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

King Feisal II on 31 March 1957, when Sir John Cockcroft was elected first chairman of its Scientific Council. H. A. C. McKay of the Chemistry Division at Harwell will succeed Whitehouse in July.

In its early stages the center is concentrating on the practical applications of radioisotopes to the problems of Middle Eastern countries and is organizing intensive short courses in the uses of these materials. Two instructors each from Iraq, Iran, Pakistan, and Turkey were trained at Harwell during 1956, and the United Kingdom also assisted by donating equipment and by providing staff to supervise, teach, and promote the development of the center until local personnel were sufficiently trained to take responsibility.

## Grants, Fellowships, and Awards

*Latin American Awards.* On 1 July the Organization of American States will inaugurate a new fellowship program, recommended by the Inter-American Committee of Presidential Representatives, that will offer grants for advanced study or research to specialists throughout the Western Hemisphere. Qualified persons who are looking for an opportunity to do pure research, improve their professional skill through a postgraduate course, or enroll in an advanced technical course may apply now to the program. The program contemplates approximately 170 fellowships for 1958–59 and a minimum of 500 annually in the future. Grants will be made for periods ranging from 3 months to 2 years, covering such items as travel, registration and tuition fees, study or work materials, and room and board. Inquiries and requests for necessary forms may be obtained from: Technical Secretary, OAS Fellowship Program, Pan American Union, Washington 6, D.C.

*Marine Biology.* The Office of Naval Research and the Rockefeller Institute are jointly sponsoring the position of Jacques Loeb associate in marine biology at the Rockefeller Institute in New York and in its laboratories at the Marine Biological Laboratory, Woods Hole, Mass. Appointment will be for a period of 1 year, beginning on or about 1 September 1958. The purpose is to encourage the interest and increase the competence in marine biology of an outstanding teacher of biology, preferably in a liberal arts college, so that he may in turn, through his teaching, further the interests of his students in this field. An applicant should have a doctor's degree, at least several years of teaching experience, preferably be between 30 and 40 years of age, and be on leave of absence from his college or university. The stipend will be equivalent to his regular salary and employee benefits, with an additional allowance to cover extra costs incurred in moving, additional rent, and so forth. Applications for the position should be addressed to Detlev W. Bronk, President, Rockefeller Institute, New York 21, N.Y.

## Scientists in the News

HERBERT F. YORK, director of the University of California Radiation Laboratory at Livermore, has been named chief scientist of the Defense Department's new space agency. In his new capacity, York will head the Division of Advanced Research Projects of the Institute for Defense Analysis. The institute, formed in 1956, is an association of five universities that provides the Secretary of Defense and the Joint Chiefs of Staff with scientific evaluations of potential weapons systems. EDWARD TELLER succeeds York as director of the Livermore Laboratory.

JOHN BUSHNELL, professor of horticulture at the Ohio Agricultural Experiment Station at Wooster, Ohio, for the past 35 years, has joined the research staff of the Growers Chemical Corporation, Milan, Ohio. He will study the relation of lime and fertilizer solutions to the specific gravity of chip potatoes.

LEON Z. SAUNDERS, former veterinary pathologist for the Brookhaven National Laboratory, has joined Smith, Kline & French Laboratories, Philadelphia, Pa., as supervisor of the newly created pathology and toxicology section. The section will centralize research on the effect, at the cellular level, of new agents in laboratory animals.

WAYNE O. SOUTHWICK, a member of the Johns Hopkins University medical faculty, has been appointed associate professor of orthopedic surgery at the Yale University School of Medicine, effective 1 July.

C. E. JACOB, ground-water consultant and former head of the department of geophysics, University of Utah, has moved his office from Utah to the Los Angeles area (Northridge, Calif.).

WALTER S. McNUTT, formerly assistant professor of biochemistry at Vanderbilt University and at present a senior research fellow at the California Institute of Technology, has been appointed to the staff of the Connecticut Agricultural Experiment Station, New Haven. He will conduct research in the department of soils and climatology on the biochemistry of environmental effects on plants.

Sir MacFARLANE BURNET, director of the Walter and Eliza Hall Institute for Medical Research at Melbourne Hospital, and professor of experimental medicine at the University of Melbourne, is delivering the 14th biennial Flexner Lectures at Vanderbilt University School of Medicine. The first three lectures of the series, which deals with "Clonal Selection as Exemplified in some Medically Significant Topics," were delivered in March. The final three have been scheduled for 7 April, 25 April, and 28 April.

ELLIS ENGLESBERG, bacteriologist with the Long Island Biological Association, Cold Spring Harbor, N.Y., has been appointed full professor in the department of biological sciences at the University of Pittsburgh.

HAROLD F. TANKE, technical staff officer of the Radio Technical Commission for Aeronautics Secretariat, Washington, D.C., for the past 8 years, resigned this position in March. He is returning to duty with the Civil Aeronautics Administration as an electronics engineer in region 4, Airport Station, Los Angeles, Calif.

JOSEPH V. CHARYK, formerly director of the aeronautics laboratory of Aeronutronic Systems, Inc., a subsidiary of Ford Motor Company, has been named director of missile technology. Operations will be carried out at Aeronutronic's headquarters in Glendale, Calif., and in experimental and test facilities under construction in Newport, Calif.

PAUL WEAVER, professor of geology at Texas A & M College, has received the Sidney Powers Memorial Medal of the American Association of Petroleum Geologists in recognition of his outstanding contributions to petroleum geology.

The tenth annual award of the Cornell University Medical College Alumni Association has been presented to PAUL F. RUSSELL of the Rockefeller Foundation "for his outstanding contribution to medicine."

A. STANLEY THOMPSON, nuclear scientist, who was formerly on the staff of General Atomic, a division of the General Dynamics Corporation, has joined the Nuclear Development Corporation of America, White Plains, N.Y., as manager of engineering operations.

*Erratum*: The third sentence of the legend for Fig. 2 of the report, "Blocking by picrotoxin of peripheral inhibition in crayfish," by W. G. Van der Kloot, J. Robbins, and I. M. Cooke [*Science* 127, 521 (7 Mar. 1958)] should have read "The inhibitory nerve was simultaneously stimulated at a rate of 21 stimulations per second (broken line) or at 150 stimulations per second (dotted line)."