USE OF THE TERM "CELSIUS" INSTEAD OF "CENTIGRADE"

and Other Notes on the International Temperature Scale of 1948

The name "Celsius" will be used to designate the centigrade degree of temperature in official communications, publications, manuals, records, forms, etc., published by the U. S. Weather Bureau after January 1, 1953. Adoption of the term "Celsius" in place of "centigrade" should cause little confusion to the layman since most weather reports that reach the public express and will continue to express temperature in Fahrenheit degrees. In those phases of Weather Bureau work where the centigrade scale is used, no difficulty in making the changeover is anticipated, for the degree unit usually will be abbreviated by using the symbol °C. Thus the symbol for degree Celsius is the same as that previously used for degree centigrade. However, to avoid any possible confusion when the term is spelled out, it will appear as "degree Celsius (centigrade)" in all official material printed during a transition period from January 1 to December 31, 1953.

Use of the term "Celsius" conforms with the official decision of the Ninth General Conference on Weights and Measures in 1948 [1] and is desirable in the Weather Bureau for the sake of uniformity in view of the international connections of meteorology. The term has been widely accepted since its recommendation by this international authority on weights and measures and is now found in the publications of many scientific agencies, including the World Meteorological Organization and the International Civil Aviation Organization. In the United States, the National Bureau of Standards has recommended using the term "Celsius" [2].

The Conference made its decision to resolve a question in language that was posed by the trilogy of terms, centigrade, centesimal, and Celsius, by which the same temperature scale was known in different countries. In favor of the selection of the term Celsius, besides its general use in Scandinavia, Germany, and some other countries for many years, was the appropriateness of naming the centigrade scale in honor of a person who had advanced the science of thermometry, just as other scales recognize the contributions of Fahrenheit, Reaumur, Kelvin, and Rankine.[1] Anders Celsius, professor of astronomy at Uppsala, in 1742 proposed [3] a thermometric scale with 100° at the melting point of ice and 0° at the boiling point of water [4]. While the modern centigrade scale, on which these values are reversed, has been credited to Christin of Lyons (c. f. [5]) and to Linnaeus (c. f. [6]) (the latter a contemporary of Celsius at Uppsala), Celsius' specification of the fundamental 100-degree interval between boiling and freezing points of water is now accorded international recognition by the Conference's decision to name the scale "Celsius".

It seems appropriate in this announcement of the Weather Bureau's use of the term "Celsius" also to call readers' attention to the specifications of the International Temperature Scale of 1948 that was approved by the Ninth General Conference on Weights and Measures [1]. The Scale of 1948 is designed to conform as nearly as practicable to the thermodynamic temperature scale (Kelvin scale [7]) while incorporating refinements to make the scale more uniform and reproducible than its predecessor, the International Temperature Scale adopted in 1927.[2] Among the specifications are six primary and fundamental fixed points selected for their reproducibility. The assigned numerical values and the definitions of these fixed points are shown in table 1. The last decimal place given for each value represents the degree of reproducibility of that point. Although the two fundamental fixed points of the Celsius scale remain the ice point (0° C.) and the steam point (100° C.), a resolution adopted by the Conference defines the zero of the thermodynamic Celsius (centigrade) scale as being the temperature 0.0100 degree below that of the triple point of pure water. This definition was adopted because the triple point of water, with present-day techniques, can be determined more precisely than the "melting point of ice." While the International Temperature Scale of 1948 does not have a value of the ice point specified on the Kelvin scale agreed upon by all

[1] See footnote 3 on p. 245.

[2] The differences between the 1948 and 1927 Scales have been discussed by Corruccini [8].

TABLE 1.—*Fundamental and primary fixed points under the standard pressure* of 1,013,250 dynes/cm.*[2] *(After Stimson [12])*

Fixed point	Equilibrium temperature	Assigned value ° C.
Oxygen point	Temperature of equilibrium between liquid oxygen and its vapor.	−182.970
Ice point (fundamental fixed point).	Temperature of equilibrium between ice and air saturated water.	0
Steam point (fundamental fixed point).	Temperature of equilibrium between liquid water and its vapor.	100
Sulfur point	Temperature of equilibrium between liquid sulfur and its vapor.	444.600
Silver point	Temperature of equilibrium between solid and liquid silver.	960.8
Gold point	Temperature of equilibrium between solid and liquid gold.	1063.0

*It is of interest to note that the standard pressure (one atmosphere) is now defined in absolute terms, 1,013,250 dynes/cm^2 (=1013.250 mb.), rather than in millimeters of mercury under specified purity, and temperature or density, and gravity as in the 1927 definition.

nations, it may be noted that the Conference considered 273.15°. This was not ratified and the United States representative pointed out that 273.16° K. was widely used in United States literature (see Birge [9]). Subsequently, the International Meteorological Organization adopted 273.16° as the ice point on the Kelvin scale [3] at its meeting of 1947 [10].

Other specifications of the International Temperature Scale of 1948 describe the means for interpolating temperatures on the scale. For a concise account of this and related topics on the present status of the International Temperature Scale readers may refer to an article by Stimson [2]. The technical details concerning the fixed and reproducible equilibrium temperatures and the specified interpolation formulas relating temperature to the indications of specified measuring instruments are given in the official text of the International Temperature Scale of 1948 [11], an English translation of which has been presented by Stimson [12]. An interesting description of the work of the National Bureau of Standards in maintaining the International Temperature Scale and in calibrating standard temperature-measuring instruments has been given recently by Wilson [13].

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[3] Readers not familiar with the relationships among degrees on the Kelvin, Rankine, Celsius, Fahrenheit, Reaumur, and approximate absolute scales are referred to p. 17 of *Smithsonian Meteorological Tables*, 6th Revised Edition, Washington, 1951.