

PHYSICS

More Than 99 Per Cent Steam Wasted by Big Boat Whistles

Siren Type Signals Found More Efficient Than Whistle in Tests Conducted by U. S. Naval Proving Grounds

MARK TWAIN was not so far off when he told of the river steamboat which had to stop to get up enough steam to blow the whistle. According to a report of Louis Thompson of the U. S. Naval Proving Grounds, Dahlgren, Va., a large steam whistle consumes an unreasonably large amount of power. A 12-inch whistle may consume as much as 400 horse-power. The report was given in a discussion of signal efficiency at the meeting of the Acoustical Society of America in Los Angeles.

In precise scientific tests steam whistles made a pitiful efficiency score. Using several hundred horse-power, the ten- and twelve-inch whistles wasted over 99 per cent. of the energy supplied. The balance was, of course, transformed into actual sound energy.

These investigations are being carried on by government authorities in quest principally of more effective fog signals. They disprove, among other things, the popular notion that sound

travels farther in a fog than in clear air. In fact the fog seems to have but a negligible influence either way. Wind and air eddies are of much greater importance. In one test a ten-inch whistle, using two hundred horse-power, was heard only three miles away in the face of unfavorable wind, while at another time a two-inch whistle, using but two horse-power, was heard five miles distant. Hot and cold layers of air are found to refract the sound and ruin signal values.

In the tests measurements of sound values are taken over wide areas, both over land and sea, using modern electrical recording instruments. The siren type of signal excels the whistle by a wide margin. In one of the best of these devices air is forced out through peripheral ports by centrifugal action, giving signals audible at a great distance.

The designers of such sound producers are studying the differences between the wave forms of the natural sounds of a turbulent sea, and those which they wish to be heard. It is found further that the plan of varying the sound in an irregular manner introduces the element of surprise and increases audibility. This is in contrast to the old idea of a continuous low sound of a fog horn or whistle. Signals of 180 to 300 vibrations per second are best heard. These correspond to the middle range of the piano keyboard.

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ASTRONOMY

Christmas Eve Meteor May Have Showered Stones

THE METEOR that flashed over Idaho on Christmas eve was heard over a greater area than the famous Tilden, Illinois, fall of 1927 from which important stones from the sky or meteorites were recovered, Prof. C. C. Wylie of the State University of Iowa declared to Science Service, basing his

opinion on the first reports of the meteor.

But the Idaho meteor probably covered a smaller area than the Paragould, Arkansas, fall of last year which set a new record for the recovery of meteorites seen to fall.

"If reports from points in Idaho, Washington, Oregon and Montana are obtained, giving the direction in which the meteor was seen and its path in the sky," Prof. Wylie explained, "the orbit in which the meteor was travelling before it entered the earth's atmosphere can be computed. But this is not sufficient for locating this meteorite which may have reached the earth.

"The ball of fire appearance for the meteor probably ended at a height of fifteen miles and any surviving stones, falling from there as dark objects, would be invisible at night. If meteorites fell in a well settled district in Idaho, a study of the sounds heard by various persons should locate the place of fall well enough for the purposes of search. A large meteor after bursting often scatters stones over an area ten miles long and three miles wide. But the stones are found only after some search."

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ELECTRICITY

New Vacuum Tube Detects Smallest Electric Current

THE smallest electric current ever measured—about one three-hundred-quadrillionth of the current required to light an ordinary 100-watt electric bulb—can be detected with the aid of a new vacuum tube developed at the research laboratory of the General Electric Co., under the direction of Dr. A. W. Hull.

Such a current consists of a flow of only 30 electrons a second. The number of electrons flowing through the 100-watt lamp in a second can be expressed by a ten followed by 18 ciphers.

Speaking in Cleveland before the American Physical Society, Prof. L. A. DuBridge, of Washington University, told of his researches with this new tube. In the past, he said, small currents have been measured with an electrometer, which is rather a troublesome instrument with which to work. The new tube can amplify currents smaller than one ten-quadrillionth of an ampere, too minute to operate an electrometer. Dr. DuBridge also pointed out that the tube is much more convenient than the electrometer.

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A GREAT LOSS

Of energy takes place when the engineer blows this whistle, and the same is true of all the other steam whistles in the world.