SOME THOUGHTS ON STORAGE RINGS

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There seems to be a slight misapprehension about the real role of storage rings in the immediate future in high-energy-physics research. This question has been dealt with by the European Committee for Future Accelerators, the parallel body in Europe to the Ramsey Committee. In the first of its recommendations for the CERN member states, it says:

"In the region of highest energies, the programme of accelerator construction should include both:

"(a) the construction of a pair of storage rings for operation in association with the existing CERN-PS,

"(b) the construction of a new proton accelerator of very high energy." (The case for a 300-Gev accelerator is argued later.)

"Both these projects should have high priority. Provided authorization could be obtained by the end of 1964, the storage rings could be completed by 1970 and would make possible, at a comparatively early date, a programme of highly significant physics in an energy region not accessible by any other means in the foreseeable future. Owing, however, to the reasons set out below, the storage rings, while representing a very important part of the programme, could never in themselves form an acceptable alternative to a high-energy proton accelerator."

This places the role of storage rings in its right perspective. It would seem possible to have storage rings in operation by about 1970, producing a center-of-mass energy equivalent to that of a 1350-Gev machine. The earliest date for a 300-Gev accelerator in Europe would be 1973. If there had been any possibility of getting a 1350-Gev accelerator in Europe before 1973, the committee undoubtedly would not have put its recommendation in this form. Similarly, if a 1000-Gev accelerator were to be built at Brookhaven by 1975, the case for building storage rings would have to be reconsidered. However, from the report of the Ramsey Committee, the early 1980's would seem the earliest possible date. It would appear that there is sufficient interesting physics that could be done with storage rings and could not be done by any other technique within the 10 to 12 years before a high-energy accelerator is available.

It is a great mistake to compare the physics which can be done with storage rings and an accelerator of equivalent energy. The latter will always win. On the other hand, the storage rings would present us with an opportunity for doing high-energy physics in a region which can be studied now only in cosmic-ray investigations. Storage rings, while not giving the same fullness of answers as conventional accelerators, would provide enormously better information than cosmic rays.

Thus storage rings have to be considered as a window on the future; they will not do very many measurements on a quantitative basis. For many such measurements we shall have to wait for conventional accelerators. It is a matter of opinion whether storage rings can produce results worth having at an early stage, or whether it is better to wait another 10 to 12 years, or perhaps forever, before obtaining these and many other measurements with a conventional accelerator.