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NEW YORK, SATURDAY, MAY 2, 1903.

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.

THE SUBWAY CONTRACTOR AND THE SUFFERING PUBLIC.

The contractors of the New York Subway are rapidly losing the public good-will which they had unquestionably secured by the expedition with which they carried out the work of excavating and building the new tunnel. They are losing it because of the inexcusable indifference to the convenience of the public which they have shown, and are showing to-day, by making no attempt to clean up the streets as soon as they are through with their work.

We are not sure that the engineers of the Rapid Transit Subway are not also somewhat to blame for this discomfort; for in order to protect the public there was a special clause inserted in the first general contract and specifications of the Subway covering this very point—a clause which, as we know to our cost, is "more honored in the breach than in the observance." It was stipulated in the first contract that any given stretch of the cut-and-cover work was to be open for only a limited period of time, sufficient presumably for putting in the steel work and concrete; and it is expressly directed that "at his own expense, and as directed from time to time by the Engineer, the Contractor is to *clear the work, streets, and all public places occupied by it from all refuse and rubbish, and leave them in a neat condition.*" Now, when we consider that some stretches of the work, such for instance as that through 42d Street, will have been "open" and encumbered for between two and three years, it is evident either that the contractor has been willfully obstreperous, or that the engineers have not fully exercised the authority conferred upon them under the contract. We are inclined to think that the fault lies with the contractor more than with anyone else for in spite of the storm of public indignation which has found its expression of late through the press, and despite the fact that the Chief Engineer of the Commission has recently called special attention to the shocking condition of the streets, there are scores of blocks along the route of the line which, although the Subway beneath them has been completed for many months, are to-day in a disgraceful state of disrepair and disorder.

Nothing could be more admirable than the patience with which the merchants and property owners, to say nothing of the pedestrians of New York city, have endured the enormous inconvenience arising from the construction of the Subway; and they have certainly deserved something better than the total disregard of their interests and convenience which has been shown during the progress of this great work. We commend this subject to the special and immediate attention of Messrs. Parsons and McDonald, respectively the Chief Engineer of the Rapid Transit Commission and the Chief Contractor for the Subway.

FAILURE OF THE "IOWA'S" 12-INCH GUN.

When the deplorable accident to one of the 12-inch guns of the "Iowa" occurred, it was generally credited to the bursting of a shell in the bore of the gun. Although the official report of the Board of Investigation has not yet been made, there is now a general belief that the failure of the gun was not due to a defective shell, but either to the inherent weakness of the gun itself, or to abnormal pressures set up in the chase of the gun by the smokeless powder employed. The gun was one of the pieces with which the "Iowa" was originally supplied, and as this vessel went into commission in the summer of 1897, it has seen nearly six years of service. During this time the gun has had to do duty in the regular courses of target practice each year, and it also endured the severe test of the Spanish war, during which the "Iowa" was engaged in the bombardment of San Juan, the blockade at Santiago, and the naval battle which ended in the destruction of Cervera's fleet. In all these years the 12-inch gun that failed has been fired between two hundred and three hundred times; and if there were anything in the theory that the life of a modern built-up gun of large caliber is restricted to between one hundred and fifty and two hundred rounds, there might be some truth in the suggestion that the strength of the gun was exhausted. For our part we do not believe that there is anything in the suggestion, provided, of course, that during its six years of service the gun has not been subjected to powder pressures exceeding the limit which it was designed to stand.

Now, it is just here, in connection with the question of powder pressures, that the probable cause of the explosion will be found; for although the most modern smokeless powder is stable and reliable in its results, some of the earlier powders, especially if they have been for any considerable time in storage, are liable to a more rapid combustion with consequent higher pressures than they were intended to give. The "Iowa's" 12-inch gun was designed for the old brown powder, which was relatively quick-burning, and did not give such high pressures during the latter part of the travel of the projectile down the bore as the later smokeless powders. Hence it was not necessary to give so much tangential strength to the chase of the gun as would be the custom in designing a modern, high-velocity gun using slow-burning smokeless powder. Hence the smokeless powder employed would be somewhat more trying for the gun than the brown powder, and if there were any sudden combustion of the remaining unburnt powder shortly before the shell left the gun, the chase might readily have proved unequal to the extra duty put upon it.

TESTS OF OIL FUEL ON LOCOMOTIVES.

At the time that the preliminary report of the elaborate tests of oil fuel now being carried out by the Naval Department was made last year, we gave a brief account of the findings reached at that time. During the intervening months a series of tests has been carried out to ascertain the value of oil fuel for use on locomotives, the trials being made on the Florida East Coast and the Boston & Maine Railroads. Particular value attaches to the results, from the fact that the work of the locomotive was tested when it was hauling its regular load, and the results represented, not merely a single trip, but the work of a whole month. On the first-named railroad, on level track the engine consumed 6¾ gallons of oil per mile run, the oil weighing 7.55 pounds per gallon. The same engine in doing the same work burned 2,000 pounds of Tennessee coal for every 19.6 miles that was covered; the result showing that under those particular conditions 132.3 gallons of oil did the work of one ton of coal. When the same locomotive was tested on freight service, where the speed was lower and the loads greater, the consumption was 10.6 gallons per mile on oil, and 2,000 pounds of coal per each 13 miles, thus giving a ratio of 131.8 gallons of oil to 2.000 pounds of coal. The test on the Boston & Maine Railroad was made on a helper used in assisting trains in the Hoosac tunnel. The work was done by the engine on an upgrade of 42 feet per mile, the engine returning without any load. On this test the oil weighed 7.75 pounds per gallon, and 11.45 gallons were used per mile. When burning coal, this engine ran 12.25 miles for every 2,240 pounds used, thus showing a ratio of 140.26 gallons of oil to 1 ton of coal. An important fact developed in these tests was that the engine could be urged to a greater capacity with oil fuel than with coal, and that this could be done with a smokeless fire. It is considered that there is no reason why equal results should not be obtained in marine service.

ENGLISH REPORT ON THE AMERICAN RAILWAYS.

The Board of Trade, London, recently authorized Col. Yorke, its Chief Inspecting Officer of Railways, to visit the United States and make an extended tour over our railroad systems. The report of his investigations has recently been published in pamphlet form, and taken altogether it may be regarded as one of the most fair-minded and valuable documents of its kind that has ever appeared.

It is pointed out under the head of steam railways, that there is a fundamental difference between English and American track in the fact that in England the bullhead rail, laid on cast-iron chairs, is in almost universal use, whereas in the United States the T-rail is almost exclusively used, the latter being laid either directly on the ties or upon tie-plates, and the rail secured by ordinary rail spikes. The weight of the rails on first-class track is about the same in both countries, varying from 80 to 100 pounds in the United States, and from 85 to 103 pounds in England. Although American roads use from 14 to 16 ties to a 30-foot rail, as against only 12 ties to the same length of rail in England, the larger dimensions of the English ties give a slightly larger total bearing surface, there being 85.3 square feet of such surface with 16 ties on American track, and 90 square feet for the 12 ties used on an English rail. The bearing surface of the rails on the ties is 768 square inches in American practice, as against 1,260 square inches bearing surface of the cast-iron chairs in English practice. Attention is drawn to the fact, however, that on the best eastern roads in America, the ties are of hard wood, which has better wearing qualities than the Baltic timber ties used in Great Britain. The report speaks favorably of the American practice of breaking joints when laying the track, that is to say, bringing the joint in one rail opposite the center of the adjoining rail. In discussing the advisability of abolishing the chairs and using hard-wood ties, Col. Yorke considers that the extra cost of the ties would be greater than any saving gained by discontinuing the use of the chairs.

Perhaps the most interesting portion of the report is that which deals with the question of signaling. This was found to be in a more or less experimental condition, no uniform practice having as yet been adopted throughout the country. The remarks on this subject are particularly timely just now, because of the attention that has been directed to our signaling system by the many and fatal collisions that have occurred, either through faulty signaling, or through disregard of correct signals. Moreover, as the Board of Trade has oversight of all matters relating to the safety of the traveling public, and has the authority to investigate and report on all railway accidents, the opinion of its expert necessarily will carry very great weight. His severest criticism is of the fast-and-loose method by which the interpretation of block signals is in many cases left to the judgment of the engineer; by which more than one train is frequently allowed to be in the same block section at the same time; and by which trains are permitted, under special conditions, to run against the traffic, that is to say, a down train is permitted to run on an up line, and *vice versa*.

On the question of automatic signaling, the report considers that it does not necessarily produce greater safety of operation, that it is after all merely a labor-saving device, and that while it gets rid of errors due to the human element, it opens the way for other errors due to inaccurate operation or breakdown of the mechanism, which may be equally disastrous. It is pointed out that since the chief object of such a system is to increase the density of the traffic by enabling trains to be run under shorter headway, this very density must of itself increase the chances of accident. We must confess that we can hardly see the force of this argument. It is evidently desirable that as many trains as are consistent with safety should be run over any given stretch of track. Automatic signaling increases the number, and if the apparatus be properly made and carefully maintained, this increased traffic can be worked with the same immunity from disaster as a less frequent traffic under a non-automatic system. The fault is not in the automatic system, but in the human element that operates and takes care of it. The system being good in itself, the obvious thing to do is to teach signalmen and maintenance-of-way engineers to exercise redoubled care and vigilance in keeping the automatic plant at all times in first-class condition. Automatic signaling has come to stay. With increased experience in its use, and with a more rigid observance of the first principles which underlie its successful operation, our railroads will learn to operate their trains without incurring the frightful loss of life that has occurred during the past few months.

ELECTRIFICATION OF THE LONDON "UNDERGROUND" RAILWAY.

BY OUR LONDON CORRESPONDENT.

By permission of Mr. James R. Chapman, general manager and chief engineer of the "Underground Electric Railway Company of London, Ltd.," the writer was enabled a few days ago to inspect the two new electric trains for the District Railway which have just arrived at the carsheds at South Harrow, and to make a trip in one of these over the new electrified line between Ealing and South Harrow, which will shortly be open for public service.

Each of the new trains is made up of seven cars, three of which are motor cars and four trailer cars.

They are to be regarded at present as experimental only, and on their working will depend the nature of the cars, not only for the electrified Metropolitan District Railway, but also for the three tube railways controlled by the Underground Electric Railway Company via the Baker Street and Waterloo, Charing Cross, Euston and Hampstead, and Great Northern, Brompton, and Piccadilly Circus lines.

In a few weeks' time electric trains will be running on the new line which the Metropolitan District Railway Company has constructed from Ealing to South Harrow, a distance of six miles. This line has been finished for more than eighteen months, but it has not as yet been opened for traffic. It has been chosen as the first section to be operated by electricity, and a temporary power station has been installed at Alperton which supplies current to the rails at 550 volts direct.

The new Ealing-South Harrow Railway, which con-