A beacon of reform

Long a symbol of East German pride, the Charité medical school is flourishing in the twenty-first-century shake-up of German universities. **Alison Abbott** reports.

The concrete high-rise of the historic Charité hospital was the pride of communist East Germany's medical sciences. Built in 1982, its 21 stories were a riposte to the Verlagshochhaus — a 19-storey tower that the Springer publishing group built close to the wall in west Berlin, and that was seen as a way to taunt people in east Berlin with visions of western freedom, progress and wealth. The monolithic response from the other side of the wall was a showcase building for a top research institute — one of the few institutes in the former republic that gave some scientists the freedom to travel abroad and provided a certain independence from the all-pervading communist ideology. The 'Charité' sign on the top of the building could be read kilometres away — a proclamation that one of the city's proudest and oldest scientific institutions stood tall in the east.

Today, the Charité still holds its head up high. Last year it was ranked top university medical school in Germany by an independent research assessment, creeping ahead of schools in Heidelberg and Munich. Much of its success is due to its having grabbed, with an alacrity not

shown by most other universities, the opportunities offered by recent government reforms.

Founded in 1710 as a plague house outside the city gates, the Charité was later converted into a hospital, and developed close links with the University of Berlin (now Humboldt University). It was the intellectual home of, for example, Rudolf Virchow, the father of modern pathology, and Emil von Behring, the bacteriologist who discovered the diphtheria toxin. The Charité officially became Berlin's university hospital in 1927.

This was a time when Germany was the world leader in science and medicine; when it was unthinkable, for example, that anyone planning a research career would not learn German. But only a few years after the Charité won its university hospital status, the Nazis came to power, and by the end of the Second World War the picture had changed entirely. Physical and moral destruction had left the country's scientific landscape in ruins. The Charité's historic buildings had to be rebuilt brick by brick from the rubble. Reading German would never again be compulsory for scientists from Chicago to Shanghai.

On both sides of the wall, German science eventually recovered from the war and from the subsequent shock of reunification. Today the country's scientific impact is among the world's top five, thanks in large part to the network of Max Planck Institutes that serves as home to the majority of Germany's most-cited scientists. But the country's politicians think that things would be even better if the university sector, too, were to house similar excellence. They are aware that Germany boasts no heavyweights to rival the giants of Cambridge in Massachusetts — or, closer to home, of London or Paris. Although Germany spends more on research than either France or the United Kingdom, Heidelberg, Munich and Berlin do not shine in the world rankings. German universities rarely feature in lists of the top 50 worldwide.

The shackles holding back the universities, critics say, were forged from a mixture of traditional stodginess and utopian zeal. In the post-war years, the strong hierarchy within German universities meant, among other things, that young scientists were rarely able to run their own research. Herr Professor — or the very

P. KNEFFEL/DPA

occasional Frau Professorin — made all the decisions, applied for all the research grants and received guaranteed levels of research money from the university, no matter how productive he, or she, happened to be.

The spirit of '68 and the political awakening it brought to Europe's students dovetailed with the postwar generation's concern that many of those in charge of the universities had served the Nazi regime. The result was a drive to democratize academia. For example, student, administrative and technical representatives were included on all university committees, including the selection boards for faculty appointments. Decisions became painfully slow. The university president had very few powers, and it was never clear who was responsible for anything. "It is really time to say goodbye to this collective irresponsibility," says physicist Jürgen Mlynek, former president of Humboldt University, where the professors have a majority of just one in the highest academic committee, the senate.

All things being equal

In the 1970s, a series of developments enshrined the concept of the 'equality of universities' in law. A degree from one university was supposed to be as good as one from any other university and the law prevented universities from selecting their own students and from charging for tuition. The roughly equal funding of the roughly equal universities provided adequate education for all but it didn't promote competition or innovation.

And some of the biological sciences suffered other political constraints. The idea of genetic

Former research minister Edelgard Bulmahn helped remove barriers to innovation and reform.

engineering was mostly rejected — an understandable reaction to the appalling abuses of Josef Mengele and his cohorts — and that held back the development of molecular biology. The first German factory for producing genetically engineered human insulin was supposed to open in the early 1980s, but was famously delayed for nearly a decade. Although the regulations for genetic engineering are now in line with those elsewhere, research on embryonic stem cells remains among the most restricted of European countries.

Meanwhile in eastern Germany, research had been more or less stamped out of most universities. The freedom of thought it required

was not seen as sitting comfortably with the teaching of young minds. Most research took place in the Soviet-style institutes of the German Academy of Sciences. The Charité was one of the few institutions spared.

In the 1990s, reunification, with its bankrupting costs, forced the restructuring of East German institutes. The upheaval also provided an opportunity to take a closer look at the stagnating system in the west, and in particular at the perceived loss of the best young researchers to the United States. The result was a series of schemes to enliven the universities, for example by cutting the time it took students to graduate and by increasing competition between institutions. But the effect of federal initiatives is limited by the 16 state governments that hold sway over Germany's 100 or so research universities.

In 2001, the research minister at the time, Edelgard Bulmahn, pushed through legislation aimed at removing the obstacles to innovation and reform that had been put in place by some of the state governments. Among its provisions was a new salary system for professors that allowed performance-related pay. Another important reform was the creation of fixed-term 'junior professorships' also paid for by the federal purse. These independent positions have allowed 1,145 young academics to set up their own research groups at a university. At the same time the *Habilitation* qualification required for university teachers stopped being mandatory, removing years from potential qualifying times.

Competitive streak

Since 2001, the federal government has succeeded in forcing research organizations over which it has more direct control, such as the Helmholtz Association (see 'Uncoiling the dead hand', page 633) to become more competitive. But despite the relaxation of rules on salaries, *Habilitation* and hiring of young academics, the universities were not obliged to change their ways, and at first most didn't — even when some state governments, such as those of Bavaria, Baden Württemberg and North Rhine-Westphalia, joined the reform bandwagon and passed local laws that encouraged their universities to modernize and to use their budgets flexibly.

The Charité, by contrast, has been one of the few universities to take up all opportunities for reform without hesitation. Unlike many of its counterparts in western Germany, the medical school was never burdened by inertia. Quite the opposite — it had been turned upside down and inside out by reunification. Alongside major restructuring, the Charité staff had their political backgrounds examined: those found to have collaborated with the Stasi to the detriment of

Flexibility at the Charité

With her PhD and medical qualifications, Seija Lehnhardt (pictured) could have carried on working at Harvard Medical School. There she would have found a way to divide her week sensibly between the clinic and research. Most institutes in Germany don't have such flexibility. Clinicians work under rigid employment conditions that mean that lab work has to be relegated to evenings and days off — a system that some say explains why so much of the clinical research in the country is poor.

But Lehnhardt wanted to return to her family and friends in Germany, while

continuing her research and qualifying as a neurologist. The answer was to be found at the Charité University Hospital in Berlin (see main text), where a flexible attitude to financing and the support of her clinical chief allows her to work part time on an unorthodox contract.

The Charité has set aside funds to promote the careers

of female scientists. A Rehel-Hirsch fellowship pays Lehnhardt a full-time salary as a researcher and provides support for her small research group, which works on the brain's immune system. That allows her to work 'unpaid' in the Charité's neurology clinics for three days a week — work that will allow her to qualify in her speciality.

She sees herself as a fortunate exception in a system that makes it hard for clinician-researchers to do either job well. "In Boston I knew a lot of happy people doing clinics and research — I don't see a lot of happy people in this situation here." **A.A.**

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A. PALIEGE & E. SCHOTT

their colleagues were dismissed. Many others were dismissed simply because of massive overstaffing, particularly among the technical-support staff.

Joining forces

Staff morale might have been low, but funding prospects were better at the Charité than at the two medical schools of the Free University in west Berlin, which lost their lavish federal subsidies in the cutbacks after reunification. In 2003, the cash-strapped Berlin state government decided to merge the city's medical schools under the umbrella of the Charité, making it a university in its own right, but demanding an additional 33% budget cut to be phased in by 2010.

The fresh if traumatic start forced on the Charité made it easier to make the necessary changes. Commercial activities, such as clinical-trial services, add 10% to the €200 million (US\$270 million) budget it gets from Berlin's state government. And it is pulling in enough grant money to make up for the reduction in state funds. "The early years after reunification were psychologically difficult on both sides," recalls Detlev Ganten, head of the merged medical schools. "But I'm optimistic now — we are really starting to identify with the scientific spirit in Berlin before the Nazi period."

To weaken the rigid academic hierarchy, whenever any academic staff left the Charité, Ganten pooled their institutional money and support staff and used the shared resources competitively, for example to offer good starting packages for young academic staff, to improve career opportunities for women and to sup-

Detlev Ganten is head of the expanded Charité medical school.

port top performing staff (see 'Flexibility at the Charité', page 631). Already a third of faculty resources are shared out in these ways, and the beneficiaries have to reapply every year for their share. The pool will grow further at the end of this year when all packages agreed over the decades will be cancelled and renegotiated.

Today, the Charité hosts 25 junior professorships, the highest number of any medical

school. Unlike some other institutions, it has appointed to those positions people whom it truly intends to see tenured at the end of the process. Elsewhere, the reforms have been less impressive. By 2004, only two-thirds of the junior professors had gone on to get tenured positions, fewer than had been anticipated. Most universities didn't want to offer the few open faculty positions they had to junior professors (see 'The Emmy awards').

Attractive incentives

In 2005, the federal government adopted new tactics and decided it could best persuade universities to adopt reforms by dangling carrots — in the form of competitions that could be won only by universities able to attract the best students and faculty and to network effectively with their neighbours. The most influential of these competitions is the massive three-part Excellence Initiative — €1.9-billion over 5 years. For comparison, the country's science-funding agency, the DFG, has an annual budget of €1.3 billion.

The initiative is now halfway through. Eighteen graduate schools and seventeen 'clusters of excellence' have been rewarded in the first funding round.

The initiative can name up to five 'élite universities' from among the winners of the other categories. In the first round, three universities — two in Munich and one in Karlsruhe — earned the élite label. This should mark the end of the pervasive myth that all German universities are equal. "The competition has challenged the dogma of equality, making the difference between universities apparent," says Peter Strohschneider, chair of the German Science Council in Cologne. "A new paradigm in Germany science policy has been established and it has far-reaching effects for the whole university system."

"The competition's really put new momentum into all the universities," says DFG president Matthias Kleiner, whose agency is helping to administer the initiative. "For one thing it got people interacting — faculties had previously behaved like little kingdoms but they had to cooperate for the Excellence Initiative."

The Charité is already reaping the benefits of the more competitive structure it has created. It won an Excellence Initiative award for its graduate school in neuroscience — the Berlin School of Mind and Brain — worth €1 million a year for five years, and has been short-listed in the second round, to be decided this autumn, for a neuroscience research cluster worth around €6.5 million per year for five years. This success adds to a prestigious award

The Emmy awards

The Emmy Noether awards are run by Germany's main funding agency, the DFG. They aim to encourage young German scientists working abroad to come home.

This spring, *Nature* surveyed this year's 77 award recipients about their attitudes to Germany as a place to do research. Of the 55 that responded, more than half described Germany as being either as attractive or more attractive to young scientists as the countries they had left. "I find conditions surprisingly good," says

biomathematician Korbinian Strimmer, who spent two years as a postdoc in Oxford, UK, and now works at the University of Leipzig in Germany. "Right now the intellectual climate is better in the United Kingdom, but Leipzig is getting very interesting, and the critical mass is now arriving."

However, more than half the recipients judged university hierarchies to be more intrusive in Germany than in the country they had left, and more than a third said that they thought the *Habilitation* qualification

was still important for their career in Germany. Many complained that the effect of performance-related pay has been to lower salaries, because the basic rate has been reduced and the universities are tight-fisted with bonuses.

"In practice, this reform has served only to cut costs — it is a battle for scientists to get the same salary they had before," says 38-year-old Joachim Hermisson, who leads an Emmy Noether group in population genetics at the Ludwig Maximilians University of Munich. **A.A. & S.S.**

it won from the federal research ministry last year to create the Berlin-Brandenburg Center for Regenerative Therapies, which comprises 23 research groups and is funded with €45 million over four years. Also last year it was ranked top German medical school in impact and grant money by the independent Bertelsmann Foundation in Gütersloh.

Slowly but surely

Some of the older Charité professors were not happy with the rapid pace of change, says Ganten. But the young faculty members are. "I'd be a liar if I said the atmosphere here was quite the same as San Francisco and Berkeley but there is already a huge difference compared with when I studied here in the mid-1990s," says Charité neuroscientist Dietmar Schmitz. "It's getting there slowly."

Schmitz returned to Germany in 2002 with both a junior professorship and an Emmy Noether award, designed to attract back emigré scientists, and now has tenure and coordinates the Charité neuroscience cluster. Two main things attracted him back from the United States. "The Charité offer was tenure track with a good package," he says. And he was aware of a growing neuroscience buzz around the city and its academic community. The city had chosen neuroscience as a focus and built up appropriate infrastructure. Top neuroscientists had already started to arrive there from elsewhere.

Cosmopolitan Berlin: Charité researcher Christian Spahn discusses his work with Venezuelan colleague Francisco Triana-Alonso.

"German universities are getting more professional," observes Christian Spahn, a structural biologist with tenure who also joined Charité as a junior professor in 2002 — despite the offer of a faculty position in the United States. He is now being courted by other German universities and knows he will get the facilities he needs to match his research ambitions. But Spahn doesn't think that the changes in Germany go far enough in trying to improve competition. "What we really need now is for funding agencies to introduce [payment to cover] overheads," he says, "so universities know that if they employ a good scientist he or she will bring in regular money — more regular than the occasional competition like the Excellence Initiative."

As things gradually improve for German universities, the Charité is planning to upgrade its concrete high-rise to celebrate its rise in status. An €86-million restoration project has been launched to give it a new façade and seven additional floors. The reasons are practical — the medical school needs more space. But the extension and expansion are not without their own propaganda purpose. The newly heightened building will go by the name of the Leuchtturm der Lebenswissenschaften Berlin — the Beacon of Life Sciences. ■

Alison Abbott is Nature's senior European correspondent. Additional reporting by Sophie Stiegler.

See Editorial, page 613.

Uncoiling the dead hand

Germany's Helmholtz Association runs 15 large national research centres addressing a range of government priorities. The association has acquired a reputation for stodginess and civil-servant mentality, and with federal money providing 90% of its income, it was a prime target for Germany's reforms. A bill introduced in 2001 (see main story) aimed to make the research centres more competitive and responsive to changing government strategies, and the association's drive to implement these changes has been ruthless.

Then-president Jürgen Mlynek changed the system from a guaranteed budget for every centre to one in which the entire €1.6-billion (US\$2.2 billion) annual budget is pooled into strategic areas from which

scientists must apply for support. The strategic value and quality of the research proposals are evaluated by panels of experts, half of whom are foreign. Less than 5% of the allocations have shifted since the practice was introduced in 2001, but some research areas have received a

big boost. Financing of energy efficiency, for instance, has increased by 15% and the budget for photovoltaics has doubled.

Mlynek has partitioned off an annual €25 million, rising to €60 million next year, for a president's initiative fund, which allows him to indulge in some social

engineering he thinks is much needed. For example, centres that appoint women to top positions get a million-euro top-up, and the fund also finances up to 100 tenure-track junior research groups.

The president's fund also supports, with €10 million over 5 years, a suite of 'Helmholtz alliances' between centres and universities. The 'Physics on the Terascale' alliance includes the particle-physics centre DESY in Hamburg, the Research Centre Karlsruhe and 17 German universities. Its strategic aim is to keep the German particle-physics community, about to lose the country's main particle accelerator HERA at the DESY lab (pictured), in good enough shape to exploit the Large Hadron Collider at CERN in Geneva when it starts pumping out the particles in 2008. **A.A.**