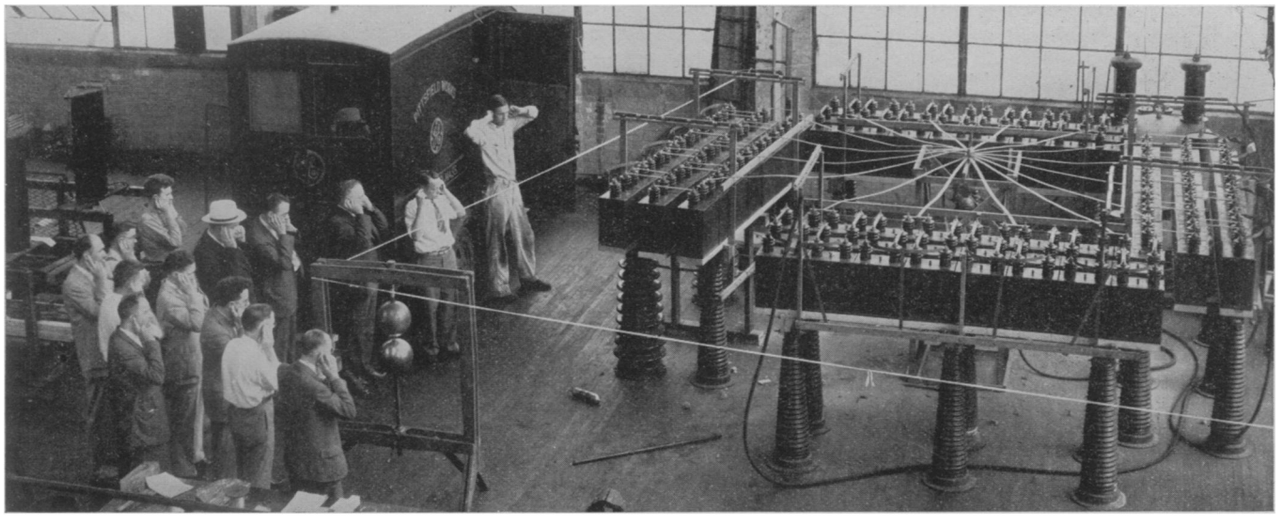

ARE THEY SCARED ?

Visitors waiting for flash marking 250,000 ampere display of artificial lightning at Pittsfield, Mass., plant of General Electric Co. Thunderlike sound accompanied the discharge. Current in natural lightning seldom rises above 150,000 amperes. The high-current demonstration is part of research to find more effective ways of guarding power transmission lines from lightning shocks.

PHYSICS

Artificial Lightning More Powerful Than Nature's

Electrical Current Amounting to 250,000 Amperes Makes Impressive Display for Visitors to Laboratory

MAN-MADE lightning rivaling nature's own thunderbolts with electrical current of 250,000 amperes was put on display at Pittsfield, Mass., recently in a crashing, flaming exhibition by engineers of the General Electric Company's high voltage laboratory.

Measurements of current surges in power lines have indicated that a direct hit by a natural stroke of lightning causes the current to mount to only 150,000 amperes. The current in the demonstration was discharged at 150,000 volts potential.

The electrical power expended during the eight one-millionths of a second of the flashing "bolt" was 30,000,000,000 watts. This is thirty times the electrical power developed by the hydro-electric plants at Niagara Falls and as much as the combined electrical output of all the electric plants in the United States.

Ordinary copper wires for handling heavy currents were blown apart and vaporized in a few millionths of a second during the demonstration. A section of reenforced concrete was shattered by the impact of the artificial lightning bolt just as a concrete structure is sometimes wrecked by natural lightning.

A metallic conductor large enough to carry the tremendous current without fusing is subjected to powerful mechanical forces during its transmission of the current. A flat strip of copper shows the "pinch effect" which changes it from a ribbon to a nearly round cross section.

The new high current apparatus is a companion instrument for the 10,000,000 volt artificial lightning generator already in use at General Electric's high voltage laboratory. Both instruments are used in the research which the company is and has been making to study the effect of natural lightning on long distance power transmission lines.

Already many protectives have been devised to improve the service to distant places which formerly was interrupted by lightning strikes.

Science News Letter, July 21, 1934

MARINE ENGINEERING

Ship's Propeller Should Be In Bow As Is Seal's

IF MARINE engineers really wanted to increase the speed of great ocean liners they would put the ship's propeller in the bow and make it act as a "puller" instead of a "pusher" as now used. This is the verdict of the German scientist, Dr. Heinz Judis, after a study of the methods of movement in fast-swimming sea animals like the penguins, dolphins, seals and sharks.

All these animals, which gain remarkable speed in spite of comparatively small effort, have two sets of "propellers" which are the fins in front and rear. But in fast swimming only the forward fins are employed for straight-ahead motion. The tail fin serves mainly for steering.

A ship produces a bow wave, a resonance wave, and a system of stern waves. At high speeds these complicated wave systems constitute the major part of the total resistance, declared Dr. Judis.

Every propeller, and so also a penguin's wings, says Dr. Judis, produces a system of waves. But when a penguin is swimming fast, the waves produced by the wings cancel the bow waves so that the animal saves nearly the whole of this resistance.

Towing tests on a dead penguin made at the Berlin Institute of Shipbuilding Research showed that the resistance decreased the moment that the water began to flow over the shoulders of the animal, and the bow wave then almost disappeared.

Dr. Judis equipped a boat with fins and a mechanism by which the com-