

## New Instrument Eliminates Fog Peril

**N**AVIGATORS before long may find fog robbed of its terrors through a device invented by Dr. A. G. Webster, of Clark University, Worcester, Mass., for showing the direction of signals, which he demonstrated recently at the final autumn session of the National Academy of Sciences held in the American Museum of Natural History at New York. The apparatus, which he calls a "phonometer," translates the intensity of sound into terms of light or intensified sound, as by ringing a bell, so that, as the inventor expressed it, the deaf may see and the blind may hear it.

Impressed with the loss of the steamship "Empress of Ireland" in 1914, he went to Father Point, on the St. Lawrence, where the vessel was sunk in collision and 1,200 perished, and there made the experiments on which his invention is based.

In a thick fog, when two vessels are approaching each other, it is often impossible for the captains to tell within 45 degrees the direction of the sounds from horns. In the St. Lawrence disaster the masters of both vessels should have stopped, in his opinion, in view of the uncertainty of determining the direction of signals in fog.

First Professor Webster showed a resonator or "phone" which took up the vibrations of a tuning fork and emitted a sound of standard pitch. This instrument took the place of a regular fog signal. The receiving instrument, or phonometer, looked like a small round box on a tripod, and from each end of the box projected a conical horn resembling a megaphone. The small ends of the horns were turned toward each other.

The device is placed so that the horns are at right angles with the course of the vessel on which it is installed, as seen in our illustration. The vibration caused by the signal is concentrated by the horns and communicated to a metal diaphragm, which is held in place by small steel wires. The pulsation goes to a tiny electric light, and the effect upon it is registered by the reflections of a mirror on a scale which can be read through a glass attached to the instrument (see detail insert cut). The

### DRIVES AIRSHIP BY WIRELESS.

The invention of a German engineer, Herr Bohle, which he demonstrates nightly in a large vaudeville house of Berlin, is attracting considerable attention. The invention consists of an airship in miniature (about 3 meters long and 1½ meters in diameter), which the inventor drives by means of wireless electric currents from a battery stationed afar. No personnel is required to drive this airship, which executes every maneuver the inventor desires. Even explosives can be dropped from this airship on high at the will of its master

scale shows the intensity of the sound as the image of the light widens or contracts. The horns swing easily upon a pivot (readily controlled from the ship's bridge by an electric controller as depicted, hooked up with a small electric motor geared to the rotatable horn chamber mounted on the mast). When they have been so adjusted by the operator that they show the greatest intensity, the tube of the instrument is pointing in the direction from which the signal is being sounded.

With the phonometer, although it is not absolutely accurate in its present stage, Dr. Webster declares that the direction can be determined within a very few degrees. Experts who witnessed the demonstration said

within its rights in standardizing fog horns. It would be too much to expect the masters of vessels to tune up their phonometers to correspond with the timbre of every new siren. In connection with wireless messages, it is believed that the phonometer would be of value, for ships approaching each other could communicate details about the fog horns employed as a further guide.

Dr. A. A. Michelson, of the University of Chicago, said: "I cannot withhold my admiration. This paper marks a most notable advance in the effort to solve a problem of the greatest interest. It seems to me that Dr. Webster has brought to a brilliantly successful conclusion this important research."



Remarkable Scientific Visual Fog Signal Receiver Devised by Dr. A. G. Webster, of Clark University. Insert Cut at Left Shows Details of Receiver Mechanism.

that if the device could show within five to 10 degrees it would be of incalculable value.

The inventor himself saw a practical objection to the device in that to have it of universal use the navigation laws would have to be changed so as to prescribe that all fog horns and sirens be of the same pitch. As at present the actual variation of horns is within an octave or an octave and a half, he does not regard this objection as insuperable. He thinks that the Government of the United States would be well

at his station below, it is claimed.

Expert engineers declare that the great question is whether this airship can be constructed on a larger scale and managed from a greater distance. If so, another upheaval in military warfare may be expected.

### ELECTRIC COMPASSES ON AMERICAN BATTLESHIPS.

Motor-driven gyroscopic compasses have now been installed on 20 United States battleships, one armored cruiser and 15 submarines. Master compasses in duplicate are

soon to be placed on all battleships of the Delaware and later classes. The Bureau of Navigation maintains with the Atlantic fleet two chief gunners who have been specially trained as gyro-compass experts, and it is the duty of these men to inspect and adjust the compasses and to give instructions in their use. Special attention is also given to the instruction of officers and men in the care and use of the compasses, the ship's crews who have to do with these compasses being sent to the New York Navy Yard or the works of the manufacturer for 30 days' instruction.