tion was less than one-third of the peak amplitude in the first pulse and at 1000 kilometers less than one-fifth. Consequently, it is now estimated that the first motion must exceed the background noise, or natural unrest of the earth, by at least a factor of 3 to 1 instead of the previous estimate of 2 to 1 if the direction of first motion is to be reliably determined.

Summary

The method for distinguishing earthquakes from explosion by direction of first motion is less effective than was previously estimated; the number of earthquakes equivalent to a given kiloton yield is about double the previous estimate. As a result of these two conclusions, the annual number of unidentifiable continental earthquakes equivalent to 5 kilotons or more will be greater than that previously estimated by the Geneva conference of experts by a factor of 10 or more.

Graphs and Recordings Provided

In addition to a report, the following graphs and copies of recordings were transmitted to the United Kingdom and U.S.S.R. delegations:

1) Copies of 36 seismographic recordings made of the three Hardtack II underground explosions.

2) A curve showing the response characteristics of the Benioff seismograph.

3) A table of estimates of Blanca, Logan, and Rainier magnitudes as estimated from various individual station recordings.

4) A curve showing the estimate, prior to and following Hardtack II, of the world's total number of earthquakes per year versus kiloton yield equivalent.

5) A curve showing the amplitude of the longitudinal waves as a function of the distance from the origin and also the amplitude of first motion as a function of the distance from the origin.

6) Curves showing the estimated total annual number of continental earthquakes as a function of kiloton yield equivalent.

Copies of these graphs and recordings are available for study. It is expected that the complete technical information will be made available to scientific journals in the near future.

The members of the panel that produced the conclusions presented were as follows: Carl Romney, U.S. Air Force, chairman; Billy G. Brooks, chief seismologist, The Geotechnical Corporation; Perry Byerly, director of the Seismographic Stations, University of California; Dean S. Carder, chief seismologist, U.S. Coast and Geodetic Survey; Frank Press, director, Seismological Laboratory, California Institute of Technology; Jack Oliver, professor of geophysics, Columbia University; James T. Wilson, chairman, department of geology, University of Michigan; Hans A. Bethe, Cornell University; D. T. Griggs, University of California, Los Angeles; Kenneth Street, University of California Radiation Laboratory; and Carson Mark, Los Alamos Scientific Laboratory.

East-West Scientific Exhibits

The United States and the All-Union Chamber of Commerce of the Soviet Union have reached agreement on the regulations and procedures to govern the exchange of national exhibitions of science, technology, and culture to take place next summer. The agreement, signed on 29 December, confirms earlier exchange agreements worked out in Moscow in October and November and in Washington in December.

The U.S. exhibit will occupy two buildings in Sokolniki Park in Moscow. The Soviet exhibit will be shown on two floors of the Coliseum in New York City for 4 weeks beginning 21 June.

This latest agreement makes the point that the success of the exchange of exhibitions requires "a substantial degree of flexibility and discretion" for each party to determine the scope, nature, and content of its exhibition as well as "a high degree of trust and cooperation." Further, each party may show "such motion pictures . . . as it deems appropriate which would be cultural and nonpolitical in character, devoted to an objective presentation of various aspects of its science, technology, or culture." Explanatory publications relating to the various displays may also be distributed by each party.

Rocket Development at Los Alamos

A method of propelling a rocket by a series of small nuclear explosions is being studied by a group of theoretical physicists and mathematicians at the University of California's Los Alamos (N.M.) Scientific Laboratory. This method was first outlined in 1947 by Stanislaw Ulam, research adviser at the laboratory and codeveloper of the hydrogen bomb. It was later taken up and extended by T. B. Taylor, former staff member at Los Alamos, who is now with General Atomic.

Studies at Los Alamos will determine how effectively blasts from explosions can be directed to get the maximum push on the rocket from given masses of exploding materials. Each explosion would give the rocket an extra push forward. Care has to be taken to avoid subjecting the rocket structure to excessively high pressures and temperatures, but Ulam believes this method might give several times more push for each pound of propellant than the reactor method.

If studies are successful, they will point the way to a possible method of propelling space ships through the solar system. In development of this concept, the laboratory will share ideas and information with the group at General Atomic, which has a contract to consider the possible structure and operation of such a space ship.

Science Information Council

The National Science Foundation has announced the appointment of scientists, leaders in the field of scientific documentation, and representatives of the public to the newly constituted 19-member Science Information Council. These members will serve with four ex-officio members as consultants to the foundation's Science Information Service, which was established in December [*Science* **128**, 1616 (26 Dec. 1958)].

The council will provide the Science Information Service with a broad range of technical skills and experience on problems in the dissemination of scientific information and the communication needs of scientists. The Science Information Service was set up to make scientific literature in all languages more readily available in order to shorten the time spent by scientists and engineers in searching for needed information. The service also seeks to bring about effective coordination of the various scientific information activities within the Federal Government and to improve cooperation between government and private scientific information programs.

Council members are as follows: William O. Baker, vice president of Bell Telephone Laboratories, Inc.; Graham P. DuShane, editor of *Science*; John M. Fogg, director of the Morris Arboretum, University of Pennsylvania; Elmer Hutchisson, director of the American Institute of Physics; Merritt L. Kastens, assistant director of the Stanford Research Institute; H. W. Russell, technical director of Battelle Memorial Institute; Verner W. Clapp, president of the Council on Library Resources, Inc.; E. J. Crane of Chemical Abstracts, Ohio State University; W. T. Knox, director of the Technical Information Division of Esso Research and Engineering; William N. Locke, head of the department of modern languages and director of libraries at Massachusetts Institute of Technology; John W. Mauchly, director of the Univac Applications Research Center of the Remington Rand Univac Division, Sperry Rand Corporation; Donald R. Swanson of the Information Systems Division, Ramo-Wooldridge Corporation; Curtis G. Benjamin, president of McGraw-Hill Book Company, Inc.; Boyd Campbell, president of the Mississippi School Supply Company; John S. Millis, president of Western Reserve University; L. Quincy Mumford, the Librarian of Congress, Congress (ex-officio); Frank B. Rogers, director of the National Library of Medicine; Foster E. Mohrhardt, director of the library, U.S. Department of Agriculture (ex-officio); Burton W. Adkinson, head of the Science Information Service (ex-officio).

International Yard and Pound

Agreement has been reached between the national standards laboratories in British Commonwealth countries and the United States on international values for the yard and the pound, fundamental units in the British system of weights and measures. The following joint announcement was issued on 1 January.

"The directors of the following standards laboratories—Applied Physics Division, National Research Council, Ottawa, Canada; Dominion Physical Laboratory, Lower Hutt, New Zealand; National Bureau of Standards, Washington, United States; National Physical Laboratory, Teddington, United Kingdom; National Physical Research Laboratory, Pretoria, South Africa; National Standards Laboratory, Sydney, Australia—have discussed the existing differences between the values assigned to the yard and to the pound in different countries. To secure identical values for each of these units in precise measurements for science and technology, it has been agreed to adopt an international yard and an international pound having the following definition: the international yard equals 0.9144 metre; the international pound equals 0.45359237 kilogramme.

"It has also been agreed that, unless otherwise required, all nonmetric calibrations carried out by the above laboratories for science and technology on and after July 1, 1959, will be made in terms of the international units as defined above or their multiples or submultiples."

The international inch, derived from the international yard, is exactly equal to 25.4 millimeters. This value for the inch has been legally adopted by Canada. In addition, this value was approved by the American Standards Association for inch-millimeter conversion for industrial use in 1933 (ASA Standard B48.1-1933), was adopted by the National Advisory Committee for Aeronautics in 1952, and has been adopted by many standardizing organizations in other countries.

At present, for the calibration of line standards and end gages having nominal lengths expressed in inches, the National Bureau of Standards is using the inch defined by the Mendenhall order [T. C. Mendenhall, "Fundamental standards of length and mass," *U.S. Coast and Geodetic Survey Bull. No. 26* (1893)]. The values corresponding to this order are approximately

1 yd = 0.91440183 meter
1 in. = 25.4000508 millimeters

These are derived from the exact relation

1 yd = (3600/3937) meter

The inch used by the National Physical Laboratory of the United Kingdom for its calibrations is defined by the equation

1 in. = 25.399956 millimeters

It will be noted that the international inch is approximately 2 parts per million shorter than the inch presently used by the National Bureau of Standards and somewhat less than 2 parts per million longer than the inch now used by the National Physical Laboratory. To avoid possible confusion, during the transition period, National Bureau of Standards calibrations of length or mass expressed in English units will embody a statement indicating clearly the unit which has been used if the choice introduces a significant difference in the calibration values. Furthermore, if the accuracy of the calibration is such that the certified values would be the same in either international units or the older units, the qualifying adjective *International* will not be used—that is, the values will be expressed, for example, as so many inches or pounds.

The Coast and Geodetic Survey has requested the following exception, with which the National Bureau of Standards concurs.

"Any data expressed in feet, derived from and published as a result of geodetic surveys, shall tacitly bear the relationship: 1 foot equals (1200/3927) international meter. This relationship shall continue in being, for the purpose given herein, until such a time as it becomes desirable and expedient to readjust the basic geodetic survey networks in the United States, after which the ratio, as implied by the international yard, shall apply." This unit shall be referred to as the American Survey Foot. Inasmuch as there is little or no interchange of survey data, where the foot measurements are used, with industrial and scientific data, where the international units will be used, it is anticipated that no confusion will result from this dual usage. For example, base line surveys which might enter into a velocity of light determination would invariably be made in terms of meters.

The values of the pounds currently in use in the United States, United Kingdom, and Canada are as follows:

1 U.S. pound =	0.4535924277	kilogram
1 British pound =	0.453592338	kilogram
1 Canadian pound =	0.45359243	kilogram
1 International pound =	0.45359237	kilogram

The relative differences in the various pounds are substantially less than those in the yards, but since masses can be measured with greater accuracy than lengths, the differences can be significant. The present British pound is about 1 part in 10 million smaller than the international pound, whereas the U.S. and Canadian pounds are about 1.5 parts in 10 million larger.

The conversion factor for the international pound was selected so as to be exactly divisible by 7 to give the following value for the grain:

1 International grain = 0.06479891 gram

The grain is the common unit in avoirdupois, apothecary, and troy pounds. There are 7000 grains in the avoirdupois pound, and 5760 grains in both the apothecary and troy pounds.

The standard U.S. gallon and the Imperial gallon are so substantially different that a compromise international gallon was not practicable. The U.S. gallon is defined as equal to 231 cubic inches. On the other hand, the Imperial gallon is defined as the volume of 10 pounds of water under specified standard conditions. A fairly exact relationship is

1 Imperial gallon = 1.20094 U.S. gallons

Science in 1958

Year-end editorials have included a number on the significance of 1958 in the history of scientific development. The 4 January *New York Times* published the following.

The year 1958 "will go down as one of extraordinary scientific advance. The reason is that it saw the completion of the International Geophysical Year. . . . In this enterprise the U.S. and Russia sent satellites aloft with instruments to record space data. In addition, 30,000 scientists from sixty-six countries, manning more than 4,000 observation stations, amassed new knowledge of the earth, its crust, its oceans, its magnetic field, its belts of radiation, and the sun and space beyond.

"The satellite programs had military significance as part of the race for supremacy in missiles and space exploration. As 1958 began, the United States labored under the psychological burden of Russia's head start. Then came suc-