Silencing Our Subm

By Doris Kanter

THE blasting of trumpets tumbled the walls of Jericho, but the silence of a submarine may well bring victory underseas in some future atomic war.

With modern electronic devices which can pick up sounds thousands of yards from their underwater origin, a noisy submarine becomes as valuable in combat as a reconnaissance patrol wearing bells. To be effective, a submarine—regardless of size, propulsion or equipment—must operate quietly.

For this reason, engineers in the Wave Mechanics Laboratory at the Naval Engineering Experiment Station in Annapolis are conducting full-scale investigations into why submarines make noises and how they can be hushed. Their investigations have already produced audible results in such potentially deadly noisemakers as a diesel engine and gears meshing in submarine machinery. But there are problems, wave mechanics engineers say, and years of investigative work ahead before anything approaching ideal silence can be achieved.

Every noise which can possibly reach a submarine's hull is analyzed in a laboratory specially designed for noise-reduction tests. Every piece of machinery which contributes to the underwater din is tested for the single purpose of cutting down vibrations.

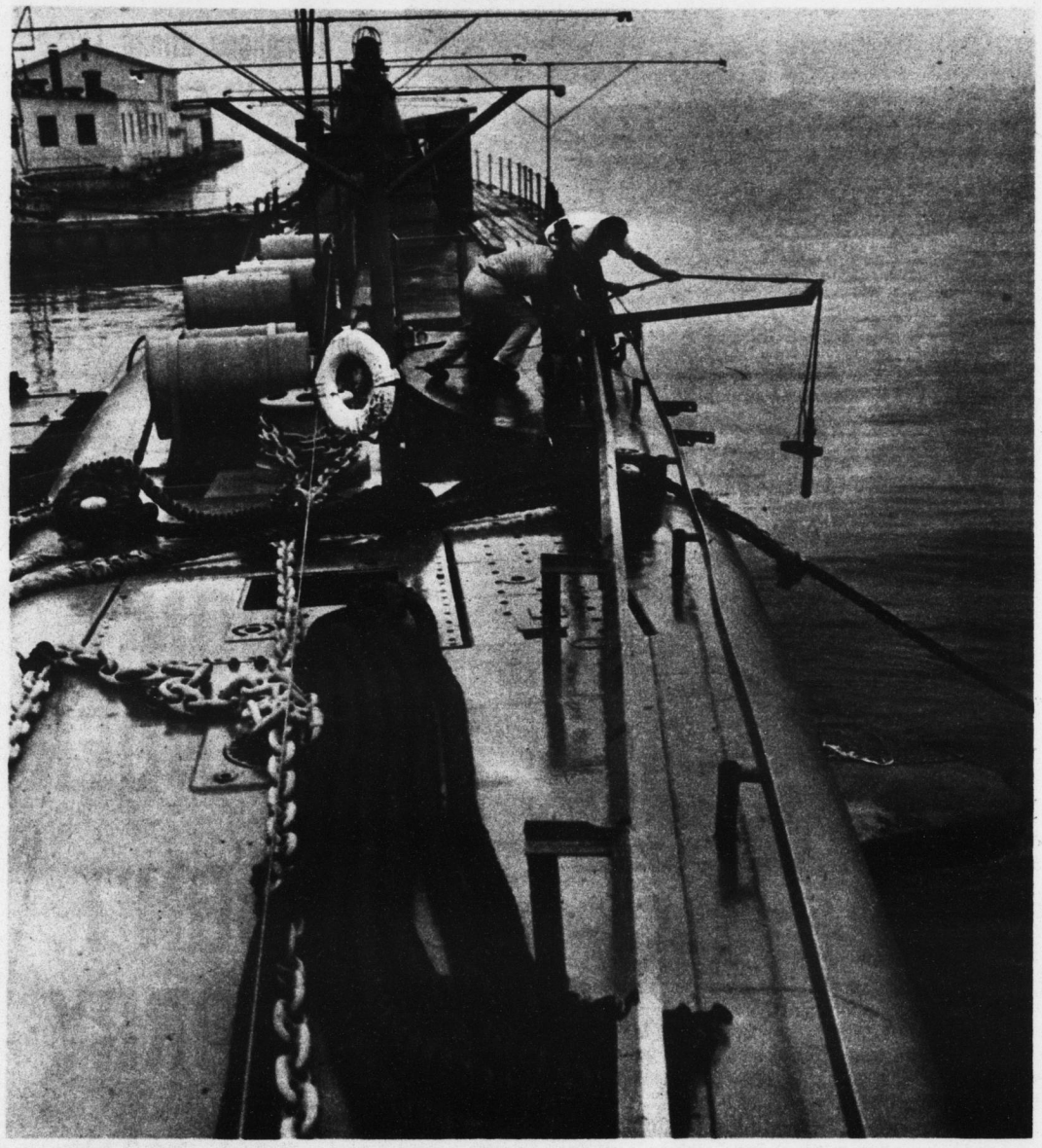
"The genesis of all machinery noise is vibration," says Larry J. Argiro, electronics engineer in the Acoustics Branch of the laboratory. "And, in machinery, our enemy is any vibration which reaches the submarine hull."

The steel skin, he explains, transmits vibrations to the water, a noisy element through which sound can be carried to an enemy over much greater distances than through air.

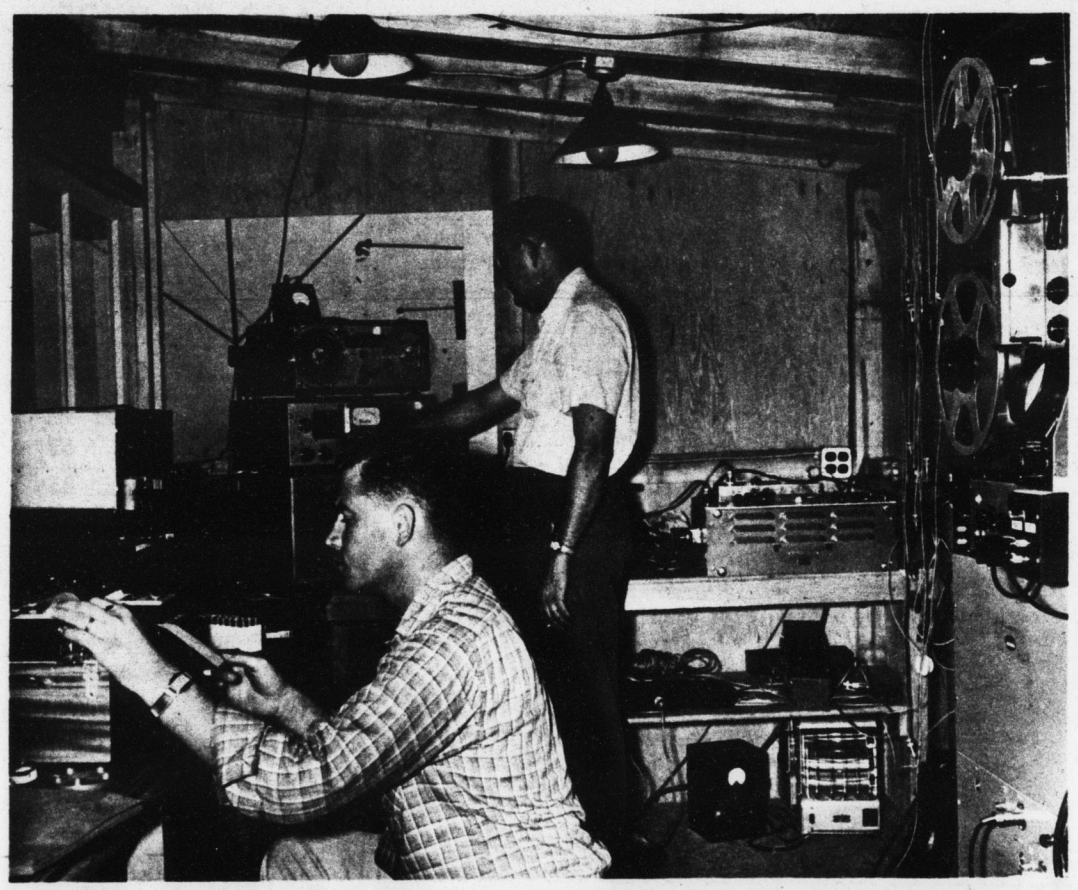
The production of vibrations in a ship's hull is not the engineers' only worry. Vibrations travel—even those of a slamming submarine door can get to the hull and contribute to the sounds an enemy can pick up.

The engineers have two ways of eliminating production and transmission of vibrations. Sometimes, a change in design of machinery parts or housing will muffle the sound. When this doesn't help, they go to work on isolating the noisemaker, either by mounting it so that it will vibrate less or by adding vibration-resistant materials.

To determine the best way to hush a steering unit, an engine or even connecting pipes, engineers have to know how various pieces of equipment behave sound-wise. They can find out by taking a machinery item to an echo-



At anchor in the Severn River, the Navy submarine Turbot is a testing ground for engineers trying to silence noisy machinery. Technicians are lowering a hydrophone alongside to pick up operating sounds.



A temporary shack on the sub's deck houses recording equipment which picks up sound relays from outside and below deck by the hydrophones. The sound technicians are John Donald and Charles Longley.

Pneumatic horns are set up in the experimental silencing room by Dan Morgan (left), engineering aide, and Mr. Grapes as part of a test. The small window in the background is for observation and recording purposes.

Inside the submarine, machinery sounds like Mr. Donald, John Du