in itself an indication of ternary or asymmetric binary fission. The possibility of ternary fission has not been sufficiently investigated.

We should state again that the coupling terms between odd and even harmonics provide an explanation of the marked asymmetry of fission. In the calculations so far there has been found evidence for two modes of fission. One is by way of a saddle point for which the drop when in the critical shape has a symmetrical form ($a_3=0$). The other is by way of a twofold saddle point for which the critical shape is not symmetrical ($a_3\neq 0$). Which mode requires the less activation energy cannot be decided at the present stage of the calculations. The odd-even coupling terms will have an effect in determining the final products of either mode. It must be emphasized that higher order terms, which are being introduced, may materially affect the entire situation.

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[2] N. Bohr and J. A. Wheeler, Phys. Rev. **56**, 426 (1939).
[3] Except for a misprint in (22) which when corrected removes the inconsistency with (23).

Neutron-Induced Radioactivity of Tungsten

On bombarding tungsten with slow neutrons, Fermi and his co-workers[1] found an activity decaying with a period of about 1 day, and McLennan and others[2] and Jaeckel[3] obtained, as its half-life, 23 hours and 24.5 ± 1 hours, respectively. They ascribed this activity to the reaction $W^n(n, \gamma)W^{n+1}$, but the isotope concerned was not determined.

To see if there are some other periods, pure metallic tungsten powder (99.97 percent purity) was irradiated for about 100 hours (intermittently) with neutrons produced in the Tokyo cyclotron according to the following conditions:

	Target	Sample
fast neutrons:	Li+D,	enclosed in Cd+B box, immediately behind a Li-target.
slow neutrons:	Li+D,	enclosed in a paraffin block, about 30 cm apart from the target.
	Be+D,	enclosed in a paraffin block.

A Lauritsen type electroscope was used to observe the activity. In all of these samples, besides the well-known 24-hour tungsten period (in our case 24.0 ± 0.1 hours), a long-lived activity of half-life 77 ± 3 days was found.

Chemical separation showed that the carrier of this long-lived activity is also tungsten and is neither Ta nor Hf. With a thin-walled G-M counter and magnetic field, it was found that both carriers emit negative electrons.

From the relative intensities of both periods in the above three cases, it was found that the shorter period is produced practically only with slow neutrons and the longer one both with fast and slow neutrons. The above results lead to the conclusion that 24-hour activity is due to W^{187} and 77-day activity to W^{185}.

By using the Al absorption method and the range-energy relation,[4] the upper limits of energy of the β-rays were measured and were found to be 1.1 ± 0.1 Mev (24 hours), and about $0.4-0.5$ Mev (77 days), respectively. Both periods were accompanied by a considerable amount of γ-rays. A more detailed report will be published shortly in the *Scientific Papers of the Institute of Physical and Chemical Research.*

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