with an average of 66,000 lb. ultimate strength, 36,000 lb. elastic limit, and 25 per cent. elongation in small test specimens. None of the bars tested to destruction were broken in the head, and it is believed that great uniformity has been secured in their manufacture.

The vertical posts are shop riveted in lengths of from 45 to 77 feet, and field connections are made with main pins up to 24 inch diameter, and with 500,000 7/8-inch and 1 inch field driven rivets, and 10,000 turned bolts.

It is interesting to note that in the 1,710 feet spans of the Forth Bridge, which is entirely of riveted construction with tubular compression members 12 feet in diameter, built up piecemeal in position, there is 9½ lb. dead load for every pound of live load, while in this longer pin-connected span with shop built members the proportion of dead to live load is only 4⅛ : 1.

View of South Anchor and Cantilever Arm Under Construc tion.

The south cantilever arm containing 10 panels was erected last year to the point where the south end of the suspended span will be connected.

The photographs show the erection traveller in position, the traveller track for the cantilever arm being carried on temporary floor beams suspended from the lower chord pins which project for that purpose.

The bridge is being built by the Phoenix Bridge Company, Phoenixville, Pa., for the Quebec Bridge and Railway Company, under the direction of Mr. E. A. Hoare, the company's chief engineer.

THE ENGINEER, HIS SCOPE AND QUALIFICATIONS.*

By John Hays Hammond.

This is the era of the engineer. To her supremacy in the industrial art, rather than to the triumphs of diplomacy and of war, America owes her recognized position in the forerank of the nations of the world. Therefore, it is not an idle boast to claim for the engineering profession a large, if not, indeed, the chief part in this attainment. Not only in the development of new spheres of activity, but among the pioneers of civilization itself, the engineer has been ever in the van. First, as the mining engineer in quest of gold, and then followed his confreres, the civil, the mechanical, and the electrical engineers in turn.

Though, as I have said, the engineering profession has done much to promote the welfare of mankind, there has been, I think, a wholly inadequate appreciation of its services.

I do not wish to lay myself open to the imputation of commercialism by intimating that success can be best reckoned in dollars and cents. But nevertheless, I do confess my conviction that money is an important consideration in the measure of accomplishment. I hasten to disclaim, however, any intention to disparage the admirable work done by engineers sometimes in a position where the guerdon lies not in the pecuniary recompense, but in the winning of fame, which is, indeed, more precious than any other testimonial of success. Notwithstanding this reservation, I believe that we owe it to our profession to insist upon a fair monetary compensation for our service as engineers.

In common with that of the wage-earner, the remuneration of the engineer is determined largely by the law of supply and demand. Until within the past few years there has been a superabundance of engineers, and the shrewd business man has not been slow to take advantage of the situation to cut down salaries and fees. To prevent the recurrence of this condition and the consequent professional congestion—if I may use the term—I advocate the extension of the scope of the engineer. I would have him invade the sphere now monopolized by the employer and the capitalist, and eventually become, in fact, himself the master, for I cannot see wherein a technical education per se should deprive a man of business aptitude.

Contrariwise, it is not unreasonable to believe that a man equipped with technical education, supplemented by experience and a knowledge of business methods, is far better able to promote and to manage industrial enterprises than the so-called practical man of business. A business

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