

## Epilogue

When Boerhaave died his funeral oration was delivered by his friend Professor Albert Schultens, who published it in 1739. In the same year Samuel Johnson, then a young journalist, contributed a Life of Boerhaave to the *Gentleman's Magazine*. This short biography was drawn entirely from Schultens's Latin oration and from a perusal of a few of Boerhaave's academic orations. Unfortunately it contains factual errors that are not in Schultens's work, and from the scientific aspect it added nothing to our knowledge of Boerhaave. But it was later republished in Johnson's *Collected Works*, and thus it has become the readily available English source for information on Boerhaave. It is still used and quoted, errors included. During the next twelve years five brief accounts of Boerhaave's life and work were published, all but one by his former pupils. After that, nothing. Now, after the lapse of over 200 years, Boerhaave has found in Professor Lindeboom a biographer who has read all the extant contemporary evidence, in manuscript and in print, who has studied Boerhaave's works with knowledge and understanding, and has drawn his own long-considered conclusions. No departed scholar or scientist could wish for more.

## REFERENCES

- 1 F. W. Gibbs, *Ambix*, 1958, 6, 117-135.
- 2 See G. A. Lindeboom, *Herman Boerhaave*, London, 1968, pp. 328-52. See also J. Read, *Humour and Humanism in Chemistry*, London, 1947, pp. 132-55. A more closely written account is given in J. R. Partington, *A History of Chemistry*, London, vol. 2, 1961, pp. 746-58.
- 3 In the second volume of his *History* (1961, p. 758) J. R. Partington stated that what Boerhaave prepared might have been microcosmic salt; but in his third volume (1962, p. 78) he seems to have concluded that Boerhaave had indeed discovered urea.
- 4 H. J. Backer, *Ned. T. Geneesk.*, 1943, lxxvii, pt. ii, 1274-78. Backer was able to accelerate Boerhaave's process without altering his fundamental method. Backer, like Partington, who does not seem to have been acquainted with Backer's paper, thought that Boerhaave's urea may have been in an impure form—namely, the hydrate of urea and sodium chloride. He further thought that this impure form may also have been the substance later independently discovered by Rouelle and by Fourcroy and Vauquelin.

- 5 H. Boerhaave, *Atrocis, nec descripti prius, morbi historia*, Leiden, 1724. In 1964 G. A. Lindeboom published a facsimile of the first edition and of the first French translation.
- 6 T. C. Allbutt, *Brit. med. J.*, 1900, 2, 1848-52.
- 7 G. A. Lindeboom, *Mededelingen van de Konink. Vlaamse Acad. v. Wetenschappen, Letteren en Schone Kunsten van België*, Kl. d. Wetensch., 1961, xxiii, No. 2, pp. 30-32.
- 8 It is noteworthy that Osler possessed only the original Latin edition of the *Elementa chemiae* (*Bibliotheca Osleriana*, p. 112, No. 1094, Oxford, 1929). He had the English translation of the spurious Latin edition of 1724, but not Shaw's 1741 translation of the genuine *Elementa*. In his unpublished paper he did indeed quote a few sentences from this work by Shaw, but they were from an appendix written by Shaw himself and not translated by him from Boerhaave's text; and further, they referred to Boyle and not to Boerhaave. It is also noteworthy that Osler, in his posthumous *Evolution of Modern Medicine* (1921), which was based on lectures delivered in 1913, has not a word about Boerhaave's chemical investigations.
- 9 T. C. Allbutt, *Greek Medicine in Rome*, London, 1921, pp. 529-40.
- 10 The works to which I refer in this paragraph are as follows: (1) C. A. Wunderlich, *Geschichte der Medicin*, Stuttgart, 1859, pp. 166-71. (2) C. Daremberg *Histoire des Sciences médicales*, Paris, 1870, vol. 2, pp. 889-905. (3) H. Haeser, *Lehrbuch der Geschichte der Medicin, und der epidemischen Krankheiten*, vols. 2, and 3, 1881-82, in many places, but especially vol. 2, pp. 496-508. (4) J. H. Baas, *Grundriss der Geschichte der Medicin*, Stuttgart, 1876, pp. 472-6; and the revised edition translated by H. E. Handerson as *Outlines of the History of Medicine*, New York, 1889, especially pp. 603-07. (5) E. T. Withington, *Medical History from the Earliest Times*, London, 1894, pp. 324-27. (6) T. Puschmann's *Handbuch der Geschichte der Medicin*, edited by M. Neuburger and J. Pagel, Jena, vol. ii (1903) and vol. iii (1905)—many references in vol. ii, but especially pp. 74ff., and pp. 457-72, and also in vol. iii. (7) J. L. Pagel, *Einführung in die Geschichte der Medicin*, 2nd ed., revised by Karl Sudhoff, Berlin, 1915, pp. 302-4. (In the combined third and fourth editions Sudhoff did mention the *Elementa chemiae* on p. 299, but only in a bibliographical list and without comment.) (8) F. H. Garrison, *Introduction to the History of Medicine*, 2nd ed., Philadelphia, 1917, pp. 309-11. Garrison's account contains a number of factual errors. He admits that the *Elementa* was the best book on chemistry during the eighteenth century, but he appears to have found nothing of interest in it except that Boerhaave introduced the idea of chemical affinity and invented an improved method of making vinegar. He does not link up Boerhaave's chemical with his clinical work. Garrison quotes a phrase from Allbutt's paper, and it would seem that in this matter he was much influenced by Allbutt. In his fourth edition (1929, pp. 315-17) Garrison expands this section on Boerhaave slightly, but without change of attitude. (9) Sir Michael Foster, in his *Lectures on the History of Physiology*, Cambridge, 1901, pp. 200-4, perhaps approaches nearest to the actual significance of Boerhaave's chemical physiology, though he deals only with the aspect of Boerhaave's work relating to digestion.

## NEW APPLIANCES

## Self-levelling Venous Pressure Transducer

Dr. J. P. BLACKBURN, Department of Clinical Measurement, Westminster Hospital, London S.W.1, writes: Venous pressure may be measured with a saline-filled manometer, but where more detailed information is required

or a continuous record is needed an electro-manometer is commonly used.

Levelling any pressure-measuring device is important, particularly for venous pressure measurements, and a number of methods

have been described (Sykes, 1963; Bethune *et al.*, 1966). Levelling must be repeated every time the patient changes position.

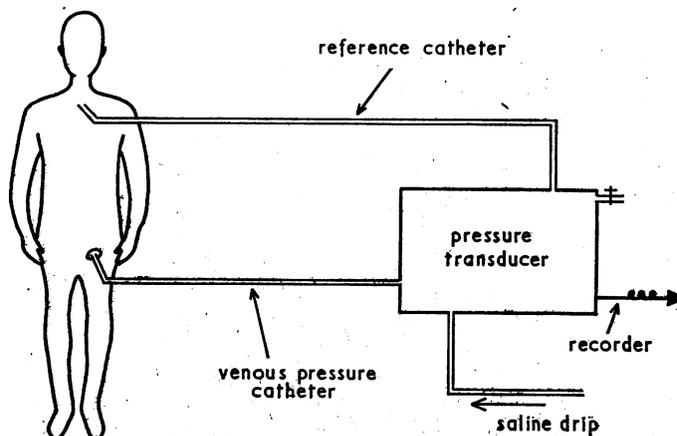
When a differential electromanometer\* is used for the measurement of pressure automatic compensation for changes in the position of the patient can be arranged as shown in the diagram. The reference limb is an open-ended water-filled tube† which is attached to the patient's skin at the sternal angle or other suitable reference point. The other side of the transducer diaphragm is connected to the intravenous catheter in the usual way. Changes in the position of the patient affect both the venous and the reference pressure equally, so the measured pressure is always related to the reference catheter and the transducer need not be moved.

## REFERENCES

- Bethune, D. W., Gillett, G. B., Watson, A. C., and Crichton, T. C. (1966). *Lancet*, 2, 684.  
Sykes, M. K. (1963). *Ann. roy. Coll. Surg. Engl.*, 33, 185.

\* Sanborn Physiological Pressure Transducer Model 268B.

† Portex 6-ft. (183-cm.) Manometer Connector Tubing B208.



Arrangement for differential pressure measurement.