the value of co-operation

Norway, Poland and Yugoslavia agreed in 1964 to co-operate in research on problems in reactor physics.
Their initial agreement had a life of three years, but the programme was found to be so successful that it was continued first for a second three-year period then for a seventh year. Although the agreement has now lapsed formally the seeds of future co-operation have been sown.

The co-operative research programme under what came to be known as the NPY agreement was carried out at the nuclear research institutes of the three countries — the Institutt för Atomenergi, Kjeller, Norway, the Institute of Nuclear Research, Swierk, Poland and the Boris Kidrič Institute of Nuclear Sciences, Vinča, Yugoslavia — with the active encouragement of the IAEA. Its rationale was simple. The national programmes in reactor physics in each of the three countries contained a significant common part on the one hand; and on the other were so complementary to each other that the parties could benefit from a co-operative effort and achieve greater progress in their respective reactor development programmes. A practical motivation for the NPY programme was the fact that the parties had access to a larger pool of equipment than would have been available to one country working independently, including a larger variety of critical and sub-critical assemblies, larger computing facilities together with computer programmes, and special laboratory instrumentation. In addition, a permanent exchange of information, technical discussions and critical considerations of the work done, exchange of staff, common performance and interpretation of experiments, counterpart calculations of various chosen examples and so on made the solution of particular problems more thorough and much faster.

The main objectives of the NPY programme were the development and testing of theoretical models and computational methods used in reactor calculations and interpretation of experimental data, the development of experimental techniques and the testing of their applicability in various fields of reactor physics. Specifically, the NPY teams centred

their activity on the establishment of a consistent set of nuclear data; thermalization and thermal neutron distribution; slowing down and resonance absorption effects; buckling measurements and their interpretation; void effects; reactor kinetics; development of a nuclear design code; on-line digital computer control of reactors; and burn-up calculations and experiments. The achievements of the programme were presented in 254 reports.

A detailed technical summary of the work undertaken during the life of the agreement was presented at the Fourth International Conference on the Peaceful Uses of Atomic Energy in September, and will be included in the proceedings of that conference when published. [The NPY Co-operation in Reactor Physics, by R. Żelazny, of the Institute of Nuclear Research, Swierk, prepared under the recommendation of and approved by the NPY Joint Committee; A/CONF.49/P/330]. The author of that paper, Żelazny, noted that as a part of the scientific activity undertaken in connection with the NPY programme a series of seminars and summer schools was organized, each devoted to a discussion of a chosen problem important to the co-operative programme. The main objectives of these seminars and summer schools were two: first, to review progress in various branches of reactor physics and to outline foreseeable future trends as a basis for future recommendations of the NPY Joint Committee; and secondly to raise the scientific level of the NPY staff, to organize exchanges of ideas and experience between NPY specialists, and to train participants from other Member States of the IAEA. Each was financed partly by the Agency using UNDP funds and partly by the host country.

Seminars were held in 1964 in Belgrade (on resonance absorption effects), at Kjeller (on reactor kinetics and related topics); in 1965 in Warsaw (on neutron thermalization); in 1966 at Kjeller (on reactor noise analysis); and in 1969 in Warsaw (on the numerical solution of multidimensional diffusion equations). In each case 25 to 30 participants from Member States of the IAEA took part in the discussions and presented their own contributions. In addition, there were working seminars at each meeting of the NPY Joint Committee at which scientists of the host country presented reports. These meetings were considered to be an important part of the project; they and visits to laboratories helped the Joint Committee to keep in touch with progress made and to take the necessary decisions on future work.

There were three summer schools. The first, at Zakopane, Poland, in 1964, dealt with various aspects of theoretical and experimental reactor physics, and was conducted by nine invited lecturers from various countries. About 30 papers contributed by 67 participants and observers from 28 countries were presented; the IAEA published lecture notes used during this course in 1966. The second summer school, at Sandefjord, Norway, in 1966, dealt with the interpretation, analysis and use of reactor physics experiments in thermal critical and sub-critical assemblies ; eight lecturers gave 10 lectures to about 90 participants. The lectures were published in 1967. At the third and last summer school, held in 1970 at Herceg-Novi, Yugoslavia, the scientific programme covered physical problems of nuclear power reactors on thermal neutrons; nine lectures were given by seven invited lecturers to 92 participants from 24 countries. Again, the proceedings are to be published.

Żelazny wrote in the paper presented at Geneva: "It is considered that these schools served well the NPY countries as well as the scientific community of IAEA Member States working in the field of reactor physics. It is most desirable to keep the tradition of organizing such summer schools by the IAEA vivid. If this happens, all active participants of the NPY Project will consider these schools as the best tribute to the existence of the NPY Project and the spirit of scientific co-operation and friendship which was generated successfully during the seven years of its activeness."

Looking back on the NPY programme, Zelazny distinguished problems of a rather limited character, connected closely with national programmes, national needs or national traditions ; and tasks and problems of a more general character, interesting to physicists working in reactor development. Some tasks had been undertaken with practical ends of co-operative interests or possibilities; some were worth continued study. The NPY Joint Committee and scientific panels organized by the IAEA had now recommended Co-ordinated Research Programmes — one on fuel burn-up calculations and experiments; one on dynamics and digital control of power reactors; and one on new methods in linear transport theory.

"If these co-ordinated research programmes attract larger numbers of scientific institutions and start their activity, stimulating co-operative research in Europe," wrote Żelazny, "the people who took an active part in the establishment and activity of the NPY project will consider their efforts to be successful, not only from the point of view of their national goals but also from the point of view of their contribution to IAEA activity and the activity of the scientific community of reactor physicists."