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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.

## THAT FIRE PERIL AGAIN.

Once more we have received clear warning of the fire peril which confronts the congested business centers of our large cities. This time it was in the Adams Express building, one of several very old and inflammable structures, that stand on the west side of lower Broadway, just below Trinity Church. The conditions, as far as the buildings were concerned, were ideal for a great conflagration, for they were quite open to the sweep of a prevailing westerly wind which, had it been stronger, might well have carried the fire across Broadway into the great mass of tall buildings in the Wall Street district opposite. The situation would have been decidedly critical under ordinary circumstances, for the fire swept rapidly through the Adams Express building, and was raging fiercely very soon after the blaze started; but what made the fire strongly suggestive of another Baltimore disaster, was the fact that for the first half-hour of the efforts of the Fire Department, although the engines were driving under a full head of steam, they had difficulty in raising even small streams of water to the third and fourth stories of the burning building. In other words, the water supply in the mains was for some reason or other very low, and quite inadequate to keep the fire engines going at full capacity. This was noticeable in the case of the first of the water towers to be started in Broadway; for, although three lines of hose are usually sufficient, in the present case it took six lines to throw a stream of the proper volume. The dangers from fire to which the city is exposed are fully appreciated by our very efficient Fire Department, and a hint of this was given in the fact that although only one five-story building was immediately involved, the "double nine" call was sent out, and engines hurried to the fire from far up town. The early concentration of such a powerful force at a fire of really moderate proportions, suggests that the Baltimore disaster has rendered the Fire Department doubly apprehensive of the ever-present danger of a widespread conflagration; and it is gratifying to learn, as we go to press, that the Board of Estimate has voted an appropriation of \$5,425,400 for the installation of the high-pressure auxiliary water supply, that was recommended by the engineers of the Department of Water Supply, Gas, and Electricity.

## THE BLOCKING OF THE PORT ARTHUR ENTRANCE.

The blocking of the entrance to Port Arthur would have had more significance before the invention of high explosives than it can possibly have to-day. If it is successfully done, it will, of course, greatly simplify the naval situation as far as Japan is concerned—for the present, at least; for it will mean the detention of the Russian fleet within the harbor for a considerable period, leaving the Japanese fleet free to devote its attention to the armored cruiser squadron at Vladivostok; the work of the transports in transporting the troops and supplies of the Mikado's army being rendered for the time being perfectly secure.

It is a mistake to suppose, however, that the sinking of a line of merchant ships across the harbor entrance would "bottle up" the Russian fleet for good. Modern high explosives, properly placed, would cut the sunken Japanese ships to ribbons, and it would be possible to dredge out and remove the wrecks, piecemeal, until the channel was clear. Of course, these operations would not be allowed to go on undisturbed by the enemy, who would bend every effort by long-range bombardment of the wrecking crews to hinder, if not altogether to prevent, their operations. The bottling up of Port Arthur is without doubt the most important and urgent step that the Japanese can take, for it is absolutely necessary that Makaroff's fleet be captured or destroyed,

or at least rendered inoperative, before the arrival of the relieving force from Europe.

The destruction or capture of this fleet, so long as it remains under the guns of Port Arthur and behind protecting mines, is out of the question; but if the harbor entrance can be sealed, and kept so, Admiral Togo can await the approach of the Baltic fleet with composure. We may look for frequent repetitions of such daring attempts as were recently made to sink heavily-laden merchant steamers across the narrow channel. Not merely does the fate of the Japanese navy ultimately depend upon this successful bottling up, but also the fate of the army of invasion itself. If, during the coming summer, the Baltic and Far Eastern fleets should be able to unite; and, unless the Russian officers and seamen are altogether incapable, Japan would have to face the likelihood of defeat by overwhelming numbers. With Russia in command of the seas, the Japanese army would be cut off from its base of supplies, and the question of capitulation to the advancing and steadily-growing army of the Czar would ultimately have to be faced. Never was the advantage of the command of the sea so strikingly illustrated as here; and the struggle of Japan to maintain her present advantage promises to form one of the most fascinating chapters in the history of naval warfare.

## DEPARTURE OF THE PANAMA CANAL COMMISSION.

The recent sailing of the Panama Canal Commission for the Isthmus on their first visit of inspection, coupled with the announcement from Paris that the suit of the Republic of Colombia against the Panama Canal Company has failed, must bring home to the people of the United States the conviction that the long-deferred construction of the canal across the Isthmus is at last about to commence. The commission, as appointed by the President, consists of Rear Admiral John G. Walker, William Barclay Parsons, Col. F. J. Hecker, C. E. Grumsky, Gen. George S. Davis, Benjamin M. Harrod, and W. H. Burr. Accompanying the commission were Dr. Col. William C. Gorgas and Dr. Louis La Garde, of the United States army, and Dr. Ross, of the navy, who are to have supervision of the sanitary arrangements on the Isthmus.

The decision of the first Civil Tribunal of the Seine against the Republic of Colombia says of the various treaties made by Colombia: "These articles have the manifest purpose of assuring the full exercise of sovereignty over the canal. It results from what is established before this tribunal, that Colombia is not in possession of the territory traversed by the canal. By coming before a French court in order to sustain its rights over the canal, Colombia tacitly admits its inability itself to control the canal. It therefore follows naturally that it has lost sovereignty over the territory traversed by the canal."

"It also appears that this sovereignty is maintained by the new Republic of Panama, which is in actual possession of the authority and power of administration and of police. Under such circumstances it only remains for the Panama Company to accept the actual situation of authority and the facts relative to the territory embraced by the concession. Therefore the action commenced by Colombia is not receivable."

It will probably require a fortnight to complete arrangements and pass the title, when the \$40,000,000, the purchase price, will be paid to the Panama Canal Company, and the \$10,000,000 to the Panama government.

## STEEL ROADS FOR COUNTRY DISTRICTS.

At this time of the year, when the frost is coming out of the ground and nearly all the roads in and around our country towns are long lines of mire, one cannot help wondering, when considering the subject of our highways, why the government is not quicker to respond to the appeals for aid in their improvement, and why it does not push the adoption of a system of roads that will last for long periods with but slight expenditure for repairs.

Nearly seven years ago the office of Road Inquiries of the Department of Agriculture conducted experiments with steel rails for use on country roads, and made arrangements with a large steel works for the rolling of suitable rails for this purpose. At that time the 8-inch rails for a mile of steel roadway, weighing about 100 tons, could be purchased for about \$3,500, and the price has not increased much since. A sample steel road two miles in length between Valentia and Grao, Spain, had then been in use for five years under exceedingly heavy traffic, and had shown splendid results; yet the United States did not, and has not as yet, profited by this experiment in an ordinarily unprogressive foreign country, and we have to-day no steel roads for commercial purposes save the short section in Murray Street, this city, laid about a year and a half ago. As for the foreign example mentioned, during the time it has been in use, the annual cost of maintaining the roadbed has been \$380, against \$5,470 yearly expended to keep the flint stone road which preceded it in repair. The average traffic over

this road is 3,200 vehicles per day. This example of a steel road and its lasting qualities is not the only one abroad, but it is the most noteworthy.

But aside from the permanency of such a road, and the slight expense of keeping it in repair, the greatest advantage that it offers is the reduction in power required to haul loads over it. Tests have shown that while it requires five times as much power to pull a given load on a loose gravel or dirt road as it does over good macadam, and ten times as much power to pull the same load through loose sand or mud, on steel rails only one-sixth as much power is needed as on macadam. This great reduction in power, and consequent diminishment of wear and tear on draft horses, is all the more valuable in that it is permanent and lasts throughout all seasons; so that the farmer is not obliged to figure on a greater loss of time and fatigue of his horses at one season of the year than at another. If self-propelled vehicles are considered, these need not be nearly so powerful as they would otherwise have to be, and they can be operated with great economy. The importance of a special track for self-propelled vehicles was recognized in the early days of the locomotive. Such a track was built and improved until the steel railway track of to-day was finally developed. Now that the self-propelled vehicle has again come on the scene in the form of the automobile, it has drawn attention to the needs of good roads for all vehicular traffic, since the increase in power needed to pull a machine through the mire can no longer be "whipped out of the horse," but must be drawn from a large reserve, and, in the case of the electric automobile, can be accurately measured on every machine. Thus, when it is brought directly to one's notice, and the total mileage of the machine is greatly reduced because of it, the owner sees his expense account rapidly rising, and demands a better highway. This demand is soon to be fulfilled by private corporations, which have recognized it, and have devised systems of steel roads that can be built at no greater cost than a macadam road, and maintained at far less expense. It is to be hoped that the supervisors of roads in the various States will investigate the steel road more thoroughly, and that trial sections may be built for the purpose of comparison with the best macadam roads.

## CAST-IRON COLUMNS IN THE DARLINGTON HOTEL COLLAPSE.

Commenting editorially on the Darlington Hotel disaster, a day or two after it happened, we said: "Long before the falling of the building, it was suspected that a considerable amount of 'jerry' work was being done on the bastard steel structures which are being run up continually in this city. We use the term 'bastard' advisedly; for a structure that extends ten stories in height and depends for its rigidity upon the lugs and flanges of miserable little rectangular cast-iron columns, has no rightful claim to the reputation for strength and security that goes with the term 'steel construction.'"

In the intervening month since these words were written, the testimony presented before the coroner's jury has abundantly substantiated their truth. A large number of possible causes for the collapse were suggested, such as faulty foundations, excessive loading of the top floor, framework being out of plumb, changes in plans (although apparently only minor), improper jacking up of the lower framework while replacing a defective cast-iron column; failure of a cast column about the fourth floor, and others. Probably several of these causes co-operated to start or intensify the ruin, but one prominent fact was referred to again and again, both on the stand and the street, namely, the improper use of cast-iron columns in a structure of this character. This point was not included in the jury report, perhaps because the criminal features of their work demanded first attention, or because of a natural but mistaken reluctance to antagonize local foundry interests. We say mistaken reluctance, for the most far-sighted iron founders agree on the futility of endeavoring to force the use of a material into lines for which it is unsuited.

Good cast iron is strong when subjected to compression, but against tension or bending strains it is notoriously weak, and its reliability is further decreased on account of hidden internal defects. The practical impossibility of securing sound castings from even the most reputable foundries is borne out in the Darlington disaster, where the experts of both the Building Department and the District Attorney found that the "fairly good" cast-iron columns used possessed flanges from one-third to 40 per cent defective. As a result of these latent defects, tensile weakness, internal cooling strains, and the danger of water freezing inside and bursting their hollow shells, the use of cast-iron columns should be limited to simple cases of direct compression where there are few complicating elements.

The skeleton frame of a building is subject to two kinds of strain, namely, direct compression from the weight of the structure and contents, and a bending