use of large sources and accelerators

A comprehensive review of applications of large radiation sources and accelerators in industrial processing was made at a symposium held in Munich during August. Reports presented dealt with industrial work already proved to be practical, projects in an advanced stage of development and with others in which there appears to be significant potential.

Close on 200 nuclear scientists, chemists and industrial research workers from 30 countries were present for the week's discussions. Industrial goods which came under review were medical products, textiles, plastics, wood, paper, chemicals, leather, rubber and concrete.

At the end of the final afternoon a review of the symposium was made by Mr. J. Silverman, of Maryland University, USA. He considered the occasion had been well worth while and that radiation technology had shown itself to be a useful part of technology, worthy of continuing

interest by those engaged in atomic energy. In addition to the development of successful projects, the penetration of markets and the research which had been accomplished, the technology had also stimulated the activities of those engaged in competitive methods. This could be regarded as a beneficial result.

Those taking part had formed a realistic group, with over-optimism vigorously questioned. They had also included successful appliers of radiation who had shown that some techniques were improving very rapidly.

On the positive side they had seen that methods developed in laboratories were becoming industrial processes. Realization of polymerization of trioxane was near and of textiles was now a reality. It would appear that more of this type of activity was on the way.

In 1963" observed Mr. Silverman "the idea of irradiated wood plastics was almost laughed out. Nobody is laughing any more. We are not only talking now about applying the method to wood plastics and fibres but to concrete and bauxite residues. Radiation may not win the day in all the areas being considered, but it will succeed in many".

Curing paint by use of radiation was looking very good, as the cost calculations showed. One process which had to him always had the sweet smell of success was the curing of rubber latex. It had suffered from the departure of some of its principal scientific exponents, but French design activity demonstrated that it was coming back into the picture and there was real industrial interest.

Cross linking of polyethylene had not been discussed, mainly because it was already established and might involve a market of $150 million a year. The polymerization of ethylene by gamma rays was advancing, while butadiene grafting to polyvinyl chloride was almost sure to achieve industrial realization in the next year.

The science could indeed be viewed with some measure of pride by those who had contributed to it.

Sulphoxidation of alkanes to produce detergents must have been worthy of serious consideration, but had not found industrial realization. This might be because there were attractive alternatives and that source technology was poor, particularly on electron machines. So far not enough had been done in chemical reactor engineering, though a report by Stahel and Manowitz (USA) was extremely interesting, as well as that by Danno (Japan) on radiation-initiated chlorination of the chloroethanes. Electron beam generators represented one of the great attractions, but little was known about the efficiency of utilization of the beams. Additional light had been thrown on the subject by Wiesner (Fed. Rep. Germany) in his paper on cables. More illustrations of the use of the magnetic field, like those given by Konkov (USSR) were needed. Accelerators were still inadequate because the market had not justified the kind of effort which must be undertaken if they were to have useful machines capable of working 24 hours a day and operative by comparatively unskilled personnel. There were also inadequacies in the range of machines and Professor Abramian (USSR) had illuminated the subject.

Why did they need the technology for chemical research? The tie-in with the laboratory had been very slow, but Williams (USA) and Hummel (Fed. Rep. Germany) had given an understanding of what would influence copolymerization research and pulse radiolysis.

He drew attention to the reports of Hayashi and Tabata (Japan) on solid state polymerization and to the valuable basic work of Seguchi and Tamuta (Japan) as containing the answers to several problems on grafting.

Balestic (France) had really asked what could be done to reduce the dose requirements for cross-linking. If these could be pushed down to 100 000 rads the technique could really be established. They might soon be talking again about gamma sources for cross-linking.

They had heard of new areas of work, and of old ones which kept coming up, and had to decide on those which would be useful industrially.

Under an agreement signed between Pakistan, Canada and the Agency the Karachi Nuclear Power Station will become the first to be subjected to Agency safeguards in South East Asia.
In the photo, left to right, are Enver Murad, Pakistani Ambassador to Austria, Upendra L. Goswami, acting Director General, John A. McCordick, Canadian Ambassador to Austria, and W.F.S. Beattie (standing) Counsellor, Canadian Embassy in Austria.