

observations were carried out by a crew from Livermore.\* One of the irradiated elements was hafnium. A resonance at 72.7 eV had been ascribed earlier to the neutron capture in hafnium-180. This assignment was confirmed. Actually, throughout the whole spectrum of hafnium a number of resonances which had not yet been assigned to a definite isotope have now been identified by the decay time of the activity which had been generated.

It is worthwhile at this point to consider in slightly greater detail the conventional and the Plowshare means of investigating neutron spectra. In both cases neutron velocities are determined by time-of-flight. In the usual experimental procedure, however, many very weak neutron pulses are produced, whereas in the case of the nuclear explosion a neutron pulse is available which corresponds to the neutron output of our best velocity selector instruments of a thousand years.\*\* In the older experiments the total cross section of the bombarded material was the only thing that could be found by measuring the diminution of the beam intensity as it penetrated the material under investigation. In the Plowshare experiment the great intensity permits us to find and identify the isotopes which are created by the capture of neutrons of definite velocities. This procedure obviously permits a much more thorough analysis and similar principles can be applied even more generally to other phenomena occurring in nuclei.

An improved resonance analysis would be particularly important in the region of neutron energies between 1 and 400 kilovolts. These are the relevant

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\*\*This has been pointed out with great emphasis by Don Hughes of Brookhaven National Laboratory. His untimely death prevented his participation in the Gnome experiment.