Correspondence.

Test of a Full-Sized Bridge Chord.

To the Editor of the SCIENTIFIC AMERICAN:

An editorial article in your last issue on "Proposed Test of Full-sized Blackwell's Island Bridge Chord," contains an error to which I beg leave to call your attention.

The test with small tubes for the steel arch bridge over the Mississippi River at St. Louis was not actually made, but had been proposed by Col. Flad, who at that time was Capt. Eads's principal assistant.

By referring to Prof. Woodward's "History of the St. Louis Arch Bridge," page 119, you will also find indicated the reason why the proposed test was not carried out, i. e., the necessity to avoid even small expense, a reason which does not apply in the case of the Blackwell's Island bridge. GUSTAV LINDENTHAL.

New York, August 31, 1908.

Proposed Rearming of Our Warships.

To the Editor of the SCIENTIFIC AMERICAN:

I follow all articles on the United States navy very closely. In fact, I take your paper solely for the information that I get on our navy as well as those of other countries.

I have read Mr. H. M. Kennard's article closely and enjoyed it, and indorse his sentiments heartily. If opinions from readers and laymen are in order, I would like to present a few ideas of my own. If his ideas of modernizing our next latest battleships of "Georgia" and "Connecticut" classes and making "Dreadnoughts" are practicable, it is an excellent thought. But it occurs to me that these are very formidable ships, and would give good accounts of themselves in any line of battle. If any changes are to be made, why not substitute two 45-caliber high-power 12-inch rifles for the four 10-inch rifles proposed by Mr. Kennard?

In a four-mile engagement one new 45-caliber 12-inch would do more damage than two 10-inch and require fewer men to handle it. These 12-inch rifles could be placed one in a turret on the beam. It would hardly be worth while to take out 8-inch guns and put in 10-inch. If a change is made, substitute 12-inch. Another cogent reason for putting in 12-inch guns is to keep down the number of calibers of guns on a ship.

If Mr. Kennard's suggestions were carried out, the "Connecticut" or "Georgia" would have 12, 10, 8, and 6-inch rifles on her. Substitute 12-inch for the 8-inch and leave out the 6-inch and you would have real "Dreadnoughts." The 12-inch ammunition passages and hoisting gearing could be extended to the two new turrets instead of installing an entirely new size.

My idea is that if any changes be made, they should be on the ten or twelve new cruisers of the "Washington" and "Tennessee" classes.

Take the "Tennessee" for instance, with her four 8-inch rifles. She could never get into a modern sea fight because the battle will be fought at four or five miles' range, and her 8-inch guns would be harmless, while she would be exposed to the fire of modern 12-inch rifles, and not being able to return the fire would have to get away if she could. Suppose four 12-inch rifles were put in place of the four 8-inch, and all of her fourteen 6-inch guns were replaced by ten 5-inch rapid-fire rifles, and all her flying bridges and military masts were taken off and the tripod skeleton mast placed. Enough weight could be saved on these fine 13,500-ton cruisers to make these changes. Then the ten or twelve practically useless new armored cruisers would make a fleet of fast 20 to 22-knot battleship-cruisers. These cruisers could operate with the new "Dreadnought" class of battleships now building, and when a battle came on could take their places in the first line and stay there too. With new 45-caliber 12-inch rifles they would be good matches for anything excepting new "Dreadnoughts."

Now suppose four of these new "Tennessee" cruisers with the 12-inch 45-caliber rifles are cruising on the flanks of a fleet and come in touch with the enemy. They stand some chance of sinking detached battleships of the latest design, or of getting away in case the enemy is too strong. With the puny four 8-inch rifles they could neither keep the enemy off nor get away from 12-inch guns. Six-inch rifles are obsolete. They are not heavy enough to sink anything, or even get in reach of anything, and are too heavy to keep off torpedo attacks.

My idea would be to take all the 6-inch batteries off the new cruisers, substitute one-half the number of rapid-fire 5-inch and then place four 12-inch 45-caliber rifles in two turrets on these ships. Certainly on a displacement of 13,500 and 14,500 tons this can be done, by doing away with the heavy flying bridges, cranes, military masts, etc. Why haul hundreds of tons of 6-inch ammunition besides the guns around when neither would be effective in a modern sea fight? Better do away with the 6-inch guns entirely and use the displacement to carry ammunition for four modern 12-inch rifles, after providing a light rapid-fire battery to keep off torpedo attack. When a fleet is cruising thousands of miles away from home, the more homogeneous the fleet can be made in respect to size, speed, and uniformity in size of guns, the more effective will that fleet be. What use would 10,000 tons of 6-inch shells be to a fleet of "Dreadnoughts" that needed 12-inch shells?

By battleships as well as cruisers all having their main armaments 12-inch, one ship could supply another's needs before and after battles on far-away stations, to say nothing of the extra guns and gun repairs that would be carried by a fleet on a distant station.

It would seem to me very inexpedient to introduce another caliber into the United States navy. The 10-inch gun is carried on a very limited number of our cruisers. Why not do away with it also and make the 12-inch the one and only heavy rifle in the United States navy? Then one ship could supply another in case of need, and all could fight with equal effect in the battle line. A. B. WINGFIELD.

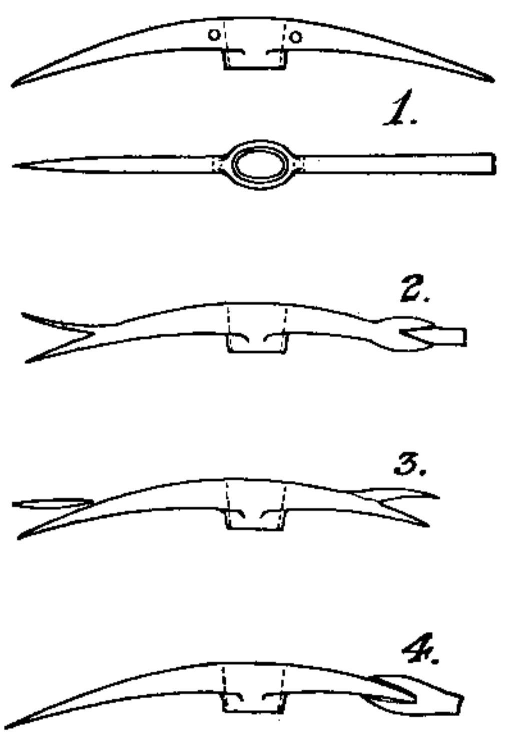
Charlotte, N. C., August 15, 1908.

[To change the armament of a ship in the way suggested by our correspondent is a far more complicated problem than is generally supposed. The concentrated weight of a 12-inch gun emplacement would so seriously affect the stresses in the hull structure of a cruiser as to call for costly changes and an increase of hull weight. The strongest objection would lie in the light 6-inch armor protection, and the fact that the increase in gun and turret weight would sink this light armor belt even lower in the water than it now is. Such changes have been frequently proposed in other navies; but the consensus of opinion is that appropriations are best expended on absolutely new construction.—ED.]

REPAIRING RAILROAD PICKS.

BY I. C. BAYLEY.

The body of a pick is generally made of a low-grade steel, but the points are either of cast steel or high-grade tool steel.



REPAIRING RAILROAD PICKS.

On account of the body being of a low grade, it is no unusual thing for an energetic laborer, when hammering the pick down upon the helve or handle, to split the eye or even burst it open.

For this reason, in one of the railroad shops, where many of these picks are repaired, the blacksmith conceived the idea of drilling two holes near either side of the eye, as shown in No. 1, and inserting a couple of countersunk rivets, after which he declared that very few picks came to him for repairs in that particular spot. But to my mind the best wrinkle he gave to me was in welding the steel points on the ends.

No. 2, at the right-hand side, shows one of the usual manners of doing this. The ends of the pick are split open for a little way, to take the point, which is made wedge shape at one end, and the whole welded together and brought to a point, as in No. 1. But it was noticed that when these same energetic laborers used their picks for levers, they came back to the shop with the points missing, and wide open jaws, as shown to the left of No. 2.

Another method, called the German, I believe, is to weld a piece of steel on one side the point, as shown to the right of No. 3. When any of these came back, they were worse than the first, for they came back not only minus the point, but the half-welded jaw.

It will also be seen that in both of the cases mentioned, the wear and tear of the pick is on the low-grade steel jaws as much as the high-grade steel points. So instead of splitting open the ends of the pick, the blacksmith split the steel point as shown to the right of No. 4. When those came back to the shop for repairs, they were generally as seen to the left of No. 4, and only needed the points put to the emery wheels.

Kitchen Ice-Making Machines.

Consul-General Robert P. Skinner writes that kitchen ice machines have been upon the market in France for a dozen years, but apparently they never have advanced much beyond the interesting scientific toy stage. In the chief bazar of Marseilles one model remained on hand the price of which was 75 cents, and the salesman said that it had been imported from the United States. In this device, similar in form to a domestic ice-cream freezer, the water is placed in a tin receptacle, which is plunged into nitrate of ammonia. After agitation, ice is formed and withdrawn from the tin.

Better machines of French manufacture were upon the market for a long time, and sold for from $6 to $10. The manufacturers claimed that the nitrate of ammonia could be used over and over again, but in practice this appears not to have been the case. So much dissatisfaction followed the sale of these devices that most of the local dealers soon ceased to handle them.

At the present time one reliable Marseilles house is selling with satisfactory results another form of freezing machine, worth from $17.37 to $27.02, according to size. No. 0 gives 300 grammes (10.58 ounces) of ice per thirteen minutes; No. 1, 600 grammes (21.16 ounces) in fifteen minutes; No. 2, 1,200 grammes (42.32 ounces) in fifteen minutes, and No. 3, 2,400 grammes (84.64 ounces) in twenty minutes. This device consists of a porcelain recipient for the water, which is placed inside a larger recipient containing either nitrate of ammonia or sulphuric acid and sulphate of soda. The whole, when tightly closed, is fitted to a curved iron frame, which once set in motion by the hand continues rocking automatically a sufficient time for the production of the ice. The manufacture of artificial ice in most French cities is now carried on upon such a scale that it is scarcely profitable to make use of domestic ice-making machines, which nevertheless appear to have a considerable utility in hot countries where modern ice manufacturing and distributing methods do not exist.

Railway Progress in Northern Nigeria.

With regard to the progress of the railway in Northern Nigeria, it is reported that heavy shipments for the first year's work have been begun, and that 25,000 tons of material will be delivered on the Niger by December. Track-laying will begin in the autumn, and it is hoped that the first section of the main line to Kano, a section of some 150 miles, will be completed by September of next year. Engines and rolling stock for the construction of trains will be at Baro, the commencement of the line, in August. Earthworks on the first section are completed to the seventy-fifth mile, and work is proceeding to mile 100. Unfortunately, progress has been somewhat hampered owing to the exceptionally low water of this and last year. Important schemes regarding land tenure and the deepening of the Niger waterway are now under the consideration of the colonial office.

A Process for Staining Wood.

Hitherto wood has been stained by impregnating it while still fresh, with a solution of some coloring matter. The solution was squeezed into the wood under a high pressure. According to a new Swiss process the wood is impregnated with a solution of a coloring matter in hydrocarbons such as petroleum. For this purpose the wood is placed in a cask filled with the colored solution so as to be completely covered. There it remains until it is thoroughly impregnated by the solution. The staining in the cask may be effected with or without pressure, cold or warm. In this manner it is possible to stain any wood, either fresh or dry.

In Electrical Engineering a description is given of a rotary converter, which is self-synchronizing when thrown upon the line. Starting is effected from the alternating side. To start it, it is only necessary to close the high-tension switch and turn the hand-wheel of a controller first to the starting position and then to the running position. The set can be brought up to speed ready to supply direct current. The machine is provided with an *amortisseur* specially designed to give a good starting torque. It is able to start and run up to synchronous speed with no more than one-fifth of the normal voltage on the slip rings. This low voltage at starting, which is obtained from tappings on the transformer, is an important feature, as it enables the starting current to be kept down to the full load value, and there is no sparking or burning of the brushes during starting, such as commonly occurs when a high-voltage rotary is starting up from the alternating-current side.