

when the group proclaims that the British toothpaste industry, say, has much to gain from a better understanding of non-newtonian liquids (which may well be true, given the meagre literature on the rheology of toothpaste). Taking advantage of its "close links" with the new Advisory Council for Science and Technology (ACOST), the centre will no doubt easily win a ringing declaration that national energies should be bent to the refinement of the extraction of toothpaste from the tubes containing it, whereupon the research councils will listen carefully, marking up research proposals in all cognate fields.

There will no doubt also be more serious issues to be dealt with, such as the utility of high-energy physics as a stimulant of industry. The new centre will not be a going concern until after the British government has decided whether or not to pull out of CERN (the European high-energy physics consortium), but the scope of its opinion on the subject is easily guessed at. (It would point out that high-energy physics is not a profitable field for industrial investment, but might surprise some by noting that British manufacturers should be more energetic in the competition for CERN contracts and might even say that learning more about the processing of particle beams could serve British industry well, not merely in the competition for subcontracts for the US Strategic Defense Initiative.) Whatever the centre's opinion, that is likely to be amplified by ACOST, of which the prime minister is occasionally to be the chairman and on which academic research is represented only in the most formal way. And while the research councils are titularly autonomous, the penalty of ignoring what ACOST says is easily imagined; failure to bend before the wind will risk untried ACOST's disapproval and the possible reduction of the whole science budget that could follow. If that is how it turns out, 18 companies will each have won the right to shape the spending of £600 million for a mere £50,000, a leverage (as the phrase goes) of 10,000 to one.

The plain truth is that the new centre, as advertised, will not be doing the job that British industry needs most urgently to be done. Motor manufacturers continue to spend less on innovative research than their overseas competitors. Electronics manufacturers look primarily to markets opened up by electronics manufacturers elsewhere. Even biotechnology, blessed enthusiastically by the British government ten years ago, seems to play only a marginal part in industrial development. What British industry now needs is what it has needed for most of the past 50 years — constant reminders of the well-known opportunities it has consistently neglected, and persuasive demonstrations of how much profit it has lost thereby. It would be easier to hope that this lesson would occasionally be read by the new administrative apparatus if those concerned were less obviously skewed in their interests towards those of industry. □

Clouds over *perestroika*

What Soviet perestroika most needs now is a demonstration of success. Here's where to start.

MR Mikhail Gorbachev's most urgent need in the pursuit of *perestroika* may be for a stroke of luck. That is the kindest reading of the events of the past few days in Moscow. Mr Gorbachev's difficulty is no different now from what it has been for the past two years, that of persuading all his compatriots, including conservatives and those with a vested interest in the present, that the time has come for change. Yet little seems to be going right for him. His address on the 70th anniversary of the October Revolution, outspoken though it may have been, was a less open repudiation of past domestic abuses of Soviet power than the intellectual community had been hoping for. The sad case of Mr Boris Yeltzin, dismissed for hot-headedness last week from his job as Moscow Party chief, is another sign of the care with which Mr Gorbachev must trim his sails. Now there is the disappointing news that the rate of growth of industrial production in the Soviet Union is lagging behind the target of 4.4

per cent set for this year, which will provide comfort for those eager to say that *perestroika* is not working. The harvest has also been disappointing, although the weather and not *perestroika* is probably to blame. But, Mr Gorbachev may be asking, will nothing go right?

Although, like the rest of us, politicians cannot rely on good luck, they are well-placed to increase the chances when it falls their way. Although Mr Gorbachev's programme for *perestroika* is as much social and administrative as economic, the best place to find the demonstration that he needs that reform can be effective is in the economic field, and in the connection between research and industry. The most obvious difficulty is that much of the research the Soviet government generously supports yields little economic benefit because it runs into the sands of the all-pervading indifference of the bureaucracy. The repeated appeals that Soviet researchers should redouble their efforts to turn discovery to practical application will remain irrelevant so long as there is no particular reason why industrial ministries and their factory managers should disturb themselves by making novel products or by striving after the quality of production familiar in the West. Yet there are several points in the pattern of Soviet research at which it might with advantage be possible to organize the nexus between research and industry so as to prove a kind of existence theorem for *perestroika*. Why not see what might be made of one or two of them?

Instrumentation would be a good starting-point for a demonstration of success. Last month's brief survey of Soviet science (*Nature* 329, 776; 1987) told some tales of groups of talented people working on the development of instruments which are either novel or simpler (and thus potentially cheaper) than those available in the West. There could have been many others — photomultipliers developed at Serpukhov for use in high-energy physics, for example, and high-resolution cathode-ray tubes developed at the Lebedev Physical Institute. The Soviet government appears to have recognized that this is an opportunity to be seized by setting up what it calls an inter-agency complex to look after the development and manufacture of novel scientific instruments, but the mechanism is too cumbersome and its goals at once too grand and insufficiently ambitious. The managers of the complex must still persuade production units to manufacture novel things, which goes against the grain, but are stuck with the hopeless task of satisfying the domestic demand for novel instruments. Meanwhile, they are prompted by their awareness of their ignorance of the worldwide market and their depressed expectations of what Soviet industry can accomplish to talk to manufacturers in the West about the licensing of their more imaginative proposals. Everything goes slowly.

The Soviet interest and the need to demonstrate that *perestroika* can work argue for a different and complementary way of working. If the Soviet economy is eventually to hold its place in the world, it will have to learn to compete in worldwide markets not merely in ingenuity but in the quality and cost of its production. It would make sense that the inter-agency complex for scientific instrumentation should be required to find a way of doing just this for a handful of the instruments (chosen by itself and not by a committee) now in its portfolio, and that it should be given the resources to find out what will sell outside the Soviet Union and to manufacture what it decides to make unhampered by the bureaucracy, most simply by recruiting a new labour force to a newly built manufacturing facility. The general principle is that the Soviet government should find a few places in its economy where the connection between research and production is as direct as in instrumentation, and that it should plead the need to compete with enterprises in the West to rid those concerned from the administrative shackles that cripple its exclusively domestic industry. It should not take long for success to be apparent on a narrow front. The scientific community in the Soviet Union, which has the most to gain from *perestroika*, should bend its intellectual energies to the advocacy of such a course of action. □