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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.

THE NAVAL PROGRAMME FOR 1909.

The programme of the Navy Department, which received the indorsement of the President, calls for the expenditure of \$75,000,000 in the construction of thirty new ships, including four first-class battleships, or double the number of battleships that Congress was disposed to build, each year, as part of a continuous naval programme. The House Naval Committee has cut down the proposed expenditure by nearly two-thirds, to a total of \$29,000,000; and the increase of the navy, as now proposed, will include fifteen new ships, namely, two 26,000-ton battleships, five torpedo-boat destroyers, four submarine boats, one sub-surface torpedo boat, and three colliers.

The disposition of the last Congress to commit itself, as far as battleships are concerned, to a continuous programme, calling for the construction of two of the largest of this class every year, was considered to be one of the most fortunate events in the history of the upbuilding of our modern navy. If it be adhered to, we shall have no difficulty in maintaining our position as the second most powerful navy in the world; and it would certainly seem to be wiser to encourage Congress in holding to a continuous programme of this character, rather than go back to the old haphazard methods of earlier years. The two battleships will be the largest ever laid down by several thousand tons. Their displacement will be 26,000 tons; and they will carry twelve 12-inch, 50-caliber guns in six turrets, all placed on the center line of the ship. If the middle pair of turrets be placed *en echelon*, or diagonally, across the vessel, the new ship will be capable of directing a fire of twelve heavy guns on each broadside and eight ahead and astern. This will be a more powerful fire than that of any ship at present planned. The new German battleships, it is true, can concentrate the same number of heavy guns in the directions named; but as these are 11-inch pieces, of less caliber-length, their fire will be of far less power than that of the proposed battleships.

We have one fault to find with the Senate recommendation, and that is that the provision for three colliers is altogether too scanty. So serious do we consider the lack of colliers in the crippling effect which it would have upon our naval operations, that we would prefer to see the torpedo boats and submarines cut out altogether, and the balance of the appropriation, after providing for the two battleships, devoted to the immediate construction of eight or nine colliers, of the new "Vestal" and "Prometheus" type, each of which can carry 6,000 tons of coal at a sea speed of 16 knots an hour.

OUR DECADENT MERCHANT MARINE.

The signs of the steady decadence of our merchant marine are written so clearly, that he who runs may read. Those of us who a few years ago were hopeful that an era of rapid upbuilding had begun, and that the United States was in a fair way to win back something of that prestige which was hers before the ravages of the civil war swept our magnificent fleet of sailing ships from the high seas, must view with regret, even if it was not unexpected, the abandonment of the Eastern Shipyard at New London, in which Mr. James J. Hill, by the construction of the then two largest steamers in the world, endeavored to establish a strong hold on the Oriental trade, and incidentally assist in winning back for our merchant marine something of its one-time prestige.

In those days Mr. Hill firmly believed that American ships, built in American yards, and embodying the many well-known advantages which accrue to a freight steamer of the largest size, could be run profitably

without any assistance from the government; and we may be satisfied that the conduct of the new venture was marked by those excellent business methods, which have rendered the transcontinental road with which the steamships were associated such a conspicuous success.

One of these fine vessels was lost off the coast of Japan, it is true; but it is also true that the vessel was insured, and hence the failure of Mr. Hill to take any steps toward replacing the ship must be regarded as highly significant. Although the sister ship "Minnesota" is still running in the Pacific trade, the fact that she is generally understood to be for sale, coupled with the recent dismantling and abandonment of the yards where she was built, must be taken as a tacit acknowledgment of the failure of an enterprise upon which so many high hopes were centered.

The lesson which is written so clearly upon this abandoned New England shipyard is not new. Rather it is one among many accumulating proofs of the fact that, because of the greater cost of building and running American ships, it is hopeless for this country to try to establish a merchant marine in the face of keen foreign competition, unless some measure of aid be afforded by the government.

In seeking for government aid, the shipping interests do not ask that any new policy be established. They simply request that the principle of protecting young industries, until they have developed to a point at which they are able to meet foreign competition unaided, be extended to the merchant marine. It is confidently believed that if government aid were extended in some form or other, preferably as compensation for carrying the mails, the resulting increase in the shipbuilding business would be so great, as ultimately to place the shipping industry in a position to meet foreign competition unaided. When that stage of development approaches the subsidies could be gradually reduced, and finally withdrawn. Expectations of the successful working of a system of this kind are strongly warranted by the phenomenal development, during the past two decades, of some of our leading industries, and notably that concerned in the manufacture of steel. The recent statement of our leading ironmaster, that the steel industry in this country is to-day strong enough to hold its own unaided against free European competition, is fresh in our minds; and we confidently believe that the extension of a well-considered measure of government aid to our merchant marine would, in the course of time, enable this country to win back something of its former proud position as the leading maritime nation of the world.

Postmaster-General Meyer, speaking of the ocean mail service, says that with the exception of our service to Jamaica, Cuba, and the Atlantic ports of Mexico, which has prospered under the act of March 3, 1891, our mails to Central and South America, West Indies, Australia, and the Orient, are almost wholly dependent on foreign steamers, over which we have no jurisdiction. He further notes that within two years the number of American steamers crossing the Pacific and available for carrying the mails has been reduced more than one-half. Last year, the Post Office Department recommended, and the Senate by a practically unanimous vote passed, a bill which provides that the compensation of \$4 a mile, now allowed to 20-knot transatlantic American mail steamers, be allowed also to American steamers of not less than 16 knots speed on routes of 4,000 miles or more to South America, the Philippines, Japan, China, and Australasia. It would require several years to establish the new mail routes which are contemplated in the bill, since most of the fast steamers would have to be built. The passage of the bill would impose no large immediate expenditure; whereas the creation of new mail lines would promote trade, stimulate shipbuilding, and greatly strengthen the auxiliary naval forces of the government.

THE TRAFFIC OF A GREAT CITY.

Not many of us were prepared for the really stupendous figures of the passenger traffic of New York city, which are made public in the report, for 1908, of that most admirable and efficient body known as the Public Service Commission. It appears that the surface, elevated, and subway companies in New York carry annually over 1,300,000,000 passengers. What these figures mean will be better understood, when it is stated that they are over 66 per cent greater than the total number of passengers carried in the same year on all the steam railroads of the country combined. The total capitalization of these transportation companies is over \$533,000,000, and they derive annually from the passengers carried over \$62,000,000. Incidentally, it may be mentioned that the capitalization of New York's gas and electric companies is over \$386,000,000, and that they sell, annually, 32,000,000,000 cubic feet of gas; which amount is more than twenty per cent of the entire gas production in the United States. Moreover, the income from the sale of electricity alone in the city exceeds \$20,000,000.

By the close of 1908 the city had expended over \$50,000,000 in the construction of subways; and an additional \$100,000,000 will be necessary to build the Broadway-Lexington Avenue line, the loop lines connecting the Williamsburg and Manhattan bridges, the line across Manhattan below Canal Street in Manhattan, and the Fourth Avenue line in Brooklyn.

So much confusion exists in the public mind as to the exact status of the proposed new construction, that the following information from the report will be of no little interest. In the first place, the Commission declined the proposal of the Interborough Company to build a road by way of the new Manhattan Bridge from Flatbush Avenue, Brooklyn, to the Third Avenue Elevated Road in Manhattan, preferring instead to proceed with the construction of the Fourth Avenue Subway in Brooklyn. The construction of this line, however, has been held up by a taxpayer's injunction, and the matter is still in the courts. The Broadway-Lexington Avenue Subway has been delayed by the difficulty experienced in getting the consent of property owners. A decision of the Appellate Division rendered last month has cleared the way for the Board to proceed with the construction, and it hopes shortly to adopt the final plan of its chief engineer. Plans are also being prepared for a subway to run below Canal Street, from the Manhattan Bridge to the Hudson River, with provision for a rail connection at the intersection at Broadway with the proposed Broadway-Lexington Avenue line. The Subway loop connecting the Williamsburg and Brooklyn bridges is being pushed to completion, except on that section which passes below the new Municipal Building adjoining the Brooklyn Bridge Terminal, where it will be necessary to lay the building foundations before completing the Subway. The refusal of the Utilities Board to purchase the Steinway tunnel from the Interborough Company was due to the objection, among many others, that the contract for operation proposed by the Interborough would have cost the city some \$350,000 a year.

The suggested improvements in the operation of the existing subways, made by Bion J. Arnold, are being followed in two particulars. First, with a view to facilitating the loading and unloading of trains, several new cars are under construction, which will be provided with a pair of doors at each end of the car, one of each pair being for ingress and the other for egress; and it is expected that some of these cars will shortly be placed in operation. Unless some unforeseen difficulties develop, it seems to us that the new cars should result in a considerable acceleration of the train service, due to the cutting down of the time of stops at stations. The new signal system proposed by Arnold, which permits express trains to be run under shorter headway, has proved so successful at the greatly congested 96th Street station, that the company is planning to install it throughout the line. Another important improvement is the alteration of the Bowling Green station to permit of a service of shuttle trains between Bowling Green and South Ferry, with a view to allowing all express trains to be run through to Brooklyn.

Most commendable has been the work of the Commission in gathering careful statistics of accidents and fatalities on all transportation lines. The total number of accidents has reached during the year the appalling total of 50,000, in which no less than 600 lives have been lost. Impelled by these statistics, the Commission conducted a series of extensive competitive tests of fenders and wheel guards, which were thrown open to all manufacturers in this country and abroad. We sincerely hope that these tests will shortly result in the enforced adoption of some satisfactory life and limb saving device on all the street railways of this city.

Sir James Dewar having succeeded, by the use of the radiometer, in detecting a gas pressure of the fifty-millionth of an atmosphere, and having definitely detected by this means the helium produced in a few hours from about ten milligrammes of radium bromide, has undertaken the direct measurement of the helium produced by radium. For this purpose he employed 70 milligrammes of radium bromide belonging to the Royal Society, which had been used by Dr. Thorpe in his recent determination of the atomic weight of radium. The apparatus employed for measuring the helium consisted of a McCleod gage in which no rubber joints were used, together with ingenious arrangements for exhausting the apparatus. Any traces of adventitious gases were absorbed by an attached bulb containing charcoal and cooled in liquid air. In one instance the pressure registered at the start of the experiment was 0.000044 milligramme. The radium salt was occasionally heated and the pressure of the helium was determined from time to time. A steadily maintained helium increment was obtained of approximately 0.37 cubic milligramme per gramme of radium per day. This result agrees very closely with Rutherford's theoretical calculation, which gives about 0.3 cubic millimeter per day.