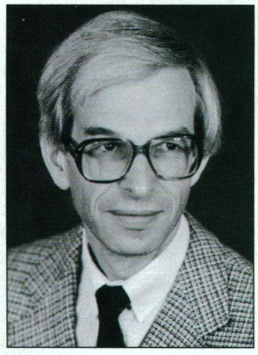
GERMANY

Reunification: Scientists in The East Count the Costs

BERLIN AND HEIDELBERG—Three years ago, plant cell biologist Lutz Nover was among the thousands of researchers in the former East Germany who eagerly embraced the end of the communist regime. And when a panel of western experts in 1991 gave a world-class rating to the Institute for Plant Biochemistry in Halle where he worked, Nover thought his long struggle to do top science in an isolated country and with outdated equipment was over. Indeed it was. But to find a professorship, Nover had to move to the University of Frankfurt in western Germany. "A painful decision," he laments, "when I'm needed in the east."

Unfortunately, Nover is far from alone in finding the reality of German reunification a bitter disappointment. Viewed from the east, the process seems like a takeover by the west rather than a friendly merger. Although some eastern scientists are prospering and are finally getting access to the latest instruments, for many others, reunification has meant either the end of their research careers or has left them with a tenuous hold on their jobs. And researchers in the west are also having to revise their notions about reunification. Most expected to assimilate the east without much trouble and then get back to business as usual. But with the tab for reunification spiraling beyond original predictions—and the growing realization that change is required from both sides—western German science is now being forced to shed some fat and examine its own shortcomings (see box on facing page).



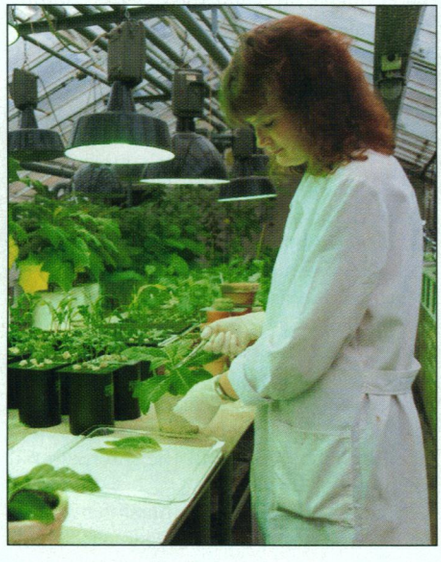
In the 3 years since reunification, science in the east has been taken apart and is slowly being put back together. The institutes of former East Germany's three Academies of Science, for instance, where much of the country's research was concentrated, have been closed and roughly one-third of their activities transferred to a smorgasbord of new labs established along western lines. The choice of what to retain was made by the Science Council—an independent group of senior western German scientists that advises the government—in a review of 130 eastern institutions carried out at breakneck speed in the months following reunification.

A huge part of the effort—and money—so far has gone into rescuing buildings and modernizing labs. Many eastern German labs were in a "catastrophic condition," says physicist Helmut Gabriel of west Berlin's Free University, a senior Science Council member. Together with the cost of new buildings, equipment, and libraries, repairing the east's scientific infrastructure will cost almost $2 billion over the next 5 years. Some $500 million of this is slated for an ambitious project that should restore Berlin to its former glory as one of Europe's leading scientific centers.

For a discussion of the background to the policies of scientific reunification, see page 1753.

All this has transformed the lives of some fortunate eastern German researchers. Take biochemist Günter Fischer, who heads a Max Planck Society-funded group at the University of Halle. Fischer says that the new system has opened up a "wonderful, completely new world." Nine years ago he discovered the first protein isomerase, a class of enzymes that help proteins fold. At the time, his primitive work conditions made it hard to take the finding much further. But now, he's setting up a $1.5 million state-of-the-art nuclear magnetic resonance facility and taking his rightful place at the forefront of the booming field he pioneered. The Max Planck Society isn't alone in seeking out top researchers in the east. The Fraunhofer Society, for instance, which runs 37 applied research institutes in western Germany, has been quick to exploit former East Germany's pool of applied science talent and now employs 1000 scientists in the east.

Go west. Plant biologist Lutz Nover *(left)* had to move from top-ranked institute in Halle *(below)* to Frankfurt to get a professorship.



Second-class citizens. Sadly, however, this spirit of renewal is outweighed by the widespread bitterness among many eastern scientists who've been made to feel like "second-class Germans," says chemist Hans-Georg Henning of east Berlin's Humboldt University. "We were unprepared for the brutality of reunification," says Nover, "for the westerners who say, 'We have 30 years experience, so you have to do it our way.'"

Perhaps the biggest blow came soon after reunification, when nearly all eastern researchers lost their permanent positions, and only a fraction were rehired on temporary contracts. The situation was worst in the universities, where the cuts were made so quickly that the committees in charge sometimes had an hour or less to decide the fate of each scientist—with a "no" often meaning the end of a career, especially for those over 40. Even those who got short-term contracts then had to compete against all comers to win back their old tenured posts, a procedure many consider unfair. "I'm sure many 55-year-old West German professors wouldn't get their jobs back if they had to compete with 35-year-olds," says Beate Meffert, a Humboldt University informatics professor.

Fueling the resentment are the large numbers of westerners getting many of the jobs in the east, even in fields where East Germany was relatively strong. Of the 17 job offers made so far by the Humboldt physics department, for example, 13 have gone to western Germans. Werner Ebeling, a department member and former dean of mathematics and natural sciences, is bitter about this outcome. "The physicists weren't worse than the mathematicians," he claims—all of whom were rehired. The problem, he says, is that the selection committees were dominated by former West Germans, and in some disciplines this led to a bias in favor of western candidates.

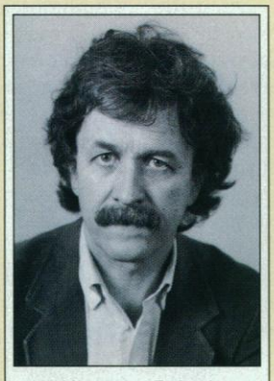
Ebeling isn't arguing for protectionism. "It's not that we don't want people from the west," he says. "We want new blood. But if there are no easterners left, it won't work. The differences [between east and west] will only go away if there's a mixture." Many other scientists share his disillusionment. "We thought capable people who were kept down under the old regime would now get their chance. There, our hopes are disappointed," says Marion Bimmler, a biomedical engineer at the new Max Delbrück Center in east Berlin (see box on next page).

Political integrity. Easterners fighting to retain their jobs also face another hurdle—the so-called integrity checks of their politi-

The West Copes...for Now

When the Berlin Wall came down, German scientists cheered like everybody else. Now that the party is over, researchers in the west—like their colleagues in the east (see main story)—are counting up the costs of reunification. So far, the science budget is coping, thanks to large increases that covered some of the immediate expenses in the east. But with the German economy in a tailspin, western German science is being forced to tighten its belt—and in the process, say some, to usher in some long-overdue reforms.

So far, big-ticket items like nuclear research and the space program have taken the brunt of the cuts. For instance, financial stringency at DARA, the German space agency, forced Germany to reduce its commitment to European space projects, which in turn resulted in the Hermes spaceplane project being put on ice until 1995. But for now, at least, the world of small science isn't hurting too badly. True, the Deutsches Forschungsgemeinschaft (DFG), Germany's main granting agency, dropped its approval rate to 45%—the lowest point in history, but still attractive by U.S. standards. "Good people still get money—but less. I need more grants to run my group, and that means lots more bureaucracy," says Hermann Bujard of the University of Heidelberg's Center for Molecular Biology.



Hermann Bujard

But while most western German scientists are weathering the current financial storm relatively well, they are more worried about what might lie in store after 1994. The reason? It's unclear whether science will continue to get the "new" money that's currently shielding it from deeper cuts. Furthermore, sometime after 1995, Germany will be asked to pay an increased contribution to international scientific organizations such as the European Molecular Biology Laboratory in Heidelberg and the CERN high-energy physics center in Geneva to reflect the reunited country's total national income.

But the cloud may have a silver lining: A growing chorus of reform-minded western researchers are also now saying that the post-reunification soul-searching provides an ideal opportunity to undertake a critical appraisal of western German science. Some top researchers believe that the system grew flabby and complacent during the days of plenty in former West Germany. Says Bujard: "In principle, Germany still has enough money for research, although the universities come up short. Our research is too expensive, too inflexible, and not geared enough to excellence.... Reunification is a good occasion for taking a hard look at our system and coming up with some new ideas."

Slowly, that's starting to happen. Earlier this year, the Science Council began an evaluation of environmental research in Germany—the first-ever review to survey a whole field rather than assessing specific institutes, according to physicist Helmut Gabriel of west Berlin's Free University, who coordinates the work of the Council's 20 discipline-specific committees. And it won't be the last. "We'll be taking up other broad themes covering the whole German science landscape," he promises.

The 13 national research centers in former West Germany are likely to come under particularly close scrutiny. Most were set up in the 1950s and 1960s with clear strategic missions such as nuclear energy and space research, and later added fields like medicine and biotechnology. But while many of the early objectives are now either accomplished or abandoned, their largely tenured staffs continue to swallow huge sums of money that bypass peer review—in 1991 they had roughly 21,000 employees and a budget of $1.8 billion, more than twice the amount the DFG distributes in grants for all researchers in western Germany. Cuts are now on the agenda, but they will still be more generously funded than the three new national centers that have been set up in the east, which are also more dependent on grant money and have fewer tenured positions. In this case, what is happening in the east may be a model for the west.

–P.K.

cal pasts. In East Germany, getting a good position often meant being pressured to toe the Communist Party line, or even to report on colleagues to the secret police. After reunification, the checks were set up to weed out scientists who had misused the system and held back colleagues' careers for political reasons. But the governments of some eastern German states are now firing people on vague and often apparently ill-supported charges of going along with the old regime. Hundreds of the several thousand scientists fired on political grounds are protesting the decision in court. Says one, a prominent biology professor: "I wasn't allowed to see the evidence against me...The principle was, 'guilty until proven innocent.'" Even for those who win their case, the victory is usually hollow: By the time the legal battle is over, their job has been given to someone else.

All the researchers who spoke with *Science* were glad to see the worst offenders go, but many condemned the harshness and unfair methods behind some of the integrity checks. Jens Reich, a Max Delbrück Center bioinformatics specialist and a former leader of the opposition movement that brought down the old regime, believes the purge is becoming a witch hunt that damages the credibility of democracy in the east and "adds to the feelings of depression and resignation."

That downward spiral is being exacerbated by the slow pace of rehiring at many institutes. Nover's decision to leave Halle for Frankfurt is a case in point. German law forbids hiring professors who are older than 52, the age Nover has just reached, so he couldn't wait any longer. With the other two senior scientists in his institute due to retire in the next few years and no replacements in sight, "everything we wanted for Halle is now up in the air," said one member of the Science Council upon hearing of Nover's decision.

Importing western problems. Another cloud on the eastern horizon is the problems the universities will inherit as they come into the west's public university system—which is sinking fast under the burden of too many students and too little money. While East Germany's universities badly needed an overhaul, they also included some treasured features that easterners hate to lose. One was the close attention lavished on students, which won't survive the current money crunch. And some curricula were also highly valued. "Our pharmaceutical studies had much more basic science," says Martin Luckner, pro-rector at the University of Halle, who calls the western curriculum he's now being told to follow "old-fashioned." The east's medical training also wins high praise from some westerners. "East Germany had a much better system, with more research training...and more contact with patients," says Karl Einhäupl, a neurologist who recently moved from Munich to east Berlin's Charité Hospital. But it's also being jettisoned.

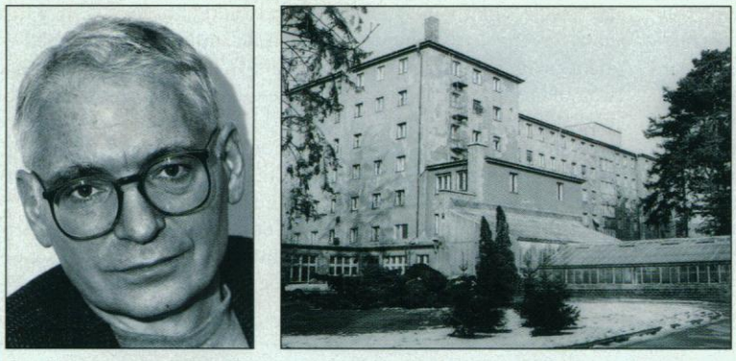
For disheartened eastern scientists, the failure of western policy makers to accept that some aspects of their old system might be worth saving is the ultimate insult. But thankfully, some westerners are now begin-

Where East Meets West

BERLIN—A glance at the artwork outside the director's office makes it clear that the new Max Delbrück Center (MDC) for Molecular Medicine isn't your average lab. The posters on the wall satirize the German government's broken promises of reunification without pain. And they're testimony to the difficult social experiment going on alongside the scientific ones at the MDC—reuniting two research communities separated by decades of life under radically different political systems.

The new center is a flagship of Germany's efforts to develop top-class institutes in the east. And what better location than Berlin, the reunited city that's set to become the nation's capital. But in the city where east and west mix most directly, the conflicting emotions generated by reunification are expressed perhaps more intensely than anywhere else—as soon becomes obvious when you visit the MDC.

Director Detlev Ganten, a hypertension researcher recruited in 1991 from the University of Heidelberg, bills the MDC as a "new-style" national research center. It is relatively small—only 350 staff scientists—and is much more dependent on peer-reviewed funding than national labs in the West. It also has a 1990s-style mission: studying the molecular biology of disease and bringing the results to the bedside, a rare combination in Germany. And the MDC has also taken the bold step, considering the widespread public fears in Germany about the misuse of genetics, of launching one of the country's first gene therapy programs.



LEFT: ULRICH SOEDER; RIGHT: PRESSESTELLE DES MDC BERLIN BUCH

Coming together. Jens Reich predicts the Max Delbrück Center will eventually merge eastern and western research traditions.

The center had a painful birth, however. It is situated in buildings that once housed three huge institutes of the East German Academy of Sciences—in molecular biology, cancer research, and heart disease—employing 1800 scientists. These researchers have felt sidelined ever since a panel of western scientists reviewed the three institutes in late 1990. "The easterners suddenly realized that they had no major influence on what would happen," says Ganten. "People were and still are feeling overrun by the western system." Hundreds of the former staff have left, most with no prospects, and more are expected to follow.

Most of the top MDC posts are going to westerners—a bitter pill for many of the remaining staff, although they know the institute needs new blood. "If [Ganten] wants to make something of this place, he has no real choice but to [bring in outsiders]," says immunologist Ida Körner. "But when westerners hire new westerners into their groups without looking at people here—that I don't understand."

Some of the MDC's surviving easterners are finding it hard to learn the roles of the western system. One symptom: Grant money is going unused in the east. Wolfgang Frühwald, president of Germany's largest granting agency, the Deutsches Forschungsgemeinschaft, recently visited the MDC to encourage people to apply, and faced a skeptical audience. Easterners, used to years of continuous research funding, are distrustful of short-term support and are unfamiliar with the ground rules—for example, if you're turned down, revise the application based on the reviewers' comments and try again. Other adjustments are even harder for easterners, unused to what Körner calls "the elbow society—a fury to publish and grab any money you can." Heart researcher Ernst-Georg Krause points to limited geographical mobility and low self-confidence as special problems. "It's probably too late for the over-40 generation; I put my hopes in our students," says Krause.

As for the westerners coming into the MDC, those who work closely with easterners seem to adapt best. Says Friedrich Luft, an American who runs the MDC's cardiology clinic with mostly eastern staff: "[The easterners] want this place to turn around. They know we have the expertise and can help make it work." But those in all-western groups have found it most difficult to adapt to their new environment. "I come from another world," says one. "We're seen as invaders who came to conquer the wild east." But it's precisely the "other worldliness" of the MDC that has attracted some westerners. "I don't want to work in a typical German institute with lots of big bosses and empires and no chance to change anything," says one researcher in line for a junior professorship. "At the MDC, I can be part of building something up." Michael Gotthardt, a medical student from Heidelberg who recently joined the MDC's gene therapy group, agrees: "If you want to be part of something that's moving, go east," he says.

And how will the social experiment turn out in the long run? Jens Reich, an MDC computer specialist and former East German dissident, has an interesting answer: "Conquerors always take the leading positions," he says. "But eventually the culture of the grass roots prevails." Over time, he predicts that the eastern style of working quietly on long-term themes will reemerge. He names epidemiology and human genetics as fields that can profit from this approach. "Ten years from now," says Reich, "it won't smell like the west [at the MDC]."

–P.K.

ning—albeit belatedly—to see the advantages of marrying the best features of each system. One small sign: In Berlin, the east's Charité Hospital and Max Delbrück Center are pooling their expertise with the west's Free University to offer a Ph.D. in medical science that will be the first such program in Germany, and should provide a boost for the country's weak clinical research.

This kind of east-west merger is needed throughout Germany, says Gabriel. "We have to look at the problems all over Germany and come up with new structures that are more than the sum of their parts." But there's more to it than structures, he stresses—east and west must come together at the level of individual scientists. "We made mistakes in the way we dealt with each other, and these need time to heal. It will be years before we can say the job is done."

–Patricia Kahn

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