to a certain distance by seismographs. For example, the U.S. Pacific tests of 1954 were detected by seismographs in the United States, Australia, Pakistan, Japan, Greece, Sweden, Germany, South Africa, etc. Seismic detection techniques also tell the location and time of the explosion, and can determine the size of an underground explosion.

"As with the acoustic wave, the seismic wave cannot be detected at large distances for sub-nominal tests. For example, the underground Nevada test of September 19, 1957 was not detected in the eastern United States. The U.S. Atomic Energy Commission reported the yield of this test as 1 to 3 kilotons TNT. However, such underground explosions can be detected at distances of 300 miles and the signals can be distinguished from natural earthquakes. [On 11 March 1958 the Atomic Energy Commission confirmed that a small underground atomic explosion in Nevada on 19 September 1957 had been detected on official instruments more than 2000 miles away in Alaska. In a previous announcement the commission had stated that the explosion had not been detected beyond 250 miles.] The initial signal (at distances up to a few hundred miles) of a man-made explosion is a sharp pulse, while the signal from a natural earthquake is of much longer duration. The initial seismic waves from a bomb test are longitudinal and come from a point source, while natural earthquakes initially are predominantly transverse and usually come from a more extended and deeper source.

"For detection of nominal yield bombs at large distances, the acoustic detection appears more sensitive than seismic detection. In the case of deep underground tests one must rely completely on seismic detection since nearly all of the bomb's energy is dissipated underground. A chemical explosion of 0.06 kiloton has been detected by seismograph 240 miles away. . . ."

Electromagnetic radiation. "The high frequency end of the electromagnetic spectrum (x-rays, ultraviolet) is quickly absorbed in the atmosphere and converted to lower frequency electromagnetic energy and molecular energy. Thus an appreciable part of the bomb energy travels in the regions of the electromagnetic spectrum where there is little absorption; namely, as visible light and radio noise.

"Detection of the visible light at distances up to within 300 miles is quite simple. One merely points a photocell at the sky. It doesn't matter whether it is day, night, clear, or cloudy. As long as the test is not deep underground, a very distinctively shaped light pulse will be observed. The same mechanism which gives twilight when the sun (or bomb) is below the horizon will give a glow in the sky due to the nuclear explosion. Because of the large number of photons involved, one can detect light pulses very much smaller in intensity than the steady background intensity. Earth satellites could also be equipped to monitor the electromagnetic radiation emitted by a nuclear explosion. It also appears feasible to detect the light flash of the bomb from the moon. . . .

"The main limitation to electromagnetic radiation detection is the weakness of secondary scatterings. This technique is probably useful up to about 500 miles."

Radioactivity. "According to estimates of United States officials, one should expect that some of the future tests will be '100 percent clean,' and that some current tests have been 96 percent clean. One should keep in mind that '100 percent clean' is a practical impossibility due to neutron-induced activity in the bomb shell and atmosphere. This activity should be equivalent to up to 1 percent fission content, so that if we already have bombs with only 4 percent fission content, there is not much room for improvement.

"Because of the neutron-induced activity, all except the deep underground tests will produce radioactivity which may be detected. For example, the Japanese have detected low-yield Nevada tests by collecting dust from air at sea level.

"Because of the rapid decay, one would expect to obtain maximum sensitivity by collecting dust downstream from the test at high altitudes. The closer to the test, the greater the sensitivity. Collection at high altitudes and within 1000 miles of the test area would require monitor aircraft flying within the Soviet Union, which would require more sacrifice of internal security than fixed ground monitoring stations. Since the fixed monitoring stations at distances of 300 miles give adequate detection, one need not rely on detection of radioactivity. . . ."

Eisenhower on Eniwetok Test

At his news conference on 26 March 1958, President Eisenhower said that the United States will invite foreign scientists, including Russians, to watch a large nuclear explosion at Eniwetok Atoll this summer. One purpose of the explosion will be to demonstrate progress by American scientists in reducing fallout. The President also hinted that in seeking an agreement with the Soviet Union to ban future nuclear tests he might not insist on concurrent suspension of nuclear weapon production. This would represent a change from the Administration's present policy of linking the two items together.

Invitation to watch test. Following are excerpts from the President's comments on the United States invitation to foreign observers:

"In line with what I said to the press on July 3, 1957, the United States will demonstrate the progress our scientists are achieving in reducing radioactive fallout from nuclear explosions.

"To this end, for the first time at any test, we are planning to invite the United Nations to select a group of qualified scientific observers to witness at the Pacific proving ground this summer a large nuclear explosion in which radioactive fallout will be drastically reduced.

"We shall also invite—as we have on occasions in the past—a representative group of United States and foreign news media representatives.

"The United States scientists have been making progress in reducing radioactive fallout from nuclear explosions in the hope and belief that basic advances in both the peaceful and military uses of nuclear energy will thus be achieved. The advantages to mankind of continued progress in this field are obvious.

"The United States has always publicly announced in advance its nuclear testing programs. We trust that the forthcoming tests will provide valuable information to the world."

[At this point the President was asked whether he could specifically say whether observers from Russia and other communist nations would attend the tests.]

"Of course I cannot tell whether they will accept, but we are hopeful that the United Nations will designate the Scientific Committee for Detection, I believe it is, of radioactivity, that's about its name, and on that committee are the U.S.S.R, Czechoslovakia, the United States, the United Kingdom, Canada, and a few others and as a matter of fact Mr. Hagerty can give you also the entire list of nations. [Confers with Mr. Hagerty]. Mr. Hagerty wants me to read the full—the United Nations Scientific Committee on the Effects of Atomic Radiation, that's the name of the committee."

Baghdad Pact Nuclear Training Center

The Baghdad Pact Nuclear Training Center was established in Baghdad, Iraq, in 1956 by the member countries of the Baghdad Pact. W. J. Whitehouse of the Atomic Energy Research Establishment, Harwell, England, was the first director of the center and went there in 1957 with four other members of the Harwell staff. The center was formally opened by