tion as a useful *social* science rather than a hard science, says Vitz. Researchers in this field develop tests to gauge intelligence, occupational aptitudes, mental pathologies, and other traits.

Therapeutic psychology, the branch that *is* psychology to most people, still has a modest base of scientific observation and experimental research, but it's no longer interested in being a science. The success of biologically based drug therapies in treating many psychological maladies is one reason. Modern therapeutic psychology uses "concepts and broad interpretive frameworks that are intrinsically nonscientific—and, indeed, philosophical in nature. The result is that psychology is becoming an applied philosophy of life," writes Vitz, a part of the humanities.

One sign of the field's new maturity is the emergence of "positive psychology." Traditional psychology focused on traumas and pathologies—and bred the victim mentality and flight from personal responsibility that now afflict American society. Positive psychology, built on the research of Martin Seligman of the University of Pennsylvania, seeks to balance the discipline's focus by looking at "traits that promote happiness and well-being, as well as character strengths such as optimism, kindness, resilience, persistence, and gratitude," according to Vitz. In making this shift, he writes, therapeutic psychology "has moved not only from science to philosophy, but also from the past and its effects to the future and our purposes, from mechanical determinism to teleology."

At the same time, therapeutic psychology has become far friendlier to religion than it was in its younger days. Indeed, "many clinical psychologists today are themselves religious." Ironically, that friendliness has something to do with the democratization of therapy, which has brought psychologists into greater contact with ordinary Americans.

Vitz sees the possibility of a new "transmodern" psychology that incorporates the wisdom of traditional religious and philosophical thinking in guiding people to better lives. It would be a "smaller and humbler" discipline, but far more useful to its public than the overeager adolescent ever was.

Genework

"The Unselfish Gene" by Johnjoe McFadden, in *The Guardian* (May 6, 2005), 119 Farringdon Rd., London EC1R 3ER, England.

For decades, scientists have been in hot pursuit of the genes for this and that—for heart disease, autism, schizophrenia, homosexuality, criminality, even genius. For the most part, they've come away empty-handed. As a result, many are turning to "an entirely new way of doing biology: systems biology," says McFadden, a professor of molecular genetics at the University of Surrey, England.

Scientists studying the cell's metabolic pathways picked up some early clues that something was amiss in their search for isolated genes. The metabolic pathways are like a network of roads that transport food to enzymes, which assemble the useful molecules into more cells. Biotechnologists seeking to engineer the cells to produce certain types of new cells found their efforts hindered by genes that appeared to be controlling the whole network's operation. Striking back, the scientists engineered the genes to prevent them from taking control. But it didn't matter: The metabolic pathways swiftly went back to business as usual.

Geneticists were also frustrated and puzzled by the many genes that had no apparent function at all. Take the "prion gene," which mad cow disease turns into a pathogenic brain-destroying protein. What does this gene normally do? "The standard way to investigate what a gene does is to inactivate it and see what happens," McFadden writes. Yet when geneticists did that to the prion gene in mice, *nothing* happened: The mutant mice were perfectly normal. But a functionless gene isn't really a "gene" at all, as the entity is conventionally understood, for it is invisible to natural selection.

Instead of having a single major function, McFadden writes, most genes "probably play a

small part in lots of tasks within the cell. . . . So the starting point for systems biologists isn't the gene but rather a mathematical model of the entire cell. Instead of focusing on key control points, systems biologists look at the system properties of the entire network. In this new vision of biology, genes aren't discrete nuggets of genetic information but more diffuse entities whose functional reality may be spread across hundreds of interacting DNA segments." Instead of a single gene's being responsible for schizophrenia, for example, the condition "may represent a network perturbation generated by small, almost imperceptible, changes in lots of genes."

To pursue this new vision, systems biology centers "are popping up in cities from London to Seattle." Unlike traditional biology departments, these centers generally have on staff not only biologists but physicists, mathematicians, and engineers. "Rather like the systems they study, systems biology centers are designed to promote interactivity and networking."

ARTS & LETTERS

Paying Tribute to Mr. Bellow

A Survey of Recent Articles

Saul Bellow, whose exuberant novels shouldered their way through the second half of the 20th century, died on April 5, at the age of 89. Recipient of three National Book Awards, a Pulitzer Prize, and the Nobel Prize for literature, Bellow, whose books included *The Adventures of Augie March* (1953), *Henderson the Rain King* (1959), *Herzog* (1964), *Mr. Sammler's Planet* (1970), and *Humboldt's Gift* (1975), continued to write until shortly before his death. The veins of the tributes to Bellow this spring were as varied as his characters. But united as they were in praise, his eulogists could not agree on his essential qualities: Was he a misanthrope or a champion of flawed humanity? Was he the first modern American novelist to successfully embrace a European mode, or the quintessential American writer?

Saul Bellow in 1953

"Bellow's dark philosophical moods are what defined him as the most European of American novelists, though he is often celebrated—especially by British writers—as the epitome of American literary exuberance," critic Lee Siegel wrote in *The Nation* (May 9, 2005). "But Bellow was really a nationally unaffiliated free agent who exuberantly used European lines and pulleys to get America under control of his imagination, just as he wielded an American idiom to throw off any claim that Europe might have had on his creative will."

In *The Guardian*'s pages (April 7, 2005), novelist Ian McEwan proclaimed Bellow uniquely American as he explained why British writers tend to lay claim to him. "What is it we find in him that we cannot find here, among our own? I think what we admire is the generous inclusiveness of the work—not since the 19th century has a writer been able to render a whole society, without condescension or self-conscious social anthropology. Seamlessly, Bellow can move between the poor and their mean streets, and the power elites of university and government, the privileged dreamer with the 'deep-sea thought.' His work is the embodiment of an American vision of plurality. In Britain we no longer seem able to write across the crass and subtle distortions of class—or rather, we can't do it gracefully, without seeming to strain or without caricature. Bellow appears larger, therefore, than any British writer can hope to be."