INTRODUCTION

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This Conference was the third in a series of informal conferences devoted to high energy proton linear accelerators. The first two of the series were held at the Brookhaven National Laboratory in April, 1961, and August, 1962. This third Conference was sponsored by the Physics Department of Yale University and was supported by the United States Atomic Energy Commission.

The chairmen for the daily sessions were E. D. Courant, E. R. Beringer, J. P. Blewett, R. P. Featherstone and P. Grand. The Minutes of the Conference were prepared by H. B. Knowles, and the arrangements of the Conference were handled by Miss Thomson and Mr. Auten.

During the past few years there has been a rapidly increasing interest in high energy proton linacs for use as meson factories and as injectors for large circular accelerators. This interest stems from the linac's ability to produce very high current external proton beams of excellent quality while minimizing the activation of the accelerator. The highest energy proton linac presently in operation is the 68 MeV machine at the University of Minnesota while the machine with the highest peak current (60 mA) is the injector for the CERN PS. A 100 MeV proton linac is under construction in the USSR.

The list of laboratories presently interested in proton linacs of higher energy (above 200 MeV) is impressive. Table I lists those interests of which I am aware. There may be others. This interest ranges from very preliminary discussions through design studies to construction proposals already submitted. None of these projects has yet been authorized.

TABLE I

Current Interest in Proton Linacs of 200 MeV or More

Laboratory	Energy (MeV)	Intended Service
ANL	200	New injector for ZGS
BNL	2000-5000	Injector to 300-1000 BeV AGPS
BNL	750-1000	New injector for 33 BeV AGS
Karlsruhe	750	Meson factory
LASL	800	Meson factory
LRL	600-1500	Injector for 100-200 BeV AGPS
MURA	200	Injector for 12.5 BeV FFAG
NIRNS-CERN	200	Injector for AGS Booster for 150-300 BeV AGPS
NIRNS	600-800	Meson factory
Yale	750	Meson factory
BNL-Yale	750-1000	Combined function linac meson factory and injector for 33 BeV AGS

During the course of the Conference several matters were shown to need much further study. Beam loading, which has not been a serious problem in existing linacs, must be more fully understood as the beam current, pulse length, and length of the linac are increased. Drift tube structures up to about 200 MeV are well understood. On the other hand, much work is required to determine the best accelerating structure above 200 MeV. Several types of structure were discussed and an improved understanding of the significant features is emerging. While it seems clear that the conventional iris-loaded waveguide can be used, other forms of loading appear more attractive. Injection into the linac received considerable attention and it was shown that there is room for improvement here. The problem of initial tune up and subsequent control of the linac was mentioned and it is obvious that much more serious thought must be given to this matter. RF power sources and systems were discussed with the conclusion that engineering tests and evaluation should proceed as soon as possible. The present state of the art in other areas of linac design were reviewed. However, five days proved insufficient to do justice to all interesting matters.