British Military Surveys of Palestine and Syria 1840-1841

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Palestine has long been the scene of political controversy. In the nineteenth century another kind of dispute, politely termed ‘topographical arguments’ by biblical scholars, reached a climax outside the country, in Europe and America. The accurate depiction of relief and drainage, the naming and positioning of settlements, became of paramount importance in the interpretation of biblical records. Unfortunately, the numerous travellers who went to Palestine and Syria in order to reconstruct the topography of the Bible in maps, lacked the resources which would enable them to conduct a systematic instrumental survey. The resulting maps were therefore variable in their standards of accuracy, and relied heavily on compilation from several sources of information, the validity of which was rarely ascertained.

Landmarks in the modern mapping of Palestine

Recent papers on exploration and cartography in Palestine have laid particular emphasis on the maps produced by Jacotin in 1818, Van de Velde in 1858, and by Kitchener and Conder in the years 1872-77. These have long been regarded as the major landmarks in the development of the modern mapping of the area. Jacotin’s map, at the scale of 1:100 000, is regarded as the first attempt at any instrumental survey of the area. Although the map mainly covered Egypt, four sheets were relevant to Palestine, but there is no evidence to show that this part of the survey was done by theodolite triangulation. Van de Velde, when compiling his own map in the 1850s, remarked that Jacotin’s map was grossly misleading, and he stated that the detailed topography “is for the greatest part the mere fancy-work of the draughtsman”.

Van de Velde’s map of the Holy Land (1858), at the scale of 1:315 000, is commonly held to be the first to mark the transition from compilation to a more thorough original survey. This is a misleading concept as Van de Velde probably made use of more sources of information than any other person who compiled a map of the Holy Land. Furthermore, it never was his intention to make a “complete triangular survey” but “a survey of a more superficial character, and yet satisfactory for the present times”. He continued, “chronometers, sextants or theodolite were out of the question as I had neither time nor intention for astronomical observations”. Even so, the map which he produced was remarkable in one respect; much of it was founded on the basis of theodolite triangulations which had been carried out almost eighteen years previously. He acknowledged this in the title of his map, and the accompanying memoir pointed out that a map in three sheets, covering the whole of the eastern seaboard of the Mediterranean at the scale of 1:253 440, had been produced from surveys undertaken by the Royal Engineers and other British army officers in 1840-41.

It is clear that the true significance of Van de Velde’s map lay in the material it incorporated. The fact that he acknowledged this so clearly makes it difficult to under-
stand why the achievements of the British military surveyors in Palestine and Syria in the 1840s should have been given only passing mention by writers at the end of the last century and by present-day authors. Indeed, had not this military survey partially embraced Palestine (Figure 1), thus attracting the attention of biblical scholars, it is possible that the operations might have passed unnoticed.

Thus the reconstruction of the story which lies behind these military surveys has established that they fore-shadowed, more than any other work in Palestine or Syria before 1872, the improved standards of accuracy and completeness attained in the surveys of Kitchener and Conder for the Palestine Exploration Fund (PEF) in the 1870s. Kitchener and Conder surveyed the area with a dense network of first and second order triangulation, conducted separate levelling operations and carried out systematic topographical surveys, producing a map at the scale of one inch to the mile.

The historical background

The development of cartography in the nineteenth century owes much to the great impetus given by the military surveyors, who, with the increased sophistication of their artillery, saw even more clearly than before the need for accurate maps. Within the military this enormous responsibility devolved upon the Ordnance and Staff Officers, who were quite capable, by 1840, of undertaking a general triangulation of a country, using a theodolite, levelling and filling in the topographical detail by accomplished hill drawing. The military surveyor abroad, by the nature of his profession, could only operate where duty called, and so it is in the areas of colonisation and political strife that the wealth of nineteenth-century military cartography is to be found.

In 1840, Syria and Palestine were again a scene of such strife. The Pasha of Egypt, Mehmet Ali, had for some years made himself almost independent of the Turkish Sultan, Mahmoud II, and had annexed the whole of Syria. His adopted son, Ibrahim Pasha, repeatedly defeated the Ottoman forces, overran the larger part of the 'Turkish dominions in Asia and even threatened Constantinople. On 1st July 1839, the Turkish Sultan died, and a few days later, his Lord High Admiral, Achmet, despatched to Mehmet Ali with the whole of the Turkish fleet. The Ottoman empire was about to topple when England, Austria, Prussia and Russia intervened.

At this point it became necessary to send forces to Syria under the command of Admiral Sir Robert Stopford, £60,000 being allocated to the operation.11 With the Royal Navy was a small contingent of Royal Engineers together with hand-picked cavalry, artillery and staff corps officers, who had embarked from Gibraltar on the 7th August 1840, under the command of Col. Sir Charles Smith, R.E., accompanied by Lieut. E. Aldrich. The War Office Returns12 show that he was sent on 'secret service', to do active duty with the fleet. The Royal Sappers and Miners, under the orders of Aldrich, landed at Beirut on the 10th September. Aldrich was also at this time the Assistant Military Secretary to Brigadier General Michell, who was the Consul General in Beirut, and then Commanding Officer of the forces in Syria. Sidon and Tyre were taken on the 25th and 26th September, and both Smith and Aldrich were present at Beirut when it was captured in October.

Not all the future surveyors had yet arrived in Syria. Major R. C. Alderson was still in Madrid when he received orders to proceed to Syria on the 30th October. He left Madrid on the same day that Acre was taken, 3rd November, Lieut. J. F. A. Symonds had just arrived at Woolwich, having taken a distinguished part in Col. Pasley's operations to salvage the wreck of the Royal George, which had been sunk off Spithead in 1782.13 He had to get to Gibraltar in time to embark for Syria with Major Alderson on 24th November.

This second detachment, which included ten rank and file, under the immediate orders of Symonds, arrived in Beirut on the 13th December. He was then sent to Acre to reinforce the sappers who were already there, and to assist in repairing the breaches in the fortifications caused by enemy action. At this time, Sir Charles Smith, who was now a Major-General, became too ill to command the Ordnance Corps, and departed for England on 15th December, leaving in his place Alderson, who had been promoted to the army rank of Colonel.

Alderson, who was now the officer in charge of the engineers, was never given any official notice of his duties, and so decided that one of the most useful ways in which his officers could be employed, would be in making plans of the fortresses along the coast.14

When the plague broke out at Acre, Symonds went to Jaffa with a small party of men, and at this time too, Brig. Gen. Michell died, and Aldrich, in the words of Alderson "was returned to normal duties—employed in taking plans of the fortified places like the other officers."15 It was now February 1841, Lieut. C. F. Skyring, R.E. arrived from Ceylon via England, and the engineer party was complete. It must be said that up until now their surveying work was not out of the ordinary, and would have excited no attention outside military circles had it gone no further; but in February, Aldrich and Symonds went to Jerusalem, to be followed later by Skyring.

The Survey of Jerusalem

I lifted up mine eyes again, and looked, and behold a man with a measuring line in his hand. Then said I, Whither goest thou? And he said unto me, To measure Jerusalem, to see what is the breadth thereof, and what is the length thereof.

Zechariah 2:1-2

The result of the visit to Jerusalem was a plan of the city drawn at the scale of 1:4800 in March 1841. The plan was to be the subject of great controversy in the next decade. Canon George Williams, in his book on the Holy City,16 published in 1849, referred to the survey in glowing terms, "The publication of the first accurate Plan of the Holy City may justly be regarded as an era in the literature of the subject."17 His eulogies were perhaps excessive, "a single glance at its beautiful outline sufficed to convince me that the character which the Ordnance Office has established at home for precise accuracy of observation . . . had been maintained on that distant survey." He somewhat misleadingly referred to the plan as the "Ordnance Survey of Jerusalem". None of the officers belonged to the Ordnance Survey of the United Kingdom at the time, but they were responsible to the Board of Ordnance, and were commonly styled "Ordnance Corps". It was, however, a significant misnomer, in that this plan was to remain one of the more acceptable available until officers seconded
from the Ordnance Survey, under the direction of Captain (later Sir) Charles Wilson, surveyed Jerusalem at the scale of 1:2500 in 1864-65.18

Williams described how Aldrich surveyed the exterior of the city with a 5½ inch theodolite and a 100 ft chain, while Symonds surveyed the interior with a Schmalcalder compass (prismatic surveying compass). He also stated that Col. Alderson surveyed the castle himself, but this is doubtful as Alderson’s reports to the Board of Ordnance make no mention of his having been to Jerusalem at the time.

It must be remembered that the British had achieved considerable military successes on the coast of Syria. They were therefore able to travel further inland not only without threat of attack from the population, but actually gaining their cooperation. In spite of this, the officers thought it wiser, while in Jerusalem, not to enter the Haram19 in case they offended the Moslems. This decision was significant, because the only point about the plan which was really

Figure 1. Map of Syria, sheet 3, 1846, 1:253 440, compiled from the surveys of the British army officers, 1940-41. By courtesy of the Trustees of the British Museum.
disputed was the way in which the western wall of the Haram was depicted. The controversy arose because the engineer officers had given the wall two re-entrant angles where formerly there were supposed to be none. This was a crucial discrepancy, but Williams emphatically denied all the accusations of inaccuracy: "the officers are indisputable authorities, and the accuracy of their plan in other respects does not permit us to suspect it of incorrectness here".\textsuperscript{20} Williams' book was cited as a "controversial work",\textsuperscript{21} but it is only fair to say that his opinion was naturally strongly influenced by information gained from correspondence with Alderson and Symonds, especially since Symonds had kept his field books and sketches, and after re-examining them was able to state, "I am happy to inform you that we are perfectly right with regard to the disputed angle(s)".\textsuperscript{22} Symonds undoubtedly was right, but the point seems to have been missed that this was not an error of measurement, but an error of interpretation. The angles did exist as parts of private buildings, not as part of the western wall of the Haram.

When Van de Velde was compiling his plan of Jerusalem, he disagreed with the shape of the western wall of the Haram as shown by Aldrich and Symonds. He therefore modified this part to coincide with the outlines shown on Catherwood's plan,\textsuperscript{23} on the grounds that Catherwood had been inside the Haram, and was likely, therefore, to be the more accurate of the two. It was Van de Velde's opinion, however, that the rest of the plan was sound.\textsuperscript{24}

It would appear that this once famous controversy was soon forgotten with the advent of the Ordnance Survey of Jerusalem 24 years later. The new survey showed conclusively that the disputed re-entrant angles did not exist. This meant that Symonds and Aldrich had positioned the western wall of the Haram several feet too far to the west, thus causing some of the interior buildings to be shown out of alignment. In addition, Warren was also able to state several years later that while the outline of the city and the depiction of the relief were accurate, there were further discrepancies in the interior.\textsuperscript{25} In view of the fact that the officers did not have access to the inner side of the wall, and because the exterior continuation was difficult to trace through the adjoining houses, perhaps excessive criticism of this point would now be out of place, especially since only a month was given to the survey. It seems probable, moreover, that contemporary scholars strove to find more detail, and greater accuracy than was ever intended to be shown by the military surveyors.

Some sources, such as Conder's volume on Jerusalem,\textsuperscript{26} give the publication date of the plan as 1849. This was the year that it appeared in Williams' work, but prior to this a trace of the plan was sent to the Board of Ordnance in June 1841. It was drawn in transfer lithography, reduced in scale to 1:7200, and printed at the Horse Guards in August (Figure 2). It was subsequently published in an even more reduced state to accompany a note by Col. Alderson in the Professional Papers of the Royal Engineers in 1845.\textsuperscript{27} Then followed its publication in the second edition (1849) of William's book and was also featured as an inset to Van de Velde's map. In addition, versions of both these appeared later in other publications.
Figure 3. J. F. A. Symonds, Plan of the Town and Defences of Sidon, 1841, 1:2400, ms. A marginal note reads “The contours are assumed to be about 2 feet apart”. Public Record Office, Crown Copyright.
Jerusalem having been surveyed in the March of 1841, the party returned to Beirut in April and was quarantined because the plague was widespread at this time. Lieut. Skyring had finished his plan of Beirut at the end of April, and so far Acre, Jerusalem, Sidon (Figure 3) and Beirut had been surveyed in some detail. Symonds had also finished his plan of the works at Jaffa, but further work on Caïfa (Haïfa) and Tyre was delayed until the plague moved on. Many of these plans were later published in the Professional Papers of the Royal Engineers. In the meantime the engineers set up camp at Mount Carmel and cordoned it off for quarantine purposes.

The general survey
At the onset of hostilities in Syria, it was never envisaged that a more thorough survey of the country, if indeed anything beyond reconnaissance with compasses, should take place. Nevertheless, when Lieut. Symonds was billeted at Acre with Major C. Rochfort Scott (Royal Staff Corps.), the two must have discussed the subject seriously and in some detail. As a result, Symonds wrote about his ideas to his father, Sir William Symonds, an Admiral and then Surveyor of the Fleet. The possibility of a survey of Syria evidently interested Sir William for he showed the letter to Lord Palmerston, Secretary of State for Foreign Affairs and under whose orders the expedition to Syria was taking place. Palmerston also thought it would be a good idea to conduct a survey of the country: “...it is desirable that advantage be taken of the present state of affairs to obtain a correct map of Syria”. He accordingly issued an order to this effect to Col. Hugh Rose, the Commanding Officer in Beirut. In the order he suggested that Symonds and Scott were probably the best qualified men to undertake such a survey, but modified his statement by saying “Her Majesty’s Government do not expect a minute survey of the country which would require more time and hands than could be given to such a service”. The results show, however, that the subsequent survey was in fact more thorough than any that had yet been undertaken for Palestine or Syria.

It is easy to understand the utter astonishment of Alderson on receiving Palmerston’s order from Rose. These were in fact the first written orders he had received since being in Syria. Symonds was, furthermore, the most junior officer under his command (he would have only been 26 or 27 at the time). The orders concerning him had completely bypassed the Board of Ordnance who were the normal authority for such procedures. With all this in mind, Alderson wrote in some irritation to the Board of Ordnance, saying that in his opinion, Symonds was not the only officer capable of undertaking the ‘General Survey’, as it had then become known. He fully agreed with the idea of the survey, however, the more so since during the time they had already been in Syria he had directed all his officers, “in travelling between different ports, to survey the road with the small calder compass, as the maps of this country are extremely inaccurate”.

Alderson had also told the Board of Ordnance that Symonds could not undertake the general survey until he had finished drawing up his plans of the coastal fortifications and he estimated that this would take until the end of May. Symonds was obviously eager to get on with what he considered to be the more important work, however, because he was ready by 8th May. The work of the survey was apparently divided up as follows: (a) the northern part of Palestine and Syria was entrusted to Majors Scott, Robe (87th Foot), and Wilbraham (7th Foot), (b) the main survey of Palestine was the responsibility of Symonds, and in addition, Alderson, Aldrich and Skyring, with other army officers were to make local topographical surveys of a more superficial nature to fill in the detail of the triangulations. Ultimately, all this work was to be gathered together by Rochfort Scott to enable him to compile the finished map. As far as can be ascertained, this map contained no other material than that provided by the military surveys done at this time. This in itself was remarkable and rendered the printed map unique in this respect, until the surveys of the Palestine Exploration Fund.

The survey of Palestine
Symonds’ triangulations covered the area of Palestine from 31° 40’ to 33°. Two sets of measurements were involved: the first triangulation extended from Acre to Lake Tiberias via Safed, the second from Jaffa to the Dead Sea via Jerusalem, the two triangulations being connected by various intermediate points. It is worth noting that these two lines of measurements were almost identically followed by Kitchener and Conder’s lines of levels in the 1870s. This was because they were chosen expressly for the purpose of ascertaining the true levels of Lake Tiberias and the Dead Sea.

Alderson’s letter to the Board of Ordnance included a list of the surveying instruments which Symonds required for the General Survey, but this list is no longer extant. In spite of the lack of instruments, work had already commenced by the beginning of May: “the survey will not however be delayed until their arrival as a base has been measured near Acre, and they can work on for some time without it”. It is not known exactly how Symonds measured his base lines. A reference is to be found in Warren’s revision of Frome’s Trigonometrical Survey, where, in the chapter on measuring base lines, it is stated that “Lieut. Symonds... when commencing the survey of Syria, measured two bases of about two miles each (see Figure 4), the extent of the survey from north to south being about 200 miles”.

The accuracy of Symonds’ base line measurement was to be later questioned by a fellow officer, and it is therefore unfortunate that no more information appears to be available for the methods he used.

The surveying instruments finally arrived at the end of the month, and Symonds was at last able to set out. In the meantime he had incurred considerable expense in equipping himself. In a letter to Maj. Gen. Elicombe, detailing his expenses, he complained “The performance of this duty [the survey] entailed heavy expenses upon me, in having to purchase several horses to enable me to carry it on properly. I purchased them for £130 and only sold them for £23 10s”. His survey pay was rated at 13s 8d a day.

Thus the first triangulation of the northern part of Palestine was begun using a five inch theodolite, heights also being obtained trigonometrically. It was obvious that Symonds was dissatisfied with much of this because he apparently revised several points on the arrival of a seven inch theodolite, of which he told Mr Hamilton, who was President of the Royal Geographical Society, “finding the instrument sufficiently nicely divided in its vertical arc,
Figure 4. Diagram to show the triangulation of Palestine by J. F. A. Symonds. Based on F. Robe's manuscript copy, 1:120 720, in the Public Record Office.
[I] was able to ascertain the relative levels of various points with great accuracy’.

This last statement cannot be regarded as true for the Acre-Lake Tiberias measurements, because a major and unaccountable error seems to have crept into his height calculations at this point. This was perhaps the result of his having used an inferior instrument to start with, and his having failed to correct all the inaccuracies upon his subsequent measurements. The figures he eventually arrived at for the level of Lake Tiberias were only 328.29 feet below the level of the Mediterranean. Even in those days this was half the amount arrived at by barometric measurements, while the value of the bench mark at Tiberias, fixed by the PEF surveys was -682.5 feet. Another possible source of error could lie in the mirages which were a frequent hazard to surveying in the summer, and which caused some incorrect measurements to be made in the PEF surveys 30 years later.

An error in a feature of such importance was most unfortunate, because it was immediately seized upon by Symonds’ antagonists, notably Dr Robinson, who sought to discredit his entire work on this point, but according to Van de Velde, “he [Robinson] has gone too far in throwing doubts upon the value of Lieut. Symonds’ operations in general . . . and that subsequent observations by Lieut. Lynch’s expedition at the Dead Sea have sufficiently proved the worth of Symonds’ triangulations, notwithstanding the error in the level of the Galilean Sea”.

Symonds’ work in northern Palestine was, in fact, of great value in that it established certain positions which had until then been disputed. An example is to be seen in his positioning of Safed, which had formerly been placed too close to the northern shores of Lake Tiberias. When Rochfort Scott was compiling the final map, however, he did not make full use of Symonds’ positions and so the error was again perpetrated and Safed was again wrongly placed, although the error did not exist in the manuscript records according to those who had access to them at the time. The route from Jebel Jurmkuk and Acre to Tiberias also contained many points which were fixed for the first time by Symonds’ triangulation, and which were to prove invaluable to Van de Velde in the compilation of his map. Additionally, the topographical work which had been done in the vicinity of Mount Carmel provided much information which had formerly been lacking in this area, in spite of Jacotin’s surveys at the beginning of the century.

The measurement of the Jordan depression posed a seemingly insoluble hypsometric problem in the early part of the nineteenth century, and Dr Robinson had said that it could only be solved by a line of levels, carried from the Mediterranean to the Dead Sea by triangulation. Although Symonds did not carry out independent spirit levelling operations, he was the first person to use a theodolite to determine the heights in this area. His southern base was measured on the plain to the east of Jaffa, and from here he worked eastwards across difficult country to the Dead Sea. The figure he eventually arrived at for the level of this sea was 1312.2 feet (the modern value is -1299.2 feet) below the Mediterranean. Other contemporary data, obtained from barometric readings varied between -598.5 feet to -1400 feet, hence Symonds’ trig height was accepted by most as the only plausible solution.

There was considerable confusion with regard to the heights that Symonds arrived at for both Lake Tiberias and the Dead Sea, for at least three different versions can be found in published sources. In a letter from Dr Eli Smith to Dr Robinson, for example, the former stated “I am happy to inform you that the altitude (depression) of the Dead Sea has been ascertained by exact trigonometrical measurement . . . he [Lieut. Symonds] found the Dead Sea to be 1337 feet below the Mediterranean. . . . These numbers he gave me himself and at the same time showed me his calculations”. The same source quoted the height for Lake Tiberias as -84 feet. The figures -1311.9 feet for the Dead Sea and -328 feet for Lake Tiberias appear in a note in the *Edinburgh New Philosophical Journal*, 1843; the source there quoted for these values was Mr Hamilton’s Anniversary Address to the Royal Geographical Society (R.G.S.) in 1842. In 1843, Mr R. I. Murchison gave an Address on presenting the Patron’s Gold Medal of the R.G.S. to Symonds for his work in determining the level of the Dead Sea for the first time by theodolite triangulation. It was a fitting reward for a long-awaited scientific achievement which had been finally accomplished by a British surveyor. The heights given in this Address were -1312.2 feet for the Dead Sea and -328.98 for Lake Tiberias, but in the same volume, Lake Tiberias is quoted as being -328.1 feet.

There seems to be no explanation for the values given by Dr Smith. It is possible that Symonds changed his mind on re-examination of his calculations, for the figures on the manuscript triangulation diagram correspond with those given in Mr Murchison’s Gold Medal Address. It is therefore reasonable to accept these as the official results.

The correspondence between Symonds, Williams and Smith indicates that Symonds kept his field notebooks and sketches. This would partially account for the apparent disappearance of much of his material today. Nevertheless, many of his manuscripts were still at the Board of Ordnance in the 1840s because they were extensively used in the production of a fine relief model of the Holy Land. This model incorporated the hysometric profiles that Symonds had drawn (Figure 5).

Symonds did try to check his own work by calculating the value for the highest point on the Jerusalem Range (Nebiy Samwil) by two different routes through his triangulation, and he found the difference in his measurements to be negligible. From this point, Symonds took two lines of levels to the head of the Dead Sea, but the difficult terrain

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*Figure 5. Extract from Relief Map of Palestine or the Holy Land . . . constructed from M.S. Documents in the Office of the Board of Ordnance, published by Dobbs, Bailey & Co., 1845. By courtesy of the Trustees of the British Museum.*
prevented his taking the two lines independently of each other. Mr Hamilton’s Anniversary Address stated that the difference in level between the heights for the Dead Sea so obtained amounted to only “11 or 12 feet.” It is tempting to think that if Symonds had chosen a value of -1300.2 feet instead of 1312.2 feet that he would have been very close to the modern value of -1299.2 feet.

The distance that he covered on this southern triangulation was only 52 miles, or four days march from Jaffa, but it took him ten weeks. That he completed the work at all is a tribute to his endurance and determination. He was virtually alone in these operations, and additionally, by this time all the engineers, including Symonds, had been ill with fever, and had suffered considerable hardships. Col.
Rose, in writing to Earl Aberdeen in December 1841, said "I have the honour to add that every officer of the Corps of Royal Engineers serving in Syria has suffered from sickness produced by the climate, and all but one severely". Illness and miserable conditions were then the constant companions of Europeans in Palestine and Syria. Only the Acre-Lake Tiberias triangulation was to be used in the compilation of the third or southern sheet of the final map, but when Major Robe was coordinating his own observations with those of Symonds and the other officers in Palestine, he attempted to check Symonds' work. He did this by testing some of the measurements against selected observations provided by Capt. Graves, R.N. Graves obtained his figures for the coast on a steamer which was equipped with several chronometers, expressly for determining the geographical coordinates of several points on the Syrian coast. Robe stated "that the arc of the earth's surface between Jaffa and Acre, given Graves' measurements, on reduction to statute miles gives a measurement of 62.330 miles, whereas by Lieut. Symonds' diagram it is but 59.446 miles, being in defect 2.884 miles".  

It is difficult to make an independent assessment of the accuracy of Symonds' work, not only because it is not available today, but also because it was incorrectly used in the printed map. Even the triangulation diagram that has survived is a copy of Symonds' original made by Major Robe, and according to Van de Velde it was not constructed as accurately as the original measurements warranted: "I believe that . . . points are laid down with less correctness than those of which the calculation was given". Robe conjectured reluctantly that the discrepancy between the observations could be accounted for by an error in Symonds' base measurements, "a conclusion which, from my knowledge of that officer's industry and talents I should be very sorry to hazard". If indeed there were any error of this kind, another possible cause may be that the northern and southern triangulations were connected by ill-conditioned triangles (see Figure 4).

While little can be traced of Symonds' original material, there are still some good examples extant of the work done by Majors Scott and Robe, although these are scarcely referred to in subsequent literature. A small map by Robe of the source of the River Jordan at the scale of 1:400 000, was published in Ritter's Erdkunde. Major Rochfort Scott was recognised as a highly competent officer in reconnaissance techniques, and he was a close friend of Major Basil Jackson, who was Professor of Surveying at the Honourable East India Company's Military College at Addiscombe. They had been in the Royal Staff Corps together since 1812, and had collaborated in a biography of Wellington. Jackson, in his well known Course of Military Surveying, first published in 1838 (which was still a standard text in the 1870s), used some of Scott's maps and descriptions taken while in Spain, as an example of how reconnaissance should be done. (An example of his work is shown in Figure 6).

The survey of Northern Syria

Most of the northern surveys in Syria were undertaken by Majors Rochfort Scott and Robe. No one appears to have investigated their calculations for this area, presumably because interest was centred mainly on Palestine. It is evident, both from the printed map and from his letters to Sir Willoughby Gordon (Quarter Master General), that Robe constructed a triangulation founded on two bases for the northern part of Syria. One base was measured on a plain a few miles south west of Aleppo, and the other was taken near Beirut. He was later interrupted in the measurement of a third base on the plain north east of Tripoli, when he received orders to return to England. He therefore admitted that his triangulations were not constructed with an accuracy that would satisfy himself. He had made use of numerous observations of latitude, "taken very carefully to reconcile the differences", and he was himself sure that he had avoided any serious errors, having linked the northern part of his survey with points that were determined by the Euphrates Expedition of 1837. He did not determine his altitudes by theodolite, but used instead "two excellent barometers by Troughton and Sim". He must, however, have experienced marked frustration when taking his measurements, because his coadjutant, who was supposed to record the fluctuations of the lower instrument, while Robe observed the upper one, was absent most of the time, having been seconded to other duties. He failed in many of his readings as a result.

Major Robe also worked in the part of Palestine that was surveyed by Lieut. Symonds, but since there were no triangulations for the area south of Jaffa, towards Gaza and Hebron, the work Robe did here was entirely carried out with pocket instruments. It is clear from his letters to the Quarter Master General, that in spite of the small coastal inaccuracies which he claimed to have found in Symonds' work, he did utilise many of the points fixed by Symonds' triangulation. Even so, Robe had no great confidence in his own surveys; he thought, for example, that his measurements would place Gaza and Hebron two miles north of the positions normally assigned to them, and he therefore failed to implement the results of his own observations in this case. This was in spite of the fact that he had found so many errors on the maps he had hitherto used, "on all the published maps of the country to which I have had access . . . I have found abundant reason for questioning them".

The final compilation

While the job of coordinating the various surveys was entrusted to Majors Robe and Rochfort Scott, it is apparent that the final compilation of the map which was to be printed, was the responsibility of Rochfort Scott. This was obviously not a straightforward task because the officers concerned had been sent to different stations on the termination of their work in Syria and Palestine in January 1842. Robe did not send his drawings home from Gibraltar until April 1845, Symonds sent some of his to the Board of Ordnance in 1842 from Malta, and Aldrich had gone on to Hong Kong. The result was a long delay in assembling the material. Rochfort Scott had been sent to C Arnarthen on what he thought was a temporary duty, but by the time he had been there for four years he realised his mistake, and decided in 1846 that if he did not attempt to finish the map then, it never would be printed. He wrote to London requesting all the outstanding material to be sent to him, so that he could finish the work in his spare time.

It is clear from the correspondence (1846) between Rochfort Scott and the Board of Ordnance, that the map had already been started at the Horse Guards. It had been partially laid down in lithographic chalk apparently in some detail. This approach was obviously too much for Scott to cope with in his leisure time. He therefore re-
started it, “adopting a style that admitted of greater rapidity of execution”, (i.e. pen and ink, the relief hachured in the vertical style. This was the method in which Scott excelled) while admitting that the work “is one which required to be executed with the utmost accuracy and considerable minuteness”. He added a further important qualifying remark, “the sudden recall of myself and the other officers employed on the survey of Syria prevented its being completed.” The map was eventually printed on the scale of 1:253 440 by John Arrowsmith in 1846, for the private use of the Foreign Office. It was therefore never published except for sheet 2, which was reproduced in Churchill’s book on Mount Lebanon.

Conclusion

The survey of Syria, although incomplete in the eyes of those who undertook it, was the first attempt at a systematic instrumental survey of the country. Its proper place in the history of the mapping of the area has been neglected for a number of reasons; the fragmentary and contradictory nature of the published material led to confusion with regard to the operation as a whole. Symonds and Rochfort Scott were singled out in the critical appreciations that followed, primarily because Scott had drawn the map of Syria and Symonds hadascertained the level of the Dead Sea. It was never realised that the idea for the survey was theirs, or more probably, the brainchild of Symonds, whose qualities of leadership, initiative and tenacity of purpose had already made him well known amongst his fellow officers. He was ambitious, and must have felt the need to equal the achievements of both his father, who was an Admiral and Surveyor of the Fleet, and his elder brother William Cornwallis, the founder of Auckland, New Zealand. It was against this background that Symonds had set out to survey Palestine, but it was his father’s influence with Lord Palmerston that enabled the survey to take place at all.

The attention of biblical scholars was focused on the outcome of the survey, and many of their comments were adversely critical. It was, after all, a sophisticated military reconnaissance, even though it included theodolite triangulations. As such, it was typical of its time, but its critics assumed a standard of accuracy that was never admitted by the surveyors themselves. The new sets of figures which it produced were therefore bound to cause controversy when compared with the results obtained by those who had spent years compiling maps of the Holy Land. Had Scott’s map been published, it is likely that interest in the survey would have continued to the present day, but instead it was totally eclipsed by the later surveys of the PEF. This, together with the uncertainty about the overall accuracy of the work has obscured the major significance of the survey. It was entirely original and embodied the first theodolite triangulation of Palestine; the levels of the Dead Sea and Lake Tiberias were fixed for the first time by this method, an operation which was not to be superseded until 30 years later, in 1872, by the PEF.

The administrative aftermath of the survey dragged on until 1846. The Foreign Office was reluctant to assume financial responsibility for the work, the Board of Orinance declared that it had not known about the orders for the survey until after they were issued by Lord Palmerston. The Officers’ claims for expenses were still being submitted in 1846, before they were finally settled. In spite of the delays in payment, Symonds indefatigably announced that, given the opportunity, his next task would be to ascertain the level of the Caspian Sea, and so settle another undetermined hypsometric problem.

In the civilian context, it is worth recalling Carl Ritter’s opinion of the survey, “Valuable as have been the labours of Von Schubert, de Bertou, Russeger, Moore, Beke, de Molinieux and Von Wildenbruch, they can be regarded as merely preliminary to the perfected efforts of the English Government”. In the military context, the standard of the operation is perhaps more truly summarised by Roy’s famous comment, “in a theatre of war, each individual has repeated opportunities of contributing... and these observations being ultimately collected, a map is sent forth into the world, considerably improved indeed, but which still being defective, points out the necessity of something more accurate being undertaken, when times and circumstances may favour the design.”

Acknowledgements

The idea for this paper arose from a chance enquiry by the Rev. Dr. J. W. Parker, who, having seen Aldrich and Symonds’ map of Jerusalem in Williams, The Holy City, (1849), wished to know more about the background of the 1841 survey of the city. His enquiry was passed through the Palestine Exploration Fund to Mr Peter Clark, who realised that the Survey of Jerusalem was connected with the Survey of Syria. It was at his suggestion that the research into these operations was undertaken. The writer gratefully acknowledges her indebtedness to Mr Clark for his constant supply of ideas, advice and encouragement, and also to her colleagues in the Map Room for their invaluable help in criticising the manuscript.

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15. P.R.O. W.O. 44. 288.
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28 P.R.O. W.O. 44. 288.
29 P.R.O. W.O. 44. 288.
30 Col. Bridgeman had succeeded Brig. Gen. Michell, but had himself died after a couple of months to be succeeded by Roe.
31 J. F. A. Symonds was one of a family of four. The two elder brothers are mentioned in D.N.B., the second son being born in 1835. J. F. A. Symonds was therefore 26 or 27 at the most in 1840.
32 P.R.O. W.O. 44. 288.
33 Alderson must have meant the Schmalcalder compass. For a full description of this instrument see Major Basil Jackson, *A Course of Military Surveying*, John Nichols, London, 1838, 2.
34 P.R.O. W.O. 44. 288.
35 P.R.O. W.O. 44. 288.
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<tr>
<th>Name</th>
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<td>ALDRICH, Edward</td>
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<td>28-11-1854, Lieut.-Colonel</td>
<td>11-11-1851, Lieut.-Colonel</td>
<td>Silver Medal for Syria</td>
<td>24-11-1857</td>
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<td>ALDERSON, Ralph Carr</td>
<td>1-7-1812, Royal Engineers</td>
<td>10-1-1837, Captain</td>
<td>10-11-1840, Lieut.-Colonel</td>
<td>Silver Medal for Syria</td>
<td>26-10-1849</td>
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<td>NAPIER, Edward Hungerford Delaval Elers</td>
<td>11-10-1826, 46th foot</td>
<td>3-10-1864, Colonel of 61st foot</td>
<td>6-5-1866, Lieut.-General</td>
<td>Gold Medal for Syria</td>
<td>1870</td>
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<td>ROBE, Frederick Holt</td>
<td>11-3-1819, Royal Staff Corps, later transferred to 87th foot</td>
<td>5-9-1869, Colonel of 95th foot</td>
<td>30-11-1856, Major General</td>
<td>Gold Medal for Syria</td>
<td>4-4-1871</td>
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<td>ROCHFORT SCOTT, Charles</td>
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<td>25-6-1830, Captain</td>
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<td>SKYRING, Charles Francis</td>
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<td>4-3-1868, Major General</td>
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<td>SYMONDS, John Frederick Anthony</td>
<td>27-2-1833, Royal Engineers</td>
<td>22-5-1846, Captain</td>
<td>11-11-1850, Major</td>
<td>Silver Medal for Syria</td>
<td>8-8-1852</td>
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