A Brief History of Thermometry

History: The Thermoscope
- Designed by Galileo (1597)
- Something similar built by Santorio (1612)
- Problem: It responds to changes in pressure.
  - It’s also a barometer!

History: The Galileo Thermometer
- Also termometro lentos
- Ferdinand II built the first Galileo thermometer (1641)
- Each ball has a weight-to-volume ratio such that it will rise or fall in a hydrocarbon fluid as the density of the fluid changes
  - When fluid is less dense, balls will sink
  - When fluid is more dense, balls will rise

History: The Hook Thermometer
- Robert Hook developed an alcohol ("spirit") thermometer with a scale (1664)
- Each "degree" represents 1/500 of the volume of liquid at the freezing point of water (which is zero degrees)
- First intelligible meteorological records use this scale

Fahrenheit Scale (°F)
- 1724:
  - 0° = Temperature of sea salt, ice, and water
  - 30° = Temperature of ice and water
  - 96° = Temperature "obtained if the thermometer is placed in the mouth so as to acquire the heat of a healthy man"
    - Stories differ on the original definition for the scale
  - Boiling point of water = 212°F
  - Freezing point later (i.e., within Fahrenheit’s lifetime) adjusted to 32°F to give ΔT = 180° between freezing and boiling

Réaumer Scale (°Ré, °Re, or °R)
- 1731:
  - An 80-point scale
    - 80°R = boiling point of water
    - 0°R = freezing point of ice
  - Used mercury thermometers
  - Old European data may use °R
  - Why 80°?
    - Can be halved 4 times and still be an integer!
**Rankine Scale (°R or °Ra)**

- 1859:
  - Absolute scale where 1°F = 1°R
  - 0°R = -459.67°F = 0 K

- The Rankine scale is to Fahrenheit as the Kelvin scale is to Celsius!

**Celsius Scale (°C)**

- 1742:
  - 0°C = boiling point of water
  - 100°C = freezing point of water

- 1744:
  - Linnaeus reversed the scale

- 1954:
  - 0.01°C set as the triple point of water
  - 99.9839°C set as the boiling point of water at standard SLP
  - These changes make \( \Delta 1 \text{ K} = \Delta 1 \text{°C} \)

**Kelvin Scale (K)**

- 1954:
  - 0 K = absolute zero
  - 273.16 K = set as the triple point of water
  - 0°C = 273.15 K

**About the Kelvin Scale**

- From the 13th General Conference on Weights and Measures in 1967:
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