Correspondence.

Prevention of Street Noises.

To the Editor of the SCIENTIFIC AMERICAN:

Referring to your comment on the rail joint, the writer would say that this fault has apparently been corrected here, by welding a heavy cast-iron chair around the joint. This furnishes a practically jointless rail, and under proper maintaining conditions it lasts indefinitely. The Philadelphia Rapid Transit Company has special road gangs which keep these welded joints in shape by smoothing occasionally with an emery stone weighted with a heavy block of cast iron, and the rail joint is practically noiseless.

A. HARRIS INSINGER.

Philadelphia, September 4, 1908.

Rank of the French Navy.

To the Editor of the SCIENTIFIC AMERICAN:

In your issue of August 8 I read with interest "The German Navy of To-Day," being a continuance of articles on the leading navies of the world. I was under the impression until recently that France was considered a naval power of the first class, holding second place to England; but judging from your articles of 1907-1908 on the American, English, and German navies, it would appear that France is not now so considered, that is as a naval power.

Could I learn through you why and what position she now holds, and if you are to include France in your series? GUSTAVE E. VILLARET.

New York, N. Y.

[The French navy, which is the subject of the present article of the series, holds the fourth position. She is certainly a first-class naval power; but the greater activity of the United States and Germany has placed them in second and third rank.—ED.]

Electrocuting Mosquito Larvæ.

To the Editor of the SCIENTIFIC AMERICAN:

It may please some of the readers of the SCIENTIFIC AMERICAN (especially those interested in the mosquito question) to know that by a simple experiment I have found it possible to kill mosquitoes with electricity. The test is easy and simple. All that is needed is a small glass or transparent vessel filled with water which contains young mosquitoes, commonly called wigglers. This can be obtained from any rain barrel or pool of standing water. Next, 110 volts of alternating current and at least ten 16-candle-power lamps wired in multiple. The lamps would allow at least five amperes to flow, but as the resistance offered by the water is so great not nearly as much power will be used. Place the bank of ten lamps in series with the glass of water containing the mosquitoes, by fastening two small pieces of copper to the ends of wire, which are to be inserted in the water, then turn on the lamps one at a time and the experiment is ended.

I have noted that the mosquitoes at the bottom of the glass were killed as quickly as those nearer the electrodes, which were only a half inch below the surface of the water. The water, offering a much higher resistance than the mosquito's body, allows enough current to pass through the mosquito to kill it.

This experiment may not work out so well with salt water, as salt water offers a lower resistance, but I think the experiment is worth trying.

GEORGE H. STUART.

Elizabeth, N. J., August 29, 1908.

IV.—THE FRENCH NAVY OF TO-DAY.

The present article is the fourth of our series, describing the present condition of the leading navies of the world. The first, published December 7, 1907, dealt with the American navy; the second, on the British navy, appeared on March 7, 1908, and this was followed on August 8 by a description of the German navy. The French navy, to which the present article is devoted, ranks fourth in power, although some authorities are inclined to assign this position to Japan.

Throughout the nineteenth century and the early years of the twentieth, the French navy was recognized as the leading naval power next to Great Britain. It is only since the Russo-Japanese war, and because of the great activity displayed by the other leading powers, that France has had to yield the premier position, first to the United States and then to Germany. The lessons of that war, as incorporated in the "Dreadnought" and the "Indomitable," seem not to have made the instant impression upon France that they did upon her competitors. She was slow to incorporate in her designs those features of size, gun power, and speed, which have made the possession of modern, high-speed, all-big-gun battleships the determining factor in the ranking of the naval powers; and although she has now under construction six "Dreadnoughts" of an excellent design, their construction is proceeding so slowly as compared with the feverish haste displayed by her competitors, that she has fallen from second to fourth position, and in view of the great activity displayed by Japan, may possibly have to rank as fifth naval power within the next two or three years.

The genius of the French engineer and architect has never shown itself to better advantage than in the design of naval warships. The French were the first to incorporate certain important features in their ships, which were destined to exercise a revolutionary effect upon the navies of the world. Unfortunately, this touch of genius has been clouded by a certain extravagance or whimsicality of design, which has made their naval architects tend to run to extremes, and push an idea which was excellent in itself to fantastic and impractical lengths. Also, the French navy, more than any other, has been hampered by political influences. Legislative interference with the naval designer, similar to that which is responsible for those two ships of doubtful modern value, the 13,000-ton, 17-knot "Idaho" and "Mississippi," in the closing years of the last century produced in the French navy a number of ships of such bewildering variety that they cannot readily be assembled in those groups or classes which are necessary to the effectual tactics of actual warfare. Of late years, the government has been disposed to intrust the question of design entirely to the naval authorities, with the result that the later ships, which have been built in groups of four or six, are comparable with the best contemporary warships of other nations, and in some respects are superior. In this connection, as showing the valuable contribution made by the French in the development of the modern warship, we may refer to the fact that they were the first to introduce side armor, and the high-explosive shell. Moreover, they were the first to recognize the value of high velocity in artillery, anticipating the other nations by many years in the introduction of guns of great length and high ballistic quality in proportion to their weight. Also, they have long recognized the advantage of high command for the guns; and although this quality, like many others, was pushed to extreme length, many of their ships being so topheavy and unstable as to require subsequent modification, the French deserve credit for emphasizing a feature which is now being widely incorporated in the later ships of contemporaries.

SUMMARY.—The French navy includes twenty-two battleships of over 10,000 tons displacement, the oldest of which was launched in 1891. Six of these, of a modified "Dreadnought" type, are at present under construction. The total displacement of the twenty-two ships reaches 310,116 tons. Of battleships too old or too small to be used for anything but coast defense, the French have the "Hoche," launched in 1886, of 10,581 tons, and the "Henri IV," launched in 1899, of 8,807 tons. In this class also may be reckoned a dozen smaller, coast-defense ships and older battleships of from 6,000 to 12,000 tons displacement, whose limitations of size, speed, and coal endurance would necessitate their operating within comparatively easy reach of a friendly port. France possesses eighteen ships of the armored-cruiser type, whose total displacement is 191,761 tons. They vary in displacement from 7,578 tons to 13,780 tons, and the speed ranges from 21 to 23 knots. Of second-class cruisers, she has nine ships totaling 55,797 tons, of from 4,681 tons and 18 knots to 7,898 tons and 23 knots. These are chiefly of the protected-cruiser type, a few being older armored cruisers, lightly protected with side armor. There are twenty-one third-class cruisers of from about 2,000 to about 4,500 tons displacement, whose speed ranges from 19 to 20½ knots. The total displacement of these vessels is 66,773 tons. The French torpedo fleet numbers seventy-six destroyers, of from 250 to 436 tons displacement and from 25 to 33 knots speed; forty-two sea-going torpedo boats, of from 120 to 185 tons displacement and from 20½ to 30 knots speed; and 290 torpedo boats, of from 54 to 97½ tons displacement and from 20 to 26 knots speed. Her submarine fleet is a large one, numbering sixty-one boats, of from 106 to 577 tons displacement, and from 8 to 10 knots submerged speed.

BATTLESHIPS.—By far the most important section of the French navy is the group of six battleships of the "Danton" class (1906-7) due to be completed in 1910-11-12. They are of a modified "Dreadnought" type, carrying four 12-inch 50-caliber guns, and twelve 9.4-inch guns also of 50 calibers length. It is a question whether the gain in the rapidity of fire, due to the use of the lighter 9.4's, is compensated by the loss of energy of the individual projectiles. The English evidently think not; for they built but two ships of the "Danton" type, namely, the "Nelson" and "Agamemnon," and in their late ships, in common with the other naval powers, are using the 12-inch exclusively as the main armament. In the "Danton," the 12-inch guns are carried in turrets protected by 12 inches of armor, and the 9.4's are mounted in pairs in turrets protected by 8.7 inches of armor. They carry a belt 10 inches in thickness amidships and 6 inches at the ends, and this excellent side protection extends to the main deck in thickness varying from 8.7 inches to 6 inches. The speed is low for ships of this class, the expectation being that with 23,000 horse-power and Parsons turbines, a speed of 19.25 knots will be secured. Next in importance is the "Démocratie" class (1903) of four ships. They are of 14,900 tons displacement and 19½ knots trial speed. The 11-inch belt tapers to 9 inches forward and 7 inches aft. Above this is a 10-inch belt tapering to 5½ inches at the ends. The protective deck is 2¾ inches. Four 12-inch guns of 50 calibers length are mounted behind 12 inches of armor in two turrets; and ten 7.6-inch guns are carried, six of them in single-gun turrets above the spar deck; two in casemates forward on the main deck, and two in casemates aft on the gun deck. The ships of this class have the same high freeboard as the "Danton" class, and as in them the armor protection is admirable. Their battery, however, is light in comparison to that of battleships of the same date in foreign navies. The two battleships "Republique" and "Patrie" (1901-2), on which the "Démocratie" class are an improvement, have similar armor protection; but the battery is less powerful, the four 12-inch guns being of an earlier 45-caliber pattern, and the secondary battery consisting of eighteen 6.4-inch 45-caliber guns, this latter being a much less powerful piece than the 7.4-inch. The 6.4's are mounted in six two-gun turrets above the spar deck, and in six casemates, two forward on the main deck abreast of the conning tower, and the other four amidships on the gun deck. These two are 19-knot ships. The "Suffren," laid down in 1899, is an instance of one of those individual ships in the French navy, which belong to no particular class. She is of 12,750 tons displacement and 18 knots speed. In many respects she may be taken as the type ship from which the "Republique" and "Démocratie" classes were developed; for she was the first battleship to mount the 6.4-inch gun in turrets in place of the old and comparatively feeble 5.5-inch mounted in broadside. Particulars of this ship will be found beneath the illustration on the front page of this issue. Next in fighting value to the "Suffren" are the three battleships of the "Charlemagne" class: the "Charlemagne," "St. Louis," and "Gaulois," the particulars of which are given beneath the accompanying engraving of the last-named ship. In them, for the first time, the French adopted the plan, inaugurated by Mr. White in the British ships of the "Royal Sovereign" class, of mounting the main battery in two positions, one forward and one aft of the superstructure, with a numerous battery of rapid-fire guns in a central broadside battery amidships. They are heavily protected by a 16-inch belt which tapers considerably less than similar belts in the ships of foreign navies, the least thickness being 10 inches at the ends. They are provided with two protective decks, one above and one below the belt, an excellent feature which originated with the French designers. The main armament consists of four 12-inch guns of 40 calibers length. This piece, because of the light weight of the projectile, 644 pounds, and in spite of its high velocity of 2,700 feet a second, is not very effective at modern battle ranges, its penetration of Krupp armor at 8,000 yards being only 5½ inches. In the later 12-inch models, however, both the weight of shell and the velocity have been greatly increased. In the 50-caliber model of 1902 as mounted in the "Démocratie" class, the shell weighs 731 pounds, the velocity is 3,000 feet a second, and the penetration at 8,000 yards is 9 inches. Not satisfied with this, the French have brought out a 50-caliber 12-inch piece, known as the 1906 model, which fires a 1,000-pound shell at over 3,000 feet velocity, and penetrates 12 inches of Krupp steel at 8,000 yards. This is the most powerful 12-inch gun in existence, and it will form the main armament of ships of the "Danton" class. Between 1893 and 1896 the French launched four battleships, the "Charles Martel," "Carnot," "Massena," and "Bouvet," varying in displacement from 11,882 tons to 12,205 tons, which in the arrangement of the main battery may properly be considered to constitute a single class, but which vary in minor details sufficiently to render them not strictly homogeneous.

The description printed below the accompanying engraving of the "Massena," and the general appearance of that ship, will serve to give a fair description of any one of the four. The latest and largest is the "Bouvet," launched in the spring of 1906. She has a 16-inch belt, tapering to 10 and 12 inches aft and forward; a 3½-inch deck above and a 1¾-inch deck below the belt; and her 12-inch turret guns are protected by 14 inches of armor. The distinguishing characteristic of these four ships is that the four guns of the main battery consist of two different calibers. A 12-inch gun is mounted forward on the forecastle deck in a single turret; another 12-inch is mounted aft on the main deck in a single turret; and on either beam, amidships, is a 10.8-inch gun carried in a single turret upon armored sponsons built out beyond