Source: http://home.comcast.net/~igpl/Temperature.html

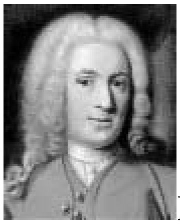
# A Brief History of Temperature Measurement

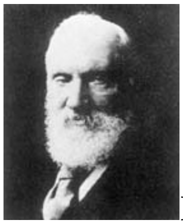
In 1701, Ole Christensen Rømer (1644-1710) created one of the first practical thermometers. Rømer's thermometer used red wine as the temperature indicator. Rømer created a temperature scale for his thermometer with 0 representing the temperature of a salt and ice mixture (at about 259 K), 7½ representing the freezing point of water (273.15 K), and 60 representing the boiling point of water (373.15 K). (In 1676, Rømer became the first scientist to measure the speed of light.)

Daniel Gabriel Fahrenheit (1686-1736) devoted most of his life to creating precision meteorological instruments. Fahrenheit invented the mercury thermometer in 1714, and later discovered the effect of pressure on the boiling point of liquids.

Fahrenheit sought to create a practical temperature scale in which 0 corresponded with the coldest temperature normally encountered in Western Europe and 100 corresponded to the hottest temperature. Fahrenheit initially created a temperature scale in which 0 represented the temperature of a salt and ice mixture (at about 255 K), 30 represented the freezing point of water (273.15 K), and 90 representing the mean human body temperature (about 310 K). Fahrenheit later adjusted his temperature scale so that 32 represented the freezing point of water and 212 represented the boiling point of water (373.15 K). The Fahrenheit temperature scale is still used today in the United States and other backward places.

In 1742, Anders Celsius (1701-1744) created an **inverted** centigrade temperature scale in which 0 represented the boiling point of water (373.15 K) and 100 represented the freezing point (273.15 K).

In 1744, Carl Linnaeus (1707-1778) suggested reversing the temperature scale of Anders Celsius so that 0 represented the freezing point of water (273.15 K) and 100 represented the boiling point (373.15 K). The centigrade relative temperature scale gradually became popular throughout the world. The units of the centigrade temperature scale were designated "degree centigrade" (symbol °C).

In 1848, William Thomson (1824-1907) proposed a thermodynamic temperature scale which assigned 0 to thermodynamic absolute zero and used the degree centigrade as its base unit. This absolute scale was later named the Kelvin thermodynamic temperature scale (after Thomson's peer title) and its unit designated degree Kelvin (symbol °K).

In 1859, William John Macquorn Rankine (1820-1872) proposed another thermodynamic temperature scale which also assigned 0 to thermodynamic absolute zero, but used the degree Fahrenheit as its base unit. This absolute scale was later named the Rankine thermodynamic temperature scale and its unit designated degree Rankine (symbol °R).

In 1948, the Ninth General Conference on Weights and Measures changed the name "degree centigrade" to "degree Celsius" (symbol °C) in honor of Anders Celsius.

In 1954, the Tenth General Conference on Weights and Measures selected the degree Kelvin as the metric unit of thermodynamic temperature. The degree Kelvin was named in honor of its creator, Sir William Thomson, Baron Kelvin of Largs, Lord Kelvin of Scotland. The conference defined the degree Kelvin by assigning the exact value 273.16°K to the triple point of water. The triple point of a substance is the thermodynamic singularity at which the gas, liquid, and solid phases may coexist in thermodynamic equilibrium. A triple point is therefore a much more accurate temperature reference than either a freezing point or a boiling point.

In 1967, the Thirteenth General Conference on Weights and Measures changed the name of the thermodynamic temperature unit degree Kelvin (symbol °K) to merely kelvin (symbol K). The conference redefined Celsius temperature as the thermodynamic temperature minus 273.15 kelvin.

The table below compares the values of the Fahrenheit, Celsius, and Kelvin temperature for some common reference temperatures.

| **Temperature Scales** | | | **Significance of Temperature** |
|---|---|---|---|
| **Fahrenheit** | **Celsius** | **Kelvin** | |
| 9,944.45°F | 5,506.92°C | 5,780.07 K | Blackbody temperature of visible surface of Sun |
| 6,169.76°F | 3,409.87°C | 3,683.02 K | Freezing point of tungsten |
| 3,034.26°F | 1,667.92°C | 1,941.07 K | Freezing point of titanium |
| 1,984.32°F | 1,084.62°C | 1,357.77 K | Standard freezing point of copper |
| 1,947.53°F | 1,064.18°C | 1,337.33 K | Standard freezing point of gold |
| 1,763.20°F | 961.78°C | 1,234.93 K | Standard freezing point of silver |
| 1,220.58°F | 660.32°C | 933.47 K | Standard freezing point of aluminum |
| 787.15°F | 419.53°C | 692.68 K | Standard freezing point of zinc |
| 449.47°F | 231.93°C | 505.08 K | Standard freezing point of tin |
| 313.88°F | 156.60°C | 429.75 K | Standard freezing point of indium |
| 212°F.00 | 100°C.00 | 373.15 K | Standard boiling point of water |
| 136°F.00 | 57.78°C | 330.93 K | World record high air temperature |

| Temperature Scales | | | Significance of Temperature |
|---|---|---|---|
| **Fahrenheit** | **Celsius** | **Kelvin** | |
| 98.60°F | 37°C.00 | 310.15 K | Human body temperature reference |
| 85.58°F | 29.76°C | 302.91 K | Standard melting point of gallium |
| 68°F.00 | 20°C.00 | 293.15 K | Room temperature reference |
| 39.15°F | 3.97°C | 277.12 K | Temperature of maximum water density |
| 32.02°F | 0.01°C | 273.16 K | Triple point of water |
| 32°F.00 | 0°C.00 | 273.15 K | Standard freezing point of water |
| 0°F.00 | -17.78°C | 255.37 K | Fahrenheit's zero |
| -37.90°F | -38.83°C | 234.32 K | Triple point of mercury |
| -128.56°F | -89.20°C | 183.95 K | World record low air temperature |
| -308.82°F | -189.34°C | 83.81 K | Triple point of argon |
| -361.82°F | -218.79°C | 54.36 K | Triple point of molecular oxygen |
| -415.47°F | -248.59°C | 24.56 K | Triple point of neon |
| -434.82°F | -259.35°C | 13.80 K | Triple point of molecular hydrogen |
| -459.67°F | -273.15°C | 0 K.00 | Thermodynamic absolute zero |

The formula table below shows the relationships among Fahrenheit, Celsius, and Kelvin temperatures.

| | | |
|---|---|---|
| $\mathbf{t_F}$ | $t_F = (t_C \times 9/5)+32$ | $t_F = (T_K \times 9/5)-459.67$ |
| $t_C = (t_F-32) \times 5/9$ | $\mathbf{t_C}$ | $t_C = T_K-273.15$ |
| $T_K = (t_F+459.67) \times 5/9$ | $T_K = t_C+273.15$ | $\mathbf{T_K}$ |