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.*