The First Railways in Egypt

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I. Introduction
II. The Overland Route through Egypt before the Railway
III. Deferred Construction of the Cairo-Suez Railway
IV. Construction of the Alexandria-Cairo Railway
V. Construction of the Cairo-Suez Railway
VI. Conclusion

エジプトの最初の鉄道

石田 進

エジプト最初の鉄道（アレキサンドリアーカイロスエズ）の建設をめぐる不明確な諸点のうち、以下四点について各種資料の検討を通じて、より明確な観点を提示したい。
（1）ムハンマド・アリの関与。
ムハンマド・アリは1834年にカイロースエズ鉄道を建設しようと計画し、レール
など資料の一部をイギリスから購入し、アレクサンドリアまで運んだものの、計画の中止に追い込まれて、以後鉄道建設は慎重となり、結局鉄道の建設を果たさなかったというのが従来の定説である。実際にはムハンマド・アリは1843年と1844年にもカイロエスエズ鉄道を建設しようと試み、この間計3回も着工を試みたことが事実のようである。しかし、そのいずれの場合も、彼を取り巻く当時の国際関係などのため計画の中止に追い込まれた。

（2）アレクサンドリアーカイロ鉄道建設計画内容の変更。

1851年7月、アッバスとイギリスの鉄道王、ロバート・ステファンソンの間で結ばれたアレクサンドリアーカイロ鉄道建設契約の内容には、その後いくつかの変更が加えられ、本論文では変更の内容の特定化と詳細化に努めた。主な変更は、鉄道ルートの変更、ナイル川西支流のカフル・アル＝ザヤートにいったん建設された蒸気フェリーを間もなく鉄橋に架け替えたことおよびルートの一部で必要性が疑わされる複線化のための工事がなされたことであった。そのため、工期の遅延や建設費の増大が生じた。

（3）土地税（ミリ）増収効果。

エジプト最初の鉄道が建設された頃はエジプトの歳入や税収の増大が必要な時期であった。本論文では、その頃の土地税の推移を示す表をまとめた。その表の示すことは、短期的に見る限り、鉄道が建設されたデルタにおける土地税（ミリ）の増収効果には顕著なものがなかったということである。

（4）カイロエスエズ鉄道の廃業。

1859年に開通したカイロエスエズ鉄道は、競合するスエズ運河が1869年に開通した後廃業に追い込まれたことは周知の事実であり、簡潔に述べようとする場合、このように表現しても間違いではないだろう。しかし、廃業に至る経緯は単純なものではなかったことを本論文は示した。建設されたカイロエスエズ鉄道には計画段階から難点が指摘されており、この路線よりも時間節約が可能なバネハーザカーズイク＝イスマイリーヤースエズ間の鉄道支線が1868年に開通すると、一刻を争う郵便物の廃送は、スエズ運河の開通以前からカイロエスエズ鉄道を見限ってこの支線を利用するようになっていた。また、スエズ運河は開通後しばらくの間夜間航行が禁止されており、その間はこの鉄道支線による郵便物と貨物の廃送はろうとしてスエズ運河に対抗していったものの、1888年に夜間航行が解禁されると、鉄道支線の利用は停止され、全面的にスエズ運河が利用されるようになった。
I. Introduction

It was essential for Great Britain to establish a safe and lucrative route of communication and trade with India. According to Halford Lancaster Hoskins, Ph. D.,\(^{2}\) the first contacts the English had with India were established by way of the Mediterranean. Accordingly, the all-sea route around the Cape of Good Hope was not attempted by English mariners until near the end of the sixteenth century because of the numerous hazards from natural forces and from hostile Hispanic fleets. As the sixteenth century drew toward a close, Mediterranean trade no longer sufficed as a source of eastern goods for English markets. Consequently, the English attempted to reach sources of eastern products by routes other than the preempted Cape route. One by one these passages were tried and abandoned, either because of physical obstructions or because of the great distance. The first tentative ventures to the East around the Cape of Good Hope disclosed the decline of Hispanic power, and opened up an amazing source of wealth. At the close of the sixteenth century, the English largely abandoned the lucrative Mediterranean trade for the more dangerous, but much more lucrative trade by the all-sea Cape route.

Toward the close of the seventeenth century, English vessels crossed the Arabian Sea, entered the Red Sea, and at Mocha purchased quantities of Arabian coffee on very favorable terms. It was this advance toward Europe from the Orient which first suggested the expediency of establishing connections between England and the southern coasts of Asia by a passage through Egypt. But the idea of developing a trade route through Egypt and the Red Sea was foiled principally by the then Ottoman ban on navigation of the Red Sea north of the port of Jeddah by all Christian vessels. This ban was in effect because of the proximity of the Holy Cities of Medina and Mecca, and also because of other Turkish suspicions.

Since having become masters of the ocean passage to India, the British were accustomed to approach their commercial domain in India by way of the Cape route. This was the case until the beginning of the second quarter of the nineteenth century when many changes, due to the Industrial Revolution and growing efficacy of the steam vessel, effected a return of lines of communication and trade to those through the Mediterranean. After a long controversy over the relative merits of the ‘overland (Egyptian)’ and ‘alternative’ or ‘direct (Mesopotamian)’ routes, by 1838, the steam line between India and Suez was in fairly regular use. The acquisition of Aden by the British in 1839 was one of the last steps in the definite establishment of the Red Sea route for regular communication between England and India.
II. The Overland Route through Egypt before the Railway

In 1840, when the Peninsular and Oriental Steam Navigation Company opened regular communication with Egypt, the overland route through Egypt started to be greatly improved and regularized. While the steam engine continued to be more efficient, and the electric telegraph played more important role, Mr Thomas F. Waghorn, the Peninsular and Oriental Steam Navigation Company, J. R. Hill & Co., the Egyptian Transit Company, and so on, were endeavoring and competing to expedite, regularize and comfort the passage through Egypt in order to make bigger profit.

According to the information circulated by the Peninsular and Oriental Steam Navigation Company, the route and mode of travelling across Egypt from Alexandria to Suez in 1842 were as follows:

The entire distance from Alexandria to Suez via Cairo is about 252 English miles. The journey of the passengers may be divided into three distinct stages, in each of which the mode of travelling differs.

The first stage is from Alexandria, by the great Canal (most frequently called Mahmoudie) to the village of Atfeh, the distance of which is about 48 miles. From the Great Square of Alexandria to that part of the Mahmoudie Canal where the track boats for Atfeh are usually stationed, is about two miles. The luggage is sent to this place by camels, which are to be had in abundance. Some European carriages are also to be had for ladies, and gentlemen can either proceed on horseback, on donkeys, or, in the winter season, it is only an agreeable walk. Arrived at the banks of the canal, they step on board the track boats, one of which is generally loaded with the luggage, and the others kept clear for the more comfortable accommodation for the passengers. Relays of horses for tracking are provided at seven different stations along the banks of the canal, by means of which the journey to Atfeh is usually accomplished in from eight to ten hours.

The second stage is from Atfeh to Cairo, by the Nile, the distance of which is about 120 miles. Arrived at Atfeh, the passengers and luggage are transferred to one of the Company's steamers, the 'Cairo', 100 feet in length, 14 feet in breadth, or the 'Lotus', 89 feet and 12 feet respectively. The passage from Atfeh to Cairo will be made in from 15 to 20 hours, according to the high or low state of the Nile.

The third stage is from Cairo to Suez, across the desert, which distance is about 84 miles. Arrived at Boulac, carriages, horses, donkeys, and camels for luggage, will
be found in readiness to convey the travellers into the city of Cairo, a distance of scarcely two miles. For the third stage of the journey, there are coaches drawn by four horses, each capable of taking eight passengers, ditto carrying six passengers each, two-wheeled vans, carrying four persons each, and drawn by two horses; also donkey chairs, a kind of light sedan, slung upon poles, and carried by two donkeys to each, one before and the other behind. For carrying luggage, camels or dromedaries are employed.

Along the route through the desert, there are seven station houses which are placed at from 10 to 12 miles distance from each other. In crossing the desert during the summer or hot months, it will be well to start from Cairo in the afternoon, a short time before sunset. The centre station will be reached early next morning. Here the travellers may repose during the heat of the day, and again starting toward the afternoon, reach Suez early the following morning. During the winter season, when this part of the journey will be performed both by day and night, travellers, especially ladies and invalids, are recommended to provide themselves with cloaks or other warm covering, because, although during the day it is fine, with temperature equal to a warm day in July and Aug. in England, immediately after sunset it becomes cold and chilly.

The mails are forwarded from Alexandria to Cairo by a land route on donkeys, and generally reach Cairo in 40 to 48 hours. From Cairo to Suez they are forwarded on dromedaries in about 16 to 20 hours. Including an hour or two of stoppage at Cairo, in shifting from the one conveyance to the other, the usual average time of the mail transit from Alexandria to Suez may be reckoned at 64 hours, being added the time of 24 hours which the steamer is bound to remain at Suez after the arrival there of the mails, by order of the Hon. East India Company, total time allowed for passengers from Alexandria to Suez is 88 hours.

As is well known, the need to develop an overland route via Egypt originated in European Powers colonizing Asian countries. The idea to facilitate an overland route led to construct railways between Alexandria and Suez via Cairo, or to cut a canal connecting the Mediterranean Sea to the Red Sea. The English, after examining these projects, preferred the railway project, leaving the plan to dig a canal to the French.

In this article, the author will try to discuss some endogenous aspects of the railway projects, with an analysis of the then relations between Egypt and the Porte given by Helen Anne B. Rivlin.
Ⅲ. Deferred Construction of the Cairo-Suez Railway

At the urging of Mr Waghorn who extolled the virtues of a railway linking Cairo to Suez in 1832, Muhammad Ali, the Pasha of Egypt, seeing the benefits of Egypt's being a link between England and India, decided to commence with the project in as early as 1834. Galloway Bey, an Englishman who had spent many years in Egypt engaged in engineering enterprises, was charged with making the necessary surveys and estimates for the railway project.

Galloway Bey finished the surveys and estimates in April 1834, and submitted a report to the Pasha recommending the establishment of a railroad. This railroad would be used to transport carriages laden with goods or passengers to and from Cairo and Suez, a distance of 80 miles 24 chains, either by cattle, or locomotive steam engines. (See Figure 1) The Pasha wanted the carriages to go by steam at 12 to 15 miles per hour requiring about 6 hours to perform the journey, which had been taking an average of 24 hours.

Galloway Bey’s recommendation was approved by the Pasha, who was so satisfied with it to issue a firman to confer upon Galloway Bey the rank of colonel. The Pasha directed Galloway brothers’ establishment to carry out the work, in promotion of which, all the preliminary arrangements were made, and a large portion of the rails and machinery supplied. A statement of Messrs Galloway & Sons claim is as follows.

In Sept. 1834, His Highness Mohammed Aly, commissioned Messrs Galloway in Egypt to order from England the necessary rails and machinery for the construction of a railway from Cairo to Suez; which order was transmitted by them to Messrs Galloway & Son, Engineers in London, together with His Highness’s directions to follow the instructions of Galloway Bey, His Highness’s engineer who was deputed by His Highness to proceed to England to superintend the commission and at the same time to confer with the English government and convince them of the desire of His Highness to facilitate the Indian transit through Egypt. The original order for the commission is signed by Boghos Bey, minister of His Highness, and was duly preregistered in the administration of commerce. Galloway Bey then went to England, and used great caution to effect the objects of His Highness, and gave the necessary instructions to the House of Galloway & Son in London for the rails, and machinery, a portion of which rail and machinery arrived here within a reasonable time. And Galloway Bey having completed his mission, returned to
Egypt, ready to commence the railway, but political circumstances induced His Highness to defer its construction.

Unfavourable political circumstances in Turkey,¹⁷ and the sudden death of the Pasha's engineer, Galloway Bey in 1836 in Alexandria,¹⁸ caused the project to be deferred.¹⁹ After that, the Pasha seemed to become reluctant to try it again,²⁰ but actually he might have tried it two more times in 1843 and 1844. The statement continues:

In 1837, the House of Galloway & Co. here was requested by His Excellency Boghos Bey to suspend, as far as possible, the shipment of the remaining rails and machinery, which request was communicated to the House of Galloway & Son in London, and in Aug. 1838, Messrs Galloway in the City were requested by His Excellency Boghos Bey to annul the order. On both these occasions, Messrs Galloway explained to His Excellency, verbally and in writing, that the request of His Highness could not be complied with, unless a fair compensation was made. Some time afterwards, this question was discussed with His Highness and Boghos Bey, and Messrs Galloway having consulted the House of Galloway & Son in London, it was mutually agreed that the order of Sept. 1834 should remain in abeyance, upon the express condition that whenever a railway should be made in Egypt, the remainder of the order should be executed by Messrs Galloway.

From this time to 1843, political circumstances continued to defer the construction of the railway but in Sept. of that year, His Highness again determined on making it, and in pursuance of the agreement made in 1838, before mentioned, His Highness ordered W.R.H. Galloway to instruct the House in London to put in hand immediately the remaining portion of the order of 1834, and himself forthwith to proceed to London to superintend its execution. This determination of His Highness, to construct the railway was however again, in the month of Dec. unfortunately precluded by political circumstances. At the end of 1844, His Highness again signified to Messrs Galloway his intention of carrying out the railway, which was communicated to the House in London, and in consequence, Mr John Galloway, member of the House, of Messrs Galloway & Son, Engineers, came out with his assistants to commence the railway, and on his arrival here, His Highness gave him orders to make fresh surveys and plans of the Suez line with a view of introducing any improvements the experience of the last few years in railway might suggest in the original plan of his brother the Bey made in 1834²¹ and whose death had occurred here in 1836.
These plans and surveys were accordingly completed by Mr John Galloway, and were at several interviews submitted to and approved by His Highness, and Mr John Galloway also received an order from His Highness to prepare a note of the rails and machinery necessary to complete the railway. And after having been engaged here for four months in these affairs by order of His Highness, he returned to England as circumstances again determined His Highness to postpone the construction of this railway, but before leaving, Mr John Galloway received the assurances of His Highness that whenever a railway should be made in Egypt, the order for the rails and machinery should be given to the House of Galloway as before, and that he, Mr John Galloway should be appointed engineer to the line.

From that time the Pasha had been engaged in the expensive operation of the Delta Barrages, and it was not likely he would enter into the construction of the railway. The Pasha was said, in the meantime, to have disregarded the railway scheme, preferring its substitution by the construction of navigable canals. These canals could be constructed by local personnel at much lower cost without depending on foreign support, and would have two main advantages of transport and irrigation.

Figure 1. The Delta of Egypt

Source: Lionel Wiener, L’Egypte et ses chemins de fer (Bruxelles; 1932), Fig. 22, p.81 and Fig. 24, p.87.
IV. Construction of the Alexandria-Cairo Railway

After Abbas succeeded the Viceroy of Egypt in 1848, in order to find a powerful ally to aid him against his enemies in the Ottoman Empire, he offered, on 18 Sept. 1850, Alfred S. Walne, the British Consul in Cairo, to build a railway in Egypt at his own cost, which had long been desired by Great Britain, in exchange for British assistance at the Porte. Meanwhile in the beginning of 1851, Mr Robert Stephenson himself inspected the site in Egypt, and by March of that year the Egyptian Pasha had made up his mind to place the whole matter of constructing the railway from Cairo to Alexandria in Mr Stephenson's hands. His Highness Abbas Pasha 'expressly refused to give Mr Galloway the order for the rails, machinery and others assigning as reason that Mr Galloway had identified himself too much with His Highness Said Pacha thus violating the engagement of the Egyptian Government entered into by his predecessor, His Highness Mohammed Aly which, according to every principle of equity and public law, he was distinctly bound to the Messrs Galloway.'

On 12 July 1851, the contract for the engineering department of the Cairo and Alexandria railroad was signed and executed between Stephan Bey, minister of the foreign department, acting on behalf of the Viceroy, and Mr Michael Andrews Borthwick, acting on behalf of Mr Robert Stephenson, Esq., M. P. The main terms of the agreement consisting of 18 articles are:

1. Robert Stephenson shall by himself or other competent persons to be appointed by him superintend the planning laying out and construction of the railway and of all works and buildings (Article 1),
2. Robert Stephenson shall at his own expense procure all such assistant engineers, surveyors, draftsmen or other persons (Article 2),
3. His Highness shall pay to Robert Stephenson the sum of fifty six thousand pounds sterling by installments (Article 7),
4. His Highness shall supply at the expense of His Highness all such superintendence labour and labourers (Article 13), and
5. The railway, works, and buildings shall be completed within a period of three years to be reckoned from the first day of Sept. next ensuing the date of this agreement (Article 18).

Even after the conclusion of the agreement, some points of the railway plan were discussed in more detail between Mr Robert Stephenson and the Pasha of Egypt. As a
result of such discussions, the idea of the railway between Alexandria and Cairo was modified from the original one 'skirting the desert and leaving undeveloped the traffic of the richest part of Egypt'\(^{(31)}\) across 'the Barrage Bridges',\(^{(32)}\) to 'the line by way of Tanta and Benha'\(^{(33)}\) although Mr Robert Stephenson was reluctant,\(^{(34)}\) because it was to cross two branches of the Nile and some major canals by bridges or by a steam ferry. In addition, some extra works were found necessary beyond those described in the plans and specifications of the original contract. These extra works were necessary to complete a steam ferry and bridges at Kafr al Zayyat, Banha and Birkat al Saba. Mr Edward Price, the contractor, requested Mr Robert Stephenson to issue a certificate for the payment of twenty-six thousand seven hundred and sixty-six pounds seven shillings and three pence (£26,766.7.3) for the extra works, £12,000 of which Mr Robert Stephenson considered the contractor was allowed in addition to the £133,000 stated in the original contract.\(^{(35)}\)

In order to cross the distance of 1,100 feet of the western branch of the Nile at Kafr al Zayyat, according to the original contract, a steam ferry was designed by Mr Robert Stephenson, and at his works at Newcastle-upon-Tyne the several parts of the structure were manufactured, which were afterwards fitted together on the Nile, and the total cost of which, including the jetties, amounted to £18,000.\(^{(36)}\) A paper describing the ferry says as follows:\(^{(37)}\)

The length of the ferry is 80 feet, its height about 60 feet, and the width of the ferry-boat at the bottom is also 60 feet. It is worked by two steam-engines, each of about 15 H.P.,......, and their united power suffices to take this gigantic framework, and its railway-load of carriages and passengers, across the Nile in six minutes. .... The progress of the railway system, and more enlightened views now entertained, have since led to the adoption of a fixed bridge. In the present case, it was requisite to comply with financial and other local arrangements, which for a time prevented the erection of so capacious a bridge.

......Captain Moorsom remarked, that he had crossed the Nile ferry twice, and on each occasion there was a delay in the starting of the trains from the opposite shore, of from an hour and a half to two hours. ..... He understood, in the present instance, that the ferry was to be superseded by a permanent bridge, which would cause a saving of an hour and a half, or two hours in a journey of only seven hours.

The steam-ferry at Kafr al Zayyat was superseded by a permanent bridge very soon after the opening of the Alexandria-Cairo railway with an added cost of £150,000. \(^{(38)}\)

As for the amount of the rails in store which had been ordered and supplied for the
deferred construction of the Cairo-Suez railway and should be used for the construction of the railway between Alexandria and Cairo, Mr Borthwick, acting on behalf of Mr Robert Stephenson found, against his expectation, that there were only 12 to 15 miles instead of 40 miles.\textsuperscript{(39)} Concerning a double or single line of way, Mr Robert Stephenson wrote in his letter of 24 March 1851, 'I saw no such traffic as to justify my advising the outlay that a double line would involve. I am satisfied we have erred in this country in having many lines double which have been quite sufficient if single.'\textsuperscript{(40)} Even in his report dated 22 Dec. 1851, he mentioned, 'I still think that my original view of a single line is correct. The permanent way will of course remain single, and also the large bridges at Benha and Berket el Saba, but I am disposed to advise the embankments and ordinary masonry be made for a double line also between Alexandria and Kafr Azzayat.'\textsuperscript{(41)} All these modifications and changes of the original plan caused an increase of the construction cost and delay of the completion of the railway.

The construction cost of the railway for the 140 miles between Alexandria and Cairo was originally estimated by Mr Robert Stephenson in April 1851 to be £6,000 per mile, or £840,000 in all, which was made up by the following figures.\textsuperscript{(42)}

1. Earthwork and bridges £350,000
2. Rails and permanent way 280,000
3. Stations and rolling stock including ten engines with necessary carriages, waggons etc. 100,000
4. Engineering superintendence 70,000
5. Margin for contingencies 40,000

Total £840,000

Also in March 1851, Mr Robert Stephenson proposed his own remuneration to be about £500 per mile, totaling £70,000 for the 140 miles between Alexandria and Cairo which included salaries and expenses of assistant engineers, surveyors, draftsmen or other persons whom he was to employ.\textsuperscript{(43)} But finally, as was mentioned above, the total amount of his remuneration was agreed to be £56,000 in the Article 7 of the contract concluded in July 1851.

There is an estimate of the actual construction cost of the Alexandria-Cairo railway with some standards different from those of Mr Robert Stephenson, in which:

1. The distance of embankment was 131 miles,
2. Badly remunerated native forced labour was employed,
3. The land for the line was taken without payment of compensation except in the case of a portion of the area occupied by the station at Alexandria, and
4. Reckoning the cost of rolling stock was excluded.
According to this construction cost analysis, the actual total cost of the railway was £661,090, or £700,000 with contingencies included. This breaks down to £5,340 per mile. Not included in this analysis is the above-mentioned £150,000, or the amount added to complete the bridge in lieu of the ferry over the western branch of the Nile. With this cost included, the project cost £850,000 in total, or nearly £6,500 a mile. The breakdown of the total cost is as follows.\(^{(45)}\)

\[
\begin{array}{ll}
1 & 131 \text{ miles of embankment, at £800 per mile} \quad \text{£104,800} \\
2 & \text{Rails and ironwork — say 131 miles, at 220 tons per mile}, \\
 & \text{at £5 5s. per ton} \quad 151,305 \\
3 & \text{Freight, &c., — say 35s. a ton on } 131 \times 220 \quad 50,435 \\
4 & \text{Laying the rails — say at £50 a mile for 131 miles} \quad 6,550 \\
5 & \text{Tubular bridges and ferry (by contract)} \quad 133,000 \\
6 & \text{Labour, &c., supplied by Pasha of Egypt} \quad 30,000 \\
7 & \text{Other bridges and culverts} \quad 20,000 \\
8 & \text{Stations at Alexandria and Cairo, and workshops at Boulak} \quad 50,000 \\
9 & \text{Stations along the line} \quad 15,000 \\
10 & \text{Superintendence of all kinds} \quad 100,000 \\
\hline
\text{Total} & \text{£661,090} \\
\text{Allowance for all contingencies} & 38,910 \\
\hline
\text{Total} & \text{£700,000}
\end{array}
\]

Another estimate of the actual construction cost of the line was £11,000 per mile for the 140 miles, with partly double and partly single track covered, including the initial provision of rolling stock.\(^{(46)}\)

In 1856 when the railway between Alexandria and Cairo was opened two years later than scheduled, and yet before the link between Suez and Cairo was established, the contract time to forward mail through Egypt was 75 hours for outgoing mail, and 65 hours for incoming.\(^{(47)}\) Between 29 Aug. and 3 Sept. 1856, three vessels arrived in Egypt. The following is an account of how long mail took to arrive at its destination.\(^{(48)}\)

The **Cadiz Steamer** arrived on 29 Aug. at 7 pm at Suez. The Steamer's cargo and baggage arrived at Alexandria on 1 Sept. at 10 am. The **Nubia Steamer** arrived at Suez on 2 Sept. at 8.20 am, and her holdings reached Alexandria in 78 hours. The last vessel, the **Pera Steamer**, docked at Alexandria on 3 Sept. at 5.30 pm. The whole of her cargo was delivered to Suez in 65 hours on 6 Sept. These three vessels brought with them 7,754 packages of cargo and treasure valued at approximately 1.25 million sterling, the whole of which was carried through in proper time.
without loss. The number of camels employed in transit was 1,750, of which a good number died from fatigue and lack of water. As there was a lack of water in Suez, a large number of camels could not remain there for a long time without inflicting great suffering on the inhabitants of Suez.

Table 1 shows land tax (miri) including the tax on date trees collected in each of provinces in 1853, before the opening of the Alexandria-Cairo railway, in 1856 when the railway was opened, and in 1858, just before the opening of the Cairo-Suez railway. This table was formed with an assumption that the land area and number of date trees were the same in the three years indicated, when Egypt needed as much land tax as possible. Between 1853 and 1856, the subtotal of land tax both in Upper and Lower Egypt increased at the almost same rate according to the indices. However the amount of land tax per fad-

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<td>Kelyoub</td>
<td>141,117</td>
<td>19,850,327</td>
<td>21,068,334</td>
<td>49,957,206</td>
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<tr>
<td>Rhoda el Bahrie</td>
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<td>132,886,60</td>
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<tr>
<td>Dakealilah</td>
<td>346,610</td>
<td>36,059,393</td>
<td>38,434,470</td>
<td>60,073,145</td>
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<tr>
<td>Sharkieh</td>
<td>349,753</td>
<td>22,927,395</td>
<td>28,524,360</td>
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<tr>
<td>Ghizeh</td>
<td>142,329</td>
<td>18,156,152</td>
<td>20,545,171</td>
<td>26,878,193</td>
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<td>Lower Egypt Subtotal</td>
<td>2,039,900</td>
<td>215,867,077</td>
<td>245,147,055</td>
<td>299,613,694</td>
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<tr>
<td>Index</td>
<td>100</td>
<td>114</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Purses/faddan</td>
<td>0.106</td>
<td>0.120</td>
<td>0.147</td>
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<tr>
<td>Total</td>
<td>3,525,079</td>
<td>348,396,699</td>
<td>397,445,224</td>
<td>501,898,665</td>
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<tr>
<td>Index</td>
<td>100</td>
<td>114</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>Purses/faddan</td>
<td>0.099</td>
<td>0.113</td>
<td>0.142</td>
<td></td>
</tr>
</tbody>
</table>

* Transliteration of the names of provinces depends on the source.
Source: A comparative statement of the revenue from the land tax of Egypt in the years 1853, 1856, and 1858, Inclosure in FO Desp. No. 66 of the 1 May 1858 in FO 141/36.
Jordan increased more in Upper than in Lower Egypt. Between 1853 and 1858, and between 1856 and 1858, the figures of the table suggest that both the subtotal of land tax and the amount of land tax per faddan increased at higher rates in Upper Egypt with no railway, than in Lower Egypt with newly constructed railway.

V. Construction of the Cairo-Suez Railway

When Mr Robert Stephenson visited Alexandria, Cairo and Suez in Jan. 1851 in order to inspect the site, he wrote from Suez that, 'the present mail road would not do well for a railway.'(49) He was going to return from Suez to Cairo by camel, 'through another part of the district and through which any railway that may be made will most likely pass.'(50) In addition, Mr Robert Stephenson commented on the idea of constructing navigable canals instead of a railway to which, as was mentioned above,(51) the late Pasha, Muhammad Ali had preferred in the decline of his life, by saying that 'the railway is painfully easy and the canal full of difficulty.'(52)

The construction work of the Cairo-Suez railway was started immediately after the completion of the Alexandria-Cairo railway. The length of the Cairo-Suez railway was estimated to be 88 miles, and in the absence of detailed levels, the construction cost could not be precisely defined.(53) Based on judgment and experience, the cost was estimated not to exceed £6,500 per mile, giving £572,000 as the maximum capital to cover everything. The amount did not account for rolling stock, which was necessary as between Cairo and Alexandria, did not require an increase of more than 25 or 30 per cent to accomplish the traffic to Suez.(54) Mr Robert Stephenson was expected to reduce the estimate of the construction cost when the detailed plans and sections were submitted.(55)

It was proposed that the first section of 20 miles should be completed in March 1856, and the whole line should be finished in March 1857.(56) Actually the Cairo-Suez railway was completed at the end of 1858, and the first train arrived at Suez on 5 Dec. 1858.(57) On 25 May 1859 the railway was opened for traffic between Alexandria and Suez.(58)

In 1857 when the construction of the Cairo-Suez railway was occurring, it was pointed out by an anonymous English person that the line under construction was involved in the inextricable difficulties of encountering sand, high land levels and want of water.(59) The desert where the workers were employed for the railway construction was entirely without water, which was supplied from Cairo.(60) Nearly the same situation might be said for Suez itself, whose inhabitants, about four thousand, were supplied with brackish water from springs two and a half hours away. These sources barely yielded enough water for
the existing population.\textsuperscript{(61)} The plans and sections of Egyptian railways were somewhat state secrets, but the gradients of the line under construction were exceedingly disadvantageous, because the waterless line had a summit level of about 850 feet above Suez, and 800 feet above Cairo.\textsuperscript{(62)}

Galloway Bey had noticed the problems of a lack of water, and the difference of land levels in his surveys and estimates which were originally ordered by Muhammad Ali in 1834.\textsuperscript{(63)} Galloway Bey mentioned:

...... there is no water to be found between Cairo and the Fortress of Agoroot, the nearest point from Suez ......, under these circumstances it is necessary that a provision be made for the supplying of water, which I would propose to be effected ...... by means of moveable tanks ......
The difference of level between the point where I left off at the Tomb, ......, and the Gate of Suez, ...... is just 103 feet 33 decimals higher than Suez.

Muhammad Ali counter proposed on how to supply water to Galloway Bey's proposal.\textsuperscript{(64)}

As to the means of procuring water, instead of having recourse to moveable tanks for the purpose, we might employ water pipes of the thickness of two inches considering the short distance between Cairo and Suez. ...... What is your opinion regarding that method? Do you think water can be obtained by these means?

Galloway Bey responded to Muhammad Ali.\textsuperscript{(65)}

I must again repeat that it will be indispensably necessary to establish water stations not exceeding ten miles apart to enable the engines in their route to take in a supply of water, as each engine will evaporate 200 gallons of water per hour, ......
In reply to Your Highness' demands relative to the laying down piping from Cairo to Suez, to convey water to the several stations.
It has no doubt appeared to Your Highness as it would to many persons a most feasible plan, particularly as I informed you in my report that Cairo was 103 feet higher in its level than the town of Suez. But although this is the case as regards those two points, yet we have many points very considerably higher, which had I have anticipated Your Highness mind, would have been at work in forming projects connected with same, I would certainly have communicated more in detail than I then
considered was necessary, but which I must now recite, to support my argument and opinion.
I am decidedly of opinion, that to lay down pipes for the conducting of water as suggested, would, although not impossible, be a most tedious, difficult, and expensive plan.

It is usually pointed out that the Cairo-Suez railway was closed due to the opening of the Banha-Zaqazig-Ismailiya-Suez railway in 1868, and to the opening of the Suez Canal in 1869. But the actual process of the closure of the Cairo-Suez railway might be more complicated as mentioned below.

An anonymous English viewpoint suggested that the Suez line under construction would be disastrous from beginning to end. This could be rectified by stopping the rails halfway between Cairo and Suez, and then constructing an entirely new line from Banha to Suez. The construction contract of the intended line from Banha to Zaqaziq was granted to Mr Henry J. Rouse, who was one of Mr Stephenson’s late principal assistants in the superintendence of the Alexandria and Cairo line.

In 1868 when the railway direct from Alexandria to Suez was opened via Zaqaziq, the Cairo-Suez railway was abandoned for through mail transport. In addition, the opening of the Suez Canal in Nov. 1869, rendered this direct railway link between Alexandria and Suez obsolete. However, steamers could only proceed through the Suez Canal during daylight, and in view of the slow rate of passage permitted through the Suez Canal (about 5 miles an hour), the mail continued to be sent across Egypt on the railway, on which the maximum speed was from 25 to 27 miles an hour. In 1888, when the Suez Canal authorities withdrew the restriction against night travelling on condition that the packets carried powerful electric head lights, the use of the direct cross railway route was cancelled, and the Suez Canal was used for post and passengers alike.

VI. Conclusion

The virtues of a railway linking Alexandria to Suez via Cairo were clear early in the beginning of the nineteenth century, however, it was not easy for Muhammad Ali to commence with a railway construction project from Cairo to Suez across the desert. He had planned to carry it out three times during the period from 1834 to 1844, but he had had to defer all three plans mainly due to the then unfavourable international political circumstances surrounding Egypt. Muhammad Ali who saw well the benefits of Egypt’s being a
link between England and India was not, after all, successful in linking Cairo to Suez by a railway.

Abbas Pasha who succeeded the Viceroy of Egypt in 1848 made up his mind to build a railway in Egypt, a line between Alexandria and Cairo at the first step, which had long been desired by Great Britain, in exchange for British assistance against his enemies at the Porte. Robert Stephenson was nominated to be responsible for the railway project, the original plan of which was modified resulting in increasing the construction cost, and the line was completed in 1856 two years later than originally scheduled. Although the effect to regularize transit of mail, and decrease the necessary time of it by the railway constructed in the Delta was almost satisfactory, land tax increasing effect of the railway for the Egyptian government was not so prominent in the short run.

The construction work of the railway between Cairo and Suez across the desert was commenced immediately after the completion of the Alexandria-Cairo railway. It was pointed out that the line under construction was involved in the inextricable difficulties of encountering sand, high land levels and want of water in the desert. It was suggested that the disaster of the line could be rectified by constructing an entirely new line from Banha to Suez avoiding across the middle of the desert. The desert line from Cairo to Suez opened in 1859 was soon abandoned for through mail transport and replaced in 1868 by the newly constructed line from Banha to Suez via Zaqaziq. In 1888 this direct cross railway route was cancelled and instead the Suez Canal opened in 1869 was used for post and passengers alike.

NOTES

The author of this article owes it to Messrs Michael R. Bailey, Alan C. Clothier and many other persons that he could collect documents, and could read and understand them, from which he is quoting many evidences in this article.

(1) In this article, the first railways mean the first main railways between Alexandria and Cairo, and between Cairo and Suez.

(2) Halford Lancaster Hoskins, British routes to India (New York, London, Toronto; Longmans, Green and Co., 1928), Chapters I to VIII.


(4) Alexandria, 25 May 1847, Mr Davidson's report on transit affairs in FO 141/13.

(6) Information for the guidance of travellers to India via Egypt, with a map of the route, from Alexandria to Suez (London; J. Unwin, 1842) in FO 141/13.

(7) One of early such examinations is John Alexander Galloway, Communication with India, China, &c., observations on the proposed improvements in the overland route via Egypt, with remarks on the ship canal, the Boulac Canal, and the Suez railroad (London; John Weale, 1844), in Egyptian National Railways Museum, Document 10.


(9) John K. Sidebottom, p.165, Appendix M.


(12) Cairo, 12 June 1834, Letter to His Highness in answer to his on the subject of laying down water pipes on the Suez road in Egyptian National Railways Museum, Document 5.

(13) John Alexander Galloway, p.5.


(15) John Alexander Galloway, p.4.

(16) Fry to Bruce, Alexandria, 28 April 1856, A statement of Messrs Galloway & Sons claim on the Egn. govt. in FO 141/30. See also 8 June 1853, Correspondence on Mr Galloway's claim in FO 141/21.

(17) See note (9).

(18) Fry to Bruce, Alexandria, 28 April 1856, A statement in FO 141/30.

(19) John Alexander Galloway, p.4.


(21) Mr John A. Galloway was given orders by His Highness to make fresh surveys and plans of the Suez line on 23 Jan. and on 11 March 1845, he submitted a letter to His Highness to tell the completion of the requested surveys, John A. Galloway to Highness, Cairo, 11 March 1845 in Egyptian National Railways Museum, Document 11.

(22) Palmerston to Murray, Foreign Office, 8 Feb. 1847, Correspondence respecting the transit through Egypt, No.12 in FO 407/3.

(23) Egyptian railways in 125 years 1852-1977 (Cairo; Egyptian Railway Press, 1977), p.3.

(24) Murray, Cairo, 1 March 1851 in FO 407/19.

(25) Helen Anne B. Rivlin.


(28) 'Under the circumstances, they were compelled to claim compensation from the government of His Highness Abbas Pacha. The proceedings for such compensation were however immedi-
ately discontinued on the happy accession of His Highness Said Pacha as Viceroy. Mr Galloway being persuaded that His Highness, who is fully acquainted with all the merits of the case, would do him justice, more especially as His Highness had promised Mr Galloway frequently, that he should have the order for the railway, whenever His Highness should become Viceroy. His Highness however having given the order for the rails to another house, and having, as before stated, deputed Mr De Lesseps to obtain from Mr Galloway the particulars of his claim, the question is at once simplified, viz the amount of the indemnity.’ See note (18).

(29) Murray to Palmerston, Kafr Maggiar, 16 July 1851 in FO 424/7A. The reason why this dispatch was from Kafr Maggiar was, ‘...for the sake of the success of the project, the Wall maintained absolute secrecy about the agreements. Interviews on the issue were held at a small village called Kafr Magar situated in the north western region of the Delta near Dessouk some distance from Cairo and Alexandria.’ See note (22).

(30) Lionel Wiener, L’Egypte et ses chemins de fer (Bruxelles; 1932), Annexe A.

(31) Murray to R. Stephenson, 6 Sept. 1851 in FO 141/19.


(33) R. Stephenson to Murray, Cairo, 22 Dec. 1851, Mr Stephenson’s report on the proposed arrangements for the Egyptian railway in FO 141/19.

(34) R. Stephenson to Murray, London, 19 Sept. 1851, Relative to railroad in FO 141/19. Herapath’s Journal, 20 Dec. 1851 reported as follows. ‘Mr R. Stephenson, who arrived in Egypt on 25 ultimo, in order to inspect the country well, and to come a final decision with regard to the precise course to be adopted for the Egyptian railway, seems to think that the best plan will be to carry the railroad over the barrage, where the bridges are in a very forward state.’ — ‘Times.’


(37) Ibid., pp.56-7 and p.64.

(38) Railway in Egypt; Communication with India (London; 1857), pp. 26-8.

(39) M. A. Borthwick to Murray, 15 July 1851 in FO 141/19, and M. A. Borthwick to Murray, Alexandria, 6 Aug. 1851, That there are not more than 12 to 15 miles of available rail for the railroad, in the Country in FO 141/19.

(40) See note (31).

(41) See note (32).

(42) R. Stephenson to Murray, London, 5 April 1851, Proposed arrangements to be carried out in the construction of the railroad between Cairo and Alexandria in FO 141/19.

(43) See note (31).

(44) See note (37).
Ibid., Appendix, p.iii. The payment of £12,000 for the extra works executed by Mr Edward Price (See note (34)) is not included in this total cost.


Green Bey, director, transit administration to Bruce, Alexandria, 12 Sept. 1856, Respecting the transit of the mails through Egypt in FO 141/30.

Ibid.

See note (25).

Ibid.

See note (22).

See note (25).

Railway to Suez, Thurburn's proposal and letter in FO 141/19.

Ibid.

Ibid.

Ibid. The construction schedule might be proposed depending on the original plan to complete the Alexandria-Cairo railway within a period of three years. See note (29).

M. Nubar to Monsiuer J. Green, Cairo, 5 Dec. 1858, Reports completion of the railway to Suez in FO 141/36.

John K. Sidebottom, pp.80-1.

See note (37), p.87.

Ibid., p.55.

Ibid.

Ibid., p.57 and p.61.

See note (11).


See note (12).

J. Marlowe, p. 82, n. 1 and C. Issawi, p. 412.

See note (37), p.21 and p.61.

Ibid., p.24.

John K. Sidebottom, p. 81.

Ibid.

Ibid.

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