

**THE NEW SUBMARINES FOR THE BRITISH NAVY.**

Although the British Admiralty was for some time disposed to regard with little favor the attempts which were being made by other nations, notably by France and the United States, to develop a practical submarine torpedo boat, now that they have themselves commenced the construction of this type of vessel, they are pushing forward their experimental work with characteristic thoroughness and activity. The first vessels, introduced some three or four years ago, were of the Holland type, with which we are familiar in this country. An order for five submarines was placed with Vickers, Sons & Maxim, at Barrow. These vessels were practically identical with our own boats of the Holland type. They are 63.4 feet in length, 11.9 feet in diameter, and 120 tons displacement. They have engines of 160 horse-power, and have a speed of 9 knots on the surface and 7 knots submerged. The vessels were launched in from 1901 to 1902. Following these came the A class, five vessels 100 feet in length by 10 feet in beam, and of 180 tons displacement. With 150 horse-power they are credited with a surface speed of 15 knots, a speed of 9 knots submerged, and a radius of action of 300 miles. It is one of these that was lost on June 8. The next order was for ten boats of much greater size and power. They are 150 feet in length and 300 tons displacement. Their engines of 850 horse-power are designed to give them a speed of from 15 to 16 knots on the surface and from 9 to 10 knots submerged. These vessels have a radius of action of 500 miles. Under the programme of last year, ten submarines were ordered, but the particulars of these vessels have not yet been made public. The first Holland submarines and the vessels of the A class are driven by gasoline engines when they are on the surface, and by electric motors when they are submerged. In the B class the motive power is said to be entirely electric—a rumor which we very much doubt. Great improvements have been made in the diving gear, by which the boats are enabled to dive at very short notice. Under the older system, as used on the Holland boats, it took about three minutes for the vessel to dive. Moreover, it was necessary for the boat to keep in motion as long as it wished to remain submerged. The older boats cost about \$150,000 each, and the B class cost about \$650,000.

It will be noticed from the dimensions given above that the ratio of breadth to length is much smaller in the new boats than in the earlier Holland type. In the first case the ratio is about 12 to 64, or say 1 in

5 1-3; whereas in the A class it is 10 to 100, or 1 in 10, and probably something finer in the vessels of the B class. The finer lines of the new boat are very noticeable in the accompanying views, as is also the high freeboard and considerable deck space when the vessel

**ON A PROCESS OF MEASURING NERVOUS SUSCEPTIBILITY.**

BY DR. ALFRED GRADENWITZ.

It is a well-known fact that any psychical process is attended by some alteration in the physical state of the body. The temperature of the blood is known to rise in the case of excitation, while chemical and physical actions of a nature yet insufficiently known will occur. There is on the other hand a mental state called depression, when the blood temperature falls and behavior of the body is in every respect the opposite of what is observed in the above case.

The physical changes just referred to form a criterion of the actual state of the mind, but it has not so far been possible to use them for an accurate determination of the psychical process going on. The much-discussed discovery of N-rays seemed to afford another outward sign of mental activity, Prof. Charpentier having shown that the amount of these rays given off by each nervous center is proportional to its activity. This outside manifestation of psychic activity would be of the highest interest, allowing as it would of explaining many phenomena hitherto enigmatic. Until, however, the existence and properties of these mysterious N-rays have become universally recognized, it would seem preferable to leave them out of account.

Now another physical criterion for the state of the human mind has just been found out by a Swiss engineer, Mr. E. K. Müller, of Zürich, Switzerland, and as this criterion is susceptible of accurate determination by the ordinary physical methods, we do not hesitate in describing the interesting results thus found.

Mr. Müller noted an interesting connection between the conductivity of the human body and its psychical and physiological condition. This conductivity, in the first place, undergoes great variation, according to the hour of the day at which the experiment is made and according to the meals taken by the person experimented on. Accurately identical figures will occur very frequently in series of experiments lasting from 10 to 15 minutes, with the same minutes and the same person, even in the case of experiments separated by an interval of some days.

The magnitude of the conductivity, as well as the regularity in the behavior of the different series, are highly influenced by the presence of a third person; whenever anybody enters the room or a noise is produced, the resistance of the person experimented on is found to undergo a spontaneous variation of extraordinary magnitude. Outside of objective

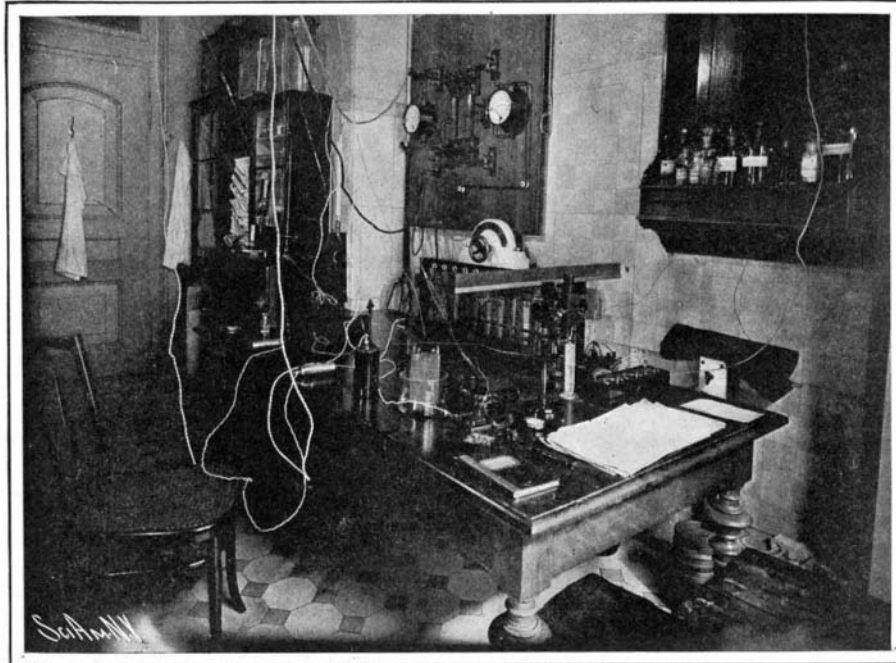


Fig. 1.—APPARATUS FOR MEASURING INDIVIDUAL RESISTANCE OF PATIENTS.

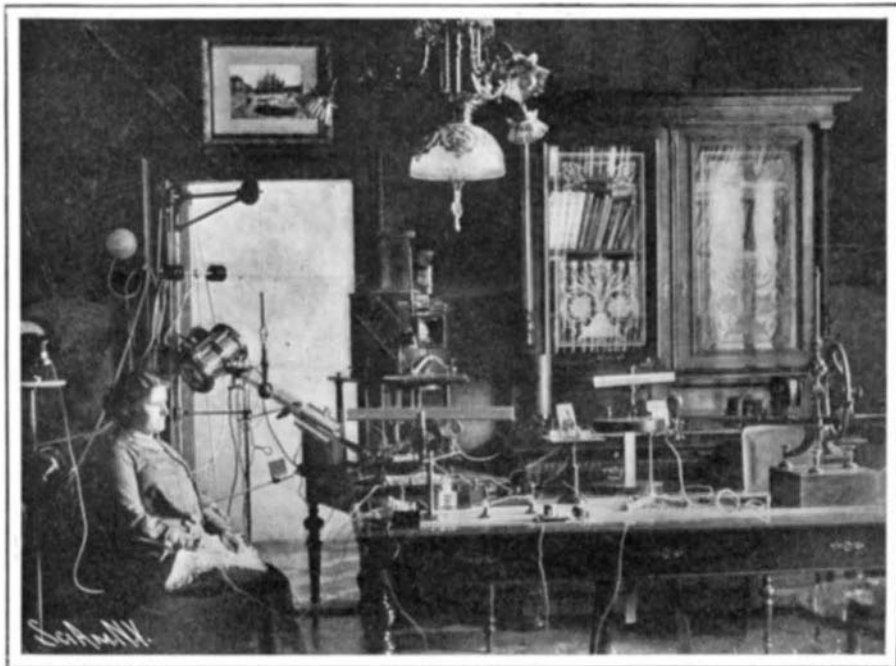
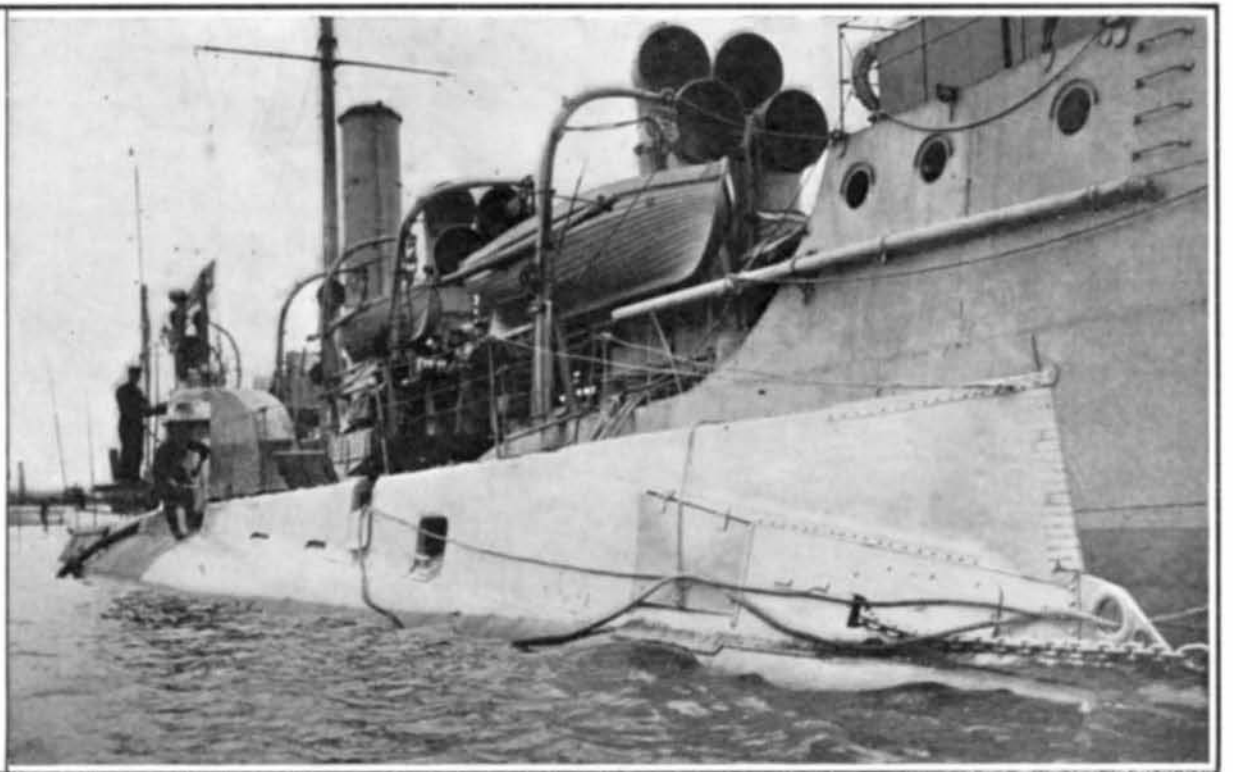


Fig. 2.—APPARATUS FOR CHECKING AN ELECTROMAGNETIC TREATMENT.

is in the surface position. It is probable that we shall see in the future developments of the submarine an increase in proportions and size, similar to that which has taken place in the torpedo boat and torpedo-boat destroyer, which have developed from the little craft of less than 20 tons up to seagoing craft of 550 tons.



Bow View.



As Seen from Aft the Starboard Bow.

Displacement, 300 tons. Horse-power, 850. Speed: Submerged, 9 to 10 knots; surface, 15 to 16 knots. Radius of action, 500 knots.

TWO VIEWS OF THE LATEST B TYPE BRITISH SUBMARINE. THE VESSEL LOST JUNE 8 WAS OF THE SMALLER A TYPE.