

Ambitions for Lake Baikal

A scheme for creating an international research centre seems to break new ground in the pattern of Soviet collaboration with the West, and deserves warm encouragement.

ONE of Mikhail Grachev's dreams seems well on the way to becoming true. Grachev is the energetic new director (since 1986) of the Institute of Limnology of the Siberian Branch of the Soviet Academy of Sciences near Irkutsk, the south-east Siberian city nearest to Lake Baikal. The institute is now moving even closer to the world's largest body of fresh water. While Grachev has been given generous support since the outset of his tenure, he has always known that a complement of 120 scientists would be insufficient for the work that needs to be done.

Just over a year ago (see *Nature* 329, 802; 1987), he was dreaming of attracting people from outside the Soviet Union to exploit the opportunities of Baikal. Now, in an astonishingly short time by Soviet standards, he is launching an international research centre at Listvyanka, on the edge of the lake. In its constitution, the centre will be unique by Soviet and, perhaps, by any standards.

The crux of the idea is that overseas research organizations, either academies or grant-making agencies, should become partners with the Institute of Limnology in the financing and direction of the centre, acquiring an equal voice on scientific policy. While the long-term objectives would be agreed at the outset, each year's research programme would be determined by the international council on the basis of specific proposals and the assessments of international panels of referees. It is hoped that overseas members will contribute up to a third of the cost of the centre (roughly 50 million rubles), ambitiously intended to include kindergartens for visitors' children as well as social facilities for making Siberian life tolerable for long-stay visitors. Grachev says there will be no charges for running costs, which will be borne ultimately by the Academy of Sciences, but project participants will have to get themselves and their families as far as Moscow. The proposed charter even includes provisions for the return of contributions by the founder-members if, for some reason, the centre is wound up.

Grachev, who bubbles with enthusiasm, is anxious that the operational management (which, for legal and practical reasons, must be Soviet) should be seen to be responsible to the international council: he plans that there should be an executive officer (appointed by the council) responsible for carrying out policy decisions. Otherwise, principal investi-

gators will direct their own research programmes in the usual way. While the Institute of Limnology will continue its independent existence, much of what it does will consist of support for the international centre.

The outline plan has already been approved by the praesidium (executive council) of the Soviet academy. Dr V. A. Kapyug, the president of the Siberian Branch of the academy, a crucial backer, has been commending the plan on recent visits to Western Europe and the United States. Grachev's model is the Woods Hole Marine Biology Laboratory, a familiar magnet for long-stay visitors, but the planned constitution probably resembles most closely that of the International Centre for Insect Physiology and Ecology at Nairobi. Grachev is hoping that there will soon be some indication of overseas commitments.

Will this optimism be justified? Even as a once-and-for-all capital contribution, a third of 50 million rubles is a considerable sum, especially when limnologists in the West are being starved of funds. Much will turn on Grachev's case that Lake Baikal, acknowledged to be a distinctive natural phenomenon, may be made to yield general understanding.

Here is a version of Grachev's case, culled from a breathless summary over dinner a few days ago. First, Baikal is unique not only by its size (literally a fifth of the world's fresh water) but it is also (partly for that reason) the most pure. The margins of the lake remain mostly in their primitive condition. Moreover, the water regime is distinctive. There is one major inlet and one outlet, both in the southern third of the 1,000-km inland sea. Were it not for the winter covering of ice, the vertical mixing that keeps the lake oxygenated throughout its great depth (up to 1,700 m) would not occur.

So there is a need for a mathematical model of the lake — a task Grachev reckons will take 20 years or more. The difficulty is not the construction and solution of mathematical equations but the measurements without which accurate modelling cannot be built. The nature of the lake, particularly its size and its substantially pristine condition, should yield a model that becomes a modeller's model.

On a similar tack, Baikal should be a valuable indicator of the spread of man-made pollutants over great distances.

With the exception of the two now-notorious cellulose plants due to be closed in 1993, there has never been any substantial industrial activity within the watershed, so that heavy metals and artificial chemicals found in the lake must have made their way there by other means.

The great seal infection of 1987 is a puzzle much of this kind. The Baikal seals were stricken a season earlier than those of the Baltic and the North Sea. The viruses responsible appear to be identical. By what means did the virus spread across Eurasia? Most probably, birds. Where did it come from? Nobody knows. And what is the fate of the Baikal seals? Recent investigations show that roughly 70 per cent of them carry antibodies to the virus, suggesting that mortality in 1989 will be largely restricted to pups in the post-weaning stage.

Lake Baikal's freshwater seals are a distinct species whose provenance is unknown, but that is true of more than a third of the 1,700 species of plants and animals recorded in the lake. Grachev's own interests (he is a chemist turned nucleic acid specialist) prompts a third line of investigation — the use of DNA-sequencing techniques to reconstruct the genetic differentiation of life-forms in the lake during the past 25 million years or so. There are a score of molecular biologists already, but they can hardly scratch the surface of a gigantic problem.

Meanwhile, Baikal's sediments, almost literally untouched, should provide splendid opportunities for palaeo-specialists. But there is apparently still dispute about the typical thickness of the deep sediments — 500 m or three times as much? An expedition with the University of Hamburg plans a start on this work during the coming ice-free season.

Curiously, even the tectonic structure of the region is inadequately known by modern standards. Although the geology has been mapped for half a century, much of what is known of the rift is inferred by analogy from elsewhere, principally East Africa. That the rift is active is plain from the seismic activity of the region. Will the new centre give geophysicists the chance to instrument the rift as carefully as, say, the San Andreas fault in California?

In Grachev's book, anything is possible. To have hatched out the idea of an international centre at Lake Baikal in such a short time suggests that what is possible is likely also to happen. **John Maddox**