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TECHNOLOGY—GREEK, ROMAN AND MEDIEVAL

A History of Technology

Edited by Dr. Charles Singer, E. J. Holmyard, A. R. Hall, and Trevor I. Williams. Assisted by E. Jaffé, Nan Clow, and R. H. G. Thomson. Vol. 2: The Mediterranean Civilizations and the Middle Ages, c. 700 B.C. to c. A.D. 1500. Pp. lix+802+44 plates. (Oxford: Clarendon Press; London: Oxford University Press, 1956.) 168*s*. net.

IT is a great pleasure to welcome the second of the five volumes which will undoubtedly constitute the standard work on the subject. The first volume appeared two years ago and was reviewed in these columns by Dr. F. Klemm (*Nature*, 176, 182; 1955). This work is not only authoritative and well-documented but also very readable. Particularly commendable are the numerous illustrations throughout the book, so many of which are due to Mr. D. E. Woodall.

The division between Vols. 1 and 2, which separates Greece and Rome from the earlier civilizations, is perhaps arbitrary though convenient, but that between Vols. 2 and 3 is more significant, for this volume carries the story to the momentous period at which technology began to be influenced by the rise of modern science. These divisions are not, however, rigidly adhered to. Thus the subject of glass, not treated in the first volume, begins here with Egypt and the civilizations of the Middle East, and the extension of mining into the sixteenth century is obviously made necessary by the existence of Agricola's illustrations; and although printing with movable type began before 1500, that subject has been left for the next volume.

The period between the collapse of the Roman Empire and the Renaissance was on the whole one of technological advance, though retrogression naturally occurred in engineering activities such as public water supply and road building and maintenance, which require political unity and stability. Thus the crank was a medieval invention, and such outstanding advances in textile technique as the spindle wheel or great wheel and the spinning wheel with flyer belong to the same period.

In the first 1,500 years of our era there occurred, however, one of the most important of all technological advances, namely, the utilization of natural forces for motive power. In antiquity the chief source of energy was man's muscle power. The use of the horse did not substantially increase the level of energy production even if it increased the total amount, because the ancients did not know how to harness a horse effectively. The latter was discovered in the Middle Ages. The Greek water mill, also known as the Norse mill, was ineffective and gave no more power than a pair of slaves or a donkey. The Vitruvian water mill and later more effective mills, however, significantly raised the level of power production. The water mill was first used for grinding corn, but owing to the shortage of man-power and the disappearance of slavery at the end of the Roman Empire the use of water-power was extended and water wheels were used for driving saw mills, tilt hammers, fulling mills, and other machines. The harnessing of wind-power was also accomplished in the Middle Ages by the introduction of the windmill, and was more effectively utilized in the improved sailing ships which were able to sail to windward.

The most general discussion of this revolution in power production by the effective harnessing of water, wind and animal muscle is to be found in Prof. R. J. Forbes's chapter on power, which is therefore the key chapter of this volume; but this topic is also to some extent involved in M. B. Gille's chapter on machines.

Prof. Forbes has also contributed chapters on metallurgy, food and drink, and hydraulic engineering and sanitation; and with R. G. Goodchild, on roads, harbours, docks and light-houses. The late C. N. Bromehead contributed a chapter on mining and quarrying; and the late Dr. F. Sherwood Taylor, in collaboration with Dr. Charles Singer, a chapter on industrial chemistry. E. M. Jope has written on agricultural implements, medieval ceramics, and vehicles and harness, and A. R. Hall on military technology, and on military pyrotechnics. There are chapters on leather by John W. Waterer, spinning and weaving by R. Patterson, furniture by Cyril Aldred and R. W. Symonds, Greek and Roman ceramics by Gisela M. A. Richter, glass and glazes by D. B. Harden, the medieval artisan by R. H. G. Thomson, building construction by Martin S. Briggs, fine metal-work by Herbert Maryon, shipbuilding by T. C. Lethbridge, and alchemical equipment by E. J. Holmyard. There are also notes on parchment by H. Saxl, coin stamping by Philip Grierson, windmills by Rex Wailes, and cranes by A. G. Drachmann.

After such a recital of subjects it may appear ungrateful to ask for more; but it is nevertheless a pity that it was not found possible to continue in this volume the subjects of measures and weights, and the measurement of time, especially as this volume is shorter than its predecessor by about the length of a chapter.

A book by so many authors is in danger of lacking unity, but the editors have contrived to bind it together by thorough cross-referencing, and the impression of unity is strengthened by the use of many of the illustrations in more than one context.

This work is confined, of course, to Western technology, but Dr. Singer in the last chapter discusses what we owe to the technologies of the East.

Finally, it should be said that Imperial Chemical Industries, Ltd., by providing financial backing and office accommodation, has made this lavish production possible. Students of the history of technology will share with the editors their appreciation of this great company's enlightened patronage.

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