

EXPERIMENTS AT ST. CATHERINE'S WITH FOG SIGNALS.

BY H. C. FYFE.

To guide the mariner during the hours of darkness elaborate and costly lighthouses have been erected on shore or on some rocky reef; lightships have been moored around the coasts, while thousands of floating buoys, illuminated by means of compressed gas stored in them, are used to define navigable channels or to mark dangerous localities. On a clear night such lights as these are of priceless value to the navigator; but when the grim and insidious sea-fog settles down over the face of the water, he is thrown back on his chart, his compass and his lead and is forced to advertise his presence with the foghorn, and to endeavor to discover his whereabouts by any sound signals that he can detect.

It being impossible to appeal to the eye of the navigator, his sense of hearing must be attracted by some sort of noise-making instrument capable of being heard at a considerable distance, and thus we find on every man-of-war, on every great liner and on vessels of lesser size and value various sound-producing instruments and also similar apparatus at points of vantage around the coasts of civilized nations.

Of recent years noise making has (it has been remarked) been raised almost to a fine art, and every effort has been exerted to produce the most distinctive, the loudest and the most ear-piercing sound that can be developed.

During the years 1894-95 some very important experiments with sound signals were carried out under the auspices of the Trinity House Corporation with the aid of the late Prof. Tyndall, at that time scientific adviser to the corporation, at the South Foreland. It was then demonstrated that, contrary to the generally accepted opinion, fog offers no obstruction to the passage of sound through the atmosphere. The instruments for producing sound which were in use at this time were bells, gongs, whistles, guns, reed-horns and sirens, and the experiments proved that the siren was the best sound-producer, both as regards loudness, penetration and the power of overcoming opposing influences. Siren sound signals were accordingly adopted for the large majority of coast fog-signals set up on the coasts of Britain and other nations.

Since the 1894 experiments improvements have been effected in the various sound-producing instruments, and a few months ago

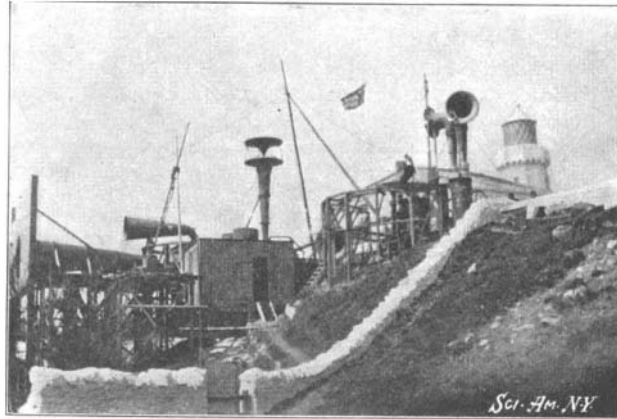
the Trinity House, with the co-operation of the authorities for Scotland and Ireland, arranged for a new series of trials to be carried out at the fog signal station attached to the electric light establishment at St. Catherine's Point on Isle of Wight. A special committee of the board was appointed and with them were associated Lord Rayleigh, scientific adviser, and Mr. T. Matthews, engineer in chief to the Trinity House. Over 4,600 observations were recorded, the Trinity House steamer "Irene" steaming about in the

all the conditions of wind and weather experienced and that reed sounding instruments as at present developed were much inferior and only suitable for guarding positions of secondary importance. A new form of siren trumpet with a mouth of elliptical section, devised by Lord Rayleigh, was found to work very well, and this form will probably be adopted. It should be observed that the musical note produced by the speed of rotation of a siren or by the vibrations of a reed should, to get the best effect, be in unison with the fundamental note of the associated trumpet. The conclusion arrived at by the committee was that a low-pitched note was most suitable for a fog signal.

In calm weather, they say, a low-pitched note is more suitable than a high-pitched one; but when the wind is opposed to the course of the sound waves or the sea is rough and noisy, a high-pitched note penetrates further than a low-pitched one. A very remarkable phenomenon experienced was the soundless zone or silent area, which sometimes existed at varying distances from the station. Outside this area, both in front and behind, the sound signals could be plainly heard, but once inside the zone they could not be detected. The experiments which we have so briefly summarized have yielded some very valuable results, and as they will be continued a few months hence, more results calculated to improve our fog-signaling appliances both on shipboard and along the coasts should accrue.

Sound—when all is said and done—is an imperfect medium for carrying signals to the mariner during fog. Perchance in the future some perfected system of syntonized wireless telephony or telegraphy will enable the navigators of to-morrow to successfully combat the fog fiend.

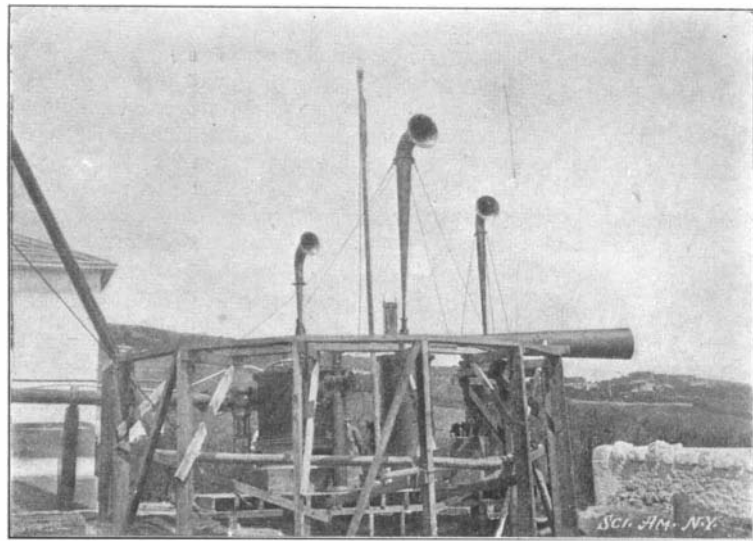
What are probably the two largest dining cars ever built were recently completed for the Chicago, Milwaukee & St. Paul Railroad, and now in service of the "Pioneer Limited" trains of that road. These cars are 70 feet over end sills, and 77 feet 11 inches over all. They are 10 feet wide over side sills, making them 4 inches wider and 6 inches higher from floor to ceiling than the standard palace car. These increased dimensions add considerably to the roomy effect of the interior and to the comfort of the passengers. Thirty-six people may be seated at the tables at one time.



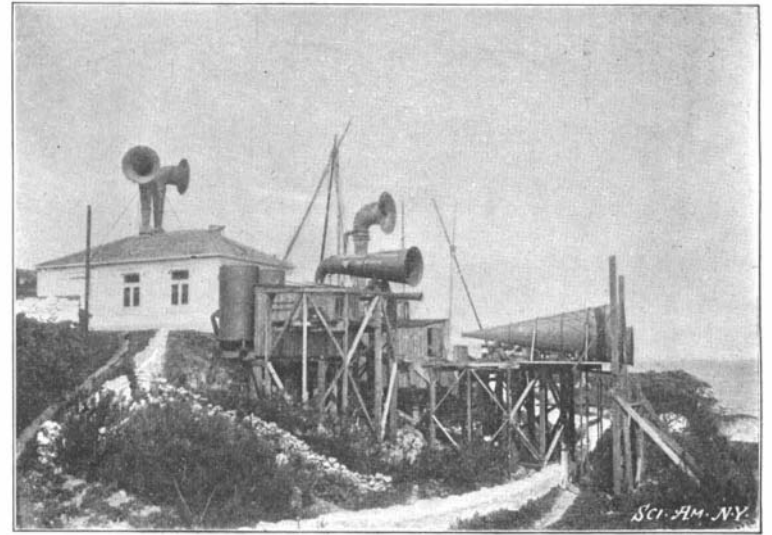
A Group of Fog-Horns.



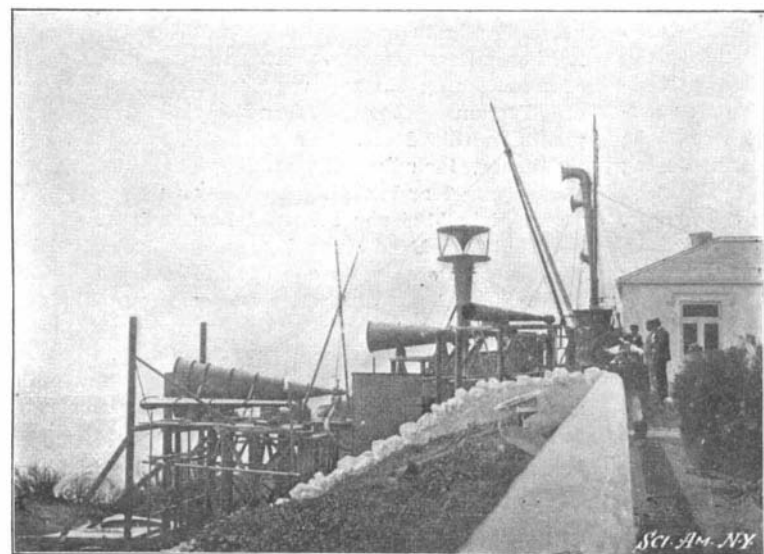
Signaling to a Passing Steamer from the Experimental Sound-Signal Station.



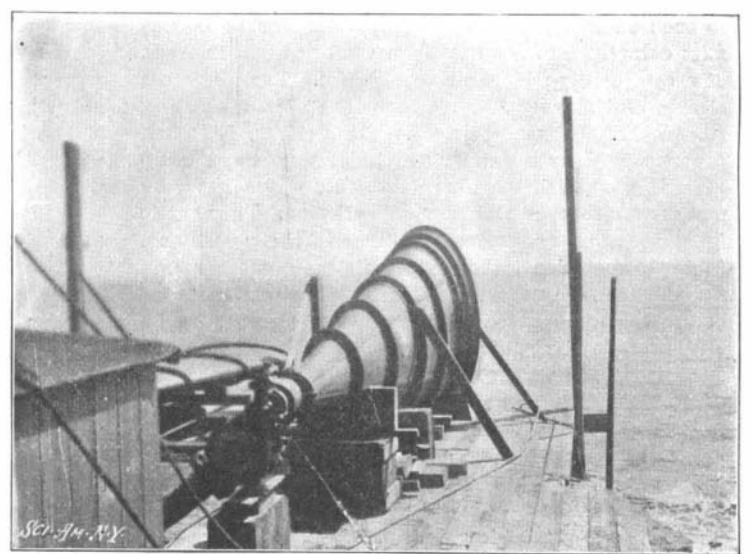
Reed-Horns at the Station.



Siren-Trumpets.



Siren-Trumpet and Reed-Horn. Lord Rayleigh's Trumpet in the Background.



Lord Rayleigh's Trumpet.

vicinity of the station and recording the intensity of the sounds emitted by the various sound-producers used.

The instrumental tests were mainly devoted to comparisons of efficiency between the siren principle and the reed principle of producing sound and between modified forms of each type. Two sizes of cylinder sirens were tried; one of 5-inch diameter, as used in the Trinity House service; one of 7-inch diameter, as used in the Scottish service, and a new experimental form of disk siren 7 inches in diameter. Of the reed instruments four types were tried, viz., the Stentor fog-horn, the Barker reed-horn, the Taylor reed-horn and the Trinity House service reed-horn. In the details of these different kinds of sirens and reed-horns employed it is impossible to enter, and we must content ourselves with a few of the more important conclusions. The committee reported that the siren was the most effective sound-producer for fog-signal purposes under

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