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,\(^1\) 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 repre-
sentation of a hydrogen band. In the following year Pfeiffer\(^2\) suggested as an explanation of the weakness of o-hydroxyanthraquinone that the hydrogen atom is "coordinate" 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.\(^3\) 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\(^4\) cited the existence of HF\(_2_\) but not F\(_2\)\(^{-}\) as offering direct evidence of a hydrogen bond. The unusual properties of ammonia, water

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*Address of the vice-president and chairman of the Section of Chemistry, American Association for the Advancement of Science, St. Louis, December, 1925.


\(^2\) P. Pfeiffer, \textit{Ann.}, 398: 137, 1913.


Editor's Summary

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