RUSSIA'S LOSSES IN THE FIRST WEEK OF THE WAR.

There has been no war of modern times in which there was such a dearth of reliable information as in the present struggle between Russia and Japan. If we carefully sift out all the sensational reports with which the papers have been flooded, we find that the only really reliable information is contained in the brief but expressive official reports sent by Admiral Alexieff, the Russian Viceroy in the Far East, to the Czar. These, supplemented by a few authentic accounts by eye-witnesses and some meager information from the Japanese government, enable us to tabulate the number of Russian ships that have been disabled, but without being able to state, except in two cases, what is the nature and extent of their injuries.

It has been proved in the case of ships of our own navy that it takes but a mere touch of a reef of sand or rock to send a ship to the drydock for several months at a stretch; yet, speaking broadly, it may be said that injuries from striking a reef are relatively mild compared with the blowing in of a large section of the ship's side or bottom, which must result from the explosion of a modern Whitehead torpedo carrying over 200 pounds of guncotton. Consequently, it may be safely assumed that the Russian ships which have been disabled by torpedoes are put out of action, at least for several weeks, probably for several months, and quite possibly, for good. Of the eleven Russian vessels already disabled in the war, we know that three, the battleships "Czarevitch," of 13,000 tons, and "Retvizan," of 12,700 tons, and the cruiser "Pallada," of 6,630 tons, were disabled by the torpedo during the first attack on Port Arthur. We think it is unlikely that either of the two battleships can be made available for active service except, perhaps, in a more or less crippled condition, during the present war, and this for the following reasons: The draft of these vessels at normal displacement is 26 feet, and since they were probably in war trim, with a full complement of sea stores and coal aboard, the draft may easily have been 28 feet. The crushing in of the bottom or side by the torpedo must have resulted in the flooding of at least one compartment, if not two, which would easily add another three feet or more to the draft, especially if the vessels had taken on a heavy list, throwing one bilge deeper in the water. Now, the Port Arthur dock is supposed to be only about 450 feet in length, and it is quite possible that it has only a draft of 28 feet over the sill, in which case the disabled battleships would be unable to enter, unless the bottom could be temporarily patched up and made sufficiently air-tight to permit of pumping out the damaged compartments. This presumption is borne out by a recent report supposed to emanate from Port Arthur, to the effect that these two ships are to be employed as guard ships at Port Arthur, until some opportunity occurs to send them for repairs to the big drydock at Vladivostok. The cruiser "Pallada," of 6,630 tons, whose draft is only 21 feet, will probably take her turn in drydock, that is if she is still afloat. In addition to these three vessels, that are known to be seriously crippled, two others, the protected cruiser "Boyarin," of 3,200 tons, and the torpedo transport "Yenesei," of 2,500 tons, have been "hoist with their own petard," by coming in contact with submarine mines that had been laid for the protection of Port Arthur harbor. These two vessels may be stricken off the list for good. Two other ships, the cruiser "Variag," of 6,500 tons, and the gunboat "Korietz," of 1,500 tons, were sunk by gun fire at the battle of Chemulpho. If they are floated it will be by the Japanese salvage ships, and they will become an asset of their navy. The battleship "Poltova," of 11,000 tons, and the cruisers "Pallada," "Askold," and "Diana," vessels of about 6,500 tons and 23 knots speed, are reported as having been disabled by a "hole beneath the waterline," the same description being used of the injury to the 3,000-ton protected cruiser "Novik." It is puzzling to determine just what this injury amounts to, or by what agency it was inflicted. If the ships were penetrated by gun fire, the holes would scarcely be below the waterline, unless the vessel happened to be rolling her under-body out of the water at the time the shell struck. It is, of course, possible that the hole was made by some solid projectile that struck the ship with a plunging effect, hitting her just at the waterline on the side that was exposed to fire, and passing out below the waterline on the other side. If the injury were not caused by a shell, it must have been the work of the torpedo, in which case these vessels must be included in the terrible list of fatalities wrought by the Japanese destroyers. There is presumptive evidence that the cruisers were injured by gun fire, in the fact that the "Novik" is reported as having left the dock after repairs were made, for it is certain that no injury wrought by a torpedo could be made good in so short a time.

After one has taken the most optimistic view possible of the present condition of the Russian fleet, the fact remains that in the very first week of the war, a fleet of eleven vessels, all but one of which were of the most modern and approved construction, and several of which were among the very best of their class, were temporarily or permanently disabled, and four at least of them completely lost to the Russian navy. If one wishes to obtain a vivid idea of the enormous damage entailed in this one week of the war, he has but to look at our double-page illustration, showing this fleet of eleven ships assembled in one group, and then turn to the accompanying table, showing the size and

RUSSIAN SHIPS LOST OR DISABLED IN FIRST FEW DAYS OF THE WAR.

Name.	Date.	Tons.	Cost.	Nature of Damage.
Czarevitch	1901	13,000	$6,900,000	Torpedoed.
Retvizan	1900	12,700	6,500,000	Torpedoed.
Poltova	1894	11,000	5,500,000	Hole below waterline.
Pallada........	1899	6,630	3,000,000	Torpedoed.
Askold.........	1900	6,500	3,000,000	Hulled at waterline.
Diana	1899	6,630	3,000,000	Hulled at waterline.
Variag..........	1899	6,500	3,000,000	Sunk by gun fire.
Boyarin........	1900	3,200	1,100,000	Blown up by mine.
Novik..........	1900	3,000	1,300,000	Hulled at waterline.
Korietz.	1886	1,500	450,000	Sunk by gun fire.
Yenesei........	1900	2,500	800,000	Blown up by mine.
Tonnage and value of ships destroyed or disabled.......	....	73,160	$34,850,000	

cost of each vessel. Here we have eleven ships of a total tonnage of 73,160 tons, and a total cost of about $35,000,000, put out of action at a cost in torpedoes, powder, and shell to the Japanese of far less than the cost of the "Korietz," the smallest vessel in the disabled fleet.

Such is modern naval warfare. It was believed that it would be swift, sudden, disastrous, and costly. The first seven days of this, the first struggle between two navies that were both well equipped and thoroughly up-to-date, has proved that modern naval warfare is even more terrific than was foretold.

Melting Out Frozen Water Pipes Electrically.

During the recent intense weather the method of thawing out frozen water pipes electrically was undertaken successfully at Altoona, Pa. Mr. E. B. Greene, the well-known superintendent of the Edison Electric Illuminating Company of that city. He now writes to the Electrical World and Engineer as follows concerning practical results:

We use for this purpose alternating current of low voltage, the maximum voltage not being over 50. The method of doing this, as you know, originated with Messrs. Jackson and Wood about the year 1900, so you will appreciate that it is not new with us. We use a 25-kilowatt transformer wound for 50 volts, using an amperemeter to know what quantity of current we are using, and reduce the voltage with a water rheostat, using common table salt to impart the necessary conductivity.

The transformer, water rheostat, and instruments are assembled in a box which is hauled out to the place desired to use, when the transformer is connected up to run as in ordinary methods of lighting, using the water rheostat on the primary side of the transformer (as this requires a very much smaller vessel for the water rheostat). The secondary, or low-voltage cables, are connected directly to the spigot or to the pipe inside the building, the other one being connected to a fire plug, or, if more convenient, to the pipe in the adjoining house, which then completes the circuit on the iron pipe for the low potential.

We have thawed 250 feet of one-inch pipe in twenty minutes actual time of current on, using between 18 and 20 kilowatts. In smaller services, say ¾ inch, and on 30 or 40 feet, we have thawed out in from five to eight minutes, using about 11 to 15 kilowatts. The apparatus is very small and it is quite a convenience to people to have water, when their pipes are frozen, in two or three hours after asking to have the apparatus connected up. There is, of course, very little business in the sale of current in connection with the above, but the advertisement we get from being able to help out people who don't have water we think will repay us amply for the trouble and the expense entailed.

As you, no doubt, can see from the above the cost of sending out the transformer, the time of the men connecting up and disconnecting, and the draying charges would leave very small margin unless you would charge an excessive price, which we don't believe it pays us to do. The cost varies very much. The cheapest job, which was near by the station, was $2.50; the most expensive one was $9.50; yet the amount of current used is a very small amount as compared with the charges for labor and drayage.

Electrical Notes.

The news comes from Paris that the operation of extracting radium from the ores has been considerably shortened. The preliminary process, which reduces the material to laboratory dimensions, now occupies one month, whereas it has previously taken three months. It is estimated that up to the present about 730 tons of ore have been used to produce about one-fifth of an ounce of radium.

Advices from Canada state that the Canadian government is looking into the subject of the electrical smelting of iron, and is sending a commissioner to Europe to study the subject. Canada has many valuable iron ore deposits in the vicinity of large water powers which could be utilized for generating a cheap supply of electrical energy.

What is known as the inverted arc lamp, and which has been used for illumination in some workshops for many years, is suggested for the artificial lighting of lawn tennis courts on dull days and at evening time. An installation of these lamps has recently been put up at the tennis courts at Sheen, near Richmond, and was brought into use recently at a special tournament arranged to test the capabilities of the light. Four lamps of 1,500 candle power each are arranged around the court, an even illumination being obtained with the aid of screen sheets, from which the light is reflected. The experiment is said to have been a success, the illumination obtained being only slightly inferior to daylight on bright days.—Electrical Eng. (London).

It has been frequently found by experimenters that when an oxide of a metal, whose temperatures of reduction and volatilization are nearly the same, is mixed with sufficient carbon to combine with the oxygen, and heated to the temperature of reduction, the main resulting product is not the metal which is wanted, but a carbide. The reason is thought to be that the metal becomes volatile as soon as it is formed and combines with free carbon present in the mixture. In a patent granted to Mr. F. J. Tone, engineer of the Carborundum Company, of Niagara Falls, and described in the Electrical World, these disadvantages are overcome by maintaining proper conditions of temperature, proper distribution of heat, and proper arrangements of the charge. The method may be described by its application to the production of silicon for a mixture of silica and carbon. The constituents are finally subdivided and thoroughly mixed, and the design of the furnace is such that the discharge of heat is over a wide zone (as opposed to localized heat), so that the progress of the reaction is relatively slow and the best conditions are maintained for agglomerating the particles. The most even temperature possible is maintained throughout the zone of reaction, to prevent the silicon from being volatilized as soon as formed, and the charge is so arranged in the furnace as to allow globules of reduced silicon to drop by gravity out of the zone of reaction to a lower portion of the furnace. It is evident that for these purposes an arc furnace would be unsuitable. Mr. Tone therefore employs a resistance furnace. The heating resistance in the center of the furnace is made up of carbon blocks piled together with intervening spaces. The charge is fed into the furnace at the top, and as the silicon is reduced it sinks down into the cooler portion of the furnace, and finally into the receptacles at the bottom, where it solidifies as a metallic block.

The Current Supplement.

The opening article of the current Supplement, No. 1470, deals with the whale-oil industry of the United States. It is copiously illustrated. Various types of rails used in Europe and in America are described in an exhaustive article. Dugald C. Jackson's paper on the typical college course dealing with the professional and theoretical phases of electrical engineering is published in full. Foreign and American types of horizontal boring machines electrically operated are described by F. C. Perkins. Dr. Samuel G. Tracy writes instructively on thorium and its therapeutical possibilities. Kretschmer's tetrahedral design for boats is described in full. "Tobogganing in a Basket" is the title of an entertaining article by Laura B. Starr. The usual notes will be found in the Supplement.

The Depth of the Antarctic Ocean.

The State Department has received from John Barrett, United States Minister to the Argentine Republic, a communication to the effect that the Scotia scientific expedition, sent to the Antarctic from Scotland to make meteorological and oceanographical observations, cruised about five thousand miles to the south and east of the South Orkney Islands, between longitude 16 degrees west and 45 degrees west and as far south as 70 degrees 25 minutes, and in this region located a deep sea of an almost uniform depth of 2,500 fathoms. The deepest sounding was 2,739 fathoms, or 16,434 feet.