

lieu of his own contributions, Havinga exhibited a rare degree of intellectual generosity. His discussions of the various cultural and non-scientific activities reveal a widely read, highly philosophical mindset. From his youth on into his mature years, this man maintained and cultivated an enormously wide circle of loyal friends who greatly appreciated his intellect and strength of character. These were friendships that persisted for decades. As might have been expected out of respect for such a noble individual, one of Havinga's colleagues, Harry Jacobs, in what was basically a labor of love, helped to guide the extant manuscript into an effective posthumous document. In a touching, but very characteristic fashion, Havinga pays tender tribute at the end of his book to his partner for life, his beloved wife, Louise D. Oversluys, by stating that he would follow exactly the same career path all over again but only if he could once more enjoy her companionship, moral support, and spirit of adventure. *John Belletire, Department of Chemistry, University of Cincinnati, Cincinnati, OH 45221.*

LETTERS

The Stereochemistry of Benzene

I should like to say how much I appreciated Dr. Paoloni's nonpolemical article on "Stereochemical Models of Benzene, 1869-1875" (*Bulletin*, 1992, 12, 10-24). I was pleased to see this area of research pursued since these questions were the ones that got me started in my research in the history of stereochemistry while an NSF Science Faculty Fellow at the University of Wisconsin working with Aaron Ihde in 1968-69. How chemists attempted to reconcile the planar structure of benzene with van't Hoff's tetrahedral carbon atom becomes even more interesting when you examine the numerous "space filling" models of benzene proposed in the latter part of the 19th and early 20th century. The problem is also entangled with the early development of conformational analysis.

I would also like to offer my congratulations on this excellent publication. I can remember the frustration many of us HIST members experienced in the 1980s as we struggled to find ways of raising the \$10,000-20,000 required to start and publish a journal to replace *Chymia*. We never found the money. Desktop publishing, Bill Jensen, and a newly "professional" group of HIST members arrived to revitalize what had been a somewhat moribund activity of the American Chemical Society. *Bert Ramsay, Eastern Michigan University*

Chemical Slide Rules

I am sure William Williams' article on "Some Early Chemical Slide Rules" (*Bulletin*, 1992, 12, 24-29) will elicit many comments and contributions of additional "chemical" slide rules. An early 20th century German-made and designed slide rule

"nach Dr. Tisza" distributed in the USA by the Scientific Materials Company of Pittsburgh, PA was introduced as part of a promotional brochure (for my "chemical" calculator) at the August 1993 meeting of the American Chemical Society. The slide rule in question contained a number of element symbols and chemical formulas to be used to calculate chemical "Equivalencies." The major limitation of the traditional "chemical" slide rule was that there simply was not enough space to place all of the formulas for which one might have wished to calculate a formula mass. This limitation, as well as a number of other shortcomings of slide rules in general, has been overcome with my patent (pending?) chemical calculator. The chemical formula, as well as chemical equations, can be easily "written" from the periodic table keypad which then carries out the required series of operations to calculate the formula mass. [Editor: Further information about Dr. Ramsay's calculator can be obtained by writing to him at his company: Chemical Concepts Corporation, 912 North Main Street, Ann Arbor, MI 48104] *Bert Ramsay, Eastern Michigan University*

* Since the publication of my article on "Some Early Chemical Slide Rules" (*Bulletin*, 1992, 12, 24-29) I have uncovered several additional references and have also received several letters from readers containing further information on the locations of existing examples, which I have summarized below:

A. John Johnston's *Manual of Chemistry* (Thomas Cowperthwait, Philadelphia, 1846, p. 133) mentions the Beck-Henry scale.

B. Professor B. P. Huddle, of Roanoke College, Salem, VA, sent photocopies of an "Ashley" rule in his possession. The photocopy of his rule shows what was unclear on the illustration used in the *Bulletin*; the manufacturer was Keuffel & Esser Company and it carried patent dates of 5 June 1900 and 22 December 1908. A good magnifying glass on the "Ashley" illustration in the 1914 E. H. Sargent catalog revealed that it was indeed made by K & E. Professor Huddle's rule presented formulas for "ACID, BASE, SALT," on one side, while the other side listed "OXIDE, ELEMENT."

C. David J. Bryden, of the Royal Museum of Scotland in Edinburgh, sent several pertinent items about different chemical slide rules:

i) In 1834, Carpenter's Chemical Warehouse, 301 Market Street, Philadelphia, published a "Catalogue of Chemical and Philosophical Apparatus, Utensils and Materials, manufactured by a distinguished artist of this city." (G. Carpenter, *Essays on some of the most important articles of the Materia Medica ...*, G. W. Carpenter Chemical Warehouse, Philadelphia, 1834, p. 285). Among the items in that catalog was a "Sliding Scales of Chemical Equivalents, in which oxygen is called eight, as taught in the schools of America."

ii) There is a chemical equivalents rule produced by Newman, the instrument maker at the Royal Institution, in the Whipple

Museum of the History of Science at Cambridge, England.
 iii) The Playfair Collection in the Royal Museum of Scotland once held four different models of the Wollaston scale. Sadly, they were listed as missing in 1978 when R. G. W. Anderson published *The Playfair Collection and the Teaching of Chemistry at the University of Edinburgh 1713-1858* (The Royal Scottish Museum, Edinburgh, 1978, p. 153).

D. In the above publication Anderson included the following comments and references concerning the scales:

Thomas Charles Hope demonstrated a variety of scales (2) to his classes. His manuscript "List of Specimens" (used by his assistant for preparing apparatus for demonstration at Hope's lectures) includes four: "Dr. Wollaston Table Cheml Equivalents - Dr. Dewars - Dr. Reids - Prideaux"(3). These four may be those which once formed part of the Playfair Collection.

Scales bases on the diagram in Wollaston's original paper seem to have been relatively common, (4). On the other hand, no examples of Dewar's, Reid's or Prideaux's tables appear to have survived ... John Prideaux's scale of 1830 was complex, including symbols for about 500 substances. It was based on oxygen = 1 and was doubled, opening on hinges like a book (6). Dr. Dewar's is not easily traceable. The reference may be to a scale (unpublished) by Henry Dewar, M.D. (7).

2. Various forms of instrument are discussed by D. C. Goodman, "Wollaston and the Atomic Theory of Dalton," *Historical Studies in the Physical Sciences*, 1, 37 (1969). Michael Faraday, *Chemical Manipulation* (London, 1827, 551) warned on practical grounds that the instrument was not dependable: "It is almost impossible that the scales should be accurate, because of the extension and contraction of the paper when it is damped, and again dried, and the facility with which it yields to mechanical impressions."

3. Edinburgh University Library MS Gen 270, "List of Specimens," under heading "Chemical Action."

4. There are three examples at the Science Museum, London (inv no 1932-578, see A. Barclay, *Handbook of the Collections Illustrating Pure Chemistry* (London 1937), 13), two examples at Harvard (in my *Bulletin* paper), and one example at the Museum of the History of Science, Oxford (see C. R. Hill, *Museum of the History of Science Catalogue 1* (Oxford 1871) 42, item 292).

6. J. Prideaux, "Continuation of the Table of Atomic Weights, and Notice of a New Scale of Equivalents," *The Philosophical Magazine*, 8, 423 (1830).

7. H. Dewar, "The Influence of Chemical Laws on the Phenomena of Physiology," *Edinburgh Medical and Surgical Journal*, 17, 479 (1821).

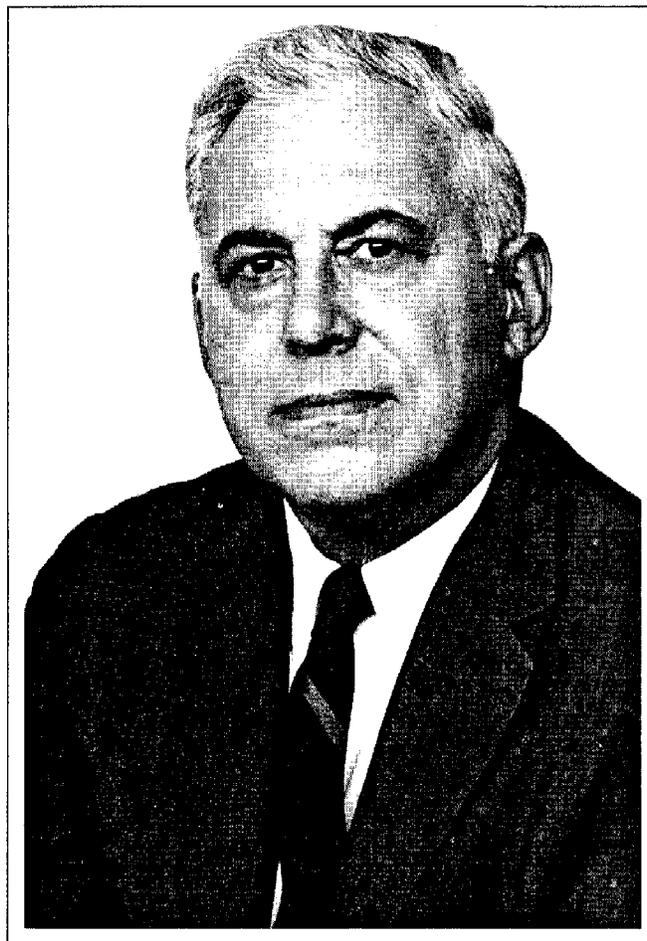
Readers with further information concerning chemical slide rules should contact either me or Bill Jensen. *William D. Williams, Harding University*

AWARDS

The Dexter Award

The 1993 Dexter Award for outstanding accomplishment in the history of chemistry has been awarded to Dr. Joseph S. Fruton of Yale University for his work on the history of biochemistry. The award, which consists of a cash prize of \$2000 and an engraved plaque, was presented at the Fall National ACS Meeting in Chicago, IL in August of 1993.

Born in Czestochowa, Poland, on 14 May 1912, Dr. Fruton became a naturalized U.S. citizen in 1929. He received his B.A. in chemistry with honors from Columbia College in 1931, and his Ph.D. in Biological Chemistry from Columbia University in 1934. From 1934-1945 he was associated with the Rockefeller Institute for Medical Research. In 1945 he became Associate Professor of Physiological Chemistry at Yale University, followed by promotion to Professor of Biochemistry in 1950, and appointment as Eugene Higgins Professor of Biochemistry in 1957. In 1980, Dr. Fruton was also appointed Professor of the History of Medicine at Yale, and since 1982 he has



Dr. Joseph S. Fruton