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Ultra-Violet Spectra of Water Solutions

RECENTLY, investigations of the ultra-violet absorption spectra of inorganic and organic ions in the wave-length range below 250 m μ have been made. At the shortest wave-lengths obtainable on the commercial instruments some interesting results were

Fig. 1. Water spectrum at various temperatures. (1) 25° C.; (2) 91° C.; (3) 110° C.; (4) 155° C.

Fig. 2. Effect of solutes on the water spectrum. (1) Water; (2) 0.17 *M* ethanol; (3) 8.5×10^{-3} *M* sodium sulphate; (4) 4×10^{-4} *M* potassium bromine. All spectra were measured at 25° C. Note in curve (4) the broad Br⁻ peak with the water spectrum superimposed on it

obtained. These show that the absorbances measured were not primarily due to the ions under examination, but resulted from a series of water absorption peaks which are strongly enhanced by the presence of solutes. The spectra were measured on a Beckman DK2 using 1-cm. silica cells, and one sample was reproduced on a 'Uvispek' with silica optics.

The spectrum of pure water at room temperature was found to be relatively weak (oscillator strength at 297° K. is 1.6×10^{-7}) and to have three main peaks at 1880, 1890 and 1908 Å. The absorption is very dependent on temperature, as is shown in Fig. 1.

Fig. 2 illustrates the effect of dissolved solutes. A wide range of both inorganic and organic compounds was examined and the water peaks were always found. It is hoped to publish soon a more detailed paper on these observations, which show that the spectra of water solutions in the range 185–200 m μ are not true solute spectra, but an enhancement of the water peaks. It is probable that the series of water peaks may be due to a 'forbidden' transition to the triplet state for the water molecule. This may be induced by the electrostatic field strengths of the solutes.

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Sea-Water as the Primary Source of Sulphate in Tidal Swamp Soils from Sierra Leone

ONE of the main features of the chemical composition of the black glutinous muds of relatively high organic content in the Sierra Leone River Estuary is their high content of sulphide. Work carried out by the Rice Research Station at Rokupr on the Searcies River, some 30 miles north of the Sierra Leone River estuary, suggests that the principal source of oxidizable sulphur in these estuarine soils is iron disulphide, or possibly some other polysulphide¹. The presence of sulphide in marine muds has been ascribed by various authors to a number of causes. It may be produced by the way of bacterial decomposition of organic matter containing sulphur. On the other hand, it is known that certain bacteria

in the presence of organic material can reduce sulphates to sulphides; this reaction probably accounts for the presence of ferrous sulphide in marine muds in many parts of the world.

Interest has been focused on the marginal swamp soils in Sierra Leone within recent years because of the possibility of using them for rice cultivation after empoldering. On drying, however, very low pH values are obtained, and toxic conditions inimical to rice cultivation are developed unless arrangements can be made to leach the acids and salts from the soil with fresh water. The part that the sulphur fraction plays in producing these conditions is not yet fully understood, but it would appear to be of some considerable importance and must be elucidated