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NEW YORK, SATURDAY, MAY 6, 1905.

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.

SAFETY OF THE GREAT ASSOUAN DAM.

The great success that has attended the operation of the Assouan dam, in extending the area of cultivable land in Egypt, recently led to the consideration of the question of raising the height of the dam by about 18 feet—an addition which would greatly increase the capacity of the reservoir. At the request of the government, Sir Benjamin Baker, who is responsible for the design of the Assouan structure, was requested to make an investigation, in the course of which the fact developed that the rush of water, passing under great head and high velocity through the sluice gates, had worn out a series of cavities in the bed of the river below the dam. The structure is built in places upon a rock of a somewhat friable character, and in order to secure a perfectly broad and solid foundation platform, a broad table or bench of concrete was laid in the river bottom, upon which the masonry of the dam was built up. At the time of its construction, it was realized that the scour due to the rush of water through the sluice gates must be provided against, and the concrete platform was extended for a certain distance, forward of the downstream face of the dam. Acting upon Sir Benjamin Baker's recommendation, the concrete platform will now be carried a further distance downstream, so as to make sure that the effects of scour can never work back toward the dam and endanger its stability.

Simultaneously with the investigation of the dam, there appeared in England an academic discussion by two college professors of the question of the stability of dams in general. They advanced a rather fanciful theory as to the probable line of failure of dams, which was quite at variance with accepted and well-proved engineering theory on this subject. The proposal to increase the height of the dam; the chief engineer's investigation of the structure; and the curious theories of dam failure, above referred to, offered an attractive coincidence for the reportorial sensation monger, who seems to be getting wonderfully well acclimatized in the field of London journalism; and the British public has been treated to whole columns of matter tending to prove that this costly engineering improvement is doomed to short life, if indeed it is not liable to be swept down the Nile Valley without a moment's warning.

As a matter of fact, the Assouan dam, so far from being in any danger of failure, has a margin of stability so great as to render it possible to add the 18 feet of height suggested, and still leave the structure proof against overturning, or rupture, for all time to come.

THE MANHATTAN BRIDGE SCANDAL.

When the present Bridge Commissioner of this city took office some eighteen months ago, he found confronting him what is perhaps the most urgent problem pressing for solution in this great city of New York; namely, the construction of a new bridge across the East River for the relief of the present overcrowded Brooklyn Bridge. The Bridge Commissioner makes no pretension to knowledge of bridge construction; but he called to his assistance, as chief engineer, a former employe of the Bridge Department, who was known to be bitterly opposed to all the work that had been planned for the construction of the bridge—work which had involved two whole years of careful preparation. The commissioner clearly understood that the appointment of this man meant the undoing of everything that had been done by his predecessor, and the subjecting of the city of New York to at least two years more of the disgraceful conditions due to the overcrowded condition of the Brooklyn Bridge. When the new chief entered once more the offices of the Bridge Department, he found on file a complete set of working plans for the new bridge—plans, by the way, which had been passed upon and unanimously indorsed by a commission composed of the most eminent bridge engineers in the United States. These plans had been drawn up in accordance with the most up-to-date design and practice for long-span bridges, and in their preparation special forms of construction had been adopted with a view to insuring speedy erection. The plans and specifications were in a complete condition, ready for the contractors to bid upon. Had bids been invited, contracts let, and the work pushed through with the zeal that the urgent need for the bridge demanded, the structure would, at the present writing, have been one-half completed, and the opening would have taken place within about eighteen months from the present date.

The obvious duty of the commissioner and his chief engineer was to push the bridge through to completion with all possible dispatch. It was a duty that they owed to the people of this city. Did they meet it? Not in the least particular. On the contrary, they deliberately subjected the city to a delay, which they knew positively would amount to not less than from eighteen months to two years, and which, as the event has proved, is likely to amount to not less than four years. Had the commissioner and his chief engineer followed the course which was dictated by the most elementary sense of fidelity to a great public trust, the Manhattan Bridge would have been opened in the autumn of 1906. As it is, New York will be fortunate if it is open by the year 1910.

The plans for the new structure were unceremoniously thrown aside. Why? To many of us the reason is not far to seek, when we remember that the rejected plans had been formulated under a previous administration, and that they had been designed by a former commissioner who had promptly discharged the present chief engineer for leaving his desk to criticise those plans in a public meeting. Of course, it would never have done to have alleged political or personal motives for the blocking of a great public utility such as this; and, consequently, the commissioner and his chief engineer had recourse to the ridiculous statement that the bridge, as designed, was faulty. In other words, the present chief engineer, whose knowledge of the science and practice of New York city bridge engineering has been confined to such work as has fallen to him in subordinate positions, and who has not a single engineering work to his credit that approaches this bridge in importance, undertook to set his judgment against that of an expert commission which included the acknowledged leading authorities on bridge engineering in this country. It would have been presumption of the most extreme kind had this single individual pitted his solitary and limited reputation against that of the acknowledged leaders in this great branch of civil engineering. But when he does this, as he has done, at the cost of an enormous amount of inconvenience and damage to the leading city of the United States, the presumption, we had almost said the cool impertinence, of the thing is beyond adequate expression.

What have the present commissioner and his chief to show for their eighteen months' work in the department? When they came into office the stone piers for the towers of this bridge were completed. Had the contract been let at once, these towers would to-day be finished to their full height; as it is, not a pound of steel has been built upon the piers, and their top surface is as barren of steel-work as it was on the day the commissioner took office. Not only have the towers not been commenced, but the new plans, if you please, are not even yet completed. So also with the superstructure, that is, the cables and the suspended roadway. Had the commissioner called for bids at once, the cables would by now have been partially erected; the steel for the roadway gotten out; and, indeed, the whole structure would have been in such a forward condition as to guarantee its opening by the autumn of next year. So again with the anchorages. Had property been at once condemned, the buildings removed, and contracts for construction let, these anchorages would, to-day, have been completed, or nearly so. As it is, no construction whatever has been done; and, by the way, thereby hangs a tale that tells so graphically the whole story of the attitude of the commissioner toward this bridge, and the full appreciation of that attitude by the contractors, that it is worthy of repetition. As soon as the contract for these two anchorages was let, it was the duty of the contractors to commence at once to pull down the houses that cover the site of the anchorages, in order to make a clear space for the excavators and the masons, and for the storage of materials. Did they do this? In the case of one of the anchorages, nothing of the kind was done. Instead, the contractor promptly rented all of the buildings covering the site, and forthwith sat down to play the rôle of landlord, knowing perfectly well that time was a minor consideration in the affairs of the present Bridge Department.

Surely in all the long history of maladministration of New York city's affairs, it would be impossible to find a parallel to this exquisite comedy.

In view of the fact that not even the plans are yet completed, and that a preliminary investigation of these plans renders it pretty certain that the bridge will cost some two million dollars more than one built on the rejected plans would have cost; in view of the further fact that the spirit of indifference pervading the Bridge Commissioner's office is so perfectly realized by the contractors, we do not hesitate to say, here and now, in answer to the many questions that reach us as to the probable time of opening of the Manhattan Bridge, that, if the construction be carried on under the present methods, it will not be opened to the public until the year 1910.

In view of the dangerous and disgraceful overcrowding on the Brooklyn Bridge, which the new bridge designed to relieve, it must be confessed that the apathy of the Bridge Department has reached a point where it calls loudly for action on the part of the mayor. Mr. McClellan has the confidence of the New York public; for he has shown that he is solicitous for its best interests. We believe there is no direction in which he could further those interests so materially as by a searching investigation into the causes of the inexcusable delay in building the Manhattan Bridge.

TEXTILE FABRICS OF PAPER.

Garments made of paper have long been used in eastern Asia, but only in default of other clothing or on special occasions. In western countries the only articles of dress made of paper, until recently, were collars, cuffs, and shirt bosoms, that is to say, articles which are usually starched. Now, however, numerous inventors are endeavoring to introduce woven paper fabrics.

Some time ago an Italian, Prof. Zanetti, devised a method of making fine and strong yarns by twisting very thin silk paper, cut into strips about one-tenth of an inch wide. As yet these yarns are used only for wicks of wax candles and in the manufacture of incandescent gas mantles.

A greater advance has been made in Saxony. Here also narrow strips of paper are spun, by a process patented by Claviez & Co. Paper and cotton are also spun together, so that in the finished yarn the paper envelops the cotton. These yarns are used as fillers, in conjunction with cotton warp, in weaving drillings suitable for toweling and summer waistcoats, trousers, and skirts.

Heavier and warmer cloth is made by combining paper and woolen yarns. The fabric is cream colored, and may be washed repeatedly without injuring the surface. It is well adapted for tennis and lounging suits. Sufficient cloth for a jacket, waistcoat, and trousers costs only ten marks, or $2.50, and still cheaper garments are made for laborers. This new product is named xylolin.

For such use, however, raw materials even cheaper than finished paper are sought. Spinning mill refuse, consisting of very short smooth fibers that cannot be spun, goes, as a rule, to the paper mills. Many attempts to utilize this material have been made in spinning mills, and experiments in spinning it wet suggested the idea of further comminuting the short fibers in paper machines. In this way a thin fibrous paste was produced. This, when poured on sieves, yielded a thin soft paper which, partially dried and cut into narrow strips, could be spun into yarn. Other cheap paper stock, including wood pulp, can be converted into yarn by a similar process, and so spinning and paper making meet.

One brand of these cellulose, or wood pulp, yarns is called silvalin. During the last ten years many similar processes have been patented. The manufacture is still in the experimental stage, but definite progress has been made, and the industry has a promising future before it.

Prof. Pfuhl, of Riga, recently published a technical treatise on processes and results thus far attained.

The first practical requirement of yarn is tensile strength, which is indicated by the maximum length that will support its own weight. Cotton yarn has an average breaking strength of from 43,000 to 47,000 feet, that is, it will just break with the weight of a skein of that length. For dry-spun flax the figures are 39,000 to 41,000; for wet-spun flax, 41,000 to 49,000; for ramie, 37,000 to 40,000; for jute, 32,000. Wood-pulp yarn is much weaker than any of these. The greatest strength yet attained is 28,000, the average from 18,000 to 23,000. The strength, however, may possibly be increased by improvements in manufacture and admixtures of other material.

Resistance to the action of water is another important quality in which fabrics differ greatly. Prof. Pfuhl gives an example from experience. A lighter laden with grain in jute and canvas bags sank in the Volga. Thirty-six hours afterward the canvas (flax) bags were raised with their contents, but the jute bags had disintegrated so that the grain which they had contained was lost. Jute yarns, however, withstand several hours' immersion, but wood-pulp yarns fall apart after very brief soaking.