Science policy in Poland

Science has not escaped recent developments in Poland.

Below, a Special Correspondent describes the trends.

AFTER four relatively fat years science in Poland seems to be entering a less happy period. Following the dismissal of Mr Gomulka during the stormy days of December 1969, his successors initiated a more dynamic economic policy and science was declared an essential factor of economic growth. The new leaders were keen to present themselves as scientifically oriented people. A honeymoon for science began with the setting up of a special committee, headed by the well-known sociologist Professor Jan Szczepanski, to develop long term policy in education at all levels. The state pocket was enriched by loans from abroad and was opened wider for science.

As a result of this, research and development expenditure rose from 1.4–1.6% of GNP in 1969 to about 2.5% in 1975. GNP itself rose by about 60% during this period and so the funds available for science were almost doubled—a dramatic increase, especially in comparison with stagnating funds for science in Western countries. These official figures perhaps exaggerate the increase to some extent because the definition of what is meant by science for budgeting purposes is vague and some expenditures not included previously are now under the heading of science. A sharp rise in the money available is, however, an indisputable feature of this period and witnessed by a number of new buildings, better endowment of institutes and laboratories, improvement of the level of scientific work in many fields and wider contacts between Polish and foreign scientists.

The rise of money was not accompanied by a proportional rise of scientific staff or number of students. In the 1950s the relative number of students in Poland was greater than in most Western countries. But since the further rise of the number of students was slow (especially after the student riots in 1968) Poland has been overtaken by most European countries. The accompanying table of numbers from the official Statistical Yearbook, 1975, shows the recent trends.

It has never been easy in Poland to spend all the money allocated for science, and it may be even more difficult in the future. Budgets of Universities and Institutes are being tightened by a large number of regulations more relevant to industry than to science. This is a feature of the five-year plan for the 1976–1980 period for the development of different aspects of technology. Plans of this kind—strange

as it sounds—have also been compiled for basic science. A low opinion of the value of the whole time-consuming and inelastic planning system is common in the scientific community.

In spite of the earlier generous flow of money the housing conditions of many scientific institutions remain poor. Many courses in the University of Warsaw are given in buildings belonging to different secondary schools dispersed over the city of Warsaw. The salaries of academic staff are very small in relation both to academic salaries in other countries of the communist block and salaries of other professional groups in Poland. The salary of a senior member of the staff (*adiunkt*) of a research institute is equal to the average salary of those working in the state sector (about 3500 zlotys per month, that is, \$120 on the official tourist exchange rate—a figure which gives an accurate impression of the buying power of the earnings). From September 1976 the salaries will rise by about 15%. The rise of salaries previously given to all other professional groups is now reaching the last group of government employees, namely, those working in the scientific institutes.

The honeymoon of the Polish scientific intelligentsia was over in 1973, close to the time of the much advertised Second Congress of Polish Sciences. It seems that the reason for this change of the official attitude was related to the disillusion of the government that Polish science will contribute significantly to the immediate improvement of the economy. Unfortunately these idle hopes have been repeatedly supported by a large number of short-sighted Polish scientists eager to satisfy their personal goals.

In Poland as in most eastern-block countries the intermediate link between scientific research and technology, the link responsible for implementation of new products and processes, is very weak. Its functions are frequently performed with doubtful results by purely

academic institutions, for example in the institutions of the Polish Academy of Sciences (PAS). Thus the sharp rise of the level of Polish industry in 1970–75 was only marginally based on the achievements of Polish scientists and engineers, and was due mainly to the purchase of know-how from abroad; noting this, the leaders of the country have begun to treat science not as a producer of goods but as a consumer.

The social sciences in Poland depend on official doctrine to a lesser extent than in other countries of the communist block. However, in spite of the official statements made in 1970 interest in their work has declined steadily. The report of the education committee under Szczepanski has been shelved, and the education policy actually introduced bears little relation to its conclusions. Poland was fortunate to have after the war three economists of international distinction, Oscar Lange, Michael Kalecki and Edward Lipinski, but their economic advice has been used in several other countries and never in Poland. Of these three only Professor Lipinski, member of PAS, is alive, but his views expressed in a number of letters having a wide hand-to-hand circulation are not taken into account by the authorities.

In contrast to other groups of Polish intellectuals the scientists are relatively meek. Not many scientists or scholars signed the letters of protest against the recent revision of the Polish constitution legalizing the leading role of the party and friendship to the USSR. Those who did are being punished: younger people are not having their contracts renewed, and others, as for example Professor Stefan Amsterdamski, philosopher, are prohibited from going abroad even to attend conferences.

According to official statements the government is not planning to increase the quota of places for students in universities. This means that the situation of an applicant will be about the same as during the last few years due to the fact that the post-war demographical bulge is now close to its end. The announced quota based on the evaluation of future demands is very conservative and recently it became clear that for example the number of

Student trends in Poland

Year	No. of students per 10,000 of population	No. of resident students per 10,000 of population	No. of students per 1,000 of population in the age group 19–24	No. of resident students per 1,000 of population in the age group 19–24
1970–71	101	64	136	87
1974–75	126	76	139	84

The official number of students per 10,000 of population given in the international part of the Yearbook is 144, but this includes also students in higher schools under the Ministry of Defence and the Ministry of Internal Affairs. In these schools there are about 80,000 students, and the total number of students in other institutions of higher education is 427,000.

physicians needed exceeds the number of accepted medical students.

During the academic year 1975-76 there was a considerable rise of political activity among students. They raised their voices in protest against the changes in the constitution. More recently they protested against the expulsion of their colleague Mr Jacek Smykala from the Medical Academy in Szczecin (during a tutorial class in economics he asked what part of the national budget is allocated to the police force), and against the imprisonment of their colleague Mr Stanislaw Kruszynski from the Catholic University in Lublin (the only private university in Poland), who was sentenced to six months in prison for writing unfavourable opinions about the social system in Poland in private letters to his relatives and friends. From Warsaw University alone about 800 people signed this protest.

At the beginning of 1976 a reduction of staff (up to 10%) took place in many research institutes, including those connected directly with industry. These reductions touched universities and industries of PAS to a lesser extent but it was decided to freeze the number of their staff for the next three years.

The Polish economy, as is commonly accepted, is now entering a very difficult period. One of the signs of this was the government's proposals to increase the food prices in June (meat by about 70%, sugar 100% and so on) which would have caused a fall in the spend-

ing power of wages by about 20 to 30%. The wave of strikes (70 to 80% of big factories according to unofficial figures) and unrest in a few places forced the government to rescind this proposal. Science seems to be near the top of the list for economies. According to some sources it has already been decided to halve the rate of investment in science. Considerable political tension in the whole country has not by-passed the scientists. Speculations about personal changes have wide circulation. Meanwhile the repressions against those involved in strikes and protests have already begun.

As in all countries of the communist block, scientists in Poland have no real representation to defend their own interests and those of science. The Polish Academy of Sciences is the agent of the government and provides no more than formal representation. For example, recently, in June 1976, after the abortive attempt to increase prices, the Praesidium of PAS at its meeting in the metallurgical factory in Silesia wrote a letter of adulation to Mr Gierek, the Secretary of the Party. A few months previously, his son, Professor Adam Gierek, was elected to the PAS; perhaps those who voted in his favour had in mind the dire fate of the Romanian Academy, which, as it is said, was a consequence of its refusal to elect Mrs Ceaucescu (wife of the Secretary of the Party in Romania) to the Academy.

These and similar steps do not con-

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Polish leader Edward Gierek

tribute to the authority of PAS and do not reflect the views of the Polish scientific community. An interesting new development in this community and in the whole group of intellectuals is the collaboration of differently minded people, rightists and leftists, catholics and even members of the party. This collaboration is an outcome of the common feeling that the present policy endangers not only the further development of science, but also the very existence of independent Poland, and that the most important task confronting the intelligentsia is the defence of the national identity. □

Artificial intelligence in education

Miranda Robertson discusses research aimed at exploiting computers in human communication and teaching

IF the principal goal of research in artificial intelligence (AI) has been the development of intelligent machines, an increasingly conspicuous sideline is the promotion of intelligence in human beings. This social orientation has been stimulated partly by Newell and Simon at Carnegie Mellon, and the ideas of Papert and Minsky, at the Massachusetts Institute of Technology, (MIT), who see in artificial intelligence a new way of looking at the nature and development of natural intelligence.

Papert has for some years been an advocate of the use of sophisticated computer programming languages to help children learn how to think. Writing a program in a high-level language involves the expression of thought processes which would not usually be formulated. When there is a mistake ("bug") in the program, the child can retrace his thoughts in

the program and understand his own mistake. The result, Papert believes, is to increase the child's intellectual effectiveness in general and make him more articulate.

LOGO learning for children

That is the idea behind experiments which have been going on in the LOGO laboratory at MIT for about three years. LOGO is a high level language which children can use to program various devices, the best known of which is a mechanical "turtle" with a retractable pen.

Usually, the child begins by learning how to draw geometric designs by programming the turtle; later, as the system becomes more familiar, the turtle can be replaced by a somewhat nimbler oscilloscope trace. One important advantage of a LOGO system over more conventional curricula is that children enjoy working with it

and it can be used to overcome the resistance that many children develop to learning mathematics.

So far, the experiments at MIT have not been sufficiently systematic to produce clear evidence for Papert's persuasive arguments. Up to now, the children have been drawn largely from the families of MIT research workers and from a local school, neither (probably) very representative; and the classes have been supervised by research staff, in particular Dr Jeanne Bamberger, rather than by professional teachers.

There has for some time been talk of an entire school geared to the LOGO system, and where about half the school curriculum would be undertaken at a computer terminal. But this ambitious project is not expected to start in earnest for another two years, during which a small group of teachers will be trained in LOGO, a pilot LOGO educational project will be run with the cooperation of one of the Cambridge or Boston schools, and some thought will be given to how the children's intellectual development should be evaluated.