The results of our measurements are represented in Fig. 1. From these experimental results the following conclusions may be drawn:

(1) When we calculate the relaxation time at one atmosphere from the absorption coefficient A cm. (Knesernotation) at 16·6° C. and −31·0° C., we find respectively $(8\cdot3)\times10^{-6}$ and $(13\cdot3)\times10^{-6}$ sec. These values agree very well with the values obtained by Eucken. He finds from his recent measurements $(8\cdot27)\times10^{-6}$ sec. at 19·5° C.

(2) The full lines of Fig. 1 represent the theoretical curves which are calculated for the relaxation times $(8\cdot3)\times10^{-6}$ and $(13\cdot3)\times10^{-6}$ and by supposing that the relaxation time for the transversal oscillation is the same as for the longitudinal vibration. We see that at −31·0° C. and at 16·6° C. (here only for a portion of the curve) the experimental values are on the theoretical curves.

The dotted curves of Fig. 1 correspond to the classical absorption.

(3) As under (2), the experimental values at 16·6° C. deviate from the theoretical curve in the region of small pressures. From the discussion of these deviations we have come to the conclusion that the experimental curve may be described by means of two relaxation times. An estimation of the second relaxation time gives as result $(1\cdot7)\times10^{-9}$ sec. A possible explanation for this very small relaxation time is an influence of the rotations. On the other hand, a serious objection to such an explanation is that at −31·0° no deviation is found.

(4) Finally, it is necessary to direct attention, as was done by Eucken, to the fact that impurities of the order of a few parts per thousand have an excessive influence on this kind of phenomenon. We believe that such facts must have a great importance relative to chemical kinetics.

The results of these experiments together with others will be published in a more complete form in *Physica*.

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Infra-red Absorption of Carbon Disulphide

Two points of considerable interest in this spectrum have just come to light. With the view of instituting a comparison between the corresponding infra-red frequencies of gaseous and liquid carbon disulphide, the two spectra have been carefully re-examined in this laboratory. Using a prism spectrometer, we have found that the band of gaseous carbon disulphide at 11·4 μ, previously supposed[1] to be a doublet with a maximal separation of 13 cm.$^{-1}$, is really a triplet with maxima at 884, 878, and 870 cm.$^{-1}$, having the appearance of a band with a medium intensity Q branch. Up to the present this band has been assigned to $\nu_3-\nu_1$, but it is difficult to see how the triplet structure can arise from such a combination.

For information on the second point I am indebted to the kindness of the Government Chemist, Dr. J. J. Fox, and his collaborator, Dr. A. E. Martin. Some time ago, Dr. Cassie and I[2] explored certain of the bands with a grating spectrometer, and resolved the 4·61 μ band into a doublet with maxima at 2175·3 and 2162·0 cm.$^{-1}$. Doubt was thrown upon the accuracy of our results by Sanderson[3], who repeated the work and found maxima at 2191·2 and 2177·9 cm.$^{-1}$. The two observations are reconciled by the observations of Fox and Martin, who find all three peaks at 2190·2, 2177·1, and 2165·4 cm.$^{-1}$, and also obtain the rotational structure. The band has generally been assigned to the combination tone $\nu_3+\nu_1$, but may arise in part from excited levels. It is remarkable that no evidence seems to have been found for the existence of the double doublets which are such a characteristic feature of the spectrum of carbon dioxide.

With regard to the change of spectroscopic frequencies with change in state, Dr. Angus and I have found somewhat unexpectedly that in spite of the non-polar nature of the substance, there are marked shifts of the order of 30 cm.$^{-1}$ in many of the bands in the passage from the gaseous to the liquid state.

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Colour Changes in *Hippolyte varians*

THE demonstration by Perkins[1] that colour changes in *Palæmonetes vulgaris* were controlled by a hormone that originated in the eye-stalks has since been confirmed and extended by a number of investigators (see Hänstrom's[2] review). Gamble and Keeble[3] in their classic study of colour changes in *Hippolyte* were the first to describe a diurnal rhythm which persisted under constant environmental conditions. Within the past five years, several papers on persisting diurnal rhythms in the pigmentary system of crustaceans have appeared. The two English investigators interpreted the phenomena of crustacean metachrosis, according to the view of chromatophoral activity prevalent at that time, as being dependent upon the nervous system. We reinvestigated the colour changes of *Hippolyte* to see whether the endocrinal control similar to that found in other crustaceans was present.

It was found that extracts of crustacean eye-stalks (prepared form *Leander serratus* and from *Hippolyte varians*) when injected into test *Hippolyte* were effective in causing concentration of the chromatophores, accompanied by the diffusion of blue pigment into the surrounding tissues. Normal individuals, when kept under normal day and night conditions, exhibit the diurnal rhythm of colour change described by Gamble and Keeble, becoming "nocturnes" at night (the dark chromatophores concentrating to the punctate or stellate condition and the diffuse blue colour appearing in the tissues) and reverting to their original colours during the day. Individuals in which the retinas had been destroyed showed identical diurnal behaviour. Inasmuch as the presence of the crustacean eye-stalk hormone has been found necessary for concentration of the chromatophore pigments, we thought it might be possible to abolish the nocturnal colour phase by amputating both eye-stalks at their bases and thereby removing the source of the hormone. Gamble and Keeble had attempted to