

# OFF *the* BEAT

**On Ben Franklin,  
pyramid builders,  
Stonehenge's decoder,  
sharks  
and the Green Revolution**

Charles L. Drake can turn a phrase with the best of them. The Dartmouth geophysicist is president of the Inter-Union Commission on Geodynamics, whose International Geodynamics Project is studying the dynamic history of the earth and the processes that produce its surface features. Drake notes that although the geodynamics project was formally inaugurated in 1970 by the International Council of Scientific Unions, "its roots are deeply imbedded in the rich organic topsoil of geological speculation."

He also has an eye for history. He credits "that eminent earth scientist, our own Benjamin Franklin," with first advancing the idea of plate tectonics, the unifying theory that explains manifold processes on and under the surface of the earth. Drake notes that in 1782, after some geological observations, Franklin wrote: "Such changes in the superficial parts of the globe seemed to me unlikely if the earth were solid to the center. I therefore imagined that the internal parts might be a fluid more dense, and of a greater specific gravity than any of the solids we are acquainted with; which therefore might swim in or upon that fluid. Thus the surface of the globe would be a shell, capable of being broken and disordered by the violent movements of the fluid on which it rested. . . ."

"You see," comments Drake, "the basic idea is there."

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There has always been a friendly rivalry between the geologists and the geophysicists, but they recently all found themselves in the same boat, or more accurately on the same uphill mountain trail, south of Mexico City. During an off day at the recent Science and Man in the Americas meeting, a hundred or so of them, and this reporter, huffed and puffed our way up volcanic cliffs above the Mexican village of Tepoztlán. This massive accumulation of volcanics is among the largest in the world. Everyone made it to the top, but not before giving a good workout to muscles that obviously remain unused in the laboratory or the lecture room—or the news room.

At the top is a small Aztec pyramid dedicated to the local god of strong drink, Tepoztecatl, but now only soda

pop is available there. Judging from the condition the climb puts most people in, it's just as well.

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The archaeological history that permeates Mexico provides plenty of opportunity for reflection on perceptions of time, of fate, of religion, of permanence. When the wandering Aztecs arrived in the valley of Mexico in the 14th century to begin building their brilliant but short-lived civilization, they associated the long-deserted pyramids of Teotihuacán with the beginning of time. To them, the pyramids, which we date from the sixth century, were erected by the gods who created the world. The pyramids of Teotihuacán today remain. But thanks to Cortes and the Spanish conquerors, the temples built in the 1300's and 1400's by the Aztecs are dismantled and gone. The stones of one temple can today be seen reincarnated at Tlatelolco in Mexico City—as a Catholic Church.

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Gerald S. Hawkins, the astronomer who decoded Stonehenge and wrote a book about it in 1965, has come to a fundamental revision of his ideas about the complex megalithic structure in



*Symbol of  
the meeting  
on Science  
and Man  
in the  
Americas.*

southern England. Hawkins looked up from the reading of a prepared paper at the Science and Man in the Americas meeting in Mexico City long enough to announce that startling information.

As he explained later to SCIENCE NEWS, Hawkins talked to Colin Renfrew of the University of Sheffield, England, at a meeting last December in England. Renfrew suggested that Stonehenge may be not an observatory but a repository, a central filing system of all the then-known astronomical information. Hawkins says he is now prepared to accept that idea as valid.

To Hawkins, this makes Stonehenge and the people who built it all the more remarkable. "This raises the intellectual plane even more," he says. Stonehenge was not a means of making practical observations but "an abstract intellectual activity."

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To call Eugenie Clark a shark woman is not an insult. She is a University of Maryland marine zoologist and a

diver, and she has spent a good part of her life studying sharks first hand.

Naturally she has come to know sharks pretty well, and she finds it necessary to correct many popular misconceptions and fears about them. One has to do with their danger to humans. According to statistics, she says, "The chances of being bit by a shark while in water are less than the chance of being struck by lightning on land."

She has found that working with sharks is somewhat like working with dogs. "You can get to know when they're getting irritated."

Not that she hasn't had an uneasy moment or two. She tells of diving one time in deep waters of the Red Sea, when she saw a large shark swimming with aggressive intentions directly toward her and her diving companion. Her fellow diver happened to have a small club, "a shark billy." "He hit the shark on the nose with the shark billy, and it turned and went away."

She believes that if people could get over their hang-ups about sharks, the animals could have "great potential use for man." Shark meat is rich in protein, and there are no bones. "We don't use this animal the way we should."

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Norman E. Borlaug's work to improve grain yield that won him the 1970 Nobel Peace Prize was conducted in large part at his laboratory south of Mexico City. The Iowa-born plant scientist has spent more than 30 years of his life in Mexico, and he told the audience at the Science and Man in the Americas meeting, "If I have a country in the true sense of the word, it is Mexico."

Speaking in Spanish-accented English, Borlaug defended the "Green Revolution" against some of its recent critics. In 1964, he pointed out, the wheat harvest in India and Pakistan was 15.5 million tons. In 1972, it was 33 million tons, a 17.5 million-ton difference. The critics "might learn more if they carried those 17 million tons on their back." He's not claiming miracles or that problems of famine have been solved, "but imagine what things would have been like without that increase." Borlaug reiterated his concern that population growth is outstripping food supply, even with such gains. He foresees severe food squeezes in India, Egypt, Indonesia and Bangladesh by the end of the decade and in 8 or 10 Latin American countries in two decades, if population pressure is not relieved. Nevertheless, he is optimistic. "If the Naked Ape had been a pessimist, there wouldn't be any problems for mankind. It would be extinct—maybe a million years ago."

—Kendrick Frazier