perial authority. Roman governors sought to satisfy the Greeks by ingeniously blurring the distinction between man and God during the sacrifices. They saw to it that the rites were supervised not by true priests but by civic officials. The animals were offered "on behalf of" the emperor, rather than "to" him. And where the Greeks traditionally slaughtered white animals to worship gods and darker beasts to honor heroes and the dead, the imperial "priests" used speckled animals.

Price believes that a dispute over such rituals largely explains why the Romans singled out the early Christians for religious persecution. Until their revolt against Nero in A.D. 66, even the Jews willingly sacrificed animals "on behalf of" Roman rulers as they had always done for their own kings. Christians, however, would go no further than praying for them. They claimed that Christ's Crucifixion represented the ultimate sacrifice and ruled out all future blood rituals except for the symbolic Eucharist. Infuriated by this slight to their gods (and perceiving an insult to the emperor), Roman authorities drove the Christians underground until the Emperor Constantine's conversion in 313.

The Third Form of Love

"Compassion and Transcendence of Duty and Inclination" by Alan R. Drengson, in *Philosophy Today* (Spring 1981), Messenger Press, Carthagena Station, Celina, Ohio 45822.

When Christ implored man to love his neighbors and enemies, what did he mean? Immanuel Kant (1724–1804), the great German philosopher, concluded that Christ spoke of "practical love" stemming from a sense of duty (surely he was not referring to "pathological love," or passion). Drengson, a philosopher at the University of Victoria, Canada, contends that Kant neglected a third form of love—compassion.

Kant was influenced by Plato and Aristotle, who held that right living is the product of reason and self-discipline. Both Greeks believed that individuals could bring their emotions and appetites into harmony with the just dictates of the intellect—thereby reaching an understanding of the "ways of nature, society, and self." But where his mentors emphasized a "balance of one's natural capacities," Kant argued that emotions could never be tamed by the mind. To him, the most moral actions were precisely those that conflicted with natural inclinations but were propelled by a commitment to ethics grounded in reason.

Kant's philosophy seems well-suited to a secular society, notes Drengson. There, "laws and rules become necessary substitutes for the large heart" of Christian charity, and actions become all-important. But religion demands a spiritual transformation. In his Sermon on the Mount, Christ asked his followers to suffer (empathize) with real people in their personal plights. Those who act out of duty alone, says Brengson, can only love abstractly. Worse, a sense of duty fashioned by the mind can lead one to cast judgments and value "consistency" without wisdom or mercy. Compassion summons up forgiveness and acceptance.

RELIGION & PHILOSOPHY

When Christ said that the poor in spirit would gain the kingdom of heaven, he meant those who are "empty of pretensions, free of compulsions and desires . . . unfilled with accumulations of dogmas, theories, principles, and rules," writes Drengson. A Christian so transformed will focus his reason, emotions, and will on the task of helping particular people in particular situations.

SCIENCE & TECHNOLOGY

Newton's Apple

"Newton's Discovery of Gravity" by I. Bernard Cohen, in *Scientific American* (Mar. 1981), 415 Madison Ave., New York, N.Y. 10017.

Sir Isaac Newton (1642–1727), formulator of the landmark law of universal gravitation, also dabbled in "fiction." It was he who spread the tale about being inspired by a falling apple. Did his discovery (that all objects attract each other with a force that varies directly with the product of their masses and inversely with the square of their distance) spring from a sudden stroke of genius? Or did Newton pirate an insight of physicist Robert Hooke, with whom he corresponded? The two scientists' writings disprove both ideas, says Cohen, a Harvard historian.

It started with the mystery of orbiting bodies. In a 1679 letter, Hooke convinced Newton that the motion of an orbiting body results not from a centrifugal, or "center-fleeing," force but from two elements—an inertial force propelling the body in a straight line and a centripetal force drawing it toward the center. Hooke even proposed that the "attractive motion" between the sun and a planet varied inversely with the square of their separation. But at this point, Cohen writes, "Hooke was stuck." Hooke believed that centripetal force was a "one-way street" emanating solely from the center body. Why, then, were the planets' orbits elliptical, as the Dutch astronomer Johannes Kepler had observed 70 years earlier?

Hooke's way of subdividing curved motion set Newton on a new path of inquiry. Using Kepler's observation that a line stretching from a planet to the sun sweeps across equal areas in equal periods of time, Newton deduced that the forces Hooke described produced elliptical orbits (see Newton's geometric proof, next page). Therefore, he reasoned, the planets' movements around the sun must result from Hooke's forces.

Newton knew that the sun was not at the physical center of planetary orbit. He also knew that in the actual world (as opposed to the ideal world of mathematical constructs) "attractions customarily are directed toward bodies" and that, by his own law of action and reaction, the "actions of attracting and attracted bodies are always mutual and equal." Newton figured that the sun and planets must attract *each other* (he never claimed to know how) and that they all rotate around a