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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

HOW LONG MUST WE SUFFER? OUR ENGINEERING DEPARTMENT AT PRESENT THE CREATURE OF PARTY POLITICS.

Every evening between half past five and half past six o'clock the Brooklyn Bridge on the Manhattan side of the East River presents a scene which mere words describe but feebly. In that brief hour, tens of thousands of men and women who live in Brooklyn and work in New York city pour out of the downtown office buildings, rush for the trolley and elevated cars that circle in cramped loops around the Manhattan terminal, and literally fight for a place to sit, often for a place to stand. Men and women struggle in this throng, so utterly regardless of the common courtesies of life, that even injuries are sustained by those who are least able to wage this evening strife. Long ago the conditions became so shocking that policemen were stationed at the tracks to preserve something like order, and to restrain the over-energetic from worming themselves through the car windows in an ambitious attempt to outdo those who fought their way through the end gates.

This state of affairs has prevailed for years. Finally, the cry for better transportation facilities aroused even the sluggish municipal officials, and induced them to divert their attention for a time from the less onerous exigencies of politics to the city's immediate needs. Several bridges were authorized. One of these, the Williamsburg Bridge, is completed. For the time being it is of little or no value in relieving the congestion in City Hall Park, because the railway companies have not as yet laid the tracks for which ample roadways have been reserved. Two bridges are still in course of construction. When they will be completed, no one can foretell.

With thousands of Brooklyn residents clamoring for better means of reaching their homes, one would suppose that the municipality would make a determined effort to meet the situation. Officials to whom the construction and care of bridges are intrusted have not been idle; but their activity has been expended very largely in drawing plans for imposing structures, in discarding them, and in providing others to take the place of those discarded. The Bridge Department of one administration seems to exert its utmost endeavors to undo the work of previous office holders, and to substitute its own ideas of what the city wants, regardless of the disgraceful scenes that occur daily before their very eyes at the Brooklyn Bridge. What may be regarded as a typical instance of the delays by which the patience of New Yorkers has been taxed for years is offered by the history of the Manhattan Bridge—a history which is anything but diverting, and in which politics, personal spite, useless engineering debates have played their part.

We first heard of the Manhattan Bridge about six years ago. On November 30, 1898, resolutions were passed by the Board of Aldermen, authorizing the preparation of plans for the structure. That was the first step. An ordinary business man would be justified in assuming that these plans were adopted after reasonable consideration, and that the necessary money was appropriated without unnecessary delay to carry them into effect. Unfortunately, however, New York city is administered on political, and not business principles. It was not until January 1, 1900, that the construction of the bridge was authorized. For some inexplicable reason the aldermen saw fit to appropriate, not a lump sum for the building of the structure, but to set apart a small amount for the construction of certain parts—an amount which the engineers in the Department of Bridges considered absurdly inadequate, even for the particular purpose for which it was intended.

This method of procedure was not without its effect on the Department of Bridges. In the summer of 1899 following the resolution authorizing the preparation of drawings, the drafting force of the Department began its work. In the summer of 1900 plans for one tower and its foundation had been completed, and the drawings for the other parts had been developed to a degree rendered necessary in preparing the tower plans. In the inscrutable wisdom of the Board of Aldermen, only money enough for the building of a single tower had been appropriated at first. That money not being immediately available, the contract for the single tower in question was not let until the spring of 1901.

Three years had elapsed, and not a spadeful of earth had been turned.

Meanwhile the drawings for the Manhattan tower had been prepared. In printed form they were ready for bidding contractors by January 1, 1902. Then came a turn in the tide of political affairs. When the Reform administration came into power, every Tammany man was swept out of office. The Commissionership of Bridges was wisely intrusted to an eminent engineer of international reputation, undoubtedly to the Department's benefit. The new incumbent objected to the plans of the Manhattan Bridge, because he considered the structure which they represented entirely inadequate. New plans were prepared. For the wire cable suspension bridge that had been proposed, he substituted an eye-bar cable structure. The newly-proposed plans, however, aroused such a storm of criticism that the mayor of the city deemed it advisable to submit them to a board of experts for approval. That board, composed of men who stand in the front rank of their profession, gave their unqualified approval to the eye-bar design. After this delay, the substituted plans for the bridge were completed in a general way by the summer of 1903, and duly approved by the Municipal Art Commission.

Five years had elapsed. The foundations of the towers loomed up on the shores of the East River—all that had been done.

The elections of 1903 brought defeat to the Reform administration. Following the usual American practice, the change of administration again resulted in turning out the department engineers. A new Commissioner and a new engineering force began the administration of the Department of Bridges. Eyebar cable designs, which had cost so much time and trouble to prepare, and over which so much ink had been spilled in alternate disparagement and approval, were thrown aside. The old wire cable design was dug up; its architectural faults were remedied so far as possible; the whole entailing an expenditure of $75,000 to $100,000 in the preparation of new drawings and loss of time that cannot be measured in money.

Six years have passed; and still, all that the city can show in actual work completed is the foundations on the shores of the East River.

Those who know something of the leisurely delivery of the wire cable used in the construction of the Williamsburg Bridge, place the date of completion of the Manhattan bridge at 1909. Meanwhile the Williamsburg Bridge is still trackless; and crowds still struggle for a chance to ride home across the old Brooklyn Bridge every night.

Where is this hopelessly unbusinesslike and impractical method of constructing the engineering works of a large city to bring us? How long will it take to build the Manhattan Bridge, if each new Commissioner is to discard his predecessor's plans and substitute others for them? If it has taken six years to build the tower foundations, how long will it take to build a whole bridge?

One conclusion must inevitably be drawn from the history of the unfortunate Manhattan Bridge, and that lesson is this: Municipal engineering should be free from every political influence. Is it advisable to change the engineering force of the Department of Bridges with each election? No well-conducted manufacturing company would dream of placing the management of its affairs every two years in the hands of a new man, just after the old had succeeded in mastering the intricacies of his business, and become of some value to his employers. And yet this is the very proceeding which is adopted not only in the Department of Bridges of New York city, but in every other department. We tear up our streets to lay sewers, and, having laid them, fill up the trenches and carefully repave the streets. Two weeks later excavations are begun in the same streets, for the purpose of laying gas pipes or electric wires, all to the great public inconvenience. A permanent engineering force in charge of those municipal departments which require the exercise of engineering judgment is certainly a crying need of New York city, an engineering force so permanent in its nature that its plans are not likely to be overthrown with each election, so well selected in its personnel that the interests of the city will be conserved with the same care that marks the management of a well-conducted manufacturing corporation.

CORROSION OF STEAM BOILERS.

In a paper recently published in a German contemporary (Stahl und Eisen) Mr. L. Vogt takes exception to the current practice of judging the availability of boiler-feed water exclusively according to its hardness, i. e., its percentage in substances susceptible of forming scale. According to him, the remaining components of the water should also be ascertained, as these give rise to repairs much more frequently than the former and even directly result in explosions. This problem is the more important as cleaning the water will in many cases produce strong corrosion, when, relying on the efficiency of the cleaning, the boilers are kept in operation for too long a period. In most cases, the prevailing substances forming scales, namely, sulphates and bicarbonate, are precipitated by means of soda and lime water, sodium sulphate being dissolved and pumped into the boiler along with the cleaned water. After the water has been vaporized, the sodium sulphate will remain undissolved in the boiler water. Now as with continued cleaning the concentration of the sodium sulphate is increased up to rather higher figures, this salt will finally exert corrosive effects on the boiler wall. The various nitrates and chlorides always present in boiler-water will, especially in the presence of air, be even much more noxious. Of all these substances, magnesium chloride seems to be the most noxious, barium and sodium chloride coming next.

In order to obviate the destructive effects of such substances as do not form scales, the author suggests maintaining their concentration below the limit at which they attain the property of attacking iron. It should, however, be borne in mind in this connection that a thorough intermixing of the water does not take place except in boilers with very active water circulation, whereas in many other cases the average concentration found by calculation is not immediately available for deciding the question at issue, which depends, on the contrary, on the maximum value of concentration, as obtaining at the point of strongest vaporization, i. e., in the neighborhood of the heat source. The author thinks soft water containing a not immaterial percentage of salt remaining in solution, to be more dangerous in this respect than a water otherwise equivalent but containing a higher percentage of scale formers, sheet iron being the more easily destroyed as its surface is of higher metallic purity. As regards the question as to whether cast iron or wrought iron offers less resistance to corrosion, Mr. Vogt thinks cast iron not to be less advantageous than wrought, corrosion being most likely due not to the material of the boiler but to the quality of the boiler water.

In testing a specimen of water, the minimum amount should be 3 quarts, so as to allow of a good quantitative analysis being made together with a checking analysis. Should it be necessary to use inferior water, parts of the contents of the boiler would have to be blown out every week and the boiler emptied out every 6 or 8 weeks, rinsed, and filled with fresh water. In the case of soda being not objectionable, owing to manufacturing reasons, a daily addition of soda of sufficient strength to give a slight alkali reaction would be advisable.

NEW METHOD OF GOLD EXTRACTION FROM PYRITES USED IN ITALY.

The process of gold extraction which has been put in practice in Italy by the Belgian chemist Body is awakening great interest among metallurgists. A few years ago the English geologist Morse and others observed that wherever there were placers of free gold there was also to be found in the neighborhood a source of combined gold in a volcanic matrix which was much richer in the metal. This theory has just been confirmed in a striking manner by M. Body. The process which he is now using in Italy is in reality only the geological synthesis of the formation of alluvia, and confirms the theory which attributes the formation of the placers to volcanic action.

The process is based, not upon the elimination of sulphur, but upon its addition; although this seems in contradiction to the present metallurgical processes, the result is said to be remarkable, and the output of gold obtained in this way greatly exceeds that which is given by the usual processes. The method is founded on the polysulphuration which is obtained by chemically disaggregating the mixture by means of special salts, under the influence of a temperature which does not exceed a cherry red. The process is of a relatively short duration. The disaggregating action removes the gold from its most stable compounds. At the Piedmont works, where the process is now employed, it costs only $2 or $3 to treat a ton of ore. It should be remarked that the new process is not an extraction of the gold, properly speaking, but a process of transforming the pyrites, which is so difficult to treat, into a product which can be worked in the ordinary way. As gold-bearing pyrites exists in great quantities in nature, the new process is likely to prove of great value.