uncomfortable the situation will grow for researchers who have built instruments especially for it. One such device is a double-focusing three-axis spectrometer, designed by Peter Link of the University of Göttingen's Institute for Physical Chemistry. "You can't move it anywhere else without significant changes," he says. Petry and Zehetmair say they are not opposed to using MEU eventually—after the high-density fuel recipe is perfected and tested to ensure that the loss in neutron quality would be minimal. But even the next-generation MEU would require changes in the reactor's moderator tank, and using any less-enriched fuel would require boosting the core size and the reactor's power.

Both sides are hopeful that a deal can be worked out. "I still think we can get this reactor running within 6 months," says Zehetmair. Federal officials agree that it is feasible for the final operating permit to be issued before midyear—if the Bavarians compromise. Meanwhile, scientists are at the starting blocks, waiting for the gun. "Once the final permit is granted, the first fuel element could be installed in about 6 weeks," says Petry. "The fuel elements are ready and waiting in France." —ROBERT KOENIG

CONSERVATION

No Easy Answers for Biodiversity in Africa

Wilderness areas, those vast regions untouched by humans, hold great allure. But in terms of conservation, focusing on only pristine, uninhabited spaces would leave many species vulnerable to extinction, according to a new analysis of human population and biodiversity in sub-Saharan Africa. On page 2616 of this issue, researchers report that some of the most densely populated regions on the subcontinent also contain the greatest biodiversity. "You can't do conservation and development in very different places," says Andrew Balmford, one of the study's authors. "If your goal is to preserve most of Africa's biodiversity, you're going to have to grapple with the challenges of preserving biodiversity where there are quite a lot of people."

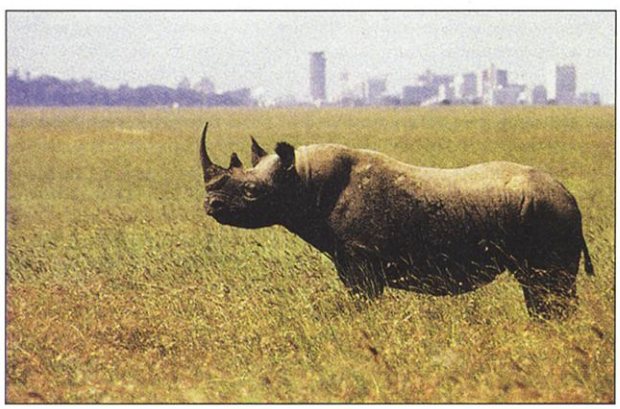
The analysis does not surprise most conservationists, who for years have been talking about global "hot spots," areas rich in varied or rare species and also under exceptional pressure from human populations. But the current study provides a more detailed look, says ecologist Gustavo da Fonseca of Conservation International in Washington, D.C. "The fact that these hot spots are emerging even at this finer scale is really surprising," he says. "We were never sure if we could find hot spots within our global hot spots."

Balmford, a zoologist at the University of Cambridge, zoologist Carsten Rahbek of the University of Copenhagen, and their colleagues mined a comprehensive database at the Zoological Museum in Copenhagen describing vertebrate populations across sub-Saharan Africa. The team analyzed human census data and data on 1921 bird species, 940 mammal species, 406 snake species, and 618 amphibian species in geographical squares approximately 100 kilometers on a side.

Areas rich in species also tend to contain more people, the team found. To test whether the correlation might be explained by sampling bias—a possible tendency for species lists to be more comprehensive in easily accessible regions close to human population centers—the team compared the correlations separately for different animal groups. If a sampling bias was causing the correlation, says Sir Robert May, a zoologist at the University of Oxford, one would expect the effect to be stronger for less studied groups, for which data are sparse. But in fact, the correlation was stronger for better studied birds and mammals and weaker for relatively uncataloged amphibians.

The pattern is probably not unique to Africa, says Balmford. In North America, for example, "some of the highest conservation priorities have the highest real estate values," most notably along the East and West coasts. Smaller studies in South America show a similar pattern as well, says ecologist Stuart Pimm of Columbia University in New York City.

The team found no easy answers when it analyzed which 100-km squares would need some kind of protection to preserve nearly all known species in the database. A strategy that started in regions with minimal human populations still identified a set of squares

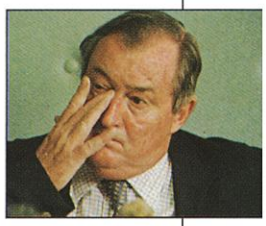


Crowded. Areas rich in biodiversity overlap with centers of human population, such as at Nairobi National Park in Kenya.

CREDITS: (TOP TO BOTTOM) SAYYID AZIM/AP; WILLIAM CONWAY/WILDLIFE CONSERVATION SOCIETY

ScienceScope

Leakey Ousted Kenya President Daniel arap Moi this week sacked prominent paleontologist and politician Richard Leakey (right) from his posts as head of the nation's civil service and an anticorruption team. Moi had appointed Leakey—a leader of the opposition and one of his staunchest critics—to the posts 20 months ago in a bid to stabilize his regime, which is under increasing pressure from foreign aid donors and in-country critics advocating greater democracy.



Leakey's tenure was marked by controversy over his management style and efforts to reform Kenya's bloated bureaucracy. His ouster, says a source close to the researcher, came as no surprise.

Westward Go! Germany's premier basic research organization, the Max Planck Society, is looking west again after a decade focused on building institutes in former East Germany. The society's governing board last week approved plans to build its 79th institute, for vascular biology, in cooperation with the University of Münster.

The new institute, which will focus on the molecular and developmental biology of the circulatory system, will be led by Belgian angiogenesis researcher Peter Carmeliet and German biochemist Dietmar Vestweber. Münster rector Jürgen Schmidt predicts the initiative "will give the university a big boost."

A Stretch Japan aims to dramatically boost public spending on science—if its economy recovers. This week the Cabinet was expected to endorse a plan to spend $195 billion over the next 5 years on R&D. If achieved, the outlay would raise government science spending to 1% of Japan's gross domestic product (GDP)—and put the nation near the top of global rankings based on the portion of GDP spent on R&D by private and public sources combined.

But reaching that goal rests on "a big assumption," says Hiroshi Tamada of the Council for Science and Technology Policy, a top advisory body. Japan's GDP would have to grow by 3.5% over the plan's span—a rate not seen since 1990.

Meanwhile, Japan's legislature last week approved nearly $27 billion in science spending for the 2001 budget that begins 1 April. The 0.5% increase falls below the amount needed to meet the new target. Officials are still looking for items that might boost the bottom line for science.

Alger says, researchers can use cannabinoid-receptor blockers or mice lacking cannabinoid receptors to see whether cannabinoid-mediated DSI occurs in these brain areas and to pin down its roles in brain function.

The studies also shed light on how marijuana affects brain functions such as memory, says Alger. "For years people thought that cannabinoids disrupt the development of LTP," he says, but now it appears that endogenous cannabinoid release may instead enhance it, by triggering DSI. But whereas the normal effects of DSI and DSE are limited to just the neurons in the vicinity of those releasing the cannabinoid and last only tens of seconds, marijuana use exposes the entire brain to high levels of marijuana's active ingredient, tetrahydrocannabinol (THC), for much longer. That would "swamp the whole system," says Irvine's Piomelli.

And that may explain findings such as those reported last December in the *Journal of Neuroscience* by Sam Deadwyler's team at Wake Forest University School of Medicine in Winston-Salem, North Carolina, showing that THC-treated rats behave on some memory tests as if they had no hippocampus. THC flooding the brain would eliminate the local activity patterns set up by DSE and DSI, just as spilling a bottle of ink across a page obliterates any words written there.

–MARCIA BARINAGA

MARINE MAMMALOGY

River Dolphins Add Branches to Family Tree

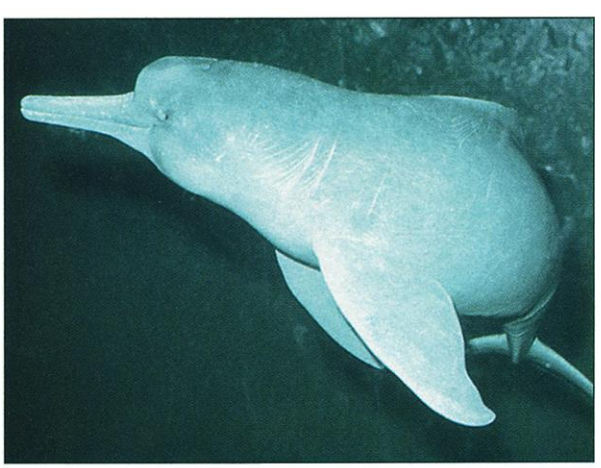
YOKOHAMA—Scientists who study marine mammals have long puzzled over where to place four species of river dolphins on the family tree. Similar in appearance, the Ganges, Yangtze, Amazon, and La Plata dolphins were thought to be more closely related to each other than to their whale cousins. But new data from a genetic analysis suggest that the species diverged at different times. One of the species may have diverged before beaked whales, whereas most dolphins did not appear until much later.

Norihiro Okada, a molecular biologist at the Tokyo Institute of Technology, and colleagues presented results here* based on a technique that uses unique repetitive bits of DNA, called short interspersed elements (SINEs), that are inserted randomly throughout the genome. Okada says the probability of identical but independent insertions at the same location in unrelated species is vanishingly small, as is the possibility of an insertion being precisely deleted later in evolutionary time. "It's the golden method" for molecular studies of evolution, says Hans Thewissen, a paleontologist at Northeastern Ohio Universities College of Medicine in Rootstown.

Okada and his colleagues gathered DNA samples from 14 cetacean species and identified 25 new SINEs, from which they constructed a relative timeline of whale, dolphin, and porpoise divergence. One significant conclusion was that the molecular analysis shows a clear separation between toothed whales, or Odontoceti, and baleen whales, or Mysticeti. Although this is the traditional morphological division, previous molecular analyses had been divided on the issue.

Based on his analysis, Okada believes that toothed marine animals diverged in the following order: sperm whales, Ganges river dolphin, and beaked whales, followed by the remaining freshwater and marine dolphins. No SINEs were found that could be used to resolve the relationships between those remaining freshwater and marine dolphins, although some SINEs indicate a sister relationship between the two South American river dolphins (Amazon and La Plata), and other SINEs clearly group together the remaining marine dolphins. Despite these gaps, Okada says that "the analysis still clearly shows that river dolphins are paraphyletic."

The new analysis supports a growing number of morphological studies, says Christian de Muizon, a paleontologist at the National Museum of Natural History in Paris, "so I was quite happy to see these results." And Ulfur Arnason, a molecular phylogeneticist at Lund University, Sweden, adds that Okada's results are also consistent with a growing number of molecular studies. Both agree that the results strengthen the case for



Intruder. The Ganges river dolphin may fit between sperm and beaked whales on the evolutionary tree.

CREDIT: (DOLPHIN) VARIN–VISAGE/JACANA/PHOTO RESEARCHERS

* Evolution and Adaptation of Marine Mammals, 12 March, Tokyo Institute of Technology, Nagatsuta campus.

ScienceScope

Courting a Consortium A former pharmaceutical executive is trying to shake up the proteomics world. Alan Williamson, a retired Merck & Co. official, is pushing an ambitious plan to have companies solve the structures and functions of 200 human proteins a year—then give away what they learn.

It might sound implausible. But the project has already won a pledge of support from The Wellcome Trust, a British charity. Williamson also claims that "nine or 10" firms are thinking of contributing $3 million each to the consortium, which he hopes will begin work this year. He hopes to seal these commitments with a business plan in the next few weeks.

Williamson has pulled off a similar coup in the past. He was instrumental in launching the SNP Consortium, which has made public more than 850,000 single-nucleotide polymorphisms (SNPs), the genetic variations that may be used to study diseases (*Science*, 16 April 1999, p. 406). The new proteomics group, he argues, could play a similar role in jump-starting drug development by sharing basic knowledge.

You've Got Mail President George W. Bush and Secretary of Health and Human Services Tommy Thompson received yet another letter this week urging them to allow the federal government to fund research on embryonic stem cells (*Science*, 1 September 2000, p. 1442). Antiabortion groups and some lawmakers are opposing the plan, because it involves extracting cells from embryos. But 112 university presidents have now joined 95 members of Congress and 80 Nobel laureates in urging the Administration not to backtrack.

Meanwhile, eight groups—including the American Society of Cell Biology, the Juvenile Diabetes Research Foundation International, and Harvard University—have hired some lobbying muscle to fight for stem cells. Vicki Hart, a consultant and aide to former Senator Bob Dole, will help the new Coalition for the Advancement of Medical Research make its case.

Contributors: David Malakoff, Robert Koenig, Dennis Normile, Eliot Marshall, Gretchen Vogel