

## Mathematics and Perception

**P**UZZLES OLD & NEW: HOW TO MAKE AND SOLVE THEM, created by Jerry Slocum and Jack Botermans; text by Carla van Splunteren and Tony Burrett. University of Washington Press (\$19.95). Martin Gardner himself happily reports that this book presents, "for the first time in history, . . . a comprehensive survey" of mechanical puzzles. The term is used for those puzzles made of solid parts that must be manipulated to arrive at a solution. Even a count of the objects displayed here is difficult, but there must be between 400 and 500 distinct puzzles. This volume arises out of the annual international puzzle parties that are held around the prodigious collection of Jerry Slocum of Los Angeles, and it enhances a traveling exhibition originated by the Craft and Folk Art Museum of Los Angeles.

The authors have an organizing taxonomy. They distinguish 10 classes of these puzzles: take apart, put together, interlocking, disentangling, sequential move, vanishing image, object impossible to make, folding, enigmatic vessel and puzzles demanding manual dexterity. One essential page shows an array of 100 or so realizations of Rubik's (or Larry Nichols') Cube, a world teaser a few years back. Another set of pages cracks open a hard chestnut of enduring influence, the Chinese Rings. That wiry disentanglement requires movement sequences—which are mapped out here—that recall the equally classical Tower of Hanoi. No taxonomy rests easy.

The variety of puzzles represented can be described only as awesome. In contrast to that notorious cube, another spread shows four or five dissec-

tions of plane figures. An outline letter T, for instance, is divided by two parallel cuts into four parts. Of unsurpassed simplicity, this cheap T puzzle is a kind of logical converse of the commonplace jigsaw. Its origin goes back to the turn of the century; it has periodically become popular. In Chicago it was circulated (to advertise sausage) as the Tormentor, the handbill proclaiming that it was "a real test" to fit the parts back into a perfect T. The earliest version on record was a five-part ivory cross, made in China, widely known 150 years ago.

Most puzzles evolve. The interlocking wood puzzles of Edo Japan surely first reflected the skill of carpenters who fitted wood pieces without nails. Those puzzles are made today in architectural and animal forms of all kinds, as well as in the shape of cars, ships and planes. Puzzles like those but more abstract, interlocking notched rods assembled into "burrs" that show high external symmetry, have been made for a long time in the West; there are said to be some that consist of hundreds of pieces.

A unique specimen is a bolt and nut a foot high, a 1972 puzzle patent. The nut can be unscrewed from the bolt threads, a series of spaced annular grooves, only by a specific sequence of turns; the puzzle is a rotary maze! It is foolhardy to summarize more of this cornucopia of bizarre ingenuity. The book will transfix some readers at almost any age; others, chilled, will put it down at once. One wonders, though, whether any library that serves a population of teen-agers can afford to be without a copy. Is its topic mathematics, perception, artisanry, recreation or a benign voluntary insanity?