

## SCIENTIFIC AMERICAN

ESTABLISHED 1845

MUNN &amp; 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 1883)..... 2.50  
 Scientific American Export Edition (Established 1875)..... 5.00  
 The combined subscription rates and rates to foreign countries will be furnished upon application.

Remit by postal or express money order, or by bank draft or check.  
 MUNN & CO., 361 Broadway, New York.

NEW YORK, SATURDAY, SEPTEMBER 26, 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.

## LIFE IS LONGER UNDER MODERN CONDITIONS

At a recent session of the International Congress of Actuaries, held in this city, the comforting fact was brought out that the improved conditions of modern life, as shown by statistics of the insurance companies extending over half a century, have resulted in a decided increase of the length of life of the average individual. The actuaries are men of the very highest professional ability and their conclusions are based, not upon limited observation, as is so often the case where important deductions are drawn from statistics, but upon a vast accumulation of insurance data and upon a careful analysis of the census. Hence their conclusions may be accepted as perfectly reliable and accurate. Mr. C. L. Landre, of Amsterdam, in speaking of the results obtained in his country, stated that it was remarkable how very constantly the insurance statistics show the expectation of life is increasing, the increase of the maximum of the expectation of life having risen from 46.1 to 56.4 years for men and 48.6 to 57.8 years for women. Mr. C. G. Warner stated that the results obtained in Great Britain show that whereas in 1838 the annual rate of mortality of men for all ages was twenty-three per thousand, in 1900 it had fallen to nineteen per thousand; while for women it had fallen in the same period from twenty-two to seventeen per thousand. The same authority stated that the distinct decrease in mortality as the nineteenth century progressed was so symmetrical as to indicate a settled and permanent tendency. The curious fact was brought out that the most marked improvement is shown in the early years of life. From four years of age up to thirty-four the improvement is so steady that it must be regarded as the direct result of law, while the same fact holds true of female mortality for a decade longer, or up to the age of forty-four, and in a less decided degree for the male. After this age there are periods through which the ratios are at about the same level, and in the later epochs of life there is an evidence of retrogression. During the first years of the great national prosperity that marks the nineteenth century, the effect in the lengthening of life was not marked, for prosperity was "not a little heartless." But in later years humanity and philanthropy had left their mark in the growth of hospitals and organizations for the care of the poor and suffering, while contemporaneously there was a great advance in hygiene and surgery, which also helped to extend the period of life. These developments have acted with more marked beneficial effect on childhood and youth than they have upon middle age; for in the later periods the intenser strain and keener competition which characterize modern life, its higher pressure, and special forms of diseases, are causes of mortality from which the earlier periods of life are exempt.

## ELEVATED AND TROLLEY TRACKS ON THE NEW BRIDGES.

The bridge commissioner has recently submitted to the mayor of this city a comprehensive plan for connecting the new bridges over the East River with the surface and elevated roads in Manhattan and Brooklyn. The subject is of such vital importance to Greater New York, and indirectly, as an object lesson in transportation, to the country at large, that we present herewith a brief digest of the commissioner's suggestions.

In the first place it is recommended that the Brooklyn Bridge be strengthened and double-decked, the present elevated and bridge cars being carried on the upper deck and the trolley cars removed from the roadway and run upon the lower deck between the trusses. This would facilitate trolley traffic, and the general vehicular traffic would have the roadways entirely to itself. The trolley tracks will expand into ten loops beneath the new station, which is to be built at the City Hall. The elevated trains also will travel around a loop at the new City Hall station and return

over the same bridge to Brooklyn, there connecting with the Fulton Street and Flatbush and Myrtle Avenue elevated tracks.

The new Manhattan Bridge adjoining the Brooklyn Bridge will be utilized by carrying the Flatbush Avenue railroad across the structure to Manhattan. This line will pass over the Second, Third, Sixth, and Ninth Avenue elevated railroads to the North River, thus tapping these north and south lines and putting them in through communication with Long Island, while the Fulton Street elevated railroad will cross by the same bridge, and in Manhattan its tracks will be carried upon an upper deck, above the present elevated structure, through Chatham Square and down Park Row to the proposed City Hall station. This last-named railroad will thus provide a complete loop from Fulton Street over the Manhattan Bridge, back to the Brooklyn Bridge to Brooklyn. Similar trolley and elevated connections are suggested by way of the new Williamsburg Bridge, commonly known as the New East River Bridge, and the commissioner also advocates the installing of the moving-platform scheme which is now under consideration by the rapid transit commissioners. This platform will extend from Williamsburg over the bridge to Manhattan, and in a subway below Delancey Street to the Bowery, then under the Bowery, Park Row and Nassau Street to the Battery. The platform would have a capacity of 70,000 passengers an hour. The elevated railroad tracks on Blackwell's Island Bridge will be connected in Manhattan with the Second Avenue elevated system, while on Long Island connections will be made with the elevated railroads at Thompson or Jackson Avenue.

## STEAM TURBINE FOR OCEAN LINERS.

It is persistently rumored that the Cunard Steamship Company has under serious consideration the question of installing turbines in place of the customary reciprocating engines on the two great steamships which it is about to build for the Atlantic service. Our readers will remember that when the question of the construction of these two vessels, which will greatly exceed all existing steamships in size, power, and speed, was finally determined upon, we expressed the conviction that the time was ripe for the introduction of the steam turbine into the Atlantic service, and that there was every reason why this new type of motor should be adopted for these ships. Naturally, before venturing upon so momentous a change, the company will wish that they had for their guidance more extended records of the behavior of the marine turbine, particularly on vessels of some intermediate size between the existing turbine channel passenger steamers and the giant vessels which they are themselves about to build. If the Cunard Company should determine to use the turbine, they will have acted with a great deal of courage and much commendable enterprise; but for our own part, we feel satisfied that the time is ripe for such a venture. The success of the turbine from its first installation in the little "Turbinia" up to the large and fast channel steamer "Queen," has been so pronounced and uninterrupted, that one fails to conceive of any complications which might develop, were the turbine employed on ocean liners, that would prevent the same excellent results from being secured. Indeed, the presumption is rather the other way, for the larger the ship, the better has been the performance; and, indeed, we have the oft-reiterated statement of Mr. Parsons that the greater size of the turbines that would have to be installed in ocean liners would tend toward better results in speed, power, and economy. A strong presumption as to the practicability of using turbine units of great horse power successfully on steamships is found in the fact that the units of 2,000 horse power or more that have been built for electric lighting and power plants have given such excellent service, and the electrical companies are so well satisfied with the results, that they are not hesitating to build units of as high as 10,000 maximum horse power. Now there is no reason why the engine room of a transatlantic liner should present any obstacles to the successful employment of the high-powered turbine any more than it has to the use of the high-powered reciprocating engine. Indeed, the presumption is the other way; for the racing of the propellers, which is liable to have serious results in the reciprocating engine, could, in the nature of things, do but little harm to the perfectly-balanced parts of a large turbine.

## MERCHANTS' ASSOCIATION ON CITY TRANSIT.

We have before us one of those voluminous and most carefully compiled reports which are issued from time to time by the Merchants' Association of this city, on questions affecting the municipal welfare of New York. While we have not on every occasion been able to agree with the suggestions of the Merchants' Association, the exceptions have been rare, and in the report before us, which deals with the question of passenger transportation service in the city of New York, the Association has covered the ground most thoroughly and, as a result of its investigations,

has drawn up a series of suggestions which, in the main, we heartily indorse.

Reference is made to the public indignation which was aroused last winter by the disregard of public rights shown by the surface and elevated railroad companies of this city. It will be remembered that after public hearings by the State Railroad Commission, a report was filed in which was set forth what might be done to improve existing conditions. After the expiration of the greater part of a year, the Merchants' Association states that the orders of the Commission, as a result of their investigation last winter, although ostensibly complied with by the companies, have not in reality been given such effect as to afford any substantial relief. Moreover, the Railroad Commission has made no serious attempt to enforce its orders, and, indeed, the legal committee of the Merchants' Association has shown that the Commission lacks the necessary legal powers to do so.

After making a thorough examination of the street car systems of Boston, St. Louis, Philadelphia, and other cities, the expert engineers employed by the Merchants' Association have offered the following conclusions and recommendations:

That more cars be put in service during the rush hours, the Committee being satisfied that the number of cars now operated might be increased considerably, even in the busiest hours.

That immediate measures be taken to reduce to the minimum the obstruction to the movement of trolley cars that could be handled, were this done, would be trucks, by building operations, and by other preventable obstructions. It is believed that the number of cars that could be handled, were this done, would be increased fully twenty per cent.

That measures be taken to substitute on all the congested lines cars with a seating capacity of fifty-two passengers each; the present seating capacity of the closed cars on Broadway being thirty on the average.

That a fair trial be given to double-decked cars. This is a suggestion which the SCIENTIFIC AMERICAN made several years ago, and we are still of the opinion that the double-decked car, with ample means for ingress and egress, because of the large number of passengers carried would do more than anything else to relieve congestion in the busiest hours.

The above are the most important recommendations of the report, but it is also suggested that at the principal transfer stations the cars be stopped in sets of two or more; that two motormen be stationed on all cars 28 feet long, or longer, at least during the rush hours of any congested lines, the cars being stopped to take on or leave passengers only at alternate cross streets, which shall be properly designated, and that effective power brakes be adopted.

In conclusion, we draw attention to the comment made in the report upon the plea of the elevated railroad management that during rush hours their cars are only partly filled toward the end of the runs. In reply the Merchants' Association makes a statement which every transportation company in this city would do well to ponder: "Franchises for street railways," says the Association, "are granted for the accommodation of the citizens, and not merely for the companies to make a profit. It is not to be admitted that the companies have any right to run only enough trains to be profitable at all times."

## TORPEDO EXPERIMENTS WITH THE "BELLEISLE" BY THE BRITISH ADMIRALTY.

Another interesting experiment has been carried out by the British Admiralty upon the target vessel "Belleisle," which has been the subject of several previous gunnery tests. The object of this latest experiment was to ascertain the effect of a torpedo exploding beneath a battleship, and also the value of cellulose, which is an American material made from corn pith, as a means of preventing the inrush of water into a ship after the penetration of the hull by collision or gunfire. It is contended that the cellulose, if rammed tightly in the double bottom of a ship, would offer resistance to the inrushing water and yet would not expand to a sufficient extent under the influence of water saturation, to burst open the side of the vessel. Previous trials upon a small scale, which were carried out some time ago, substantiated this claim, but the present test was carried out upon a much larger basis, and under conditions closely resembling actual warfare. On the port side of the "Belleisle" a compartment was specially constructed to represent a section of the latest type of armorclad. The compartment was 20 feet in length by 3 feet in depth, and protruded from the side of the target vessel for some two or three feet. Into this section a quantity of cellulose was tightly rammed, rendering it practically solid. A torpedo of the type used in the British navy was lashed alongside this section, and was connected by electric wires to the "Vernon" torpedo training school, a safe distance away. The "Belleisle" was towed to the outer harbor, and moored in 25 feet of water, with a depth of 10 feet below the keel of the vessel. The