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## 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 sub-multiples."

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

$$\begin{aligned} 1 \text{ yd} &= 0.91440183 \text{ meter} \\ 1 \text{ in.} &= 25.4000508 \text{ millimeters} \end{aligned}$$

These are derived from the exact relation

$$1 \text{ yd} = (3600/3937) \text{ meter}$$

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

$$1 \text{ in.} = 25.399956 \text{ millimeters}$$

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:

$$\begin{aligned} 1 \text{ U.S. pound} &= 0.4535924277 \text{ kilogram} \\ 1 \text{ British pound} &= 0.453592338 \text{ kilogram} \\ 1 \text{ Canadian pound} &= 0.45359243 \text{ kilogram} \\ 1 \text{ International pound} &= 0.45359237 \text{ kilogram} \end{aligned}$$

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:

$$1 \text{ International grain} = 0.06479891 \text{ gram}$$

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

$$1 \text{ Imperial gallon} = 1.20094 \text{ U.S. gallons}$$

## 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-

cesses. Three small United States satellites went into orbit. In May the Russians far overmatched them with the ton-and-a-half Sputnik III. But the United States followed with "lunar probes" that reached a quarter of the distance to the moon, and the first successful flight of an Atlas Intercontinental Ballistic Missile at full range of more than 6000 miles. In December a full Atlas rocket went into orbit—a feat comparable to the Russians' with Sputnik III. That Russia is still ahead, however, is apparent from their successful moon shot on 2 January."

## News Briefs

The Atomic Energy Commission has contracted with the American Municipal Association to assemble and report on the available information relating to the impact of private atomic energy activities on local government. The contract cost of the study, which is to be completed in 6 months, is \$14,860.

In authorizing the study, the commission noted that there has been growing interest and concern on the part of municipalities about the potential impact of private atomic energy activities on local governmental functions, services, and responsibilities, particularly with regard to public health and safety, fire protection, and zoning.

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The National Aeronautics and Space Administration has established an Inventions and Contributions Board to evaluate scientific contributions to aeronautical and space technology. The board will recommend actions which would reward an inventor or contributor, or waive the government's title to inventions made in the performance of work under NASA contract. These decisions will apply to contributions by private citizens as well as NASA and other government employees, and NASA contractors. More than 250 proposals for aeronautical and space technology have been submitted to NASA since the National Aeronautics and Space Act of 1958 was passed last July.

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Levels of strontium-90 in milk increased during September in eight out of ten sampling stations across the country, the Public Health Service reported recently. All samples remained well below the levels currently considered by the National Committee on Radiation Protection and Measurements to be permissible for consumption.

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The second Holloman Summer Lecture Series, sponsored by the Air Force Missile Development Center, will be held 15–26 June in Cloudcroft, N.M. The lec-

turers will be Theodore von Kármán, Karl Pohlhausen, Paul S. Epstein, and Wallace D. Hayes, each widely known for his work in aerodynamics, physics, or applied mathematics. Housing information and other details may be obtained from Dr. J. R. Foote, P.O. Box 1053, Holloman AFB, N.M.

## Grants, Fellowships, and Awards

**Astronautics.** The annual Daniel and Florence Guggenheim Fellowships for graduate study in astronautics, rockets, jet propulsion, and flight structures have been announced by the Daniel and Florence Guggenheim Foundation. From 18 to 20 fellowships will be given for study during 1959–60 at the Daniel and Florence Guggenheim Jet Propulsion Centers at Princeton University and California Institute of Technology and at the Daniel and Florence Guggenheim Institute of Flight Structures at Columbia University. The fellowships, of which six to eight are awarded for advanced study at each center and the institute, provide tuition and a stipend ranging from \$1500 to \$2000, depending on the stage of advancement of the student.

Fellowships are open to science or engineering students who are residents of the United States or Canada, who have outstanding technical ability and leadership qualities, and who intend to make a career in rockets, jet propulsion, flight structures, or astronautics. Applicants must file their credentials with the university selected by 1 March. Successful candidates will be notified by 1 April.

**Biochemistry.** The \$1000 McCollum Award for Sustained Research in Biochemistry, made possible through the generosity of friends of Elmer V. McCollum, is to be awarded by the American Society of Biological Chemists at the spring meeting in Atlantic City, N.J. The award will be made to an investigator in this country who has continued to make significant experimental studies in biological chemistry after reaching the age of 60. In general, only those studies made since 1950 will be reviewed. Nominating letters and pertinent material must be sent before 1 March to Roger M. Herriott, 615 N. Wolfe St., Baltimore 5, Md.

**Industrial Hygiene.** Applications are invited for the Atomic Energy Commission's Special Fellowships in Industrial Hygiene, which lead to the master's degree in the subject. These fellowships are open to college graduates who hold bachelor's degrees in physics, chemistry, or engineering, and who are acceptable for graduate work at one of three universities to which they may be assigned. Fellows must also be under 35 years of

age and citizens of the United States.

Basic stipend for industrial hygiene fellows is \$2500 for the academic year, plus \$350 for a spouse and \$350 for each dependent child. Normal tuition and fees will be paid, as will a limited travel allowance. Applicants who have one or more years' graduate work or industrial experience in a related field may be eligible for an additional \$200 in the basic stipend. Fellowship appointees study at Harvard University, the University of Cincinnati, or the University of Pittsburgh and, whenever possible, the applicant's choice of university will be adhered to. Applications, which must be returned by 1 March, are available from Dr. L. K. Akers, Industrial Hygiene Fellowship Office, Oak Ridge Institute of Nuclear Studies, P. O. Box 117, Oak Ridge, Tenn.

**Therapy.** Each year the American Therapeutic Society presents the Oscar B. Hunter Memorial Award in honor of its late secretary, Oscar B. Hunter. The award is made in recognition of an outstanding contribution, or series of contributions, to therapy by an individual or a team of workers. One object in making the award is to bring recognition to those who have not received distinguished awards for their work. The term "therapy" is used in a broad sense to include the use of any drugs, procedure, or device of benefit in the treatment of patients.

The award consists of a bronze medal struck in the likeness of Dr. Hunter, mounted on a plaque, and engraved with the name of the recipient. The winner will be expected to deliver a paper that describes the award-winning work at the time of the presentation of the award. Travel expenses to the presentation will be furnished. Nomination letters, accompanied by a curriculum vitae of the candidate and a list of his publications, should be sent before 1 March to Dr. Harry E. Ungerleider, 393 7th Ave., New York 1, N.Y.

## Scientists in the News

The National Science Foundation has announced the appointment of JAMES S. BETHEL as head of the Special Projects in Science Education Section, and ARTHUR S. ROE as head of the Course-Content Improvement Section. Both positions are in the Division of Scientific Personnel and Education.

Bethel is succeeding WALTER J. PETERSON, who will return to North Carolina State College as dean of the Graduate School. Bethel, on leave from North Carolina State, has held positions there of professor of wood technology, head of the wood products department, and acting dean of the Graduate School.