

neighbourhood are among the latest victims of chloracne, the skin complaint which can appear as a result of contact with dioxin. The number of children affected is reported to be about 340. Most of them, it seems, have come into contact with dioxin through contamination of school buildings. Indeed, dioxin contamination of the buildings is considered to be too serious to allow the schools to remain open. Following protests from school teachers and parents the Lombardy authorities have closed six schools in the Séveso municipality; they will remain closed until the work of dioxin decontamination is completed.

The decontamination programme itself has come in for much criticism in Italy. Local residents are reported to be incensed over the delay in cleaning the Séveso area and the Italian Parliament is concerned enough to consider appointing a commission to investigate the cause of the delay.

The Lombardy administration's de-

contamination programme was, in fact, finally approved by parliament only three weeks ago. The proposed plan of action includes the incineration of vegetation, dead animals and polluted topsoil, which is to be removed to a depth of 25–35 cm. This operation should be completed by August, when all the topsoil will have been placed under canvas on a concrete base at a location near the ICMESA plant. The total material to be disposed of is estimated to amount to about 70,000 tons. It will take three years to burn, in a high temperature incinerator which will itself take a year to construct. The whole decontamination programme will, it is estimated, cost £13.5–15 million and will eventually be paid for by Givaudan, the Swiss company which owns the ICMESA plant.

The variability of dioxin contamination has proved a major obstacle for the local authority in formulating its decontamination programme. With some areas considerably more con-

taminated than others, a detailed relief map of the area has been necessary and this has taken time to produce.

Many residents of Séveso are angry that it has taken so long to devise a graded decontamination programme, with the result that the Lombardy regional government now stands accused of gross mismanagement in its handling of the whole affair. But the outbreak of chloracne among Séveso schoolchildren has resulted in the far more serious charge being levelled that the local authority has minimised the dangers of contamination.

These accusations will now be subjects for consideration by the Parliamentary Commission. For the pregnant women of Séveso, however, no inquiry will relieve their anxiety. If a link is established between the recent infants born deformed and dioxin, the hundred-odd women who were in the first trimester of pregnancy on 10 July and who will reach full term during the next two months face a bleak future. □

POLAND

Problem solver

Vera Rich reports on science policy in Poland following the visit to Britain of the Polish Science Minister.

THE recent visit to Britain of the Polish Minister of Science, Higher Education and Technology, Professor Sylwester Kaliski, was essentially a matter of diplomatic routine. No major changes were expected in the existing programme of Polish-British scientific and technical cooperation and educational exchanges, and the immediate practical outcome amounted to little more than the agreement by both parties that such cooperation is of mutual benefit, should be continued and, where possible, expanded. Nevertheless, the Ministerial visit served to highlight and provide an opportunity for discussing several interesting aspects of current Polish policy.

Professor Kaliski told *Nature* that, in addition to 65 "key" problems, Polish science policy incorporates seven "government problems" to be tackled at top-priority level: water resources, coal mining technology, electronics and integrated circuits, copper, building engineering, cancer, and proteins. Two others, energy (including atomic power engineering) and computerisation, are in preparation. In all these fields there are either already technological exchange agreements between Britain and Poland or else approaches have been made by the Poles for such agreements

(in certain cases, notably integrated circuits and computers, response is limited by the Co-Com embargoes). Most of these problems lie largely in the field of technology; two, however, cancer and proteins, seem to fall within the sphere of research rather than application.

The inclusion of cancer in such a list of problems is notable. Whereas problems like mining technology or computerisation of production seem amenable to state planning with its targets and schedules, there are no hints of a major Polish breakthrough in cancer research that would make any comparable set of targets more than a list of desideration. Indeed, Poland does not seem to have been assigned a special role in the new Comecon oncological project, which hardly suggests a Polish lead in the field. The explanation may be one of national tradition: Mme Skłodowska-Curie, the discoverer of radium, was a Pole, and the very word radium, to Polish ears, is connected with two roots meaning respectively 'joy' and 'good counsel', attributes associated in the popular imagination with the early hopes of radium as a specific weapon against cancer.

In the field of protein resources, current plans envisage an increase in output of one million tonnes per year by 1980. New sources are being sought, including the production of animal feed from petroleum waste and a programme for exploiting the krill re-

sources of the Antarctic. A research ship, the *Professor Siedlecki*, of the Gdynia Maritime Fishing Institute, is at present in the Antarctic carrying out a "scientific reconnaissance" of krill. Last year, the *Professor Siedlecki* brought home krill specimens for investigation by sixteen research institutes in Poland for possible use for human consumption or animal feed.

This year's expedition is testing methods of processing krill. The prospect of krill harvesting on a commercial scale has been causing concern among ecologists in many countries, since krill stands at the head of so many food-chains. Questioned about this, Kaliski stated that at present the krill project was only at the investigation stage and "we cannot tell what its future will be". No ecological problems would arise, he said, for at least ten years. Ultimately, however, there would have to be some kind of international agreement governing the harvesting of krill.

In the current Five-Year Plan, said the Minister, government spending on sciences will be increased by some 70% from 115 thousand million to 200 thousand million zloty. This, he suggested, presumably referring to the involvement of scientists in the current unrest in Poland, is "proof that we don't believe there is a crisis in our country". The financial target is not represented by the budgets to date, which for 1976 and 1977 envisage expenditure on science of 16.6 thousand million and 15.9 thousand million. A considerable increase is to be expected

in the last three years of the plan, if the 200 thousand million target is to be reached.

The Minister said that of the total expenditure on science some 12–15% is allotted to fundamental research, and the rest to applied research projects, the latter being financed half from the central budget and half from industry by means of research contracts. The implementation of such applied research in production is Poland's biggest problem. This statement is true also of the Soviet Union, but whereas Soviet scientists frequently receive official rebuke for not producing the results that industry needs, the problem in Poland, says Kaliski, is that they "often have very good scientific results but no chance of introducing them". Poland's scientists, he explained, "think that if they have obtained a result, that it must be introduced". This was not always feasible under a socialist system;

under capitalism it would always be possible to find some manufacturer who would undertake to introduce a new process simply for profit motives, but in a system of state planning this was not always possible. To test promising innovations at the pilot stage, he pointed out, the Polish Academy of Science possesses a small pilot factory. The main activity of the Academy, however, is fundamental research and "quality potential", rather than the development of individual applications.

Concerning Comecon, Kaliski said that Poland participated principally in mining, computers, electronics and laser physics. In atomic power engineering, the Poles were "not the leading group—but we all contribute". In the Interkosmos space programme, Poland was concerned mainly with on-board computers, the application of space research to cartography and meteorology, the study of plasma *in vacuo*,

magnetic field research, and signal propagation. She was involved in "serious collaboration" in space medicine. Kaliski appeared quite satisfied with the present scheme of financing Comecon research projects by direct contracts between the countries concerned, and showed no interest in the more sophisticated arrangements suggested recently in the Polish journal of international affairs *Sprawy Miedzynarodowe*.

One interesting feature of Kaliski's visit was his meetings with laser physicists. These were not, strictly speaking, in his capacity as Minister. In addition to his governmental duties, Professor Kaliski is head of the Institute of Plasma Physics and Laser Microsynthesis in Warsaw. In an informal lecture which he gave at the Rutherford Laboratory, Chilton, he described the work of the Institute on microthermonuclear synthesis.

BRITAIN

More of the same

The UK Government has published details of its proposed expenditure plans for the next few years and its Defence Estimates for 1977. Chris Sherwell reports

LAST week's White Paper, *The Government's Expenditure Plans, Volume II* (Cmnd. 6271-II, HMSO, £2.35), which follows publication earlier of a general account of the plans, contains the details of individual expenditure programmes. Twelve months ago the government published its plans for the rest of the decade, and these promised a painful levelling off in the growth of expenditure. Since then the government has announced two rounds of further measures, in July and December; the impact of the latter has yet to be assessed and incorporated into figures for 1979–80 onwards.

Unsurprisingly, the latest plans confirm the trend foreshadowed last year. Because organised research and development in Britain has a large government element, this means that the circumstances under which the country pursues its science effort remain far from happy. Some of the details from the White Paper are contained in Table 1 (see over).

For the Ministry of Defence, which is the government's biggest spender on R&D, the table shows only the trend in the overall budget. Latest plans are available in more detail in the *State-*

ment on the Defence Estimates 1977 (Cmnd. 6375, HMSO, £1.50). Expected expenditure on the defence research programme in 1977–78 amounts to £123 million, two-thirds of it devoted to "evaluation and exploratory development" on equipment and weapons, the rest devoted to maintaining a base of scientific knowledge and advancing technology. Another £23 million-worth is linked with civil research.

Defence research did not escape the public expenditure axe last year, and the White Paper confirms this trend too. Implementation of the rationalisation of R&D establishments is described as "well advanced with the first major moves now taking place". By the early 1980s four "systems establishments"—sea, land, air and underwater—complemented and supported by eight "technology establishments", will have replaced the 25 original R&D establishments.

With the reviews of future levels of R&D at Porton complete, work on chemical warfare at the Chemical Defence Establishment (CDE) "can be reduced to about two-thirds its present size", the White Paper says; and the future of the Microbiological Research Establishment (MRE), because microbiological research requirements can be met "by a small team of ten scientists" integrated within the CDE, depends "on the scale and range of civil requirements".

Other details from the White Paper on expenditure include:

- Support for the National Physical

Laboratory, the National Engineering Laboratory and Warren Spring Laboratory (the Department of Industry's Industrial Research Establishments), together with department-sponsored work at the Atomic Energy Authority (UKAEA) and the Natural Environment Research Council (NERC), is expected to remain at broadly the same level up to 1980–81. The general industrial research and development programme overall, however, has been reduced by £2 million compared to last year "as a contribution to savings in public expenditure".

- The pattern of funding for R&D in certain aviation fields will be modified if and when the new nationalised industry, British Aerospace, comes into existence with the passage of the Aircraft and Shipbuilding Industries Bill through parliament.

- Reflecting developments in the past year involving the country's nuclear reactor programme, the White Paper says that the provision for R&D by the UKAEA is now "subject to adjustment in the light of the current review" of the programme.

- The Science Budget, which indicates the organised government effort on the civil side in basic sciences, reflects the reductions of last year. Resources devoted by the Science Research Council to 'big science', the White Paper says, will be reduced by about 25% over the survey period. The breakdown for 1976–77 is shown in Table 2.

- In most nationalised industries, but especially electricity and telecommunications, the lower forecasts of investment in fixed assets are the product of revised estimates of demand. □