be built of great bevelled stones to a depth of at least 60ft. below the surface, and we have not yet come on the rock.

In my last letter I expressed some diffidence about our being able to get across, on account of the treacherous nature of the soil, although we were then only 50ft. off. By employing a different shape of gallery frame, and keeping a non-commissioned officer continually at the head of the gallery fixing them, we have been able to surmount these difficulties, and are now likely to make a great addition to our knowledge of the ancient topography. Already we have made a happy commencement.

We struck the Haram Wall about 18ft. south of the north-east angle, and at a depth of about 32ft. below the surface. We then turned north, and ran along the Haram Wall for 26ft. without finding any angle similar to that above. At this point a slit about 18in. wide and 4in. high was observed in the Haram Wall, formed by cutting out parts of the upper and lower beds of two courses. A stone, dropped down this slit, rolled rattling away for several feet.

It was some time before I could believe that we had really passed to the north of the north-east angle; but there can now be no doubt of it, and that the ancient wall below the surface runs several feet to the north of the north-east angle without break of any kind.

If the portions above ground are *in situ*, it would appear that this angle is a portion of an ancient tower reaching above the old city wall,

probably somewhat similar to the view De Vogüé gives of it (Plate xvi., "Le Temple de Jerusalem").

We have this morning examined the slit mentioned above. At first it was impossible to squeeze through, but after a few hours it became easier, though it is now only 7in. in height.

The passage in from this slit is difficult to describe: the roof falls by steps, but the floor is a very steep smooth incline, falling 12ft. in 11ft., like the slit and shoot for letters at a post-office. The shoot ends abruptly, passing through the roof of a passage. This passage runs east and west; it is 3ft. 9in. high, and about 2ft. wide; it runs nearly horizontally, and at its eastern end opens out through the Haram Wall. At the western end it goes (by measurement) to the east end of the Birket Israil, but is closed up by a perforated stone. This passage is 46ft. (?) in length. On the south side of it, a little to the west of the shaft, is a staircase cut in the masonry, and running apparently to the surface, but it is jammed up with stones. The roof of the passage is about 48ft. below the surface. The stones forming it are of great size, but do not show large in comparison with those of the sides, which are from 14ft. to 18ft. in length, and vary from 3ft. 10in. to 4ft. 6in. in height. To the west of the staircase the bottom of the passage slopes down rapidly, so that in one place it is 12ft. in height. The roof also is stepped down 4ft., about 11ft. from the western end.

Altogether this passage bears a great resemblance to that which we found under the Single Gate, October, 1867.

At the eastern end, where the passage opens out through the Haram Wall, a rough masonry shaft has been built round, so that we can see a few feet up the wall, and about 7ft. down it below the sole of the gallery. It is evident that here there has been some tinkering at a comparatively modern date.

In the course forming the sole of the passage there is a water duct leading through the Haram Wall, about 5in. square, very nicely cut; but in the next course, lower, a great irregular hole has been knocked out of the wall, so as to allow the water to pass through at a slightly lower level, and so run into an aqueduct 9in. wide and 2ft. high, which commences at this point, and runs nearly due east from the Haram Wall. All this botching and tinkering looks as if it had been done quite recently, and the workmen have left their mark on the wall in the shape of a Christian cross, of the type used by the early Christians, or during the Byzantine period.

At the further end of the passage, to west, the same large massive stones are seen until the eye rests upon a large perforated stone closing it up. This is the first approach we have yet found to any architectural remains about these old walls (which I believe now are admitted to be of the time of the Kings of Judah), and though it merely shows us the kind of labour bestowed upon a concealed overflow aqueduct, still it has a bold and pleasing effect, and until something else is found, will hold its own as some indication of the style of building at an early period.

It consists simply of a stone closing up the end of the passage, with a recess or alcove cut in it 4in. deep. Within this recess are three cylindrical holes, 5½in. in diameter, the lines joining their centres forming the sides of an equilateral triangle (see sketch, plan, and section). Below this appears once to have been a basin to collect the water; but whatever has been there, it has been violently removed. It appears to me probable that the troops defending this portion of the wall came down the staircase into this passage to obtain water.

At first sight this passage appears to be cut in the rock, as stalactites have formed all over it, and hang gracefully from every joint, giving the place a very picturesque appearance. It seems probable that we are here some 20ft. above the rock.

There can be little doubt that this is an ancient overflow from the Birket Israil, which could not at that time have risen above this height, about 235°, or 25ft. above the present bottom of the pool, and 60ft. below the present top of the pool.

It is also apparent that the Birket Israil has been half full and overflowing during the Christian period, and that for some purpose or other the water was carried away by an aqueduct to the Kedron Valley. At the present day, when there is such a dearth of running water in Jerusalem, it is rather mystifying to find that within our era the Birket Israil has probably been constantly full up to a certain point, and flowing over.

It will be a great mistake now if we have to stop this work for want of funds. We have got over to this N.E. angle with considerable trouble and at great risk, and it is highly probable that difficulties would be put in the way of a second excavation at this point.

If the excavations are to continue, I am convinced it is essential that we should strain every nerve to get sufficient funds to complete this work.

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#### XLIV.

18th August, 1869.

*N.E. Angle of Haram area (continued).*—We have now made further progress at this angle, and have settled several points of considerable interest.

1. We find that the tower (so-called tower of Antonia) at the N.E. angle of the Haram area, forms part of the main east wall, and, at near its base, the wall and tower are flush, or in one line.

2. The wall is built up of bevelled stones from the rock, but up to a certain height (nearly the same as at Robinson's Arch) the stones have rough faces.

3. The rock, which is only twenty feet below the surface at the St. Stephen's Gate, falls rapidly past the tower, so that at the southern angle the wall is covered up with *débris* to a depth of no less than one

hundred and ten feet, and the total height of the wall is over one hundred and fifty feet.

4. There is now no doubt that the valley at the Bab az Zahiré passes down through the Birket Israil into the Haram area, and thence out to the east between the N.E. tower and the Golden Gate: and that the platform of the Dome of the Rock is at least *one hundred and sixty-five feet* above one part of the valley in the northern part of the Haram area; and also that the contour trace showing the conjectural lie of the ground in the northern part of the Haram area, forwarded in June, appears to be nearly generally correct.

5. Some characters in red paint have been found on the bottom stones of the Haram wall under the southern end of this tower: a trace is enclosed.

6. It appears probable that the four courses of bevelled stones of this tower, which appear above ground, are *in situ*, and also in the wall south of the tower, but of this latter it does not seem so certain.

7. The faces of the stones below a certain line are described as rough (in paragraph 2), but they are quite unlike the roughly-faced stones at the S.W. angle. The faces project from two to *twenty* inches or more, presenting a very curious appearance.

8. The stone used does not seem to be so compact and hard as that used at the S.E. angle, and the chisel working is not so carefully done.

The manner in which the tower becomes flush with the wall is very interesting: for the first forty-eight feet above the rock it is one wall, the stones being carefully drafted, the faces projecting irregularly, on an average ten inches. The upper and lower parts of the faces are horizontal, and the sides are vertical, so that they in some instances present the appearance of one cube stuck on to a larger one.

The wall throughout this distance has a batter formed by each course receding  $4\frac{1}{2}$  inches from that below it, up to course Q, where the projecting faces end; here the tower begins, and it is formed by the portion forming the wall continuing to recede from 4 to 7 inches, while that forming the tower only recedes about  $1\frac{1}{2}$  inches, so that at 70 feet from the bottom (level of the gallery), and 22 feet from whence the tower begins, the projection is nearly 2 feet. If this were continued at the same rate up to the surface, another 40 feet, it would give to the tower a projection very similar to what it has, *viz.*, about 7 feet; from this it would appear as though the upper were *in situ*; but it is to be remarked that the stones in the *wall* at the surface, and also in the gallery, have projecting faces, and as the southernmost shaft was sunk at the junction of the tower and wall, it yet remains to be seen whether the *wall* throughout is composed of stones with projecting faces, while the stones in the tower are like those at the Wailing Place.

It is also to be remarked that the level of the point where the tower commences is only a short distance below the surface at the S.E. angle, where there is a check in the wall as if just such another tower were commencing.

De Vogüé's view of the temple of Jerusalem restored, appears to give

an approximate view of what the east wall of the Haram is *at present*, except that the centre tower is not known.

There is no straight joint between the tower and wall at the N.E. angle; it is one wall for the 22 feet we have examined, and probably continues the same up to the surface. Where the projection increases to 2 feet, the stones are cut out to that depth, but a few feet higher some other method must have been adopted.

I propose after the summer to drive the gallery 100 feet further to the south along the wall, and then to sink again in search of the bottom of the valley, which is likely to be some thirty or forty feet lower down: as it is, this shaft at the angle of the tower is the deepest yet sunk, the bottom being 110 feet below the surface.

I have left this shaft open, so that M. de Saulcy may have an opportunity of examining the wall if he arrives in time.

(The detail of this work will be sent next mail, with plans.)

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#### XLV.

18th August, 1869.

*Conclusion of the Excavations at the South-West Angle, Haram area.*— Three shafts, during the spring, were sunk alongside the south wall of the Haram area, west of the Double or Huldah Gate; it was also considered desirable to sink two other shafts alongside the west wall, near Robinson's Arch, but the family of Effendis, who own this portion of the ground, and who gave Captain Wilson trouble in 1866, again displayed so much greed, that while they were holding out in expectation of securing an exorbitant *bakshish*, it was found more convenient to examine the wall from a lower level without troubling them.

We have now as much information with regard to this portion of the Haram Wall as we are likely to be able to obtain, and the results are important, very important, for they establish the fact that the south wall east of the Double Gate (about 600ft.) is of a different construction to that portion west of the same gate (about 300ft.), the eastern portion appearing to be the most ancient.

That we can arrive at any immediate definite conclusion as to the position of the Temple from the establishment of this point, does not appear to be probable. It certainly is curious that we should find the portion of the south wall to east of Double Gate to coincide nearly in length with the width of the outer court of the Temple as given by Josephus; that it should be built up *from the rock* with bevelled stones, whose faces are finely dressed, and in this differing from the Haram Wall examined at the south-west and north-east angles, where the faces of the stones for some distance above the rock are left rough; that we should find the south-west angle and east wall to north to be apparently of less ancient construction, and so far agreeing with the description of the

extension of the Temple of Herod to the north and west (Josephus, "Wars of the Jews," v. v. i., and i. xxi. i.); that we should have found signs and characters on the stones at the south-east angle which were evidently written and cut before the stones were laid, and which are pronounced to be Phœnician; that we should have found under the Single Gate (of Ordnance Survey plan) a passage for carrying into the Kedron some liquid, and which is wholly distinct from the water channels under the Triple Gate. We have these, then, and many other indications of the Temple having been at this south-east angle, and yet we have against it arguments which appear to be so strong, that at the present moment there appear to be almost equal reasons for placing the site of the Temple on the three points indicated in a previous letter, viz., 1. Coinciding nearly with the present Dome of the Rock platform. 2. To the east of No. 1, and reaching up to the east wall. 3. At the south-east angle.

The finding of this wall to be of different constructions east and west of the Double Gate, makes it appear improbable that the Temple could have been at the south-west angle.

Between the south-west angle and the Double Gate, four shafts in all have been sunk, viz., the first at 90ft. from south-west angle (described in Letter XII., 22nd October, 1869); the second at 64ft. 6in. from south-west angle; the third at 213ft. from same angle; and the fourth at the south-west angle itself.

Before describing the three latter, some remarks on the south wall may be required.

The south wall of the Haram area, 922ft. in length, is broken into nearly three equal portions by the Triple Gate to east, and the Double or Huldah Gate to west. At the present time the surface of the ground runs nearly level from the south-west angle to the sill of the Triple Gate, and then shelves down about 22ft. to south-east angle; but in earlier times the wall must have presented a very different appearance, for the rock of Mount Moriah, which is found within a foot of the sill of the Triple Gate, shelves down rapidly to the south-east angle, falling over 100ft. in 300. Towards the west from the Triple Gate the rock falls more gently; at the Double Gate, whose sill is on a level with that of the Triple Gate, the rock is probably at a depth of 30ft.; it then falls more rapidly to about 90ft. from the south-west angle, where appears to be the bed of the Tyropœon Valley—this point is 90ft. below the sill of the Triple Gate; the rock now rises again rapidly to west, having risen about 30ft. at the south-west angle.

From the examination of this south wall, in nine separate places, there appears to be no doubt that the whole of the stones below the present surface are bevelled or marginal-drafted, though the faces are not all finely dressed, and that they are *in situ*, although, as previously observed, the portion of the wall to the west of the Double Gate appears less ancient than the remainder.

As the rock is found at the sill of the Triple Gate, it follows that we can have no course of stone running through from end to end below

that level. The first through course has its bed on a level with the sole of the Triple Gate: it is nearly double the height of the courses below, being from 5ft. 10in. to 6ft. in height (see Letter XXVIII., 2nd September, 1868), while other courses vary from 3ft. 4in. to 3ft. 10in. It extends in a broken line from the S.E. angle to the Double Gate, the S.E. corner-stone being the heaviest, but not the longest, yet found in the Haram Wall. Were the south wall of one construction, we ought to find this large course running through west of the Double Gate, but we have searched for it in vain. At the first and third shafts it is difficult to determine whether the stones on a level with this great course are bevelled or not, and therefore they give no information; but at the second and fourth we find bevelled stones apparently still *in situ*, at a higher level than the great course, and yet we find no signs of the great course itself. We have certainly a large stone at the S.W. angle, the longest (38ft. 9in.) at present known, but it is only 3ft. 3in. to 3ft. 6in. in height, and its bed is about four feet above that of the great course; it is, then, apparent that this great course did not reach so far as the S.W. angle, or in other words, that this western portion of the south wall is of a different construction to the eastern. We find this again to be the case when we examine the walls to their foundations, for at the S.E. angle and at the Single Gate we find the wall springing from the rock, with the faces nicely worked, while at the S.W. angle, and for at least 213ft. to east of it, we find the stones up to a certain level, with beautiful marginal drafts, but with rough picked faces; and the line where these rough stones end, and the smooth-faced stones commence, is on a level nearly with the pavement on which the *débris* of Robinson's Arch rests. We have said that the rough stones are found along the west wall under Robinson's Arch, up to the level of the pavement, and it appears probable that they continue with the pavement up to Barclay's Gate. If so, it gives the impression that the portion of the wall west of the Double Gate, and round by the S.W. angle to Barclay's Gate, was constructed after the Tyropæon had commenced to fill up, and that the lower portion, the rough stones below the pavement, were never exposed to view. In Josephus, "Wars," v. v. 1, we find: "The lowest part of this was erected to the height of three hundred cubits, and in some places more, yet did not the entire depth of the foundations appear, for they brought earth and filled up the valleys, as being desirous to make them on a level with the narrow streets of the city." This passage can only apply to two sides of the Temple, the west and the north, for on the south there is no valley near, and on the east is the Kedron, the apparent bottom of which is still considerably lower than the actual bottom of the walls. Now it is just on the south-western side (and north-eastern) that we find these roughly-faced stones reaching up to a certain level; and finding a hard, well-squared, marble (*mazzeh*) pavement also running along at the level, we may fairly conclude that this was the line of surface at some time after the construction of the S.W. angle, and we may also infer that it was the *first* surface used after the S.W. angle was completed,

and that the roughly-faced bevelled stones below were never intended to be exposed to view.

At the S.E. angle, and along the south walls up to Triple Gate, we find the smooth-faced stones are continued down to the rock, and it appears that when this portion of the wall was built there was a *débris* at this point of only twelve feet in depth.

At the S.W. angle, and for at least ninety feet along the south wall, we have found a second and less ancient pavement. It is about twenty feet above the first pavement, and about twenty-three feet below the present surface; it is nearly on a level with the sill of Barclay's Gateway, and with what appears to have been an old surface under Wilson's Arch. This pavement appears to have been used after the destruction of Robinson's Arch, and before the building of the present Wilson's Arch.

It was under this pavement that the signet "of Haggai, the son of Shebaniah" was found in 1867; and in another shaft at the S.W. angle, we have found several fragments of pottery at a depth of about five feet below the pavement. Among the fragments are several Greek lamps, one of which has an inscription of Christian origin, similar to those on lamps which have been considered to be of the third or fourth centuries. These fragments may, to a certain extent, help us in ascertaining the age of this pavement. No arrangement in the laying of these pieces of pottery was noticed: they had the appearance of having been lying in the position in which they were found when this upper pavement was laid, and if so, we must suppose it to have been made after the third or fourth century. It appears possible that this may have been the level of roadway leading under Wilson's Arch, and through the present Dung Gate, spoken of in the Norman Chronicle (see Williams's *Holy City*); also there is to be seen a line of road under Wilson's Arch along the west wall of the Haram area on the plan of Jerusalem in the twelfth century given in Fergusson's article on Jerusalem (*Smith's Dictionary*). It has been observed in a previous letter that the west walls of the Haram area at Robinson's Arch cut through an ancient system of water ducts and tanks running along the western side of the Tyropœon Valley. The long aqueduct which is described in Letter X. (11th October, 1867,) and which commences abruptly at the South Haram wall, was found to follow the bed of the Tyropœon for several hundred feet, and was probably also cut through at the construction of this wall.

If we are to suppose that the roughly-faced stones at the south-west angle were never exposed to view, we must presume also that the two apparent voussoirs lying on the aqueduct under Robinson's Arch belonged to a bridge which crossed the Tyropœon Valley previous to the building of the Haram Wall at the south-west angle (see Letter XXXVI., 12th January, 1869). It is to be remarked with reference to the roughly-faced stones that their joints and marginal drafts are quite as perfectly wrought as those to be found on the stones whose faces are finely worked.

The present surface of the ground between the south-west angle and the sole of the Triple Gate is now nearly on a level (2,380ft.), from thence it shelves down to a level of 2,356 at the south-east angle. As previously observed, a great course of stones runs between the south-east angle and Double Gate, partly broken away in a few places: above this great course no bevelled stones are to be seen except a few, apparently *in situ*, just at the south-east angle. As the bed of this great course is on a level with the floor of the great vaulted substructures inside the Haram area at south-east angle, it can readily be seen that the original substructures are not likely to have remained after the retaining walls to east and south had been destroyed, and that, therefore, the present substructures are likely to be less ancient than the great course and lower portions of the old wall, which still remain *in situ*.

Between the Double Gate and the south-west angle, bevelled stones are only to be seen above the present surface for 90ft. from the south-west angle; for this distance four bevelled stones are to be seen above the level of the spring of Robinson's Arch; they then suddenly break away, and are succeeded between this and the Double Gate by several courses of large squared stones, which are jointed on to the bevelled stones in a very irregular manner. (See Captain Wilson's Plates, O. S.) The top of these squared stones ends in a line with the top of the upper bevelled stones, and above them there are courses of stone of a smaller size. These squared stones vary in height, some courses being more than 4ft.; they are not laid very skilfully, the lines of the horizontal joints having a wavy appearance, and in one case a course commencing at one end with a height of 4ft., gradually runs out in 200ft. to a height of 3ft. 4in. This, however, is not a feature confined to the newer or squared work, it frequently occurs in the bevelled stones; for example, the stone at the south-west angle, 38ft. 9in. in length, is 3ft. 3in. high at northern end, 3ft. 4in. at centre, and 3ft. 6in. at south-west angle.

There appears to have been a considerable want of attention in the reconstruction of the wall at the south-west angle, for the joints between the squared stones are found to act as weepers. The wall is very much disfigured by the deposit left by the running water.

A diagram showing all the shafts sunk round the walls of the Haram area is forwarded; from this it will be seen that the courses from Wilson's Arch appear to run through as far as the Double Gate, though there are slight discrepancies in height of the stones in each course at the several points where they were measured.

It is curious to find that from Barclay's Gate to Wilson's Arch, the bevelled stones have their faces finely worked, while so near to the south of Barclay's Gate there are stones at a higher level which have their faces quite rough; perhaps some reason for this may be suggested, it is difficult to see why this change should exist.

*Descriptions of Shafts sunk alongside South Wall near S.W. Angle.*—The second shaft commenced at a point 64ft. 6in. from S.W. angle; the surface of the ground is here about the middle of course E. The first

No. III. (I. and II. in "Quarterly Statement" No. II.)—Return showing the height of courses of stone in the Haram Wall, as exposed in the several shafts. A thick line in each column marks the present surface of ground.

128

No. given to shaft or to each course.	Wilson's Arch.	Barclay's Gateway.	South-west Angle.	64 ft. 6 in. east of S.W. Angle.	90 ft. east of S.W. Angle.	213 ft. east of S.W. Angle.	West of Triple Gate.	Triple Gate.	Single Gate.	South-west Angle.	South end of Tower, N.E. Angle.	N.E. Angle, 19 ft. to south	Remarks.
	1 Ft. in.	2 Ft. in.	3 Ft. in.	4 Ft. in.	5 Ft. in.	6 Ft. in.	7 Ft. in.	8 Ft. in.	9 Ft. in.	10 Ft. in.	11 Ft. in.	12 Ft. in.	
8	...	...	...	...	...	...	...	...	...	...	...	...	
7	...	...	...	...	...	...	...	...	...	...	...	...	
6	...	...	...	...	...	...	...	...	...	...	...	...	
5	...	...	...	...	...	...	...	...	...	...	...	...	
4	3 4½	3 4	C 22	C 20	C 19	C 21	...	...	...	...	3 10	3 10	
3	...	3 6	...	...	...	...	...	...	...	...	3 10	3 10	
2	3 6	6 10	...	...	...	...	...	...	...	...	3 10	3 10	
1	3 3	Lintel	3 2½	3 2½	3 2	3 2	...	...	...	...	3 10	3 10	
A	2 6	3 5	3 4	3 3	3 3	3 3	...	...	...	...	3 10	3 10	
B	3 6	3 8	3 4½	3 6½	3 6½	3 5½	...	...	...	...	3 1½	3 1½	
C	3 6	3 7	3 7	3 6	4 0	3 4	...	...	...	...	3 9	3 9	
D	3 4	3 3	3 6	3 4	3 9½	3 10½	...	...	...	...	Not seen.	Not seen.	{ Level of bottom of lintel, Barclay's Gate, 2398f. 5i.
E	3 9½	3 8	3 8	3 6½	3 2½	3 2	5 10	5 9½	5 11	6 1	Not seen.	Not seen.	{ Bed of B springing of Wilson's Arch 2391f. 5i.
F	3 8½	3 8½	3 7½	3 7½	3 0	2 10½	—	Great	course.	—	Not seen.	Not seen.	{ Bed of C springing of Robinson's Arch 2388f.
G	3 8	3 8	3 6½	3 5½	3 9	3 9	3 6	Rock	3 5½	3 5½	Not seen.	Not seen.	{ Bottom of great course, Triple Gate, 2380 ft.
H	3 9	3 9½	3 8½	3 6½	3 9	3 9	3 9	...	3 5½	3 9½	Not seen.	Not seen.	{ Bed of I, sole of Barclay's Gateway, 2366ft. 4½in.
I	3 3	3 4½	3 6½	3 4	3 9	3 8	3 9	...	Not seen.	3 9	Not seen.	Not seen.	{ Bottom of course J in columns 11 and 12, 2363ft. 3in.
J	4 1	Not seen	4 0	3 11	3 8	3 8	...	...	Not seen.	3 8½	Not seen.	Not seen.	
K	3 11	7 8½	3 10½	3 11	3 9	3 3½	...	...	...	3 8½	3 5	3 5½	

L	3 11½	3 10½	3 10	3 10	3 9	3 6	...	Opening	3 9	3 4½	3 6	} Bottom of course L at S. E. angle, 2357 ft.
M	3 10	3 9½	3 9	3 9½	3 8	3 8½	...	3 8	3 8	3 5	3 5	
N	3 9	3 11½	3 8½	...	3 11	3 10	...	Opening to	3 9	3 5	3 9	
O	3 9	3 6½	3 4	...	3 8	3 4½	...	channel	3 9	3 5	3 9½	
P	3 6	3 6½	3 9	...	3 9	3 7½	...	3 9	3 9	4 0	4 0	
Q	2 10½	3 5	...	...	3 9	3 6½	...	3 9	3 9	4 0	3 11½	
R	Rock	3 6½	...	...	...	3 9	...	3 9	3 9	4 0	3 4½	
S	...	3 6	...	...	...	3 8½	...	Rock	3 9	3 2½	2 10	
T	...	3 5½	...	...	...	4 0	...	...	3 8	3 0	3 5½	
U	...	3 7	...	...	...	3 8½	...	...	3 9	3 4½	In rock	
V	...	2	...	...	...	...	...	...	3 9	3 4½	Rock	
W	...	Rock at 2320	1	Not continued to rock.	Not continued to rock.	...	Not continued to rock.	...	{ Not seen }	4 0	...	
X	...	...	...	...	Detailed measurement mislead.	...	...	...	...	3 6½	...	
Y	...	...	...	...	...	...	...	...	4 6	3 11	...	
Z	...	...	...	...	...	...	...	...	4 0	3 1½	...	
a	...	...	...	...	...	...	...	...	4 0	2 11	...	
b	...	...	...	...	...	...	...	...	3 6	2 10½	...	
c	...	...	...	...	...	...	...	...	4 2½	3 1½	...	
d	...	...	...	...	...	...	...	...	3 7½	2 10½	...	
e	...	...	...	...	...	...	...	...	4 2½	2 7½	...	
f	...	...	...	...	...	...	...	...	4 3½	Rock	...	
g	...	...	...	...	...	...	...	...	3 8	...	...	
									Rock 2272	2½		

N.B.—This return and the accompanying diagram cannot show the perpendicular measurements taken in each shaft, from surface to rock, etc. For this reference must be made to the detail plans of each excavation

NOTE.—A wavy line in columns 3, 4, 5, 6, 11 and 12, show where the rough-faced stones join the smooth-faced. The four upper stones in column 2, and the stones above the surface in columns 5 and 6, are not bevelled; all other dimensions in this return refer to bevelled (marginal-drafted) stones.

To understand thoroughly the relative positions of the courses, &c., in the Haram Wall, this return must be examined in connection with the accompanying Diagram\* drawn to scale (1/100), because the height of courses does not correspond all round the Haram area. The courses in columns 1, 2, 3, 4, 5 and 6 appear to be of one construction, in columns 7, 8, 9 and 10 of another, and in 11 and 12 of another.

129

The levels are given in feet above mean-sea level of the Mediterranean, as obtained from the B.M. placed by Captain Wilson in the streets of Jerusalem.

19th August, 1869.

\* This arrived too late for lithographing.

CHARLES WARREN, Lieut. R.E.

three courses below the surface are bevelled but much worn; at a depth of 15ft. 6in. a rough pavement was met with, stones about 12in. cube; below this pavement the stones are well preserved until at 29ft. 6in., at bottom of course M, the bevelled stones with rough faces commence; this shaft only exposed course N.

The third, 213 feet from S.W. angle.—Level of surface of ground nearly at bed of course F; found a rough wall butting on to the Haram Wall, very difficult to get through; bevelled stones in bad preservation; at depth of 25ft. arrived at the upper course (N) of roughly-faced stones, continued down to the rock, which was reached at a total depth of 54ft. 10in.; rock cut smooth for the foundation-stone.

The fourth, at S.W. angle, on S. side.—Level of soil at bed of course D, bevelled stones very well preserved; at 23ft. met with a stone pavement; at 25ft. came upon some Christian lamps, one with a Greek inscription—stones of wall very well preserved below pavement; at 38ft. came upon a second pavement, the same as that under Robinson's Arch; at 42ft. came upon the roughly-faced stones at course Q; drove a gallery for 6ft. round the angle to examine the roughly-faced courses.

*Gallery under Pavement at Robinson's Arch.*—This was driven in from the shaft at Robinson's Arch for the purpose of examining the west Haram Wall; the result of the examination is that the line of smooth-faced stones ends at the pavement under Robinson's Arch, and that below this pavement the stones are roughly-faced.

It is to be remarked that the smooth-faced stones above the second or upper pavement are found in much better preservation than those below it, which appear to be quite unworn; this would rather imply that this upper pavement was laid only a comparatively short time after the building of the Haram Wall at this angle.

THE  
PALESTINE EXPLORATION FUND.

PATRON.

HER MAJESTY THE QUEEN.

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OFFICE-9, PALL MALL EAST, S.W., LONDON.

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*Reports on Progress of Works at Jerusalem and elsewhere in the Holy Land, by Lieutenant Warren, R.E.*

XLVI.

*Excavations at the North-East Angle of the Haram Area.*—The general results of these shafts have already been noticed in Letters XLII., XLIII., and XLIV., and now the details of the working are given.

In commencing work here we were completely in the dark as to the nature of the rock below the surface; we certainly were aware of the valley running down from the Bab-as-Zahiré, but it was generally supposed to run out through the Birket Israil, turning sharp to the east, as shown in the Ordnance Survey Plan 1:10,000: instead of continuing in a south-easterly direction through the north-east corner of Haram Area, as our excavations have shown it to do: we therefore found it necessary to sink several shafts so as to completely mark out the present lie of the rock; and it is to be remembered that the present lie of the rock gives very nearly the features of the ground as they appeared in early times, for it can hardly be doubted but that in those times the rock about here was nearly bare; covered at the most with 2ft. or 3ft. of red earth.

Wherever we have excavated we have found the rock at bottom of our shafts to be cut away in steps, or levelled, or otherwise showing that the hand of man had been applied to it; and on this rock we generally find 2ft. or 3ft. of red earth (the natural colour of the soil of this part), and all above it is stone-chippings and shingle mixed up with pieces of red pottery, a black earth formed of rubbish from the city.

The following remarks are made on the supposition that the contour trace of supposed lie of rock 1:2500, the elevation of the east wall of Haram 1:120, and the sections through the east Haram Wall at north-east angle are before the reader.

It is also to be observed that in giving these details no account of the actual working is given, as this, though interesting in itself, would prevent the results being readily accessible; in this account one shaft is said to be tamped up and then another commenced, while in fact, whenever convenient the earth taken out of one was used for filling up another, so that at No. 10 shaft, no soil had to be taken up to the surface after we had once reached the wall, though we have been working them for many weeks.

In giving the details, also, the shafts have not been taken consecutively or by the date of commencing, but with regard to their positions one to another.

One important point these excavations have established, viz.:—that outside the city wall on east to north of St. Stephen's Gate there are only a few feet of *débris*, and often none at all, while immediately south of it, and indeed all along to the south-east angle, the *débris* varies in depth from 50 to over 100ft; this rather implies that to the north of this gate there has been very little destruction of old walls.

Another important point with regard to the city wall at this gate is, that the present wall only goes down for 10ft. below the surface, and there rests upon 10ft. of concrete, which again is on the rock, and that there is no appearance of an older wall.

From this it would appear that the St. Stephen's Gate may not stand upon the site of the old wall; and the line of bevelled stones found in drain at shaft No. 10 may mark the place where the old wall turned in to the west. This idea is rather confirmed by our finding the Haram Wall running north from the north-east angle for at least 64ft., so that if it continued far enough in the same straight line, it would lie under the St. Stephen's Gate nearly.

We come now to a question of very great interest in the East Haram Wall north of the north-east angle. We found an overflow aqueduct at a level of 2,341ft., while the present level of the Haram Area at same angle is 2,410ft. This aqueduct forms part of the old Haram Wall as seen at this angle, and every detail about it points to its having been used as a fountain or overflow aqueduct, and not as a floodgate; and if we admit this, we must suppose the water in the Birket Israil to have stood at the highest at 2,415ft. at the time the present north-east angle and north-east portion of Haram Wall was built. If this be so, and if we might suppose the present northern end of the Haram Area to have been built up to same height as it does at present, when this north-eastern wall was built, then, we ought to find southern side of the Birket Israil built up of the same kind of blocks as this wall.

Now we find the inside of the Birket Israil faced with stone and plaster, so as to act as a tank up nearly to the level of the Haram Area, and what may be the true face of the north Haram Wall may thus be covered up. The removal of a few stones here might settle this question. This question may thus be described.

Some authorities make the limits of Herod's Temple to have extended up to Birket Israil on north; now we have found the northern part of east wall to be apparently *in situ*, whether it be the wall of Solomon, Herod, or Herod Agrippa. If of Herod then the south side of Birket Israil should also be of like stones.

In shaft No. 11 we have found a massive wall of bevelled stones, apparently not *in situ*. This may have been at a later period the line of the city wall; certainly it appears to be later than the aqueduct which it cuts in two, and which appears to run up to St. Stephen's Gate, shaft No. 10, for this aqueduct is on a level and does not appear to have been made until the Birket Israil was made into the tank it appears at present.

Shaft 1.\* Commenced 2nd April, 1869, at a point at the foot of the mound of rubbish outside St. Stephen's Gate, where some Christians say tradition places the site of an ancient church.

Surface 2,343ft. above sea-level. Rock was found at depth of 6ft., it sounded hollow, and on striking with a jumper, caved in, and a grotto was exposed to view, nearly circular on plan, about 9ft. in diameter and 4ft. high; it had been used as a tomb, and is divided into five loculi by plaster partitions about 3in. thick and 12in. high; two of these lay about north-east to south-west, and three north-west to south-east.

At the southern side a shaft leads down into a chamber (No. 2) 26ft. long, 6ft. broad, and divided latitudinally into ten loculi, separated as in the chamber above; one of the middle loculi serves as a passage, opening at either end into two chambers (Nos. 3 and 4) parallel and similar to No. 2; these are also divided into loculi.

Other chambers open out from these; the largest being at the south-east angle of No. 3, where there is a shaft (about 6ft. deep) leading down into a lower range of chambers, in direct length about 40ft. All these chambers, nine in number, are divided off into loculi, except one which appears to have been an ante-room, and in which some pieces of cut stone were found.

The partitions separating the loculi in some cases are cut out of the rock. The chambers were found half full of earth, fallen in from above, and it is evident that they had been opened, and perhaps used, at a period subsequent to the time when they had been used as tombs. The earth was moved from one chamber into another, but we found no indications of passages into a larger grotto, the only places not explored were some shafts leading up, apparently, to the surface.

The work was continued for twenty-four days. Six pottery lamps, apparently early Christian, and some glass vases were found, these were sent home in a box under charge of Corporal Ellis.

The chambers are cut in the "Malaki" of a very rotten description, nearly approaching to the Cakooli, and no chisel marks were found on

\* The numbers are not Captain Warren's

the rock. The system of chambers with shafts leading up to surface is somewhat on the plan of the Greek or Phœnician tombs at Saida.

A plan of some of the chambers, and a section, are enclosed; the whole system is not given, as they lie over each other, and are cut so irregularly as almost to suggest the idea that they may have been natural caverns enlarged by man.

Shafts 2, 3, were two shafts sunk at the bottom of the road, due east of St. Stephen's Gate; rock was found in each at 5ft. 6in. and 2ft. respectively; at the first (H. 4) the last 3ft. 6in. was of the red virgin soil. Shafts were now commenced higher up the road leading to St. Stephen's Gate.

Shaft 4. Commenced 9th April, 1869, was sunk near the road 256ft. east of the gate; at 14ft. a small aqueduct or cistern was broken into, about 4ft. 6in. square of masonry. Rock was found at 20ft. 9in., the walls of the cistern resting on it, the rock levelled. Soil for first 13ft. nearly black, in layers sloping from north to south for the first 11ft., and then from west to east to a depth of 14ft., slope two in three; below this the colour was red, and continued so for 6ft. to the rock; level of surface 2,390ft. A shaft, H 8, was next sunk higher up near the road, at a distance of 162ft. from the gate; level of surface 2,409ft.

Shaft 5. Rock was found at a depth of 30ft. The top of a scarp facing to east; this was followed down 20ft. the rock receding under to west, apparently the side of a tank, as it was plastered and ended abruptly to north; large stones were found, as though they had been part of the vaulting of the tank; after getting to a depth of 50ft. below the surface this shaft was filled up. For the first 20ft. the soil was black and rotten, apparently rubbish from the city; from thence to the rock loam mixed with stones.

Shaft 6. Commenced 12th May, 1869, near road at 109ft. east of St. Stephen's Gate; level of surface 2,411ft. Rock found at 22ft. 9in. below surface, falling out one by one to south-east. At 16ft. colour of soil changed from black to a reddish brown. At 8ft. some pottery found. In consequence of the finding of the wall at No. 11, it was considered desirable to drive a gallery to west from No. 6 in search of continuation of the same.

Rock very soft and rises to west slightly; first 10ft. level, then 3ft. with rise of 3in. and then 2ft. level again; in all, 15ft. The rock is then scarped to west to depth of 8ft. 4in., is level for 10ft., and then rises again in a small scarp of 2½ft., and then goes on level again. Space of ditch filled in with small stones and earth. Total length of gallery to west 25ft. 8in. No signs of any wall as found at H. 9; but probably we were not near enough to west.

Shaft 7. Commenced 24th April, 1869; at the first angle in city wall, 43ft. north of St. Stephen's Gate; surface level 2,419ft.; wall below surface same as that seen above; at 18½ft. came on rock and concrete on which the wall rests; no signs whatever of anything more ancient than the present city wall, as seen above ground; soil passed through, a loose rubbish.

Shaft 8. Commenced 8th April, 1869, at a point 200ft. due east of the south corner of tower of north-east angle Haram Area. Rock, cut down level, found at 29½ft. Level of surface 2,347ft. Some broken pieces of fresco were found near the rock. Soil passed through was black for first 8ft., and then of a brown colour, with the appearance of water having passed constantly through it with lime in suspension. A gallery was now driven to south-west to determine the lie of the rock. Rock found to slope to south-east; after progressing 11ft., the gallery had to be tamped up on account of our striking a layer of loose stones with no earth among them, and which ran down in streams on being touched.

Shaft 9. Commenced 30th April, 1869, higher up the hill, and at a distance of 40ft. to west of No. 8. Level of surface 2,364ft. Sunk 23ft. through black earth and then came upon shingle from one to two inches cube, without any earth; shaft continued 20ft. deeper, when at a depth of 43ft. the shingle changed to a layer of stones from three to four inches cube, and in getting through these the shingle commenced to run and filled in the shaft for about a foot and a half; the shaft was then filled up till the bottom was 22ft. below the surface, and a gallery was driven in to west for 25ft.; a shaft was then sunk through stones 12in. cube, and mud. Rock found at 25ft., being 47ft. below the surface; rock falls one in four to south.

Shaft 10. Commenced 5th May, 1869, along city wall at first angle to south of St. Stephen's Gate, at a distance of 34ft. from the Gate. Level of surface 2,410ft. Bottom course of ashlar of city wall at depth of 11ft., resting on concrete formed of stones about 6in. cube, and hard lime; at depth of 20ft. found rock, the concrete foundation of wall resting on it: rock sloping to south about one in four. Shaft was then filled up to top of concrete and a sloping gallery driven to the south along city wall.

In gallery, at 19ft., came upon a stony rough masonry wall, lying east and west, about 3ft. thick, which did not reach up to city wall by 6ft.; within this wall to south was a pavement of rough tesserae at a level of about 2,391ft. Sergeant Birtles suggests that this was perhaps the remains of a house, the space between the rough wall and the city wall having been the doorway. Just before reaching the rough wall, a masonry drain 7in. by 6in. in the clear was crossed below level of pavement.

At 38ft. the top of a barrel drain was crossed, and at 40ft. another rough wall, also large cut stones were found on east side, and bottom of gallery.

At 44ft. 6in. a shaft was sunk and rock found at 4½ft. below sole of gallery, being 33½ft. below surface of ground at mouth of shaft; the surface of rock therefore at this point is 2,377ft.

The top of the barrel drain was now examined; after going in 2ft. 6in. it ended, and another roof formed of flat stones at a rather higher level was seen, and after 8ft. the sides of an aqueduct running

west were visible, formed of large stones; for the first 10ft. this passage is only 10in. wide, and it then becomes larger (2ft. wide), the southern side being formed of large stones 3ft. 6in. high, and 4ft. 6in. long, well squared and exhibiting slight traces of a bevel; the aqueduct was traced for 39ft. in all, and was blocked up by a stone having fallen down from the roof. In the top, about 15ft. from entrance, a cylindrical earthenware pipe, 9in. in diameter, was built in, apparently to conduct water from a higher level; also two other pipes, about 4in. in diameter, were found laid horizontally *above* the stones forming the roof. The aqueduct was in a very decayed condition and not safe for the men to work in; it apparently leads from the Birket Israil at a level of 2,390ft., the bottom of the pool being 2,325ft. It is probable that it was constructed before the present city wall, but it has not the appearance of very great age, and the fact of the south side being composed of large bevelled stones rather goes to show that it was formed after the destruction of one of the old walls.

Shaft 11. Commenced 16th March, 1869, at a point about 100ft. to east of Haram Wall, a little north of the North-East Angle. Level of surface 2,405ft. At a depth of 42ft. an aqueduct was broken through, very rough, no plaster, roof formed by rough stones in form of an arch, runs in a north-westerly direction, directly for the aqueduct found in shaft No. 10. To the north-west 27ft. were open, and to south-east 20ft.

Shaft was now continued, and at 60ft. the earth changed colour and rock found at 64ft. from surface; cut in steps apparently for resting a foundation on. Falls to west about one in four.

The shaft was now filled up to level of aqueduct, and the clearing out of the portion towards the city wall was commenced. Passage 3ft. 6in. high, and 1ft. 9in. wide; stones forming sides and roof, 3in. thick and 6in. long, very rough.

At 32ft. found the passage broken in at sides; after securing this, it was found to continue and to be filled with hard silt. At 57ft. a very massive wall of bevelled stones running north and south, and 65ft. from city wall, was reached—stones well squared and somewhat similar to those found at the Jews' Wailing Place: course 3ft. 7in. in height. Commenced a gallery along the wall to the north; the second stone found was not bevelled, though well squared and dressed. At 18ft. from aqueduct, the gallery being driven horizontally, the rock was struck, and the lowest course of the wall took a turn about 30° to north-east, while the second course continued straight on to north; the wall now was composed of small stones, and after continuing it for 8ft. further, the gallery was tamped up by earth taken from a new gallery driven along wall to south.

Gallery continued to south along bevelled stones of wall; at 19ft. reached the corner stone, the wall now running to west. The stones here are very well dressed, but have a curious cracked appearance as if they had been subjected to great heat, and they broke off in large

chips when struck accidentally. Followed up the wall to west, and at 13ft. 6in. came upon what appeared to be part of a rough wall running to south, stones about 1ft. 6in. high, and 2ft. long. The main wall still went on to west, but was now composed of very rough irregular stones of large size; the gallery was now continued for 46ft. from the angle, when the wall suddenly ended, and after being continued for 7ft. farther, the gallery was stopped, and another gallery driven to south-west from the point (47ft. from angle) where the main wall had ended.

Continued gallery to south-west; progress impeded by meeting with a concrete floor composed of black cement and small stones; point where this floor was met with 29ft. from where the gallery branched. At 38ft. came close on point below north-east angle of Haram Wall, and broke into a gallery from No. 10. This was done for the purpose of tamping up No. 9 with the soil from No. 20, and so avoid taking it along the rough aqueduct, which had been an awkward business.

It does not appear that the stones of the massive wall in No. 11 are *in situ*, the stones differ in height, and sometimes a squared stone is interpolated; it is probable that this wall was built after the aqueduct had ceased to be of use, as we find it cut in two by the wall, that is to say, if we are to suppose it to be one and the same as found in Shafts Nos. 10 and 11.

Shaft 12. Commenced 24th April, 1869, at a point ninety-seven feet due east of north-east angle of Haram Area: level of surface 2,396ft. The soil at first was very good for working (black soil) to a depth of forty-two feet, where a rough wall was met with, running east and west. Below this, rough stones were met with, and the shaft proceeded with some difficulty to a depth of fifty-nine feet, when rock was met with: falls one in three to east. The shaft was then filled up to thirty-three feet from surface, and a gallery driven in towards north-east angle through very good soil for thirty-five feet. At this point the earth gave way suddenly in front of the frames for about nine inches, and down came a torrent of shingle, filling up the gallery for six feet.

It appears that the surface of the good earth falls *towards* the Haram Area, the shingle lying on top of it, there being again after a few feet of good earth another bed of shingle.

We now had to try back, and at twenty-nine feet from shaft turned the gallery sharp round to south, stepping it down each frame one in one, so as to get a few feet of good earth over our heads. After ten feet the gallery was turned round again towards the city wall, and gradually stepped up again: we were now again in most excellent soil, the best we had come across in Jerusalem; but there was still the chance of our meeting a break of shingle and being prevented reaching the Haram. Every effort was made to obviate any such accident; and Sergeant Birtles and Corporal McKenzie, putting in thirty frames in two days, arrived safely at the Haram Wall without encountering the dreaded shingle. What prevents progress in these galleries is not so much the

work at the head of the shaft, as the difficulty in making the men carry off the soil quick enough. A gallery was now driven along the Haram Wall to north; and at twenty-six feet the curious shaft leading to aqueduct was met with, described in Letter XLVIII.

The gallery along Haram Wall was continued to north beyond the *light-shaft* of this aqueduct; and the stones were found to continue bevelled and well cut for sixty-five feet, when they changed in character from being similar to those at the Jews' Wailing Place to those found near bottom of tower at north-east angle; the centres of the stones projecting from six to ten inches. These were examined for ten feet, and then the gallery was tamped up. It is to be observed that this wall was traced considerably beyond the point where the massive wall of H 9 should have come in, and therefore they appear not to be connected.

In the gallery to north a concrete floor was encountered, apparently ascending to north, at a distance of sixty-four feet. It was just here that the Haram Wall stones changed their character; and probably it may have been that the projecting faced stones were hidden beneath the concrete floor.

A shaft was sunk alongside the Haram Wall at the point where the gallery from No. 12 met the Haram Wall, 18ft. south of the north-east angle of Haram Area (as seen on surface). Level of bottom of gallery 2,363ft. 3in. Passed through black earth and stone about 12in. cube; at 17ft. came on stone chippings. Hitherto, in this shaft, the Haram Wall stones had the ordinary marginal draft; but at 21½ft. the first course of projecting faced stones was met with, the projection being 25in.

At 36ft. the rock was met with, having a very steep fall to south, and being cut in steps for the reception of the stones of the Haram Wall. Shaft tamped.

The gallery to south was continued until it reached the southern corner of the tower, which here only projects 2ft. (see Letter XLIV.); and here another shaft was sunk: level of bottom of gallery 2,363ft. Commenced 7th July, 1869. At first the soil was good, then some very large stones had to be broken through: at a depth 46ft. the soil became better to work in. The face of stone 14th course X (see section) was very faulty, and its irregularities were filled up with small stones and mortar, rendered on outside so as to look like stone (specimen of mortar kept). Along the top of Z course, which sets out 7½in., a small drain was built about 6in. by 5in. in the clear: it runs into a small cistern about 3ft. square and 6ft. high, the sides plastered, and top covered with a rough flat stone: depth of drain from bottom of gallery 52ft. 6in. The cistern lay to north of shaft, its western side about 1ft. 6in. from Haram Wall; the drain, 1ft. 4in. wide, enters at north-east angle of tank, and the outlet, which is only about 6in. square, is at the south-west angle; there was about a foot of deposit at bottom.

At 58ft. we got among dry shingle, and at 62ft. 6in. came to the course.

on one stone of which red painted characters were found: the face of the stone was not dressed, but, in the working of it, a large piece had split off, leaving a smooth face, and on this the characters were painted. In one case the letter appeared to have been put on before the stone was laid, as the trickling from the paint was on the upper side.

Rock was found at 70ft. 9in. below bottom of gallery: it had a steep slope of two in one to south.

This shaft was now tamped up and the gallery driven on to south along the side of the Haram Wall for 75ft. past the corner of the tower, the soil being very good; all at once our old enemy, the shingle, again appeared and filled up the end of our gallery, so that it had to be tamped up for 12ft., as it is impossible to drive through this shingle with our means. Shaft now sunk (commenced 2nd December, 1869) at 63ft. south of corner of tower, passed this loose earth and large stones, some of them 4ft. long and very nicely dressed. 13th December got down to a depth of 28ft.

Wherever the wall of the Haram, south of the corner of the tower, has been seen as yet, the stones have been found with projecting faces, and it seems most probable that this description of wall extends in an unbroken line as far as the Golden Gate.

The Count de Vogué visited the excavations at H. 10, and was shown the aqueduct; while he was down there a piece of magnesium wire was lighted at the top of the *light-shaft* so as to imitate daylight pouring in; the light after passing down the shaft strikes the aqueduct just where the passage opens in, so that any person coming down it would have been able to have seen where he was going to.

The passage has since been cleared out for 28ft.; it was filled with earth and large stones which rolled down with great force into the aqueduct; the passage is found to be a staircase leading up towards surface to north, at an angle of one in one; it appears to have been cut out of the solid after the wall was built. The roof is hollowed a little in centre and ascends by great steps of about 4ft. each.

13th December, 1869.

*The Substruction at the South-East Angle.*—I gave you an account of a visit to this on 11th Feb., 1869. A few days ago I went down again in company with Count de Vogué to ascertain for certain whether the engaged columns, shown blue in my plan of same date, 1869, rest upon bases or not.

The result is important, neither the engaged column C or A have bases; C rests immediately upon the rock, which then forms the ramp leading up from the Triple Gate. A is let into the rock about 6 or 8in., the rock then being about 2ft. 6in. below the present surface.

Jerusalem, 13th December, 1869.

*Himyaritic Stone from Arabia.*—A Jew professes to have brought this stone from a place he calls Sheba, on the other side of Jeddah.

He said he had obtained it from a ruined rectangular building, and that it was let into the wall about 4ft. from the ground—the building he appeared to think had been a place of worship.

Dr. Chaplin was allowed to take a squeeze, and he kindly places it at the disposal of the Palestine Exploration Fund; a pencil trace from the squeeze was forwarded last mail.

The stone appears to be alabaster; the sculpture in bas-relief, very rudely done, appears to have reference to the ancient worship of nature. The stone is split in two.

The Jew says he was offered four hundred rupees for it by a gentleman at Aden; he has been offered five pounds for it and has refused it.

18th December, 1869.

*The Great Rock-cut Aqueduct in the Kedron Valley.*—A description of this was given at the public meeting held at Willis's Rooms, June 11, 1868: an extract from it is given below:—

*"Rock-cut Aqueduct.*—Down the valley of the Kedron, and south of Siloam, there is the Well of Job, or Joab, about which there are many curious traditions which connect it in many ways with the ancient Temple. It has been examined, but to my mind there is yet a mystery concealed there. It is a well 100ft. deep, without appearance of connection with any surface drains, and yet after heavy rains it fills up and overflows in a voluminous stream.

"South of this well, about five hundred yards, there is a place called by the Arabs, 'The Well of the Steps,' about which they had a tradition that there were steps leading up to the Well of Joab. I had the ground opened, and at 12ft. below the surface came upon a large stone which suddenly rolled away, revealing a staircase cut in the solid rock leading to a rock-cut chamber and aqueduct, running north and south. It was filled up with silt or fine clay. We cleared it out to the north for about 100ft., and found it to be a great aqueduct 6ft. high and from 3ft. 6in. to 4ft. broad. When the winter rains came on, a stream burst through the silt, and, completely filling the passage, found its way up the steps and rolled down the valley in an abundant stream, joining that from the Well of Joab. In April the stream abated, and in May we were able to commence again; and, working day and night, we may expect to reach the city in six months. We are working with English barrows in this aqueduct, much to the delight of the Arab workmen, who take a childish pleasure in using these new toys. We clean out at present about 15 cubic yards in 24 hours. Looking at this aqueduct from a sanitary point of view, we might suppose it built for carrying off the sewage

of the city, and, from a military point of view, for carrying secretly off any superabundant water to the nearest crevice in the rocks; possibly it may have been used for both purposes. Looking into the Bible history, we find in the Second Book of Chronicles that Hezekiah stopped the brook that ran through the midst of the land, saying, 'Why should the King of Assyria come and find much water?' Again, we find from the other account that the refuse from the burnt-offerings was carried down to the Kedron by a subterranean channel; and, as water would be wanted to run it down, it may be supposed that the aqueduct in question might have been used for some such purpose. At any rate, it is highly important that we should discover for what purpose; and we have the chance of its being a clue to the Altar of the Temple, and—which is of more practical value to the inhabitants of Jerusalem—to the hidden springs of Hezekiah, which, if found, might again supply the city with living water."

A further account is given in Letter XXV., 1st January, 1869. Since that time the work has not been resumed until within the last few days, when I recommenced in order to obtain a correct idea of the probable expenditure that would be incurred in continuing the work.

It took a few days to get quit of the mud which lay in the passage; for, all through the summer there has been a little water trickling into the tunnel: on going on to north we had not cleared away 3ft. before a large grotto was discovered, out of which the aqueduct opened.

Apparently this grotto was originally natural, but afterwards cut out so as to form a receiving tank. It is 35ft. from east to west, and 20ft. from north to south, nearly oval on plan; it is about 45ft. in height, the roof being formed by the sides gradually approaching each other. At the highest point there appears to be a shaft upwards, about 2ft. square, covered by a white stone. The bottom of the passage by which we entered is about 9 (or more) ft. above the bottom of the cistern, so that there would always be a depth of 9ft. of water retained in it. At the northern end are two aqueducts running into the cistern: the upper and eastern one has its bottom 12ft. above the bottom of the outlet aqueduct; below it (the upper), by 9ft. and 6ft. to the west, is the lower aqueduct which, after a few feet, runs in under the upper one; they both come from the same point (about 80ft. north-north-east of the cistern), where they are in one, forming a passage 15ft. high, and nearly 6ft. wide. This point is 90ft. due west of Eyub.

The way in which these two aqueducts run together is very curious: at the point where it is one passage, there is a little staircase cut in the rock going up about 9ft. on to a landing where the upper aqueduct begins; this is 3ft. 10in. wide, and 5ft. 9in. high, it is very well cut, the roof is curved a little, and it runs nearly straight to the cistern, falling about 2 (?) ft. in its length; about midway it is blocked up by a masonry wall, 3ft. thick, and composed of cut stones set in a hard black mortar, apparently mixed with oil. The lower aqueduct starts from the same level as the bottom of the high passage. It is only about 3½ft.

high (apparent), and the top is about 6ft. below the bottom of upper aqueduct; for some distance it runs immediately under the upper one, and then, with some winding, comes out to its west by 6ft. : just before it enters the cistern, it opens into a natural cleft in the rock, which appears to be part of the original cavern. This cleft is nearly perpendicular, and is about 4ft. wide, and over 15ft. high. Corporal M'Kenzie went up it 48ft. to north-west, it then gets too narrow to be followed up.

The rock throughout is a hard mezzeh, and the passages appear to have been cut out with the chisel. The surface of the rock appears to be not less than 70ft. above the aqueduct.

This tunnel, as we have now examined it, extends from near Bir Eyub, to a point 1800ft. down the Kedron Valley: it has been judiciously cut under one side (the west side) of the valley, so that though it is from 70 to 90ft. under the surface of the rock, yet the staircases being commenced to the east (nearer the bottom of the valley), have not to descend by more than 40 to 50ft. : in the 1,800ft. we have cleared out, 7 staircases have been exposed: they are about 3ft. wide, and descend at about an angle of 35°. The steps are about 1ft. in height, and the tread is about 15in. : in some cases the steps are much worn and broken. At the bottom of some of the staircases, the aqueduct is deepened a little so as to form a shallow pool.

In one place, between the third and fourth staircase, there is a branch tunnel leading across towards the east side of the valley in a south-east direction: this was only followed for 30ft.

It is apparent that this aqueduct was of considerable importance, for the labour in cutting it so far below the surface must have been enormous. That it was for water I think there can be no doubt, and probably for pure water.

The cistern we have just found is similar in its construction to those found under Robinson's Arch, and the aqueduct altogether has the same appearance as the rock-cut aqueduct found there; the staircases, too, may have originally been used for bringing up the chippings, but they appeared to be very much worn, as if they had been in constant use.

We have not as yet found there is any connection with Bir Eyub, and if we do find any, it will probably be a communication by which the water from the aqueduct flows into it, and cut at a later period; neither is there any appearance of its being connected with the Virgin's Fount Aqueduct, for they differ in height and width, the tunnel we have found being nearly twice as wide and very much higher; also the Virgin's Fount Aqueduct winds very much more than this one, and there are shafts instead of staircases.

It would be a most important point to establish the direction from whence this great aqueduct comes; at present we do not know whether it comes down the Kedron Valley, the Tyropeon, or by the valley from the Jaffa Gate.

It is currently reported in the city that a Jewish blacksmith descended

Bir Eyub a few years ago, when it was dry, and found a passage at bottom from whence a strong wind was blowing. However this may be, it is evident that the man has some curious tradition about the place, as he has been trying to buy the land over where we have lately found the grotto, and the fellahin of Siloam say they refused twelve napoleons for it. This man sent a messenger a short time ago to ask if we were going on with the clearing out of the great aqueduct, and to say that if so he intended to raise the money to continue our work.

21st December, 1869.

In continuing our work a staircase at angle of about 45°, and 90ft. up it, has been found. The top is walled up with masonry: near the top another staircase leads off towards Bir Eyub, branching into two. The rains have suddenly set in, and if Bir Eyub overflows, this work will have to be stopped for the present.

N.B. It has been stated that the bottom of the cistern or grotto is 9ft. below bottom of outflow aqueduct, but 9ft. is the depth to which we have sunk. The water in the cistern prevents our sinking deeper, and the jumper cannot be driven on account of the large stones met with.

21st December, 1869.

*Weights.*—A stone weight, which was found during the past few months at Robinson's Arch, has characters on it supposed to be Hebrew.

Mr. Ganneau thinks that on one side they refer to the weight, viz., five shekels.

The exact weight is 1,234½ grains troy, which would give 247 grains to the shekel. I send a squeeze of the stone and also a sketch of the characters. It would be interesting to get these deciphered.\*

You have now a great number of stone-weights from the excavations, and I have to suggest that they should be accurately weighed, their original weights estimated, and some notes made upon them.

The stone in question is of the kind classed A in the list sent home in January.

21st December, 1869.

*The Gennath Gate (so-called).*—An account of this is given in Letter XXXVII., 1st February, 1869.

The jambs of the gate do not rest on the rock, but on made earth mixed with pottery similar to what we found at lowest point south-east angle of Haram Area. The rock we found at a level of 2,49ft., the old

\* Nabathean Inscription.—This squeeze was brought me by an Adwan. He says he took it from a stone at Uni-el Russas, to the east of the Dead Sea.

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roadway going under the gate being 2,474½ft., and the surface of ground at mouth of shaft 2,486ft.

No walls of any kind were found near the rock, and no signs of any wall older than the Gennath Gate within 13ft. to the east and 20ft. to the south; if the first wall of the city was built up from the rock and was not totally destroyed, it was not within the above-mentioned distance of this gate.

*20th December, 1869.*

B 6. Commenced this shaft 19th May, 1869, at the side of the street El Wad, close to the "Bath of the Sultan" (see Ordnance Survey Plan  $\frac{1}{25000}$ , 27): level at surface 2,418ft.

Passed through black soil mixed with large rough stones: came on rock at 17½ft.: it shelves down rapidly to west-south-west at about 45° by steps 2ft. 6in. high. Drove a gallery in to west for the purpose of discovering the lowest parts of the valley: found the soil very hard and mixed with large stones. At 5ft. 6in. broke into a passage or old sewer running north and south, apparently down the street El Wad, which runs from the Damascus Gate to the Mahkama. This passage is of rough stones: it is 4ft. 9in. high and 2ft. wide, and has a slope to south of about one in six; the bottom is the natural rock; the roof is formed of stones, about 14in. in breadth, laid across from wall to wall.

Continued gallery to west; rock still falling. At 17ft. broke into a masonry shaft (plastered), about 4ft. square, leading down towards the rock. On climbing up this shaft 7ft. drain was found opening into it from north to south; cleared the shaft out and descended: found the rock scarped to south and east of shaft, and found rock bottom at 15ft. below our gallery: the rock bottom is cut level: level of rock 2,378ft.

It is probable that this place was an old cistern, the scarps facing to the north and west being the sides. The soil passed through here was wet mud mixed with stones. Shaft now tamped up; and the first passage found was examined to south.

This passage runs down under the street El Wad. At first the soil was like silt or clay; but, after 50ft. or 60ft., it became like sand left by a running stream: it was quite filled up. After continuing the passage for 130ft. to south under the street El Wad, it was tamped up.

Three shafts leading down into this passage were passed; the first at 16ft. south of one shaft: it is circular, 2ft. in diameter, and is closed by a flat stone at 8ft. 3in. from top of passage: the second at 62ft. from entrance, is 1ft. 8in. square, and covered by flat stone at 5ft. 3in. from roof of passage: the third at 76ft., and connected a drain from the east with the main drain. It does not seem certain whether this passage had originally been for water or for a sewer. It does not appear to have been used for many years.

Although we did not find the natural course of this valley, yet I am

inclined to think that the passage we first found runs nearly along it, and the street El Wad defines it. The scarped rock we found may have been for other purposes, but I think it probably is inside of a cistern cut in the rock. It was a peculiar arrangement to have had a sewer running in from both north and south if this had not been a tank. The gallery to west was not continued on account of our having reached nearly to the west side of the street.

*South-east Angle Haram Area.*—The frames had become quite rotten in the galleries at this shaft. Many of them had to be left in; and, in tamping up the upper gallery, so many had given way, that it was necessary to fix a smaller set of frames inside the larger ones before the tamping up could be effected with safety. These galleries have already been described.

In tamping them up, a gallery was driven down to east, along the surface of the rock, so as to complete the section of the rock down to the Kedron Valley.

The rock is found to be nearly level in front of the east wall for 10ft.: it then rapidly slopes down the 24ft. in 30ft. As the section of rock thus found is nearly at the same angle, and in the line of the section coming up from the Kedron, it was not considered necessary to continue this gallery.

*Jerusalem, 13th Dec., 1869.*

*Roofs of Houses at Jerusalem.*—In the rock-cut aqueduct under Robinson's Arch, a stone roller was found, the object of which was not at first apparent.

On seeing the rollers for the flat roofs in the Lebanon, Corporal McKenzie suggested that our roller had been used for the same purpose, and on examination I found it to be similar in its shape and proportions, and have little doubt that it was formerly used in Jerusalem for rolling the flat roof of a house.

The houses of Jerusalem now, as is well known, have vaulted or ground roofs of masonry, and it would be a matter of considerable interest to ascertain when they first came into use.

In the Old Testament we find the roofs to have been generally flat, both in Jerusalem and elsewhere. Deut. xii. 8; Josh. ii. 6; Judg. xvi. 27; 1 Sam. ix. 25; 2 Sam. xi. 2; xvi. 22; xviii. 24; Jer. xix. 13; Zeph. i. 5.

In the New Testament the roofs are often spoken of as being flat, although we do not hear much about those at Jerusalem.

It is, however, to be observed that many of the vaulted roofs of the present day at Jerusalem are nearly flat, so that the mere fact of a roof having been flat, and used for walking on, is no proof that it was not vaulted and of masonry; but it is difficult to conceive why people

should go to the expense of building dismal dungeons with vaulted roofs, so long as there was still timber in the land: rather we should suppose that the present masonry roofs came in from necessity, when there was no wood obtainable. At what period that happened it is difficult to say; we know after the destruction of Jerusalem by Titus that the woods immediately surrounding the city had ceased to exist, but there might still have been plenty of timber at a greater distance, and that there were at one time great forests in Palestine cannot be doubted, for at the present day we obtain our fire-wood in this city from the roots of trees long since disappeared, dug up by the fellahin in the neighbourhood.

The stone roller we have found shows that at least one house in Jerusalem was roofed in the same style as houses at the present day are in the Lebanon and in those parts of Palestine where wood is obtainable, and this is more particularly interesting as the roof of Herod's Temple is said by Dr. Lightfoot (on the strength of the Talmud) to have been nearly flat and to have been composed of plaster formed of reeds, chalk, stones, &c., made so compact as to be like stone; if this be so, either the art of making concrete roofs permanently water tight has been lost to this country, or else the roof of the temple must have been rolled, or pointed and repaired periodically, and so the sharp points with which Josephus adorns the roof, for the purpose of pricking the feet of the passing birds, would have necessarily been of a movable nature, possibly like "crows' feet" (iron spikes used in warfare for throwing into fords, &c., in order to retard the approach of an enemy).

Another point of interest relating to vaulted roofs is the amount of *débris* that would result from their destruction.

The house I am at present sitting in (of two storeys) if destroyed and the ruins smoothed over the site would give a general height of *débris* of 14ft., while if it had been a house with a wooden roof covered with concrete, the height of *débris* would not have been more than 6ft.

In repeated destructions this difference would be very great. There is, however, one advantage that these vaulted houses have; they cannot be burned down, and would have to be regularly battered down before they could be destroyed, so that cities like Jerusalem might last through a siege of former days with little damage, while one like Beyrout would be burnt down, and this might possibly have been a reason in unsettled times for building the houses entirely of stone. Against this one advantage of the vaulted roofs stand a host of disadvantages, aggravated by the vile method of construction practised by the native architects of this city.

Instead of adopting the Spanish *patio* (which is a courtyard inside a house, and can be made of such a size as to be covered with a cloth in summer and with glass in winter, and so keep the house at even temperature), they construct a series of isolated rooms round a large courtyard, with narrow and steep stairs leading to the exposed gallery open-

ing into the rooms on the upper floor; the result is that in going from one room to another an umbrella is generally useful against the sun in summer, the rain and snow in winter, or a great-coat is wanted to keep off the wind. The vaults are damp, and require a fire—light a stove in one room and it becomes in a few minutes like an oven, while the others by the contrast are rendered to the senses still more damp and disagreeable.

The vaults appear to be permanently damp, and many of them acquire a nasty unhealthy smell after they have been shut up a short time; perhaps this may result from a common habit of ascertaining the faulty parts of the roof by letting the first rains fall on it, and then looking to see where it shows the damp inside.

*December 22, 1869.*

K. 1. Commenced 3rd July, 1869. A trench was dug in front of the core of an old wall appearing above the surface of ground just outside the city wall, north of Kalât al Jalud. Rock was found at 4ft., and between it and the core of the wall is a space of about 2ft., probably where the cut stone rested. The rock was examined for a distance of 20ft., but no appearance of any old foundations.

K. 2 commenced same day, in Greek garden outside city wall to north-west, a little north of Latin Patriarch's Palace, where a core of a wall crops up on surface; rock was found at 4ft., the core resting on it with a space in front where the cut stone had been; rock scarped in front; followed it down and found it bevelled at bottom at 12ft. below surface; no signs of any old foundations.

At the Sisters of Zion, in excavating to the east a prolongation of the scarped rock to the north-east has been found for about 30ft.

M. Gauman has discovered two Roman inscriptions in the city, one on the wall south side of church of the Holy Sepulchre, the other on the north city wall near the Bab es Zahire; we have assisted him in getting squeezes and casts of them, and he will probably publish them when they are ready.

I send you thirty-one traces of inscriptions found near Saida, which M. Draghello, the French vice-consul, asked me to copy and forward to the Society.

*Certainty of a Valley running from near Jaffa Gate to Bab es Silsile.*—During the past year many tanks have been examined in the city, and the level of surface of rock ascertained from them, so that we have now an approximate contour plan showing the surface of rock in the city.

In this work much time has been unavoidably expended, for at each tank there are petty difficulties, and in many cases even the silver key fails to unlock them if it is not used carefully.

When they are seen the greater part of them either lie on the rock or are else so plastered that the rock cannot be seen.

One result, however, is the certainty of a valley running down from the Jaffa Gate to the Bab es Silsile, apparently just as is shown on the Ordnance Survey plan, ١٤٦٧٧.

*Shaft at Golden Gate.*—The galleries in this shaft have now been tamped up; the tank referred to in Letter XL. was examined; it is 5ft. 4in. long and 2ft. 2in. broad, plastered on inside, and has a flat stone for roof. It is about 5ft. high; apparently it was for holding water; a cylindrical tile was lying near it. Within a few feet of this we found the ring cut in the scarped rock, apparently for tying up cattle; similar rings are found in the substructions of the Haram Area, and in the cavern described Letter XXXVII., also in the substructions at Baalbec.

*The Copper Candlestick found south of the Haram Area in Cavern (Letter XXXVII., 1st Feb., 1869).*—I have seen three lamp-holders at the house of a gentleman at Beyrout, which appear to be almost exactly similar to the one we have found; on each of these a copper lamp fits on to the spike at top. Two of them are supposed to be early Christian, and one Greek, or Greco-Phœnician.

22nd November, 1869.

*North-east Angle continued.*—The gallery has been driven 40ft. to south of southern angle of the north-east tower, and a shaft sunk facing five courses of the wall.

In each course the faces of the stones are found to project from 6in. to 12in., so that it may be said that it is highly probable that the Haram Wall at this end is, from the present surface to the rock (over 110ft.), composed of stones with well-dressed marginal drafts, and with faces projecting considerably; while the tower forming part of the wall is composed of stones with projecting faces up to a certain height, and after that with the well-known type of bevelled stones.

*The Valley of Hinnom.*—In my remarks on the topography of Jerusalem, June 6, 1869, I suggested that the Valley of the Kedron and that of Hinnom, or "the child of Hinnom," are identical.

In support of this there is the present name to this valley to the east of the Haram Area, which existed at the time of Niz-ed-Deir, viz., Wady Gehinnom. And there is a verse in the book of the prophet Jeremiah xix. 11, "Go forth into the valley of the son of Hinnom, which is by the entry of the East Gate."

I can find nothing in support of its having been on the west side of Jerusalem, or identical with the Wady Rebebi.

TEMPERATURE (FAHRENHEIT) OF SPRINGS ON EAST SIDE OF JORDAN.

Date.	Name.	Temperature.	Remarks.	Height in feet above N. S. L. Mediterranean.
	Ain Suweimeh	{ 80° 0'	Summer of 1867 } Winter of 1868 }	1080
		{ 82 0		
July 19, 1867	{ South of Kaferein, near Wady Mashâideh hot spring	{ 95 5	nearly stagnant ...	580
July 22, 1867	Ain Hesbân	68 4		2360
July 22, 1867	Ain Buwarideh	73 0		1720
July 23, 1867	Ayûn Mûsa	{ upper	73 0	1690
		{ lower	74 0	1590
July 24, 1867	Ain Nâûr	64 5		2430
July 28, 1867	Ain Amman	64 0		2550
August 3, 1867	Ain Seir	64 7		2230
August 5, 1867	Ain Saffit	68 0		2700
August 5, 1867	Ain Hemar	63 0		3000
August 5, 1867	Water in Wady az Zarka	73 5		770
August 7, 1867	Ain Jarash	67 0		1900
August 9, 1867	Ain Keltch	67 5		2265
August 10, 1867	Ain Alan	67 5		1900
August 13, 1867	Ain Jadûr	67 5		2380
August 14, 1867	Ain Jaryah	81 0		400
February, 1868	Callirhoa	scalding.		300

  

ON WEST OF JORDAN AND DEAD SEA.				
July 18, 1867	Ain as Sultân	71 5	} two of them	730
August 14, 1867	Ain Hajlâ	75 0		1200
February 29, 1868	Ain Sakut (Succoth)	{ 79 9	}	640
July 7, 1867	Ain Jidy	{ 78 0		
		82 5		

It will be observed that to a certain extent the heat of these springs diminishes with the altitude; the temperature of air is not given because it could not have affected the water at the head of the spring, and such is the velocity with which the water issues that the temperature of the ground on *surface* is not likely materially to affect them; these figures probably give an approximate idea of the temperature of the rocks *beneath the surface* at the different altitudes.

## PHOTOGRAPHS.

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The Committee will be glad to appoint more agents, and take this opportunity of drawing the attention of their subscribers to the photographs as a means of helping the Society. The photographs are the cheapest series published of the Holy Land. Very many are of places never before taken, and are of great interest. The terms of agency are so arranged that the agent runs no risk whatever beyond the safe custody of the views. It is particularly requested that agents will send in a statement of accounts to the Secretary before December 31 and June 30, for views supplied and sold during the preceding six months. It is also requested that if agents find a delay of more than a fortnight between the despatch of an order and its execution, they will state the facts to the Secretary.

List of photographs may be had on application.

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