

Another proof that the south country was comparatively fertile in more recent times is, that on the Medeba Mosaic Map of Palestine, which was probably constructed towards the end of the sixth century A.D., there are shown a number of towns in the district, south of Beersheba—towns that have now ceased to exist.

Enough has been said to show the great interest of the proposed survey. The primary duty of the explorers will be to make an accurate map of the district, with its many hills and valleys, and then to record upon the map the position of all ruins of ancient towns, and of other archaeological remains, giving to each the name by which the site is known at present, in the same manner as was done in the case of the previous surveys carried out by the Palestine Exploration Fund. The work will be exploration, not excavation, and we may hope that it will lead to the identification of some, at all events, of the places mentioned in the Bible, and increase our understanding of the history of the Patriarchs and the Israelites.

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## THE DEAD SEA.

By SIR JOHN GRAY HILL.

IN the October number of the *Q.S.* Dr. Masterman gives a very interesting summary of the variations in the level of this strange lake from 1900 to 1913. As I think I was the first to call attention to the rise of its waters, in my article in the July number 1900, after which the measurements began, and as I watch the north part of the lake from my house on Mount Scopus every spring, and take a great interest in the subject, I should like to add something to what Dr. Masterman says.

It seems to me clear that not only has the Dead Sea risen considerably, on the whole, during the last hundred years, but that that period witnessed great variations in its level.

Irby and Mangles (ed. 1823, p. 459) state that in June, 1818, from the different bearings which they took and mention, they ascertained that the length, including the backwater (apparently at the south end), did not exceed thirty miles, which, if English, is about the length from the north end to the Lisan. The Duc de Luynes (see below) says: "Il n'y aurait rien d'improbable à ce

que la mer morte ait eu autre fois sa pointe méridionale à la presque île de la Lisan (Vol. 3, p. 257)."

Messrs. Moore and Beck in March, 1837, surveyed a great portion of the shores of the lake in a sailing-boat which they brought from Jaffa, but had to abandon their work on account of difficulties. They say: "the length of the sea is much less than is generally supposed" (*Journal of the Royal Geographical Society*, 1837, Vol. 7, p. 456).

Dr. Robinson, who appears to have made careful observations in 1838, states the length at 39 geographical miles which would be equal to about  $44\frac{1}{2}$  miles English, but adds that his own estimate founded on various data was about 50 miles (*Biblical Researches in Palestine*. Murray, 1891, Vol. 2, p. 217).

Lynch who made his survey in 1848 shows the length in his map as 40 miles English.

Van de Velde, who visited the Dead Sea in 1851-2, passed Jebel Usdum from north to south on March 30th, 1852. (Memoir, Original edition, p. 112.) His map shows a length of  $46\frac{1}{2}$  miles English.

De Sauley, who made a map in 1856, evidently gives a wrong scale to it at the foot, viz.,  $\frac{1}{2}$  inch to 5 miles instead of to 10; but, treating the latter as the correct scale, the length comes to  $46\frac{1}{2}$  miles.

The account of the Duc de Luynes, who passed twenty-one days and nights on the lake in a sailing vessel in March and the first days of April, 1864 (*Voyage à la Mer Morte*, published after his death in 1874 or 1875), says the lake is 40 "milles" (apparently geographical miles = 46 English miles) long, and that length, or little more, is shown on his map.<sup>1</sup> A photograph amongst his illustrations seems to show a strip of shore on the east side, north of the Arnon, which did not exist when I coasted along that side in February, 1897.

The P.E.F. Survey, made in 1878, which is confined to the north part of the lake, and Armstrong's Southern Survey, made about 1883, when combined give the length at 48 miles English.

Dr. G. Adam Smith, in *The Historical Geography of the Holy Land*, published in 1899 (p. 499), states that the Dead Sea occupies the fifty-three deepest miles of the Jordan valley, but he does not give any authority for this statement.

<sup>1</sup> Probably Van de Velde's map.

M. Berton, who in April, 1838, passed along the shore to the east of Jebel Usdum, going from north to south, speaking apparently of the narrowest part, says: "les montagnes viennent jusqu' au bord de la mer à peine a 80 metres" (*Bulletin de la Société de Géographie*, 1839).

Both Robinson's and Lynch's map show a wide beach to the east of the whole of Jebel Usdum, and so does the map of De Saulcy. Holman Hunt's picture of "The Scapegoat," which was painted in 1854, in front of the north end of Jebel Usdum (Preraphaelitism and the *P.R.B.*, Vol. I, p. 473), shows a very wide beach at that spot.

Poole, in 1855 (Report of a Journey in Palestine made in 1855, *Journal of Royal Geographical Society*, Vol. XXVI), after saying that, on November 2nd, he pitched tents in the *Plain* of Usdum, continues: "I walked down to the shore of the Dead Sea . . . Crystallised salt extended 40 yards in width from the water's edge, and the line of drift wood was 70 yards distant. We passed a hole where a camel had fallen through the encrusted sand which was about 60 feet above the present line of the sea." (Was not this part of the Jebel?) "November 5th. We rode to the cave of Usdum. At 10 a.m. we left Usdum and rode along the western shore (apparently to the north). I saw many trees standing in the Dead Sea from some distance from the shore in the bay." (? South bay. Would these be the trees marking the line of the old ford?)

November 5th. "We left Usdum and passed the cave . . . and rode south until we came to the end of Usdum." He then rode round the south end and came to the south side of the Lisan, and round it on the west side, and beyond, and returned round the south end of the lake to Jebel Usdum.

November 9th. He says, after reaching the north end of that mountain, "The sea had very sensibly receded from the shore since we were there, and I should think had lowered a foot in perpendicular height. We left at 10.15 a.m. and very soon afterwards had to leave the shore as the mountains came down directly into the sea and there was no beach to ride along. We had to travel along a very bad path about 200 feet above the level of the sea." Poole's map, however, seems to show a wide beach the whole way from Usdum to Engedi.

The Duc de Luynes visited the cave at Jebel Usdum on foot (Vol. I, p. 93).

Tristram passed east of Jebel Usdum in 1872 (*The Land of Moab*). My wife and I passed east of it in March, 1890, going from north to south, but could not do so going from south to north in March, 1895, or in April, 1897, because the water was up to the cliffs, and we had on both occasions to go to the west of that mountain. Libby and Hoskins could not pass it in March, 1903 (*The Jordan Valley and Petra*, Vol. 2, p. 303). The pictures and accounts given by Père Abel in his "Une Croisière autour de la Mer Morte" show that early in January, 1909, the water was up to the cliffs, but a note at p. 93 states: "En 1907, M. Benzinger a pu chevaucher trois quarts d'heure durant le long du versant oriental du Djebel Usdum en allant du nord au sud." From this I infer that M. Benzinger could not get past the south end of the Jebel. I supposed from *Palestine and its Transformation*, p. 108, that Prof. Huntingdon's party had passed it in May of the same year by the shore; but on communicating with that gentleman he informs me that they passed over the top of Usdum, or back of it, and that it was impossible to go along the shore.

The fact that a ford once existed between the west coast and the Lisan is mentioned by Irby and Mangles, who, in June, 1818, actually saw a caravan partly composed of donkeys, which, owing to their small height, could only have got through very shallow water, proceeding towards the ford (indicated by boughs of trees), and saw it again just after it had passed over (p. 454), and the report of the ford's former existence is mentioned by Robinson, Tristram, and others, but no one seems to have seen an actual use of this ford since the time of Irby and Mangles.<sup>1</sup>

Then, at the northern end of the lake, Lynch's map shows a little projecting headland connected with the shore by a peninsula. Van de Velde mentions seeing this peninsula in 1837 on May 4th (p. 712). Poole mentions this promontory and his map shows it. De Saulcy's map shows the headland as an island which was known as Rujm el-Bakhr, the connecting neck having disappeared by 1856, but the water above it was so shallow that De Saulcy rode along its ridge to the Rujm (Vol. 2, p. 33). His map also shows a considerable beach to the east of Jebel Usdum. Tyrwhitt Drake's report (P.E.F. *Q.S.*, 1874, p. 188) says: "The causeway which connects

<sup>1</sup> See Mr. Forder's account, *Q.S.*, 1910, pp. 112-114. His guide, when young, had crossed this ford; it is called by the local Arabs "im-gayta"—the short cut.

the Rujm el-Bakhr with the mainland has, according to the Arabs, been submerged for twelve or fifteen years."<sup>1</sup>

The Duc de Luynes speaks of the Rujm as "une petite île" (A 931) and his map shows it so. He says: "Elle est unie à la terre par une langue de gravier actuellement submergée sous environ 2 metres d'eau." The P.E.F. Survey also shows the Rujm as an island. Robinson's map on the other hand does not show the Rujm which must, therefore, have been covered in 1838. In an article by Captain Allen, R.N. (*R.G.S.J.*, Vol. 23, p. 166), he says: "From a fact observed by travellers in three consecutive years a salient part of the north shore is sometimes an island and sometimes peninsular, there is some reason for conjecturing that the point of equilibrium (*i.e.*, between the process of evaporation and the supposed rising of the bed of the lake) has been already reached." But the subsequent rise of the level of the water shows that this was not so. According to Frère Levin's *Guide Indicateur des Sanctuaires et Lieux Historiques de la Terre Sainte*, the Rujm disappeared in 1892. The contour of the shore at the north end has long ago changed and ceased to resemble that shown in the P.E.F. Survey. It curves to the north instead of to the south. See my article before referred to.

No doubt the rise and fall would affect the length of the lake chiefly at the south end, because the water there is very shallow, and the shore nearly flat. But Lynch's map shows depths of 1-3 fathoms at the ford and south of it, until near to the south end. He and those engaged with him, however, suffered so much from fever that possibly his soundings were not always correct.

A table of the rainfall in Jerusalem, 1845-1906, a period of 62 years, is given in *Palestine and its Transformation*. It varies from less than 400 millimetres to over 1000, but the changes in the first 31 years very nearly resemble those in the second 31 years. The rainfall, however, in Jerusalem may differ materially from that in the watershed of the Jordan and the Dead Sea.

It seems clear, however, that there has been on the whole a gradual but very considerable rise in the level of the lake during the last hundred years.

Burchard of Mount Sion (*Palestine Pilgrims Text Society*, p. 59), who wrote in the thirteenth century, says that the Dead Sea "measures six leagues in width from east to west" (the editor explains that

<sup>1</sup> In April, 1869, I saw the Rujm as an Island.—J.D.C.

Burchard's league means one hour's march on foot). "Its length from north to south, the Saracens told me, was five days' journey. It is always smoking and dark like Hell's chimney," and he places Kerak about midway on the east *shore*, whereas it is 3,355 feet above the lake to the south-east. At p. 60 he says: "some declare that Jordan does not mix its waters with that Sea, but that they are swallowed up by the earth before they reach it, but Saracens have told me that of a truth it both enters the sea and leaves the same, but shortly after leaving it is swallowed up in the earth."

It is probable from this fantastic account that Burchard never saw the Dead Sea near at hand. There is of course no smoke from it, and when the sky is bright its waters are of a lovely sapphire blue colour, as anyone can see from the Mount of Olives, or anywhere along the same ridge.

*Palestine and its Transformation* (p. 315) quotes from Clermont-Ganneau a remark of the pilgrim Daniel, a Russian, who visited the Holy Land in 1106-7. After having spoken of the Convent of St. John the Baptist, the Kasr el-Yahud of our day, and the place where Jesus was baptized in the Jordan, the pilgrim adds:

"The Jordan went to this place but seeing its Creator approach to receive baptism it left its bed and turned back affrighted. Formerly the sea of Sodom extended clear to the place of baptism; but to-day it is distant about 4 versts. The sea seeing the Lord enter into the midst, the waters of Jordan fled in terror and the Jordan drew back as the Prophet says."

This fable does not seem to add anything trustworthy upon the question of the length of the Dead Sea. In what Burchard says there appears to be an echo of this legend.

Apparently no reliance can be placed on the ancient accounts.

About prehistoric times there is of course nothing but scientific opinion to guide one, but that seems to show that the level of the lake was at some period very much higher than now. There appears to be no real evidence upon the subject in historic times previous to the year 1818.

Would it not be worth while for the P.E.F. to ascertain the present length by having bearings taken from some point whence the whole of the Dead Sea can be observed, say from Ras el-Feshkah, the pass of 'Ain Jidy, or Massada?

I understand that the motor boat in which Père Abel and his colleagues made this voyage no longer exists, and I know from

experience the difficulties of a voyage in a row-boat on such a stormy piece of water. The extreme heat in all but the winter months throws another great impediment in the way of exploration on the lake or its borders, but would not throw difficulties in the way of observations taken from a great height.

Still there are very cheap motor boats now to be had, and if a proper survey could be made in one the result would be very interesting. The east coast has never been fully surveyed. On both sides of the mouth of the Arnon the red sandstone precipices are very fine, the gorge at the mouth of that river being as grand as anything in Petra. The American Colony of Jerusalem have made a beautiful coloured photograph of it. But no one has succeeded in ascending it to any considerable distance.

Perhaps in view of the recent prospecting for oil on the shores of the lake more will soon be known about its waters and its east shore. Some day I believe the value of its waters, and of the waters of Calirrhoe on the east side, will make it a place of resort in the winter months for curative purposes. I have found the use of the Dead Sea water most invigorating. I get a supply at my house brought in old petroleum tins on donkey back, and use it somewhat diluted for my morning tub.

I am indebted to Mr. Crace, the Hon. Secretary of the P.E.F., for reference to several of the authorities above quoted.

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## THE DAMASCUS GATE, JERUSALEM.

By J. D. CRACE, F.S.A.

SEVERAL questions connected with this gate have been raised during the last few years: some, such as that of its occupying the same position as the gate of Roman times, have already been answered, the Roman gateway having been found at a considerable depth below the present structure.

But other questions were unsolved; as, for example, the actual depth of the original ground below the present roadway; the question whether an extensive northern suburb ever existed beyond the gate; and the question of the course of the water which is known to have entered the city near this point and to have flowed originally down the valley.