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Sources of Four Temperature Scales

There are many areas where temperature is measured, or where it plays a role in a process to determine the state of the material. For example, in this world we monitor the temperature outside, the temperature of ourselves, or the temperature of fluids inside our cars. Just as the reasons for measuring temperature vary, so do the units in which we measure it. The purpose of this paper will be to discuss the creators of four temperature scales. The four temperature scales that will be explored in this paper are Fahrenheit, Celsius, Kelvin, and Rankine as named after their sources.

The first temperature scale that will be examined is the Fahrenheit scale. This relative scale was brought about by Daniel Gabriel Fahrenheit. Fahrenheit was a German physicist who resided, and did most of his studies in the Netherlands. According to the New World Encyclopedia, there are a few stories on how Fahrenheit came up with the temperature scale. The most commonly story is that between 1708 and 1709 he “adopted Romer’s scale (in which water freezes at 7.5 degrees) and multiplied each value by four to eliminate the fractions” (Fahrenheit). After multiplying the Romer’s scale by four this gave him values of 30 and 240 degrees, which were interpreted as the freezing and boiling points of water. Using 96 degrees for the human body temperature, he then changed the scaling to represent the temperatures between melting ice and body temperature. He adjusted the temperature for ice melting to be 32 degrees so that there were 64 degrees separating the two. However, “Some time after his death, it was decided to recalibrate the scale with 32 °F and 212 °F as the exact melting and boiling points of plain water” (Fahrenheit). This re-calibration also made it easier to convert from Fahrenheit and Celsius. Fahrenheit was used widely by most English-speaking people up until 1960 when governments had started to use the Celsius temperature scale.

Next, the Celsius temperature scale was created in 1742 by Anders Celsius. He created a backwards Scale to measure temperature, meaning that the temperature for boiling water was zero degrees Celsius and the point of melting ice was 100 degrees Celsius. In 1744 after Anders had died, Carlos Linneaus then reversed “Celsius’s scale upon receipt of his first thermometer featuring a scale where zero represented the melting point of ice and 100 represented water’s boiling point” (Celsius). Over the next 204 years this temperature scale was referred to as the centigrade scale in the scientific communities. Since centigrade was used in the French-language for an angular measurement, and there needed to not be confusion when talking about degrees centigrade, “The 9th CGPM (Conférence générale des poids et mesures) and the CIPM (Comité international des poids et mesures) formally adopted degree Celsius in 1948” (Celsius). The Celsius scale is set up to where zero degrees Celsius is equivalent to 32 degrees Fahrenheit and 273.15K. As shown in the plot below the temperature differences between Celsius temperature scale and the Kelvin temperature scale.

The third temperature scale is the Kelvin scale. In 1848 William Thomson, also known as Lord Kelvin, wanted to create a scale where there was an absolute zero. Meaning that there could be absolutely nothing that could colder than zero. This scale is derived from the Celsius scale. "Thomson calculated that absolute zero was equivalent to −273 °C on the air–thermometers of the time. This absolute scale is known today as the Kelvin thermodynamic temperature scale” (Kelvin). It was later established that zero Kelvin was actually equal to -273.15 °C. This scale is usually used when talking about the color temperature of light sources.

The last temperature scale is called Rankine. William John Macquorn Rankine was a Scottish engineer who is most known for his works on the steam engines, shipbuilding, and machines. “He did much for the new science of thermodynamics and the theories of elasticity and of waves. The thermodynamic cycle for the analysis of the maximum efficiency of a heat-engine or heat pump using condensable vapour as working fluid is still called the Rankine Cycle” (Scottish Engineering). The units of Rankine are equivalent to the units of measurement of the Fahrenheit scale and is a scale that is used to get a better reference for an absolute zero temperature. Whereby on this scale absolute zero Rankine equals -459.67 °F.

In conclusion, there are different temperature scales that are used for different reasons. Some are used for ease of use and practicality. Others are used because it makes sense in the scientific applications of the world where we need an absolute zero. No matter the reasoning needed to determine a temperature, there are various scales available to assist in finding out how hot or cold an item may be.

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