

SEISMOLOGY-MILITARY SCIENCE

Test Inspection Queried

► THERE IS INCREASING doubt in informed circles that on site inspection is necessary to detect nuclear tests of any size, either underground or in the air.

Recent evidence indicates that ability to detect as well as to distinguish between nuclear explosions and earthquakes is far greater than official statements admit.

The small nuclear bomb exploded underground by the French in the Hoggar Mountains of the Sahara Desert on May 1, 1962, was detected by seismic stations both in the United States and in Great Britain. The blast was weak, estimated in the power range equivalent to 1,000 tons of TNT.

United States military authorities say that the detection is not significant since it probably would not have been identified as a nuclear explosion if it had occurred in an earthquake prone area.

What they do not say is that there is a considerable difference in seismic wave patterns set off by a nuclear explosion and those resulting from an earthquake. There also are a longer series of followup tremors from an earthquake than from a nuclear explosion.

As a result of these differences it may be possible to identify 75% of seismic events as earthquakes, Dr. Dean S. Carder, president of the Seismological Society of America and seismologist with the U.S. Coast and Geodetic Survey, told SCIENCE SERVICE.

In testimony, recently made public, before the Joint Committee on Atomic Energy last July, Dr. Carder also doubted the need to "go into enemy territory to operate a good station. Commenting on certain arrangements of instruments and detection systems for a seismic station to identify nuclear explosions, he said, "two or three stations set

off at a limited distance can view some of these events (nuclear explosions) quite favorably."

There also is evidence that an underwater seismic detection network also would improve detection capabilities. It should be noted that most seismic stations today are set up to identify earthquakes rather than nuclear explosions.

Yet, apparently, the stations are able to identify nuclear blasts with a considerable degree of accuracy. It has been suggested that this accuracy could be greatly enhanced if the stations were modified with equipment designed specifically for nuclear detection.

Project Gnome, the five-kiloton peaceful explosion set off in salt rocks by the U.S. Atomic Energy Commission last December, was detected before the shot was announced by seismic stations in Canada, Sweden and Finland, according to the U.S. Coast and Geodetic Survey.

The shot detection exploded assertions made at the July Congressional hearings by seismic experts from the Department of Defense that for fully decoupled explosions in salt, detecting and locating require a yield greater than 150 to 300 kilotons. This argument had been advanced by those who claimed the Soviets could perform nuclear tests in their underground salt mines and never be detected.

It is now believed that underground detonations in salt are more easily recognized than in other rock formations.

Informed sources believe that new information on detection gathered from the recent underground atomic tests in Nevada indicates the detection capabilities are, indeed, far better than is officially admitted.

• Science News Letter, 81:356 June 9, 1962

GEODESY

Satellites to Map World

► A SYSTEM of space satellites and the most scientifically advanced cameras will measure the many islands and continents early in 1963 with an accuracy undreamed of before.

The first project of the U.S. Coast and Geodetic Survey's program will be to measure the true distance across the United States with an error of less than 33 feet. Using a base line laid out by ground teams from Cape Canaveral to Homestead, Fla., some 200 miles south of the "space capital," trackers will triangulate the distances across the country.

As the system advances, the positions of Hawaii, Alaska and the Aleutian Islands will be precisely located, followed by other areas of the earth, using ground equipment likely located in South America, Africa, Europe, Asia and Australia.

The new method of triangulation is based on optical tracking of Echo-type satellites

from three or more mobile camera tracking stations. The satellites, inflated in space, will be tracked against stars whose positions are accurately known.

The camera shutters are operated simultaneously between stations so the mid-open position can be timed with an accuracy of 1/1000 second.

The Survey has already received its first tracking system, developed under Dr. Hellmut Schmid of the Ballistic Research Laboratories, Aberdeen Proving Ground, Md. The system has been in operation there since February, tracking the Echo I satellite for accurate calibration.

Although the main program is important to the Survey, the development of earth-satellite navigational systems is another objective. The system is easily applied to positioning oceanographic ships in areas where other aids are not available.

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Do You Know?

There is no valid evidence that *vitamin E* is good for heart disease or muscular dystrophy as has been claimed.

Today almost all coal mining and other industrial equipment uses principles of *hydraulics* in its manufacture or operation.

A photoelectric device measures light that passes through the ear lobe, indicating the amount of *oxygen* in the blood.

Only two of the man-made *elements*, neptunium and plutonium, have been found, in extremely minute amounts, in natural ores.

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