A

VALENCE

The principal theoretical foundation of organic chemistry is the idea of valence. Let us consider the chemical formulas of a number of the simple compounds of hydrogen, *e.g.* HCl, H_2O, NH_3, CH_4, HI, HBr. It is evident that in such formulas a single atom of hydrogen is never represented as in union with more than one atom of another element. There are, however, cases where one atom of hydrogen is in union with a single other atom, *e.g.* HCl, HBr, HI; or two atoms of hydrogen may unite with a single other atom, *e.g.* H_2O; or three atoms of hydrogen with one other, *e.g.* NH_3; or four hydrogens with one other, *e.g.* CH_4. If the assumption be made that discrete bonds or forces take part in the union of atoms, hydrogen must possess but a single such bond or valence. Otherwise compounds of the type $X-H-X$, $X-H\begin{matrix}X\\X\end{matrix}$, or of some other type in which one atom of hydrogen is in union with more than one atom of lower valence, must exist, and this is contrary to fact.

We may, therefore, employing a dash to represent valence, write the constitutional