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Sue grew at a gargantuan rate

By Andreas von Bubnoff
Tribune staff reporter

As a youngster, the Tyrannosaurus rex known as Sue packed on weight like a teenage boy raiding the family fridge before she reached adult size at 19 and died at the ripe old age of 28, scientists announced Wednesday at the Field Museum.

The age of the museum's most famous fossil was calculated as part of a study designed to explore one of the greatest mysteries about dinosaurs: how they got so big. Some paleontologists had thought larger dinosaurs got that way simply because they lived longer and kept growing the whole time.

But by examining growth rings in the bones of T. rex and several smaller ancestors, the scientists showed that all of them stopped growing when they reached adult size and that T. rex is the biggest because it grew

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SUE: Dinosaur 'lived fast, died young'

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the most during its teenage years. The findings appear in Thursday's issue of the journal Nature.

"It's pretty clear that [T. rex] lived fast and died young," the study's lead author, Florida State University paleontologist Gregory Erickson, said in an interview. "It got gigantic by growing in a very accelerated rate relative to its ancestors."

Because Sue shows so many signs of old age—arthritis in her tail, broken ribs that had healed, holes in the back of her jaw that may be the result of an infection—the researchers think T. rexes probably didn't live more than about 30 years.

"Sue was a train wreck, a geriatric animal; there is no doubt about that," Erickson said.

The growth curve for T. rexes was steepest between ages 14 and 18, when they added up to 4.6 pounds daily. The other species, by contrast, grew by only about a pound per day.

For Sue to gain that much weight, the scientists said, she would have had to eat 10 to 50 pounds of meat per day, depending on whether she was warm-blooded or coldblooded.

"It's probably the ultimate Atkins diet," Erickson joked at the museum.

T. rex is one of the largest meat-eating dinosaurs known. Once Sue stopped growing, she weighed more than 12,000 pounds. The species lived about 67 million years ago in an area including Canada, the United States and Mexico.

Experts hailed the finding as significant for the study of T. rex and dinosaurs in general.

"I am very impressed with the work," said Paul Sereno, a paleontologist at the University of Chicago. "[The age of T. rex] is one of those things you are continually asked, and we are finally getting answers to some of these questions. I think you come pretty close to some 'Jurassic Park' realism, and that's so hard to come by."

Sue's namesake said she was surprised to hear that, as a species, T. rex died so young.

"I would have thought that [because] they are huge animals, they would have had a longer life span," said Sue Hendrickson, a field paleontologist who discovered the fossil skeleton in 1990 in South Dakota.

For their study, the scientists determined the age and weight of 20 specimens of T. rex and three much smaller but closely related species: Daspletosaurus, Gorgosaurus and Albertosaurus. Using this data, they derived growth curves showing how fast each grew.

To estimate the weight of the dinosaurs, the researchers measured the circumference of the femur, or thigh bone. To determine the age, they sliced through other bones and counted the growth rings.

"There is an annual cyclic period of growth where growth slows down or stops," said Peter Makovicky, a Field Museum paleontologist who also was an author of the study. "It leaves a ring in the bone much like a tree ring."

Before this research, Erickson said, most experts used the femur to determine the age of the dinosaur at the time of death. That is not possible in T. rex because the femur hollows out as the dinosaur grows older, partially destroying the growth record.

The new study was launched four years ago after Erickson, who had been visiting the Field, spotted growth rings on one of Sue's ribs and realized it might be possible to use other bones than the femur to determine age.

"I saw this very nice growth ring with the naked eye," he said. "It was just a revelation. When I saw those bones I realized it actually was possible to crack the code."

Erickson then studied living animals of a known age to see if ribs and other non-weight-bearing bones could be used to determine age. Bones that do not bear weight are thought to change less during an animal's life because fewer forces are exerted on them.

"It turns out [it] worked fine for crocodiles, lizards and alligators," Erickson said. "That suggests it works fine for dinosaurs as well."

But some paleontologists are skeptical as to whether the growth rings used in the study provide accurate information about a dinosaur's age.

Anusuya Chinsamy-Turan, a paleontologist at the University of Cape Town in South Africa, said that even though the bones weren't weight bearing, they may still change inside, which could make them unsuitable as a gauge of age.

When the researchers were looking at the bones of modern-day alligators, she said, they should have included some older animals to see if such bones might have changed over time.

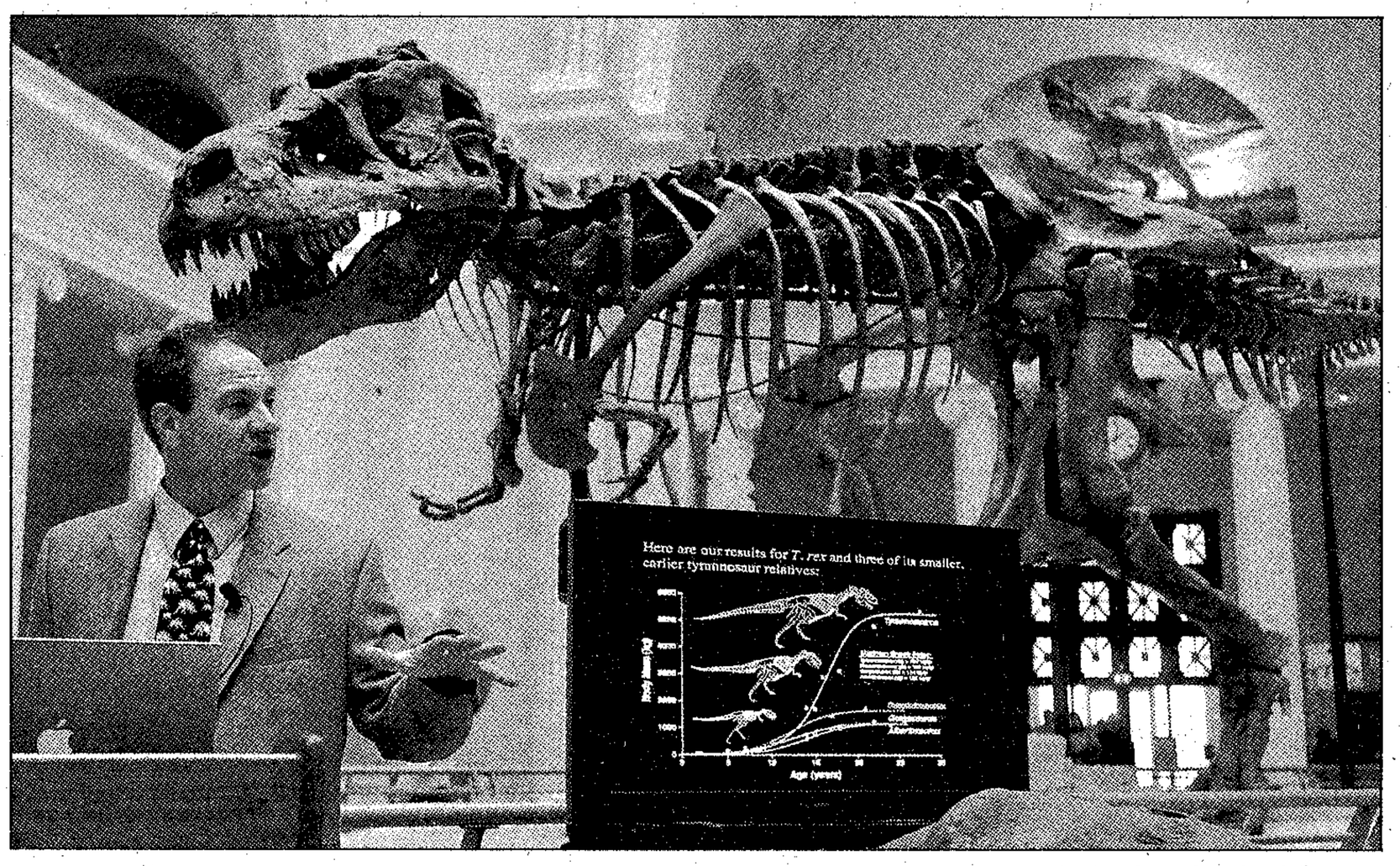
While Sue's age may now be known, one other big question remains: Was she a boy or a girl?

Some experts said there are hints that Sue is female, although others disagree.

For her part, Hendrickson said she likes the idea of Sue being female.

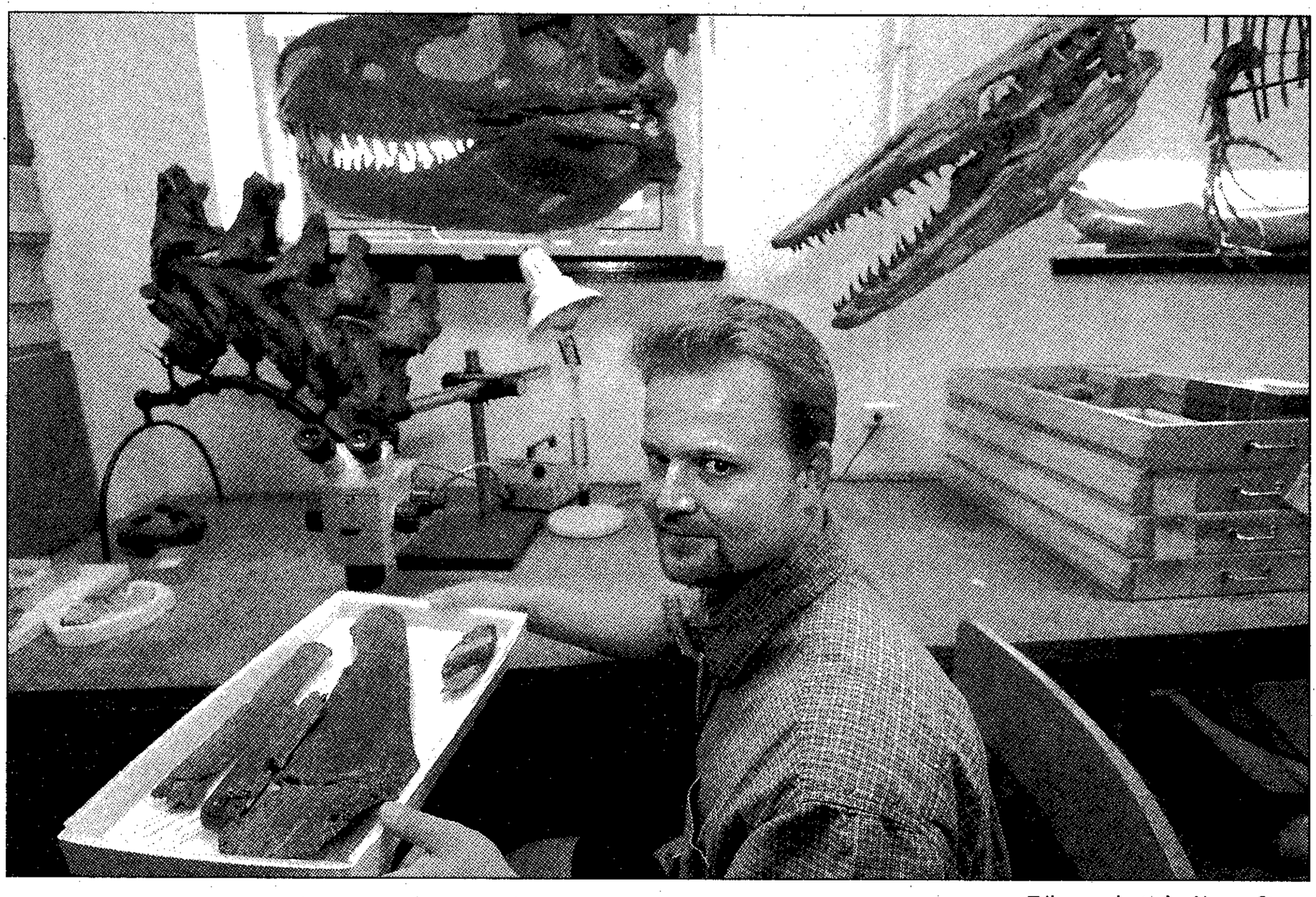
"I really, really like it that the biggest carnivorous beast that ever walked on Earth is female," Hendrickson said. "I like to be able to say that."

Growth rings on bones have helped scientists calculate the age and weight of the Field Museum's Tyrannosaurus rex



Tribune photo by Chuck Berman

Florida State University paleontologist Gregory Erickson explains Sue's growth at the Field Museum Wednesday. The T. rex grew fast during its teenage years, he said.

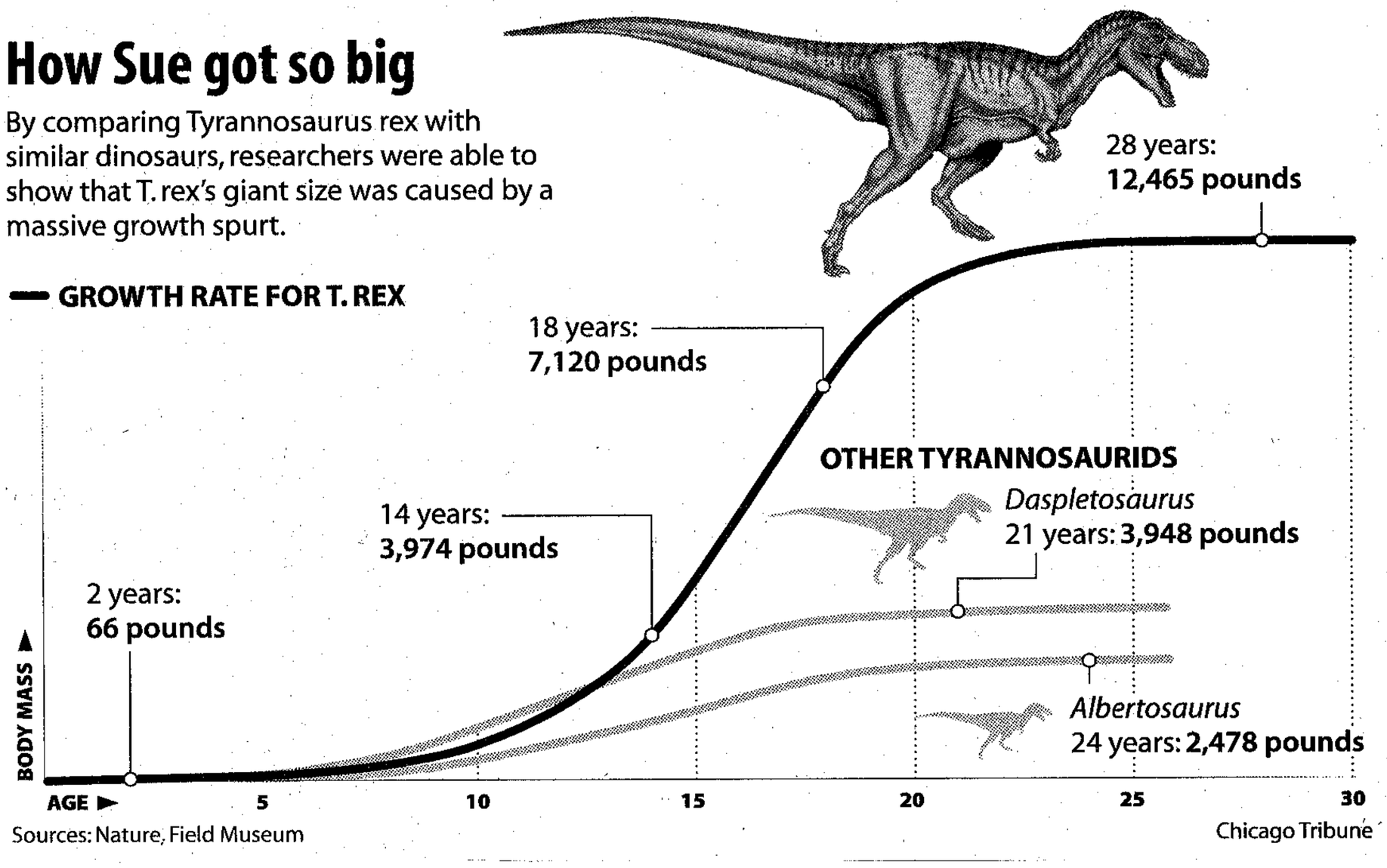


Tribune photo by Nancy Stone

Field Museum paleontologist Peter Makovicky shows Sue's rib bones, used to calculate her age and weight. She is believed to have lived to age 28 and weighed more than 12,000 pounds.

How Sue got so big

By comparing Tyrannosaurus rex with similar dinosaurs, researchers were able to show that T. rex's giant size was caused by a massive growth spurt.



Sources: Nature, Field Museum

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