

the ground that this name was the first used, namely, by Linné so long ago as 1758. The three species differ in their habits of life. *B. atrox* prefers humid, wooded, and rocky places, and feeds on small rodents. *B. jararaca* prefers the open and is commonly encountered in hay-fields. It also devours small rodents. *B. jararacussu* is amphibious and feeds almost exclusively on batrachians. Their poisons are different. These three species are described in detail. The last of the series of papers deals with *Bothrops Neuwiedii*, which Dr. Amaral proposes to divide into four subspecies, on the ground of the fixity of their chromatic characters. Here he would appear to be on uncertain ground. The characteristics on which the proposed subdivision is based are associated with the habitat of the snakes, and there is no evidence that if they were translated from one locality to another the supposed fixity would be maintained.

The papers are accompanied by excellent plates. The coloured pictures of *B. atrox*, *B. jararaca*, and *B. jararacussu*, drawn from life, are beautiful.

C. J. M.

The Newcomen Society.

The Newcomen Society for the Study of the History of Engineering and Technology. Transactions, Vol. 4, 1923-1924. Pp. xii + 153 + 21 plates. (London: Secretary, Newcomen Society, Science Museum, 1925.) 20s.

THIS latest volume of *Transactions of the Newcomen Society* is one of wide interest. The subjects dealt with range from chain pumps of the seventh century to the earliest locomotives in America; from the dynamics of Leonardo da Vinci to the bibliography of the history of engineering and applied science. As a frontispiece there is a reproduction of the earliest known print of a Newcomen engine. This print is not only the earliest drawing, but also the earliest document of any kind known showing the construction of the engine. The original by Henry Beighton was only recently discovered in the Library of Worcester College, Oxford, by Mr. L. de M. Johnson, of the Oxford University Press. Though in the *Transactions* the drawing has had to be folded, copies can be obtained unfolded, and we think this historical drawing should be exhibited wherever mechanical engineering is taught.

The philosophical view of the work of the Society is well stated in the presidential address of Mr. Loughnan St. L. Pendred, while the biographical side is illustrated by a paper on the Rastricks—a family in which engineering skill was in some degree inherited. John U. Rastrick was a contemporary of George Stephenson, and his best memorial is the London and Brighton Railway.

Just as it is the aim of the Newcomen Society to further the study of the history of engineering and technology, so it was one of the objects of the Royal Society in its earliest years to collect and chronicle a history of the minor arts and trades. In his diary of January 16, 1660, John Evelyn wrote: "I went to the Philosophic Club where was examined the Torricellian experiment. I presented my circle of Mechanical Trades"; and in Dr. Birch's History of the Royal Society is an entry of the same date: "The Catalogue of Trades brought in by Mr. Evelyn and that of Dr. Petty were referred to them and Dr. Merret to be compared, methodised and returned to the Society." Evelyn's "Circle" has been preserved, and with a prefatory note by Mr. Forbes Sieveking is reproduced in this volume.

Two very different aspects of the iron industry in England are given in Mr. Rhys Jenkins' "Sketch of the Industrial History of the Coalbrookdale District," and in Mr. W. A. Young's paper, "Works Organisation in the 17th Century: some account of Ambrose and John Crowley." Iron founding has been carried out in the Coalbrookdale district for centuries, and here the problem of smelting iron with coke was solved, cast-iron tram lines first used, the first cast-iron bridge erected, and some of the cast-iron cylinders made for Watt's engines. The blast furnace made its appearance in Shropshire about the middle of the sixteenth century, and from 1707 until 1791 the three Abraham Darbys in succession reigned over the Coalbrookdale works.

The Crowleys began as ironmongers in Greenwich and in London, and then became manufacturers of hardware in Durham. The firm was in existence for 170 years, and the picture of the works at Winlaton, where edge tools, files, anchors, nails, spades, etc., were made in very large quantities, is one of a community somewhat resembling that of a great religious house. Innumerable rules were laid down to encourage and admonish, courts of arbitration met at stated intervals, the children were educated, the sick doctored, and the infirm pensioned. Working hours were from five in the morning until eight at night, and curfew rang at nine o'clock. The instructions went so far as to provide for the assistance of those who, by reason of "folly, weakness or extravagance," have had recourse to the pawn shop. Sir Ambrose Crowley died in 1713, a very wealthy man. He had been an alderman and sheriff of the City of London, but Mr. Young's paper shows that he is entitled to be considered the pioneer of industrial welfare work. He made a very remarkable experiment, and the principles laid down by him sufficed for guidance for more than a century.