

V. THE LINEAR ACCELERATOR PROGRAM

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At the present time, essentially all of the construction work on the linear accelerator is completed. The cavities necessary for a 20-foot accelerator have been completed, magnetron power supplies are finished, and the necessarily elaborate control circuits are completed.

The 2-Mev Van de Graaff generator has been delivered, and is ready for assembly as soon as the adjustable mount for it is finished. Preliminary tests have been planned for insuring that the electron beam from the generator will be aligned in the center of the accelerator tube.

The problem of shielding personnel from the radiation from the 2-Mev beam and from the much higher energy beam from the accelerator has been studied. In view of the lack of definite data on shielding requirements at the high energies, the following plan has been adopted: The first experiments will be limited to measurements using a minimum detectable electron current. (With the detection equipment we shall use, we expect to be able to measure easily 1 μ amp steady current, and this will be almost certainly safe with essentially no shielding.) As soon as radiation measurements can be made it will be possible to make a realistic estimation of shielding requirements. No attempt will be made to run with a large beam current until the necessary shielding has been constructed. A radiation meter is under construction which will automatically turn off the Van de Graaff generator and accelerator before radiation intensity becomes dangerous.

The problem of measuring the characteristics of the accelerated beam (the spread in space and energy) is under investigation. Design and construction of measuring apparatus is under way.

It will not be possible to operate the entire 20-foot accelerator until more magnetrons are delivered. In the meantime we have made preliminary tests with the five available magnetrons, but it is too early to give any definite results of these tests.