A STUDY OF THE ULTRA-VIOLET ABSORPTION SPECTRA OF CERTAIN ORGANIC COMPOUNDS

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A Thesis submitted to the University of Manitoba as a partial requirement for the degree of Master of Science.

April, 1937

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INTRODUCTION

The study of the ultra-violet absorption spectra of organic compounds may be considered to begin in 1879 with the publication by Hartley and Huntingdon of the first paper on the connection between the absorption spectra and constitution of various chemical substances. The spark spectrum of an alloy was photographed through a solution of the required chemical by means of a quartz spectrograph. The oscillation frequencies of the edges of the absorption band at a number of different concentrations were plotted against the concentrations of the solution. The resulting curves were used as an aid in determining the structure of unknown molecules by comparison with the curves obtained from substances of known constitution.

Since then a vast amount of work has been done. Studies in absorption spectra have been applied to obtain information on the intimate structure of diatomic and the simpler polyatomic molecules. For the larger polyatomic molecules spectroscopic research has been much more empirical. The selective nature of absorption affords a ready means of detection of small amounts of substances in solution, therefore its value lies in its use as an adjunct to biochemical and organic methods of study. The recent developments in knowledge concerning physiologically active substances, the vitamins in particular, owe much to spectral absorption curves in

the two directions of elucidating photochemical changes and in providing characteristic "labels" for substances, the existence and importance of which rests on biological methods of experimentation. The main service of absorption spectra lies in the possibility of supplementing the physiological description of an unknown substance by means of a physical criterion capable of aiding in identification and analysis.

The application of ultra-violet absorption spectroscopy to the study of blood in an attempt to detect chemical differences between normal and pathological blood as a means of diagnosis of disease was started in 1930 by P. A. Macdonald. In 1931 S. G. T. Bendien published a thesis entitled "Spezifische Veranderungen des Blutserums."(1) In very brief outline Bendien's work is as follows:

Blood serum is treated with a mixture of sodium vanadate and acetic acid. In normal blood with a vanadate acetic acid solution below a certain strength, no precipitate is occasioned beyond a slight milkiness, but with the blood of patients affected with certain diseases, of which carcinoma is one, the same strength of solution yields a precipitate.

The precipitate is filtered with a glass filter, dried, weighed and dissolved in 2% Na_2CO_3.