

says Dr. Bartsch. "You let him alone and he'll let you alone. But you never can be sure about a barracuda."

The manta, or sea-devil, a great wide-winged, two-horned creature related to the sharks, is often reputed to be a man-eater. Legend says it will smother a fisherman in its great embrace, and then swallow him. But it is doubtful whether it ever eats anything more formidable than oysters. The manta could more justly complain about the manta-killing ac-

tivities of man, for sportsmen in the warm waters off southern California and Lower California like to fling harpoons into its tempting expanse of back, and then enjoy the somewhat hazardous thrill of being towed at high speed for hours by a half-ton of bewildered giant fish with the terror of imminent death upon it.

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Science News Letter, September 14, 1935

PHYSICS

Airplane Propeller Makes World's Noisiest Roar

SOMETHING more radical than better sound insulation of airplane cabins must be found by scientists if air travelers are to be spared the roar of airplane propellers, it appears from the report of E. Z. Stowell and A. F. Deming of the laboratories of the National Advisory Committee for Aeronautics at Langley Field, Virginia.

In a new study of noise from two-blade propellers the scientists have found that the greatest noise source is the roar of the fundamental frequency. This basic noise is a musical note having twice the frequency with which the propeller is rotating. In the propeller roar as many as 50 or 60 harmonics of this fundamental note appear.

Discussing the importance of propeller noise tests, the scientists state: "It is evident that, although passengers in a commercial airplane may find the noise temporarily disagreeable, the effect of the noise upon the pilots who are immersed in it day after day may be greater and even interfere seriously with efficiency."

The two-blade airplane propeller, they point out, radiates more noise as expressed in watts of power than does almost any other continuously operating device known to man. The only exceptions are certain special signalling devices.

Propeller roar due to the blades' rotation, Stowell and Deming found in experimental studies, has a maximum at about 30 degrees on each side of the propeller's axis of rotation. This angle is just about the one which passes through the passenger seats in cabins of commercial multi-motors airplanes.

At close range and at great distances the propeller roar of rotation dominates propeller noise. At intermediate dis-

stances, however, a second noise source may be prominent. This is the tearing, ripping noise caused by the periodic release of vortices from the trailing edges of each blade. The vortex propeller noise forms a continuous sound spectrum, it has been found, in the middle range of frequencies of from 1,000 to 5,000 cycles. Vortex noise is a maximum in the line passing through the axis of the propeller in both directions and a minimum in the plane of rotation of the propeller.

The fundamental rotational noise of a propeller is the most objectionable from the viewpoint of the airplanes, state the Langley Field scientists, for (1) it masks speech readily, and (2) insulation against this low frequency is difficult.

"No great improvement can result," they conclude, "from any scheme of silencing that does not include a reduction in the magnitude of this (rotational noise) component."

The propeller noise studies were made with a variable pitch two-blade aluminum alloy propeller eight and a half feet in diameter. The propeller's pitch angle was adjusted so that it absorbed 100 horsepower from its driving motor at 1,800 revolutions per minute.

The motor and propeller were 235 feet from the nearest obstruction and capable of rotating through 360 degrees so that the noise output at various angles could be obtained with a fixed microphone. Using a special apparatus, the electrical counterpart of the sound waves as generated in the microphone and the amplifying equipment was analyzed by frequency spectral parts and photographic records obtained of any portion desired.

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Grade crossing accidents took 1,554 lives in this country last year.



CHAMPION ROARER

PHYSICS

Stratosphere Balloonists To Seek Sun's Neutrons

NEW FIELDS of research in stratosphere balloon ascensions should include studies to see if neutrons are being shot out by the sun, Lord Rutherford of Nelson, F. R. S., widely known physicist and head of Cavendish Laboratory, Cambridge, told the meeting of the British Association for the Advancement of Science.

In laboratory experiments neutrons, fundamental units of matter out of which atoms are composed, make possible the transmutation of one element into another.

It might be possible to detect neutrons from the sun high in the earth's atmosphere, Lord Rutherford declared, and they should be looked for as high as scientists can reach in manned and unmanned balloons.

If neutrons occur in the sun and the other stars of the universe they should be very effective in causing breaking down and building up processes among the elements by the atomic transformation discovered by Madame Curie-Joliot