



Review: [untitled]

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nology in China. Educated as a historian, he approaches Chinese science as part of the history of mankind and civilization. His most recent publication is unique in its general survey of a limited period in Chinese history, the tenth to fourteenth centuries, and could be considered a “dynastic history of science.”

The Song dynasty (960–1279) is known as a dynamic period with many innovations in various fields. The changing economic and political circumstances stimulated a number of scientific and technological inventions and developments, such as movable-type printing, gunpowder, and the navigational compass. The first chapter of the book under review deals with these three inventions and their far-reaching impact on the dissemination of literature, military developments, and navigation. These and several other developments reflect the spirit of innovation and creativity at that time.

The Yuan dynasty (1271–1368) was a period of foreign occupation. Contacts with other countries were established and intensified.

In the four hundred years covered here a large number of famous scholars were born, most of them competent in more than one field: science, politics, philosophy, and so forth. Guan draws attention to two remarkable scientists, Shen Gua (1031–1095) and Su Song (1020–1101), and their prominent contributions to scientific research.

It is impossible for a study of roughly three hundred pages to cover all aspects of such a long period. The book does not claim to be exhaustive; Guan prefers to describe generally the results obtained in science and technology, dealing separately with main fields such as mathematics, astronomy, geography, metallurgy, ceramics, medicine, architecture, textile industry, and agriculture. For each, he identifies the main developments, the most representative scientists, and, if relevant, the main publications, which will mostly, but not always, be well known to specialists.

The last two chapters deal with scientific thought and technical exchanges between China and other countries. As in the Renaissance in Europe, a strong relation between science and philosophy is noticeable. Philosophers such as Zhang Zai, Wang Anshi, Zhu Xi, Guo Shoujing, and others clearly incorporated the evolving natural sciences in their work. Guan relates different theories and diverging concepts concerning the functioning of the universe to the development of two

trends in Chinese thinking stressed in official Marxist historiography, materialism and idealism. These categories were, of course, unknown in ancient China. Finally, he describes the stimulus that resulted from contacts with other countries, populations, and cultures.

Guan’s primary concern is the importance of past Chinese contributions to science and technology in general. His reiterations of national pride and patriotism, and his disinclination to see the dark side of technological change—still conventional in China—will remind readers of a bygone age in the historiography of Western European national science.

Apparently the author mainly, though not exclusively, consulted Chinese sources. He draws on a large secondary literature. This book does not present new data or conclusions, nor for that matter new historiography. In future editions, it would be helpful to have a detailed bibliography and index.

PATRICIA KONINGS

Derk Bodde. *Chinese Thought, Society, and Science: The Intellectual and Social Background of Science and Technology in Pre-modern China.* xiv + 441 pp., fig., tables, bibl., index. Honolulu: University of Hawaii Press, 1991. \$38.

Derk Bodde takes the question “Why didn’t the Scientific Revolution occur in Chinese civilization?” further than any author to date. He asks, What were the factors that either favored or hindered scientific and technological progress in China? These innumerable factors are grouped into six categories: the written language; concepts of time, space, and things; religion; government and society; morals and values; and man’s relationship to nature. He evaluates the relative roles of such social and intellectual factors in China’s failure to develop an effective medium for scientific communication, in short, to have a Scientific Revolution.

One could not find a better-argued analysis, nor one more likely to generate debate. For example, Bodde has limited his primary sources to the writings of the Chinese elite—especially passages from the classics, early thinkers, and histories—and of these written sources, he has chosen to exclude the sci-

entific works. For a book on Chinese science, this is suspect. In defense, he argues that such humanistic texts were to a far greater extent than the lesser-known scientific texts part of the cultural heritage of all premodern educated Chinese. In the chapter on the Chinese written language, he uses classical passages to make a profound linguistic point relevant to the development of scientific ways of thinking: literary Chinese does not constitute a clear, precise, direct medium of communication. Chinese literary devices and techniques, in turn, served to direct scholarship away from scientific thinking.

Bodde further argues that in China a network of morals and values worked against the development of the myriad of factors that contributed to the development of science in the West. The objective study of nature, individualism, a competitive spirit, self-expression, and admiration for technical ingenuity did not flourish in China. Instead, the Chinese venerated books, subordinated the individual to the group, looked back to the past, and acquiesced to established authority. The scholar-bureaucrat class and the values it represented remain the central inhibiting factors in this old story about failure.

This book is an erudite response to the central question that has influenced nearly all scholarship on Chinese science and technology since the 1950s. It would have been more influential, however, had it been published when the first draft was completed a decade ago. The framework in which it is written has since become outdated. Some historians of Western science question the value of using the "Scientific Revolution" as anything more than a heuristic device. If taken as a heuristic device, the comparison works well in this book. If not, one would be justified in asking why the Taiping Revolution did not occur on European soil and proceeding to discuss the factors that could not have favored its development but did not and those that hindered it. This deep methodological fissure aside, contemporary scholarship on Chinese science and technology thrives on issues outside the narrow focus on China vis-à-vis the Scientific Revolution.

MARTA HANSON

■ Early Modern Period

Berengario da Carpi. *On Fracture of the Skull or Cranium.* Translated with an intro-

duction by **L. R. Lind.** (Transactions of the American Philosophical Society, 80[4].) xxv + 164 pp., illus., bibl., indexes. Philadelphia: American Philosophical Society, 1990. \$20 (paper).

Most historians, even of medicine, tend to think of sixteenth-century surgery not only as crude and bloody but as unlearned. Mention of the barber-surgeons is usually enough to elicit such a response. Yet learned surgery, based on books, had a long history. Greek and Arabic authors had integrated surgery into learned medicine (the medicine that not only taught one how to carry out procedures but also explained why they should be carried out), and in the Middle Ages surgery and practical medicine (therapeutics) had been the most flourishing branches of literate medical instruction and culture. Berengario da Carpi's treatise *On Fracture of the Skull or Cranium* of 1518, addressed to the young surgeon, is a good example of this learned surgery. It has now been made available to a wider readership by L. R. Lind's translation. Like Lind's translation of the work of the early Renaissance anatomists who predated Vesalius, the present volume will help deepen our sense of Renaissance medicine.

Today Berengario is best known as an anatomist who stressed the value of personal observation, and indeed by the end of the sixteenth century he was recognized as among the first of the line of anatomists that had created the "modern" tradition in anatomy. In the Middle Ages and early sixteenth century anatomy was most closely associated with surgery, and it was as a surgeon that Berengario made his money and reputation. He taught surgery at Bologna, and after 1517, when he treated Lorenzo dei Medici for an occipital fracture, his surgical expertise was much in demand.

In *De fractura* Berengario stressed the unity of surgery and medicine and made the point that surgery used medical methods such as diet and drugs. At the same time he derided those physicians who looked down on surgeons for working with their hands. The treatise shows how medicine and surgery could be united in practice. Berengario advised on the regimen of patients with different constitutions and injuries (in terms, broadly, of the six non-naturals: air, food and drink, exercise and rest, sleep and waking, the evacuations and coitus, and the emotions) and on the medicines to be administered, including a