A. The coupling of odd proton and neutron groups.

In the preceding paper[1] the β-decay properties of nuclei with odd mass number were discussed on the basis of our present knowledge of nuclear shell structure. In the present paper the discussion is extended to cover nuclei with even A. The general background, arguments, and references are the same as in I and need not be repeated here.

The situation is somewhat more complex than for odd A nuclei. A β transition for an even A nucleus demands at one end point an even-even nucleus, which, in so far as we know, has zero spin. The other end point, mostly the initial nucleus, is of odd-odd type, in which there will be a coupling of neutron and proton groups, each of which will contribute to the resultant spin. Unfortunately only a very few spings of odd-odd nuclei have been measured so far, among these are several very high ones (Be^{10}, Na^{22}, K^{40}, Lu^{176}). The frequent occurrence of highly complex β spectra with series γ-rays is also an indication that the spins of odd-odd nuclei are often quite large.

Of course, not much can be said a priori about the coupling between the proton and neutron groups. The persistence of the islands of isomerism (I, ref. 1), leads to the suspicion that their configurations are largely independent of each other, and that their structure must in the main be preserved. More definite information can be obtained from the study of those β transitions which connect the ground states of the initial and final nucleon.

The resultant pattern, which will be discussed in greater detail later, resembles closely the pattern of the odd A nuclei. Of particular interest are the groups of allowed transitions with neutron and proton

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(1) M. G. Mayer, S. Moszkowski, and L. W. Nordheim, part I of this paper, pg. 1-29, and Rev. Mod. Phys., 24,000, 1952, quoted henceforth as I.