The Wollaston Chemical Slide Rule

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One of the great joys of collecting, is the occasional opportunity to uncover a truly rare specimen to add to the collection. Such was the case recently, when an original example of Dr. Wollaston's "Chemical Equivalents" slide rule was made available.

This is not a particularly elaborate or spectacular slide rule. Actually it is a rather plain and unassuming example of the slide rule maker's art. It is made of paper on mahogany, and measures 2.56″ W x 12″ L x 0.25″ in thickness. See figure (next page).

It has a single slide, which is slightly longer (12.75″) than the body of the slide rule. The Chemical Equivalents Slide Rule was "Published by W. Cary, 182 Strand, Jan. 1, 1814", and is so marked at the bottom of the paper scales on the body of the side rule.

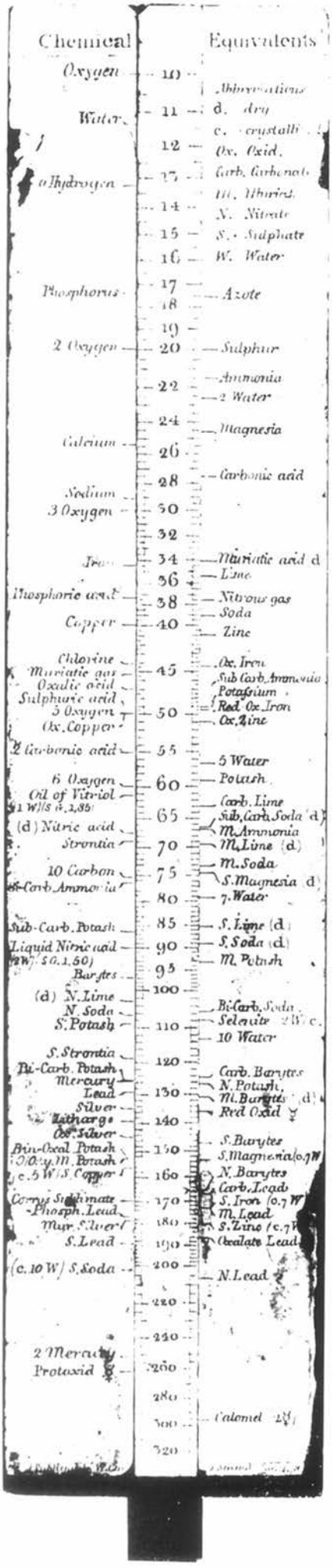
The slide contains the only numerical scale. This is a logarithmic scale, numbered from 10 (the value for Oxygen) through 320. To either side of the slide, on the body of the rule, there are lists of various chemical compounds – opposite their relative equivalent values, where Oxygen is to the base value of 10. Not being a chemist, I cannot evaluate the utility of the rule, especially in light of later discoveries in the field. Comments on this would be appreciated.

The W. Cary, shown as the publisher of this slide rule, would be William Cary (1759 - 1825), a prodigious London scientific instrument maker. He is known to have made and sold various optical and nautical instruments, including magnetic compasses, telescopes, globes, microscopes, pantographs, planetariums, theodolites, and slide rules. His business was located at 182 Strand, London, from 1794–1822 [1].

Dr. William Hyde Wollaston (1766–1828) was a well-known physicist and chemist who was very active in the scientific community in Great Britain during the early part of the nineteenth century. During this period (1813–1814) he was secretary of the Royal Philosophical Society, and on November 4, 1813 he presented a paper to the Royal Society on his "Synoptic Scale of Chemical Equivalents", published as part of the *Philosophical Transactions* of the Royal Society of London, for the year MDCCCXIV [2].

Few examples of Wollaston's chemical slide rule seem to have survived the rigors of life in the chemical laboratory. One source [3] claims that fewer than six are known to have been preserved worldwide. Of these, two are in the collection of the Harvard University Museum in Cambridge, Massachusetts; one is in the collection of the Science Museum in London; and one is in the Museum of the History of Science in Oxford, England. The whereabouts of the remaining examples of the rule were not discussed.

Curiously enough, however, Wollaston's rule, although rare by any standard, has been a favorite with authors of books and articles on scientific instruments, for use as an illustrative example of the slide rule. In his book on *Nineteenth Century Instruments* [4], Turner chose to use a photograph of Wollaston's rule to accompany his Table of Contents page, and again uses this illustration (p. 212) in his chapter on Chemical Apparatus and Instruments. He briefly describes the use of this Slide Rule as follows: "With oxygen as standard, at 10 on the scale he (Wollaston) calculated the combining proportions of various substances and listed them on the logarithmic scale from 10 to 320." In David Wheatland's book *The Apparatus of Science at Harvard 1765 - 1800* [5], he shows photographs of both of the examples in the Harvard University Museum collection on page 172, and gives a brief description, use and popularity of this slide rule during the early 1800's. He also states that "Harvard acquired its scales sometime between 1814 and the publication of Volume One of Professor John Gorham's *The Elements of Chemical Science* in 1819." Two other publications on the collections at Harvard also include listings for their examples of Wollaston's slide rule. The first of these, *Early Science at Harvard – Innovators and Their Instruments 1765 - 1865* [6], shows as Item 60 on page 56 "Two Slide Rules for Chemical Equivalents", with their description. The second, a catalog of a more recent exhibit, *Collection of Historic Scientific Instruments – Harvard University* [7], was prepared for the meeting of the International Scientific Instrument Society, in 1990. In the section titled "Before the Pocket Calculator – An exhibition illustrating the history of the slide rule, Item Number 20, on page 72, once again describes Harvard's examples of Wollaston's "Slide Rule for Chemical Equivalents". Cajori [8] in his section on "Slide Rules Designed and Used since 1800" lists as entry No. 5, "Wollaston's Slide Rule for Use in Chemistry".



Wollaston is also mentioned by Cajori in a completely different context. In his chapter on development in England (p. 38), he states "...some of the English rules had one of the two scales upon the slider inverted, a suggestion said to have been first made by William Hyde Wollaston..." Finally, there is an entry in *Calculating Machines and Instruments – Catalague of the Collections in the Science Museum*[9]. In the section on Miscellaneous Slide Rules & Scales on page 82, entry 512 is a later version of Wollaston's Slide Rule by I. Newman (c. 1820).

References

1. *Directory of British Scientific Instrument Makers 1550 – 1851,* Gloria Clifton, published 1995 by Zwemmer, London, page 51.

2. *Philosophical Transactions of the Royal Society of London.* For the Year MDCCCXIV. Part I, London, 1814. "A Synoptic Scale of Chemical Equivalents," William Hyde Wollaston, M.D. Sec. R.S. Read November 4, 1813 (22pps.+1 Plate).

3. "Some Early Chemical Slide Rules," William D. Williams, published in the *Bulletin of the History of Chemistry.* No. 12 (1992), pps. 24-29 (with numerous additional references).

4. *Nineteenth-Century Scientific Instruments,* Gerard L'E Turner, published 1983 by Sotheby Publications, Univ. of California Press. Page 212, and Contents page.

5. *The Apparatus of Science at Harvard 1765 - 1800,* David P. Wheatland, published 1968 by Harvard University, pps. 172-3.

6. *Early Science at Harvard – Innovators and Their Instruments 1765 - 1865,* 1969, by the President and Fellows of Harvard College, Item 60, page 56.

7. *Collection of Historical Scientific Instruments – Harvard University,* 1990. Section 3, page 72, item 20.

8. *A History of the Logarithmic Slide Rule and Allied Instruments,* Florian Cajori, republished 1994 by Astragal Press, Mendham, N.J., page 75, item 5, also page 38 (in text).

9. *Calculating Machines and Instruments – Catalogue of the Collections in the Science Museum,* D. Baxandall and Jane Pugh, 1926, republished 1975 by the Science Museum, London, page 82, item 51.