

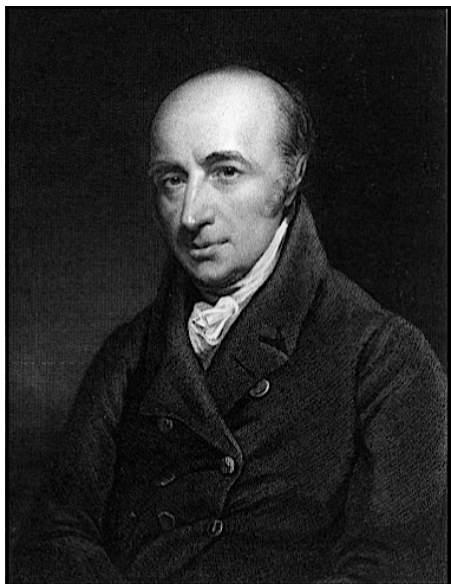
Two Chemical Slide Rules

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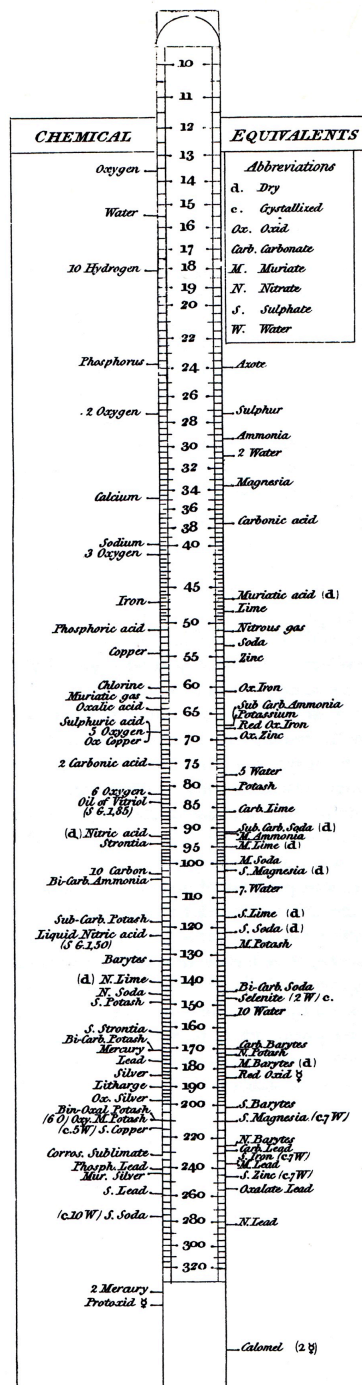
The older generation of chemists familiar with the use of slide rules may recall that the numerical value of pi was marked on the scale using the Greek letter π , thus obviating the necessity of looking it up every time it was used in a calculation. The chemical slide rule took this convenience one step further by marking the formula weights of common precipitates used in routine gravimetric analysis on the slide rule scale using their compositional formulas to indicate their locations, thus once again obviating the necessity of looking them up when performing repetitive analytical calculations.

The basic idea actually goes back to 1814 and a classic paper by the British chemist, William Hyde Wollaston (figure 1) (1). However, Wollaston was skeptical of Dalton's recently proposed atomic theory and preferred instead to indicate the locations of the empirically determined equivalent weights for various elements and compounds on his scale. For this reason



Above: Figure 1. William Hyde Wollaston (1766-1828).

Right: Figure 2. Wollaston's chemical slide rule as depicted in his paper of 1814.



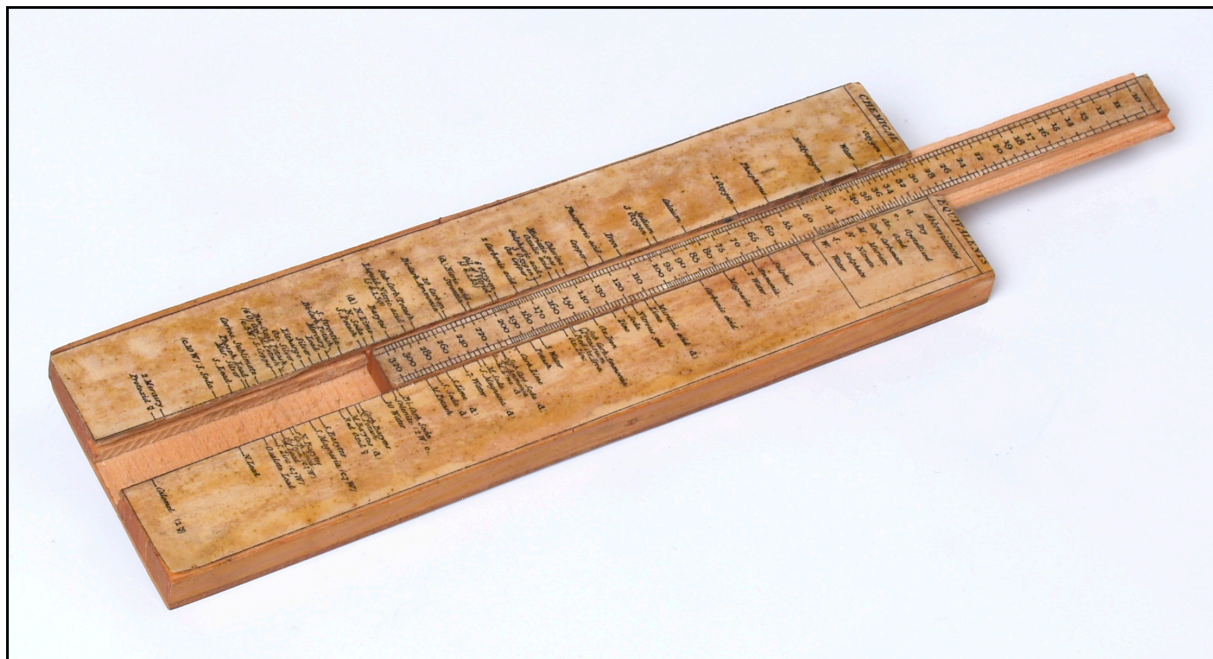


Figure 3. A reproduction of the Wollaston chemical slide rule (Jensen-Thomas Apparatus Collection).

he called his chemical slide rule a “scale of chemical equivalents.”

Though Adet and Hazzenfratz had proposed a system of compositional chemical symbols as part of the nomenclature reforms introduced by Lavoisier and his colleagues in 1787 (2), these were not widely accepted, so Wollaston chose instead to indicate the position of each equivalent weight value by printing the name of the substance in question next to it rather than by means of a chemical symbol (figure 2). A scaled-down reproduction of the original Wollaston slide rule may be seen on display in the Oesper apparatus museum (figure 3).

Various modifications of Wollaston’s scale began appearing in the chemical literature throughout the rest of the 19th century (3) and an original example of the variation known as a Henry-Beck chemical slide rule may be seen in the Apparatus Museum for Transylva-

nia University in Lexington, Kentucky (4).

By the early decades of the 20th century various chemical supply houses had begun offering commercially manufactured chemical slide rules for sale. Initially the most popular brand was known as an Ashley chemical slide rule (figure 4) (5), though most slide rule manufacturers soon began offering their own versions for sale as well (6). The Oesper collections own a circa 1960 chemical slide rule (figures 5 and 6) made by Hemmi of Japan, which was donated several years ago by Bert Ramsay of Eastern Michigan University.

References and Notes

1. W. H. Wollaston, “A Synoptic Scale of Chemical Equivalents,” *Phil. Trans.*, **1814**, 104, 1-23. Reprinted in D. Knight, Ed., *Classical Scientific Papers: Chemistry*, Elsevier: New York, NY, 1968, pp. 87-109.

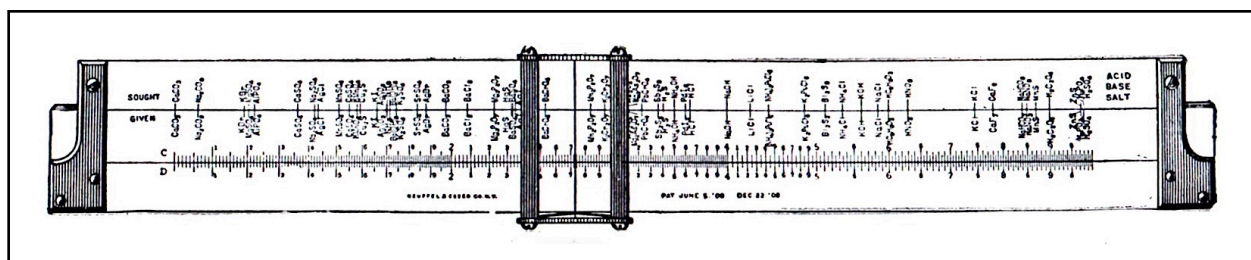


Figure 4. The Ashley chemical slide rule was patented in 1900 by Dr. R. H. Ashley and manufactured by Keuffel and Esser.

TWO CHEMICAL SLIDE RULES

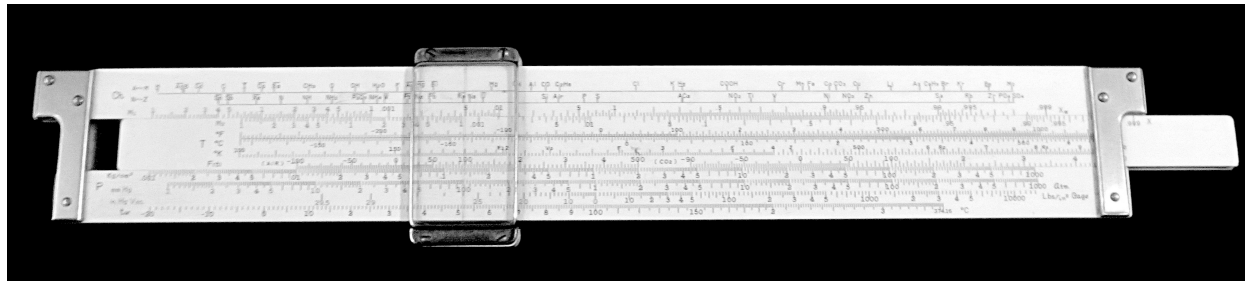


Figure 5. The Hemmi 257 chemical slide rule, circa 1960. The chemical scale is at the very top, labelled Ch (Jensen-Thomas Apparatus Collection).

2. G. Morveau, A. Lavoisier, C. Berthollet, A. Fourcroy, *Méthode de nomenclature chimique*, Cuchet: Paris, 1787.

3. W. D. Williams, "Some Early Chemical Slide-Rules," *Bull. Hist. Chem.*, **1992**, 12, 24-29.

4. G. Bodner, "The Apparatus Museum at Transylvania University," *Bull. Hist. Chem.*, **1990**, 8, 22-27.

5. The Ashley chemical slide rule is briefly described in the book J. E. Thompson, *A Manual of the Slide Rule: Its History, Principle and Operation*, Van Nostrand: New York, NY, 1930, pp. 211-212. It is also listed in the 1914, 1929 and

1937 catalogs for the E. H. Sargent Co. of Chicago (but not in the 1967 catalog); the 1919 catalog of the Scientific Materials Co. of Pittsburgh; the 1928 catalog of the Wilkens-Anderson Co. of Chicago; and the 1936 catalog of the Eimer and Amend Co. of New York (but not in the 1912 catalog). The 1936 Eimer and Amend catalog also carried a version known as the "Nestler chemical slide rule."

6. For further examples of both 19th and 20th century chemical slide rules, see the website <https://sites.google.com/site/calculatinghistory/home/chemical-slide-rules>.

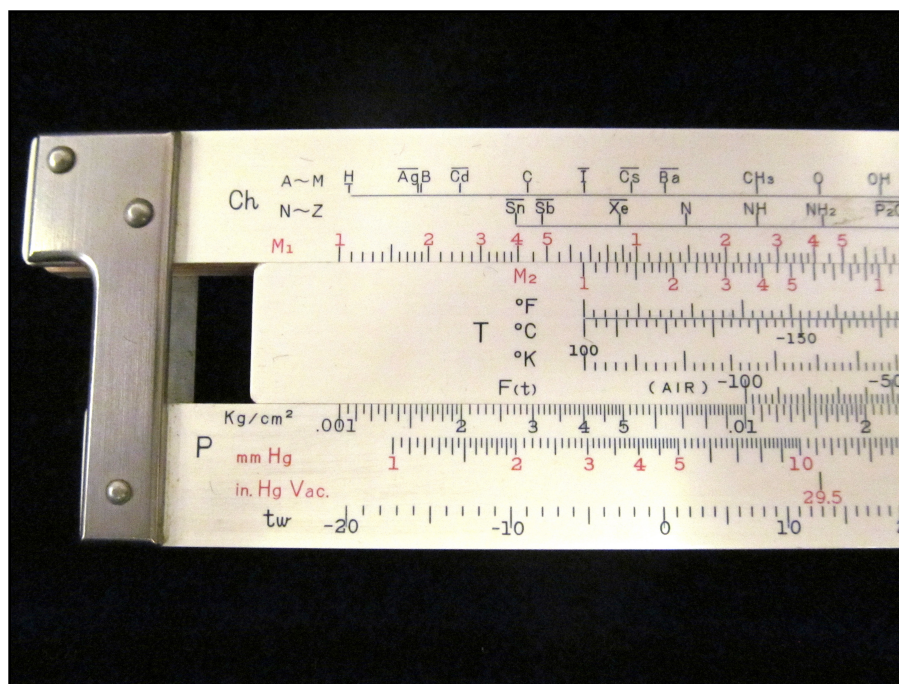


Figure 6. Closeup of part of the Ch scale for the circa 1960 Hemmi 257 chemical slide rule. Also note the scales for the interconversion of various temperature and pressure units.