

This list contains 132 names. Out of about 620 topographical names mentioned in the Bible in Western Palestine, about 430 have now been identified (or about two-thirds). Out of these 430 a total of 132, as above shown (or about a third), are thus due to the Survey.

On the other hand, out of about 200 names of the places in the Sinaitic Desert, or in the country east of Jordan, 70 only are known, including the latest identifications of the American survey and of Lieutenant Conder (*Handbook to the Bible*), being a proportion of little over one-third. Many important sites, such as Mahanaim, Jabesh Gilead, &c., remain still to be recovered east of Jordan.

SUPPOSED CLIFF IN THE HARAM.

CONSIDERABLE importance has been attached to the question whether the rock on the western slope of the Temple Hill may be supposed to fall with an uniform slope, or whether beneath the surface and within the west wall of the Haram, a cliff exists hidden by the filling-in which forms the present interior plateau.

In discussing the paper which I had the honour to read to the Royal Institute of British Architects, on 2nd December, 1878 (see "*Transactions R.I.B.A.*," No. 3, p. 41), Mr. James Fergusson said :—

"So far as I can make out, and I believe I may state that Colonel Wilson entirely agrees with me in this : the rock rises gradually, though irregularly, from the valley of Jehoshaphat to a ridge terminating westwards in something very like a cliff, where I believe the tower of Antonia to have been, and just behind the Holy of Holies of the Temple where I place it."

This passage explains the reason why importance is held to attach to the question, for if no such cliff should exist, then the Temple as restored by Mr. Fergusson must have rested on foundations of great depth, or on vaults as yet undiscovered, and not described by any ancient author.

The difference of opinion as to this cliff is also shown in the plans published in the *Palestine Exploration Fund Quarterly Statement* for 1880, pp. 9 and 20, where Colonel Wilson shows the rock as rising much more rapidly than according to Colonel Warren's section would be the case.

As regards these plans it may be noted in passing that a slight misapprehension occurs in the Editor's note, p. 97, by which I am supposed to be responsible for the first-mentioned plan, and am said to differ from both of the above-mentioned authorities respecting the lie of the rock in this part of the Haram. My plan, constructed in 1873, was taken from Colonel Warren's "*Recovery of Jerusalem*," p. 298, so far as the contours within

the West Haram Wall are concerned, and any discrepancies in the lithograph would have been corrected had not the proof unfortunately failed to reach me before publication.

The main reason for supposing the existence of a cliff in this part of the mountain is a geological one. The strata beneath the Haram, as in other parts of Jerusalem and its vicinity, having a dip of about 10 degrees E.S.E., as described in the "Ordnance Survey Notes" (p. 3), so that a "crag and tail" formation, as it is termed, might be formed by the beds as exposed on the hill-sides; the "crag" or cliff being always on the west, and the "tail" or gentle slope on the east.

Cliffs, due to this position of the strata, occur towards the bottom of the western slope of Olivet, and are commonly found in Palestine in places where the hard crystalline lower beds are visible.

A closer inspection of the geological question seems to me, however, to be less favourable to the theory, and a few words are necessary to explain the problem more clearly.

The Mount of Olives consists mainly of soft chalky beds, the total thickness of which is given by Colonel Wilson at 291 feet, out of a height of some 400 feet from the present Kedron bed to the summit of the hill. The lower strata of the chalky beds are referred by L'Artet to the Upper Cretaceous Period, while near the summit of the mountain, separated by bands of flint, occur beds belonging to the Nummulitic or Middle Eocene period. Beneath the white chalk occurs a hard limestone, containing fossils and flints, with a total thickness of 71 feet; and beneath this, again, for a depth of 40 feet, the soft white Malaki beds, whence the best building stone is obtained; while, lower still, occurs the hard Dolomitic limestone, without flints or fossils, which extends lower than the Kedron bed.

According to these measurements the levels of the beds on the western slope of Olivet are as below:—

				Above the Sea.
Soft white chalk, bottom of bed	....	....	....	2,350
Fossiliferous limestone	....	....	....	2,279
Soft white limestone	....	....	....	2,239

On turning to the Ordnance Survey Map ($\frac{1}{25000}$), it will be observed that the level of the top of the cliffs in which the so-called Tombs of Absalom, St. James, etc., are cut, is shown as 2,235, or about the level of the junction between the hard underlying Dolomite and the soft chalky Malaki beds.

Above this level no cliffs occur. The Malaki has been worn by denudation to an even slope, and the soft chalk beds higher up the mountain present in the same manner an uniform slope instead of a cliff. The action of denudation has in short effaced the "crag and tail" formation which may have resulted from the original upheaval.

These observations may now be applied to the Temple Hill. The top formation within the Haram is the *Mezzeh* or fossiliferous limestone, and the cisterns are cut in the *Malaki* beneath it. Colonel Wilson describes the beds as dipping 15° N. and S., and about 10° E. and W. ("Ordnance Survey Notes," pp. 31-33). Near the north-west angle the *Mezzeh* beds have been removed to a depth of some 30 feet (compare Ordnance Survey Map and "Notes," p. 31). The *Sakhrāh* consists of *Mezzeh* (p. 34), and near Tanks 12, 13, 14, there is only one bed of *Mezzeh* above the *Malaki* (p. 31), the surface level being 2,406.

The *Mezzeh* and the *Malaki* both belong to the Neocomian series, and are conformable with one another. The thickness of the *Malaki* where covered by the harder stratum is therefore most probably the same on the Temple Hill as on Olivet, viz., 40 feet.

From these data may be constructed sections to a natural scale with the following result as to the levels of the beds on the west side of the Haram:—

East and west section, through Sakhrāh	East and west section at Prophet's Gate.
Bottom of <i>Mezzeh</i> , 2,435 ft. above sea	2,370 feet above sea.
Bottom of <i>Malaki</i> , 2,390	2,330 "
Thickness of Dolomite above valley bed	40 feet 10 feet

These sections depend on the levels of the *Sakhrāh* and the Tanks 12, 13, and 14; but if they were based on the observations in the north-west angle the level of the Dolomite junction with the *Malaki* would be made yet lower.

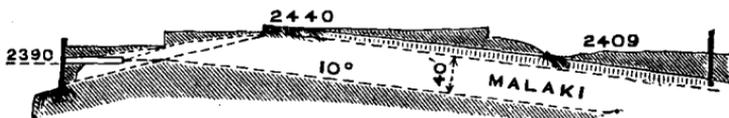
The levels near the *Bāb es Silsileh*, where Mr. Fergusson places *Antonia*, are as given below, on the same construction as the preceding:—

Bottom of <i>Mezzeh</i>	....	....	....	2,380 feet above sea.
Bottom of <i>Malaki</i>	....	....	....	2,340 "
Thickness of Dolomite above bottom of valley	....	....	....	10 feet

Now, as we know that the action of denudation on the *Malaki* and *Mezzeh* beds produces uniform slopes, and that cliffs are found only where the Dolomite comes to the surface—as observed on Olivet—we might expect a cliff near the base of the Haram Wall, and a gradual slope above it, where the soft chalky *Malaki* beds occur. The maximum height of the cliff would be only 40 feet (west of the *Sakhrāh*), its top being 50 feet below the Sacred Rock. But at the points where Mr. Fergusson places *Antonia* and the Holy of Holies, the cliffs would be apparently only 10 feet high, and their tops respectively 90 feet and 100 feet below the *Sakhrāh*. Thus if the dip of the strata is uniform, the mean height of cliff would be only about 20 feet, its top being 70 feet below the mean surface, and 100 feet below the *Sakhrāh*. The existence of such a cliff would consequently have little bearing on the question of foundations.

GEOLOGICAL SECTIONS THROUGH HARAM.

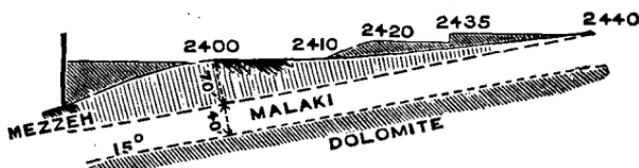
Natural Scale.



Section east and west through Sakhrāh.



Section east and west through Prophet's Gate.



Section due south from Sakhrāh.

Several indications may be noted as confirming this view with respect to the unseen portion of the Temple Hill.

1st. The tanks and galleries running in from the West Haram Wall, are lined with masonry, whereas, further east, where the rock is higher, they are simply cemented over the rough rock. This seems to indicate that the Western Tanks are not rock-cut, but only built in the made earth, and that the rock is consequently lower than the floors of these galleries.

2nd. It seems reasonable to suppose that had such a cliff as is conjectured to exist on the west side of the Haram actually occurred, the West Haram Wall would have been built upon it, rather than in the valley bed to the west of it.

3rd. Colonel Warren's shafts along the south wall indicate a gradual fall of the rock outside the Haram, and no cliff was found towards the west.

4th. In Tank No. 24 (the only one towards the west where a rock floor has been found), the rock falls westwards at an angle of 30° , which if continued would strike the level of the Tyropean bed within the West Haram Wall, without necessitating any cliff or steeper dip.

This curious question has perhaps attained to greater importance than really belongs to it, for the top of the supposed cliff, if it existed, would be at least 50 feet lower than the Sakhrāh, and 70 feet below the Barrack Scarp, but the problem has a controversial interest, and the objection briefly stated to the cliff theory is that the action of denudation on

soft chalky limestone would render the preservation of a cliff highly improbable.

Edinburgh, Oct. 20th, 1880.

C. R. C.

NOTE ON KADESH BARNEA.

THE recovery of the site of Kadesh Barnea is the most interesting question of the topography of the Sinaitic Desert, and any indication leading to a clearer understanding of the question will be of some value.

In the account of the southern boundary of Palestine (Numbers xxxiv, 4; Josh. xv, 3), this site is noticed next to the Maaleh Akrabbim, and the next points to the west are named Hezron and Adar, or according to the earlier passage Hazar Addar.

The Maaleh Akrabbim has been recognised to be some part of the ascent from the southern shores of the Dead Sea, towards the plateau of the Negeb, and although the name has not been recovered, the great feature called Wâdy Fikreh appears to answer to the "Ascent of Scorpions" (Maaleh Akrabbim) and to the later Acrabbatene (1 Macc. v, 12; Ant. 812 Ant. VIII), where Judas Maccabæus defeated the Idumeans.

It is curious that the identification of Hezron should have escaped even careful writers, but so far as I am aware, and so far as can be gathered from Mr. Grove's articles in Smith's "Dictionary to the Bible," this site has not been recognised as yet.

The name Hezron is derived from the same root with Hazor, signifying "an enclosure," and the Arabic equivalent is properly speaking *Hadîreh*, having the same meaning and spelt with the *Dad*, which is one of the two Arabic equivalents of the Hebrew *Tzadi*, represented by the *Z* in Hazor (more correctly *Khatzor*), the other equivalent being the Arabic *Sad*.

There are two cases in which the name Hazor is similarly preserved in Arabic, one being 'Ain Hadîreh, representing the Hazeroth (plural of Hazor) which was one of the Israelite camps (Num. xxxiii, 17); the other being the Royal Hazor of Galilee, the name of which still survives, as discovered by the Survey Party, in the present Merj Hadîreh, west of the Waters of Merom.

We should, therefore, expect Hezron to appear in modern Arabic under the form Hadîreh (plural Hadâîr), and on consulting the map it will be found that the prominent ridge north of the head of Wâdy Fikreh and west of the main route from Petra to Beersheba is called *Jebel Hadîreh*. (See Murray's Map, or the map opposite p. 238 of Conder's "Handbook to the Bible.")

If this identification be accepted, agreeing as it does very completely with the boundary line as usually laid down, then the site of Kadesh Barnea should be sought to the east of *Jebel Hadîreh*, probably on the main route which ascends by the well-known pass of the Nukb es Safa, which Robinson strove to show to have been the Zephath of Judges i, 17, and the Hormah of Deut. i, 44. It is, however, by no means certain that the Hormah ("destruction") of the latter passage, is the same place,