

GODEL, ESCHER, BACH:
An Eternal Golden Braid
 by Douglas R. Hofstadter
 Basic Books, 1979
 777 pp. \$18.50
 L of C 78-19943
 ISBN 0-465-02685-0



Metamorphosis. Woodcut by M. C. Escher.
 ©The Escher Foundation, 1979. Rights
 arranged courtesy of Vorpai Galleries.

In any mathematical system, propositions exist that cannot be proved or disproved. Czech mathematician Kurt Gödel shocked his peers with this "incompleteness" theorem in 1931. Now Douglas R. Hofstadter, an Indiana University computer scientist, sets out to probe the human thought process by examining the logic of Gödel's proof, the 18th-century music of Johann Sebastian Bach, and the 20th-century art of M. C. Escher. In Gödel's mathematical deduction, Hofstadter finds the concepts of self-reference—"Strange Loopiness"—and circular argument. (For a parallel, consider the irony in the simple declaration, "This statement is false.") Gödel used mathematical reasoning to explore mathematical reasoning itself; Escher and Bach developed self-mirroring and irony in their works. Thus, Escher drew staircases that seemingly ascend and descend simultaneously. Bach invented musical themes, then reversed and inverted them in different keys. Like a Lewis Carroll story, this often funny book—connecting art, literature, and science—has its own offbeat circularity.

DISTURBING
THE UNIVERSE
 by Freeman Dyson
 Harper, 1979
 283 pp. \$12.95
 L of C 78-20665
 ISBN 0-06-011108-9

"I have always remained a problem solver rather than a creator of ideas," writes Freeman Dyson, a physicist at the Institute for Advanced Study in Princeton. In these essays, Dyson supplies a philosophic insider's view of America's leading nuclear physics laboratories. Dyson never helped devise nuclear bombs, but his friends did. He recalls that the famed Robert Oppenheimer, a Jew, "was driven to build atomic bombs by fear that if he did not seize this power, Hitler would." Physicist Edward Teller, a Hungarian, was driven to build hydrogen bombs by the Stalinist threat of world domination. In 1958, Dyson took part in the planning of the now-defunct Project Orion (a spacecraft to be powered by nuclear explosions). Discussing such topics as nuclear energy and recombinant DNA, Dyson describes the scientist's dilemma of reconciling a "technically sweet" project with its potential ill effects.

Douglas R. Hofstadter: Godel, Escher, Bach : An Eternal Golden Braid (Paperback - Anniv. Ed.); 1999 Edition. Yet Godel, Escher, Bach remains a remarkable achievement. Its intellectual range and ability to let us visualize difficult mathematical concepts help make it one of this century's best for anyone who's interested in computers and their potential for real intelligence. - -Richard Dragan.