RELIGION & PHILOSOPHY

John Locke, David Hume, and the other great 18th-century empiricist philosophers.

The empiricists rejected metaphysics and insisted that all knowledge must come from reflection on the evidence of the senses. Wesley agreed, calling Locke "a great master both of reasoning and language." In *Primitive Physic* (1747), "the work of an extreme empiricist," according to Dreyer, Wesley excoriated the physicians of his day for emphasizing theory over evidence in medical research. His insistence on the "direct witness" of God was a logical result of the empiricist emphasis on sensory evidence.

Like the empiricists, Wesley held that some things were beyond human ken. The Bible revealed "facts," such as the existence of the Trinity, which had to be acknowledged. *Understanding* the Trinity was quite another thing: "I have no concern with it," Wesley said.

Wesley relied more heavily on Scripture in making his arguments than did his counterparts. He "cared more about religion than he did about philosophy," Dreyer says. "But it is philosophy in the end that explains what his religion meant."

A Kind Word For Death

"The Case for Mortality" by Leon R. Kass, in *The American Scholar* (Spring 1973), 1811 Q St. N.W., Washington, D.C. 20009.

Arresting the aging process and prolonging human life are top priorities of medical researchers. At first glance, such efforts seem an unqualified good, but Kass, a University of Chicago biologist, is troubled by some of their implications.

The aging process, he says, prepares us for death. "Inasmuch as I no longer cling so hard to the good things of life when I begin to lose the use and pleasure of them," wrote philosopher Michel de Montaigne in 1572, "I come to view death with much less frightened eyes." Death will become harder to accept as people live longer, healthier lives.

Nor would a longer life span significantly increase life's pleasures. "Would the Don Juans of our world," Kass asks, "feel better for having seduced 1,250 women rather than 1,000?" Indeed, he continues, "Is not the limit on our time the ground of our taking life seriously and living it passionately?" The immortals of Greek mythology, facing no such limits, were notoriously frivolous and shallow. Finally, knowledge of decay and death also heightens our appreciation of beauty.

The battle against aging, Kass argues, is at bottom a quest for immortality. It springs from a deep sense of human deficiency, a longing for "wholeness, wisdom, goodness"—rewards universally reserved for the afterlife in the world's religions. "No amount of more-of-the-same," he observes, will truly satisfy such desires.

Perpetuating oneself through one's children, though often "a snare and a delusion," is a secular tonic for such longings, Kass believes. But a society obsessed with the "narcissistic" fear of aging, he contends, "is

in principle hostile to children" because they are a constant reminder that one is growing older and will die. New generations, Kass adds, are needed to renew society's sense of hope and aspiration.

Life-extending measures are difficult to condemn. But Kass worries that by diverting so much attention to living longer, we may sacrifice "our chance for living as well as we can and for satisfying to some extent . . . our deepest longings for what is best."

SCIENCE & TECHNOLOGY

After $E=mc^2$

"Chasing Particles of Unity" by Michael Gold, in *Science 83* (Mar. 1983), P.O. Box 10790, Des Moines, Iowa 50340.

Physicists have identified the particles responsible for three of nature's four basic forces—electromagnetism, gravity, and the so-called "strong force," which binds the nuclei of atoms together. But until recently, "weak-force" particles have escaped detection.

Japanese physicist Hideki Yukawa first predicted the existence of such particles, which cause radioactive decay, during the mid-1930s, notes Gold, a *Science 83* associate editor.

By the late 1960s, Steven Weinberg of the Massachusetts Institute of Technology and Abdus Salam of London's Imperial College had developed a mathematical "electroweak" theory that unified the electromagnetic and weak forces and predicted the existence of three "weak" particles: W^+ and W^-, both charged particles, and a neutral Z^0.

In 1980, the European Center for Nuclear Research (CERN) in Geneva, Switzerland, spent some $350 million to modify its four-mile-long particle accelerator in a quest for the elusive particles. For two months, the accelerator hurled beams of protons and antiprotons into head-on collisions at energies, Gold says, "comparable only to those reached in the first explosive seconds of . . . the Big Bang." In theory, the experiment should have yielded a grand total of 100 W and 30 Z particles—each existing for one trillion-trillionth of a second before disintegrating into electrons, muons, and other smaller particles.

The results confirmed the existence of both the W^+ and W^- particles, identified through telltale electrons. But no Z^0 particles were detected. The CERN scientists are not discouraged: They expect the more intensive second round of tests, beginning this year, to reveal the elusive Z^0.

The prize for finding them will probably be a Nobel. But proving the "electroweak" theory of Weinberg and Salam (who shared a Nobel Prize in 1979) would be the most significant result. Its ultimate usefulness, Gold notes, is hard to gauge. But when scientists in the past have validated such "unified" theories—thus proving that seemingly differ-