SCIENTIFIC AMERICAN

ESTABLISHED 1845

MUNN & CO., - - Editors and Proprietors

Published Weekly at

No. 361 Broadway, New York

TERMS TO SUBSCRIBERS

One copy, one year for the United States, Canada, or Mexico $3.00
One copy, one year, to any foreign country, postage prepaid. £0 16s. 5d. 4.00

THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (Established 1845) ..... $3.00 a year
Scientific American Supplement (Established 1876) ..... 5.00 "
Scientific American Building Monthly (Established 1885) ..... 2.50 "
Scientific American Export Edition (Established 1878) ..... 3.00 "

The combined subscription rates and rates to foreign countries will be furnished upon application.

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MUNN & CO., 361 Broadway, New York.

NEW YORK, SATURDAY, NOVEMBER 22, 1902.

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 LESSON OF THE EAST RIVER BRIDGE FIRE.

The recent East River Bridge fire will not be without its useful effect if it results in provision being made for fireproofing the completed structure. Of all the risks incidental to a great work of this kind, the very last that anyone seems to have considered was that of fire. It is easy to be wise after the event, but it is a matter for regret that, in preparing the temporary saddles for carrying the footbridge cables and supporting the strands of the main cable during erection, the Roebling Company did not build them of steel instead of timber. The cost would have been very little more, and the disaster which occurred would have been rendered impossible. At the same time, the accident teaches a very obvious lesson with regard to the future work on the bridge; for, if the existence of a structure costing from $20,000,000 to $22,000,000 is liable to be threatened by the use of combustible material in its construction, obviously the builders of the bridge should be careful to eliminate as far as possible all material that would cause a serious fire. As at present designed, the construction of the roadways, footways and railroad tracks calls for the inclusion of several million feet of timber. The existence of this material, high up in midair, where it is exposed to the full force of any wind that is blowing, will be an invitation to a disaster compared with which the fire of last week would be insignificant. Should the mass of timber in the roadway floorings, or in the railroad ties of the elevated and trolley tracks, once become thoroughly ignited, the fire would be liable under the influence of a strong breeze to sweep with great velocity and fierceness throughout the whole length of the bridge. To guard against fire two precautions should be taken: the amount of timber should be reduced to a minimum, while such as is used should be thoroughly fireproofed, and this protection should be further strengthened by the laying of ample water mains across the bridge with frequent hydrants. The use of fireproof wood would, of course, be costly; but viewed as an insurance upon the structure, it is an expense that would be justified by every consideration of prudence and economy.

PIPE GALLERIES FOR THE BROADWAY TUNNEL.

We understand that the City Controller at the last meeting of the Rapid Transit Commission moved that the Chief Engineer be instructed to prepare alternative plans, one of which will provide for pipe galleries along the Broadway line leading to the Brooklyn tunnel. It is the hope of the Controller that the city may be able to furnish the money necessary for the construction of these galleries. The announcement of this most important fact formed an insignificant paragraph in the daily press of the city that probably escaped the notice of a majority of its readers. Yet it is a fact that the question at issue has more to do with the comfort of the citizens of New York than many other municipal questions that receive, and will receive, far more attention. It cannot be denied that the water and gas mains and electric cables that underlie the streets of New York are the source of more interruption to traffic, more dirt and general confusion, than any other cause, unless it be the erection of new buildings. Whenever a main gets out of order, whenever the existing mains become too small for the needs of the city and have to be replaced by larger mains, whenever new connections, however small and insignificant, have to be made between a building and the street mains, the surface of the street is broken up, an unsightly and very obstructive excavation is made, and, as if the disturbers of public comfort rather gloried than otherwise in their work, when the excavation is closed the dirt is roughly thrown in, and it is usually weeks before the original granite or asphalt surface is restored. And this is going on every day of the year, and in a thousand different places at once.

With the construction of the Rapid Transit Subway it was realized by the engineers that there was a great opportunity presented for solving this problem by gathering all the city mains, conduits, cables, etc., together, and placing them in galleries constructed at the side of the Rapid Transit Tunnel. Plans were drawn for these galleries, and they were so arranged, with proper manhole openings at intervals, that whenever any repairs, laying of mains, making connections to buildings, etc., had to be done, the gallery could be entered at the proper manhole and the work done without any disturbance whatever of the city's streets. On some stretches of the Rapid Transit subway excavation was made for these galleries; but owing to a most disgraceful political move on the part of the Tammany politicians who were in power at that time, two or three heads of departments raised a series of obviously absurd and inadequate objections to the plan, with the result that the Rapid Transit Commission, rather than become involved in a legal controversy that might seriously delay the work, decided to go ahead with the tunnel and drop the subway scheme altogether. As a consequence, the city mains have been spread over the roof of the tunnel, a foot or so below the surface of the ground, and the city will continue to be exposed to the same interminable interruptions of traffic, which will be all the more exasperating because they could easily and cheaply have been avoided. In the construction of the subway down Broadway to the Brooklyn tunnel an opportunity is presented for putting in the pipe galleries and ridding this important and crowded thoroughfare of the street main nuisance. According to the City Controller, the erection of the galleries is now a question of finance; and we suggest that if this is the only consideration that stands in the way, it would be well to sacrifice some other and far less necessary city improvements in order to insure the carrying through of this greatly needed work. We commend the subject to that most enterprising body the Merchants' Association, which, we believe, in times past has itself directed attention to this important question. The subject is a pressing one, and unless favorable action be taken at an early date, an opportunity will be lost, as regards our most important thoroughfare, which will never return. For it would be a more difficult and costly matter (if not in some cases impossible) to build the subways after the structure of the tunnel has been completed.

A RESULT OF IMPROVED RAPID TRANSIT.

The remarkable increase in travel shown in the annual report of the Manhattan Elevated system is another proof that it pays the great transportation companies of this city to spend large sums of money in the betterment of their tracks and rolling stock. Also, it may be noted that the statistics of travel on this road for the past eight or ten years prove with equal clearness that it does not pay a great railroad system to lag behind in the matter of improvements, trusting to its prestige and the great needs of the traveling public to maintain its volume of traffic. During the year ending September 30, 1902, the Manhattan Elevated system carried a total of 223,427,283 passengers as against 194,152,316 carried during the preceding year. This great increase is to be attributed to the change which the company has made during the past year from steam to electric traction, with its resulting advantages of improved cars, better lighting, higher speed, more frequent service, and generally increased comfort of travel. The electric equipment of the Manhattan system was a very costly undertaking; yet the results of the first year of travel under the improved conditions show that the outlay was more than justified. It may surprise the public to learn that this great increase serves merely to bring the total of railroad travel about up to the figure at which it stood in 1893, when over 221,000,000 passengers were carried. In the following year there was a marked decrease to 202,751,532 passengers, and to explain this we must remember that at that time the Metropolitan Street Railway Company, or its predecessor rather, commenced the substitution of cable traction for the old and slow horse cars. This improvement of the surface system immediately began to attract passengers from the Elevated road, which made no effort whatever to meet the competition. A still further decrease of travel occurred in the year 1898 to 1899, when the enterprising Metropolitan Street Railway Company began to open that vast system of electric railroads which now embraces the whole city, the cable system and many of the horse car lines being replaced by electric traction. The figures of travel on the Elevated railroad since 1894, stated in millions of passengers, are for 1895, 187 millions; 1896, 184 millions; 1897, 182 millions; 1898, 183 millions; and the low-water mark was reached in 1899, when the total fell to 174 million passengers; the passenger earnings being $8,704,000 as against a total of $11,000,000 earned in 1893. In 1900 there was an upward movement manifest, the total number of passengers being 184,000,000, and this increased, as we have seen, to over 223,000,000 in 1901. These figures are all the more significant when we remember that only one-half of the elevated system's lines are completely equipped with electric traction, and consequently the travel for the year 1902-3 will probably be very much greater than this. One of the most valuable advantages of the improved conditions is the fact that on account of the greater frequency of the train service and the increased length of the trains, this great increase in the passenger traffic is taken care of with less crowding than when there was a smaller volume of travel. With the opening of the Rapid Transit Subway at the close of next year, there will probably be a movement from the elevated to the subway trains, and we may look for a corresponding decrease of travel on the elevated system. So rapid, however, is the growth of New York city, that it will not be two or three years before both the elevated and subway systems, especially on the express trains to Harlem and the Bronx, will be taxed to their full capacity.

THE NEW AMERICAN LIGHTHOUSE SYSTEM.

BY GEORGE ETHELBERT WALSH.

In its efforts to protect the shipping interests of the country, which stretch over some thousands of miles of ocean and inland waterways, the United States Lighthouse Board has in recent years accomplished results of an unusual nature, and, in the practical and experimental work performed, reliable data have been collected that must throw some light upon lighthouse problems in other countries. From one of the poorest-lighted coasts, the American Atlantic seaboard has, within a quarter of a century, become one of the best in the world, and the new system of lighthouses and signal lights is far more comprehensive than anything heretofore attempted. The problem of lighting the immense stretches of coast bordering two oceans, the Great Lakes, the Gulf of Mexico, and the inland rivers and waterways, was a stupendous one to contemplate. There was, in fact, so little comprehension of the magnitude of the enterprise that for many decades no idea was entertained of attempting to establish a system of lights, beacons and buoys that would be amply adequate for all purposes. The early efforts in lighthouse construction were consequently directed chiefly, and almost solely, to the establishment of a disconnected and irregular system, which would protect the shipping world only in certain dangerous places.

In this early development of the work, the coasts were divided into zones with certain important dangerous points marked plainly for lighthouse protection. The Cape Hatteras region, and the scarcely less important Cape Cod district, early received special attention. Both of these capes were in the direct route of commerce, and the storms and shoals that made them dangerous to navigators had to be offset by adequate lights which would warn mariners of their proximity. The first attempts at lighthouse construction were consequently made at a few such dangerous points along the coast, and from these in either direction new lights were gradually erected. They formed the beginning of the new system which seeks to make all of our coast so well protected that navigators need have little apprehension in approaching the land from any direction at any point.

But the rapidly increasing commerce on both the Atlantic and Pacific seaboard has made in recent years a more comprehensive system of lighthouses imperative. Likewise the shipping interests of the Great Lakes, the Gulf of Mexico, and the great inland rivers, have multiplied in importance, and the need for better protection from dangers to navigation has been general. For a quarter of a century now the American lighthouse system has expanded and developed, until it has reached a point in its evolution where it is without question one of the best in the world. The enormous coast line of the United States is now actually connected at every point with these modern "aids to navigation," and the seaman who knows his chart well has little difficulty in finding his way on the stormiest nights.

The full extent of the lighthouse service can best be appreciated by simply stating that there are some 9,000 warning lights and signals stretched along the American coasts, forming a perfect link so that the navigator need never be beyond the sight of one of the beacons. Of this grand total—including lighthouses of different classes, buoys, beacons, and danger signals—over 3,000 are lighted, giving forth their signals at night time. One thousand of these lights are located on the Atlantic coast, 1,500 are scattered along the rivers and inland waterways, 500 on the Great Lakes, and 200 on the Pacific coast. These so-called lighted "aids" include a great variety of modern inventions, from the tall flashlight lighthouse, with its base of steel and stone, and costly lamp operated by electric power, to the modern gas and electric-lighted buoys, beacons and lightships. There is such a variety of different lights included in this list that detailed description of them would fill volumes. The advances made in lighthouse and buoy construction represent some of the marvels of modern engineering science.

From time immemorial lighthouse construction has