

Malagasy rift teems with prize fossil fauna

Unsurpassed in biodiversity, and home to all of the world's lemurs, Madagascar has earned distinction as prime territory for the study of living organisms. The island may become equally famous as a hunting ground for fossils, a study in the Oct. 22 *SCIENCE* suggests.

A team of American and Malagasy paleontologists has identified a potential mother lode of Triassic fauna, documenting a pivotal and little understood period of evolution. The researchers have unearthed exquisitely preserved skulls and bones from mammal-like reptiles, along with fragments of what may be the oldest dinosaurs yet discovered.

The fossils excavated so far represent land animals from around 230 million years ago, during the middle-to-late Triassic period. Around this time, early dinosaurs established what was to become a 150-million-year dynasty (SN: 4/24/99, p. 260), while waddling, cold-blooded ancestors of mammals sloughed off their last reptilian features.

"There are very few places in the world where there is a window on that slice of geologic time," says André R. Wyss, a paleontologist at the University of California, Santa Barbara who was a member of the team that excavated the finds.

Among the remains, the researchers

identified seven previously unknown species, including four cynodonts, which were the earliest mammal-like reptiles, and one rynchosaur, a parrot-beaked reptile of a group that disappeared shortly after dinosaurs emerged.

Two partial jaws come from goat-size, plant-eating dinosaurs belonging to a group known as prosauropods. Paleontologists view prosauropods as the first dinosaurs to succeed over a wide territory.

The jaw fragments' presence beside rynchosaur remains—plus other indirect evidence—imply an age of about 230 million years, the researchers argue. That figure puts the fossils in the running for



Fossilized skull of a cynodont, a mammal-like reptile that probably laid eggs but may also have been furry. Three buckteeth in upper jaw mark it as a previously unknown species.

John J. Flynn et al./SCIENCE

Parathyroid surgery proves its worth

Tiny glands that go into a frenzy of hormone production can cause kidney disease and bone damage. Because these overactive parathyroid glands often produce no overt symptoms, however, doctors are frequently unsure whether to remove them surgically. A new study indicates that this operation can provide long-term benefits even for patients with no apparent problems.

As small as peppercorns, the four parathyroid glands in the neck nevertheless pack a big punch. The hormone they make regulates blood concentrations of calcium, which is crucial to basic metabolic functions.

In 15 to 25 people per 100,000, at least one of the glands is hyperactive, usually due to a benign tumor. The flood of hormones that results can silently drain calcium from bones, inflate its concentration in the blood, and dump it into the urine.

In the new study, doctors at Columbia University College of Physicians and Surgeons in New York identified 121 people with elevated blood-calcium concentrations, indicating hyperactive parathyroids. Of these, 61 had opted for surgery to remove their parathyroids while 60 had not. Several people in each group had obvious symptoms, usually a history of kidney stones, but most showed no

outward signs of disease.

After tracking all the patients for a decade, the scientists report that surgery provided relief from several problems. For example, 12 patients had had kidney stones before surgery, but none of them did during the 10 years afterward, the scientists report in the Oct. 21 *NEW ENGLAND JOURNAL OF MEDICINE* (NEJM). Among the nonsurgery group, 8 had had kidney stones before the study began, and 6 of these people experienced a recurrence during the study.

In the decade after their surgery, patients averaged bone density gains of 12 percent in vertebrae and 14 percent in hip bones, says study coauthor Shonni J. Silverberg, an endocrinologist at Columbia. Average bone density in those who avoided surgery stayed about the same.

Among these nonsurgical participants, however, 11 did lose bone mass. Five of these were women who entered menopause during the study. Fourteen of the 60 people not getting surgery showed other signs of worsening hyperparathyroidism.

In 1990, the National Institutes of Health set guidelines for surgery in patients with this parathyroid condition. One criterion is moderately high calcium concentrations in the blood. Howev-

er, many people refuse an operation if they have no overt symptoms, and doctors often hesitate to recommend it.

Other scientists are disinclined to declare the fossils the winners, however, in the absence of a radiometric date, which is obtainable only when a layer of volcanic ash lies at a fossil's depth.

Prosauropod remains found previously in other parts of the world could be as old as the Madagascar ones, says Hans-Dieter Sues, a paleobiologist at the University of Toronto.

What most excites Wyss, however, is the diversity of Triassic life represented in the new finds, the quality of the specimens, and the enormous potential of the remote, undeveloped site for revealing more. The excavators have combed exposed Triassic strata in just 40 square kilometers on the dry western side of the island. The lightly packed sedimentary rock that held the fossils extends 2,000 km along the rift that formed as Madagascar tore away from Africa.

Typically, Triassic specimens are squashed flat, Wyss says, but the Madagascar fossils are fully three-dimensional. He calls them "to die for."

Only a handful of research teams has excavated Madagascar's sediments. Outside the finds of Wyss and his colleagues, the few fossils recently mined don't date back as far as the Triassic. Wyss predicts that the situation will change: "My guess is this is going to be the Hall of Fame for the late Triassic." —O. Baker

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"The basic philosophy was, if we didn't know a patient would be significantly helped, we didn't call for [surgery]," says Michael A. Levine, an endocrinologist at Johns Hopkins Medical Institutions in Baltimore.

That may now change, he says, since the study indicates clearly that many people add bone mass after surgery. "This is an important study," Levine says, predicting that NIH will revise its guidelines.

Meanwhile, nuclear imaging has helped doctors pinpoint which parathyroid gland is diseased, reducing the need for exploratory surgery. As a result, patients undergoing such operations need only a minimal hospital stay, Levine says.

Also, doctors can now monitor parathyroid hormone concentration in the blood during surgery. A prompt fall-off of hormone signifies that the gland removed was the culprit.

Such advances "make surgical treatment simpler and faster than in the past," says NEJM endocrinologist Robert D. Utiger in an editorial in the same journal issue. Those gains and the new findings indicate that surgery "should now be recommended for nearly all patients," he says. —N. Seppa