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measuring the activity induced in a detector made of manganese, which is sensitive to thermal neutrons; and in a few cases by separating out chemically the radioactive iodine resulting from fission produced by thermal neutrons. The three methods of measurement, when compared, were found to give results in satisfactory agreement with one another. However, certain internal discrepancies which appeared in the first experiments were only eliminated when it became apparent that two unexpected effects were present and would have to be taken into account. One of these effects is apparently fission produced in the uranium detectors by neutrons of energy between 1 ev and 1000 ev. It was corrected for in later experiments by covering the uranium detectors with cadmium and subtracting the activity so obtained from the total. The other important effect revealed in the first experiments was activity produced in the manganese detectors by non-thermal neutrons. Cadmium shielding also made it possible to correct for this effect in later measurements. Neither effect was expected on the basis of what was previously known. The apparent production of fission by epi-thermal neutrons is of considerable interest. Further experiments are in progress to investigate this point in more detail.

The cyclotron was used as the source of neutrons. In the previous experiments* beryllium was bombarded at the target chamber with about one microampere of 8 Mev protons. This corresponded to about 3500 curies radon beryllium equivalent. Lately it has been found that the neutron intensity at the graphite block is increased by a factor of about ten if the beryllium is bombarded internally on a probe; this increase occurs even though the probe is about 50 cm farther away from the block than is the usual target.

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*Preliminary report submitted to NDRC by H. D. Smyth on June 1, 1941.