Anders Celsius early became engaged in the general problem of weights and measures, including temperature measurements. Already as a student he assisted the astronomy professor Erik Burman in meteorology observations. At that time there existed a large variety of thermometers with different scales. Perhaps he already at this stage realized the necessity of a common international scale.

A temperature scale must be based on one or two standard temperatures, called fixed points. For those it was natural to choose temperatures within the temperature domain of practical interest, i.e. from about plus forty to minus twenty in modern Celsius degrees. Thermometers were simply used in meteorology, in horticulture, and sometimes for indoor use. As fixed points one could use the human body temperature or temperatures of local origin such as the observatory cellar in Paris or the highest temperature in sunshine in London. Of course also the freezing and boiling points of water were used, but it was not self-evident that they really were universal and e.g. independent of the geographic latitude.

Anders Celsius should be recognized as the first to perform and publish careful experiments aiming at the definition of an international temperature scale on scientific grounds. In his Swedish paper "Observations of two persistent degrees on a thermometer" he reports on experiments to check that the freezing point is independent of latitude (and also of atmospheric pressure!). He determined the dependence of the boiling of water with atmospheric pressure (in excellent agreement with modern data). He further gave a rule for the determination of the boiling point if the barometric pressure deviates from a certain standard pressure.

The position of the degree zero on a temperature scale has created a lot of discussions. The French Réaumur scale had zero at the freezing point but as regards other scales one placed zero outside the ordinary temperature region, thus avoiding the mixture of positive and negative numbers. The zero could be placed at a low temperature, a method used by the Danish astronomer Ole Rømer and then adopted by Fahrenheit. Celsius was accustomed to the Réaumur thermometer, but he also used a thermometer made by the French astronomer Joseph-Nicolas Delisle with zero at the boiling point, thus creating a reversed scale with increasing numbers for decreasing temperatures, but avoiding negative numbers.

This reversed scale was not as awkward as we think today and it served its purpose. The change to our modern direct scale was inevitable in the long run, however, but there is no sense in trying to give the credit to any single person. Linné has often been named as the inventor with reference to his famous work "Hortus Cliffortianus" of 1737, five years before Celsius' publication. However, in studying Linné's work it is obvious that the few temperatures he mentions are impossible as modern Celsius' degrees. Linné met Fahrenheit in Holland and it is clear that he used Fahrenheit temperatures when he returned home to Sweden. Most probably Linné abandoned the Fahrenheit scale when he learned about Celsius' research. After the death of Celsius in 1744 thermometers with a direct scale appeared in the meteorology reports under different names, such as 'Celsius Novum', 'Ekström' and 'Strömer'. Linné had a great interest in thermometers, and he ordered a thermometer with the modern scale from the instrument maker.
Daniel Ekström around 1744. The scale is mentioned in a dissertation by Samuel Naucler in 1745, but this does not indicate Linné as the single inventor of the modern scale. Certainly the change of scale became obvious to the Uppsala scientists in general. In an account of the history of the thermometer in the Proceedings of the Royal Swedish Academy of Sciences 1749, Pehr Wargentin, Secretary of the Academy of Sciences, mentiones Celsius, his successor Strömer and the instrument maker Ekström in connection with the direct scale. Linné is not mentioned at all. No single person can be given the credit.

From the scientific point of view the most important contribution to the modern temperature scale is due to Celsius because of his careful experiments on the fixed points. The direction of the scale comes in second place, and was hardly a great intellectual achievement.

Olof Beckman 2001
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