DIPOLE ATTRACTION AND HYDROGEN BOND FORMATION IN THEIR RELATION TO SOLUBILITY

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The germ of the idea of a hydrogen bond may be seen in some of the formulas of Werner involving covalent linkage; however, he avoided committing himself concerning the nature of this linkage, which was little more than a dotted line, and very different from its modern significance of a definite electron pair bond. Moore and Winmill, in 1912, wrote formulas containing light and heavy lines to account for the weakness of trimethyl amine in aqueous solution, \((\text{CH}_3)_3 \equiv \text{N--H--OH}\), as compared with tetramethyl ammonium hydroxide, \((\text{CH}_3)_4 \equiv \text{N--OH}\). The former may be interpreted as the first definite representation of a hydrogen bond. In the following year Pfeiffer suggested as an explanation of the weakness of \(\text{o-hydroxyanthraquinone}\) that the hydrogen atom is "coordinately" bound to the oxygen atom of the adjacent carbonyl group. The first recognition of the hydrogen bond as a general phenomenon we owe to Latimer and Rodebush. They called attention to the effects of hydrogen bond formation, such as the high dielectric constant of water, which ordinary dipoles do not show. Lewis cited the existence of \(\text{HF}_2^-\) but not \(\text{F}_2^-\) as offering direct evidence of a hydrogen bond. The unusual properties of ammonia, water

*Address of the vice-president and chairman of the Section of Chemistry, American Association for the Advancement of Science, St. Louis, December, 1935.

Editor's Summary

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