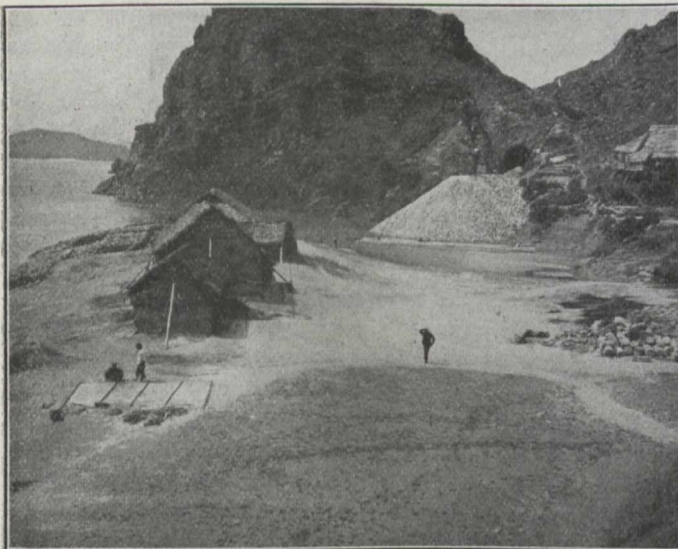


the debt for the repurchase of the concession, together with all assets of the late A.C.D. Company, chief of which was the thirty miles of finished line. The three companies shared the assets and liabilities of the A.C.D. Company in the proportion of 3:3:1 for Kwong Tung, Hunan and Hupeh. Receipts from the branch line were at that time averaging \$500 gold per day.

The Kwong Tung Company with a capital of, I think, twelve million dollars, Mex., was organized at Canton amid great enthusiasm. "China for the Chinese" was the slogan, and "No foreigners need apply." Shares were sold to Chinese only, and single shares of \$1 face value might be subscribed for. Great excitement prevailed in Canton, and when the shares list was opened for subscription, it was 50 per cent. over-subscribed.

This Kwong Tung Company is the most wealthy and most progressive of the three. They spent about a year only, squabbling over the appointment of officials. Kwong King Yang, a graduate of Columbia University, was made chief engineer. He advocated the employment of foreign engineers under himself, to supervise the actual construc-



South Portal of Tunnel at Tai Miu Hop. Top of Concrete Culvert Showing Above Water at Toed Embankment.

tion. For several months the company was without a president, and no one would assume the responsibility of ordering the material or certifying the accounts for material already purchased and work already done.

At last Sir Chen Tung Liang, late Chinese Ambassador at Washington, accepted the presidency. He is one of the most high-minded and capable officials of South China, and from that date progress commenced.

In the spring of 1907 the company commenced engaging resident engineers. A Chinaman was given the first residency, the second and fourth were given to Japanese, the third to a Norwegian, the sixth to a Swiss, the fifth and seventh to Canadians, Mr. J. Hutton, of Goderich, Ont., and myself, and the eighth to an American, Mr. J. C. Hyer. Mr. R. R. Carr Harris, jr., a Canadian, was made divisional engineer, in charge of 50 miles of construction, while Mr. J. T. M. Burnside took charge of a locating party of three Canadians, Messrs. Jordan, McDonald and Baby, the balance of the party being Chinese.

This brings the history of the Canton-Hankow Railway up to the time when the writer arrived in China, in July,

1907. For the succeeding four years construction and surveys were pushed forward as actively as possible. Under K. Y. Kwong, chief engineer, contracts for grading were let during the first two years up to mile 90, and during 1909 and 1910 up to about mile 140.

At first the chief engineer let all grading contracts in small sections of 100 feet to 1,000 feet, or 1 cut or 1 fill, etc. No attempt was made to induce big firms to undertake any considerable portion of the line.

With the advent of the foreign engineers came the letting of larger contracts; from five to ten miles of heavy work being let in one piece. There were no big native contracting firms and the company would not hear of any foreigner securing a contract, although several firms were anxious to take over the construction of a part or the whole of the line. For the first thirty miles north of Canton the line traverses an almost level country, only a few feet above the sea and subject to almost annual inundations by the overflowing of the North river, the Pei Ho. After this, from mile 30 to mile 50 a more broken country is passed through, though the grade does not at any point reach an altitude of one hundred feet above sea level. About mile 50 the valley of the North river is reached, and this is followed for over 200 miles, in fact, right to its source in the Che Ling Pass, in the extreme north of the province. Thence following down the Hsiang river in Hunan through Chang Sha, and on to Hankow.

In the gorges of the North river some of the heaviest work is encountered. From mile 60 to 70 the quantities amounted to a million and a half yards; about 30 per cent. solid rock. Miles 70 to 80 were a little heavier and about 50 per cent. S.R. In these 20 miles are four tunnels in sandstone or granite rock, and ranging in length from 250 to 1,000 feet.

Bridges and culverts were all of a permanent character and were mostly built by the company, employing day labor. The first bridge worthy of note is the Kotong river bridge, 20 miles north of Canton. This was, I think, eleven spans of 30 feet each—D.P.G.—on concrete piers about 25 feet high. The Kong How river required two spans of 200 feet each; the Woong Ngan at about mile 95, 1,180 feet long and about 70' above bed of stream, 60' D.P.G.'s. with 2-200' river spans. The Shiu Kwan Bridge over the North river, about mile 143, five spans of 200' each; sub-grade being about 90 feet above W.L.

While these are the principal bridges, smaller spans were numerous. Owing to the severe floods on the North river, where the water sometimes rises 50 ft., the grade had to be kept high. This necessitated long culverts and high bridge abutments, 50 and 60' usually.

Most of the bridge foundations were in soft yielding clay, requiring piling. On residency 7, between 3,000 and 4,000 piles were needed; yet there was not a single steam pile driver on the work. The piles were all driven by drivers operated by hand winches, striking about one blow per minute at best. The chief engineer objected to the use of steam pile drivers on the ground of economy, and the difficulty of moving them about in a country of no roads.

Consequently the work of putting in foundations took much longer than necessary. A foundation which had been under way long enough to have been easily finished, had proper methods been employed, would be perhaps half done when a flood would sweep over the entire work, and 30 or 40 feet of water cover the excavations for two or three weeks. By the time everything was under way again a couple of months would have elapsed. This was repeated again and again at the same bridge, with repeated losses of material and equipment at each flood.