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# Doubts grow over discovery of fossilized 'dinosaur heart'

**Rex Dalton, San Diego**

This spring, a team led by researchers from North Carolina State University received widespread publicity for their claim to have discovered the remains of a heart within the ribcage of a 66-million-year-old dinosaur specimen.

But since then doubts have been growing about whether the discovery is all that it seemed. Palaeontologists from the University of Texas are now preparing a rebuttal that is expected to say that the fossil — from a herbivorous *Thescelosaurus* — is a deposition of minerals known to geologists as a concretion.

*Nature* has also learned that one of the original article's authors — a commercial fossil hunter who found the specimen in South Dakota — has, according to federal records, been convicted of trafficking in Native American artefacts stolen from federal lands.

Although there is no evidence of any wrong-doing in the current case, and no one is making any such claims, the fact that the researchers were unaware of this background has again raised the question of

how thoroughly institutions investigate the provenance of the material they collect.

The heart was described as having four chambers and a single systemic aorta, more like a human heart than that of a reptile, which has only three chambers and paired systemic aortas. This suggested to the authors "the existence of intermediate-to-high metabolic rates among dinosaurs", strengthening the hypothesis that many were warm-blooded (see *Science* 288, 503–505; 2000).

But immediately after the article was published, some top US palaeontologists questioned its claims. The team at North Carolina State University — including lead author Paul Fisher and senior curator of palaeontology Dale Russell — then put up computerized tomography (CT) scan photos of the specimen on the museum's website.

Last month, says Russell, the specimen was inspected by palaeontologist Timothy Rowe, an authority on CT scans and director of the Vertebrate Paleontology Laboratory at the University of Texas, the only facility with a CT scanner dedicated to such studies.

Working with University of Texas geolo-



**Heartless?** The fossil dinosaur's 'heart' (centre) may actually be a mineral concretion.

gist Earle McBride, an authority on palaeontological concretions, Rowe is preparing the rebuttal for *Science*. Rowe — reportedly the only external palaeontologist to see the specimen since it was described — declines to discuss the details of his report before submission and publication.

But Russell says that, after visiting the museum, Rowe "doesn't think it is a heart". "We have no fear," adds Russell. "We will follow the truth. We have no case but to find out what it is. I look at it as an adventure."

North Carolina officials say they were unaware of the court record of Michael Hammer, the fossil hunter who provided the specimen. Hammer, who runs Hammer and Hammer Paleotek, a palaeontology preparation company near Jacksonville, Oregon, has refused several requests for an interview.

Officials from the North Carolina Museum of Natural Sciences in Raleigh — where the heart specimen is displayed in a \$70 million facility opened last April — maintain that their enquiries when they bought the fossil in 1996 were sufficient to document that the sale was legitimate.

Russell says he had known Hammer for more than five years before that, and that

## UK advised to step up asteroid hunt

**Natasha Loder, London**

The British government may take a bigger part in international efforts to identify objects in space that threaten the Earth. Such a move has been urged by an independent panel known as the Near Earth Objects Taskforce set up by the science minister, Lord Sainsbury, whose report was published in London this week.

Other recommendations include building a three-metre telescope in the Southern Hemisphere, and dedicating the one-metre Johannes Kapteyn Telescope on La Palma in the Canary Islands to following up observations of near-Earth objects (NEOs).

Sainsbury said that although the possibility of a dangerous NEO hitting the Earth was "extremely remote", it had potentially serious consequences. "We put a

lot of money into astronomy, and I think it is sensible to put a bit into making certain that we know if there is any danger of an object hitting our very fragile planet."

He added that he plans to consult with ministerial colleagues and international bodies about how the government should respond to the committee's proposals.

The taskforce argues that international missions could detect NEOs while making other observations. It says the government should ask the European Space Agency to ensure that one of its future missions also surveys the sky for such objects.

The taskforce also says that the Minor Planet Center at the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, should be put on a "robust international footing".

▶ Hammer invited him to the fossil and mineral show in Tucson, Arizona, in about 1995 to see the *Thescelosaurus* heart, which he was trying to sell. Hammer has said he found the fossil in 1993 in the Hell Creek formation on private land in northwest South Dakota.

Using funds raised by a support group, the North Carolina museum paid Hammer \$350,000 for the *Thescelosaurus*. When told that federal records showed that Hammer pleaded guilty in September 1994 to two charges of trafficking in artefacts stolen from federal land in Utah, Russell said he was unaware of this.

In 1990, when federal and state authorities raided Hammer's home, records show they found Native American human remains, which were repatriated to a Californian tribe in 1996. Through his wife, Hammer has denied any impropriety over the *Thescelosaurus* specimen. She attributes the earlier prosecutions to overly aggressive law enforcement in an area of changing, confusing legislation.

Earlier this month, North Carolina palaeontologists took CT scans of the heart specimen at the university's veterinarian college. Museum officials say they are clearer and more helpful than the original scans. But some palaeontology authorities say no conclusion can be drawn until the remnant is cut open. ■

▶ <http://www.dinoheart.org>

## World Bank is urged to give greater priority to science

Colin Macilwain, Washington

A prominent US economist has criticized Western governments and the World Bank for failing to acknowledge the full potential of science, technology and innovation in alleviating global poverty.

The criticism has come from Harvard University professor Jeffrey Sachs, director of the Center for International Development and former director of the Harvard Institute for International Development. He told the President's Committee of Advisors on Science and Technology (PCAST) last week that the World Bank's policies, based on the premise that open markets and good government would create growth in poor countries, were "vastly inadequate".

"There's a huge missing piece" in conventional thinking about development, Sachs told the PCAST meeting. "That is the recognition that technological change is the main driver of economic growth, but that it doesn't emerge endogenously in tropical countries."

The attack was on the *World Development Report 2000/2001* — released by the World Bank on 12 September — which emphasizes "opportunity, empowerment and security" as the keys to poverty alleviation. "There's no recognition in this document of where the



Sachs: critical of policies to tackle global poverty.

real problems lie," he claimed.

Sachs proposed three ways to mobilize science and technology in developing countries: the direct transfer of technologies, such as vaccines, from rich countries; the spread of

technology through the globalization of manufacturing; and the construction of science and technology development capacity in the developing countries themselves.

World Bank officials responded vigorously to the charges. Nora Lustig, director of the *World Development Report* at the World Bank, said in an interview that the importance of science and technology was repeatedly acknowledged in the document.

The World Bank is currently developing a new science and technology strategy. And supporters of science at the bank say they are gradually winning support for the idea that science and technology are vital to development, even in the poorest countries. ■

▶ <http://www.worldbank.org/poverty/wdrpoverty>

## Hunt for Higgs particle wins time for CERN collider

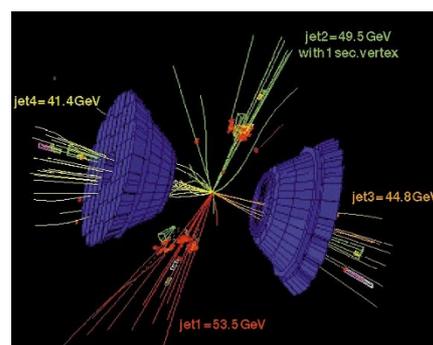
Alison Abbott

Physicists at the European Laboratory for Particle Physics (CERN) near Geneva believe that a new analysis of their recent observations indicates an increased probability that they have witnessed the transitory creation of their current Holy Grail — the Higgs boson.

Although they do not rule out the possibility that there may be another explanation for the events they have observed, the analysis helped physicists last week to convince CERN's director-general, Luciano Maiani, to extend the operation of its Large Electron-Positron (LEP) collider by a month.

LEP was to have been switched off at the end of this month to allow construction to start on its successor, the Large Hadron Collider (LHC). Keeping LEP running for an extra month will cost SFr7 million (US\$4 million). This will be found by shuffling CERN's existing budget, although Maiani says it will not disrupt LHC's schedule, or increase its cost.

Scientists working on LEP's four detector



Tell-tale signature? These four jets of quarks may come from the decay of a Higgs boson.

experiments had requested a temporary reprieve because their pooled results had pinpointed five 'events' that could be interpreted as evidence for the existence of the elusive particle. The Higgs boson is thought to be produced when electrons and positrons collide at an energy of around 115 giga-electron volts (see *Nature* 407, 118; 2000).

Re-analysis of the results shortly before last week's decision had produced a fivefold

reduction in the odds — to 1 in 1,000 — that the observed decay patterns, or 'signatures', are random events. But these odds are still four orders of magnitude too high for physicists to say that the existence of Higgs has been demonstrated conclusively.

LEP's temporary reprieve will allow its scientists to double the amount of data they can collect from particle collisions at the high energy levels that LEP was originally designed to achieve. If the signatures of the boson continue to be seen, the confidence limits will have been increased by two orders of magnitude.

"We are excited," says Tiziano Camporesi, head of LEP's DELPHI experiment. But he points out that the observations still have to be confirmed not only with a higher degree of confidence, but also in a way that is consistent across all detector experiments and all decay modes of the particles involved in the collisions. So far, no events have been seen in other decay modes apart from those involving the creation of quarks. ■

▶ <http://cern.web.cern.ch/CERN>