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**"Brief Account of the Woosung Railway."**

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FOR many years engineers have been anxious to see a beginning of railways in China. Any success in this direction would not only open an important field of engineering labour, but would also greatly promote economical intercourse with that country. Many attempts have been made; but difficulty has always arisen from the unwillingness of the local authorities to sanction the proposed works, and from the reluctance of the Central Government to interfere with the responsibilities of its Viceroy. After much patient waiting, Messrs. Jardine, Matheson & Co., of Shanghai, and their friends succeeded in acquiring a strip of land for a distance of about 9 miles, from Shanghai to Woosung. As they possessed no compulsory powers, this was, of course, a costly proceeding, and the funds at the disposal of the committee were nearly exhausted in the purchase of the necessary land and graves. Still it was felt that the effort should not be abandoned without trial, and a small company was formed under the title of the Woosung Road Company, with the intention of constructing a road, tram-road, or railroad, as opportunity might offer. In the course of the year 1875 the Author submitted to Messrs. Jardine, Matheson & Co. an estimate for a railway on a small scale, which could be carried out at comparatively little further outlay, in addition to that which had already been incurred. It was also thought that, as it was doubtful how far the opposition to railways might extend, and what character it might assume, it would be advantageous for the first railway to be of moderate proportions. With this view, a very small engine was proposed to be sent in the first instance. In anticipation of some opening occurring in China, an engine had been specially built by Messrs. Ransomes and Rapier, of Ipswich. It weighed about 30 cwt. in working order, and it easily maintained a speed of 15 or 20 miles an hour. It was intended that if this little engine were not objected to, it should be immediately followed by others of 8 or 10 tons weight.

A contract was now entered into between the Woosung Road Company and Mr. John Dixon, Assoc. M. Inst. C.E., to complete

and equip a railway on the basis of the estimate above referred to, Mr. Dixon agreeing to take a large part of his payment in shares in the undertaking. The materials were sent out in October 1875, and arrived at the beginning of the following year.

An embankment, about 8 feet high, had been constructed along nearly the whole length of the line, in order to place the railway above flood level. This embankment had been made, from time to time, as the land was purchased, so as to prevent the previous owners resuming cultivation and possession.

The laying of the permanent way was commenced in January, 1876. The rails were of the Vignoles section, weighing 26 lbs. per yard, and were laid on cross sleepers, the gauge of the line being 2 feet 6 inches. The gauge was purposely fixed thus narrow, partly for economy, and partly to ensure the thorough consideration of the gauge question at the next stage of railway making. For a populous country like China, everyone concerned was in favour of the gauge of 4 feet 8½ inches, but funds did not admit of its adoption for the experimental attempt.

There were about twenty small wooden bridges on the line over narrow creeks, but no works of importance. The chief item of expense was the ballast. This had to be brought a distance of about 70 miles in boats, at a cost of about 5s. per cubic yard.

The little engine began to run on the 14th of February, 1876, and was received by the Chinese with enthusiasm. There were frequently as many as ten thousand visitors in a single day to see it at work. It is noteworthy that the news of this favourable reception reached London the same evening.

There seemed now to be no likelihood of opposition on the part of the people, and the completion of the line with its permanent engines and rolling stock was pushed forward as rapidly as possible. The first 4 miles were opened for public traffic on the 3rd of July, 1876, and the whole line was completed in August, but was not opened until the 1st of December, of that year. Of the permanent engines, two weighed 9 tons, and one 13 tons, in working order. The rolling stock consisted of two first-class, two second-class, and eight third-class carriages, each accommodating about twenty-five passengers. It frequently happened, however, that the carriages had double their proper complement of passengers without any accident occurring. Indeed, during the whole working of the railway there was no accident to life or limb, except in the case of one man who committed suicide; and no accident to property, excepting that a spark from an engine once caused damage to the extent of £90.

The daily service of trains consisted of seven each way, performing the distance of 9 miles in thirty-five minutes, with two intermediate stoppages. The first-class fare was one dollar, the second-class half a dollar, and the third-class one-sixth of a dollar for a single ticket. Nearly all the passengers travelled third-class, there being only one first-class passenger and two second-class passengers to eighty third-class. The number of passengers per train averaged about one hundred, and frequently exceeded three hundred. The station-masters, drivers and guards were Englishmen. The booking-clerks, firemen and platelayers were Chinese. They were very tractable, and discharged their duties with efficiency and success.

A principal objection offered to railways in China has always been an alleged fear of depreciation of property near the line, owing to the disturbance of the "spirits of the air and of the earth." The only effect this railway had on property was the usual one, to cause a great increase in the market value of land and houses near it. The village of Kung-wan, the principal intermediate station, experienced advantages perceptible at every turn. Besides the more substantial evidences of prosperity, there was at the stations a constant stand of wheelbarrows, just like an English cab-rank. Boatmen also obtained greatly increased occupation. It was satisfactory that so practical an answer was at once given to the principal objections which have been urged against railways in China.

The railway was in itself highly successful, being freely used by all classes of the community. There can be little doubt that the experiment would have been continued, had it not been for the untoward dispute between the British and Chinese Governments with reference to the unfortunate murder of Mr. Margary. This dispute gave the Chinese authorities an opportunity of alleging a grievance in the matter of the railway. The difficulty was eventually settled by the suggestion of Li Hung Chang, that the Chinese Government should purchase the undertaking. As that statesman was known to hold very enlightened views, this proposition was acceded to by the company. It was, however, exceedingly distasteful to the Governor of the province, who had to carry out and complete the arrangements. The purchase sum for the railway was fixed at 285,000 taels, or about £78,000 sterling, so as just to cover the outlay made by the company, and the final instalment was paid in the month of October 1877.

In the meantime, Ting Futai, the Governor of Formosa, had expressed a desire to begin railway work in that island. The

Governor of Nankin therefore availed himself of this opportunity to get rid of the railway of which he was now the possessor, but which he did not wish to keep. Every effort was made to avert so retrograde a step. His Excellency Kuo Sung Tao, the Chinese Minister in London, made representations on the subject, which were also endorsed by the British Government; but all was to no purpose. The railway was at the mercy of the Governor of Nankin, who was annoyed at having been obliged to arrange for its purchase, on behalf of his Government, against his will. He ordered that the whole of the materials and plant should be sent by ship to the Island of Formosa. The shipment was carried out, but Ting Futai did not know that skilled engineers are a necessary part of any railway enterprise, and so no arrangements were made for any of the staff of the line to accompany the plant. Consequently the materials and machinery were landed in such a careless and negligent manner, that it is scarcely anticipated they can prove of any service.

There were about eighty shareholders in the undertaking, of whom about forty were Chinese, but the funds were chiefly found by the English subscribers. Mr. G. J. Morrison, M. Inst. C.E., was the resident engineer, and Mr. G. B. Bruce, M. Inst. C.E., was the honorary engineer in England.

Mr. Morrison has presented to the Library of the Institution a manuscript volume containing an authentic account of the undertaking, together with a full copy of all the correspondence which at any time passed with the Chinese authorities on the subject. This latter is of especial interest in view of the allegations which have been made to the disadvantage of the promoters of the undertaking; and it is of scarcely less interest in the glimpse which it gives of the Chinese view of such matters. This statement of all the facts affords complete evidence as to the entire *bona fides* of the company throughout. Mr. Morrison continues to reside at Shanghai, with the hope of making a substantial beginning of railways in a little time.

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