

conquered lands were never required to surrender their property—or their faith.

Each successive Crusade was better funded and organized, yet each was less effective than the one before it. By the 15th and 16th centuries, “the Ottoman Turks [had] conquered not only their fellow Muslims, thus further unifying Islam, but also continued to press westward, capturing Constantinople and plunging deep into Europe itself.”

Only happenstance prevented Islam from moving farther west: Sultan Mehmed II had

gained a foothold in Italy when he died in the late 15th century; Suleiman the Magnificent failed to take Vienna in 1529 only because freak rainstorms forced him to abandon much of his artillery.

The real field of battle, meanwhile, was shifting from the military realm to industry, science, and trade. With the Renaissance and then the Protestant Reformation, European civilization entered a new era of dynamism, and the balance of power shifted decisively to the West.

## *Twelve Tribes under God*

“The Jewish Roots of Western Freedom” by Fania Oz-Salzberger, in *Azure* (Summer 2002),  
22A Hatzfira St., Jerusalem, Israel.

Ask a political theorist to name the historical foundations of Western liberalism, and the reply will be predictable: the polis of Athens, the Roman Republic, the Magna Carta, etc. Few are likely to mention the Torah—the first five books of the Hebrew Bible—or the Talmud. Yet during the birth of liberalism in 17th-century Europe, intellectuals of all kinds found political inspiration in the Old Testament, and many used the Bible in surprisingly inventive and critical ways.

Oz-Salzberger, a historian at the University of Haifa in Israel, argues that many influential “Hebraist” thinkers of this crucial period recognized the Old Testament as a political document—in essence, as the Israelites’ constitution. The English jurist John Selden, for example, argued that national sovereignty was derived from biblical concepts of fixed borders and the division of peoples. Selden helped destroy the last remnants of feudalism and pave the way for nation-states: “Total borders made total sovereignty, and fostered the modern system of international relations.” Petrus Cunaeus, another prominent Hebraist, found in the Bible “what Aristotle, Cicero, and the Stoics all lacked: a clear notion of social responsibility and communal justice.” The godfather of liberalism himself, John Locke, was a noted Old Testament scholar who based his *Two Treatises of Government* in part on an interpretation of the Book of Genesis. Locke’s

famous commitment to the “pursuit of life, liberty, and property,” Oz-Salzberger asserts, was grounded in a theory of responsibility and charity drawn from the Bible.

These philosophers tended to find in the ancient “Hebrew Republic” an example that could correct for deficiencies in the Athenian and Roman models. Three features of the Hebrew Bible held particular interest: its emphasis on national borders, its concern for social equity, and the unique federal structure it prescribed for the Israelites, decentralized into 12 tribes and yet unified in one people. If the West now views liberty as more than the freedom from government intrusion—in other words, if we strive for a free community, governed under a just system of law—then, Oz-Salzberger writes, we owe a great deal to the Bible and its 17th-century readers.

With the notable exception of Locke, however, few Hebraist thinkers are widely remembered, and even Locke’s thought was largely purged of its religious themes in subsequent interpretations, especially during the 18th-century Enlightenment. Under the cultural reign of rabid anti-traditionalists such as Voltaire, and with liberalism acquiring a focus on political institutions, the Bible’s role shrank markedly. The “book of books had been removed from the desk of the political philosopher. It is back in its late-Renaissance place, on the preacher’s pulpit or under the philol-

ogist's lamp," Oz-Salzberger observes. Yet the biblical tales of Saul and David and Gideon and Deborah remain the paradigmatic stories of political actors. The Bible, she concludes, still has something to teach us about politics and human liberty.

## SCIENCE, TECHNOLOGY & ENVIRONMENT

### *Catching the Wind*

"Wind Power for Pennies" by Peter Fairley, in *Technology Review* (July–Aug. 2002), One Main St., 7th fl., Cambridge, Mass. 02142.

Wind power's potential has long been praised by dreamy environmentalists and derided by hardheaded energy experts. Wind-driven generators today produce less than one percent of U.S. electricity. But a new lightweight wind turbine with a radically different design "just may change the fate of wind power," reports Fairley, a writer based in Victoria, British Columbia.

Like "giant fans run in reverse," wind turbines "use airfoils that catch the wind and crank a generator that pumps out electricity," he explains. Many now in use have three-bladed rotors that span 87 yards—almost the length of a football field. "Power production rises exponentially with blade length," but the huge structures must be able "to endure gales and extreme turbulence."

During the 1980s and early 1990s, American companies and the U.S. Department of Energy poured hundreds of millions of dollars into a fruitless quest for lightweight turbines that could withstand those forces. Danish researchers, meanwhile, perfected a "heavy-duty version . . . and it has become the Microsoft Windows of the wind power industry," says Fairley. An 80-turbine, \$245 million "wind farm" is being built off the Danish coast.

To construct a wind farm costs about

\$1 million per megawatt, compared with \$600,000 for a conventional gas-fired power plant. Denmark, which gets 20 percent of its power from wind, has been willing to pay the price, in part because fossil fuels are so costly in Europe. The United States is a different story.

Enter the new lightweight prototype, designed by Wind Turbine of Bellevue, Washington, and erected two years ago at Rocky Flats in Colorado, the Energy Department's proving ground. The turbine has two blades (not three) stretching about 44 yards. There's a radical departure in design: The blades are flexible and hinged, and the rotor is positioned downwind, so the blades don't slam into the tower. (In the Danish design, the blades face the wind, and must be heavy to avoid bending back and hitting the tower.) The result: turbines that will be 40 percent lighter and up to 25 percent cheaper to make. A second prototype, being erected near Lancaster, California, should have blades that span 66 yards—"full commercial size"—by the end of the year.

Staffers at the National Wind Technology Center at Rocky Flats have been skeptical. They've seen a lot of failures, Fairley notes. But "today, despite some minor setbacks, those doubts are fading."

### *Heartfelt Thanks*

"Leland C. Clark and Frank Gollan: Bubble Oxygenators and Perfusion Hypothermia" by Robert S. Litwak, in *Annals of American Thoracic Surgery* (Aug. 2002), Elsevier Science, P.O. Box 945, New York, N.Y. 10159-0945.

Hundreds of thousands of people around the world have a special anniversary to mark next year: the debut in 1953 of the basic heart-lung machine used in open-heart surgery. Every

year, some 750,000 Americans undergo such surgery, from relatively routine bypasses to more complex procedures; without it, virtually all would die. (Even so, heart disease