

BICYCLE AMBULANCE.

Mr. J. E. Whiting gives, in *Indian Engineering*, a sketch of an arrangement for an ambulance, which consists of the chief parts of two bicycles from which the trailing wheels and the treadles have been removed. A bamboo is very securely strapped to the trailing or curved bar and lies above the bicycle seats—holes being made in the under surface of the bamboo, so as to admit the projecting pins or pivots* over each wheel. The bamboo then keeps the upper parts of the wheels apart at a suitable distance, to admit a hammock, which is attached to the bamboo by its ropes and has its ends resting on the two seats of the bicycles.

The tails of the bicycles are turned toward each other, and two light teakwood rods are attached to the jaws of these tails, one on each side, by the bolts or axles of the (omitted) trailing wheels; these bars keep the lower parts of the structure rigidly apart. Two cross bars are strapped to the handles of the bicycles and pass under the longitudinal bamboo. The cross bar over the rear wheel has two light iron rods with hooks attached to it; these hooks fit into eyes or staples in the longitudinal bamboo, as shown in the sketch, and so as to keep the rear wheel in plane with the bamboo, the iron frames, and the teakwood rods. The front wheel with its cross bar is free to turn about a vertical axis, as usual, in order that the ambulance may take curves and be guided.

Four men with a little training run the ambulance easily and safely; they must each hold the central bamboo with one hand and grasp the end of a cross bar with the other, and they can tilt the wheels to one side, when they admit or let out the invalid from the hammock.

Should this form of ambulance prove suitable for hospital or field service, plain stretchers or hammocks with stiffened sides could, of course, be used, and could be slung over easier springs than those under bicycle seats; but the wheels can only be used as wheels over smooth ground and should be as small and light as possible, so that the men could lift the ambulance over obstacles and over rough ground, or when they have to turn sharp corners.

THE NEW NORDENFELT SUBMARINE BOAT.

Although the official trials have not yet taken place, the representative of the *Engineer* at Constantinople tells us that enough has been done in the way of displaying the peculiar qualities of the Nordenfelt submarine boats recently constructed for the Imperial Ottoman government to show that they are very successful realizations of the ideas of their talented inventor. The No. 2 boat lately was submitted to an ordeal

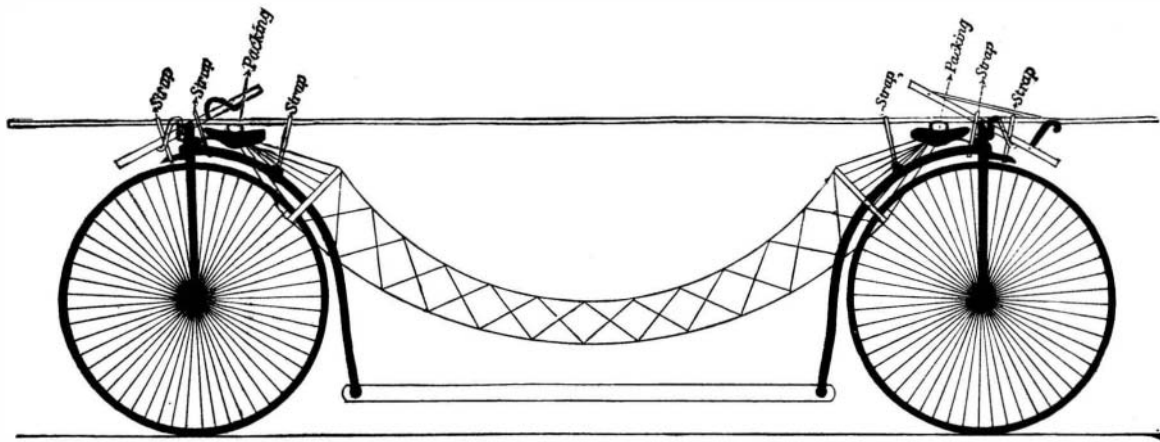
sacred in the Islamite calendar, and the Sultan, in the performance of a high function connected with the caliphate, has to spend many hours on the site of the old palace of the Byzantine emperors. After the performance of the religious duties of the day, an aide-de camp was dispatched in a steam launch to summon the Nordenfelt. She had been lying meanwhile alongside the dockyard wall, high up the Golden Horn. The fires were banked, but the required pressure—150 lb.—was in the reservoir, the water having been heated up overnight. This, it may be mentioned, would be the normal condition of these boats during war.

The water once heated up can be maintained in the requisite condition for any length of time by a daily expenditure of from 2 cwt. to 3 cwt. of coal. The loss of heat by radiation is very small, owing to the special protective coverings of the boilers, and the pressure in the reservoir does not fall more than 10 lb. in the twenty-four hours. The boat is thus always ready for

lying off the Scutari shore, as a surface boat, the Nordenfelt, turning in a little over her own length, darted across the current. End on, very little was seen of her, and the eye once removed, she was not very readily discovered again, in spite of the direction being known, on account of the absence of smoke and the very light color of the outside painting. Even on the broadside there was little of the hull to be seen while running, on account of the screen formed by the bow wave. She seems to divide the water like a plow, throwing up a bank on either side, thus forming a furrow in which she would have run completely out of view but for the small chimney necessarily kept in place for the maintenance of combustion. As she neared the vessel, two jets of water were suddenly thrown upward to fall in showers of spray. This marked the moment of delivering her attack. The tube doors being thrown open for the release of the Whiteheads, the water rushing in forces out the air through the vent holes at the rear, with the above described effect. At that moment she looked more like a whale than ever, and might easily have been taken by the most knowing Greenlander for a big fish spouting.

Returning to Seraglio Point, she was next directed to run as a surface boat against the current. In this trial for speed, her performance was a remarkable contrast to that of the attendant launches. Instead of keeping their position as pilots, they were soon left far behind. According to the revolutions and distance run in a given time, she did her eight knots over the ground against a current that was running but very little less than five. On her return from this run orders were given for a second attack to be made upon the steamer, on this occasion as a submarine boat. The vessel being at no great distance, she steamed slowly ahead so as to afford time for getting rid of the extra buoyancy, and closing up. Soon there was little to be seen of her but the hump-like dome, and having turned toward the enemy, it was very difficult to keep her view. Suddenly she was lost sight of, to appear, however, shortly afterward rounding the bows of the vessel from the other side. She had, as it were, dived to deliver her blow, and then turned off to avoid pursuit. No jet was thrown up on this occasion, the escaping air losing all force before reaching the surface. The Sultan expressed himself highly satisfied with the performance of the boat. Altogether she was under way over five hours, during two of which she ran under her reserve steam, using the latter also for her return trip up the Golden Horn. On reaching her moorings there was still 90 lb. pressure in the reservoir, so that she could have continued under way for some time longer.

We illustrate, not the Turkish boat, but the Nordenfelt, now lying in Southampton. A description of the Nordenfelt has before been published by us. It will suffice to say here that the Nordenfelt is very much larger than the Turkish boat. Indeed, she is the largest submarine boat ever constructed. Our engraving is from a photograph, and gives an excellent idea of her appearance.

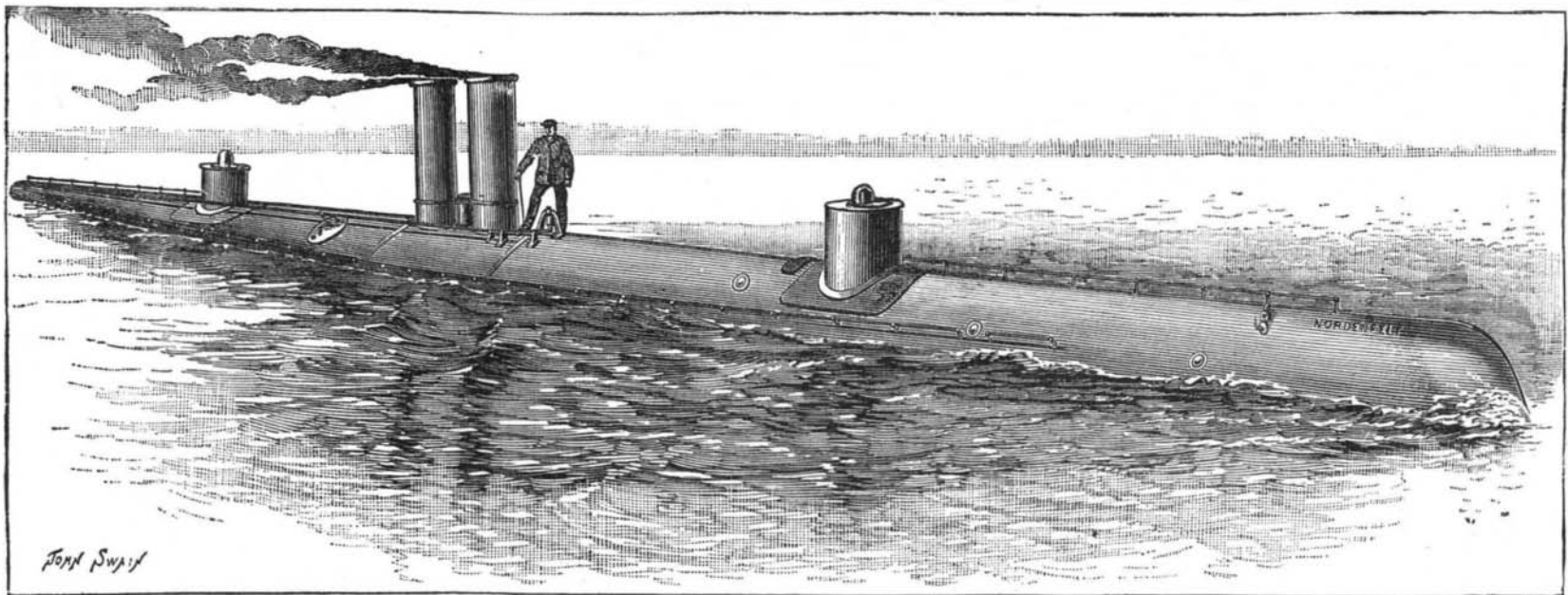


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the submarine part of the business, and can be got under way for general work as speedily as any other sort of steam craft.

At 2:30 P.M. a loud murmur of admiration and surprise arose from the old bridge at Galata, heralding the approach of the Nordenfelt. She came down the Golden Horn at a rapid rate, threading her way skillfully between the lighters and caiques that would persist in keeping their course in spite of the pilot launches, and shot the bridge without slackening speed—no easy feat considering the narrow width of the opening and the adverse set of the current which sweeps across it. Thousands of spectators were collected on the bridge, as also at Seraglio Point, and many others were afloat in caiques. It was amusing to hear the comments on her appearance. The "whale ship" was conferred upon her as a name by the general verdict, and it certainly seemed most *apropos*, as little was to be seen of her above water but the dome and upper part of the torpedo tube, which might easily have been taken in the distance for the hump and fin of some great denizen of the sea.

In obedience to the orders of the Sultan, who himself directed the maneuvers from the shore, the boat lay for some quarter of an hour, in the very strength of



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that could not possibly have been rendered more severe as a test of her steaming and steering powers, or as a trial of the nerves of those in charge. To gratify the curiosity of his Imperial Majesty the Sultan, orders were given for the boat to maneuver off Seraglio Point, as the most convenient locality for having her under observation during the whole of her runs. It is not often that his Majesty finds himself near the water, his tastes being more military than naval; but the day in question, the 15th of Ramazan, is one of the most

the current, off Seraglio Point. She maintained her position with the greatest ease by a few turns of the screw, while the attendant launches found it impossible to stem it. While in this position she narrowly escaped serious injury, owing to the traffic. A large lighter crossing the stream, and hugging the wind to save ground, passed too close and was struck by the screw. Fortunately she was empty, and so it was easy to get at the hole made in her bottom, and she reached the shore in safety. As for the Nordenfelt, a few inches off the end of one of the blades was the only damage sustained. Being directed to attack a steamer

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POLISHED granite is much more durable than hammered granite. Polishing the stone prevents the lodging of moisture and foreign particles on its surface.

* If these do not project, they can easily be added.