for independence and helped to propel the colonies along their revolutionary course: "Americans had gone to war to determine their own technological as well as their own political destiny" (p. 214). This assertion is a gross exaggeration, and not merely because, as York acknowledges, very few Americans understood or cared about technology before, during, or after the Revolution. A more fundamental problem is the apparent conflation of programs to promote manufacturing and those intended to encourage invention. York provides a solid account of the latter and presents impressive evidence of the activities of a small number of energetic men. But he overstates his case. Insofar as a coherent program for the promotion of manufacturing existed, it was one advocated by, and in large measure confined to, Hamilton and his coterie. Although York correctly observes that their program embraced the application of best-practice technology and even the stimulation of invention, he fails to recognize that this was a comparatively minor feature of the program, which laid greater stress upon technological mimesis.

Notwithstanding these problems, *Mechanical Metamorphosis* has some important things to say to students of technological change and economic history. The book's sixth chapter, "Limits to innovation: the Pennsylvania rifle," presents a superb account of an instance when institutional resistance to an invention—rifled weapons to replace smooth-bore muskets—frustrated its adoption. Most of this case study has appeared in article form, but its inclusion here will make it accessible to a wider audience. Readers will also appreciate York's treatment of the patent systems of the American colonies and the United States under the Articles of Confederation and the Constitution. The importance to industrial development and technological change of the development of a coherent procedure for protecting the proprietary rights of inventors emerges fairly clearly in York's discussion of the efforts of sorely tried American inventors such as Oliver Evans and John Fitch to profit from their work. York is at his best when discussing the work and vision of specific inventors in the context of a largely indifferent and occasionally hostile society. His thesis that a "mechanical metamorphosis"—even if only a conceptual one—had occurred among anything more than a minuscule group of Americans by 1790 is not convincing and detracts from a study that has a number of worthwhile things to say.

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## The Psychology of Music

**The Musical Mind**. The Cognitive Psychology of Music. JOHN A. SLOBODA. Clarendon (Oxford University Press), New York, 1985. x, 291 pp., illus., $36. Oxford Psychology Series, no. 5.

*The Musical Mind* is a welcome addition to the literature on the cognitive processes involved in musical skills. Sloboda is both a musician and a psychologist, and the principal value of the book lies in his careful and informative discussions of musical phenomena from the point of view of cognitive psychology. The book is distinguished by its emphasis on processes involved in the production of music—composition, improvisation, and performance. Sloboda uses composers' sketchbooks (especially those of Beethoven) as well as his own experiences as a composer in discussing the planning processes that go into composing a work. And he provides a good psychological analysis of the differences between composition and improvisation.

Parallels between language and music are emphasized throughout. Sloboda provides a broad overview of the features that are common to music and language, such as categorical perception and aspects of the structural organization of temporal units. He even raises the possibility of systematic reference to extramusical events. Sloboda suggests that music evolved together with language as a social communication system. He rejects the view that music evolved out of elaborations of mating calls, noting that most primate vocalizations involve wider categories of social communication more closely connected with group cohesion than with mating. There is every reason to believe that music was preserved in early human society because of its contributions to communication and cohesion, though Sloboda points out that music has since been elaborated in the peculiarly human ways that arise from "some specifically human tendency to create and notice organized patterns, hierarchies, and sequences" (p. 266).

Sloboda is appropriately cautious in presenting the principal results of recent research on the information processing of melodic patterns, and his discussion of the subject is lucid and informative. The perception of music is introduced by way of a discussion of the Gestalt principles of figural pattern organization in perception—the grouping of notes into melodies on the basis of similarity, proximity, and continuity. Here a puzzle confronts us: why are we so good at perceiving hidden figures we know are there? In the "find six lions in the jungle" type of hidden-figures problem familiar to schoolchildren the lions are not seen spontaneously but pop out when one searches for them. Musical analogs of the hidden-figures problem pose a similar puzzle: how can we focus attention on a pattern that has no distinguishing features of an obvious physical sort?

Tonal scales for the organization of pitch are virtually universal in the world's musical systems. Such scales define fixed sets of pitch intervals to be used in melodies, define hierarchies of importance for pitches, and establish dynamic tendencies of attraction and repulsion among them. Evidence that scale frameworks are important to perception and to memory for melodies and that they play an essential role in the comprehension of melody is reviewed here. Sloboda rightly emphasizes the contributions of several factors to the understanding of melody: tonal frameworks, melodic contours, rhythmic patterns, and the complex interactions among them. His treatment of the development of musical information-processing capacities during childhood is especially good and quite accessible to the nonspecialist.

No book of this size could cover all of the current work in the psychology of music. *The Musical Mind* focuses on cognitive processes and is not concernedwith sensory phenomena underlying the cognition of music. Within the cognitive domain, the book omits consideration of the results of multidimensional scaling studies of pitch, rhythm, timbre, and harmony. An acquaintance with the basic materials of music and with European music notation is assumed. The best passages in the book occur when Sloboda finds an illuminating musical example to illustrate a psychological point, and the examples are given in notation. The discussions of psychological phenomena do not require a specialized background and should be accessible to the general reader. *The Musical Mind* is a lucid and useful introduction to the aspects of the field that it covers.

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## Some Other Books of Interest

**Haldane**. The Life and Work of J. B. S. Haldane with Special Reference to India. KRISHNA R. DRONAMRAJU. Aberdeen University Press, Aberdeen, 1985. xvi, 211 pp. £14.95.

The geneticist J. B. S. Haldane spent the last years of his life (1957–1964) in India. Here Krishna Dronamraju, an associate of Haldane's during those years, presents a memoir to supplement the collection of