Germany's 75 Years of Free Enterprise Science

The Max-Planck-Society has celebrated its 75th birthday with its third Nobel Prize in 3 years and bright prospects, but tensions remain over its relationship to German universities

Munich

THE core idea of the modern research university—that teaching and research thrive best if carried out in close proximity—was conceived by the German scientist Wilhelm von Humboldt in the early 19th century. It is therefore ironic that Germany's foremost organization for the support of basic research, the Max-Planck-Society (MPG), was created deliberately to free scientists from the heavy burden of teaching and administration that the pursuit of Humboldt's ideals had imposed on universities.

Currently celebrating its 75th birthday, the Max Planck's network of independent research institutes remains the envy of scientists throughout the world. Although the society has been contending with serious budget difficulties and tensions in its relations with German universities in recent years, it enjoys what research institutions in few other countries have been able to achieve: substantial public funding with almost complete scientific and administrative autonomy.

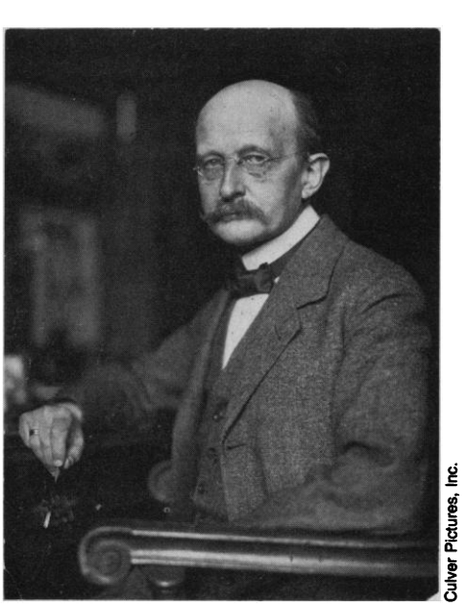
The society's scientific reputation was reconfirmed last month by the award of the Nobel Prize in physics—shared with Gerd Binnig and Heinrich Rohrer of IBM—to Ernst Ruska, the 79-year-old inventor of the electron microscope and formerly the director of MPG's Fritz-Haber-Institute in Berlin. Ruska is the MPG's 23rd Nobel prize-winner since its foundation, and the third in three successive years.

The publicity that has surrounded both this string of successes and the current birthday celebrations will, it is hoped, help break a funding deadlock that has held the Max-Planck-Society's budget constant at about $500 million a year for more than a decade. At the beginning of October, the länder (state) governments, which provide almost half the public financing, agreed to support a real budget increase of 3.5% next year. However, the MPG had been hoping for an increase of 5%, as well as an additional $10 million over the next 5 years for scientific equipment.

The Max-Planck-Society did not get its present name (suggested by British scientist Sir Henry Dale) until 1948. It began in Berlin in 1911 as the Kaiser-Wilhelm-Gesellschaft, and originated from a joint proposal by a group of scientists and industrialists who argued that advanced research was sufficiently important to receive public funding but to remain separate from the constraints of the university world.

Despite the many changes that have taken place in the world of science over the past 75 years, the philosophy of the Max-Planck-Society is largely unchanged. As a result, it remains an essentially elitist and conservative (some even use the word "feudal") organization, wedded to the idea that a nation's industry can prosper through the careful nurturing of basic science, but run with the traditional German emphasis on organizational efficiency and discipline.

The scientific activities of its 60 research institutes and project groups cover topics from nuclear physics through molecular genetics and coal research to the study of patent law. In size, they range from the 1000 scientists and technicians employed in the Max Planck Institute for Plasma Physics at Garching near Munich, to others—such as the new mathematics institute in Bonn—with no more than a dozen people on the staff.



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Max Planck. *Presided over the Kaiser-Wilhelm-Gesellschaft in the 1930's and immediately after World War II. The organization was named after him in 1948.*

Whatever an institute's size, its scientific autonomy is jealously guarded. The 200 scientific directors who are responsible for the individual research programs are each carefully selected. Once appointed, however, they are free to appoint their own staff and choose their own research topics. But they have to rejustify their support every 7 years.

Accountability is primarily scientific. Each institute is regularly scrutinized by an international team of visiting scientists, who report directly to the Max-Planck-Society president. The reports perform a double function, not merely checking on the quality of the work being performed, but also, says one administrator, "making us trustworthy on the political scene."

According to the current president, chemist Heinz Staab of the Max Planck Institute for Medical Research in Heidelberg, this independence has been made possible because the society's support has always come from two separate sources, each of which has tended to neutralize the influence of the other, leaving the MPG free to determine its own policies.

"There has always been a balance of power," says Staab. Initially it was between government and private sponsorship; now it is between the federal and state governments. "The research has never been dependent on just one of these groups," he adds.

In addition, Max Planck scientists work in an environment that reflects what one official describes as the "higher bourgeois" values of the early years of the century. This means, for example, that there has never been much reluctance to engage in research of explicit value to the private sector (provided individual topics remain set by the scientists themselves).

At the same time, it also means that there has been a conscious effort to isolate the content of research from political debates. During World War II, this led to some murky dealings with the Nazi regime, which later prompted the United States to propose that all the research institutes be disbanded (they were saved after intervention by the British).

In principle, however, the result has been to create a protected system of free enterprise science that is unique in the industrialized world. Scientists with a proven track record are provided considerable flexibility and freedom to innovate. "It is very effi-

Munich headquarters

The Max-Planck-Society supports 60 research institutes and has a budget of $500 million a year.

cient; once you are a Max Planck director, you may do what your ability, your scientific conscience, and the boundary conditions [of the laboratory] make possible," says physicist Peter Brix at the Max-Planck-Institute for Nuclear Physics.

As in any free enterprise system, there is also a price to be paid for failure. A Max Planck institute that fails to demonstrate that its research continues to be of a sufficiently high standard, or that has no suitable successor available for a retiring director, can be shut down with little ceremony. "The ability to close down institutes is one of our major strengths," says Staab. "We could not operate effectively without the freedom this gives us."

Between 1972 and 1982, 20 institutes and independent departments were closed in this way, allowing seven new institutes and eight new independent project groups to be set up over the same period.

In practice, the Max-Planck-Society operates under various external constraints. The most important in recent years have been financial; after rapid growth in the 1960's, which saw the numbers of scientific, technical, and administrative staff expand from 3000 in 1960 to 8400 in 1972, public funding (and the number of jobs) has been kept constant, leading to what is frequently described as 14 years of "stagnation." One MPG official in Munich claims that there is now "nothing left to cut," while Staab says that the level of funding available for equipment is only 60% of what it was in the early 1970's. "The institutes could produce more and better science if they had better equipment," he argues.

But money is not the only constraint. In several other ways, the MPG's traditional forms of operation have come into increasing conflict with new social policies. The freedom to close down an institute, for example, has traditionally given the Max-Planck-Society the right to terminate the contracts of scientists employed there, and the ability to maintain a regular turnover of staff in order to exploit new scientific fields (and abandon unproductive ones) is still considered a top priority. However, this desire frequently conflicts with labor laws aimed at providing security of employment.

Another area that has provoked intense discussion in recent years is the extent to which regional development needs should be more explicitly acknowledged in decisions on the location of new institutes. Traditionally, such decisions are supposed to be taken primarily on scientific grounds, while an individual state's contribution to the overall budget of the MPG system is determined mainly by the size of its population and its economic output. But there have recently been growing complaints that helping scientifically rich states to become even richer has contributed to a growing North-South division in Germany.

It is widely considered, for example, that decisions to locate a number of Max Planck institutes in Munich after the last war (it currently has nine, more than any other German city) played a major role in turning the state of Bavaria from a primarily agricultural region into the high-technology center which it boasts of being today. The state of Baden-Württemberg, Bavaria's neighbor and long-time rival, is now offering $40 million to help develop new activities in ceramics and immunology at two Max Planck institutes within its borders and thus restore the balance.

At the other end of the country, the city of Hamburg protested a decision 3 years ago to locate a new institute of polymer research in Mainz, which already has the original chemistry institute, moved from Berlin after the war. And the city-state of Bremen, faced with the decline of its shipbuilding industry, is concerned that it has no Max Planck research group, despite the fact that it is contributing to the MPG budget.

In an attempt to resolve some of these regional tensions, new rules are currently under discussion that would require individual states to increase their financial contribution to the budget of the institutes they host.

Even more difficult to resolve will be the continuing tensions with universities. In theory, the Max Planck institutes are supposed to be on a parity with universities, complementing the latter by offering facilities that the universities are unable to provide, making senior staff available to teach university courses, and giving young scientists the opportunity to spend a period of time entirely on research.

In many locations this arrangement is said to work well. In others, however, long-standing rivalries, fueled by differences in resources, opportunities, and status, remain close to the surface. The tensions were largely submerged during the rapid expansion of both the Max Planck and the university systems during the 1960's. But they have come into the open over the past decade as the two systems have diverged.

Universities have continued to expand their student intake (and are likely to go on doing so for the next 10 years). But the increased teaching load, combined with budgetary restrictions and new internal decision-making procedures designed to spread academic responsibility, have made them less sympathetic to the traditional needs of research.

Despite attempts to maintain an equilibrium by the Deutsche Forschungsgemeinschaft (DFG), the main source of federal funding for university research whose budget is roughly comparable to that of the MPG, many university scientists perceive a growing imbalance between the universities and the Max Planck system.

University scientists often look enviously at the greater freedom and better support enjoyed by their Max Planck colleagues. "For the past 15 years, every professor I know who has had an offer from the Max-Planck-Society has accepted it," says Heinz Maier-Leibnitz, a former president of the DFG and professor of physics at the University of Munich.

Maier-Leibnitz complains that since most of those who leave universities for the MPG tend to stay there, the result is a "one-way street" that undercuts the universities' ability to sustain top-rate teaching and research in tandem. "I do not see why the MPG and the universities should not be at the same level," he says.

Max Planck officials deny that the traffic is quite so unidirectional. They argue that they do much to encourage their research scientists to teach university courses. Indeed, Staab complains that MPG scientists are often handicapped in applying for university jobs by their lack of teaching experience.

In quantitative terms, most basic research is still carried out in universities, and much of it is first rate. Both sides acknowledge, however, that overall there is a difference—at least in perceptions. "The Max Planck people feel very superior; the trouble is that in most cases they are," says one university research worker. ■ DAVID DICKSON