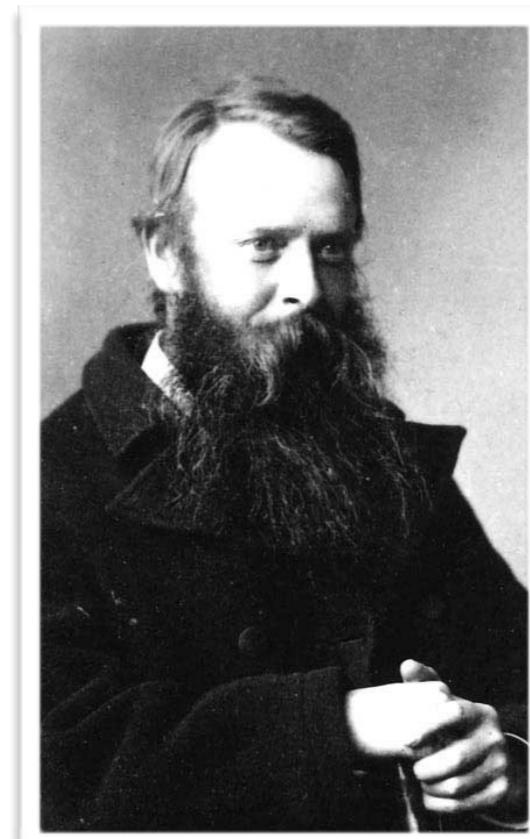


This foolish idea of shooting at the moon is an example of the absurd length to which vicious specialization will carry scientists working in thought-tight compartments. For a projectile entirely to escape the gravitation of earth, it needs a velocity of 7 miles a second. The thermal energy of a gramme at this speed is 15,180 calories... The energy of our most violent explosive - nitroglycerine - is less than 1,500 calories per gramme. Consequently, even had the explosive nothing to carry, it has only one-tenth of the energy necessary to escape the earth... Hence the proposition appears to be basically impossible.

A. W. Bickerton, 1926



Arizona State University
SES 194

Energy in Everyday Life

Temperature Scales:
Ole's and Daniel's

Frank Timmes

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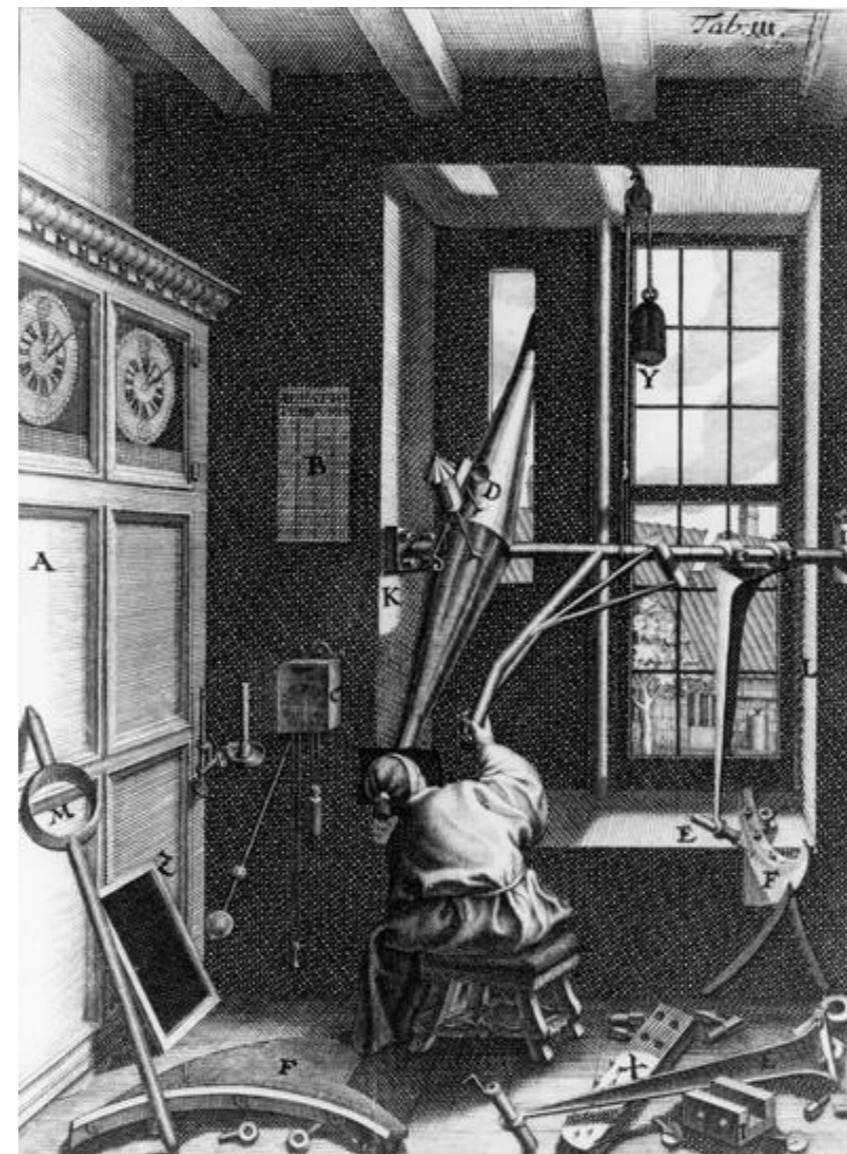
In the USA, most thermometers for everyday use are calibrated in degrees Fahrenheit. Most of the rest of the world measures temperature in degrees Celsius.



At one point during the 18th century, there were nearly 35 different temperature scales in use! Many folks felt the need to devise a temperature scale for widespread acceptance.

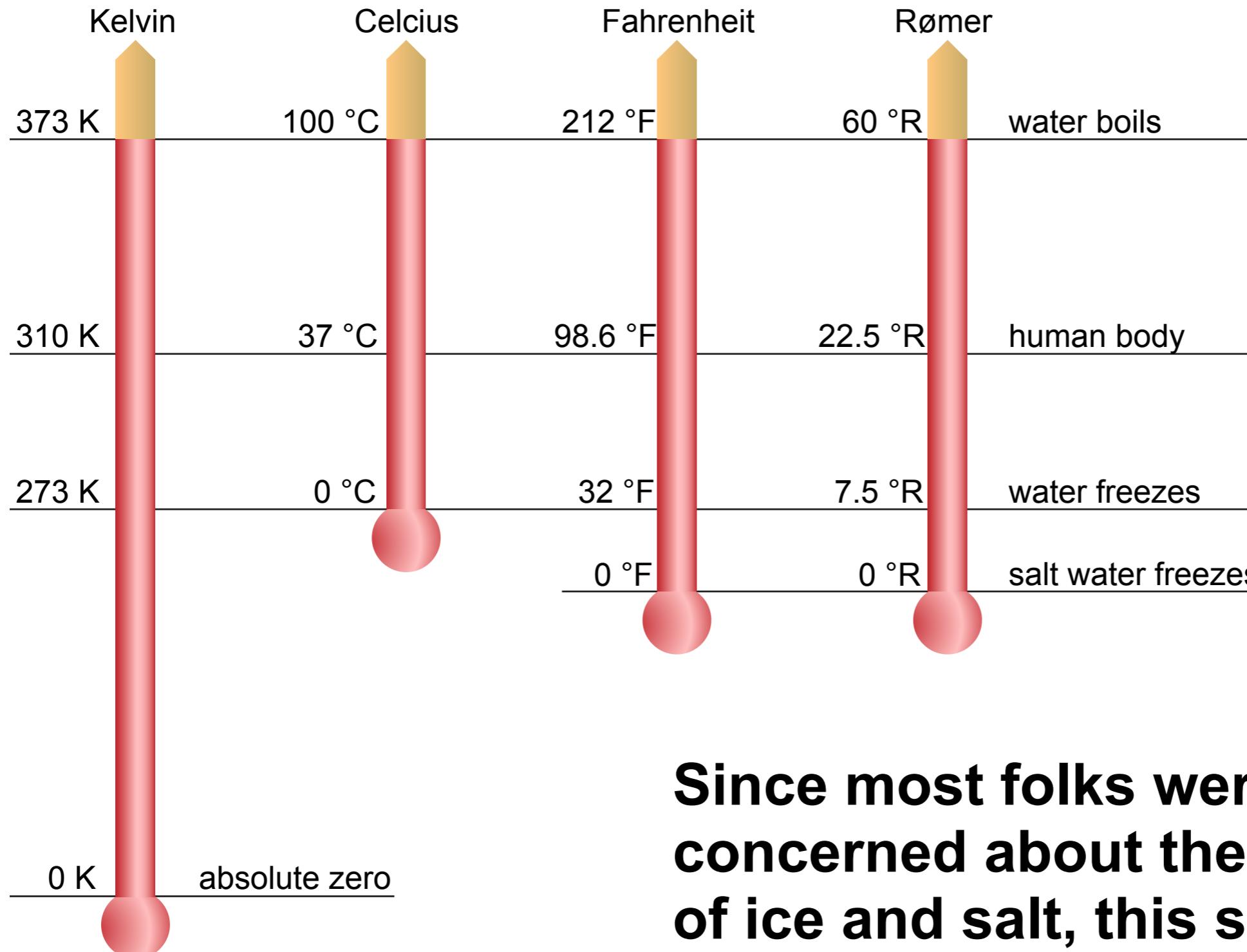
One temperature scale that met with some success was the Rømer scale, first used in 1701.

This scale was invented by Ole Rømer, a Danish astronomer whose other claim to fame was being the first to measure the speed of light in 1676, while convalescing from a broken leg.



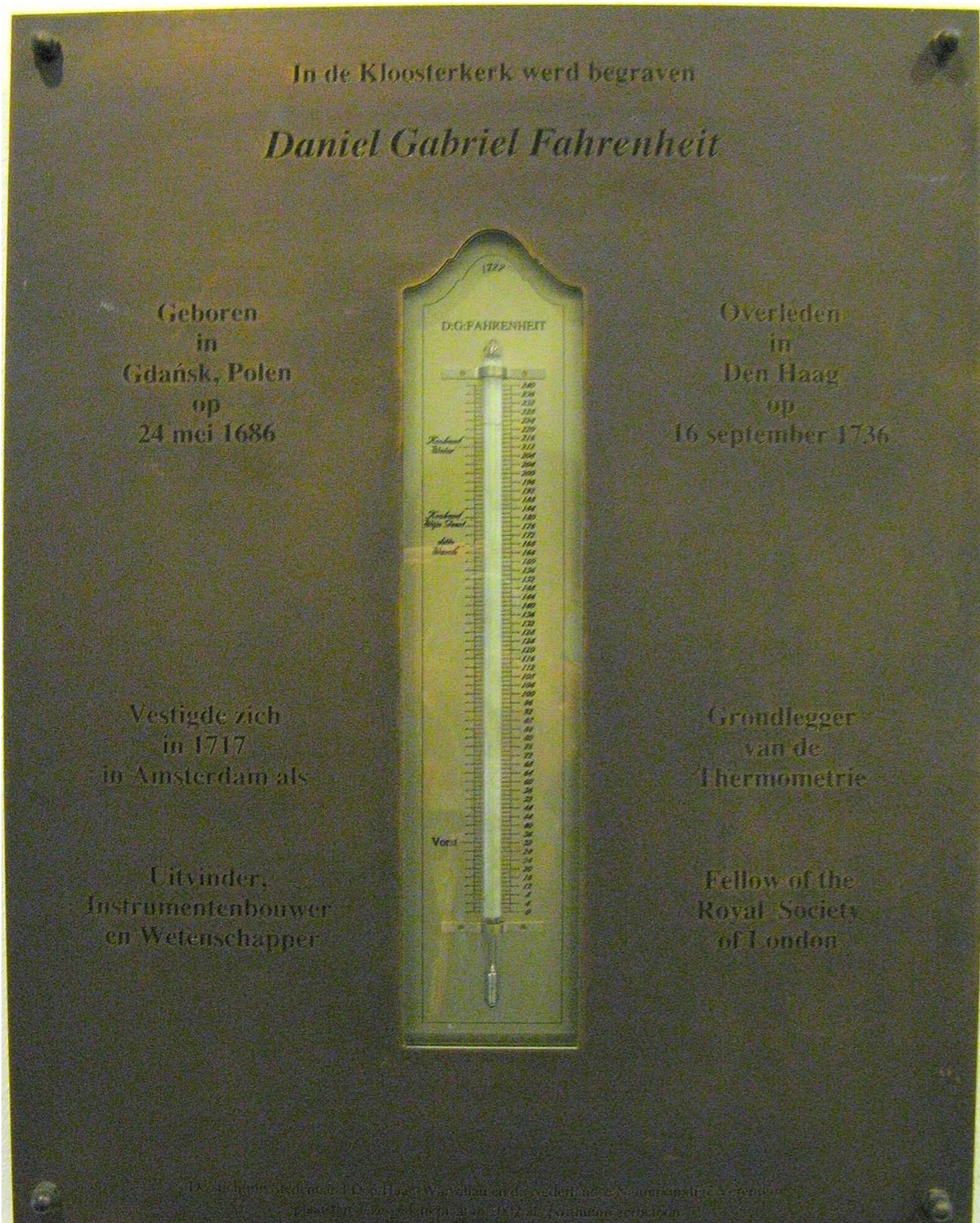
Ole Rømer at work.

His scale set the boiling point of water at 60 °R and the freezing point at 7.5 °R. The lowest temperature you could achieve with a mixture of salt and ice was 0 °R.



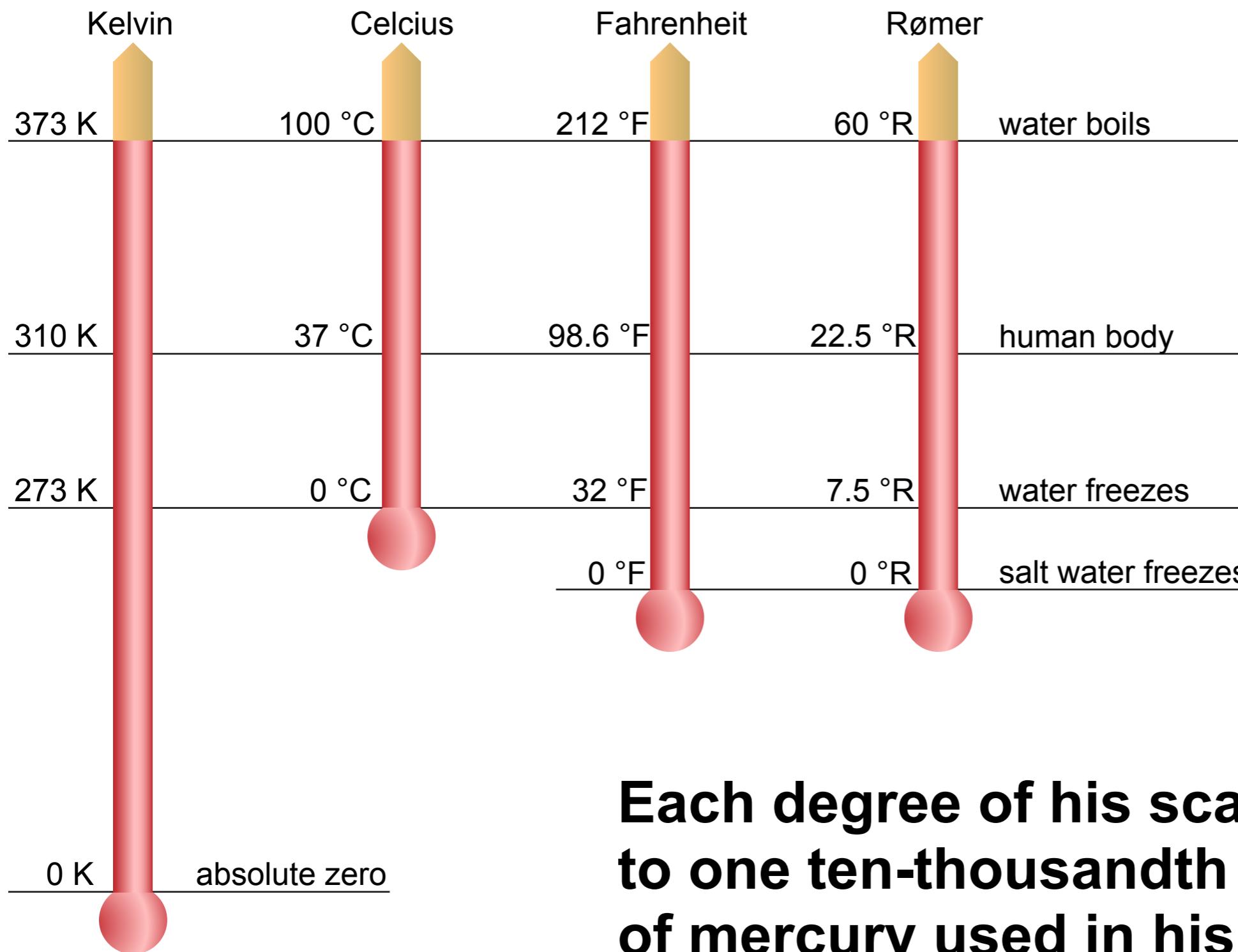
Since most folks were not too concerned about the temperature of ice and salt, this scale was destined for the dustbin of history.

Daniel Fahrenheit visited Rømer while he was recovering from his broken leg and published an alternate scale in 1724.



Like Rømer, he set 0 °F as the lowest temperature that could be achieved with a mixture of salt and water.

Fahrenheit set the freezing point of water at 32° and the body temperature of a person at 96°, which he determined by measuring the temperature under his wife's armpit.



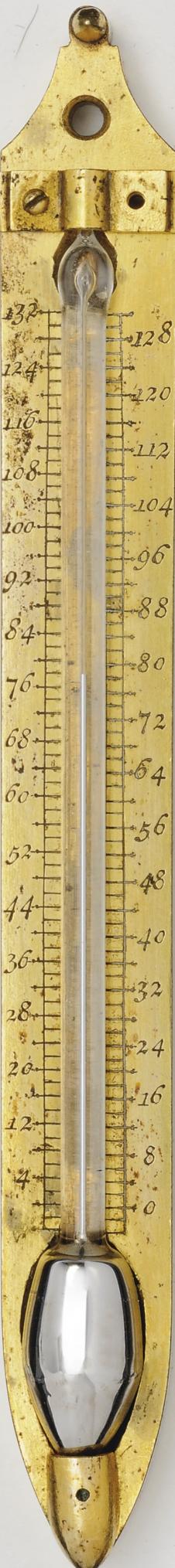
Each degree of his scale corresponded to one ten-thousandth the initial volume of mercury used in his thermometer.

To this day, there is controversy as to how Fahrenheit arrived at his temperature scale.

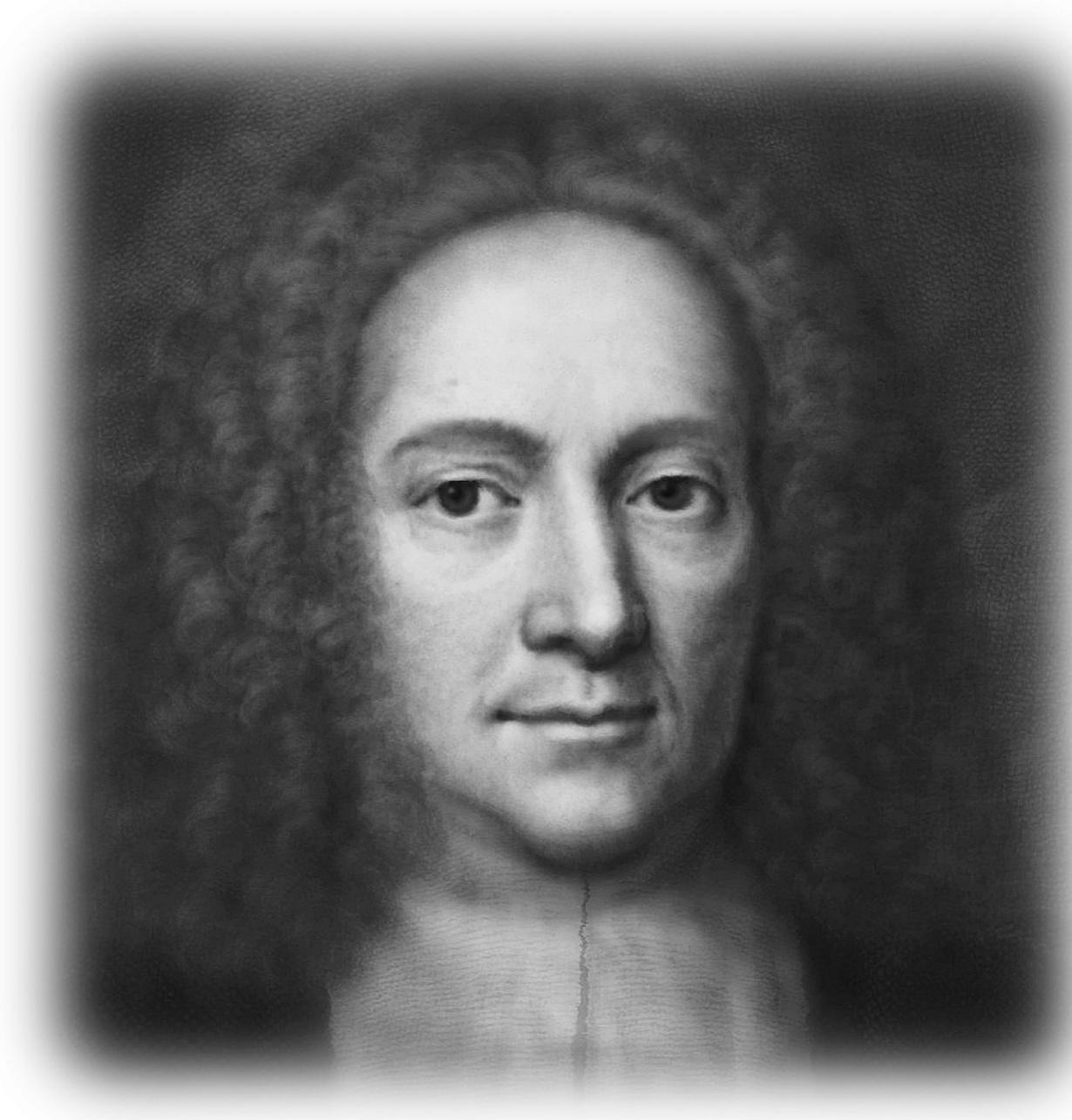
He never revealed how he arrived at the reference points for his thermometer, as he did not want others to construct and sell the thermometers he had spent much of his life perfecting.

Some postulate that placing 180 degrees between the freezing (32 °F) and boiling (212 °F) points of water was not arbitrary as this number represents the number of degrees in half a circle.

**Third original Fahrenheit mercury thermometer.
Sold for \$112,000 in 2012.**



Nevertheless, his scale met widespread acceptance because everyone could relate to it, since 0 °F and 100 °F were the lowest and highest temperatures typically experienced on any type of regular basis in Western Europe.



Daniel Fahrenheit