
corruption, divine initiative, and the authority of educated clergymen and inherited ecclesiastical structures, the Methodists proclaimed the breathtaking message of individual freedom, autonomy, responsibility, and achievement." And they did not discourage "the impulses of popular religion, dreams and visions, ecstasy, unrestrained emotional release, preaching by blacks, by women, by anyone who felt the call."

For people low on the social ladder who craved respect and opportunity, Methodism had great appeal. "As a movement," Hatch says, "Methodism became a powerful symbol of social mobility, a beacon of aspiring respectability." Wilbur Fisk, who began his ministry as a

defiant outsider, ended up as president of Wesleyan University. Between 1840 and 1860 Methodists founded at least 35 institutions of higher education, and went on to establish a like number between the Civil War and the end of the century. With the election of Methodist William McKinley to the presidency in 1896, John Wesley's heirs "sealed their place as the nation's largest and wealthiest Protestant body."

Although historians have been more interested in Puritanism, Hatch concludes, Methodism reveals "much more" about religion as it came to be practiced in America: "not great, not sophisticated, not awe-inspiring, but what it is."

SCIENCE, TECHNOLOGY & ENVIRONMENT

Big Science Blues

"Democracy and Super Technologies: The Politics of the Space Shuttle and Space Station *Freedom*" by W. D. Kay, in *Science, Technology, & Human Values* (Spring 1994), Sage Publications, 2455 Teller Road, Thousand Oaks, Calif. 91320.

In 1969, astronaut Neil Armstrong set foot on the moon and proclaimed it a small step for a man, a giant leap for mankind. In more recent years, "big science" government projects such as the space shuttle, the Stealth fighter-bomber, the Hubble space telescope, and the *Freedom* space station have seemed more prone to stumbles than to giant leaps forward. The problems are usually blamed on poor administration. But Kay, a political scientist at Northeastern University in Boston, fingers another culprit: democratic government.

Government officials, he argues, face a Catch-22 situation: big projects require broad political support, from the public or from various interest groups. But getting that support, in ordinary times, leads to further increases in the scale, expense, risk, and uncertainty of such projects. That makes them more likely to fail.

The space shuttle, for example, was conceived during the Nixon administration as a

support system for a space station. But in the post-Apollo era, the National Aeronautics and Space Administration (NASA) had to delay the station, and it needed to forge a powerful political coalition just to get the shuttle built. It persuaded the U.S. Air Force to use the shuttle to deploy reconnaissance satellites. But that required a much larger cargo bay and more powerful engines to lift the payload. For military reasons, the air force also demanded that the shuttle be able to return to its launch point after a single orbit. Further changes had to be made. To gain support from scientists, NASA promised, in effect, that the shuttle would be able to perform most of the missions originally proposed for the space station. And to make approval by the president and Congress more likely, NASA unrealistically promoted the shuttle fleet as a "low-cost" way of putting payloads into orbit. Finally, to meet objections from the Office of Management and Budget, NASA "drastically scaled back the shuttle's design to minimize its initial R&D costs."

Approved in 1972, the shuttle was plagued from the start by "a long series of technical problems, delays, and cost overruns." The *Challenger* disaster in 1986 was followed by

"the grounding of the entire shuttle fleet for much of 1990." The shuttle has scored some dramatic successes, such as 1993's daring repair in space of the disabled Hubble telescope. But political support has ebbed, and funds for operations have fallen.

Project Apollo succeeded in part because Cold War fears seemed to obviate the need for the government to satisfy a wide variety of interests. Such conditions are not likely to be seen again. In these more "normal" times, Kay concludes, "big science" may simply be too much for democratic government to handle.

Puffinology

"The Puffins Keep Their Secrets" by Les Line, in *National Wildlife* (Aug.-Sept. 1994), National Wildlife Federation, 8925 Leesburg Pike, Vienna, Va. 22184.

Pity the puffin. Forever overshadowed by the penguin, this plucky sea bird leads a colorful life veiled in obscurity. Even careful scientific study, reports Line, former editor of *Audubon*, fails to reveal much about what puffins do or why.

Although puffins and penguins are similar in stature and demeanor, they are entirely unrelated and inhabit opposite ends of the earth. Like penguins, puffins swim well underwater and mob islands once ashore, but they can also take to the air. Puffins belong to the auk family of northern sea birds, populating islands in both the Atlantic and the Pacific. Penguins are confined to the far south seas of Antarctica. An estimated 15 million Atlantic puffins nest in Iceland, Newfoundland, California, and Maine. Pacific puffins—the rhinoceros auklet, the horned puffin, and the tufted puffin—number about six million and are spread from the Aleutian Islands to the Alaskan mainland.

Puffins disappear for eight months at sea. "What they do out there, even where they go in winter," Line notes, "remains a scientific mystery." They court and mate on water, sporting attractive bills, tufts, and horns whose brilliant colors disappear after the breeding season. The same eye-catching, trian-

gular bills later serve as chisels when the puffins come ashore to dig their nesting burrows and lay their eggs. With dogged persistence, they scrape and push their way into the island turf until their burrows are spacious and rock-free. Home remains home every year thereafter—to be redug and reused until, in some cases, the island is stripped bare by excavation, wind, and weather.



Such labors seem extreme for one egg—all that a puffin will lay in a season. Six weeks pass before the egg hatches and six more pass before the puffin chick is ready to experience sea and sand. During that time its parents are diving as deep as 200 feet in the ocean, several times a day, to fetch fat-laden sand eels and capelin (smelts) for their young. This nutritional treasure is guarded from pirating herring gulls in a unique way: puffins coming home from the hunt hover above their colony, forming a large group, and land all at once to discourage attacks on individuals. But against a far more serious threat, the radical reduction of the capelin fisheries by fishing fleets, the puffins have no defense whatsoever. And that, says a specialist quoted by Line, "doesn't bode well" for the puffin and other denizens of the northern seas.

The Secrets of Baby Talk

"Phases in the Child's Development of Language" by John L. Locke, in *American Scientist* (Sept.-Oct. 1994), P.O. Box 13975, Research Triangle Park, N.C. 27709.

When baby utters his first "mama" at age one, adults exult that he has finally begun learning to speak. But his lessons in language began long before. Even in the womb, the infant's neural and vocal senses are being actively developed, writes Locke, director of the neurolinguistics laboratory at Massachusetts General Hospital in Boston.

Most theories of language assume that in-