

Slow Rebuilding of Germany's East

The German government has poured huge sums into reconstructing research along western lines; results have been encouraging, but reforms are threatened by budget shortages

BERLIN—Before the fall of the Berlin Wall, the cluster of institutes at East Berlin's Adlershof district was renowned as the East German Academy of Sciences' central research campus for the natural sciences. But, like most research centers in eastern Germany, Adlershof was thrown into turmoil in the upheaval that followed Germany's 1990 reunification. Some of its institutes were dissolved entirely, the rest were completely reorganized, and many researchers lost their jobs during what one Berlin biologist calls "the wrenching transition between the demise of the old era and the dawn of the new one."

In the years since those traumatic events, millions of dollars have been poured into restoring Adlershof to the forefront of German research. A clutch of new institutes and facilities has been established there, and last month, after years of planning and debate, Berlin's cash-strapped government finally made a commitment to pay its half of the \$350 million cost of moving Humboldt University's natural sciences and mathematics departments to the complex, although on a stretched-out timetable. Says mathematician Konrad Gröger, Humboldt's vice president in charge of the natural sciences: "We wanted more money for a faster move, but at least we're now confident that the Adlershof project is heading in the right direction."

Researchers in eastern Germany could say the same about the wider project of revitalizing science in the country's "new Länder"—the five former East German states, plus East Berlin. After a burst of reforms in the first years after reunification, the pace of change slowed considerably as funds dried up. Although many institutes are doing world-class work, and an increasing number of research groups are competing successfully for federal grants, biologist Hubert Markl, president of the Max Planck Society (MPG), predicts that it will take at least another decade to bring science in the new Länder fully up to the level of science in western Germany. Dieter Simon, president of the Berlin-Brandenburg Academy of Sciences, agrees: "The restructuring will last a generation. ... One of the great lessons I have learned is how difficult it is" to merge scientific traditions. According to Dagmar Schipanski, the first former East German scientist—and the first woman—to chair the Science Council, Germany's top science advisory panel, science "is still in

transition in the new Länder," and new programs may be needed to maintain the momentum of development.

The slower pace of progress reflects the federal and state governments' current financial woes. Stringent public spending criteria for joining Europe's single currency in 1999 have led to across-the-board cuts. This year's budget for the Federal Ministry of Education, Science, Research, and Technology was reduced by 3.7%, and—partly because of the overall costs of reunification—Germany's spending on R&D has declined since 1989



Things to come. Berlin's planned revamp of the Adlershof research campus.

from 2.86% to about 2.2% of gross domestic product—well below levels in Japan and the United States.

"There have been great improvements since 1990, but resources are now extremely tight, and the funding process is complex," says Karl Hammer, who runs the seed bank at the Institute for Plant Genetics and Cultivated-Plant Research (IPK) in Gatersleben. Says Stephan Diekmann, research director at the Institute of Molecular Biotechnology in Jena, "Science, technology, funding, and politics are now changing so fast in Germany that we need to anticipate the direction of change. The funding will be lower, competition will be greater, and we will have to work more closely with industry."

Reform boom

When East and West Germany reunified in 1990, the federal government and the Science Council moved quickly to reorganize the universities and scientific institutes of the new Länder along western lines. It was an enormous task: The East German system consisted of 130 institutions—including 72 nonuniversity research institutes—bloated with more than 75,000 employees.

The first priority was to evaluate what was there. The Science Council set up teams of

scientists to review the quality of research groups, and the council eventually gave about 60% of the natural-sciences institutes in the new Länder a positive rating—crucial for their future survival. Once the East German Academy of Sciences was disbanded, all its institutes were officially dissolved, but, based on the results of the evaluations, the best were quickly reconstituted. Thirty-one research facilities became so-called *Blaue Liste* institutes—midsize, specialist research centers funded equally by state and federal governments; several institutes were amalgamated into three new National Research Centers, funded mainly by the federal government and grants; and 10 became Fraunhofer Society institutes, specializing in applied-science research. The reshuffling resulted in the loss of an estimated two-thirds of the jobs at former academy institutes.

In an effort to buffer the transition for scientists who lost their jobs, federal and state governments spent about \$370 million between 1992 and 1996 on a scientist-integration program known as WIP, which allowed universities and research centers to employ temporarily some 2000 scientists who had been unable to land permanent jobs.

While the federal government and most research organizations moved quickly to overhaul science in the new Länder, the Max Planck Society took a more cautious, long-term approach. It turned just two former academy institutes into new MPG institutes and provided 5-year grants to 27 "work groups" within the universities to help revitalize university research and teaching. Since that slow start, however, the MPG has opened 15 full institutes and two smaller research centers in the new Länder. And MPG President Markl told *Science* that the society is likely to approve more institutes this year. "By the year 2000 or 2001, we expect approximately 20% of our capacity to be in the new Länder," he says—roughly matching the region's proportion of Germany's total population.

Lost momentum?

The burst of activity following reunification, and the recent flowering of initiatives from that era, have now run up against the hard realities of deflated budgets. Take the case of Adlershof. Berlin's government was keen on promoting the site as a science center, and

after reunification, several excellent research institutes were established there. But when Berlin fell into financial crisis last year, funding for the relocation of Humboldt's science departments—considered key to the regeneration of Adlershof—appeared threatened. Berlin sharply reduced university budgets, sparking protest demonstrations and an outcry from scientists. In the end, the Berlin government approved a scaled-back plan—still subject to the Science Council's approval—that will move the Humboldt departments over a longer period, beginning next year but with some departments not moving until after 2005.

The Adlershof delay was far from the only recent disappointment. In November, several regional scientific groups in the new Länder were unhappy when the federal research ministry announced that all three major winners in its \$100 million nationwide "BioRegio" competition—making them eligible for federal subsidies to advance biotechnology research and development—were in the west (*Science*, 29 November 1996, p. 1454). The Berlin region came in fourth and so did not qualify for special funds, but Jena's proposal to develop advanced biotechnology instrumentation got a consolation prize: It was singled out for a separate commendation and will receive some extra federal funding.

Then, at year's end—despite protests from scientists and efforts to extend it—the WIP program expired, another victim of the budget crunch. While universities and research institutes scraped together funds to hire a good number of the scientists, a few hundred others lost their jobs and have joined the estimated 34,000 scientists in the new Länder who are now unable to find work in their field. "The restructuring has been hard on older scientists, and WIP helped cushion that transition," says one WIP biologist who moved on to a permanent post in Berlin. "But some good people are now unemployed. It's a shame that there are so few jobs."

In contrast to the WIP program's sudden demise, the MPG is easing itself out of its work groups program more slowly. At the beginning of this year, 21 of the 27 MPG groups were merged into universities; the rest will be integrated by next year. To ease the transition, the MPG is spending \$20 million on the groups' costs for another 3 years to help the budget-strapped universities and keep the groups' 500 staff employed. "In the long run, the basic funding will all come from the universities," says Markl.

Institutes reborn

In spite of the budget squeeze and the slow pace of reform, there are encouraging signs that science in the new Länder is picking up. Recently, for example, the MPG announced plans to create a new institute in Jena for global biogeochemical circulation research, to be co-directed by David Schimel of the

Organization	Total Institutes	No. in former E. Germany
Max Planck Society	70	15 *
National Research Centers	16	3 **
Blaue Liste Institutes	83	31
Fraunhofer Society (applied science)	48	10

(NOTE: The population of the new Länder is 16 million, about one-fifth of the total German population of 81 million.)

* Max Planck Society total does not include two partial institutes in the new Länder, nor 27 work groups that are being integrated into universities.

** Total does not include branch institutes in the new Länder that report to centers in western Germany.

SOURCE: INSTITUTE ADMINISTRATIONS

U.S. National Center for Atmospheric Research. "It is encouraging that topnotch foreign researchers are willing to come over here and engage in science in the new Länder," says Markl.

Scientists in the east are also beginning to compete on equal terms with their western colleagues. In 1995, about 14% of all regular grant approvals by the DFG, Germany's main granting agency, went to scientists in the new Länder—a figure that does not include special grants aimed only at the region. DFG President Wolfgang Frühwald says he is confident that scientific research will continue to improve at a rapid pace. "In some fields, such as chemistry and biomedical research, the new Länder already are strong. In other fields, it will take some time to catch up," he says.

Several former academy institutes are now establishing themselves in their new environment. One of the most successful is the Max Delbrück Center for Molecular Medicine (MDC) in Berlin-Buch. Created as a national research center by merging three of the former East German academy's best institutes, the MDC has become a powerhouse of biomedical research and a leading recipient of funds from the DFG.

The other national research centers, in Potsdam and Leipzig, have also done well, as have some of the *Blaue Liste* institutes—

including Jena's Institute of Molecular Biotechnology (IMB) and the IPK plant-genetics institute, which is expanding its work into biotechnology and replenishing its seed bank—Germany's biggest and among the world's 10 largest. According to IPK director Ulrich Wobus, "the former [East German] academy institutes that survived the reunification process have generally done well. Our institute is competitive."

But it has been a slow and patchy process. According to Ingolf Hertel, head of Adlershof's Max Born Institute and president of the society of *Blaue Liste* institutes, "Nonuniversity research is doing well—we certainly can compete with the west." But he says that reshaping the former academy institutes has been a challenge. "It may take 5 years to get fully to the west's level in terms of infrastructure," Hertel says. "There was a different science culture that has to be newly reoriented and trained."

With government budgets under severe pressure, researchers and science officials are hoping that industry can help move the reform process along by establishing partnerships with research institutions in the new Länder. But industry R&D budgets are also far from healthy, and cuts have hit eastern Germany particularly hard. "If you look at the cutbacks by industries in R&D, it is far worse in the new Länder," says Markl.

In spite of these problems, chemist Ernst Gottfried Jäger, pro-rector for natural sciences at Jena's Friedrich Schiller University, says he is confident that researchers can recreate the science-industry cooperation that once made Jena world famous in optics. Today, university

science departments are working alongside Jena's revamped research institutes—including the IMB, the Hans Knöll Institute for Natural-Product Research, and the Institute for Physical High Technology—as well as Jena's two major instrument-makers, Carl Zeiss-Jena and Jenoptik. Says Jäger: "A synergy of scientific research and technology—that is our goal."

But he and other scientists at universities and research institutions across the new Länder acknowledge that Germany's budget crunch—

which leading science managers have decried as a "serious threat" to research—has made it more difficult to achieve such goals. "Science here has advanced steadily since reunification," says Jäger. "But a tremendous amount of work remains to be done."

—Robert Koenig

Robert Koenig is a writer in Berlin.



Resources are tight. Karl Hammer of the IPK seed bank.