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At the cutting edge of Soviet change

To achieve reform, Mr Gorbachev must tap the world's largest store of scientific talent, the Academy of Sciences. Rupert Cornwell reports from Moscow

The Soviet Academy of Sciences, which was founded by Peter the Great and has

It is a flower in the desert, one of those hidden jewels which give Moscow so much of its fascination. You turn south off the inner-ring motorway down Leninsky Prospect, one of those canyon boulevards in which the Soviet capital specialises, with apparently no distinguishing feature whatever. But, a few hundred yards down on the right, you see a narrow, elegant gateway, only too easy to miss. You enter, and you are in another world.

The driveway leads to a villa immaculate in ochre stucco and white colonnades. It would belong more naturally in the soft hills of the Veneto in Italy. The building started life early in the eighteenth-century, the property of a Moscow industrialist called Demidoff. Later it belonged to Catherine the Great, and later still Napoleon spent his last night in Moscow under its roof, before the great retreat of 1812.

Every now and then black Volga limousines pull up, to collect or deposit venerable gentlemen who vanish into the villa's cool, vaulted interior. Inside, the atmosphere exudes the ritual of a London club or the senior common room at an Oxford college.

Nor is the comparison misleading. For you have stumbled into the headquarters of that most clubbish institution of the Soviet Union, the Academy of Sciences. And those elderly figures are academicians, arguably the most cossetted, among the best paid, and certainly the most prestigious of the modern Russian establishment.

The Academy was founded in 1724 by Peter the Great amid his attack upon the backwardness of his country. Peter, admirer of the West, imported 13 Germans, a Frenchman and two Swiss to be its first members. Not until 1745 was the first Russian academician elected, and only at the end of the nineteenth century had the Academy become a truly Russian institution.

In the intervening quarter of a millenium, the world beyond the villa's gates has been turned upside down? Russia has changed political systems. Peter's imperial academy has become the USSR Academy of Sciences. Those foreign scientific seeds have long since taken root.

In many fields Soviet Science commands respect and admiration. Instead of just 16, there are now 270 full members of the Academy and a further 540 corresponding members, eminent in anything from laser physics to American politics. Like the Russian state, the Academy has grown to become the ruler of a mighty empire. It has acquired offshoots in the Urals, the Soviet Far East and in Siberia. Each of the 14 non-Russian constituent republics now has its own academy as well. In all, this conglomerate controls 250 affiliated institutes, employing 43,000 researchers.

History, though, is repeating itself. The Soviet Union may be a military superpower, but that mocking description of the country as "Upper Volta [or rather Burkina Faso] with missiles" still contains enough truth to hurt. Mr Mikhail Gorbachev has inherited from Peter the Great an acute awareness of Russia's economic and social failings, as well as a taste for root-and-branch reform. And if he is to succeed, it must be by exploiting the resources of the Academy, the largest single concentration of scientific talent on earth.

Many would rightly say that the institution is ripe for the Gorbachev treatment. Its failings have been in part those of the times, but in part of its own making. Almost two decades of Mr Brezhnev imbued the Academy with caution and complacency. But then again, can a group of men, most of whom are over 70, and used to the luxuries of chauffeurs, secretaries and salaries which can eclipse those of a minister, ever be at the cutting edge of change?

The Kremlin's economic order of the hour is to shift from the extensive to the intensive, towards quality rather than quantity, to coax more and better goods from existing plant and workers, instead of building new ones. Obviously science and technology are central to this leap in productivity.

But the Academy and its daughter institutes are still largely wedded to fundamental research, far from industry and the real lives of people. Hierarchies have grown rigid, bureaucracies have become entrenched. Most serious, young scientists are demoralised: the structure of an average institute is, in the words of one frustrated young researcher, like "ice on top of water".

These are the problems which that instinctive technocrat and meritocrat Mr Gorbachev intends to tackle. And after two years in power, he can look back on some useful achievements. Last October Anatoly Alexandrov finally stepped down from the presidency, which he had held for 11 years, at the age of 83. His replacement was Guri Marchuk, 22 years his junior, and very much in the Gorbachev mould.

By training Marchuk is a mathematician. Much more important, he knows how government works, and what it wants. Within the Academy he headed its Siberian department at Novosibirsk with its constellation of polit plants around it, a rare Soviet example of how scientific work can be harnessed to

Andrei Sakharov (left) as a member is the focus for Gorbachev's process of reform

the requirements of industry. Then he spent five years in charge of the State Committee for Science and Technology, a powerful co-ordinating body unloved by other ministries. Its chairmanship, however, carries the rank of deputy prime minister.

And now, a few months into his new job, Marchuk is urging that the Academy, which he is once said to have described as a "geriatric institute", be pointed "decisively towards the needs of public production".

Already a new generation of 50-year-olds has emerged immediately beneath him. Yevgeny Velikhov, one of the academy's four vice-presidents and in charge of its physics and mathematics section, is one of Mr Gorbachev's most influential advisers. He accompanied the Soviet leader to the Reykjavik Summit, and is reputed to see him weekly.

Another Gorbachev man in the limelight is Roald Sagdeyev, director of the USSR's space research institute, an academician and a leading Soviet spokesman on "peace" and disarmament. Abel Aganbegyan, a leader of the reformist "Siberian" economics school, now leads the Academy's economic section.

Guri Marchuk, Academy head

In the quest for new faces and new ideas, Marchuk is demanding a 5 per cent annual staff turnover in Academy institutes. In the rigid and stratified Soviet system, this would be a remarkable achievement. More striking still, institute employees will now face mandatory retirement at the age of 65, while academicians will in future have to step down at 70 — although special new "advisory" posts will be created, to ensure they are not rudely separated from those perks like car and driver, dacha, and exclusive shopping and medical facilities.

In a subtler sense, Marchuk is encouraging the devolution of authority from praesidium to individual departments and institutes. These, for example, will now be allowed to make their own foreign contacts, instead of the previous insistence that all be channelled through the central foreign relations department. This should help tackle a glaring weakness of Soviet science: its paucity of links with comparable work abroad.

At the centre too, the impact of the technological revolution is visible. Alongside the 17 departments in existence, two more have just been set up dealing with those late twentieth-century applications of science, computers and engineering control processes. As Georgy Skryabin, the academy's secretary general, summed it up recently: "*Perestroika* (reconstruction) has arrived here with a vengeance. We've got more responsibility and much more work."

But will the sought-after overhaul of the Academy — indeed of society here as a whole — really move beyond the superficial? In the peculiar case of the Academy moreover, Mr Gorbachev faces the risk of throwing out the baby with the bath water. Certainly much is wrong with it, but much too is worth keeping.

The Soviet leader wants independent-mindedness writ large in his new model Russia. But no area of official or semi-official life here offers a greater, however imperfect, tradition of autonomy from politics. True, the proportion of Communist Party members among academicians rose from around a third in the 1950s to an estimated 70 per cent after the elections of December 1984.

Only the most naive would suppose that as vital a body as the Academy would not ultimately be at the regime's behest. Under Mr Brezhnev, moreover, the balance of power within the organisation tilted away from the natural sciences to the social sciences. Politics and plasma physics have little in common, but politics, especially Marxist politics, and economics and history plainly do. On top of this has come a perceptible discrimination against Jews.

Even so, cases of naked political interference have been rare — and certainly nothing since to match the career of the academician and charlatan geneticist Lysenko in the 1960s, thanks to the patronage of Khrushchev. That episode still rankles: "It was the fault of us scientists for putting up with it, not of the politicians," says Skryabin.

Elections are by secret ballot, anticipating by centuries an innovation that Mr Gorbachev says he now wants to introduce into Soviet life. Candidates are proposed by colleagues, and although expert commissions state their preferences, there is no guarantee that crusty old academicians will toe the line, for all the intense arm-twisting in private. Skryabin himself only got in at the second try.

Membership too, means in practice membership for life. Much befell Andrei Sakharov after he gained election to the Academy at the unheard-of age of 32 back in 1953, as recognition of his role in helping develop the Soviet hydrogen bomb. But even in his darkest years of disgrace and exile in Gorky, he was never expelled from the Academy. Today, Sakharov is again attending and speaking at praesidium sessions.

Paradoxically, these very virtues make it likely that Mr Gorbachev will have to cajole, not coerce, to get his way. Soviet society, the product after all of scientific socialism, has always held its scientists in great esteem. A full academician is literally one in a million of the country's population of 282 million.

If the Soviet Union is to change, that process cannot bypass the Academy of Sciences, and the villa off Leninsky Prospect. In neither case though will it be simple to break habits moulded through the ages. "I wouldn't bet on it at all," commented a close western student of the Academy's affairs. "But the Academy is something which could get this place moving again. And it does have the talent and resources to make it one of the most advanced in the world."

Brilliance that overcomes the bugbears

GEORGY SKRYABIN becomes almost apoplectic at the very suggestion: "In the United States they criticise our science as bad, bad, bad. But then it turns out that everyone would like to come and work here. Yes, of course we have shortcomings in science — but who doesn't?"

The secretary general of the Soviet Academy of Sciences is talking in his cluttered office, its windows looking out over lawns and woods. A classic example of the Soviet inferiority complex before a richer, more advanced West? If you consult the bald statistics of Nobel prizes, you would tend to think so. Up to 1985, in the most prestigious disciplines of physics and chemistry, US researchers received 47 and 28 prizes. For the Soviet Union the comparable figures are seven and one.

The truth, though, is less clear-cut. Certainly Moscow is after high technology and expertise from the West, by hook or by crook. Certainly the Soviet scientist faces problems which would drive his American counterpart to distraction. But in some fields, the Russians are anything but slouches.

Arguably the most balanced recent assessment was drawn up 18 months ago in a special White House report, based on interviews with 100 American scientists with close experience of the Soviet academic world. Their broad conclusion was that the Russians are strong on theory, but weak on the experimental side.

The Soviet scientist has to contend with chronic shortages of equipment, parts and maintenance personnel. The level of instrumentation is often far below western standards. His country lacks computer power, and unlike the US, has no private industrial sector generating progress in applied technology. True, the military sector makes up for this in part, but only by creating new drawbacks.

Military work restricts a scientist's freedom of communication and travel — essential if he is to keep abreast of what is going on elsewhere. As a result, ideas spread slowly, while ingrained secrecy makes for duplication of effort — sometimes within the same institute. That poor Nobel showing may indeed be a by-product of this mentality. Increasingly, international collaboration is the key to new discoveries. But this avenue is largely barred to Soviet scientists.

Then there are the familiar Soviet bugbears of bureaucracy and obsessive concern with hierarchy, even a lack of basic supplies. One US scientist recounted that as chairman of an international conference in the Soviet Union, he had to distribute copies of the proceedings afterwards: only to be told that the sponsoring Soviet institute did not have enough paper allocated to it under the current plan.

In general, the Soviet Union lags behind in the biological sciences, and to a lesser degree in chemistry. But mathematical excellence has contributed to an extraordinary strength in experimental physics, theoretical physics, frequently called "the queen of Soviet sciences" and in astronomy.

The lack of computer power is less of a handicap than it might appear. As the White House report noted: "The quality of scientific results is very high, thanks to theoretical excellence." That analytical mathematical ability shows up in "deeper scientific understanding of problems than in the West" — and in an ability to squeeze more out of low-powered computers. And, continues the White House: "should state-of-the-art computers become available to the Russians, there may be a surge in scientific capability."

Guri Marchuk, Academy head

For those who believe the East-West struggle is inevitable, the implications are not reassuring

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