A YEAR'S EAST-WEST STUDY OF PLASMA PHYSICS

An example of international collaboration with fruitful results for the efforts to provide useful power from thermonuclear energy, for space research and for pure knowledge has marked the last academic year of the International Centre for Nuclear Physics in Trieste.

During this period, an attack on the complex problem of Plasma Physics has been carried out by a Study Group led by M.N. Rosenbluth (USA) and R.Z. Sagdeev (USSR), in association with distinguished scientists from many parts of the world. They formulated and put into effect research programmes which must have helped to avoid much duplication of effort both theoretically and in expensive research, particularly by those countries engaged in trying to harness the power of fusion.

A number of those who took part gave some comments on their reactions both to the Study Group and to the Centre for the benefit of this Bulletin.

Professor Sagdeev, who estimated that perhaps fifty per cent of the effort of the Group had been directed towards the harnessing of power from fusion, thirty per cent to basic physics and the rest to astrophysics, said an opportunity had been created to think more seriously about a number of problems than physicists in their own environment could normally find the time to do, and to engage in many discussions. They hoped to finish some papers while they were still there and others afterwards. He thought the Group must have been of great value to the younger scientists present, who were able to watch and learn and sometimes to make real contributions. It had also been extremely useful that many scientists concerned with experimental work had been able to visit them.

Professor Rosenbluth considered there had been great profit in having been able to gather at a spot which was not linked with any of the massive experimental national programmes, although there was no doubt that they had produced work which would lead to many experiments. It had been a good steady year of scientific progress. People of the highest quality in the world had been working together harmoniously, and an additional benefit had been the stimulus they had given to younger scientists.

The fact that no large experimental equipment is sited near the Centre has not been regarded as a handicap since results of this type of research are readily available, though Professor A. Skorupski of Poland looked forward to the time when the computer facilities of the University of Trieste would become available. There is already close collaboration between the University, who from the outset have adopted a most liberal attitude, and the Centre, and the provision of computer facilities will undoubtedly be a time-saver. Nevertheless Professor Skorupski felt he had been able to make useful progress in some of the academic problems in which he was particularly interested and to relate them to the general programme. "Conferences have their place in scientific work" he said "but often you find that several people have been doing the same work. Getting together like this enables us to go ahead more rapidly".

Professor B. Coppi, of Italy, made the point that formerly plasma physics had been studied, to a large extent individually, by nations with thermonuclear devices, but here men from many nations were working together for a long enough period to achieve real progress. He had been especially interested at one point when about 25 scientists were exchanging information and arguments about an aspect of fusion which concerned a new type of configuration. In Europe, he said, plasma physics was not yet recognised as a science, so that this was the only freely accessible place where it could be treated as such. His hope was that the arrangement could continue to enable a steady circulation of scientists and thus fulfil the purpose of the Centre. The fact that the subject was also essential for space programme provided another reason for cooperation.

Dr. Sudan, of India, who was able to spend a sabbatical year with the Group, hoped that he would be able to make a return visit. They had all been glad of their good fortune in being able to work with men of the calibre of the USSR and USA physicists, whom it was impossible otherwise to meet for extended periods. They and all the others formed a coherent group able to plan their work and carry it out cooperatively.

Among the younger scientists who have been at the Centre during the year's study has been Miss Zakia Hassan who before turning to theoretical physics had been engaged in experimental work at the Arabian Atomic Centre. Her impressions had been of the way in which nationalities were forgotten and of the help given to inexperienced people like herself by everybody, including the most distinguished. From the academic point of view she would like to see the idea continued as long as possible both because of the progress being made and of the experience given to developing scientists.

The Trieste centre was set up following a proposal made to the International Atomic Energy Agency's General Conference in 1962 by Professor Abdus Salam (Pakistan) who is now its Director. The Deputy Director is Professor Paolo Budini, who is also Director of the Institute for Nuclear Physics of the University of Trieste. He took a prominent part in the negotiations through which rather more than two-thirds of the finances are guaranteed by the Italian Government for four years and considerable financial and material assistance is provided from his University. The Government of the United States has made generous contributions towards the costs of the Plasma Physics Group. While it has been in progress other Associates, Fellows and visiting scientists have continued their studies of elementary particle and high energy physics, low energy physics and theoretical solid state physics. An extended course on low energy physics is planned to begin in October, and thought is now being given to an important extended seminar on the entire spectrum of modern theoretical physics. This would be the first real effort for fifty years to restore the unity of the subject.