Plans for research

Europe awakes

Brussels

"It is of course the duty of the European Commission to be ambitious", commented one British official cynically on the European Commission's new plans to increase EEC science cooperation. Next week's council meeting of the research ministers (on 30 June) will be sitting in judgement on a strategy for the future of European science policy, the fruit of two years of conferences and discussions that followed the 30 May mandate of 1980, when Mrs Margaret Thatcher won Britain's refunds from EEC's budget and when the other nine member states agreed to strengthen and broaden EEC's activities in the industrial, social and scientific fields.

Step by step, the European Commission has been subtly building up momentum by calling unusually frequent research council meetings during the past nine months. Previously, research ministers met every two years but, pushed by the European Commissioner with the science portfolio, Vicomte Etienne Davignon, the EEC ministers met in November and March and will see each other next week and again in the autumn.

The momentum for change is being created not so much by decisions as by ministerial debates intended to set the mould for a recasting of the priorities and design of EEC research programmes. The meetings so far have established the important role of research and development in achieving industrial competitiveness with the Japanese and Americans in new technologies and the economic and social dangers of failing to do so.

Davignon wants a new research and development programme with five objectives: improving the competitiveness of agriculture and industry; the management of raw materials and energy resources; the quality of life in terms of health and safety and the environment; helping the less developed countries; and stimulated science and technology in the Community. EEC spending — 645 million European currency units (£1,150 million) in the 1983 budget — represents only 2.7 per cent of the budget as a whole. Sixty-nine per cent of the total budget goes on energy, 13.5 per cent on industrial competitiveness, 9 per cent on the quality of life, 2 per cent on agriculture and 1 per cent on raw materials. But research and development employs more staff (3,000) than any other directorate general in the Commission if the staffs of the Joint Research Centres are included.

The new strategy would be based on five massive long-term programmes. One of these, thermonuclear fusion, is already in operation. The others would tackle information technology, biotechnology, the stimulation of industrial and agricultural competitiveness and research intended to

aid developing countries.

The broad outlines of the information technology programme, dubbed "Esprit", have already been sketched out (see *Nature*, 3 June, p.352); work on the other programmes may begin after the forthcoming council meeting. The reason for this is significant. Instead of laboriously budgeted and detailed programmes being presented to infrequent ministerial meetings, the planning would in future work from the top downwards.

There would be a new body, the Committee for the European Development of Science and Technology (CODEST) bringing together twenty of the great and the good in the world of science, technology and industry to select research objectives. It would interpret a master plan agreed by ministers, who would specify in advance the resources available. A plan for encouraging the research judged necessary would then be devised by CODEST and the Commission, on which basis proposals from research teams capable of achieving the objectives in question would be chosen. But independent experts drawn largely from industry would actually run the programmes. The first steps towards a long-term programme would be pilot projects funded by EEC.

In this way, with CODEST operating as a think tank, the Commission as its administrative arm and the day to day running handled independently, the political rows that sully programmes such as the reactor safety project Super-Sara would be avoided. There would no longer be haggling and long delays over the budgets of programmes that had already been worked out in detail.

The realization of the Commission's plans depends on the momentum established by the forthcoming council meeting. It is suggested in Brussels that Davignon will continue merely to be humoured because in a time of budgetary restraint EEC research, whatever other purposes it may fulfill, is not on its past record the best value for money. Few deny that there is a drastic rethinking of the rationale behind European research and development.

Jasper Becker

Soviet mathematics

No more sets

The Soviet Union is to introduce a new mathematics syllabus in the senior classes of secondary schools. The objective according to Dr M.I. Kondakov, president of the Academy of Pedagogic Sciences, is to resolve the major debate which has been raging among Soviet educationalists since the introduction of the present syllabus into Soviet schools a few years ago.

The new syllabus was part of a major overhaul of school education, begun in the mid-1960s. Special emphasis was placed on an adequate grasp of general principles and on pupils' ability to reason for themselves.

Learning by rote was to be replaced by an increased amount of independent work. In particular, mathematics was to be firmly based on set theory.

Initially, the new syllabus appeared to be a success. In the first three school years the proportion of poor achievers in mathematics dropped from 15 per cent in 1967 to 3 per cent in 1975. But in the middle and senior years, the situation was less happy. In 1977, when the first batch of students to have experienced seven years of the new syllabus took their school-leaving examinations, it was found that a majority had failed to grasp the new concepts.

One particular failing was a marked lack of spatial imagination, attributable either to the introduction at too early an age of a purely academic approach or else to the fact that, so far from working "independently", the pupils were issued with ready-drawn diagrams to save time in class. The

"NO MORE DECADENT
WESTERN MATHS FOR US!"

curriculum seems also to have nullified the avowed purpose of the reforms by using a different terminology from that used in science classes, so that pupils found themselves unable to solve quadratic or trigonometric equations arising in physics classes.

These examination results triggered a major debate in the Soviet educational press, with the president of the Academy of Sciences, Dr Anatolii D. Aleksandrov, and the prestigious mathematician L.I. Pontryagin criticizing the syllabus. Their equally prestigious colleagues S.L. Sobolev and L.V. Kantorovich, however, cautiously supported it.

The debate raged for two years (a detailed analysis of the arguments appears in the current issue of *Journal of Curriculum Studies*), and, perhaps significantly, teachers' complaints centred around difficulties in implementing the syllabus (lack of classroom aids and teachers' handbooks) rather than the actual content, although their main difficulties seem to have arisen from the highly theoretical orientation of the syllabus.

Parallel with this debate, the weekly *Literaturnaya Gazeta* launched its own

discussion, which ran for some months and in general proved to be critical of the current emphasis on mathematics as such. One correspondent depicted a future with a computer on every classroom desk and suggested that with the advent of the computer as "co-respondent", the long "marriage" of mathematics and science was ripe for divorce.

Professor M. Evgrafov, of the Mathematics Institute of the Academy of Sciences went further. "Not a single result" in pure mathematics, he claimed, had had any practical application for the past fifty years, and the current insistence on a mathematical training for scientists was "wanton", "rigid" and "useless". In the future, he said, problem-solving will be increasingly left to programmers whom he described as "persons of middle-level qualifications".

In 1980, Pontryagin shifted the whole debate from the educational and cultural journals to *Kommunist*, the leading Party theoretical monthly. His criticisms thus took on the force of tacit party policy, and have undoubtedly played a part in shaping the revised syllabus, which will give greater emphasis to practical applications and seems designed to train the "middle level" technicians of whom Evgrafov spoke.

The signs are that the new syllabus will downgrade set theory (except, optionally, in geometry), eliminate "difficult" terminology and symbolism and play down theoretical precision in favour of an "intuitive and descriptive" approach with an emphasis on new mathematical technology, including computers. **Vera Rich**

British Antarctic Survey

A good wind

On the principle that "it's an ill wind . . .", the British Antarctic Survey is hoping that the war over the Falkland Islands will bring back good times again. Meanwhile, the survey is congratulating itself that those of its scientists left stranded on South Georgia after the occupation by Argentine forces have made good use of their extra six weeks on the island.

The supply vessel that would normally have picked up the scientific parties from South Georgia in April, the RRS *Bransfield*, also seems to have done useful work. The ship was apparently in the Chilean port of Puerto Arenas at the occupation of the Falkland Islands, collecting spares for diesel engines and other gear. In the succeeding weeks, it was able to monitor radio transmissions between Port Stanley, on the Falkland Islands, and the mainland of Argentina.

During the ship's spell in Antarctic waters (below 60 degrees south), the ship served as a relay station between the British bases in Antarctica, and even kept in touch with those isolated on South Georgia by means of relayed signals from the base at Signy one the South Orkney Islands.

Falkland minerals

An agreement of sorts between Argentina and the United Kingdom on the title to submarine mineral rights off the Falkland Islands appears to have been reached on the eve of the occupation of the islands, and to have been embodied at the end of April in a resolution of the United Nations conference on the Law of the Sea. The resolution adopted by the conference (but with Argentina's dissent) says that where there are disputes about the sovereignty of territories (such as the Falkland Islands), mineral resources shall be exploited as if the wishes of the inhabitants were paramount.

This resolution appears to be a compromise reached after the rejection by Western powers, France and the United Kingdom in particular, of a draft article of the treaty that would have given each disputing party an effective veto on mineral exploitation, and which used the weaker form of words "for the benefit of the inhabitants".

The rejected article of the treaty, described as "anti-colonialist", would also have given the United Nations an important role to play in the regulation of disputed marine mineral rights. The resolution eventually adopted by the conference, which will not have the force of international law, plainly suits the British book much better.

Normally, communications with the British Antarctic bases are relayed to Cambridge, England, through the radio and telex station at Port Stanley, out of action since early April.

For most of the Antarctic programme, the interruption caused by the Falklands war should be small, as most of the bases were resupplied just before the occupation of the Falklands. On South Georgia, however, where there has been a weather station in continuous operation since 1944 and more recently a summer biological station on Bird Island nearby, a season's work is likely to be lost.

Apart from the difficulties of operating its two ancient ships in hostile waters, most of the British Antarctic Survey's problems are monetary. The numbers of people on its books have been shrinking for the past decade, and now amount to about 300, of whom 120 are scientists. The budget for the current year is about £6 million, a modest decline compared with the previous year without allowing for inflation. Even so, it has been possible to rebuild two of the three bases on the Antarctic Peninsula, while there is an ambitious plan to rebuild the base at Halley, on the Weddell Sea.

What the survey now hopes is that the British government's renewed interest in the South Atlantic, and the practical need to find peaceful activities that will occupy British nationals there, will prompt more generous budgets.

Chinese census

First head-count begins next week

Experts applaud revised plan

Washington

The only modern census of China's estimated 1,000 million people, who make up one-quarter to one-fifth of the world's population, will take place on 1 July. China's last census was in 1964, but Western demographers consider its results suspect. The earlier count in 1953 is similarly in doubt. So the July count is a demographic event of major historical proportions.

At the 1953 census, Mao Tse-Tung officially governed 583,603,417 people. The number was growing rapidly in accordance with Chinese family customs and Mao's dictum of 1949 that "revolution plus production can solve the problem of feeding the population . . . Of all things in the world, people are the most precious . . .". But by 1957, the net increase was 20 people per thousand per year and the official line changed. Mao said the population should be stabilized, perhaps at 600 million people.

That figure had probably already been exceeded and subsequent famines, political upheavals and other changing conditions have increased uncertainty as to how many people China has. Age, sex and regional breakdowns are critical for its centralized state planning. But an accurate count, besides helping the government, will among other things show whether the government's past claims for success in population control are true.

But the scale of the enterprise is staggering. How do you count 1,000 million people? Previous censuses in China were carried out literally with hand tabulation and abacuses. For the 1982 census, the government has acquired 20 IBM 4331 E Series computers and one IBM 4341 computer with funds from the United Nations Fund for Population Activities (UNPA), and has bought eight Wang computers on its own.

The five million or so enumerators will be office workers, staff of local institutions, rural accountants and record keepers. In a test count in the county of Wuxi, enumerators were required to have at least a junior middle school education. The census forms will have 19 categories to fill in, some by code, some by ordinary writing. (The 1964 census form had eight categories; the 1953 census had five). Representatives of each household will be summoned to registration points to tell the enumerators how many people were in the household at midnight, 1 July. Or they will be reached by mail, or visited on their