In view of the rapidly growing information on decay schemes, it is obvious that many of the given interpretations will have to be changed in course of time. It has, however, been our experience that a clarification of facts generally tended to remove difficulties and did not add to them.

B. APPLICATION OF SHELL CONSIDERATIONS TO β-DECAY

The selection rules[8] for β-decay involve primarily the changes of spin and parity; an interpretation of the character of a given decay demands thus an assignment of these quantum numbers.

It is known (e.g. compare Reference 1) that the values of the magnetic moments of odd A isotopes fall definitely into two groups, which in a fashion may be interpreted as arising from parallel or anti-parallel coupling of intrinsic spin and orbital angular momentum of the last odd nucleon. These groups will be referred to as Schmidt groups because of their original discoverer. A measurement of spin and magnetic moment for a nucleus thus gives formally an angular momentum quantum number. We will call this the "orbital" for the nucleus in question, without implying that a one particle wave function gives a close approximation to its actual wave function. The fundamental hypothesis underlying this investigation is that the parity of the ground state of the nucleus is the same as the one for a single particle with this orbital.

It is further known that there are marked regularities in the occurrence of definite spin values and associated magnetic moments, which are associated with the shell numbers 8, 20, (28), 50, 82, 126. Thus for a given number of protons or neutrons, only one or a very few orbitals, in the sense of the previous paragraph, are known to occur. In particular, parity is

8) For a comprehensive review of the theory of β-decay, see E. J. Konopinski, Rev. Mod. Phys. 15, 209 (1943).