
RELIGION & PHILOSOPHY

Bacon's goal was to ensure that scholarship remained firmly rooted in service of Christian principles. In his *Opus maius* ("Greater Work"), Bacon argued that Christians should embrace, not shun, new knowledge. Consider *perspectiva*—the science of vision. Not only are light, colors, and mirrors frequently mentioned in the Bible, Bacon argues, but optical instruments can make large things seem small and small objects seem large—wonders that can impress heathens or terrorize those who resist the faith. Experimental science (which, in Bacon's eyes, included fireworks, magnets, and astrology) creates practical inventions that the Church can use to defend itself against infidels and the Antichrist.

Bacon himself performed many experiments. In 1242, he was the first Western researcher to give the exact formula for gunpowder. But his chief purpose was to *extend*, not abandon, Christian faith. His work did not look forward to Godless modern science, but *backward* to the theology of the church fathers. "There is only one perfect wisdom," Bacon wrote in his *Opus maius*, "which is totally contained in sacred Scripture."

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Worlds Under the Lens

"Visual Surface and Visual Symbol: The Microscope and the Occult in Early Modern Science" by Catherine Wilson, in *Journal of the History of Ideas* (Jan.-Mar. 1988), Temple Univ., Philadelphia, Pa. 19122.

In 1691, English physicist Robert Hooke wrote that few scientists were using microscopes in their research. Hooke complained that his colleagues thought nothing more could be discovered with the microscope. Only amateurs were using the instrument, Hooke claimed, and then merely "for Diversion and Pastime."

Wilson, a philosopher at the University of Oregon, notes that many philosophers, doctors, and even playwrights of the time thought that gazing through microscopes was largely "a trivial, time-wasting, or intrinsically comical pursuit." While telescopes were used to explore such mighty objects as planets and stars, microscopes, in the minds of late-17th-century intellectuals, only explored things that were "small, dirty, and troublesome." Satirists loved poking fun at microscope users; in Thomas Shadwell's comedy *The Virtuoso* (1676), for example, the protagonist, Sir Nicholas Gimcrack, has "spent £2,000 in microscopes to find out the Nature of eels in vinegar, mites in a cheese, and the blue of plums."

Technical problems compounded the microscopist's difficulties. The lenses were imperfect, tending to distort color and scale. As a result, biologists had a hard time explaining precisely what they saw. "It is exceedingly difficult . . ." Hooke wrote in *Micrographia* (1665), "to distinguish between a *prominency* and a *depression*, between a *shadow* and a *black stain*."

Philosophers were divided. In his *Essay Concerning Human Under-*

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standing (1690), England's John Locke (1632–1704) contended that microscopists' discoveries were of little importance to practical men in guiding them "to the market and the exchange." Germany's Gottfried Leibnitz (1646–1716) disagreed. By providing evidence of life unseeable by the naked eye, microscopes, in Leibnitz's view, provided evidence of the existence of "monads," the invisible particles that he believed were the basic building blocks of life.

Not until the 19th century were achromatic lenses perfected that could convey images without distortion. By then, however, the instrument's importance was beyond dispute.

Sex and Destiny

"Daughters or Sons" by Sarah Blaffer Hrdy, in *Natural History* (Apr. 1988), Central Park West at 79th St., New York, N.Y. 10024.

Since ancient times, people have resorted to spells, chants, philtres, and prayers to try to fix the sex of a human fetus. In India, for example, people chant mantras after a woman conceives, in the hope that a female fetus will be magically transformed into a male. "A daughter's birth makes even a philosophic man gloomy," says one ethnographer in India, "whereas a son's birth is like sunrise in the abode of gods."

Hrdy, an anthropologist at the University of California, Davis, notes that, in fact, sex ratios between males and females are not always identical. Abortion, infanticide, neglect, and ostracism are methods that animals (and humans) use to ensure that one gender is favored over the other.

Consider the coypu, a guinea pig-like animal native to South America. English zoologist Morris Gosling dissected 5,853 female coypu and discovered that when healthy, pregnant coypu had small litters, the embryos were mostly male. He concluded that these coypu were, in some way, selectively aborting small litters that were mostly female. Gosling's explanation: Healthy male offspring would be able to impregnate many females, thus offering a greater chance for the species' survival.

In some species, social mores tend to discourage female offspring. Among macaque monkeys, high-ranking females "haze and abuse" daughters produced by low-ranking females; hence, such mothers tend to raise sons, who quickly emigrate. However, high-ranking monkeys tend to prefer daughters of their own. Anthropologists studying baboons at Amboseli National Park in Kenya report that daughters of *high-ranking* baboon mothers tend to live longer than do sons, and are better cared for. By staying at home and placing themselves under their mothers' protection, they are more likely to stay healthy than their migratory brothers, thus increasing the odds of bearing offspring and continuing their parents' line.

Among humans, female infanticide has been practiced in some cultures; other societies use persuasion as a means of favoring male offspring. Anthropologist James Boone examined 200 years of medieval Portuguese marriage records; he found that upper-class men were more likely to marry and have children than were their sisters, 10–40 percent of whom were sent to convents. Humans "consciously calculate" the advantages of producing boys, while animals who favor one sex over another do so because of natural selection.