Theology on the Web.org.uk

Making Biblical Scholarship Accessible

If you find it of help to you and would like to support the ministry of Theology on the Web, please consider using the links below:

 https://www.buymeacoffee.com/theology

 https://patreon.com/theologyontheweb

PayPal https://paypal.me/robbradshaw

A table of contents for *Bibliotheca Sacra* can be found here:

ARTICLE I.

DEPRESSION OF THE DEAD SEA AND OF THE JORDAN VALLEY.

By E. Robinson, D. D., Professor at New York.

[THE following paper was drawn up in April, 1847; and was read before the New York Historical Society, at their meeting in June of the same year. In September following, a copy of it was transmitted to the Royal Geographical Society of London; but I am not informed, whether it has ever been brought to the notice of that Society.

In the meantime, the fact has been made known to the public through the newspapers, that Lieutenants Lynch and Dale of the U. S. Navy sailed in November, 1847, to join the squadron in the Mediterranean; having received permission from the government to make an excursion to the Dead Sea, in order to examine its remarkable phenomena, and also to survey its shores, as well as the whole valley of the Jordan. These gentlemen did me the honor to confer with me in respect to their plan; and the points of inquiry suggested in the present paper, among others, were in consequence brought to their notice. How far they will be able to carry out their plan, remains to be seen; but so far as they shall be permitted to proceed, the public have reason to expect a great accession of accurate and valuable information.—E. R.]

THE deep depression of the Dead Sea below the Mediterranean, appears never to have been suspected down to the time of its actual discovery; and no experiments were ever made to ascertain the true level, until March, 1837. At that time, Messrs. Moore and Beke, in attempting a survey of the Dead Sea, were led to examine the question of its comparative elevation, by means of some experiments on the boiling point of water. They were greatly surprised at the

results; which indicated a depression of about *five hundred* English feet.[1] A month later, in April of the same year, Schubert's observations with the barometer gave the depression at about *six hundred* (598.5) Paris feet.[2]

In the following year, 1838, two barometrical measurements were taken. That of Bertou, a French traveller, gave to the sea a depression of 406 metres, or 1332 feet English.[3] The other, by Russegger, a German, indicated 1319 Paris feet, equal to 1400 feet English.[4]

The results of similar barometrical measurements for the level of the lakes of Tiberias and the Hûleh by Schubert and Bertou, exhibited a still greater diversity. The former made the depression of the first lake to be *five hundred and thirty-five* Paris feet; only sixty-five feet less than his estimate of that of the Dead Sea. Yet he made the Jordan at the bridge near the Hûleh to be 350 Paris feet *above* the Mediterranean; a difference of 880 French feet in the distance of about five miles![5] Bertou, on the other hand, gave the depression of the Lake of Tiberias at 230.3 metres, or 756 feet English; being 577 feet less than his estimate of that of the Dead Sea; while that of the Hûleh, according to him, is about 18 feet; implying a fall of 737 feet in the same five miles.[6]

Such was the state of the question, when the Biblical Researches in Palestine were published, in 1841. The preceding results were so greatly at variance, as to be utterly inconsistent with each other; and seemed in some respects to be equally so with the rapidity of the streams and the nature of the country. I therefore ventured, in that work, to suggest, that "so great is the uncertainty of all such partial measurements and observations, (as evinced in the like case of the Caspian Sea,) that the question can never be solved with exactness, until the intervening country shall have been surveyed, and the relative level of the two seas trigonometrically ascertained."[7] Such a measurement was afterwards understood to have been accomplished during that very year, 1841, by Lieut. Symonds of the British Royal Engineers. A very slight notice of his results was laid before the

---

[1] Journ. of R. Geogr. Soc. 1837, p. 456. Ib. 1839, p. lxiv.

[2] Schubert's Reise, III. p. 87. The proportion of the French foot to the English is as 16 to 15.

[3] Bulletin de la Soc. de Geogr. Oct. 1839, p. 161.

[4] Berghaus Annalen. Feb. u. März, 1839, p. 432.

[5] Schubert's Reise, III. p. 231, 259. The distance is here reckoned from the bridge to the alluvial tract below.

[6] Bulletin de la Soc. de Geogr. Oct. 1839, p. 161, 146, 145.

[7] Bibl. Res. II. p. 222.

Royal Geographical Society of London at their meeting, Jan. 24th, 1842.[1]   One of the earliest accounts was published in this country in July, 1842, in the following extract of a letter from the Rev. Eli Smith to the writer, dated at Beirût, Feb. 7th, 1842.[2]

"I am happy to inform you that the altitude [depression] of the Dead Sea has been ascertained by exact trigonometrical measurement. Lieut. Symonds of the British Royal Engineers, surveyed the greater part of Judea and the region around the plain of Esdraelon; and while doing it, carried a double line of altitudes from the sea at Yâfa to Neby Samwîl, and thence another double line to the Dead Sea. He found the latter to be *thirteen hundred and thirty-seven* feet below the Mediterranean.   By similar observations he ascertained the Lake of Tiberias to be *eighty-four* feet below the Mediterranean.   These numbers he gave me himself; and at the same time showed me his calculations."   The same statement of the ascertained depression of the two lakes (1337 feet and 84 feet) was communicated by M. von Wildenbruch, the Prussian Consul-general at Beirût, to the Royal Geographical Society of Berlin, during the same year, and published by them in their Monthly Report.[3]

In May of the same year, 1842, the President of the Royal Geographical Society of London, William R. Hamilton, Esq., in his annual address delivered before the Society and afterwards published in their Journal,[4] entered into some details respecting the manner in which the survey had been performed; to which we shall have occasion hereafter to recur.   He also stated the results at 1311.9 English feet for the depression of the Dead Sea, and 828 feet for that of the Lake of Tiberias.   The same distinguished gentleman in his annual address of the following year [1843], and also in his address on delivering one of the gold medals of the Society to Lieut. Symonds, gives the exact numbers at 1312.2 feet for the Dead Sea, and 328.1 feet for the upper Lake.[5]   In commenting upon this difference of level between the two lakes, he makes the following remarks, which are worthy of grave consideration:[6]

"It cannot have escaped your notice, that there still remains to be executed in this part of the globe a very important and interesting operation, to account for the very great discrepancy of these figures. For it follows from these two ascertained levels, that there is a differ-

---

[1] Lond. Athenaeum, Jan. 29th, 1842.

[2] Bibl. Repository, June 1842; also in Biblioth. Sac. Feb. 1843, p. 16.

[3] Monatsbericht der Ges. für Erdk. zu Berlin, Jahrg. IV. p. 141, Nov. 1842.

[4] Journ. of the R. Geogr. Soc. 1842, p. lx, lxi.

[5] Ibid. 1843, p. xi, lxxiv.   [6] Ibid. p. lxxiv.

ence of nearly *one thousand feet* between the Lake of Tiberias and the Dead Sea, a distance in direct line of little more than one degree of latitude; which implies (the Jordan not being a meandering stream) a fall of more than *sixteen* feet in every mile of its course. This is in itself a very remarkable phenomenon, and calls for the early attention of travellers and geographers. The river has been frequently crossed, and is always noted as a rapid stream; but no cataracts or decided *rapids*, as such, have been observed; and no one has traced its banks from one of these points to the other."

It is the purpose of the present paper to draw attention to what Mr. Hamilton so justly calls "a very remarkable phenomenon;" and, by a reference to the ascertained fall of several other rivers in different parts of the globe, to present this phenomenon in its true light and proportions. The way will then be open to bring forward some considerations, which may seem to connect themselves with the result.

The immediate banks of the Jordan, as is said above, have never been fully traced between the two lakes; though travellers have passed along the whole length of the valley. Bertou in 1837 went from Tiberias to Jericho through the valley; and in 1844 the Rev. Eli Smith passed up from Jericho as far as to Wady el-Fâri'a north of the mountain called Kûrn es-Sûrtûbeh. A copy of his unpublished Journal is now in my hands. The river has been frequently crossed at various points; and indeed, from the Lake of Tiberias as far down as to Beisân, may be regarded as well known. Irby and Mangles crossed near that lake, and again further down on the route from Om Keis to Beisân; and both they and Bertou describe the river as there "winding extremely" and having little current.[1] Buckingham relates, that in crossing the river four or five miles south of the lake, the water was so deep that the horses had to swim for a few minutes; the current here " winding slowly over a sandy and pebbly bed at the rate of a mile and a half an hour."[2]

Just below Beisân is a ford, where Burckhardt crossed in July; and found the water three feet deep. He says the river is fordable in many places in summer; but during the rainy season the spots where it may be forded are few.[3] Irby and Mangles, crossing at the same ford on the 12th of March, remark that the water reached above the bellies of the horses; and that the current was here much swifter than in the part nearer the Lake of Tiberias.[4] The same travellers a

[1] Irby and Mangles' Travels, Lond. 1845, p. 91. Bulletin de la Soc. de Geogr. Sept. Oct. 1839, p. 150.

[2] Trav. among the Arab Tribes, 4to. p. 7.

[3] Trav. in Syria, etc. p. 344.   [4] Trav. Lond. 1845, p. 92.

fortnight later, March 29th, in passing from es-Salt to Nâbulus, lost their way; and coming to the Jordan were surprised to find it very much swollen. The stream was exceedingly rapid, and so deep that they were obliged to swim their horses.[1] Buckingham, crossing with Mr. Bankes some distance above Jericho, early in February, found the river easily fordable; the stream was exceedingly rapid, flowing over a bed of pebbles.[2] The bathing-places of the pilgrims opposite Jericho have been often described; and the river there runs with a swift strong current, but without rapids. The same is true of the crossing-place visited by my own party further down; where I have described the Jordan as having "a still, though very rapid current;" so that our Egyptian servant, a stout swimmer of the Nile, was carried down several yards, in crossing. The water was here said to be ten or twelve feet deep; and the river is never passed at this point without swimming the horses.[3]

These notices all indicate a swift current of the river below Beisân; but still nothing in the nature of *rapids*. It must also be borne in mind, that the fording places are always the shallowest spots, where the current of course is the swiftest. Nor do the Arabs know of any rapids; nor have they ever reported any to travellers. It is however barely possible, that something of the kind may exist in that singular tract of the valley opposite to Kürn es-Sürtübeh. From the foot of that mountain a higher desert tract of land, or low ridge, extends across the valley; through which the Jordan finds its way in a deep ravine. Indeed, in the vicinity of the river the whole tract is broken up into a labyrinth of like ravines, with barren, chalky sides, forming a most wild and desolate scene. Burckhardt speaks of the same as "a chain of low calcareous rocky heights."[4] This portion of the river's course has never been minutely examined; though it is obvious, that if rapids exist even here, they can have no very unusual fall.

The flow of the Jordan is swift, deep, and silent; its waters emit no sound, neither roar nor murmur. Below Beisân its course has few if any windings. The direct distance between the two lakes may be taken at one degree of latitude, or sixty geographical miles; it being actually a little less according to the best maps. The difference of level between the lakes, as ascertained by Lieut. Symonds, is 984 English feet; giving therefore a fall of 16.4 feet in every geographical mile.

---

[1] Trav. Lond. 1845, p. 99.   [2] Trav. in Palest. 8vo. II. pp. 92, 93.
[3] Bibl. Res. in Palest. II. p. 256.   [4] Rev. E. Smith. Ms. Jour. Burckh. Syr. p. 347.

34*

Let us now compare the known rate of descent in some other of the most rapid streams in the different parts of the world.

I. The Orontes. The elevation of the Lake of Antioch above the Mediterranean, as ascertained by the English engineers during Col. Chesney's expedition, is 365 English feet.[1] This lake lies opposite the elbow of the Orontes, where that river turns south-west; and the outlet of the lake enters the latter; so that the level of the river at the elbow differs very little if any from that of the lake. The direct course of the Orontes from its elbow to the sea, is about 24 geographical miles. This gives an average fall of nearly fifteen feet for every mile of the course below the bend, being nearly equal to that of the Jordan. But the stream differs greatly from the Jordan in its character. Below Antioch it passes through a mountain gorge with perpendicular walls; where the river "roars over its rocky bed" in a succession of rapids and shallows, which render it unnavigable even for steam vessels.[2] Further down, in the plain towards the sea, the river is in some places fordable; but is usually crossed by a ferry, and the current is very rapid.[3]

In the following notices of the Elbe, the Danube, and the Rhine, the measurements are taken from Stein's Geography, a popular German work of high authority.[4]

II. The Elbe. The elevation of this stream at its junction with the Moldau near Melnik in Bohemia, is 426 German feet;[5] at Schandau in the Saxon Switzerland, 320 feet; at Wittenberg, 204 feet. From Melnik to Schandau the distance is about 45 geographical miles, but the river varies considerably from a direct course; from Schandau to Wittenberg the course is more direct, and is about 95 geographical miles. Hence, according to these data, above Schandau, where the river breaks through the Erz mountains, the average fall in each direct geographical mile is $\frac{106}{45} = 2.3$ feet; and below Schandau where the river is still for some distance among the mountains, only $\frac{116}{95} = 1.2$ feet. Yet the Elbe is justly regarded as a very rapid stream.

III. The Danube. It is necessary here to include only that portion of the river which flows among mountains, and is the most rapid,

[1] Journ. R. Geogr. Soc. 1838, p. 416.

[2] Irby and Mangles, p. 70. Bowring's Report on Syria, p. 49. W. M. Thomson in Miss. Herald, 1841, p. 235.

[3] W. M. Thomson, ibid.

[4] C. G. D. Stein's Handbuch der Geographie; herausgeg. von F. Hörschelmann, 3 Bde. 8vo. Leipz. 1833–4. Sixth Edition.

[5] The proportion of the German (Rhenish) foot to the English is as 139.1 to 135; or nearly as 15.5 to 15.

viz. between Passau and Vienna. The elevation of the stream at Passau is 786 German feet; at Vienna 480 feet. The direct distance is nearest 130 geographical miles. The average descent therefore in each mile is $\frac{306}{130}$ — 2.3 feet. Yet this tract comprises the celebrated *Strudel* and other rapids, formerly so much dreaded by the boatmen. Indeed, until the introduction of steam-navigation, the boats which descended the Danube were very rarely if ever taken back, but were broken up at the end of their voyage.

IV. THE RHINE. This noble river we may look at in three different sections.

1. *Between Cologne and Mayence.* Here we find the celebrated scenery of the Rhine. The river flows between mountains, and is a bold and rapid stream. The elevation at Mayence is 256 German feet; at Cologne 112 feet; the distance between the two places nearest 90 geographical miles. The average fall therefore is $\frac{144}{90}$ — 1.6 feet in each mile. Yet in this tract is the rapid at the Lurlei, the Bingerloch, and others; and so powerful is the current, that the steamers which descend from Mayence to Cologne in a day, for a long time took two days to return. Indeed, so late as 1827, the time of a steamer from Rotterdam to Strasburg was eight days; while the downward trip was made in forty hours.

2. *Between Mayence and Basel.* Here the Rhine pours its waters rapidly with very many windings through the immense plain. Its elevation at Basel is 755 German feet; at Mayence, as before, 256 feet; and the direct distance between the two cities about 158 geographical miles. This gives the average descent of $\frac{499}{158}$ — 3.1 feet a mile; nearly double that of the straighter and more navigable portion below. The very winding course of the river, however, serves greatly to diminish the rapidity of the current.

3. *Between Basel and the Lake of Constance.* At Stein, situated at the foot of the lake, the elevation is 1200 German feet; at Basel, 755 feet; the direct distance between is about 56 geographical miles. The average fall is therefore eight feet in each mile of direct distance. But this section of the Rhine is the most rapid in the whole course of that river, after it loses its character of a mountain torrent in the Lake of Constance. Besides the strong rapid at Laufenberg, it includes the celebrated falls of Schaffhausen, from 75 to 80 feet in height. If these be deducted, the average fall is reduced to six feet the mile. This portion of the river is not navigated except by produce boats; and these are only pushed or towed up the current by main strength.

V. THE MOHAWK. If it should be said of the preceding streams, that the measurements depend merely on the barometer, and are

therefore of doubtful accuracy; yet in the present instance such an objection cannot be taken. The great Erie canal runs all the way along the bank of the Mohawk; and the measurements are the results of actual levellings and surveys in laying out that vast work. The elevation of the river at Rome above tide-water in the Hudson, was found to be 419 English feet.[1] The direct distance from Rome along the valley of the Hudson is not less than 95 geographical miles. This gives the average fall in each mile at $\frac{419}{95}$ — 4.4 feet. The Mohawk is everywhere full of ripples and rapids; and probably every one who has seen the two rivers, would regard it as a more rapid stream than the Jordan. The above measurement comprises also the falls of the Cohoes, having a descent of seventy feet; and the Little Falls, where the water descends 42 feet in half a mile. Deducting these, the average fall of the river is reduced to 3.4 feet the mile.

VI. THE MISSOURI. At the Great Falls of the Missouri, 2500 miles above its junction with the Mississippi, it is stated, that the river descends 357 feet in 18 miles by a succession of falls; the greatest fall being 87 feet perpendicular, and the next 47 feet.[2] This would give the average fall in each mile at not quite 20 feet.

<h3 style="text-align:center">RECAPITULATION.</h3>

	Fall per mile.
THE JORDAN, without rapids and usually deep, . . .	16.4 feet.
THE ORONTES, "roaring over its rocky bed," with shallows, .	15 "
THE ELBE, above Schandau, ...	2.3 "
" " from Schandau to Wittenberg, ...	1.2 "
THE DANUBE, above Vienna, with rapids	2.3 "
THE RHINE, Lower Section, with rapids, ...	1.6 "
" " Middle Section, ...	3.1 "
" " Upper Section, with Falls, ...	8 "
THE MOHAWK, with many rapids and Falls, ...	4.4 "
THE MISSOURI, at the Great Falls, ...	20 "

Thus it appears, that of all these streams, the only ones which can be compared with the Jordan in rapidity of descent, are the Great Falls of the Missouri, and the lower part of the Orontes, which flows over rocks and is unnavigable. The Rhine, in its most rapid portion and including the falls of Schaffhausen, has but one half the average descent of the Jordan. The Mohawk with its many rapids and falls, has but one fourth part of the same descent. The Jordan, so far as known, has neither cataracts nor rapids; and its flow, though swift, is silent. Yet in the 984 feet of its descent in 60 geographical miles,

---

[1] N. Y. Canals: Laws and Documents, Vol. I. p. 268. Albany, 1825.

[2] Haskell and Smith's Gazetteer, p. 416.

there is room for THREE CATARACTS, *each equal in height to* NIAGARA; and still leave to the river an average fall equal to the swiftest portion of the Rhine, including the cataract of Schaffhausen !

All this sufficiently attests, that the descent of the Jordan, so far as ascertained, does indeed present, in the language of Mr. Hamilton, "in itself a very remarkable phenomenon." And it is hardly to the credit of the scholars and learned societies of western Europe, to whom the Holy Land is now brought within an easy journey of a few days, that *four years* should already have been suffered to elapse since attention was thus publicly called to this important problem, without the slightest effort having been made, so far as the public are informed, to arrive at its solution.

In the absence therefore of all further observations, and in view of the striking anomaly thus presented by the Jordan as it respects all other like rapid streams, I venture to suggest,—not certainly in a spirit of doubt or want of confidence in the distinguished engineer, but solely in behalf of the interests of science,—Whether, after all, there may not be a possibility, that some slight element of defect or inaccuracy may have entered into the observations or calculations, and thus have affected the correctness of the result ? The question would seem to be a fair one here, between the possibility of some such error on the one side, and the probability of so immense a contrast with all similar physical phenomena, so far as known, on the other.

The following account of the manner in which the observations were made, is given by the President of the Royal Geographical Society in his annual address for 1842 ; and is the only one I have yet seen.[1] Lieut. Symonds being furnished with an excellent seven-inch theodolite, "measured a base from the Martyrs' Tower near Ramleh, on the plain of Jaffa, on which he founded his triangulation for the south portion of his district ; and, finding the instrument sufficiently nicely divided in its vertical arc, he was enabled to ascertain the relative levels of his various points with great accuracy. He then worked with his triangulation towards the head of the Dead Sea, taking at every station a very accurate series of vertical angles, the mean of which he worked on, making the necessary allowances for refraction and curvature ; but, owing to the want of another instrument, and a competent person to take simultaneous observations, he could not ascertain what the former was, and had to assume it at one twelfth of the subtended angle from the earth's centre, which he considers to be very near the truth. Lieut. Symonds completed the levels in this manner by two different lines, from Jaffa to Neby Samuel, the high-

---

[1] Journal of the Royal Geogr. Society 1842, p. lx.

est point of the Jerusalem range, the one checking the other, and found the difference but trifling.   From thence he started on the same plan to the Dead Sea, and with nearly as good success ; the two levels differing from eleven to twelve feet.   Owing to the unfavorable nature of the ground about Jerusalem, and the cliffs overhanging the plains of Jericho, Lieut. Symonds could not carry the two lines of level, independently of each other, to the required spot ; which might have been done in spite of the natural difficulties, had he had better assistance than he could procure from Bedouins.   The work occupied him nearly ten weeks ; though the distance traversed was not more than forty-seven miles, the direct distance from Jaffa to the Dead Sea."

It appears from this statement, that the observations consisted in a double series of vertical angles, connected apparently (at least sometimes) with long distances.   The survey therefore was not carried on by the process of levelling usually employed in laying out the course of a canal or rail-road.   However exact therefore the observations may have been in themselves, yet no one probably will suppose, that this method of survey would ever be adopted, or in any way relied on, in undertaking any great public work, like a rail-road or canal, where the ascertaining of the true level was essential.

It appears also, that the refraction could not be determined, but was assumed hypothetically at a certain amount in the calculations.   The atmosphere of Palestine is dry and singularly transparent ; so that objects situated at a great distance appear as if comparatively near at hand.   It would seem not unnatural that this should have an effect upon the amount of refraction, and cause it to be different from that which exists in the more humid atmospheres of England and other countries ; and this difference it might require a series of careful observations to determine accurately.   Especially would it seem important to take into account the peculiar degree of refraction near the Dead Sea and along the Jordan valley ; where from the greater depression of the surface, the atmosphere must naturally be much more dense than in any other known portion of the globe.

It would seem further, that there existed an important discrepancy between the results of the earliest calculations, and those subsequently published.   In the statements reported from Beirût to this country by the Rev. Eli Smith, and to Berlin by Mr. von Wildenbruch the Prussian Consul-general, and derived from Lieut. Symonds himself, the depression of the Lake of Tiberias is given at only 84 feet ; while the later publication makes it 328 feet ; a difference of 244 feet. This would give for the difference of the two lakes 1228 feet ; and

would raise the average fall of the Jordan in each mile to 20 feet. How this difference arose, we are not informed; it may have been by varying some one or more of the assumed elements in the calculation.

There is another circumstance, which perhaps is hardly of sufficient importance to be adduced here; and yet, under a certain aspect, it is not without some weight. There exists a Plan of Jerusalem, published by John Weale, London 1844, and marked as "surveyed by Lieuts. Aldrich and Symonds, Royal Engineers." This plan differs from every other in the form and extent of the Haram-area, the site of the ancient Jewish temple. The eastern side of that area, according to the independent measurements of Mr. Catherwood, of Messrs. Tipping and Wolcott, and of the Rev. Eli Smith in 1844, is 1525 feet in length; the plan in question gives it at 1400 feet. The southern side of the same area according to the measurements of the same gentlemen, is not less than 912 feet; while it is laid down on this plan at only 830 feet; the northern end being given at about 1060 feet. Above all, the western side of the area, instead of being marked as a straight line, as is done correctly in every plan of Jerusalem from D'Anville to Schultz, is here represented as being drawn in towards the southern end by two rectangular offsets, one of 100 feet, and the other of 130 feet. That no such offsets exist, is a matter of public notoriety to all who have ever visited Jerusalem; and it is difficult to understand, how such a representation can ever have come to be connected with the names of scientific engineers. No doubt the matter can be, and perhaps has already been, satisfactorily explained; otherwise, it is easy to perceive, that it might have some bearing upon a judgment of the present question.

Taking into consideration all the circumstances thus far adduced, there certainly does seem ground sufficient for the suggestion of a doubt, whether the problem of the depression of the Dead Sea and Jordan valley is yet fully solved. Or if a re-examination should confirm the accuracy of the former results, there still remains the "remarkable phenomenon" of the great descent of the Jordan to be investigated and explained. Either of these objects alone would be worthy the attention of European governments; combined as they are, they ought not to remain uninvestigated another year. It would be a small thing for England, or France, or Prussia, to send out an expedition for this purpose; and it may be hoped, that the Geographical Societies which adorn the capitals of those countries, will not let the matter rest, until it shall be fully accomplished.

The survey ought to be conducted in the same method, and with

all the caution and accuracy, usually required in laying out the route of a canal or rail-way. It might be carried across the mountains, from Jaffa by Jerusalem to the north end of the Dead Sea; or perhaps better from Gaza by way of Beersheba to the Dead Sea, either opposite the long peninsula or further south. This latter course would avoid the mountains, except the descent to the Dead Sea itself. The survey ought likewise to take in the course of the Jordan between the two lakes, as also the tract between the Lake of Tiberias and the Mediterranean near Haifa. These three different routes would mutually check and prove each other.

In the same connection it would be exceedingly desirable to extend the survey to the upper sources of the Jordan above Hasbeiya, and to include also the valley of the Bûkâ'a between Lebanon and Anti-Lebanon, connecting it with the Mediterranean on the north of Lebanon, and perhaps also near Tyre along the course of the river Lîtâny. There is here a remarkable configuration of the earth's surface, respecting which we have as yet no accurate knowledge.

There is at least one interesting problem yet to be solved in this region, in determining the elevation of the Bûkâ'a above the sea. From barometrical measurements taken at Ba'albek, this elevation is given by Schubert at 3572 Paris feet; by Russegger at 3496 Paris feet; equivalent in English feet to 3810 and 3729 feet respectively.[1] Near Ba'albek rises the Lîtâny, which flows south and west to the Mediterranean near Tyre. Just north of Ba'albek is the low water-shed in the valley; and beyond it the sources of the Orontes, which runs north to the parallel of Antioch, and then bends round south-westwards to the sea. We have already seen, that the average fall of this stream below its elbow is 15 feet in the geographical mile. The elevation of its remotest source near Lebweh cannot vary much from that of Ba'albek, or 3729 English feet, taking the estimate of Russegger; while we have already seen the elevation at the elbow to be 365 feet. The difference gives the fall of the river between those points at 3364 feet, in the direct distance of nearest 128 geographical miles. This is equal to an average fall of 26.4 feet in each mile; or nearly double the rate of fall in the same river (15 feet) below its elbow. This result is quite incompatible with the greater comparative rapidity of the Orontes in its lower portion; and also with the general features of the country and the extensive marshes along its upper valley. The barometrical measurement of the Bûkâ'a is therefore probably too high.

The same inference is confirmed by comparing the course of the

---

[1] Schubert's Reise, III. p. 322. Russegger's Reise, I. p. 702.

Lîtâny.   From Ba'albek to the sea its direct course is nearest 55 geographical miles.   It flows at first along the alluvial valley; then breaks through the southern spurs of Lebanon by a deep chasm for about 20 miles, much of the way over a rocky bed and with a rushing and foaming stream; and at last flows to the sea with many windings through a broad low tract of meadow land.   If now for this 20 miles of chasm, we assume an average fall in the mile of 100 feet, or 2000 feet in all, (which is a very large allowance, greater indeed than the rate of descent at the Little Falls of the Mohawk,) there yet remains of the elevation at Ba'albek (3729 English feet) no less than 1729 feet to be distributed along the rest of the course, or 35 geographical miles.   This gives an average fall of very nearly 50 feet in a mile, in a course mostly along alluvial vallies.   This result, therefore, goes strongly to confirm that found above in the case of the Orontes; and both together would seem to afford decisive proof, that the reported elevation of the Bûkâ'a must be greatly exaggerated.

Let us hope that public attention may be called to the various points referred to in this paper; and that those who have it in their power, will speedily cause these questions to be put at rest forever.

ARTICLE II.

ALLEGED ANACHRONISM IN ACTS 5: 36 IN RELATION TO THE SEDITION OF THEUDAS.

Translated from the German by H. B. Hackett, Professor in Newton Theol. Institution.

[INTRODUCTORY NOTE.   The original Article is contained in the "Theologische Studien und Kritiken," edited by Ullmann and Umbreit; Jahrgang, 1837, drittes Heft, p. 622 sq.   The title there is—THEUDAS, DER AUFRUHRER, Apstlg. 5: 36. Von DR. FRIEDRICH SONNTAG, Grossherzoglich Badischem Kirchen-und Ministerialrathe.   In the translation the object has been to convey faithfully the sense of the original, but without being bound by the form of the German sentences.—TR.]

§ 1.

THE anachronism charged on Luke, which forms the subject of the present investigation, occurs in the speech of Gamaliel delivered before the Jewish Sanhedrim, as recorded in Acts 5: 35—39.   The apostles, among whom Peter appears as specially prominent, stood