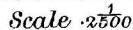


With approximate Rock Contours.



THE TYROPŒON VALLEY.

THE accompanying plan, embracing part of the city of Jerusalem, between Christian Street on the west and Valley Street on the east, and between the slope of Sion south of David Street on the south and the Via Dolorosa on the north, has been constructed with a view of showing how the observations of the levels of the rock beneath the surface may be used for the purpose of obtaining general results serving to elucidate the ancient topography of the city.

The plan includes 56 actual observations of the rock, and is fairly representative of the kind of information obtained throughout Jerusalem, as the known points in other parts are, if anything, more numerous in comparison with the area—excepting always the ground immediately west of the Haram, where few measurements have been made—as appears on the plan published in the last *Quarterly Statement*.

The area in the present plan has, however, been selected because the accumulation of *débris* in this part of the city is greater than in almost any other part within the modern walls; and for this reason the observations of the rock have here given results of more importance than in other quarters of Jerusalem. By glancing the eye along the surface contour No. 2449, and then along the rock contour No. 2450, and observing the wide divergence between them, it is at once evident that a great alteration has taken place in the outline of the ground.

The only method by which general results can be obtained from isolated observations of level is by the use of contours, or lines of equal level, the tracing of which indicates the relative positions of the features of the ground. By this method Colonel Wilson has delineated the supposed outline of the present surface beneath the houses of the modern city; and Colonel Warren has employed the same principle in his plan of rock surface in the Haram Area. In the case of the present surface the number of observations is of course considerably larger than it has been as yet possible to obtain by soundings of the rock, taken in deep excavations, or under the foundations of houses, or in cistern mouths. The surface contours are consequently more accurately traced, but all contours are by nature merely approximations to actual surfaces, answering to the lines which in section may be drawn to indicate the supposed lie of the rock between known points.

It is not, however, on the known levels of the rock alone that the contours depend in the case of the present plan. They are controlled by two other considerations. In the first place by the surface levels and contours, for it is evident that the rock level must never be higher than the surface contour, except in cases where the rock is visible above the general surface. In the second place, the level of the floor of various vaults and cellars being known, it is practically almost certain that the rock in their vicinity does not occur at a level higher than that of these floors. These negative observations are often very useful in determining

the *superior* limit for the rock level, though they do not of course give an *inferior* limit.

In order more clearly to show the manner in which the contours may be traced, it may be useful to follow one line across the plan. The contour 2,450 feet above the sea may be taken as a good specimen, and is, in fact, the master contour of Jerusalem, running through the heart of the city from the north-east to the south-west angle.

This contour first appears on the present plan in the north-east corner, where a vertical scarp 20 feet high runs parallel to the Via Dolorosa on the north side of the street. Behind the Austrian Hospice there is a steep slope (from which we may fairly suppose the rock to be close to the surface), and the surface contour 2449 limits the deviation of our rock line on the south; all the ground farther south being here not more than 2,339 feet above the sea. On the north an observation occurs about 200 feet from the rock contour at a level 2477, thus confining the contour 2450 within a limit of about 70 feet north and south. As, however, the surface slope is much gentler to the north, the limit of deviation is probably in reality less.

The rock contour 2450 reappears on the west side of the valley which runs down south-east from the Damascus Gate, the bed of which has an accumulation of some 40 feet of *débris* above it. We have here three observations in a line east and west, showing an even fall of the rock of 36 feet in 150 feet. The farthest east of the three observations has a level 2453, thus limiting the position of our contour on the west, while on the east the surface contour 2449 occurs at a distance about 100 feet from our rock line, and an observation (2402) of the rock is obtained 10 yards east again.

These data practically limit the deviation of the rock contour 2450 at this point within about 20 feet east or west, and its direction southwards is controlled between the surface contour on the east and the observations (2455 and 2454) near the Via Dolorosa on the west.

Proceeding southwards to the street called '*Akabet et Takîyeh*' (the next parallel to the Via Dolorosa) we find that the surface contour 2449 curves outwards to the east, and that an observation (2444) west of *et Takîyeh* shows rock above the ground. The rock contour therefore cannot here be far away from the surface contour, and its approximate direction is obtained by joining the point 2444 with the point 2477 at the top of the above-mentioned street, where also the rock is visible on the surface for a short distance; by dividing this distance of 350 feet proportionally (in the ratio 27 to 33) we obtain the point through which the contour should pass.

The next observation, in the street south of the last, agrees with the preceding determination. The rock contour is here confined between the observation 2457 on the west and the surface contour 2449 on the east—an extreme limit of 100 feet; and on the supposition of an uniform slope the limit of deviation is not greater than about 30 feet at most.

Within 50 yards of the last point the line of the contour, which here begins to deviate considerably from that of the surface contour, is fixed within a limit of about 20 feet—passing between two observations of the rock, 2470 on the north, and 2440 on the south, at a distance apart of about 100 feet. A section of the hillside, extending over a length of 200 feet, is here obtained by aid of the observed lie of the rock in a great cistern discovered in 1876, showing a uniform slope of about 1 in 5, and defining in a satisfactory manner the northern bank of the great valley now hidden beneath 50 feet of rubbish.

The rock contour 2450 now enters the area of the *Muristân* (the old Hospital of St. John), the surface of which, before the excavations undertaken by order of the German Government had been commenced, was an open field at a level about 2480 feet above the sea. The first observation (2438) gives the level of the rock under the south wall of the Church of St. Marie la Grande, where a rock-cut tomb (of Crusading date) was found in 1872. The next (2462), about 100 yards farther west, shows rock 15 feet below the surface. In connection with these we must take the observations close to the Holy Sepulchre Church, where, 'in the vaults of the southern courtyard, the rock is found 15 feet from the surface (2458). Under the belfry (2473) it is only 7 feet from the surface, and in Mount Calvary it is about 10 feet above the floor of the church (2490). From these and the other neighbouring observations it is clear that the church stands on the hilltop, and that the ground falls rapidly south of it. The contour which we are tracing therefore runs between the Holy Sepulchre Church and the south wall of St. Marie la Grande; and on the supposition of a uniform slope its position is limited to narrow bounds, as the slope is about 1 in 4.

It now becomes evident that the contour must again turn south, as there is an observation near the south-west angle of the *Muristân* of 2478, while all the observations farther west are at yet higher levels. The ancient Byzantine Chapel discovered in 1840 at the corner of Christian Street and David Street, has its floor 25 feet beneath the surface, and the level of the rock seems thus to be about 2470 in this place. On the east our contour is limited by the level of the rock in the magnificent tanks excavated in 1872-3, where the bed of the valley was laid bare to the rock at a depth of 50 feet below the surface. The rock was here found to be stepped down eastwards with a gentle fall, the mean level of the part measured being 2429.

Crossing David Street we obtain further indication of the rock levels. The two ancient towers, which are now built into the cistern of the Jewish Mission School, have their bases about 35 feet below the street. East of Dr. Chaplin's house there are also vaults below the street level, and at this point Colonel Warren obtained an observation (2449) at a depth of 34 feet beneath the surface, under the so-called Gennath Gate. The ground at the present day falls northwards from Dr. Chaplin's house to David Street at a slope of about 1 in 14; but the fall of the rock

from the so-called Gennath Gate to the great cistern in the Muristân is at a slope of 1 in 10.

Following our contour eastwards from the last point (2449) we find it controlled by another level (2457), where the thickness of *débris* is only 12 feet. The last point is 400 feet from the preceding, and between them the line is not well defined; but immediately east of the point 2457 we find the contour line almost absolutely fixed, the surface contour again approaching it, while four observations, at levels differing by nearly 50 feet, occur so close together as to give evidence of the existence of a precipitous slope or rocky scarp, which runs southwards until it becomes visible as a cliff some 20 feet high, facing the Haram opposite the south-west angle.

From the detailed account of this important contour the reader will be able to judge the manner in which the other lines of level have been traced. The general results may, however, be perhaps more clearly explained by means of sections of the ground. Three sections are accordingly given, one through the hill spur (east and west), a second along the valley bed (east and west), and a third across the valley and hill (north and south).

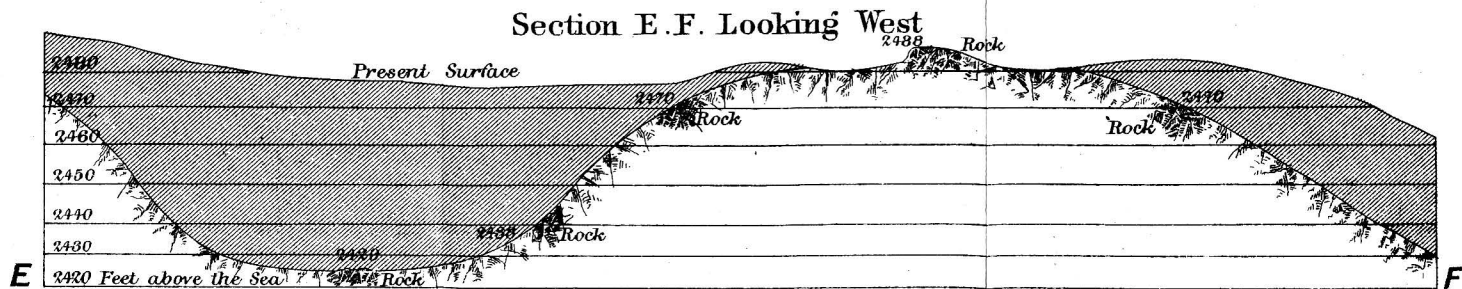
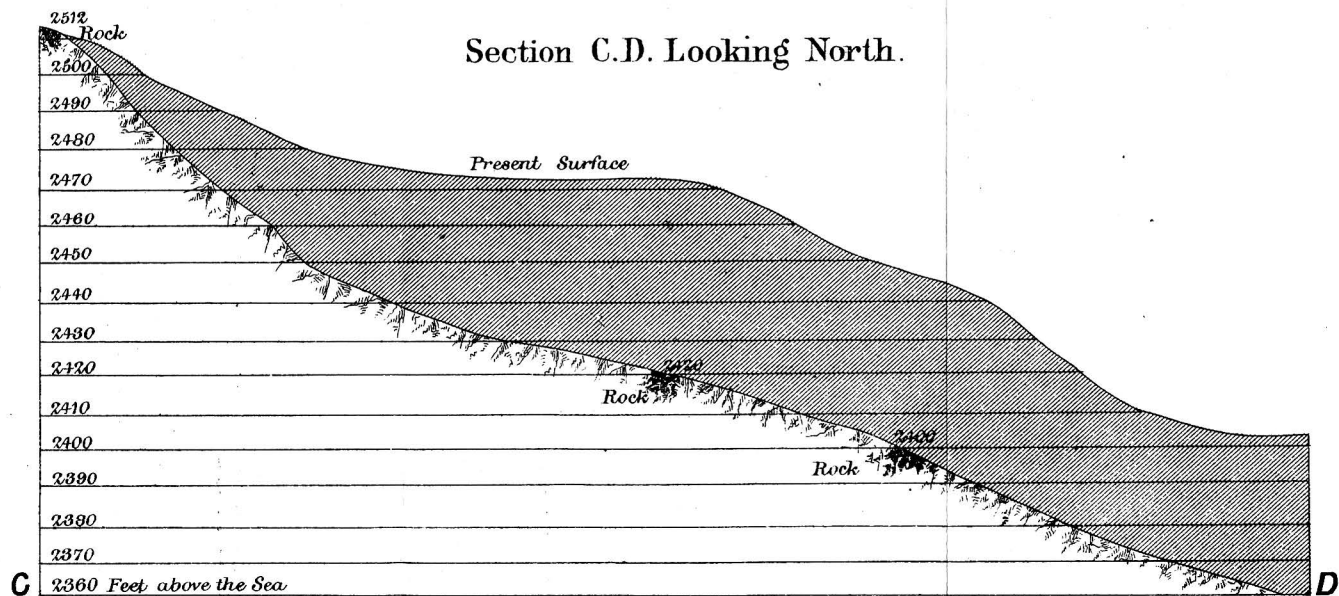
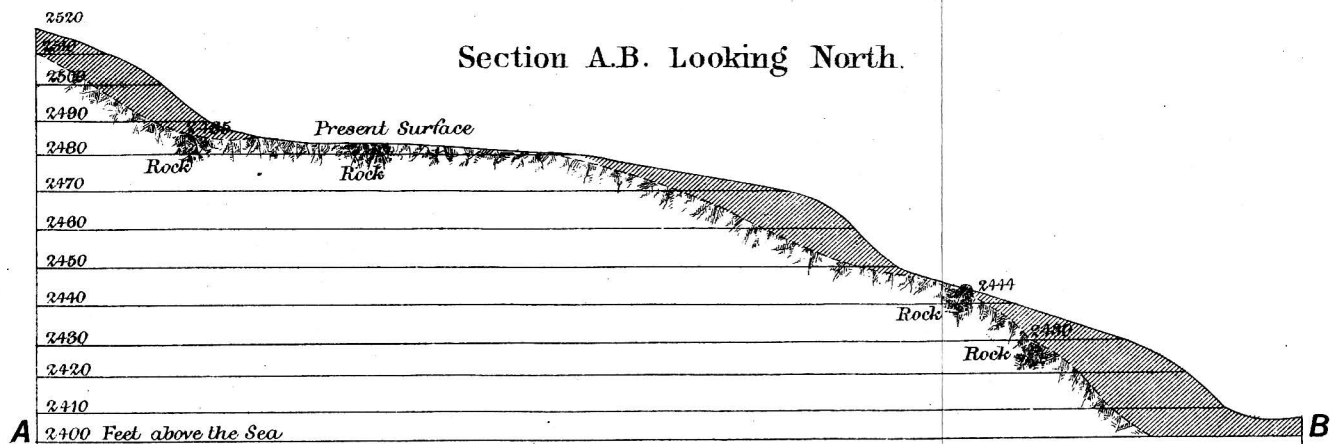
From these it will be evident that there is only a very small accumulation of *débris* on the hilltop, while the valley bed has been filled up nearly to a level with the higher ground, or to a depth of 50 feet in the middle.

The surface outline in these sections is traced in accordance with the contours given on the Ordnance Survey; and, with regard to the rock outline, it should be noted that the line depends not only on the points marked *Rock*, where observations occur on the cutting line, but also on other intermediate observations near the cutting line, and thus on the rock contours of the plan.

Before the year 1872 scarcely anything definite was known with regard to the lie of the rock in the great valley delineated on the present plan. Colonel Warren excavated in the Muristân to a depth of 40 feet without finding rock. The contours show that it existed at probably 4 or 5 feet on the average beneath his trench. The small plan which he constructed (see "Recovery of Jerusalem," p. 303) shows the contour 2450 running approximately as it is now traced, but the great breadth of the valley was not as yet fully appreciated.

In 1872 the great cistern in the south-east portion of the Muristân was excavated, and the bed of the valley laid bare. In 1876 the discovery of another tank north-east of the Bazaars gave a valuable confirmation to the correctness of the contour lines previously traced; and although further observations would be of great interest, the main fact of the existence of a valley some 10 feet deep and 800 feet wide (north and south) may now be considered definitely proved.

It is interesting to compare our present information with the discussions of earlier writers by whom it would have been considered invaluable. In 1838 Dr. Robinson described the Tyropœon Valley as



commencing near the Jaffa Gate, and pointed out the fact that there was a descent northwards to David Street from the so-called Mount Sion ("Bib. Res." ii. 264). In 1849 Canon Williams writes: "I never could find any traces of the valley Dr. Robinson calls the Tyropœon" ("Holy City," ii. 29). In answer to this Dr. Robinson was only able to point out the level of the old chapel of St. John 25 feet below the street ("Later Bib. Res." p. 185).

The earliest attempt to restore on the ground the city of Jerusalem as described by Josephus, is that of Brocardus, who, writing in 1283 A.D., says of the valley under consideration: "The ravine is now itself quite filled up, but nevertheless shows signs of its former concavity." Brocardus had visited Jerusalem, and possibly was aware of the existence of the great tanks subsequently filled up. His description at all events now proves to be absolutely correct.

By denying the existence of this valley it became possible for the apologists of the traditional site of the Holy Sepulchre so to draw the line of the second wall as to pass entirely clear of the church on the east. It can hardly be now supposed that the city wall can have crossed the bed of so deep and wide a valley, leaving ground at an elevation 80 feet higher and only 100 yards to the west, on the outside. The determination of the contour of the valley thus forces us to remove the line of the second wall farther west, where a saddle of higher ground forms the head of the great valley.

The tracing of the rock also throws light on the description which Josephus gives of the ancient city, which was rendered obscure by reason of the filling up of the valley.

Josephus (*5 Wars*, iv. 1) speaks of the Tyropœon Valley as dividing the hill Akra from that of the Upper City, and describes Akra (which was separated from the Temple Hill by another valley) as being "gibbous" in shape (*αμφάκυρος*), or like the moon in the fourth quarter. Nearly all authorities agree in placing Akra near the present Church of the Holy Sepulchre, and the gibbous shape of the spur on which that church stands is rendered conspicuous by the rock contours, but is not apparent from the surface contours. It will also be observed that a flat terrace is here formed with a steep slope on both the east and west (see Sect. A. B.), and it seems possible that this marks the artificial levelling of the Akra hill by the Hasmoneans, as twice described by Josephus.

The amount which would have been cut off supposing the original slope to have been uniform, is about 30 feet on the average, and if, as seems not improbable, there was here originally a knoll of higher ground, the amount cut down would have been yet greater.

The rock contours have been traced all over Jerusalem (as shown in the small plan published in "Tent Work in Palestine"), but with exception of the Haram Area there is no part of the city where the results of a study of the original surface appear to be so interesting and instructive.

C. R. C.