

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.

R. L. Miller
Darwin College,
Cambridge

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

it over and proceed!" In that light, some might query the prominence given the glossary that precedes the text. Second, while the body of Ross's narrative appears faithful to the original, several dates have been corrected and some changes made in spelling and in reference style, all reasonable alterations except that they pass unremarked.

Ross was born in 1857 in India amidst the drama of the great Indian Mutiny, and he died in 1932 in the drama of the Great Depression. During his life he provided his own dramas, the greatest of which was played out in India in pursuit of the malaria problem. That story Ross describes in evocative prose and abundant detail, most of it drawn directly from his correspondence with Patrick Manson, the mentor who set him on to mosquitoes as possible vectors. The hypothesis was Manson's, the actual inquiries and labour Ross's. His success in incriminating mosquitoes took four years of tenacious work under trying circumstances. Of such matters Ross wrote in his Preface that "many discoveries have really been the climax of an intense drama—full of hopes and despairs, visions seen in darkness, many failures, and a final triumph—in which the protagonists are man and nature, and the issue a decision for all the ages".

Ross's triumph brought him Sweden's Nobel Prize in 1902, a knighthood, the FRS, and many other recognitions; and his 1923 *Memoirs*—which he dedicated pointedly to the Swedes, not to the British—also earned a prize. He was a prodigious worker who projected his talents beyond the Great Problem to make contributions to mathematics, epidemiology, and literature. His archives, comprising some 32,000 items, reflect Ross's industry and his evident concern about a place in history. For all of that, Ross was a difficult and troubled man: his dogged but fruitless pursuit of a pecuniary award from Britain's Parliament for his malaria work, his bitter disputes with the Italians over priority, and his lamentable falling out with Manson, were but three affairs in which Ross's sense of proportion failed him.

The Keynes Press publication from the *Memoirs* represents a signal tribute to Ross's hard-won solution of the Great Malaria Problem. No figure in tropical medicine, and few in any other field, could match Ross for his ability to write history as well as make it.

Eli Chernin
Harvard School of Public Health

JAKE W. SPIDLE, JR., *Doctors of Medicine in New Mexico: a history of health and medical practice 1886–1986*, Albuquerque, University of New Mexico Press, 1986, pp. xvi, 384, illus. \$29.95; *idem*, *The Lovelace Medical Center: pioneer in American health care*, Albuquerque, University of New Mexico Press, 1987, pp. xii, 217, illus., \$27.50.

These excellent books are the first significant historical studies of the evolution of medical practice in New Mexico, which became the 47th state in 1912. Written by a professor of history at the University of New Mexico, they are rooted in an extensive archival and oral history programme that has been supported by the University of New Mexico Medical Center Library since 1982. Though slightly more celebratory than critical, they are valiant efforts to analyse medical practice with the criteria and viewpoints of social historiography.

The first book is "a solid, reliable introduction to the subject", as Spidle intended. During the late 1870s and early 1880s, immigrants surged into New Mexico Territory, riding the early trains, less fearful of Indians, eager to exploit the mines. Probably no more than 100 physicians practised in the Territory in 1886 when the Las Vegas Medical Society, founded four years earlier, transformed itself into the New Mexico Medical Society. By 1906, the number had doubled; by 1912, doubled again. The latter growth spurt involved numerous doctors who—like their more numerous patients—sought the arid, sunny climate for treatment of pulmonary tuberculosis. More than forty sanatoria were founded in the state between the late 1890s and the mid-1920s. Using maps and tables, Spidle ably presents demographic data about the growth and distribution of physicians in the state, and he assesses the impact of the sanatorium movement on health care practices in the new state.

After a chapter on women physicians, especially those who practised in the mountain missions, Spidle reviews the painfully slow evolution of public health policies, noting that New