

Correspondence.

Our Armored Cruisers.

To the Editor of the SCIENTIFIC AMERICAN:

As a reader of the SCIENTIFIC AMERICAN I have been very much interested in the articles appearing in the paper at different times on the various navies of the world, and especially on the development of our own navy. It is very satisfactory to think that, ton for ton, the American ships are equal, if not superior, to the ships of any other navy of the same date and class. I think this especially true of the battleships of the "Georgia" class, which are without a peer in any navy. But it is doubtful if the same can be said of the armored cruisers of the "St. Louis" and "California" classes.

In the article on the English navy in the SCIENTIFIC AMERICAN of December 10, 1898, the difference between a protected and an armored ship was explained. "Any ship having a vertical water line belt of armor" was classed as an armored ship, and for this reason I think the "St. Louis" should be classed as an armored and not as a protected cruiser. If we compare the "St. Louis" with the "Varese" of the Italian navy, it is found that the "Varese" has so much more armor protection that I almost agree with you that the two ships are not in the same class. The "Varese" has the same number of 6-inch rapid-fire guns as the "St. Louis," and one 10-inch and two 8-inch guns in addition. The "St. Louis" is better supplied with quick-fire and machine guns, but still it is to be feared that the "St. Louis" would cut but a sorry figure in a stand-up fight with the "Varese" with equally efficient crews. Of course, the speed of the "St. Louis" would enable her to run away; but if the displacement of the "Varese" (7,400 tons) were raised to that of the "St. Louis" (9,700 tons), a difference of 2,300 tons, or about 31 per cent, would not the extra displacement allow boiler and engine power enough to raise the speed of the "Varese" from 20 to 22 knots? If such were the case, what chance would the "St. Louis" have then? In the "Maine" it is expected to raise the speed from 16 to 18 knots by adding 1,000 tons to the displacement, or about 8.7 per cent.

Another ship to compare with the "St. Louis" is the Japanese "Asama." The two have practically the same displacement, coal capacity and speed, but in armor and guns the Japanese outclasses the American completely. The "Asama" ought to be a match for two ships like the "St. Louis."

In the article describing the "St. Louis" (SCIENTIFIC AMERICAN, December 22, 1900) she is compared with the English "Monmouth" without much advantage to either, as each possesses qualities lacking in the other. It has been stated several times in the SCIENTIFIC AMERICAN that the English ships were very much under-gunned in comparison with our own and other navies. If so, I do not think they should be adopted as a standard with which to compare our own ships.

If the "Asama" be compared with the "California," it is seen that the two ships have the same speed, the same battery of 8-inch and 6-inch guns, practically the same belt armor, and about the same protection for the most of the battery. Probably the continuous casemate armor of the "California" affords more protection than that of the "Asama," which has the further disadvantage of having four 6-inch guns mounted on the main deck with only shield protection. The "California" also has a more effective battery of quick-fire and machine guns. These are undoubted advantages in favor of the American ship. But they fail to account for the enormous difference of 4,000 tons in the displacement of the two ships. The Japanese have obtained nearly the same results in a ship of only 9,750 tons as we have in a ship of 13,800 tons. I do not see where we have any reason to boast. I think the fundamental principle of naval construction is that, other qualities being equal, the most efficient ship is the one which can give and take the most pounding; and the naval constructor who turns out such a design has beaten his rivals by just that much. It has been stated in the SCIENTIFIC AMERICAN that a quart of efficiency could not be obtained from a pint of displacement, but in our new armored cruisers it looks like getting a pint of efficiency from a quart of displacement. The data for arriving at the above conclusions have been gleaned from the columns of the SCIENTIFIC AMERICAN.

If my ideas on the subject are wrong, I would like to learn it through the same medium which brings me to the real reason for writing: That in some future issue of the SCIENTIFIC AMERICAN you would devote the space to a comparison of the American with the Italian and Japanese ships mentioned. I think such an article would prove very interesting to a large number of your readers. F. I. BROWN.

Kittery, Me., January 4, 1901.

[The following reply has been received from an ex-

pert to whom the above letter on our armored cruisers, and the one published in our preceding issue on the same subject, were referred.—Ed.]

These correspondents are right in denominating the "St. Louis" an armored cruiser. The term "protected cruiser" is used officially in connection with these vessels for the reason that the appropriation under which they are to be constructed was for three protected cruisers. The Board on Construction determined to embody in the vessels such features as make them second-class armored cruisers, and the disposition of weight represented in the design was forced upon the Bureau of Construction and Repair.

Speaking generally of comparison of our own vessels and those of foreign design under construction, it may be said that the difficulties in the way of a strictly true and impartial comparison are extremely great because of the inaccuracy of information as to details of the foreign vessels which is available to any one writing as your correspondents do. The displacement given in all publications touching upon such vessels is generally the trial displacement, and "trial displacement" is, at best, a very indefinite term, inasmuch as the weights to be carried on trial must be definitely known in order to make the use of trial displacement, for purposes of comparison, of any value. The trial displacement fixed for vessels of the United States navy involves a considerably greater proportion of the maximum weights to be carried, in the deep sea-going condition, than is the case with many of the foreign-built vessels of war, and this is especially true in the case of vessels designed and built by private shipbuilding concerns abroad. The disposition of weight in any design is necessarily determined by a compromise among several opposing interests, and in the case of vessels designed for the United States navy, it very often happens that the disposition of weight finally fixed upon is not that which the designers themselves regard as the most desirable.

Among the features affecting the total weight and the distribution of weight which may possibly account for some of the differences noted by your correspondents between recent designs for vessels of the United States navy, as compared with those of foreign navies, it may be said that the designers for the propelling machinery for these vessels require weights such that about 11 horse power are developed per ton of engineering weights, whereas, in the case of the vessels quoted, the horse power per ton of weight is very materially greater. The space required for machinery has also had an effect in determining the lengths of the vessels, and through affecting the length has made necessary material increases in armored protection for the water line area. The quantities of ammunition carried by our own vessels are understood to be very considerably in excess of those in either of the vessels quoted by your correspondents. The weight and space devoted to the accommodation of officers, petty officers and crews of our vessels are materially greater than in the case of the other vessels under comment; and it may also be pointed out that there is a considerable expenditure of weight involved in the provisions made for our efficient systems of ventilation, heating, and electrical installations, as well as in such less noticeable details as ice plants, cold storage, laundries, et cetera. There are other elements which may be less readily brought into the comparison, such, for example, as the differences in freeboard and total height of structure in the several cases; scantlings and general strength of the structures, and space and weight devoted to the accommodation of the complements and stores and supplies carried for their use.

A New Edition of the Cyclopedia of Receipts.

A few years ago the publishers of this paper issued the first edition of "The Scientific American Cyclopedia of Receipts, Notes and Queries." It was well received by the press, and came quickly into the favor of its purchasers. It has been used by those unfamiliar with the arts with great success. To those who are unacquainted with the book, we may say that it consists of a careful compilation of the most useful receipts which have appeared in the SCIENTIFIC AMERICAN, together with much additional information. Nearly every branch of the useful arts is represented, and almost every inquiry relating to formulæ will be found answered in its pages, making it of the utmost value in either house or factory. It is much more than an ordinary receipt book, as it gives all the standard and special formulæ, thus enabling the reader to find a receipt which fits his peculiar need. The alphabetical arrangement with abundant cross references makes it an easy work to consult. The Appendix contains the very latest formulæ, 900 in number, and in response to many requests the publishers have decided to print a small edition of the Appendix for those who have an earlier edition of the Cyclopedia. They have also prepared a very full table of contents, which will give an admirable idea of the scope of the book.

Engineering Notes.

The canal bill which was introduced in the Prussian Diet of January 12 calls for an appropriation of 339,000,000 marks, or \$97,250,000.

A large corundum mill, said to be the largest in the world, is in operation at Raglan, Ontario. Fifteen tons of corundum are turned out a day, using one hundred tons of rock.

Many railroads, including the Chicago, Great Western, and the Chicago & Alton and Erie Railroad, have ceased to permit news agents and peddlers upon the trains, as it was found to be a nuisance to the traveling public.

The St. Petersburg Car Works have just finished for the Trans-Baikal line of the Siberian Railroad a fine train of five cars, which cost over \$50,000. One of them is given up to first-class passengers, two to second-class passengers, the fourth is a parlor car, and the fifth a diner. They are all connected by vestibules. The furniture is mahogany, and the parlor is provided with a piano.

The men who were at work on the top of the Williamsburg tower of the new East River Bridge, New York, had a thrilling experience on January 19, when a sudden snow squall struck the city. The wind raised part of the wooden flooring and blew the boards in every direction. The men lay down and held on to everything within reach. Some of them had to discard their gloves in order to maintain a firm grip, and, in consequence, had their fingers frostbitten. After the flurry of snow subsided the men came down the rope ladder and work was suspended for the day.

The cycling industry of England is at present in a critical condition. The majority of the companies have not paid any dividends during the past year, and the outlook portends worse business in the future. It is estimated that no less than \$100,000,000 are sunk in the cycle industry in England. During the past four years no less than fifty companies aggregating a capital of \$25,000,000 have disappeared. The main reason for this crisis is over-capitalization, combined with reckless, dishonest trading, while the cycle, although a popular means of locomotion, is being rapidly supplanted by the motor car. The cycle firms at present in a flourishing condition make this industry only a ramification of an extensive business, so that any loss incurred by cycle manufacture is compensated by the financial success of other specialties.

Moscow was formerly connected to Nijni-Novgorod by a waterway, but through neglect this means of intercommunication has long since been closed, owing to the filling up of the channel with sand, etc. Attempts, however, are to be made to reconstruct it. The river Moskwa a few years ago was a useless waterway, but a steamer trading company built a series of locks and dams, and have since developed a vast traffic, amounting to about 17,000,000 poods per annum, between Moscow and Kolomna. Above the latter point to Rjasan, where commences the navigable portion of the river Oka, which flows to Nijni-Novgorod, the passage of the river is obstructed by sand. It is proposed to remove this sand as much as possible, and to erect dams and locks so that a sufficient depth of water may be obtained throughout the whole of this section of the river. By this means a continuous waterway will extend from Moscow to Nijni-Novgorod. The cost of the scheme will amount to about \$3,250,000.

Belgium is suffering from the effects of an acute industrial crisis, which threatens to severely interfere with the prosperity of the country. The high price of coal has necessitated the closing of numerous manufactories, and the consequent increase in the number of the unemployed. The miners, owing to their strong organization, have been enabled to enforce their demands regarding increased wages, and it is anticipated that grave trouble will result when the break occurs in the price of coal, since they will not be disposed to acquiesce to a corresponding reduction in their wages. The diamond cutters also promise considerable trouble. They have united and demand an eight-hour day without any reduction in their wages. The glassworkers have also caused severe disruption in their trade, and the result of their strike has been to direct a heavy blow at what is probably the strongest industry in Belgium. The discontent in this trade has been caused by the employment of non-union men. Owing to the strong unanimity which exists among the employes in Belgium the unions are very rich and powerful, and are in a position to defy the masters for a long time. The larger manufacturers are resisting the workmen's demands, but the smaller manufacturers, who are not in a position to maintain inactivity for any great length of time, are removing their works to other countries, where the workmen's organizations are not so potential. Unless some arrangement is shortly concluded between the masters and the men grave and extensive trouble is apprehended.