mation emerging from the genome project will require the close interaction of all these scientific disciplines, perhaps on a scale that has not been seen before."

That close interaction is evidenced by the trust's contribution to help the government build a high-intensity synchrotron radiation source. Once the playthings of physicists and chemists, synchrotrons are becoming increasingly important to biologists for unraveling molecular structure. By chipping in, the trust has ensured that a new synchrotron machine will be built. Britain currently has an aging synchrotron at Daresbury in northern England, but researchers have been pushing for a unique new high-intensity machine, dubbed Diamond. "A machine will be critical for resolving the structure of small molecules which make up living organisms and is an essential tool for structural biologists," says Dexter.

The government's plans have also calmed fears that it may be less concerned with supporting basic research than with the transfer of knowledge to industry to foster innovation—a theme constantly voiced by the previous government. According to Chancellor of the Exchequer Gordon Brown: "It would be shortsighted to ignore the health of the science and engineering base itself. That is why we need to invest now." Industry seems to agree with the government's strategy. Says a spokesperson for the pharmaceutical company SmithKline Beecham: "This new spending will make the U.K. a more attractive place for investment."

–NIGEL WILLIAMS

PALEONTOLOGY

Smuggled Chinese Fossils on Exhibit

The Jurassic-era bird fossil from China was a real find for the Miyazaki Prefectural Museum of Nature and History in southwestern Japan. The clay slab containing the remains of a *Confuciusornis sanctus* served as an important element in a new exhibit on evolution that kicked off the museum's reopening in May. But 2 months later, pride has turned to embarrassment after museum officials learned that the fossil had in all probability been exported illegally.

The Miyazaki museum is not alone. In response to a 5 July exposé on fossil trading in the *Asahi Shimbun*, one of Japan's largest daily newspapers, the Tottori Prefectural Museum also removed a *Confuciusornis* specimen from public viewing. The two museums, along with four others in Japan that have *Confuciusornis* fossils in their collections, are scrambling to get on the right side of a 1989 Chinese law that prohibits the export of such cultural and scientific treasures without proper certification. And the problem extends beyond Japan. The New Mexico Museum of Natural History and Science in Albuquerque is trying to verify the status of a *Confuciusornis* put on display on 2 July after a trustee purchased it from a local dealer. The same cloud may also hang over nine specimens acquired in 1996 by the Senckenburg Museum of Natural History in Frankfurt, Germany.

At the center of the controversy is a chicken-sized creature identified and named in 1995 by avian paleontologist Hou Lianhai of the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing from a sample brought in by a local farmer (*Science*, 15 November 1996, pp. 1083 and 1164). *Confuciusornis*, thought to have lived more than 120 million years ago, is the second earliest known bird after the 150-million-year-old *Archaeopteryx* and the oldest to possess such modern characteristics as a toothless beak and the ability to fly. Although the species has considerable scientific value for the early evolution of birds, it is not involved in the debate over their link to dinosaurs.

Even so, there is an active market in *Confuciusornis* specimens, hundreds of which have been excavated from the rich fossil beds outside Sihetun in Liaoning Province in northeastern China (*Science*, 13 March, p. 1626). Philip Currie, dinosaur curator for the Royal Tyrrell Museum of Palaeontology in Alberta, Canada, estimates that up to 75% have been smuggled out of China, leaving a minority in the country for purposes of research and exhibition. The Japanese museums paid between $5000 and $15,000 for their specimens, and the Albuquerque benefactor purchased his for $18,000.

An official with the State Administration for Cultural Relics (SACR) in China says that the Japanese museum fossils should be considered smuggled cultural relics. "This is robbery," he says, adding that any country holding the fossils should return them. A press spokesperson says that SACR has never approved the export of *Confuciusornis* fossils, nor has it received any requests.

The Ibaragi Nature Museum appears to have been the first in Japan to purchase a *Confuciusornis*, in December 1993, although it wasn't identified as such until 1997 by visiting British paleontologist Paul Davis. Since then, Miyazaki, Tottori, and

D. BUBIER/VIREO

Big flap. *Confuciusornis sanctus* fossils, like this one in Beijing, are being traded in apparent violation of Chinese law.

city museums in Osaka, Aichi, and Okayama prefectures have all obtained similar specimens. The museums typically dealt with Japanese dealers, who are themselves intermediaries in the alleged illicit trading.

Japanese scientists and museum officials say that the current incidents reflect their ignorance of the Chinese law. Prefectural and city museums often have only one or few curators in geology, says one Japanese paleontologist, and it is rare for them to be fossil specialists. "It is almost impossible for them to understand the details of Chinese domestic law regarding fossils," he adds.

Several museum officials say they asked the dealers if the fossils were legal and were told not to worry, but none of the museums received documents gaining permission from the Chinese government to export the fossils. The dealer who sold the fossils to four of the museums, and who requested anonymity, says the fossils were mailed to him from China without any authorizing documents. Another dealer says that Chinese customs officials "have not requested any documents" during more than a dozen trips to bring home fossils.

None of the Japanese museums is currently exhibiting the fossils as they ponder

their next move. "We are collaborating to solve the problem we all face, as there is no authority in Japan to deal with such a matter," says Miyazaki's Tetsuo Munekata. In New Mexico, the fossil is on temporary display while museum officials await promised paperwork from the dealer. If documents showing legal export are not produced, director Richard Smartt says that the museum will either relinquish its prize or seek to obtain permission from the Chinese government to display the fossil. The Senckenburg received assurances from its dealer that the fossils had gone through proper channels, says former assistant director Stefan Peters, who adds that "it would bother me a little if they really were illegally imported." Still, Peters says, "it is better that museums acquire these specimens rather than some private collection."

Hou says he hopes the controversy will highlight the importance of proper stewardship of valuable fossils. "Exhibits must come from legal sources," says Hou, who at a 1996 international conference in Washington collected 75 signatures on a letter condemning the smuggling of bird fossils and asking authorities at the Chinese Academy of Sciences to exercise greater control over fossil excavations. "I think SACR should immediately collaborate with the Ministry of Foreign Affairs to approach the Japanese government for the return of these fossils. At the same time, our government should crack down on fossil dealers."

Those not directly involved in the controversy say they hope the outcome will not restrict the ability of museums to serve the public. "I understand the need to ban the export of very rare fossils or fossils under research," says Keiji Matsuoka, a curator of Toyohashi Museum of Natural History in Aichi. "But if there are already a lot of fossils [of *Confuciusornis*] for researchers, I hope that the Chinese government clarifies the law and agrees to provide some fossils by a legal route."

–MUTSUMI STONE AND JENNIFER COUZIN IN WASHINGTON AND LI HUI IN BEIJING

AGRICULTURAL RESEARCH

Plant Biologists Score Two New Major Facilities

The city of St. Louis, home to agricultural biotech giant Monsanto, will soon host a powerhouse in basic plant research as well. Later this month, a public-private consortium plans to announce the creation of a $146 million center in St. Louis devoted to basic plant science and sustainable agriculture. With a $15 million annual budget and a staff that will include more than 80 scientists, the new not-for-profit center, to open in 2000, would be rivaled in size nationwide only by the Boyce Thompson Plant Research Institute in Ithaca, New York. And it won't be the only new kid on the block. Later this summer Novartis AG is expected to announce a $250 million plant genomics institute to be built outside San Diego. The blockbuster developments, says Charles Arntzen, president of Boyce Thompson, are "an indication of the emerging importance of plant science in the United States."

WASHINGTON UNIVERSITY IN ST. LOUIS

Spirited in St. Louis. William Danforth says center will be unique.

Although the two centers will fund a wealth of new plant science projects, their patrons each have differing expectations. The St. Louis center will operate independently of its backers, an unusual coalition of public and private organizations. "There's nothing exactly like it that I know of," says William Danforth, chair of the center's board as well as the board of Washington University in St. Louis. The Danforth Foundation, a St. Louis philanthropy, is chipping in $60 million to the center's endowment; until now it has funded mostly education projects at a national level. The other major contributors are the Monsanto Fund—the philanthropic arm of Monsanto company—and the company itself, which together will provide $81.4 million in funding and other support. The other founders are Washington University, Missouri Botanical Garden (MBG), and the University of Missouri, Columbia.

Independence for the St. Louis center means that it—not Monsanto or its other sponsors—will receive its own patents and any income from licensing deals that it would award without any special preference to its founders. The payoff for Monsanto, says Sam Fiorello, assistant to the company's president, is the "pool of talented people" that the center will attract to plant science. "Ultimately, it will help us," he says. According to Chris Somerville, chief of the Carnegie Institution of Washington's plant lab at Stanford University, Monsanto "recognizes the advantages of being nestled up beside a first-class research institute where people and ideas may spill both ways." A rumored candidate to head the center is Roger Beachy, a plant pathologist at The Scripps Research Institute in La Jolla, California. The center's research plan has been left "deliberately vague" for now, says MBG director Peter Raven, because it will depend largely on the incoming center chief.

Novartis, a Switzerland-based drug company, is keeping plans for its center close to the vest. But a company spokesperson con-

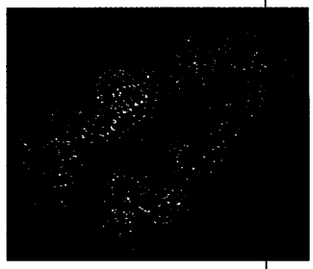
ScienceScope

USER FEE FOR PROTEIN DATABASE

Plagued by a funding crunch and inundated with new data, SWISS-PROT, a widely used amino acid database, will soon start charging a fee to industrial users.

SWISS-PROT contains sequences and other information on more than 70,000 proteins and is used by some 200,000 researchers in 100 countries, according to its developer, Amos Bairoch of the University of Geneva. But managers have a backlog of about 150,000 computer-generated sequences from which to winnow out protein information, and the database's $3-million-a-year budget is only half of what it needs, he says.

So, starting in September, SWISS-PROT—managed by the Swiss Institute of Bioinformatics and the European Bioinformatics Institute—will try to make up the deficit by charging corporate users anywhere from $2500 to $90,000 a year. Big companies are not likely to complain: The charges are "very modest in terms of the value of the database" for analyzing and comparing protein structures, says a Glaxo Wellcome spokesperson. Bairoch says that with smaller firms, fees may be negotiable. Academic and nonprofit users will still get free access to the database.



WILL MCINTYRE/ALLSTOCK/PN

ARMENIA BUCKS TREND

While Russia's competitive grants agencies are struggling (see p. 319), one former Soviet republic seems to be on the right track: Armenia is taking its baby steps in peer-reviewed research.

Next month, a new outfit, the National Foundation of Science and Advanced Technologies (NFSAT), will award 10 15-month grants to Armenian–U.S. projects in areas such as biosensors and cocaine antagonists. NFSAT's $300,000 endowment, from the U.S. Agency for International Development, will see it through the end of 1999. "Crucial for the future," says NFSAT chair Harutyun Karapetyan, will be donations from the active community of Armenians living abroad.

Contributors: Nigel Williams, Richard Stone