

The challenge confronting Richard Cifelli in his work for the Oklahoma Museum of Natural History might be described as a scientific variant of the question once posed to the Old Testament prophet Ezekiel: Can dry bones live again?

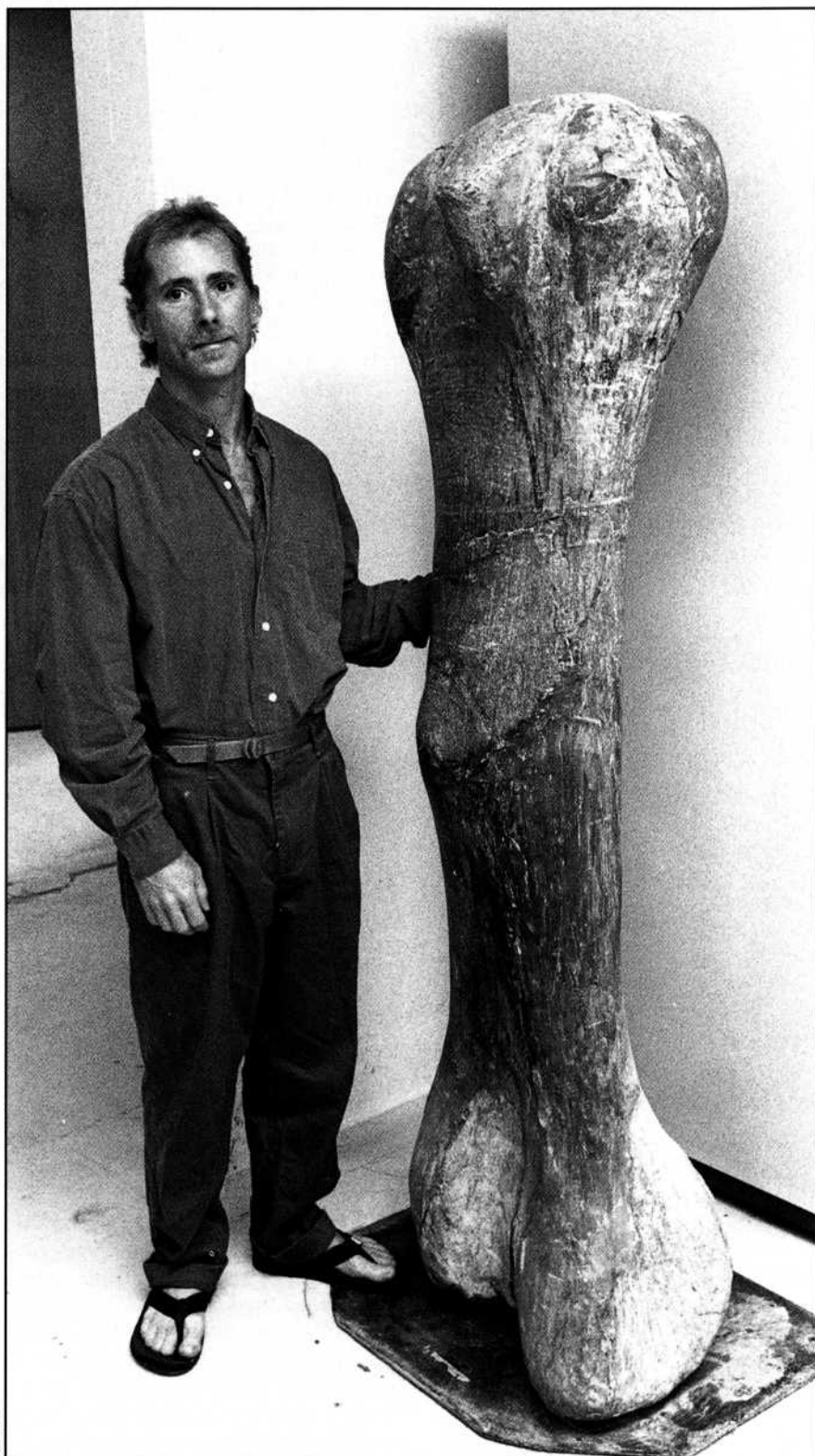
Cifelli, associate curator for vertebrate paleontology, has spent much of his six years with OU collecting and studying ancient bones — and fossils and teeth — of the small, shrew-like mammals that walked the Earth dur-

In his six years at OU, Cifelli has aided the scientific quest to sketch a true portrait of prehistoric Earth.

ing the Age of Dinosaurs some 65 to 85 million years ago. In the process, he has named some 30 different genera and 50 species, helped to challenge some long-held beliefs about the early history of mammals and in the process significantly aided the continuing scientific quest to sketch a true-to-life portrait of the prehistoric Earth.

One of Cifelli's most recent accomplishments was obtaining a \$20,400 grant from the National Geographic Society this past summer for study of early Cretaceous mammals in central Utah. The grant will allow a year of field work and study involving specimens he located last year and will help to fill in a 40-million-year gap in the fossil record.

The specimens represent what Cifelli calls "the basal branches of higher mammals," the ancestors of the two categories of modern mammal life, marsupials and placental mammals. And while the exceptional age of these Utah specimens—as much as 100 million years old—might not be especially meaningful to a layman, Cifelli says



Gil Jain

Oklahoma is famous for its dinosaur specimens, contends OU vertebrate paleontologist Richard Cifelli, shown above with the giant Apatosaurus (brontosaurus) thigh bone that was found in Cimarron County and excavated by the WPA in the 1930s. This specimen, one of the more familiar treasures of the Oklahoma Museum of Natural History, is the largest known specimen of an Apatosaurus in the world.

that "it's something I'd get up and do handsprings about.

"To put it in context, you could take all of the specimens we have from that age of the world and hold them in one hand. It's a critical time period," he insists, "and there's just not much known about it. So this is a potential Rosetta Stone for early mammal evolution."

The Utah studies epitomize the most prominent aspect of Cifelli's multi-faceted job. A field-oriented academic, he spends one-fourth of his time conducting research expeditions in the United States and abroad. When in the office, his hours are divided between cataloging, publishing, fund raising and teaching at least one course a year to fulfill a joint appointment as associate professor in OU's department of zoology.

The research projects involve extensive student participation, Cifelli says. "That's not to say each and every one of these students will end up going on and becoming an expert in teeny, tiny teeth. But this is really valuable experience, in learning how to deal with people in the field, learning some basic field geology, learning some nuts-and-bolts zoology and learning something about the past.

"And this helps them put whatever they go on to do into a greater perspective. If they go on and become medical students, perhaps they might have a better appreciation of the continuity of vertebrate structure, for instance."

Benefits of outdoor research aside, the demands of Cifelli's own field work translate into "90 nights a year sleeping on the ground." Yet he describes himself as deeply gratified to draw a paycheck for work that, for him, is almost on par with recreation.

"I wake up in the morning charged up, thinking about what I'm going to do that

day. I haven't taken a vacation since I can remember, but as far as I'm concerned my field work is my vacation. I'm getting my work done and enjoying being in some great places."

A tour of Cifelli's current research sites would start in southern Oklahoma, then veer toward the Panhandle, and lead westward to the Big Bend country of southwestern Texas, then to Wyoming, Montana, and to Utah. Studies of South American mammal



Richard Cifelli replaces the cast of a skull of an Allosaurus, acquired by the Oklahoma Museum of Natural History this past summer. The original Allosaurus skull was discovered in the Cleveland-Lloyd quarry in Utah.

specimens have led him to Ecuador, Columbia, Chile, Argentina, Bolivia and Brazil.

Digging for specimens entails detective work in any location, but the challenges are multiplied when doing research abroad. Among the difficulties is the political instability. "In many countries, particularly Latin American countries," he says, "when there's a turnover in higher administration, it goes all the way down to the lowest level. So you might develop a rapport with certain individuals and work with them, then come back next year to find they've moved on to somewhere else.

"Also, most foreign countries, for very justifiable reasons, want the fossils to

stay or ultimately come back to their countries. Unfortunately, in many cases they don't have facilities suitable to house the fossils, and they might become inaccessible or lost in the long term. You have to worry about that."

Cifelli's research skills have been a boon to other scientists abroad as well, resulting this past year in a major discovery involving a 55-million-year-old fossilized tooth uncovered by researchers in Queensland, Australia. The task of identifying the tooth stumped one of the world's foremost experts on marsupials, Michael Archer of the University of New South Wales, who contacted Cifelli for help.

"I would regard (Archer) as the leading authority on marsupials, and he was convinced this thing wasn't a marsupial," Cifelli recalls. "He hadn't had much experience with placental mammals, and he knew I had worked extensively with the types of placental mammals he thought might be relevant."

Cifelli found that the tooth came from a previously unrecorded placental mammal — a discovery that rewrote a set of well-established ideas about why marsupials dominate the fauna of Australia.

"There's been this long-standing dogma that true placental mammals, the higher mammals, never got into Australia — that higher mammals are superior to marsupials and that wherever the two are together the placental mammals will eventually dominate." Yet sometimes it takes only "one little tooth," he says, to overthrow a theory.

Sharing in such discoveries was not a burning desire from childhood, Cifelli admits. However, his initial collegiate interest in philosophy gave way to a realization that "natural science courses came easily to me." He re-

ceived a master's degree in anthropology from the University of Chicago in 1979 and a doctoral degree in vertebrate paleontology from Columbia University in 1983.

Upon arriving at OU in 1986 after a short stint as visiting curator with the Museum of Northern Arizona, Cifelli's chief goal was to catalog the museum's vertebrate paleontology collection, estimated to be the 13th largest in the nation. He says the immense task of going through the museum's 30,000-plus specimens, aided by a pair of Na-

The cataloguing of 30,000-plus specimens in the vertebrate paleontology collection is nearly complete.

tional Science Foundation grants, is close to completion.

"We've got an awful lot of dinosaurs from Cimarron County; that's one of the things Oklahoma is famous for. We've also got a large collection of fossil mammals from western Oklahoma." Cifelli adds that the small mammals and dinosaurs collected over approximately the last six years have increased the collection by at least 25 percent.

Not one to fritter away idle moments, Cifelli indulges himself away from the office in cabinetmaking and Irish and Appalachian folk music, which he plays on guitar, mandolin and fiddle. He also cares for a pair of four-and-a-half-foot tall South American ostriches, called rheas.

But at present one of his main pre-occupations is to look ahead to a challenge perhaps more daunting than anything else he has faced in his tenure at the museum.

"What I'd really like to do over the next few years is to present an integrated story of the early evolution of



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Estelle Miller, seated, is a part-time student at OU and a former employee of the museum who currently volunteers her time in the OMNH vertebrate paleontology laboratory to sort and identify the fossils of 100-million-year-old mammals and other small vertebrates collected over the past six years by Richard Cifelli, right.

mammals — where they came from, where they went, their size range, the diversity of diets, what roles they played in the fauna. Why were they living in just the interstices—or the little gaps—in a world dominated by dinosaurs? What was it about the fauna that kept mammals living as tiny rodent-like things for so long?

"I've collected these faunas in a sequence spanning anywhere from 100 million years to just about the end of

the Age of Dinosaurs, about 70 million years ago. That's a really big chunk of time to look at what was happening for mammals, and I'd really like to put that together and see just what the mammals' impact was.

"I've set the groundwork for it. Now I want to try and tie it all up."

Cifelli may not be able to make the "dry bones" live, but he is finding a way to make them talk.

—MICHAEL WATERS