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ENGLISH AND AMERICAN MACHINE TOOLS.

It will be remembered that one of the principal grounds of contention during the great strike in the British engineering trades was the question as to the right of the trades unions to control the output of labor-saving machinery. Happily for the interests of both employers and employed, the attempt of the men to limit the output of machinery was thwarted.

In a recent editorial on English and American machine tools, The Engineer comments on the fact that the English manufacturer is at length beginning to recognize that the restriction in the way of their use being now removed, automatic machine tools are of great importance. Our esteemed contemporary expresses regret that English makers of machine tools do not devote more effort to the design and manufacture of automatic machine tools, and goes on to say: "Is it possible that English manufacturers cannot find time to devote some attention to this class of machinery, and so offer battle to the increasing competition, or is it that they still profess to despise American methods? If the latter is the case they would do well to undeceive themselves by an inspection of American machines. We have frequently heard it stated that the imported article was weak and roughly made. A few years ago that was to a great extent true, but it is so no longer. American engineers do not stand still, and they have eagerly learned by experience. The consequence is that their tools are nowadays at least as stoutly built as our own and are as well finished, while in accessibility of their working parts, in ingenious automatic devices, in adaptation for rapid work, in convenience and handiness, they are far ahead of the productions of most British firms."

The Engineer has no intention of "puffing" American productions, but speaks plainly, with the hope of "removing some of the bias" which misguides the British manufacturers; and it points out to its readers that our success is due largely to the fact that instead of waiting for customers to state what is wanted, our manufacturers have a way of taking the initiative in improvements; "they lead, and do not follow manufacture."

These are candid words and full of remarkable significance, coming, as they do, from the most conservative technical journal in Great Britain; and if the British manufacturer fails to take the hint, it can never be his excuse that his loss of a profitable trade was due to ignorance of the underlying cause.

SAFETY OF THE BROOKLYN BRIDGE.

The public has lately been favored with somewhat conflicting statements regarding the strength and safety of the Brooklyn Suspension Bridge, made by two engineers whose names are prominently associated with the construction and maintenance of this great structure. The first appeared in the form of a letter to The Railroad Gazette from W. A. Roebling, who, after the death of John A. Roebling, superintended the construction of the bridge; the second statement is the report of C. C. Martin, the present chief engineer of the bridge, to Bridge Commissioner Shea.

Mr. Roebling, referring to the recent buckling of the stiffening trusses, attributes it entirely to the presence of the overfloor stays. In our issue of August 13, 1898, there will be found a discussion of the accident, in which the buckling is attributed solely to these stays, which extend from the panel points of the trusses to a rigid connection with the top of the towers. Mr. Roebling states that in any future suspension bridge he would dispense with their use, and explains they were retained by him because, on account of the increased loads which were to be placed on the bridge, "long before the cables were completed" he "had to look in every direction for an increase in supporting power." "The crying evil on the bridge," says Mr. Roebling, "is that every year since it has been opened for traffic there have been numerous additions to the dead load, the climax of the overloading" being "reached when the trolley took possession of the roadways." The builder of the bridge has no fear for the cables, as they still have ample strength and "could pull up the anchorages with ease."

Mr. Martin's report, while it gives much valuable information as to the strength of the cables and the stability of the anchorages, has little to say about the failure of that part of the bridge that aroused the present discussion, namely, the stiffening trusses. While it is, no doubt, a fact that the bridge is "absolutely safe," and "no one need entertain for a moment any fears of its stability," it is nevertheless true that the stiffening trusses are altogether unequal to the demand of a sudden emergency, and that as far as they are concerned the bridge is not "stable." Since the stiffening truss is an integral part of a suspension bridge, it follows that the failure of the trusses is a failure of the bridge, and hence a bridge in which these trusses are liable to collapse under a congestion of traffic which may occur at any time, is obviously overloaded. All that can be said of the bridge is that under its present loading it is liable to a partial failure, which will not, however, involve any risk to the traffic that passes over it.

The report states that the total moving load upon the main span is 1,962 tons, the total additional weight added in the way of new tracks, cables, electric cables, trolley arms and traces, etc., is 430 tons, and the weight of the original superstructure is 5,828 tons, thus bringing the total weight up to 8,220 tons. This multiplied by 1·7 gives a total strain in the cables of 13,974 tons. The ultimate strength of the four cables, however, is 49,200 tons, which gives a factor of safety of 3·52. It is argued that since the dead weight of the structure cannot be materially increased, any increase must come from the moving load, which must, therefore, be multiplied ten times over before it could break the cables.

The stability of the anchorages is shown by the fact that they have moved forward under the pull of the cables only one-eighth of an inch in the past eight years.

The report will allay any fears that may have been entertained by the public as to the danger of a positive collapse of the bridge. Neither the floor, the suspenders, the cables, nor the anchorages can give way under any increase of loads that can be brought upon the bridge. The stiffening trusses have failed more than once and they will fail again whenever a blockade occurs on the bridge. The best thing to be done would be to remove the superfluous diagonal stays, which were one of the conducing causes of the buckling, and replace the present flimsy and inefficient stiffening trusses by others of greater depth and weight. If this were done, we should hear no more of alarmist rumors of buckling floor system or collasping cables, and the bridge would be good for its natural life of twenty centuries.

ELECTRIC LOCOMOTIVES FOR EUROPE.

An American corporation, the General Electric Company, has recently obtained a contract for the supply of the equipment for the tunnel of the Paris-Orleans Railway, from its present terminus in Paris at the Austerlitz station to a new station near the Quai d'Orsay, in the heart of the city. The manager of the foreign department of the company said: "Although this contract involves a smaller amount of money than the contracts secured some months ago from the London Underground Railway, it is in quality, so to speak, a more important contract, for it marks the conquest of the stubborn French prejudice against American manufactures, and against too ready an adoption of the latest improvements, waiting as they are prone to do for something better still. Moreover, the contract was won against the strongest possible competition of British and European companies during a period of negotiation extending over two years. We have contracted to furnish eight electric locomotives operated with the third rail, and that they will more than fulfill all expectations we do not for a moment doubt." It has not been decided whether the third rail will be between or outside the tracks. The system of transmission will require the use of the three-phase generators for the rotary converters, changing an alternating to a direct current of 500 volts. There were fourteen competitors in the matter of the Paris contract. French engineers were taken over to the United States and a complete demonstration was given on their experimental track at Schenectady, and the company's ability to do more than was required was shown. There is a railway of considerable length at Schenectady following the course of the Mohawk River, and on this railway a train of more weight than that of the Paris-Orleans line was run backward and forth over a distance equal to that between the stations of the Paris tunnel. The perfect mobility and power of the electric locomotive was so well shown that the French engineers were immediately convinced that it met all of the conditions in even a higher degree than had been demanded. The fact that the American company could show the greatest experience in electrical locomotive building was of far more importance than the question of cost. The only point considered was, which of the competitors could supply the most efficient locomotive and accompanying electrical apparatus. This is certainly another triumph for American engineers.

BREAKDOWN IN DAILY NEWSPAPER OFFICES DUE TO LACK OF GAS.

The bursting of a large gasometer, which is referred to elsewhere in this issue, was the cause of trouble and inconvenience to the newspapers which use the linotype machines, owing to the fact that the supply of gas down town was cut off. In the linotype machine the type metal is kept hot by gas, so that when the gas pressure became reduced the type metal began to cool. In most of the machines there was no gas at all, and in the few in which it did burn, the flame was very feeble. Several of the papers had to set up their type by hand, and in one case twenty machines had to be abandoned. At least one newspaper which does not use machines courteously placed the composing room at the service of another paper. It is probable that after this newspapers will provide some means for heating the type metal in case the supply of gas is temporarily cut off, and devices of this nature are made.

HAVANA'S FLOATING DRY DOCK.

On the recommendation of the American Evacuation Commission of Havana, our government will not insist that the floating dry dock of the Spanish navy in Havana Harbor shall be turned over to the United States. Admiral Sampson endeavored to persuade his colleagues that the dock was not movable property and therefore must be surrendered by Spain. Generals Wade and Butler, however, held that the dock was a floating and movable structure. Both parties were right in a way, for $40,000 was expended for establishing it in its present berth, and the fact that it cannot be moved was cited by Admiral Sampson in support of his contention. We have already illustrated this dock in the SCIENTIFIC AMERICAN for October 16, 1897.

The dock was built in England and cost the Spanish government $600,000. It reached Havana a short time before the war began and was promptly sunk, which is not to be wondered at, considering that we know now that the Spaniards are the poorest mechanics in the world. The American commission say it has been so badly used it is not worth more than half what it cost. It is probable the dock will be put up at public auction by the Spaniards and sold, as the American commissioners and Spanish commissioners have failed to agree on a price.

SCIENTIFIC CONVENTIONS IN NEW YORK DURING THE HOLIDAYS.

Eleven associations of scientists will hold their winter meetings in this city during the week succeeding Christmas, and all are to be the guests of Columbia University. The programmes offered by the various associations are full of interest and are certain to attract many professional men to the meetings. The American Chemical Society will hold its meeting on Tuesday and Wednesday, December 27 and 28. The morning session of the first day will be held at the Chemists' Club, 108 West Fifty-fifth Street, and will be devoted to the hearing of addresses and the reading and discussion of papers, but the afternoon will be used in visiting the works of the New Jersey Zinc Company, at Newark. The second day will be given up to the reading of papers and the examination of the chemical laboratories in Havemeyer Hall, of Columbia University. On Wednesday and Thursday come the gatherings of the American Society of Naturalists, the American Morphological Society, the Association of American Anatomists, the American Physiological Society, the American Psychological Association, the American Folk Lore Society, the Society for Plant Morphology and Physiology, the Anthropological Section of the American Association for the Advancement of Science, and the Geological Society of America, while the New York State Science Teachers' Association will meet on Thursday and Friday.

Wednesday will be devoted to the business sessions of the various societies and the reading of papers, morning and afternoon, in Schermerhorn and Fayerweather Halls and the College of Physicians and Surgeons. In the evening there will be a lecture at the American Museum of Natural History, by Prof. H. F. Osborn, on "Collections of Fossil Mammals and Their Care," followed by a reception to the members of the societies, at the home of Prof. Osborn. Thursday morning and afternoon will be given up to the solid work of reading and discussing of papers, the set topic for 3 P. M., with the naturalists, being "Advances in Methods of Teaching." The programme for Friday includes visits to the Botanical and Zoological Gardens for the naturalists, while the geologists and the science teachers will still be occupied with the reading and discussion of papers. In connection with the meeting of the Science Teachers' Association there is to be an exhibition of scientific apparatus at the Teachers' College on West One Hundred and Twentieth Street. The president of the Chemical Society is Prof. Charles E. Munroe, that of the Naturalists' is Prof. H. P. Bowditch, and that of the Geologists' is Prof.