propose that FDA get full legal power to order pediatric trials, and on 29 April they introduced a bill to that effect. The attempt to curb FDA's authority may therefore have done just the opposite. –ELIOT MARSHALL

PALEOBOTANY

Fossil Plant Hints How First Flowers Bloomed

Some 65 million years ago, a riot of flowering plants burst upon the world. Where did they come from? That question, which Charles Darwin called an "abominable mystery," has perplexed evolutionary biologists ever since. Now a remarkably well-preserved fossil from China promises to unveil the murky ancestry of this most diverse group of plants, in a surprising way. "This may be the most significant fossil flowering plant ever found," says Peter Raven, director of the Missouri Botanical Garden in St. Louis.

Like a rose. The 25-cm-high *Archaefructus* resembled modern flowering plants.

The 125-million-year-old plant—which a team of paleontologists led by Ge Sun of Jilin University in Changchun, China, and David Dilcher of the Florida Museum of Natural History describes on page 899—suggests that the forebears of flowering plants may have been aquatic, weedy herbs. Most paleobotanists have long believed that flowering plants, or angiosperms, arose instead from woody plants resembling the magnolia tree. That made sense, because the closest known relatives of angiosperms—the conifers and other so-called gymnosperms—are all woody. Indeed, the latest genetic studies suggest that the most primitive living angiosperm is *Amborella*, a woody shrub in New Caledonia.

Enter *Archaefructus sinensis*, fresh from the lake deposits of Liaoning Province in northeastern China. A closely related species from Liaoning came to light in 1998 (*Science*, 27 November 1998, p. 1692), but like most plant fossils, it was fragmentary. Then, in summer 2000, Qiang Ji, now at the Geological Institute of the Chinese Academy of Geosciences, showed Dilcher a slab of rock from Liaoning that contained a much better specimen, one that preserved intact the entire plant from roots to flowers. "I had to sit down, I was so impressed," Dilcher recalls.

The plant has clear flowerlike traits. The female reproductive structure, called the carpel, is closed with seeds inside. The male organs, known as anthers, resemble modern ones and lie below the female parts, a classic hallmark of flowers. But *Archaefructus* would raise a florist's eyebrows: It has no sepals or petals, and most strangely of all, its stamens come in pairs rather than singly.

To find out where *Archaefructus* fits within the botanical family tree, coauthor Kevin Nixon of Cornell University plugged 16 such traits into a computer programmed to calculate likely evolutionary relationships. The program compared the features with those of 173 living plants, whose own relationships were strengthened by 1600 molecular markers. *Archaefructus* came out as the sister group to all living angiosperms, even closer to the common ancestor than the woody *Amborella*.

If the team's analysis holds up, *Archaefructus* could have a lot to say about the earliest angiosperms. Its characteristics support the idea that early angiosperms were herbs. Herbs grow faster and reproduce younger than other seed plants do, and that could have given them an edge over slower growing competitors. Because every branch tip on *Archaefructus* ends in a flower, paleobotanist Bruce Tiffney of the University of California, Santa Barbara, infers that *Archaefructus* had a short, fast-growing life. "This is the best evidence so far" for herbaceous early angiosperms, he says.

It may also have lived in water, Dilcher says. The presence of fish fossils in the same type of rock, the plant's delicate stems, and its bulbous structures that may have served as floats all hint that *Archaefructus* grew in lakes. Early herbs may have thrived in watery habitats, Dilcher speculates. There, free of competition from other seed plants, early flowering plants could have bloomed into new shapes.

Dilcher and his colleagues also think that *Archaefructus* helps explain some of the steps in flower evolution. The paired stamens, Dilcher says, are consistent with the idea that angiosperms once bore their male and female reproductive organs on separate shoots. As these shoots evolved to be shorter, the sexual parts came into the close proximity now seen in modern flowers. "It's very tantalizing," says Dennis Stevenson of the New York Botanical Garden.

But although many other experts are equally smitten by *Archaefructus*, they say they won't be swept off their feet until they've had a closer look at the characters used to establish its evolutionary position. "A whole lot depends on whether [*Archaefructus*] is correctly positioned in the tree," says Michael Donoghue of Yale University. If it is, then they may begin tossing roses.

–ERIK STOKSTAD

WEAPONS LABS

DOE Delays Hiring of Livermore Head

The scheduled appointment of a new director for Lawrence Livermore National Laboratory in California was delayed last week in the latest sign of tension between the lab and its two overseers, the University of California (UC) and the Department of Energy (DOE).

DOE officials say they just wanted more information on the slate of candidates drawn up by UC, which runs the labs for DOE, that was to be presented 26 April for action by the Board of Regents. The leading candidate is believed to be physicist Raymond Juzaitis, currently a senior administrator at Los Alamos National Laboratory. Sources say that the long-running rivalry between the two weapons labs may have played a role, along with the fact that Juzaitis once supervised Wen Ho Lee, the former computer scientist at Los Alamos who was caught up in allegations of spying but never charged with espionage.

CREDITS: G. SUN *ET AL.*

"DOE and [the National Nuclear Security Agency] both had some last-minute questions that we did not feel we could adequately answer in the time available," says UC spokesperson Michael Reese. DOE spokesperson Jeanne Lopatto says that Energy Secretary Spencer Abraham had "asked for more information." The planned announcement of the regents' decision, she adds, "was a bit premature." In addition to Juzaitis, currently associate director for weapons physics at Los Alamos, the other candidates are believed to be Jeff Wadsworth, Livermore's deputy director for science and technology; Michael Anastasio, deputy director for strategic operations; and Steven Koonin, a nuclear physicist and provost at the California Institute of Technology in Pasadena. Juzaitis declined to comment on his candidacy.

Typically, the university's regents rubber-stamp the president's choice for director, and DOE in turn approves the selection. But recent lab controversies have forced DOE to pay more attention. Livermore's eighth and current director, Bruce Tarter, announced his retirement in December amid problems at the National Ignition Facility that have tripled its estimated $1.2 billion construction cost.

Choosing a Los Alamos manager would be "a strong rebuke to Livermore," says Hugh Gusterson, a Massachusetts Institute of Technology anthropologist who has written extensively on both labs. "Livermore has a tradition of weak management oversight," he adds, "while Los Alamos has always been thought to run a tighter ship." It would also go against the lab's history of promoting from within. "[Juzaitis] is certainly a choice that would have left people here stunned and demoralized," says one Livermore physicist.

–ANDREW LAWLER AND CHARLES SEIFE

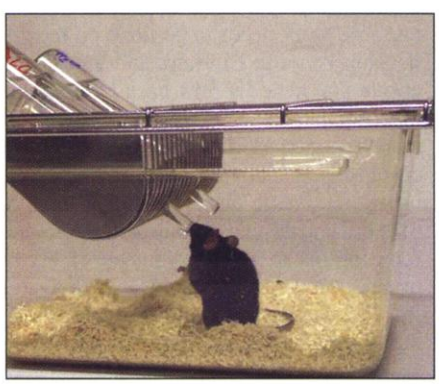
ALCOHOLISM RESEARCH

Stressed Mutant Mice Hit the Bottle

Some people can be moderate drinkers for years, only to become mired in alcohol after a stressful life event. A new mouse model described on page 931 may help explain why. In the mice, which have been genetically altered to lack a key component of their stress response system, stress apparently acts as a catalyst that makes them—perhaps permanently—more prone to drink. "This paper nicely shows the relationship between genetics and environment," says alcoholism researcher Todd Thiele of the University of North Carolina, Chapel Hill.

The work comes from behavioral pharmacologists Inge Sillaber, Rainer Spanagel, and colleagues at the Max Planck Institute of Psychiatry in Munich, Germany. In previous experiments, Max Planck researchers found that mice lacking the gene encoding the receptor for corticotropin-releasing hormone (CRH) seemed to have a blunted stress response. For example, says Sillaber, the animals were less anxiety prone than normal mice, eagerly exploring well-lit boxes that nocturnal rodents normally avoid.

Because stress is a cause of drinking in humans, and because stress-induced drinking has been shown to have a genetic component, Sillaber and her colleagues wanted to see how the loss of the CRH receptor affected the animals' drinking habits. The researchers stocked the cages of normal and altered mice with two bottles to choose from: one with pure water, the other containing 2% to 8% alcohol. Both types of mice proved to be moderate tipplers, choosing pure water most of the time.



Stress response. Moderate drinkers increase intake after nasty experiences.

But the two groups diverged after being put through some difficult experiences. In one test, a model of "social defeat," a male mouse was put into the cage of a hostile stranger for a brief period 3 days in a row. When they were together, the resident mouse attacked the visitor; then they were separated by a wire mesh, preventing the visitor from being mauled but keeping him intimidated.

None of the mice's drinking behavior changed during or immediately after the test, the researchers report. But alcohol consumption by the mutant mice began to rise a couple of weeks after the unfriendly cage visits, and a month afterward, their drinking had more than doubled, whereas that of the normal mice hadn't changed.

Both groups of mice were then put through a second ordeal. For 3 days in a row, they had to spend 5 minutes in a container of water, unable to get out. The mutants' alcohol consumption rose even further. What's more, the authors report, the mutants were still drinking substantially more than the controls 6 months after their unpleasant involuntary

CREDIT: (LEFT) INGE SILLABER AND MARKUS HENNIGER

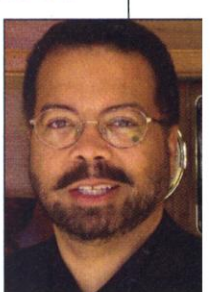
ScienceScope

Into the ITER Ring Spain has become the latest country to enter the competition to host the International Thermonuclear Experimental Reactor (ITER), a $4 billion fusion energy project. Spain last week presented its candidate site at a Moscow meeting of the ITER partners. Spain's entry is expected to compete against offers from Canada, France, Japan, and Russia (*Science*, 22 June 2001, p. 2240).

Spain would build ITER on the site of a shuttered nuclear power plant in Vandellós, near Barcelona. Ministry of Science officials tout the site's accessibility and seismic stability. Whether those assets will give Spain an edge, however, won't be known until this summer, when European Union officials decide whether to forward one or both of the continent's entries to a final competition. The ITER parties are expected to select a winning site by the end of the year.

Imaging Chief Tapped An Atlanta radiologist will direct the newest institute at the National Institutes of Health (NIH). Roderic Pettigrew (below) of Emory University has accepted the job as chief of the year-old National Institute of Biomedical Imaging and Bioengineering.

Pettigrew, who holds a medical degree and a doctorate in radiation physics, has spent most of his career developing cardiovascular imaging techniques. His experience makes him "a very appropriate choice" to bridge the fields of bioengineering and imaging, says Emory radiology chair William Casarella. Pettigrew declined to comment on his appointment, which was expected to be announced this week.



One of Pettigrew's first tasks will be to shepherd the transfer of certain grants to his institute from the rest of NIH. He must also decide whether to create an intramural program. Pettigrew's appointment means that African Americans now permanently head three of NIH's 27 institutes and centers.

Political Peer Review In a highly unusual move, the French Academy of Sciences this week voted to endorse President Jacques Chirac in the 5 May presidential runoff election that pits Chirac against far-right candidate Jean-Marie Le Pen. Citing "exceptional circumstances," the nonpartisan academy declared that Chirac was the only candidate "capable of permitting the development of research."

Contributors: Xavier Bosch, Jocelyn Kaiser, Michael Balter