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Unclassified TWX P182206Z May 79

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Radiation Laboratory

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RESEARCH PROGRESS MEETING

March 11, 1948

by

R. K. Wakerling

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Oak Ridge National Laboratories	26-33
General Electric Company	34-37
Hanford Engineer Works	38-39
Iowa State College	40
Los Alamos	41-43
Office of N. Y. Directed Operations	44
Monsanto Chemical Company	45
National Bureau of Standards	46-47
Patent Advisor	48
Library Branch (for NEPA) Oak Ridge	49
Library Branch, Oak Ridge	50-64
University of California, Radiation Laboratory	65-67
Chemistry Department	68
University of Rochester	69-70

Total

70

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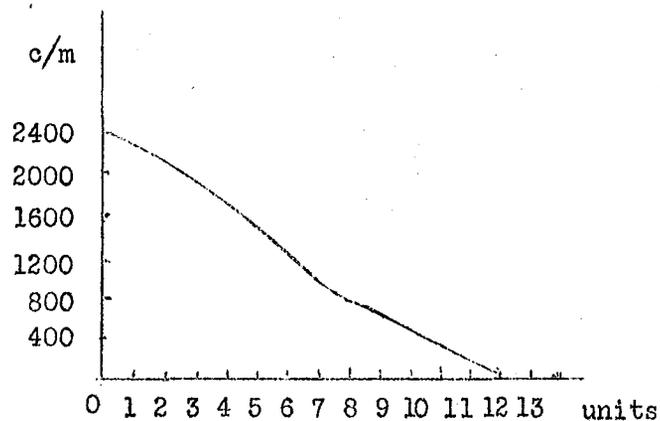
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R. K. Wakerling

Linear Accelerator. Hugh Bradner. The linear accelerator is again in operation after a shutdown for repairs and minor changes. Radio-frequency checks of the instrument were made while the Van de Graaff was open. The vacuum of the system is now very good, the base pressure being 1.7×10^{-6} mm Hg with a rate of rise of 800 s/ μ a.

Some preliminary results have been obtained on the activation of carbon with protons. The experiments were done using 10 mil, 50 mg/cm² polystyrene discs. The activation curve obtained is shown in Figure 1. The break shown in the curve was found on two separate runs



1 unit = 500 kv

Figure 1

and is yet unexplained.

In another experiment a proton induced activity in nickel was found. This had a 3.3 second half-life.

Positive Mesons. Eugene Gardner. Positive mesons have been detected on plates exposed in the 184-inch cyclotron with an arrangement shown schematically in Figure 2. The beam was allowed to strike a $1/16''$

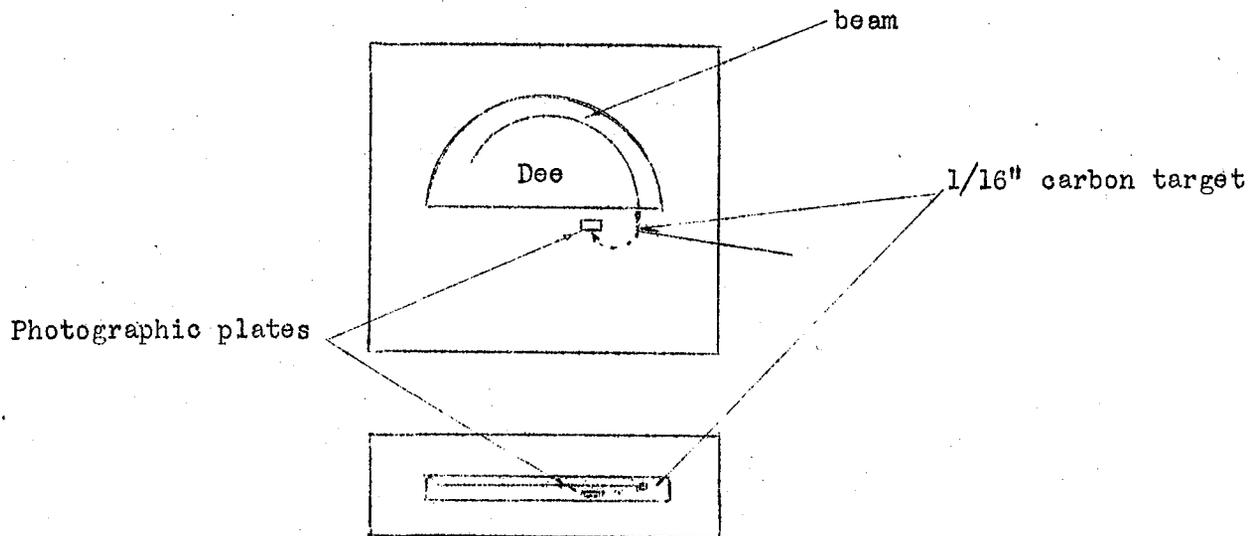


Figure 2

carbon target, and the mesons, which are bent around by the magnetic field, were detected with photographic plates placed beneath the circulating beam. A series of experiments were done in which the plates were placed at distances varying from $1-1/2$ to $3/4''$ from the beam between $1/4''$ plates of copper. The plates obtained at $1''$ and $3/4''$ were so blackened as to be unusable. From the plates secured at $1-1/4''$ Lattes has found a total of 30 positive meson tracks, of which 20 end in the emulsion. Eight of these were found to give rise to secondaries, none of which stopped in the emulsion. This work was done with 50 micron plates and will be extended using 100 micron plates. The data will be further analyzed to see if all of the positive mesons end in secondaries. The

number of positive mesons produced seems to be comparable to the number of negative ones.

Several other arrangements for placing the plates have been suggested and some tried. For example, plates were mounted directly under the target on the theory that mesons circling through an angular distance of 360° would strike the plates mounted on back of the target. There were too many neutrons present to make this scheme practical so it was abandoned.

Various methods have been devised to cut down the neutron background. One of these involved the use of an elaborate copper shield, which was tried unsuccessfully. This shield actually increased the neutron background. A system of defining vanes will be tried, the purpose of which is to achieve better definition of the lower edge of the beam.

Cross Section of Meson Production. Wendell Horning. Mr. Horning discussed the efforts that have been made to predict the cross section for meson production on the basis of the present meson theories. He emphasized that at the present state of knowledge no definite predictions were possible, although the theory is sufficient to give some order of magnitude results.



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