ELECTRONICS

Sonar Defeated Subs

The Navy reveals the story of the battle against undersea raiders. Sonar credited with bringing victory against Nazi U-boats.

➤ SCIENTIFIC superiority that developed sonar for accurately locating submerged enemy submarines was credited with bringing victory against Nazi U-boats in World War II as the Navy revealed the story of the battle against undersea raiders.

Sonar, improved during the war by cooperative work in Allied laboratories, was credited for the sinking of a majority of the 996 enemy submarines sent to the bottom during hostilities. The Navy said that 70% of the undersea "kills" were made by British ships and 30% by U. S. vessels.

Termed the only effective method of detecting completely submerged submarines, World War II sonar is a highly developed system for echoing sound waves sent out under the ocean's surface. Submarines were detected by the echoed sound, and the development of echo-ranging permitted ships accurately to locate and track down submerged U-boats.

Before Pearl Harbor, American Navy experts were cooperating with British scientists in combining the U. S. sonar with the best features of British systems. From this cooperative venture came the equipment that turned the tide to victory in the Battle of the Atlantic during the spring and summer of 1943.

The name sonar is derived from the words sound, navigator and ranging, while the British equivalent, asdic, is a holdover from the initials of the Allied Submarine Devices Investigation Committee in World War I.

Installed on ships, sonar includes a retractable projector that is lowered under the keel of a ship to send out sound waves and receive their echoes. The projector is covered by a streamlined dome to eliminate water noises that might interfere with sound reception.

The driver that produces the sound signals is usually located close to the projector, while the receiver-amplifier and indicating equipment are in a "stack" high up on the ship near the bridge.

Key device in the operation of sonar is the transducer in the projector that sends out and receives the "pings" that tell of the presence of submarines.

Asdic used quartz slabs sandwiched between steel disks, while modern sonar's transducer is a series of magneto-striction tubes, three inches long with a diameter of three-eighths of an inch. These tubes, made of a nickel alloy, have coils of wire wound around them to form small electro-magnets. They elongate or contract with changes in their magnetic flux.

Electrical energy from the transmitter moves the tubes, vibrating the diaphragm of the transducer to send out the "pings." When the "pings" are echoed back, they generate an electric current from the tubes that produces a different sound.

This sound varies according to the target that causes the echo, so that Navy sonarmen can distinguish between the signal from the ship's propellers and submarines.

Highly developed direction and range equipment show the distance and bearing of the echoed sound so that submarines could be accurately located for attack.

Enemy torpedoes were also detected by the sonar ears of ships and several cases are recorded of ships that were able to dodge approaching undersea attack by means of rapid maneuvers.

Underwater sounding devices for navigational use were developed as long ago as 1902, and a crude type of sonar was used in World War I with some success. The advances that led to the modern equipment were produced between the wars, but the production of escort vessels and sonar equipment and the training of technicians delayed the anti-submarine campaign.

During the war, previous research and military necessity combined to produce the most effective equipment yet developed to combat submarines.

Science News Letter, April 13, 1946

DEFEATED SUBS—This is a side view of the sonar control console, test installation, with operator tuning equipment. Controls are grouped in an assembly called the Stack, usually located in or near the pilot-house. Official U. S. Navy photograph.

SEISMOLOGY

Earthquake Detectors Can Also Predict Weather

➤ INSTRUMENTS used to detect earthquakes can be used in predicting the weather. Seismographs, which register the tremors traveling through the earth from far-off earthquakes, also register the much smaller shiverings caused by the pounding of heavy storm waves on the shore. These lesser vibrations, called microseisms, also travel through the earth's stony crust, often for long distances.

At the meeting of the American Association for the Advancement of Science, Rev. James B. Macelwane of St. Louis University told how a method was worked out by which the approximate location of a storm center can be located, and its movement traced as it travels off shore. It involves the use of data from three separate seismograph stations, the combined records showing the direction from which the microseisms are coming. Father Macelwane told how such an experimental setup was able to follow the great hurricane of 1938 as it moved northward off the Atlantic coast.

Since the validity of the microseismic method has been established, it is being put to practical use by several cooperating government agencies in locating and tracking hurricane centers in the Caribbean area. Lt. Comdr. M. H. Gilmore, formerly a seismologist with the U. S. Coast and Geodetic Survey, told how three seismological stations, in Florida, Cuba and Puerto Rico, are already "watching the wiggles" for signs of approaching tropical storms.

Science News Letter, April 13, 1946