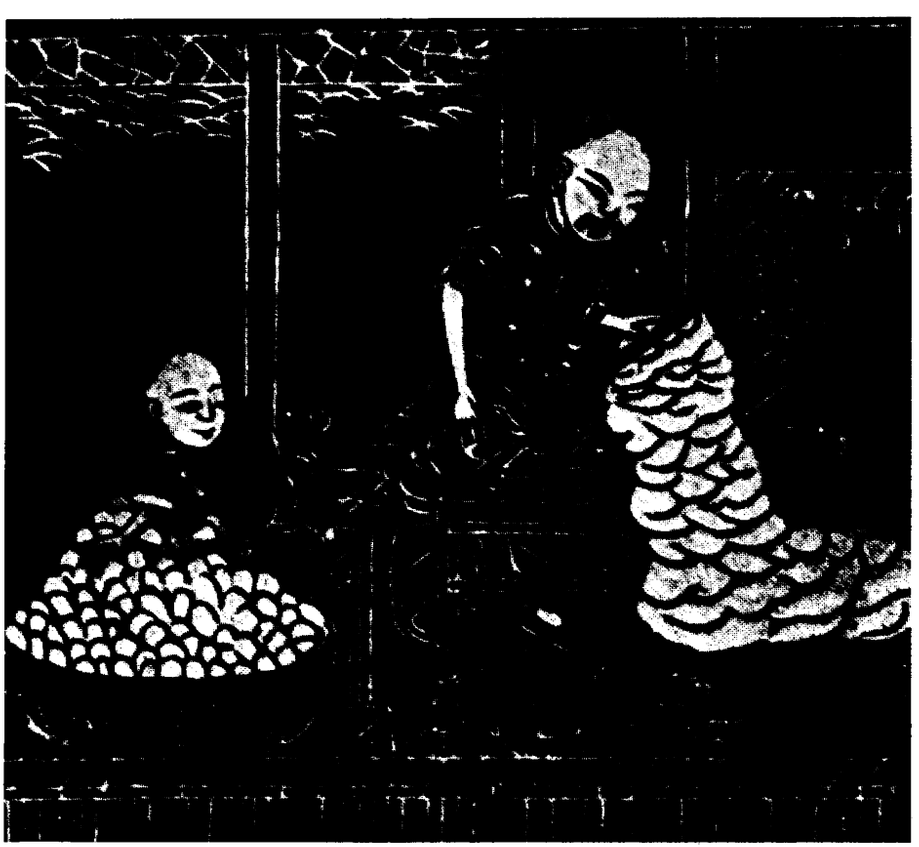
wide its range, that it will serve specialists in archeology, textile technology, economics, anthropology, linguistics, and sinology (all of which he draws upon and to each of which he contributes), yet the presentation is accessible to a reader knowledgeable in as little as one of them. For example, before approaching spinning, Kuhn provides a substantial account of the nature of the bast (ramie, hemp, and the like) and silk fibers, from culture through preliminary processing, including their places in the economy, daily life, and culture. (Shoes, often made of bean-creeper fiber, were "symbolical marriage presents because they always occurred in pairs" [p. 42].) Hand spinning with and without implements is described and compared with parallel developments in other cultures. Hand spindles and the whorls, or weights, that give them momentum are next presented and warn of the problem with the encyclopedic approach: many readers may not feel a need for some 65 pages of such description. The reader must pick his or her way through this book. Many may feel that a good deal of the information could better have been moved to footnotes or appendixes. Yet the linguist, I imagine, will welcome the interspersing of Chinese terminology and bibliography that impedes another reader. Who will welcome the overall level of detail (for example, measurements sufficient to a model-builder for innumerable implements) I'm not sure.

Yet even this complaint underlines the successes of the book. The development of the spinning wheel and its Chinese origin will not likely need retelling soon. Likewise for the multispindle treadle-powered reel dating from the 11th century, the entire complement of equipment for producing silk, from raising the worm (since the 4th millennium B.C.) to twisting the filament. Throughout, social development, custom, superstition, and economics maintain a parallel role in the tale. Though the style is a bit turgid, the illustrations (over 250) are illuminating and the explanations clear.

Kuhn has managed to maintain three levels of interpretation: the descriptive, which develops the processes and tools and their place in the life of their time and region; the intellectual, which involves the role of textile-processing in myth and symbol; and the theoretical, where he hypothesizes from available evidence and speculates about divergent paths of development in East and West. His accomplishment is immense.



Cotton gin at work, A.D. 1765, as depicted in a stone relief prepared for the *Mien Hua Thu* (Illustrations of Cotton Planting and Manufacture), one of the numerous agricultural works published in China in the 18th century. "The cotton seeds with the fibres adhering to them were fed into the narrow slit . . . between the rollers, where turning the handles caused the seeds . . . to fall to the ground or into a basket while the fibres appeared on the other side." [From *Science and Civilisation in China*, vol. 5, part 9]

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Cortical Function

The Prefrontal Cortex. Anatomy, Physiology, and Neuropsychology of the Frontal Lobe. JOAQUIN M. FUSTER. Second edition. Raven, New York, 1988. xiv, 255 pp., illus. $69.

If one of the goals of neuroscience is to understand the physics of the human mind, then a significant effort must go into learning about the prefrontal cortex, the expansion of which is a distinguishing mark of the human brain. The closest feasible model system is the prefrontal cortex of the Old World monkey, and this region is daunting in its complexity. The first edition of Joaquin Fuster's book was the place to begin any scholarly inquiry about the prefrontal cortex, and the new edition is a valiant attempt to force some coherence on this bewildering subject.

Separate chapters on anatomy, physiology, neurochemistry, neuropsychology, and human studies exhaustively survey the literature and provide capsule descriptions of much research. Some of this survey, however, is uncritical and not updated, probably because the diffuse nature of the field renders it intractable for a single author. For example, several times Fuster cites Jones and Powell's classic paper on prefrontal relationships to separate sensory streams, which emphasizes the somatosensory function of area 7 in the posterior parietal lobe. This view does not take into account subsequent work by Mountcastle and his group, who have emphasized the visual nature of much of this region, and although Fuster refers to Mountcastle, he never integrates the two views. Similarly, the book discusses the old paradox that although electrical stimulation evokes saccadic eye movements from the frontal eye field in the monkey, Bizzi's early studies failed to reveal neurons that discharged before saccades. Recent studies, however, have clearly established that there is a movement signal in the frontal eye field that precedes purposive saccades, even those made in total darkness, and have allowed the resurrection of theories suggesting that the frontal cortex does drive saccadic eye movements. These sorts of inaccuracies in the descriptions of literature that this reviewer knows intimately make one wonder about the fidelity of the capsule descriptions of research in other areas.

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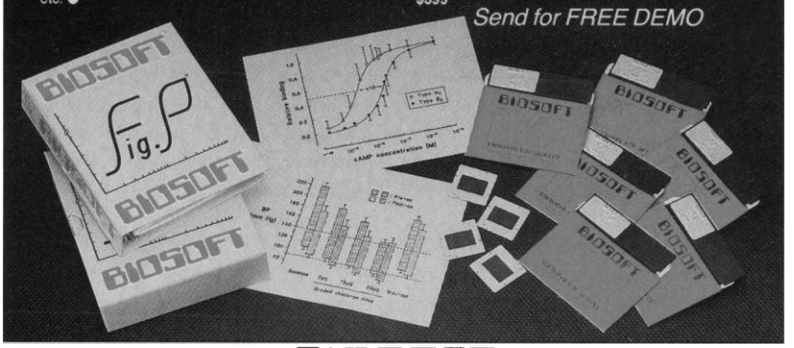

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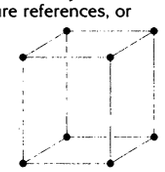

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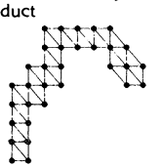

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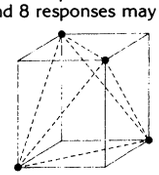

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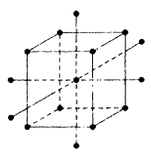

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The final section of the book contains Fuster's arguments that the prefrontal cortex has "a cardinal function . . . in the temporal order of behavior, consisting of and supported by three subordinate functions: provisional memory, anticipatory set, and control of interference." This idea arises from many experiments, starting with those of Jacobson in the 1930s demonstrating that the prefrontal cortex is necessary for the performance of delayed response tasks by nonhuman primates. Physiological experiments, especially those of Fuster and his group, have established that neurons in the prefrontal cortex have properties consistent with the necessary components for performing these tasks. The theory is not unreasonable, but Fuster does little to flesh it out, instead resorting to generalizations such as "the activated neural ensemble constitutes a giant associative network representing the stimulus in all its cognitive aspects and relationships."

Nonetheless, the book is valuable, precisely because it collects in one place the literature about the prefrontal cortex and illustrates by its very failures the sort of problems awaiting one who would tackle the topic. It may be unsatisfying, but, because of the diffuse and difficult nature of the field today, it is the best book we have.

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Some Other Books of Interest

Biology and Conservation of the River Dolphins. W. F. PERRIN, R. L. BROWNELL, JR., ZHOU KAIYA, AND LIU JIANKANG, Eds. International Union for the Conservation of Nature, Cambridge, U.K., 1989. vii, 173 pp., illus. Paper, $25. IUCN Species Survival Commission Occasional Paper no. 3. From a workshop, Wuhan, China, Oct. 1986.

Handbook of Marine Mammals. Vol. 4, River Dolphins and Larger Toothed Whales. SAM H. RIDGWAY AND RICHARD HARRISON, Eds. Academic Press, San Diego, CA, 1989. xx, 442 pp., illus. $99.50.

The river dolphins, Platanistidae, are "in trouble around the world" and "are the most endangered of all cetaceans," according to the editors of these two volumes. In 1986 the International Union for the Conservation of Nature sponsored a workshop in Wuhan, China, to inaugurate a campaign for their preservation, an event to which these books owe their content in whole or in part.

The proceedings volume consists of a general Report of the Workshop and revised versions of 24 of the 38 "working papers"