Correspondence.

The 7-inch vs. the 6-inch Gun.

To the Editor of the SCIENTIFIC AMERICAN:

I have followed with interest the controversy now in progress in your paper concerning the armament for the cruisers of the "California" class. It is most satisfactory to know that there are people who take such deep interest in the development of our navy as do your correspondents. It is well that our people take an active interest in such matters, and that their opinions be brought forth. While some very good points are raised on both sides of the question, erroneous ideas are apt to appear. It is to such an idea that I wish to call attention, not for mere argument's sake, but in the hope that its correction may lead to further discussion of the subject in question on a more comprehensive basis.

I refer to the communication in your issue of March 23, 1901, in which your correspondent suggests the substitution of 7-inch for the 6-inch rapid-firing guns as a means of solving the battery question of the "California" class of armored cruisers. That would be a great mistake; for there would be no gun of intermediate caliber between the 7-inch and the 3-inch (14 pounder) guns. Moreover, if an intermediate caliber could be introduced the difference in efficiency between the 7-inch and the 8-inch gun would not warrant the installation of the two on the same ship. In fact, it would be considered a very unwise policy to have two so closely related guns on one ship, be they 4-inch and 5-inch, or 6-inch and 7-inch. The 6-inch (100-pounder) is a very good "stepping stone" between the 8-inch (250-pounder) and the 3-inch (14-pounder).

One of the lessons of the Spanish war has evidently escaped the consideration of your correspondent, and that is the moral effect of rapid fire upon an enemy. What overwhelmed the Spanish gunners was not the accuracy of our fire, far from it—only from two to three per cent of the shots having taken effect; it was the rapidity of our fire that filled the air with shell that demoralized them.

It is safe to assume that the latest 6-inch gun will be able to deliver more metal within a time limit than the 7-inch gun, and with the same, probably superior, accuracy due to its more manageable size; for the smaller the caliber the greater the rapidity of fire. If the 7-inch gun were adopted, as proposed, the 8-inch gun and the 6-inch gun would have to be discarded and the 5-inch gun brought into play to fill in the gap between the 7-inch and the 3-inch guns, and that is not as effective for all-around work as the 6-inch gun against the latest ships.

The following also attracted my attention while reading the correspondence referred to, viz.:

"If fighting is the primary object of a warship, it would certainly seem that her offensive power should not be made of secondary importance to other qualities in her make-up."

According to that let us take our "Californias" and remodel them so that the machinery is reduced to ten or twelve knots efficiency, the coal capacity to about 500 tons, the high freeboard of some twenty feet to the low one of a foot and a half or two, and reduce everything else that we do not actually use in fighting. The result would be a monitor—an excellent fighting ship, but of what strategic value? Surely a monitor with four 8-inch, fourteen 6-inch, eighteen 14-pounders and twelve 3-pounders and four 1-pounder guns would be a most formidable fighting vessel, even more formidable than the "California" of the same armament before being changed. Anchor them both within fighting range and let them bang away at each other. The result would be the cruiser much the worse for the experience, due to her greater exposed surface; for her high freeboard would serve as a short stop for many shots. If, however, the cruiser be permitted to use her superior speed she would be able to accept or refuse battle. If accepting battle her speed would serve her for constant maneuvering which the slow speed of the monitor could not offset. But give your monitor speed, hence greater coal capacity, hence a greater crew, hence greater freeboard, hence greater displacement, and you have a rival for the cruiser on an equal standing. Thus it will be seen that a ship, to be an all-around fighting ship, must combine such qualities as belong to vessels of another class—the protected cruiser or even the gunboat, which are strategically excellent but offensively poor.

It seems that for all-around efficiency the "California" and class are first-class ships and I am sure that they are the result of conscientious work on the part of our naval constructors, to whose benefit it is to produce only first-class work.

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The great Serpent Mound in Ohio has been transferred to the Ohio Archæological and Historical Society.

Engineering Notes.

The Cape-to-Cairo railroad is now in operation to a point 100 miles beyond the southern line of Lake Tanganyika.

The company making cellulose for war vessels, explosives, etc., now has three large factories in successful operation, besides two cutting plants. A fourth factory is nearly completed.

The French art critic, M. Arsène Alexandre, has discovered that our machinery showed a distinct beauty of racial type. The national character was clearly marked, he thinks, even in our locomotives. This theory is an ingenious one, and is worthy of elaboration.

A scheme is on foot to start a fast line of steamers on the Thames between Kew and Woolwich. Certainly there is no river in the world that needs fast service of boats as the Thames. The boats which run to Hampton Court make phenomenally slow time. They are retarded by the locks.

The sizes of anthracite coal and the screens through which they are made are as follows, says Steam Engineering: Coal which runs through a screen having a mesh of 3-16 of an inch is called barley; 3/8, rice; 9-16, buckwheat; 7/8, pea; 1½, chestnut; 2, stove; 2¾, egg; 4½, grate; 7, steam. Coal beyond this size is known as lump coal. Bituminous lump coal passes over bars 1½ inches apart; bituminous nut coal passes through bars 1½ inches apart; slack coal passes through bars ¾ of an inch apart.

Germany offers abundant market for a large number of American commodities, especially in the way of office furniture and supplies. The safes are mostly of obsolete types with old-style locks, and judicious efforts on the part of our manufacturers would result in large sales of our medium styles store and office safes. German offices and stores are rapidly adopting modern furniture including desks, typewriters, file cases, cash-registers, etc., and safes will prove equally as popular. Heidelberg students carry ink in bottles to and from classes and, indeed, the fountain-pen seems to be very little known in Germany.

In December a serious country fire occurred along the line of the Great Southern Railway in the Argentine. It extended 60 miles, and burned some freight rolling stock as well as telegraph poles and fence posts. The fire appears to have been spread by the great amount of "paja voladora," or flying grass. It is blown about by the wind and whatever care the railroad companies may take naturally they cannot keep it off their right of way so long as it exists. It is difficult for the trains to cut their way through it, and it causes hot boxes and even derailments, while foremost of all is the terrible danger of its taking fire. The shifting of the wind a few points after the section hands have cleared the track of the flying grass may result in its immediately being buried in the dangerous stuff again.

Vaucluse, in South France, is a center of the ocher industry. Sometimes the ocher is excavated direct without mining, but often shafts are sunk. The material when brought to the surface is transported to the valley below on carts and is then washed. Mining is only done in the winter season, as the watercourses are dry in summer. By means of successive settling basins various degrees of fineness are secured in washing the ore. At the end of the winter these basins are filled with ocher in the form of mud, which dries hard during the heated term, and is then cut into blocks of regular size and dried in the sun. It is then either cut into blocks or crushed into powder for shipment and is sorted for color; the yellow shades command the highest price. The total production of these mines last year was about 180,000 tons, and of this amount 3,000 tons were shipped to the United States. Although the mines have been worked for many years they are not exhausted.

The London County Council have issued their annual report reviewing the work accomplished in the metropolis during 1899 concerning tramways, dwellings, and numerous other schemes which were carried out at an aggregate cost of more than $56,250,000. Twenty-three miles of new thoroughfares were undertaken, which will result when completed in an increase in the population under the jurisdiction of the Council from its present 4,700,000 persons to 7,096,400 persons. The maintenance of the Fire Brigade cost $1,000,000, while a similar sum was expended upon the drainage of the city. The present sewers are too small to cope with the rapidly-increasing exigencies of the population, and a new scheme for reconstructing the drainage system is being projected at a cost of $15,000,000. London possesses 3,809 acres of open spaces and parks, to maintain which cost $572,575. In 1889 the cost in this direction was only $263,755. The Council also maintains the coroners' courts and the asylums; is responsible for the highways, bridges and public health; controls the theaters and music halls; and attends to the enforcement of the Weights and Measures act, in which 1,100 offenses were punished during the year.

Electrical Notes.

The London United Tramways, upon which electric traction has been introduced in place of horses, are meeting with considerable opposition from the scientists of Kew Observatory. A section of the line passes within three quarters of a mile of that building and the observers complain that their delicate instruments are deranged and the records spoiled by the near neighborhood of the electric current. The Board of Trade have the matter in hand, and experiments are to be carried out to ascertain to what the electrical disturbances at Kew will amount, and the best methods of insulation. The tramway engineers do not feel disposed to resort to elaborate and expensive means for insuring complete insulation, so that a complete deadlock is the result, and the tramways cannot yet be opened to public traffic.

The separation of wireless messages is now receiving great attention by electricians. M. P. Jégou has adopted a new system in which he employs mast-wires of different ranges. Four such mast-wires are employed, two at the sending station and two at the receiving station. Their heights are so arranged that one of them covers, say, a range of five miles, while the other does not. The circuits of the coherers attached to the two mast-wires are so arranged that their simultaneous action produces no effect upon the galvanometer, but at a distance of five miles the galvanometer will respond to a message from the sending stations addressed to both coherers, as only one of them is brought into action. At half the distance when both coherers are within range no effect is produced on the galvanometer.

There is a project on foot for the construction of a movable electric platform on the right bank of the Seine. It will be underground and its length will be about six miles. The route proposed passes under the Avenue de l'Opera, the great boulevards, Boulevard Sebastopol, the Rue Turbigo and the Rue de Rivoli. The new scheme calls for four platforms instead of three as was in use at the Exposition. The first platform will be stationary, the second will have a velocity of 1½ meters a second, the third 3 meters and the fourth 5 meters or 16⅛ feet. This will enable pedestrians to have a very rapid means of transit afoot, in a portion of Paris which is greatly encumbered by vehicular traffic, for as all the locomotion is in one direction persons can walk very fast on the fourth platform, and will be able to cover a great distance. Some means of transit on the streets mentioned is so necessary that it is very likely the scheme will be carried into effect.

Attempts are being made by the Marconi Wireless Telephone Company, of London, to inaugurate a wireless telegraph service to Australia. Although the total distance is considerably in excess of that from England to this country, it can be more easily negotiated owing to the facilities offered at various points en route, for the installation of subsidiary transmitting stations. Arrangements are being made to erect stations at Prawle Point, the Lizard, Ushant, Cape Finisterre, Gibraltar, Malta, Algiers, Sardinia, Sicily, Cape Malea in Greece, Alexandria, Aden, Socotra, Colombo, Sumatra, the Cocos Islands, Perth, Albany, Adelaide, and Melbourne. The various governments of the countries in which these points are situated are being approached to obtain permission to install the stations. In no single instance is the span between two points so great as that from the west of Ireland to New York, so that, if success attends the experiments in this case, it will probably be equally possible to extend the distance and to establish ether communication between this country and Great Britain. If the vessels plying between England and the Antipodes are supplied with instruments, it will be possible for passengers to dispatch and receive messages during the voyage.

A new process for making plates of porous lead for use in accumulators or for acid filters has lately been patented in Germany by Richard Bauer. In place of treating the melted lead by a jet of gas or vapor, as is often done, the inventor uses a material which by contact with the melted metal is volatilized and penetrates through the mass during the cooling. Sulphur is best adapted for this purpose; it has the property of combining with the lead to form sulphide, and this sulphide when decomposed by dilute hydrochloric acid leaves a mass of porous lead. In practice the operation is carried out as follows: The two halves of a plate mould are heated and a small quantity of melted sulphur is introduced, so that after cooling the sides of the mould are covered with a layer of sulphur. The lead, heated to redness, is then poured into the mould; the sulphur is vaporized and penetrates into the mass. After cooling, the plate taken from the mould is composed of lead, sulphide of lead and an excess of sulphur. The latter is removed by a preliminary washing and the plate is then treated with dilute sulphuric acid, which decomposes the sulphide and leaves a plate of pure lead which is extremely porous and well adapted for accumulators and other uses.