

From a]

MODEL OF THE "ERMACK."

[Photograph.

To the Poles by Ice-Breaking Steamer.

AN INTERVIEW WITH VICE-ADMIRAL MAKAROFF.

BY HERBERT C. FYFE.

IN my opinion, the best way to penetrate into the Arctic and Antarctic regions is by means of a powerful ice-breaker." These words were spoken to the present writer some few weeks ago by Vice-Admiral Makaroff, of the Imperial Russian Navy, the designer of the ice-breaking steamer *Ermack*, a vessel which may well claim to be the strongest ship in the world.

It was in his room at the Grosvenor Hotel, London, that Admiral Makaroff was so good as to receive me, to tell me all about his trip to Polar waters, and to show me the wonderful series of photos. he took during the cruise of the *Ermack* at work in the ice-fields. There have been, of course, ice-breakers before the *Ermack*, and some of them have done good service in keeping water-ways clear of ice so that vessels may enter and leave northern ports, but none have ever achieved such wonders as has this sturdy ship.

The *Ermack* was designed especially for ice-breaking in the Baltic and Kara seas, for the purpose of keeping open the northern ports of Russia either during the whole winter or for a longer period than they would otherwise be navigable, and the idea of exploring the Polar regions only occurred to Admiral Makaroff after he discovered what the vessel was capable of. It was in the month of July, 1899, that the *Ermack* made her first Polar trip.

Vol. xix.—5.

"Our voyage," said the Admiral, "differed from those of former explorers, in that we experienced no sufferings or privations, and were never in danger."

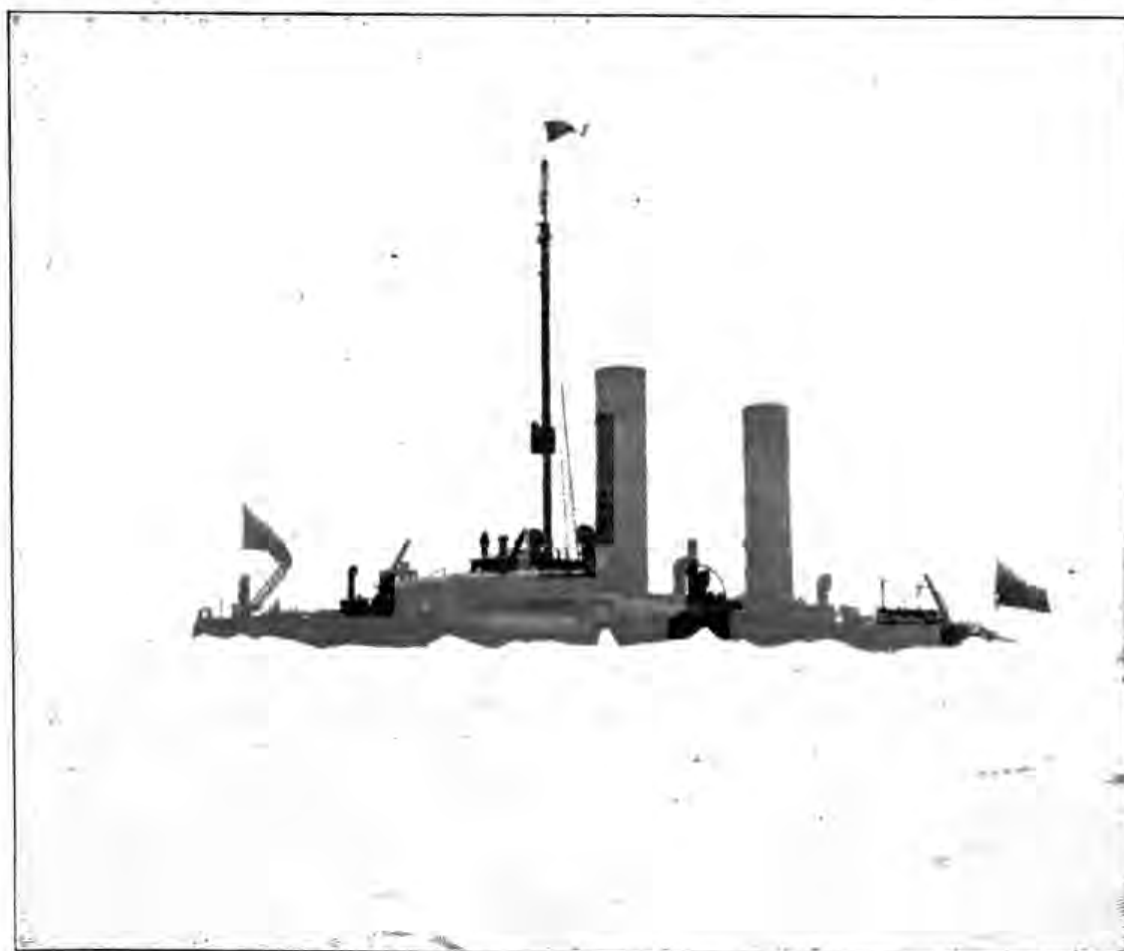
The *Ermack* was brought back to Newcastle-on-Tyne in August. During the five weeks she was away she travelled through 230 miles of Polar ice.

"Nobody before us," said the Admiral, "had ever tried the Polar Sea for ice-breaking, and our going was the first time man had taken offensive action against Polar ice. Though many scientists said the thing could not be done, we did it. Starting from Spitzbergen we found ice in lat. 80deg. 15min., and strong Polar ice it was too. The plain ice was 14ft. thick, and the pack ice (*i.e.*, in mountainous ridges) was sometimes as much as 18ft. high and seven fathoms (42ft.) deep. We found the *Ermack* could break this ice, and she proceeded very well through it. It was wonderful to see the easy way in which it broke in some places when the *Ermack* charged into it. Sometimes it would happen that we struck the weakest part—perhaps a place which had become hollowed out beneath. Yet at other times huge blocks would stick to the vessel, cover her bow, and bend up underneath her; charge into other pieces with us, and break them without leaving us, and in that event we had to steam backwards and get rid of it.

"The summer is the best time for negotiating the ice of the Arctic Ocean, for then,

although the sea is full of ice, it is ice in the shape of islands divided by the canals, which are mostly filled with broken ice. During the progress of the *Ermack* floes of ice over a mile long moved away and gave passage to her. In charging 'hummock' or 'pack' ice the bow of the *Ermack* rises up 8ft. or so; the field cracks, and the ship then falls down and goes ahead, moving both sides of the *débris* of the ice-field. It is most exciting to see some of the big pieces of ice fall down into the water and the others coming to the surface from the great depths, every detached

but with a change of weather and current the ice-islands become separated from each other, so as to render a passage possible. It is not necessary when going with the ice-breaker into the Polar region to keep a straight course and cut the ice; the ship goes in a zig-zag 'line,' shaping her course between the ice-floes. In some cases it was necessary to apply the full power, but in other places the ship proceeded easily. Before I went I spoke on this subject with Captain Sverdrup, of the *Fram*, and Dr. Nansen. Captain Sverdrup is entirely of my



From a)

THE "ERMACK" FORCING THROUGH HEAVY DRIFT ICE.

[Photograph.]

piece trying to find a new position, while the ice-breaker herself, always being pushed along gradually, rises, cracks the ice, and falls again. Our usual rate of speed was $3\frac{1}{2}$ knots an hour in Polar regions.

"The islands of the Polar Sea are of different sizes, some being as much as five miles in diameter: the others are smaller, and the great majority of them do not exceed hundreds of feet. Sometimes these islands are pressed against each other, and there are days during which it is difficult to proceed,

opinion, but Dr. Nansen did not wish to express his views. He only said that he wished me success, and he would be the first to congratulate me upon it."

The Gulf of Finland, in the Baltic Sea, is covered with ice during the whole winter, and consequently the navigation and transport of cargo to such an important commercial port as St. Petersburg is interrupted for five months in the year. In a severe winter ice may be found at a distance of 200 miles from St. Petersburg. The ice of the Finnish Gulf

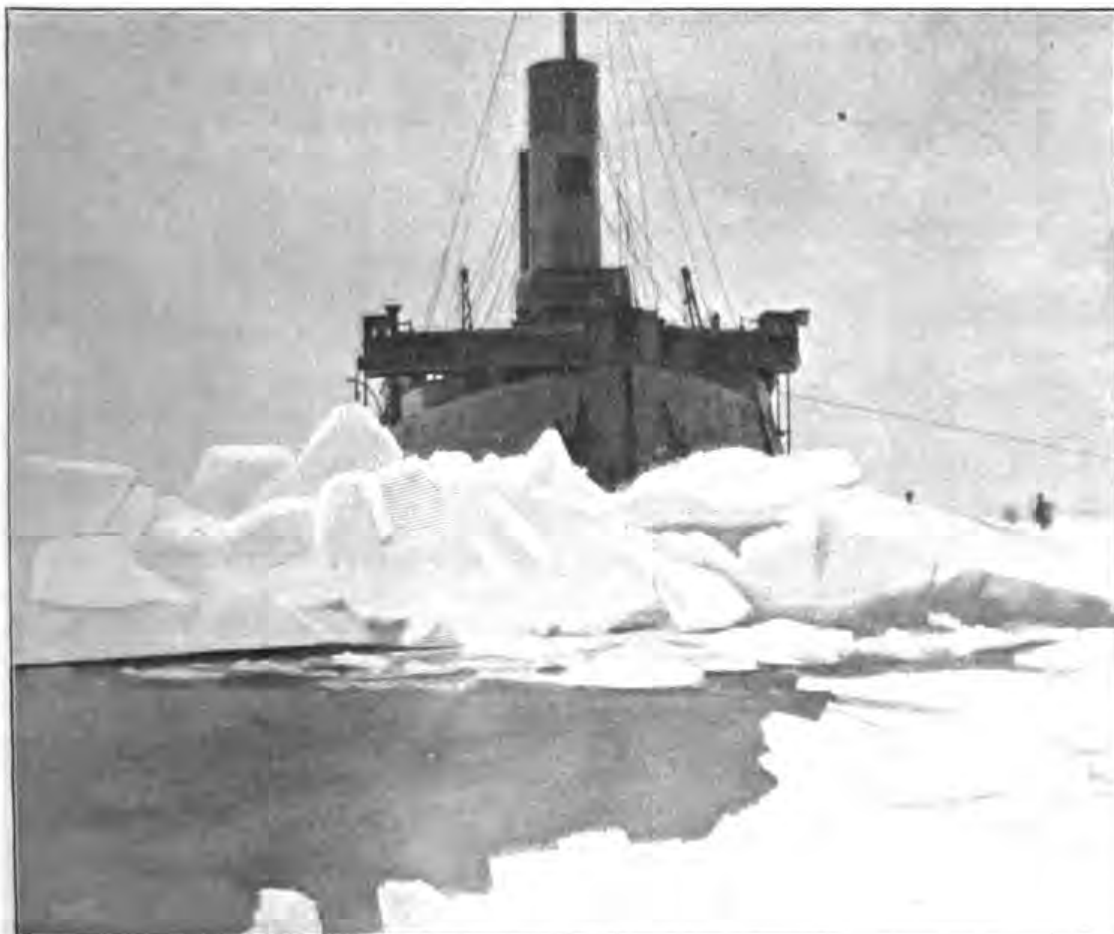
is very strong, because the water of the Baltic has very little salt in it. The thickness of plain ice does not exceed 2ft. in deep places and 3ft. in shallow water, but the winds break the ice and pile it up, and large fields of packed ice 12ft. deep may often be found.

It was to clear a passage through the Baltic ice-fields that the first ice-breaker was built in 1864, by Sir W. G. Armstrong, Whitworth, and Co., from the designs of a Russian merchant, Britneff. His idea was to take one of his steam tugs and cut the fore part into such a shape that it would run on the top of the ice and break it with its own weight. Since then this firm has built several ice-breakers for the River Volga, the Port of Hango, and the Lake of Baikal; but the *Ermack* is the finest thing in this line that they have yet done.

The quadruple screw-steamer *Ermack*, constructed at Walker-on-Tyne, can lay claim to be the heaviest and strongest steamer yet constructed. She is 305ft. long, 71ft. wide, and 42ft. 6in. deep. With 3,000 tons of coal on board, her displacement is 8,000 tons. The hull has been designed to

resist the crushing effect of ice. At the stern are three screws, one being on the centre line as in ordinary single-screw vessels, and the other two as in the usual twin-screw arrangement. Forward there is a fourth screw, and this is driven by a shaft projecting through the sloping stem forward. This bow screw is not meant for accentuating the speed of the vessel—for all ship-builders are convinced of the inefficiency of this method of propulsion—but simply to enable the ship to clear her way and keep lumps of ice from accumulating under her bottom. When the bow screw is working in the ahead direction, the "race" of water that is caused thereby washes the bottom of the vessel and clears the ice out of the way; when it is reversed—*i.e.*, in the go-astern direction—the "race" is projected forward, and lumps of ice may thus be washed out from underneath the field-ice, where they are apt to congregate and cause trouble. All the screws have been designed to work against solid ice without damage.

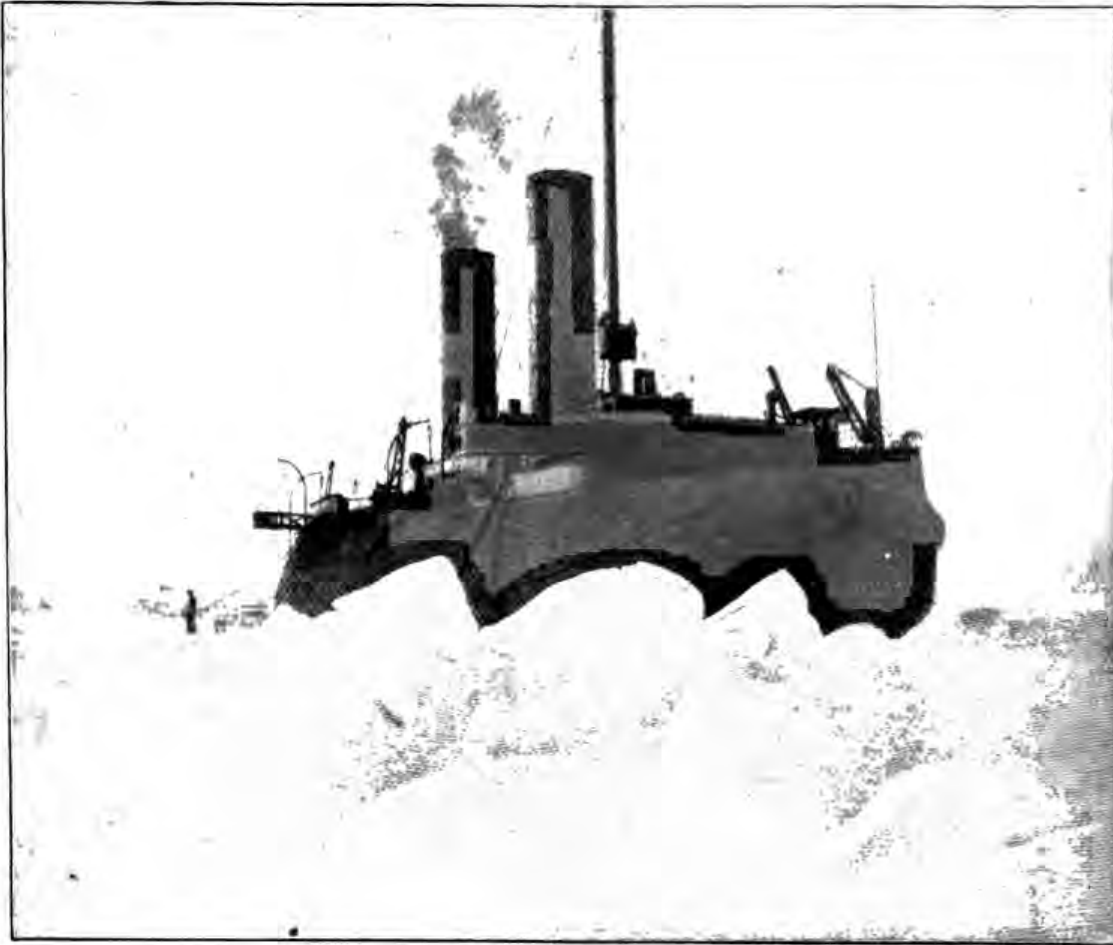
The hull of the *Ermack* is extensively sub-divided into water-tight compartments, of



From a]

FRONT VIEW OF THE "ERMACK" IN HEAVY DRIFT ICE.

[Photograph.



[From a]

THE "ERMACK" IN THE BALTIC.

[Photograph.]

which there are forty-eight in all. Each of these was tested while the vessel was on the stocks by filling it full, over 16,000 tons of water being used in all. Such is the form of the ship, and such the strength of the structure, that the effect of the ice closing in all round the vessel would simply be to raise it. The ice-belt extends 20ft. on each side round the girth of the hull, and runs from bow to stern.

As is natural with a ship intended for such hard work as is the *Ermack*, there is a great deal of machinery. This is, however, all placed so low that there is ample accommodation, not only for the crew, but also for a good deal of cargo and even passengers. There are four main propelling engines and four smaller propelling engines, or eight sets of engines in all, and there are six double-ended boilers. During her trials in the North Sea the *Ermack* reached a speed of nearly $15\frac{1}{4}$ knots with 8,000 h.p. The whole of the propelling machinery is designed with such ample margin of strength that when the engines are brought up suddenly by ice getting in the propellers no harm

is done either to engines or to screws. The shafting and all working parts have factors of safety from 35 to 60 per cent. above the requirements of Lloyd's and the Board of Trade. The propeller blades are extremely massive, and are made of nickel steel of great strength.

On her first voyage, a few months ago, the *Ermack* behaved in a most satisfactory manner. Her designer, Vice-Admiral Makaroff, and Mr. Arthur Gulston, of Newcastle-on-Tyne, were on board, and from their reports it appears that the *Ermack* first met the ice in the Baltic. It was drift ice, apparently about 5in. thick, and there seems not to have been the slightest difficulty in getting the vessel through the obstruction, as she went comparatively easily at nine knots. The worst piece of ice, we read, which was encountered was 25in. thick, and the ship went nearly through this mass of obstruction before she was brought up by it. The worst field-ice that the *Ermack* had to deal with was apparently 4ft. thick, with snow on the top of it. Snow proved to be the greatest impediment to the ice breaker's progress,

and this bore out the designer's expectations.

Mr. Gulston says that 12 in. of snow on the top of thick field ice is a serious impediment, and that 18 in. almost blocks her. The ice generally in the Baltic appears to have been much more serious in the winter of 1898 than was expected, and it is said to be beyond 1883, which was a record winter. The *Ermack* did not run continuously, but rested at night and started early in the morning, working with the search-light. There was no difficulty in starting her, although she had become fast

she can be given some movement, and can thus be worked loose by her own propellers and by ice-anchors."

From all accounts the arrival of the *Ermack* at Cronstadt must have been an extraordinary sight. The Russian newspapers were filled with enthusiastic descriptions of the vessel's majestic entry into the port. The ice was about 18 in. thick, with a good deal of snow on the top, but the *Ermack* steamed through this at $6\frac{1}{2}$ knots up to the sea-wall and past the battleships. "She swung round on the port hand and entered the harbour through



From a]

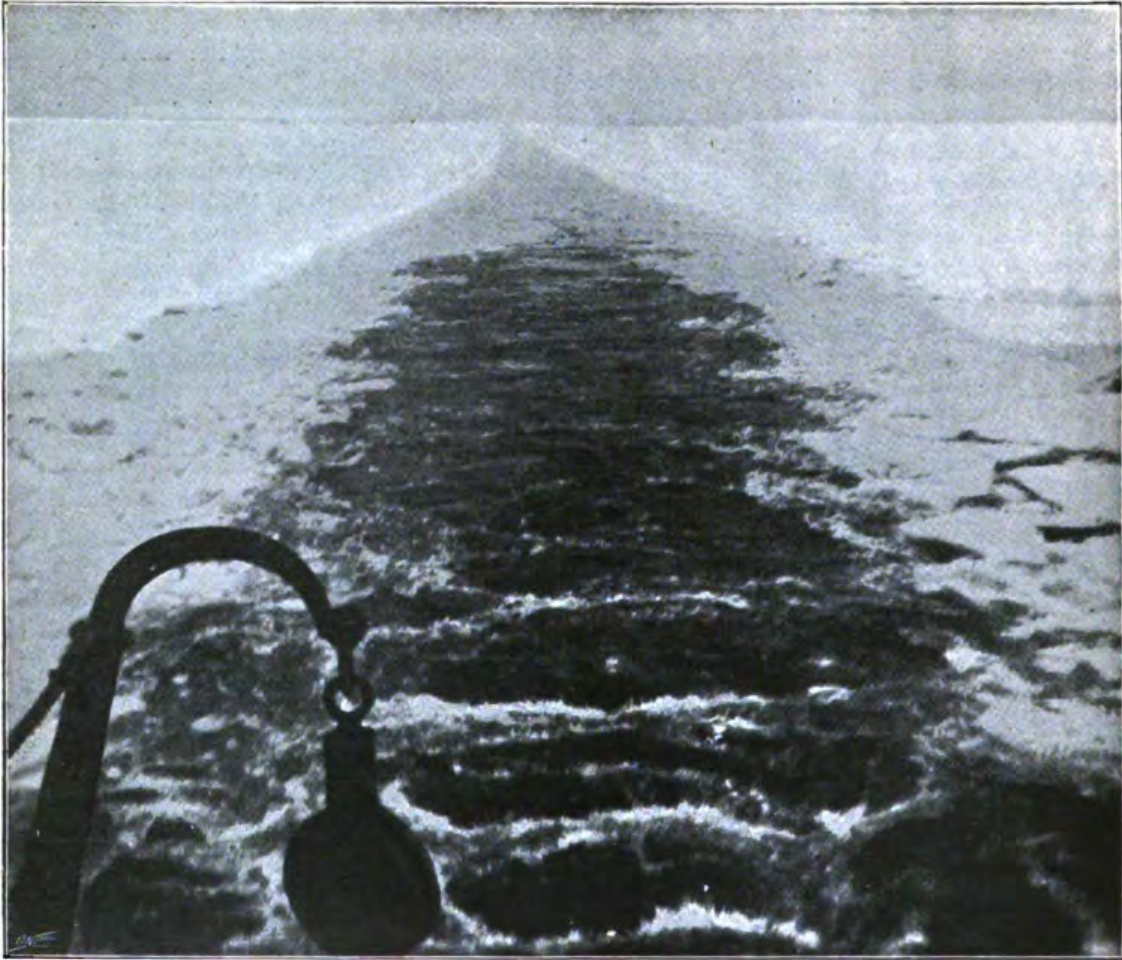
NEAR VIEW OF THE PROW OF THE "ERMACK" AMIDST THE ICE.

[Photograph.

in the ice. The ice-anchors were put out, and the vessel was warped backwards from her berth, after which she started apparently without any difficulty. In his report Mr. Gulston remarks:—

"She can be steered in any way, at any time, in any ice. This has never been the case with any ice-breakers that have previously been built, and is no doubt largely due to the form of the ship. There is no flat place in her side either vertically or horizontally, so that unless absolutely frozen in solid

an entrance only 95 ft. wide (the ship is 71 ft. beam). She swung once in the inside harbour, and one charge astern put her into her berth alongside the coal store. Some manœuvring trials were made in ice of about 2 ft. to 3 ft. in thickness, when the turning circle was found to be about 600 ft., and there was apparently very little difference in which direction the ship was turned. The effect of the bow propeller was most marked, and it appeared that if this stopped the ship stopped too."

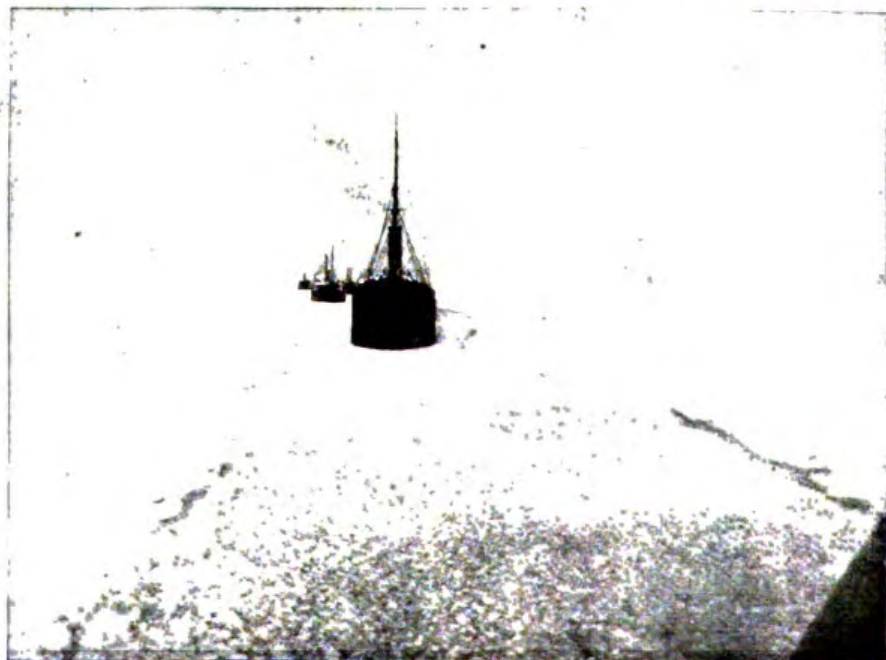


From a] VIEW OF A PATH OPENED BY THE "ERMACK" FOR SHIPS IN THE NEVA—TAKEN FROM DECK. [Photograph.

Whilst in the harbour of Cronstadt the *Ermack* was visited daily by large numbers of people, and Admiral Makaroff, who initiated the employment of ice-breakers in Russian and Siberian waters, was the recipient of numerous letters and telegrams of congratulation, not only from public institutions, but also from the Czar and various officials.

After a few days at Cronstadt the *Ermack* left for Revel, near which twelve steamers were blocked by ice to the danger of their crews. When the ice-breaker arrived the ice was found to be 20ft.

thick, but the *Ermack* steamed merrily through the mass and released nine frozen-in steamers. These she convoyed out to sea,



From a] SHIPS USING THE PATH OPENED BY THE "ERMACK." [Photograph.



THE SINKING OF THE "FRIGG."
From Photos. taken from the deck of the "Ermack."

and then proceeded to tow into port other vessels which were lying outside, and not daring to enter for fear of being frozen in. Needless to say, the rescued vessels were intensely grateful to the *Ermack* for the services she had rendered. It may be mentioned that one of the ships which the *Ermack* freed was an ice-breaker herself. The *Ermack*, however, is far



THE PROA SINKING.
From a Photograph.



THE VESSEL HAS BEEN SPLIT BY THE PRESSURE OF THE ICE AND IS FILLING WITH WATER.
From a [Photograph]

stronger than any other vessel that has ever been built before, and marks the commencement of a new era in this branch of ship-building.

From Revel the *Ermack* proceeded to St. Petersburg, where her appearance and doings on the ice-bound Neva created an immense sensation. She was received by a deputation, with the mayor at its head, and a grand entertainment was organized at the City Hall in honour of Admiral Makaroff and the officers of the ice-breaker. In May the *Ermack* left for the Kara Sea, where Admiral Makaroff intends to employ her in order to establish quicker communications than at present exist between the

Kara Sea and the mouths of the Siberian rivers.

The successful trials of the *Ermack* seem likely to indicate that the entire condition of navigation to ice-bound ports, and the course of trade with such countries as have hitherto been considered closed by sea in winter, will be revolutionized. Arch-



From a]

THE HEADLONG PLUNGE.

[Photograph.

angel, Cronstadt, Odessa, Vladivostock, Revel, etc., will now be "open ports" in more senses than one, and the benefit to commerce and shipping which must result from Admiral Makaroff's vessel bids fair to have far-reaching results in the immediate future. During her short winter's work, the *Ermack* liberated eighty vessels, each of which would, but for her assistance, have been embedded in the ice for another fortnight, while during her working in the Baltic Sea, in May last, she was successful in rescuing from danger nearly one hundred steamers. These vessels she conveyed through the ice to the ports of Cronstadt and Revel. On the 4th May word was received by Vice-Admiral Makaroff on the *Ermack* that the steamer *Frigg* was in danger near Cronstadt. They at once proceeded to endeavour to render her



From a]

THE FINAL SCENE.

assistance. Unfortunately, by the time they arrived, the steamer had been severely nipped by the ice, causing her to founder. We are enabled to present our readers with a unique set of photographs showing the sinking of this steamer. These interesting photographs, for which we are indebted to Mr. William Bourn, of Walker-on-Tyne, were taken from the deck of the *Ermack*. We have also to acknowledge the courtesy of Captain Vassiliev, of the *Ermack*, for permission to reproduce them.

Arrangements have been made by Admiral Makaroff for coupling up the *Ermack* with other vessels in order to make a train of ships for more effectually dealing with thick ice. Although the *Ermack* is the strongest ship afloat, there is a limit to her capacity of breaking up ice, and a vessel pushing astern of her would supply additional power for the work. Into the counter of the ship a recess has been built, and this is designed to take the stem of the following vessel, arrangements being made for lashing the latter in firm contact with the leading craft. There seems to be little doubt that with two

Ermacks fastened together the North Pole could be reached. Whether this will ever be attempted remains to be seen; but at any rate the feat has been brought far nearer by the advent of these ice-breaking steamers than it has ever been before.

[Photograph.