Stowers says the institute will open the doors on five well-equipped laboratories in Kansas City in January 2000. This center will collaborate with four extramural research sites—Hood's lab in Seattle, Davidson's at Caltech, the lab of T cell specialist Ellen Rothenberg at Caltech, and the lab of mouse geneticist George Carlson at the McLaughlin Research Institute in Great Falls, Montana. The Stowers Institute is already supporting these four, but Stowers says "we won't have any more" satellite groups. From now on, funding will be concentrated in Kansas City, where he has deep family roots.

Stowers says that, with Hood's advice, he has adopted a distinct scientific strategy. "We wanted to focus our efforts in one area and not be scatter-gun," he says, adding that he is "not interested in just literature; I want results." Stowers Institute scientists will work from an agenda set presumably by Hood and the scientific board. Their projects will develop in an interdisciplinary fashion, with a "systems approach" to acquiring new knowledge, Stowers says, adding that he agrees with Hood that they should work in teams and study entire systems as well as their parts. Davidson says, "You can't organize science, but we hope to find and recruit people" who are interested in "looking at the complex interactions of sets of molecules" using cutting-edge technology. His own lab will be part of a $2-million-a-year consortium funded by Stowers studying the sea urchin genome.

This coherent agenda will make the Stowers Institute different from other philanthropies like the Howard Hughes Medical Institute of Chevy Chase, Maryland, says Stowers. Hughes-funded researchers remain at their universities and, according to Stowers, "there's no focus" to the overall effort. Hughes Institute President Purnell Choppin, who says he welcomes the new institute, notes that the Hughes portfolio is focused in five broad categories of biology. And he says its approach is appropriate for its size: "If we were starting over again" to create an institute of 330 investigators—the current number—"we would still do it the same way."

One key to the Stowers Institute's success will be its ability to lure "the very best scientists" to Kansas City. Stowers—who overcame the skepticism of New York financiers to create his own mutual fund in 1958—is confident that he can repeat the performance in a new sphere. Besides, Stowers explains, "Lee [Hood] says if you have the best laboratory space, the best equipment ... and have the money to pay the scientists, they're going to come." That forecast will be put to the test in the next 2 years.

–Eliot Marshall

ECOLOGY

Restored Wetlands Flunk Real-World Test

VINELAND, NEW JERSEY—To the untrained eye, a roadside salt marsh 8 kilometers south of downtown San Diego may look like any other urban wetland: a lush carpet of tall grass teeming with fish and birds. In fact, the 12-hectare plot in the Sweetwater National Wildlife Refuge is a kind of ecological counterfeit, created in 1985 to replace natural wetlands destroyed by construction projects. But restoration ecologists were unable to fool Nature. After intense scientific scrutiny, U.S. Fish and Wildlife Service (FWS) officials last January determined that the ersatz marsh has failed to attract light-footed clapper rails—an endangered bird for which it was supposed to provide habitat—and ordered the owner of the land, the California transportation department (Caltrans), to undertake further restoration work. "It was a mistake to assume that a constructed wetland would become equivalent to a natural system," says ecologist Joy Zedler of the University of Wisconsin, Madison, whose 10 year study of the Sweetwater marsh led to FWS's ruling.

R. WEBSTER/VIREO

High living. Light-footed clapper rails snubbed the short grass in a restored marsh near San Diego.

Setbacks at Sweetwater and many other sites came under the spotlight last week at a tidal wetlands meeting* here that questioned the assumptions now driving a wetlands restoration boom in the United States. The U.S. Department of Agriculture estimates that since 1982, restoration and creation projects have added more than 400,000 hectares of fresh- and saltwater wetlands to the nation's inventory. And last February, the Clinton Administration unveiled a clean-water initiative that calls for government agencies to aid efforts to create 80,000 hectares of new wetlands each year over the next decade. The plan says new marshes should be "functionally equivalent" to natural systems, meaning they should be as good as undisturbed wetlands at processing nutrients, storing floodwaters, and sheltering wildlife.

But ecologists are still debating whether it will be possible to churn out wetlands that work like the real thing. Some, including Zedler, worry that many wetlands engineers have failed to learn from past mistakes. Others are more optimistic, saying that projects considered failures today may still prove successful in time.

Such natural healing was the idea behind the Sweetwater marsh. Caltrans wetland designers assumed that once the site had been graded to the right slope and tidal flow had been restored, nature would slowly mold the marsh into a form that would support three endangered species—the clapper rail, the least tern, and the bird's beak, a small plant—that were being driven to extinction by Caltrans development. But it didn't work out that way. For one thing, Zedler and her research team, then at San Diego State University, discovered that Spartina cordgrass—transplanted from nearby wetlands to provide nesting sites for the clapper rail—refused to grow to 90 centimeters, the bird's preferred height. The problem, team member René Langis found, was the marsh's sandy, nutrient-poor soil. To fix that, colleagues Kevin Gibson and Kathy Boyer added nitrogen fertilizer, which spurred the grass to grow taller. But unpredictably, the added nutrients allowed pickleweed, another marsh plant, to outgrow the desired grass.

Zedler's team also found that Sweetwater accumulated less nitrogen and produced less organic matter than nearby "reference" wetlands. Overall, using 11 criteria—such as grass height and invertebrate counts—the researchers concluded in 1990 that the created wetland was at best less than 60% equivalent to a natural

* Concepts and Controversies in Tidal Marsh Ecology, 5–9 April.

marsh. When that estimate was released, Zedler recalls, "proponents of [the project] said we just had to be patient and give it a little more time. Well, now it's been 13 years, and it is still not functionally equivalent." She and San Diego State's John Callaway predict it will take at least 20 more years for the new marsh to match the reference sites for just one criterion: soil nitrogen. By other measures, Sweetwater may take much longer to resemble a natural wetland, they say.

Based on Zedler's findings, FWS faulted the project for producing stunted grass—a violation of an agreement between FWS and Caltrans requiring the wetland to have the tall vegetation favored by the clapper rail. To compensate for the flaw, Caltrans must now restore other potential rail habitat on the Sweetwater refuge by removing debris that has clogged tidal channels. But the restored marsh, Zedler believes, will "never provide tall grass habitat for clapper rails, because the soils are too coarse to hold nitrogen."

Some wetland experts, however, argue that time is on Sweetwater's side. "A tidal wetland constructed on sand is going to take more than just a decade to approach natural function," says Ed Garbisch of Environmental Concern Inc., a nonprofit wetlands restoration group in St. Michaels, Maryland. Zedler's reference wetlands, he argues, "do not provide a legitimate comparison—she should compare her site to natural wetlands that are being created on [similar] mineral soils," such as those found at some river mouths.

Three years ago, the need for such one-to-one comparisons led ecologist William Mitsch of Ohio State University, Columbus, to launch one of the largest wetland experiments in the nation by building two identical 1-hectare freshwater wetlands along the Olentangy River in Columbus, Ohio. Mitsch believes that the two marshes—one stocked with plants and animals by hand, the other by nature—will eventually be indistinguishable. At the meeting, he presented data suggesting they are becoming just that, with both plots showing similar growth patterns. "The convergence in such a short a time has surprised us," he says.

But perhaps the largest current test of nature's ability to reclaim lost wetlands with just a nudge from people is currently playing out along the Delaware Bay in New Jersey. There, an electric utility—Public Service Electric and Gas Company—is using heavy equipment to breach dikes protecting farmland and surrender it back to the sea. By the end of 1999, the company—forced by regulators to undertake the $100 million project—hopes to re-create 2500 hectares of tidal marsh in an attempt to boost the bay's seafood stocks and replace millions of fish killed by operations at one of its nuclear power plants. Such megaprojects, which typically include long-term monitoring programs, should help settle longtime debates over how best to restore tidal marshes, Zedler and others say.

But government officials keen on rebuilding the nation's wetlands may have to be more patient, says John Teal, an ecologist with the Woods Hole Oceanographic Institution in Massachusetts. "Regulators typically want creation and replacement right away," he says, "but it's going to take time for Mother Nature and Father Time to do their work."

David Malakoff

David Malakoff is a writer based in Bar Harbor, Maine.

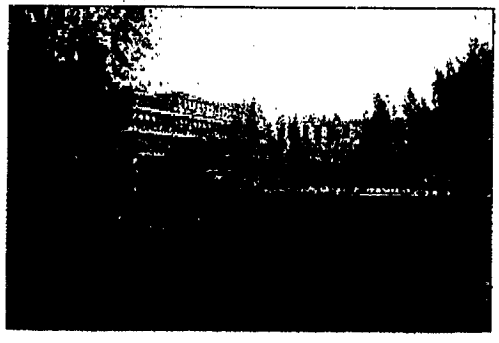
HUNGARY

Bailout for Drug Research Institute

Western drug companies have transformed Eastern Europe's pharmaceutical markets in the decade after the fall of the Iron Curtain, buying enterprises or forming joint ventures in search of new customers or a place to test drugs cheaply. But their investments, for the most part, usually don't help local researchers, many of whom have abandoned their labs in hopes of finding better jobs. For New York venture capitalist Steve Kanzer, however, such talent was too good to pass up. So his company, Paramount Capital Investments, has acquired a majority stake in the Institute for Drug Research (IDR) in Budapest, Hungary, with the idea of reclaiming its role as a regional R&D titan.

The deal, announced last week, is expected to revitalize a research powerhouse that specializes in drugs for cardiovascular and central nervous system diseases. "Combined with a clear direction from the new owners, [IDR] can be as good as anywhere else in the world," says immunologist Vince Pozsgay of the U.S. National Institute of Child Health and Human Development in Bethesda, Maryland.

The Hungarian government created IDR in 1950 as a central R&D shop for the country's drug industry. "They had very good-quality research there," says Balázs Sarkadi, of the National Institute of Hematology, Blood Transfusion, and Immunology in Budapest. Over the years, IDR developed 11 original drugs that were sold abroad. But the institute floundered after the Hungarian Communist Party gave up power in 1990 and the country's six drug companies assumed ownership of the institute. Thrust into new roles as competitors, the companies focused on in-house research staffs and mostly ignored IDR, Kanzer says. "A flood of people left, and quality went down," says Sarkadi about an institute that shrank from 900 to 250 people.



S. KANZER

Revival? U.S.–led acquisition may save struggling pharmaceutical research institute in Budapest.

To stay alive, IDR began doing contract research for Western drug firms. That work "kept the lights on," Kanzer says, and helped the institute retain talent. Of the 100 or so scientists left, says Pozsgay, "there are many young, talented people."

Kanzer, Paramount's senior managing director, says his group was impressed with IDR's "tremendous capability" in a country that he calls "the drugstore of Eastern Europe." After six visits in the past 6 months, Kanzer concluded that IDR "could serve as a beachhead to access science and research going on in Hungary." As a result, Paramount and three partners bought out five of the six Hungarian drug firms that owned the institute; terms were not disclosed. Kanzer is serving as IDR's interim chief executive officer and plans to move to Budapest soon. He hopes to tap the country's universities for talent and also to push IDR's lead compound, a potential drug against benign swelling of the prostate gland.

Besides developing its own candidate drugs, IDR will expand its contract drug testing. That strategy, Kanzer says, should help Western firms to hold down their costs. "The bottleneck is beginning to occur in the preclinical phase," he says, in which toxicology and other tests cost up to $2 million per candidate drug. Thanks to the low cost of labor, says Kanzer, such tests in Eastern Europe cost a tenth of what they would in the United States. But the deal also highlights a willingness on the part of investors to foot the bill for research. Says Pozsgay, "Hopefully, IDR will regain its former shine."

–Richard Stone