

medicine, and their use may be independent of Paracelsian theory or cosmology. This continuity is further obscured by Beier's belief in such sixteenth- and seventeenth-century worthies as Lanfrance of Milan (*fl.* 1293) and Albertus Magnus (d. 1280, here called A. Magnus), and in such Englishmen as Forestus (Dutch) and the Germans Jacob Rueff and Scultetus. Her reliance only on English versions of their works inevitably leads to misunderstandings of date, origin, and significance. The complex problem of how to interpret literary evidence is never faced, although quotations from plays are confidently introduced as solid data.

But for those who have not access to the five or so printed diaries and, still more, the three manuscript casebooks, Beier performs a useful service in extracting medical ore and forging from it a coherent narrative. But even here there are difficulties. Her example of female orgasm (p. 214) and her equation of the use of uroscopy with piss prophets are worrying signs of an inability to comprehend certain aspects of seventeenth-century medical theory. Her method of citing the manuscripts according to her own transcript and not by the folio numbers in the manuscripts themselves is slovenly, and makes any attempt to check her transcriptions almost impossible. Even so, it may be worth noting that (Barnabas) Oly of Clare Hall (BL, Sloane 1112, fols. 23v and 33v) was never knighted (as p. 127 declares), and that he lived for more than sixty years after being treated for gonorrhoea. Dr. Barker's casenotes in Sloane 78 = 663 are not, as might be supposed from pp. 271, 278, 299, in two different manuscripts but in a single manuscript given two different classification numbers. It is a pity that the data in this manuscript was not compared with that by the same physician in Sloane 79 = 664, fols. 112r–156v, and that the medical productions of Dr Poeton in Sloane 1954 were not supplemented by those of his in Sloane 1965, which are far more extensive than the catalogue might suggest.

Overall, this book, in its narrow focus, is as antiquarian as the older medical histories it purports to supplement or replace. True, it includes the occasional vivid story or telling instance, but these cannot compensate for the lack of historical insight or sustain the burden of generalization placed upon them. Besides, a book on medicine of this period that cites neither William Clowes nor Richard Wiseman inevitably lacks savour.

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AHMAD Y. AL-HASSAN and DONALD R. HILL, *Islamic technology: an illustrated history*, Cambridge University Press/Unesco, 1986, 8vo, pp. xiv, 304, illus., £25.00.

This publication represents a major achievement in the history of technology, and gives a concise, but nevertheless encyclopaedic, coverage of civil, mechanical, and water engineering, crafts, military and naval technology, chemistry, agriculture, and food processing. Numerous photographs and illustrations, many of the latter from original manuscripts, are clearly reproduced and integrated with the text to provide an invaluable and enjoyable supplement to the historical account. As no accurate account of the history of science is possible without an understanding of the actual behaviour, tools and processes of the associated technological innovations and traditions, anyone interested in the history of medicine should find much food for thought in this work. The discussion and illustrations cover water-lifting devices and water supply, metallurgy (although not the manufacture of surgical tools: has this aspect of museum collections been neglected in recent metallurgical analyses?), the distillation and extraction of alcohol, petroleum fractions, and essential oils, the manufacture of the classic inorganic acids, and the invention of hard soap.

The authors do not neglect the role of pre-Islamic and non-Islamic science and technology in providing important elements which contributed to the widespread technological innovation and organization which the shared religious, cultural, and linguistic perspectives of the Islamic world helped to achieve. The range of Islamic innovation is also emphasized. Recent field surveys in Jordan documenting Ayyubid-Mamluk water-powered sugar mills are noted, and not everyone interested in the history of nutrition would know that Muslim industrial and agricultural technicians helped introduce sugar refining to China and to establish the first sugar-cane plantations in the West Indies. A tenth-century reference to cast iron is a significant

sign of the diffusion of Chinese technology; to the textual and ethnographic sources noted by the authors, a large once-molten slag flow recently excavated by Coughenour in an Ayyubid-Mamluk ironworking area near Ajlun, Jordan can now be added as further evidence of the introduction of blast-furnace technology in medieval Islamic times.

In a work of this scope, some minor lapses are inevitable. The photograph of the straining of yoghurt to make yoghurt curd (fig. 8.25) is incorrectly described in the caption as making yoghurt, a process which would have occurred the previous day when the starter was added to scalded milk and left overnight to set. While Bulliet's recent study of paper and printing in medieval Islam appeared after this book was in print, familiarity with the published results of 1970s excavations at Fustat and Quseir would have enabled the authors to note that, within a few centuries of the Sung development of block printing, a range of apotropaic magical texts similar to those which first appeared in China were being printed on paper in Egypt.

The only serious failing is the reliance on Watson's study of agriculture, with the consequent failure to take account of pre-Islamic evidence for the origin of such cultigens as bread wheat, which may occur much earlier than Islamic times, and watermelons, which are known from classical, cuneiform and Hebrew texts as well as pharaonic sources. None of Watson's claims for the origins of cultigens can be accepted until palaeobotanical studies of Ptolemaic, Coptic, Parthian, Sassanian and Arabian sites of the third century BC–sixth century AD are completed. Similarly, while the great economies of scale enabled by innovations in credit and accounting and the state organization of agricultural production, such as occurred in sugar production, are noteworthy in early Islam, state control of irrigation was not new, and multiple cropping of irrigated fields under central administration was a feature of both Egyptian and Mesopotamian agricultural regimes well before the advent of Islam. An important aspect of nutritional history which also needs to be investigated was the role played by later Islamic agricultural technology in the diffusion of New World cultigens and the readiness to experiment with new food sources which led to maize being cultivated in West Africa, Indonesia and the eastern Mediterranean within ten to twenty years of the first contacts with the Americas. In Europe, where maize was known as "Turkey wheat", the pace of agricultural innovation was initially somewhat slower.

A great merit of the authors' work is to have made available material from unpublished manuscripts and their own extensive and wide-ranging work and reading in the history of Islamic technology. Al-Hassan and Hill, as well as their Unesco sponsors and publisher, are to be warmly congratulated for having produced a clear, readable and beautifully illustrated summary of the technology of a culture and a period marked by important scientific achievements.

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RONALD ROSS, *The great malaria problem and its solution*. From the *Memoirs* of Ronald Ross, with an introduction by L. J. Bruce-Chwatt, London, The Keynes Press, British Medical Association, 1988 8vo, pp. xxii, 236, illus., £45.00, £52.00/\$73.00 abroad.

Malaria, rampant and inscrutable since antiquity, yielded up its deepest mysteries when Alphonse Laveran recognized the causal organisms in 1880, and when Ronald Ross discovered in 1897 that mosquitoes transmit the parasites. A quarter-century after his coup Ross published his autobiographical *Memoirs*, subtitled *The great malaria problem and its solution*. In Part II of that book, about 200 pages, Ross set out his personal and scientific account of the successful quest. The Keynes Press has now republished that part of the *Memoirs*, with its illustrations, in a handsome limited edition that bears Ross's original subtitle as its title.

One can follow Ross's path to discovery in this new edition, and to compensate for the omitted Parts I and III we have a pithy and informative introduction by the doyen of malariologists, Professor Emeritus Leonard J. Bruce-Chwatt, himself a successor to Ross as a Director of the Ross Institute. Two other editorial matters merit comment. First, Ross wrote in his Preface that the *Memoirs* were addressed to medical men and to the general reader, and he hoped "There is nothing . . . in these pages which the lay reader cannot easily understand; if there be, let him pass