

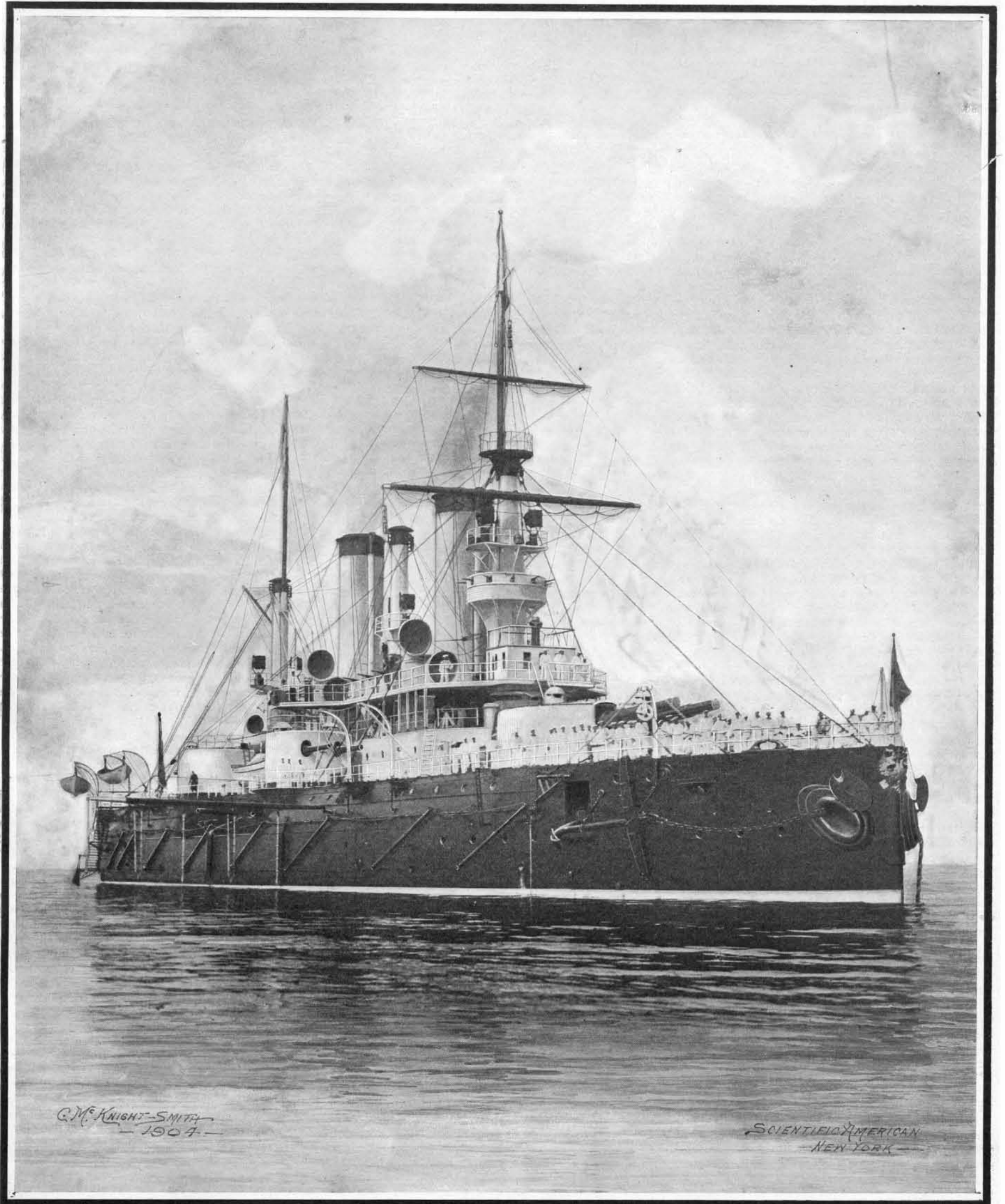
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Displacement, 11,000 tons. **Speed,** 17 knots. **Armament:** Four 12-in., twelve 6-in., 37 smaller guns. **Armor:** Partial belt, 15-in.; main turrets, 10-in.; smaller turrets, 6-in.; deck, 3¼-in. **Torpedo Tubes,** 6.
BATTLESHIP "PETROPAVLOVSK," BLOWN UP AT PORT ARTHUR, WITH THE LOSS OF ADMIRAL MAKAROFF AND 750 OFFICERS AND MEN.—[See page 327.]

THE RUSSIAN REVERSE AT PORT ARTHUR.

On April 13, Admiral Togo led his fleet for the seventh time to the attack of Port Arthur and the Russian fleet that has taken refuge behind its guns. The result was only less disastrous to Russia than the memorable action off Port Arthur on February 9 with which the war was opened, one of her battleships being sunk, either by a mine or torpedo, another battleship more or less crippled by the same agency, and one of her best torpedo-boat destroyers sunk by the combined attack of several Japanese vessels of the same type. This, however, was not the most serious part of the Russian losses; for when the flagship "Petropavlovsk" went down, she carried with her Admiral Makaroff and most of his staff, with nearly the whole of the crew of 750 men.

At the present writing it is difficult to determine exactly what was the nature of the operations that occurred on this memorable day; but after reading the official accounts given out by the governments at St. Petersburg and Tokio, it would seem that some of the Russian cruisers and torpedo-boat destroyers had been out reconnoitering during the previous night, and were intercepted by vessels of the same class of the Japanese fleet. The armored cruiser "Bayan," moreover, was sighted by the British gunboat "Espiegle" early in the morning of Wednesday, making a running fight with several Japanese cruisers, in which she just succeeded in gaining Port Arthur. Because of the hot fire to which she was subjected, and the fact that a dense cloud of steam was seen rolling from the vessel as she neared the harbor, it was judged that she was probably hard hit.

The operations at Port Arthur were opened early in the morning by an attack of the Japanese torpedo boats, probably directed against Admiral Makaroff's fleet, which, we may presume, was in the outer roadstead behind the protection of the mines and under the shelter of the guns of the forts. This was followed by a sortie of the whole Russian fleet, which in all probability made a reconnaissance in force some distance from Port Arthur. What followed is somewhat confusing. The reports given out at St. Petersburg state that Admiral Makaroff proceeded until he came in touch with the whole force of the Japanese, estimated at forty ships; that he immediately fell back to Port Arthur; that during this movement the Russian torpedo destroyer "Bezstrashni" was cut off, surrounded by several Japanese destroyers, and sunk, with a loss of all but five men out of her complement of 55 men; that when the fleet was entering the harbor, the flagship "Petropavlovsk" struck a submarine mine, and that the explosion was so terrific that she heeled over and sank within two minutes after she was struck, carrying down Admiral Makaroff, most of his staff, and over seven hundred of the crew. On the other hand, the correspondent of the London Times, which paper has chartered a steamship for the especial observation of Port Arthur, states that the torpedo boats attacked Port Arthur early Wednesday morning, and that the whole fleet of forty vessels commenced the bombardment of that place at 9:45 in the morning. From Rome there came a dispatch to the effect that the Japanese sent a few of their ships to Port Arthur, with instructions to retreat and draw out the Russian fleet in pursuit; that the ruse succeeded, and that Admiral Togo then steamed in, took up position off Port Arthur, and commenced a bombardment; that Admiral Makaroff returning found himself in the presence of an overwhelming force, through which he endeavored to force his way into Port Arthur, and that it was in this attempt that the Russian losses occurred.

We are inclined to think that the account coming from Rome is probably correct, especially as the official statement from Tokio said that the "Petropavlovsk" was torpedoed by the Japanese, and that a destroyer was also sunk. The Russians further admit that the battleship "Pobieda" was struck by a mine on the starboard side amidships. It was on the same side that the "Petropavlovsk" was struck, and we think it will probably transpire that both battleships were victims of the torpedo, fired either from the Japanese battleships or from their destroyers.

The "Petropavlovsk" is one of three sister ships (of which the other two are the "Poltava" and the "Sevastopol") built in 1894-95. All three vessels were at Port Arthur at the opening of the war. They are of 11,000 tons and 15½ to 16½ knots speed under natural draft, with a forced-draft speed of 17 knots. They have a partial belt of 15-inch Harvey armor, a flat 3½-inch steel deck, 4 inches of armor on the lower deck over the central redoubt, 10 inches of armor on the main turrets, and 6 inches on the smaller turrets. They carry four 35-caliber 12-inch guns in two turrets, twelve 45-caliber 6-inch guns, eight of them in four turrets, the latter placed one at each corner of the central redoubt, and four between the turrets on the gun deck, two on each broadside. They also carry one 9-pounder, sixteen 3-pounders, twelve 1-pounders, and eight smaller guns. They have six above-water torpedo tubes, two on either broadside, one in the bow and one in the stern. Although they are not up to modern requirements for a

first-class battleship, they are serviceable vessels, and the loss of the "Petropavlovsk" is a most serious blow to the Port Arthur fleet. The other battleship which the Russians acknowledge to have been mined or torpedoed is the "Pobieda," one of three practically identical ships of which the other two are the "Peresviet," now at Port Arthur, and the "Osliabia," which was on her way out to the Far East when the war opened and is now slowly returning through the Mediterranean. The "Pobieda," launched in 1900, is a high-freeboard vessel carrying four 45-caliber, 10-inch guns in turrets, eleven 45-caliber 6-inch guns in casemates, twenty 3-inch guns, and twenty-six smaller guns. She also has two submerged and four above-water torpedo tubes. She has a complete belt of armor 9 inches thick amidships, a 2½-inch deck, 5 inches protection on the lower deck amidships, 10 inches of armor on her main turrets, and 5 inches on the casemates. She is a vessel of 18.5 knots trial speed, and she carries a maximum coal supply of 2,000 tons, besides liquid fuel.

This last disaster will reduce the once formidable Port Arthur fleet to a mere remnant of its former self. In place of seven excellent battleships she now has but three, the "Poltava," "Sevastopol," and "Peresviet," that are effective, if, indeed, the "Poltava" has yet been repaired. In Admiral Makaroff the Russians lose their most popular and probably most accomplished naval officer; a man who achieved notoriety in the Russo-Turkish war, when he opened the eyes of the world to the tremendous destructive powers of torpedo warfare. To him the Russian people owe the fleet of ice-breakers which have done such good work in keeping open the ice-bound Russian harbors. Since his advent to Port Arthur, a more aggressive policy has been followed. This has been highly acceptable to the Russian public; but it is doubtful whether it would not have been wiser to have carefully preserved what was left of the Russian fleet under the shelter of the Port Arthur fortifications, awaiting the arrival of the Baltic fleet during the coming summer. Another sortie, followed by a similar disaster to this last, will place matters in such a fix that it will be questionable if the powerful Baltic fleet on its arrival could turn the tide in favor of the Russian arms.

The Gordon-Bennett Race.

The eliminating trials for the Gordon-Bennett cup race are to be held over the Ardennes circuit route, in order to determine the champions who are to represent France in this event. The machines which are entered for this competition are three Panhard & Levassor, three De Dietrich, two Turcat-Méry, three Gobron-Brillié, three Bayard, three Darracq, three Hotchkiss, three Mors, three Georges-Richard, and three Serpollet. Among the well-known chauffeurs who are to pilot the cars are Henri Farman, Rigally, the Fournier brothers, Salleron, Gabriel, etc. The Darracq and the Georges-Richard cars are said to be the lightest of the French makes. As concerns the foreign cars, the Mercedes occupies the front rank, and these cars are among the most formidable competitors. At least five of these cars, and perhaps six, are to be entered for the cup race, two or three of them in the German team and three in the Austrian. The new Mercedes cars, of the 90-horse-power type, are to be equipped with powerful motors of the latest design, having 7-inch cylinder bore and a 6-inch stroke. These motors are expected to make an extraordinary speed, and even exceed their performance in last year's races. The drivers designated for two of the German cars are Jenatton and Baron De Caters, both of whom are Belgians. The Austrian cars will be piloted by Braun, Werner, and the well-known American, Warden.

Dr. Baskerville's Two New Elements.

Dr. Baskerville, whose position as professor of chemistry at a prominent Southern university entitles his utterances to every consideration, recently announced that he had discovered what are probably two new elements associated with thorium, both of them radioactive. The two new substances have been christened carolinium and berzelium. Samples of the substances isolated by Prof. Baskerville have been sent to Sir William Crookes, who will doubtless confirm or disaffirm the assertion that they are new elements.

The importance of the discovery, if it should ultimately appear that the two new substances are elements, can hardly be overestimated; for the number of radio-active substances is now increased to about six. Sir William Ramsay is reported as having every confidence in Dr. Baskerville's announcement.

Eighteen automobile attachments were entered in a side-slipping contest which took place on the track at the works of Messrs. Clement Talbot, near Ladbroke Grove, England. The contest was commenced by an endurance run of 1,000 miles. After the completion of this performance, the track was greased, and the cars driven onto the slippery surface and compelled to make right-angle turns and describe S curves, and also subjected to brake tests. The object of the test was to find some device which would effectually pre-

vent side-slipping, and the preliminary run was for the purpose of determining the serviceability of the device. The amount of power consumed by the device was arrived at by allowing the car to move down hill by gravity with and without the attachment, and the difference of the two stopping points measured carefully. Points were given for ease of attachment and renewal and cost and effectiveness as shown by the tests.

Electrical Notes.

Mr. E. B. Green, superintendent of the Edison Illuminating Electric Company at Altoona, Pa., writes to the Electrical World and Engineer of his successful use of electricity for thawing water pipes. He has thawed 250 feet of 1-inch iron pipe in 20 minutes, using between 18 and 20 kilowatts; for between 30 and 40 feet of ¾-inch pipe, 5 to 8 minutes and 11 to 15 kilowatts are required. The voltage is reduced to not over 50 and the connection made to the pipe to be thawed and to a hydrant or other connection to the main on the other side of the frozen portion. The work is performed for customers in less time and with much more cleanliness than it could be done by the plumber. The cost lies chiefly in the carting of the apparatus and labor.

In a recent issue of the *Electricity*, we note a report of an experiment made at Ferrara by Prof. Battelli and Prof. Rigi on the Turchi-Brunè system of simultaneous telegraphy and telephony. The working of the apparatus is stated to have been so safe as to place beyond doubt the practicability of the method. After the Bologna telegraph inspector had allowed those present to test the various devices used in connection with the experiments (when the most recent device where the differential coil is replaced by an ordinary line coil aroused special interest by its simplicity and efficiency), telegraphing and telephoning were carried out simultaneously on a large scale, with a view to contradicting the statement that the scheme in question would allow of protecting the telephone receiver only against disturbing currents of very low frequency. In fact, the telephonic conversations were heard with perfect distinctness and strength while current impulses of very high frequency were generated in the same wire by means of a Wheatstone telegraph apparatus. In order next to test the simple means by which the disturbances due to currents traversing the neighboring parallel circuits may be eliminated, the telegraph wire 121 (Venice-Florence) was used for telephoning, while the parallel wire 86 (Venice-Genoa) was in full operation, when excellent results were obtained. The telegraph line could also be connected to a local apparatus representing a telephone subscriber, thus showing the possibility of conversations over telegraph wires in the interurban service. As regards the transmitting capacity of the Brunè-Turchi apparatus, the limiting distances appear to be the same as in the case of ordinary telephones.

With an ever-increasing use of rubber in manufacturing, it is disappointing to have to record a gradual diminution in the supply. Some figures have been published purporting to show the total production of rubber in different parts of the world, and according to these the production in the two years from 1900 to 1902 decreased by some 3,500 tons—that is to say, whereas the total output in 1900 was 57,500 tons, that in 1902 was only 54,000 tons. This decrease is certainly not a large one, but it is important as showing the tendency of the rubber supply to diminish. It is very instructive to examine the figures given for the different countries. Our two main sources of supply are Brazil, Peru, and Bolivia, and East and West Africa and the Congo country. From the first group the total supply in 1900 was 25,000 tons, and from the second 24,000 tons, but whereas in the former case the production has increased, it has appreciably decreased in the case of the latter. Thus, Brazil, Peru, and Bolivia contributed 30,000 tons to the world's supply in 1902 as against 20,000 tons for East and West Africa and the Congo country. A small supply is now had from the Straits Settlements, but in 1902 the output was only 1,000 tons. In every other case the production shows a decrease. The various states of South America gave 3,500 tons in 1900 and 1,000 tons in 1902, Central America and Mexico gave 2,500 tons and 2,000 tons respectively, Java, Borneo, etc., 1,000 tons in 1900 and nothing in 1902, and similarly the supplies from Madagascar and Mauritius, and India, Burma, and Ceylon have ceased altogether. Thus, of the total supply of 54,000 tons in 1902 as much as 50,000 tons came from Brazil, Peru, and Bolivia, and East and West Africa and the Congo country, which remain the world's chief sources of supply.

The Belgian Commission in Cuba, in a report to the Department of Foreign Affairs in Brussels, says that Cuba is an excellent market for automobiles owing to their constantly increasing use. The most popular type is the voiturette, and the commission recommends a strongly-built car of about 10 horse power, able to stand the poor roads, and moderate in price.