



Richard Leakey with assistants in Africa

gauge developed, Leakey, thinking like a poet, dismisses the pragmatic notion that it was because bands of hunters needed to communicate details of the hunt to one another. Says he: "Perhaps the most pervasive element of language is that, through communicating with others, not just about practical affairs, but about feelings, desires, and fears, a 'shared consciousness' is created. Language is without doubt an enormously powerful force holding together the intense social network that characterizes human existence."

Leakey stresses that the underlying purpose of the book (and presumably of the television series) is to give people a sense of their shared ancestry and of mankind's amazing adaptiveness. Human beings are not beasts, he declares, subject to the dictates of instinct. They are not "naturally" aggressive, as some people claim, inexorably doomed to destruction by a nuclear holocaust. "For me," Leakey concludes, "the search for our ancestors has provided a source of hope. We share our heritage and we share our future. With an unparalleled ability to choose our destiny, I know that global catastrophe at our own hands is not inevitable. The choice is ours."
—Natalie Angier

The First Stargazers

by JAMES CORNELL
Scribners, \$15.95

In 1963, as public information officer for the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts,

James Cornell wrote a press release that became the archaeological shot heard round the world. "Using only one minute of borrowed computer time," wrote Cornell, "Dr. Gerald Hawkins may have found one answer to the 4,000-year-old mystery of Stonehenge... Hawkins gave an IBM 7090 computer the task of looking for correlations between the directions defined by the lines joining various stones and holes and the directions of the rising and setting of the sun and moon at midsummer and midwinter." And the correlations were there. The chance of coincidence was one in a million.

Hawkins, then an astronomer with the Smithsonian Observatory, was saying that a seemingly barbaric people who had not progressed beyond rough earthen pottery had constructed an astronomical observatory to predict the seasons and signal the periods during which there was a high probability of solar and lunar eclipses. By so doing, Hawkins was pushing back by thousands of years the beginnings of man's intellectual development. Archaeologists were aghast, but the public accepted the explanation. It was not a new premise, yet with his analysis of Stonehenge as a sort of neolithic computer, Hawkins gave birth to the field of archaeoastronomy—the study of ancient man's astronomical practices by analysis of the stone and earthen ruins he left behind.

In *The First Stargazers*, Cornell picks up where his press release left off. In the two decades that followed Hawkins's work, evidence was found to suggest that primitive cultures around the world—from the Anasazi cliff dwellers in the American Southwest, who built a crude yet effective solar tracking station, to the Khmer empire in northwest Cambodia, which incorporated astronomical sighting devices into the temple of Angkor Wat—were aware of and kept track of celestial cycles. At least one South African tribe may have believed that the earth circled around the sun—a rare concept in ancient societies. The proof, Cornell says, lies in an old tribal song: "I shall worship you and go around you, just as the earth worships the sun."

America has its Stonehenge. It is the Big Horn Medicine Wheel, a crude circle of stones some 80 feet in diam-

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Reviews

eter, high on a mountain in Wyoming. The center is marked by a cairn—a pile of rocks—from which 28 spokes extend to the outer circle. When astronomer John Eddy, of the High Altitude Observatory, stood on a distinctive pile of rocks outside the ring in 1972 and looked across the hub of the wheel, he saw the exact point on the horizon where the sun rises on the first day of summer (the summer solstice). Other cultures, like that of the ancient Maya, who flourished in Mexico and Central America more than a thousand years ago, were more elaborate in their science. Their nine-tiered pyramid of Kukulcán on the Yucatan peninsula pinpoints the spring and autumn equinoxes, the start and end of the rainy season. At sunset on those days, the slanting rays strike the corners of the temple in such a way as to create the image of a diamondback serpent slithering down the pyramid's staircase. Says Cornell, "To achieve this intricate interplay of sun and shadow required extraordinary engineering skills, a familiarity with basic geometry, and an awareness of solar motion."

While *Stargazers* offers enough information for an introductory textbook on archaeoastronomy, it reads like a mystery story. In rich detail it reveals

With the heavens now dimmed by the glare of urban lights, it is easy to lose sight of the knowledge to be gained by long observation of the night sky. For prehistoric man it was a matter of survival: to plan his hunting, planting, and migrations. Cornell builds a convincing case that primitive man, perhaps sparked by a few Stone Age Einsteins, could indeed mark the yearly passage of the sun and moon, keep a crude calendar, and maybe even predict eclipses. The Maya measured the lunar month to within seven minutes of the best modern measurement.

Cornell presents a strong argument against earlier interpretations of the ancient artifacts—Erich von Däniken's *Chariots of the Gods?*—for example. Writes Cornell: "The relatively early emergence . . . of often sophisticated skills in geometry, mathematics, and astronomy demonstrates that humankind needed no help from 'outer space' to get science started. No men from Mars or 'gods' from another galaxy came with packaged information on temple building or star sighting. Rather, our skills and knowledge came naturally from ourselves, developed gradually through tedious observations and painful trial and error, and improved with practice over many generations." So much for von Däniken.

—Marcia Bartusiak



Big Horn Medicine Wheel

how early men discerned the passage of the sun, moon, and stars and put their observations to practical use. All these efforts, says Cornell, "seem intended as a response to the human desire to fix man's place in the universe, to control the vast and frightening environment by understanding it."

Hawkins's speculations were received with great skepticism. Primitive man, it was assumed, knew nothing.

John Muir and His Legacy

by STEPHEN FOX
Little, Brown, \$17.50

When John Muir first glimpsed the full sweep of the Yosemite Valley, in 1869, he risked his life trying to see more: "the domes and battlements of the walls, the booming waterfalls, the floor blooming like a garden, the meandering Merced River flashing glints of sunlight." Atop the largest cataract in the valley, Muir crept shoeless to the edge and then slithered, without a handhold, down a steep slope to the best lookout point: a shelf three inches wide. He made it back up in one piece, but that night he was awakened repeatedly by nightmares in which the shelf crumbled and he plummeted to the floor of the valley. But what he had seen left him forever "bewitched and enchanted."

Twenty years later, under the "protection" of the state of California, the valley was blighted with saloons, shops, lumber yards, fields of wheat and hay, and a pigsty. Sheep—"hoofed locusts" to Muir—were devouring the countryside, and "frowsy concessions" soon followed. The dreamer who had wanted to preach about the mountains was driv-