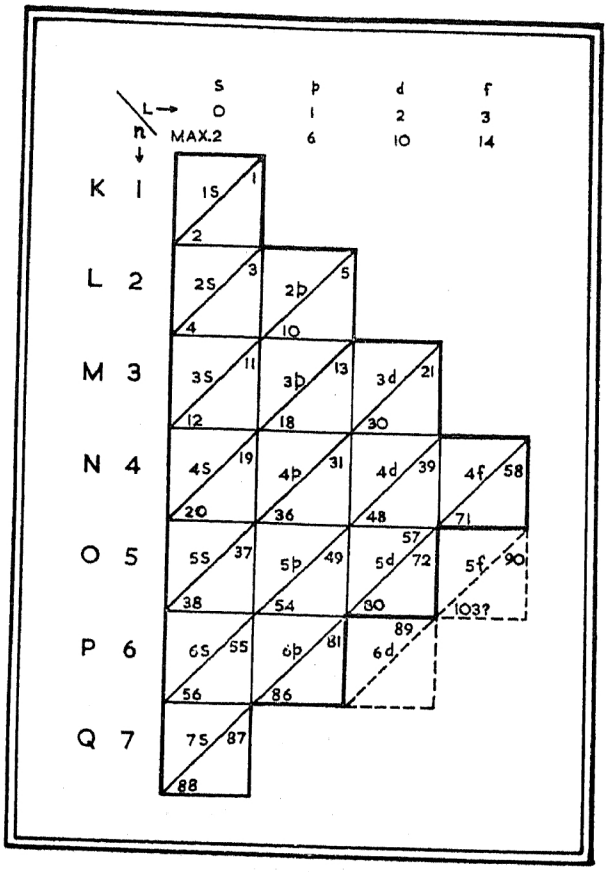
THE NORMAL ELECTRON CONFIGURATIONS OF ATOMS

THE pattern of squares shown here, which can easily be constructed, will help one to write down quickly the ordinary electron configuration for any atom Z, in the normal state. The rows of squares taken horizontally represent the K, L, M, - - - shells of total quantum number $n = 1, 2, 3, - - -$ respectively. The squares are designated 1 *s*; 2 *s*, 2 *p*; 3 *s*, 3 *p*, 3 *d*; etc., in the usual way.

Diagonal lines are drawn as shown, starting from the left bottom corner of an '*s*' square and terminating at the farthest right top corner in each case. To get the sequence in which the shells and sub-shells are formed one has to go down the diagonal lines from top to bottom starting with the first line, proceeding to the second, then to the third and so on.[1] Thus the sequence will be 1 *s*; 2 *s*; 2 *p*, 3 *s*; 3 *p*, 4 *s*; 3 *d*, 4 *p*, 5 *s*; 4 *d*, 5 *p*, 6 *s*; 4 *f*, 5 *d*, 6 *p*, 7 *s*.

Knowing that the maximum number of electrons in *s*, *p*, *d*, *f* shells are 2, 6, 10, 14 respectively, as indicated at the top of each column, the atomic number Z can be written in the serial order down each diagonal, as shown by the first and last numbers only in each square. Thus in the 4 *d* square 39 and 48 indicate that the first 4 *d* electron starts in element Z = 39 and the 4 *d* shell gets completed with $4d^{10}$ in Z = 48. Exceptions to the general sequence can also be indicated, as for example 57 in the 5 *d* square which means that after $6s^2$ in Z 56,

the 57th electron becomes a 5 *d*, and the 4 *f* starts with Z 58.



The trans-radium and the trans-uranium elements can be included by adding the 5 *f* and the 6 *d* squares to the pattern. These are shown by the dotted lines.

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Jabalpur, *September* 30, 1954.

1. Therald Moeller, *Inorganic Chemistry*, 1952 (John Wiley), 97.