the energy of the disintegrating α-particles is partly real and partly imaginary. The assumption of particles having imaginary energy is certainly open to criticism. In a recent paper on the subject Sexl[1] has suggested that one has to make the above assumption because the waves within the nucleus are damped.

Before Sexl's paper, just mentioned, was published the writer[2] had developed the wavestatistical theory of disintegration. It was assumed that, on account of a very high value of density, the phase space corresponding to the hard core of the nucleus is viscous. Due to the viscosity, the hydrodynamical waves in the phase space are naturally damped. The theory, it may be noted, has been developed only on the above assumption which is perfectly justified. No assumption regarding imaginary energy is necessary. Further, in so far as a definite nuclear property causing disintegration is assumed, the theory is free from any "uncertainty objection".

In developing the wavestatistical theory the writer has followed Rutherford's model of nucleus. However, it may be mentioned that now-a-days the picture of potential barrier seems to be replaced by Rutherford's model. But it can be easily seen that there is close agreement between the two. It is evident that the sphere of radius OP is Rutherford's hard core, where the whole of the nuclear charge is collected. Beyond OP there is the neutral shell of Rutherford. There are stationary orbits in the neutral shell. And any particle going out of the hard core is caught for a while in one of these resonance levels and *vice versa*. This explains the existence of holes in the barrier as indicated by shades in the figure.

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[1] *Zeit. f. Phys.*, 1934, **87**, 105.
[2] *Phil. Mag.*, 1933, **16**, 1097.

Depolarisation of the Light Scattered by Heavy Water.

10 grs. of heavy water supplied as 99·5 per cent pure by the Ohio Chemical Manufacturing Co., is contained in a pyrex glass double bulb which is sealed off after evacuation. The liquid is collected into one of the bulbs from the other by slow distillation. When thus purified, it is found to be quite free from dust. The bulb is painted black all over leaving two small windows for illumination and observation respectively and the depolarisation of the transversely scattered light is measured using sunlight focussed by means of a long focal length lens as incident radiation. The track representing the horizontal component is seen to exhibit a distinct reddish tinge and the depolarisation is obtained as 0·04 after applying a correction for the convergence of rays in the incident beam. This result may be compared with the depolarisation of about 0·06 observed for ordinary water and shows that the heavy water molecule is similar to that of the ordinary water molecule in respect of possessing only a feeble optical anisotropy.

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July 12, 1935.

Inhibition in the Benzoin Reaction.

FOR some time this laboratory has been engaged in a study of the kinetics of the benzoin reaction between solid potassium cyanide and benzaldehyde, in the absence of solvents or diluents. It has been shown[1] that two reactions occur, a heterogeneous reaction between solid potassium cyanide and benzaldehyde, and a homogeneous reaction between benzaldehyde and the trace of potassium cyanide which is dissolved by benzaldehyde. This latter reaction is autocatalysed by benzoin and can occur only if benzoin is present.

It has also been shown that the heterogeneous reaction is subject to inhibition in the presence of, for example, potassium iodide or quinol. The inhibition appears to be due to the adsorption of the inhibitor on the surface of the solid potassium cyanide.

This is confirmed by the fact that benzaldehyde contaminated with a trace of an inhibitor can be made to give the normal rate of reaction by allowing it to stand at room temperature in contact with a quantity of solid potassium cyanide too small to produce a measurable amount of benzoin during the time of the purification.

We have now succeeded in showing that with certain substances, inhibition occurs in the presence of small proportions, for example, a fall in the rate of reaction can be detected with benzaldehyde containing one

part in 10^7 of quinone, or one part in 5×10^5 of iodine, or one part in 2×10^4 of sulphur.

Small quantities of water and of certain alcohols accelerate the reaction, but the effect is not so marked as with inhibitors. Acceleration has been detected with, for example, with 1 part of water in 100 of benzaldehyde.

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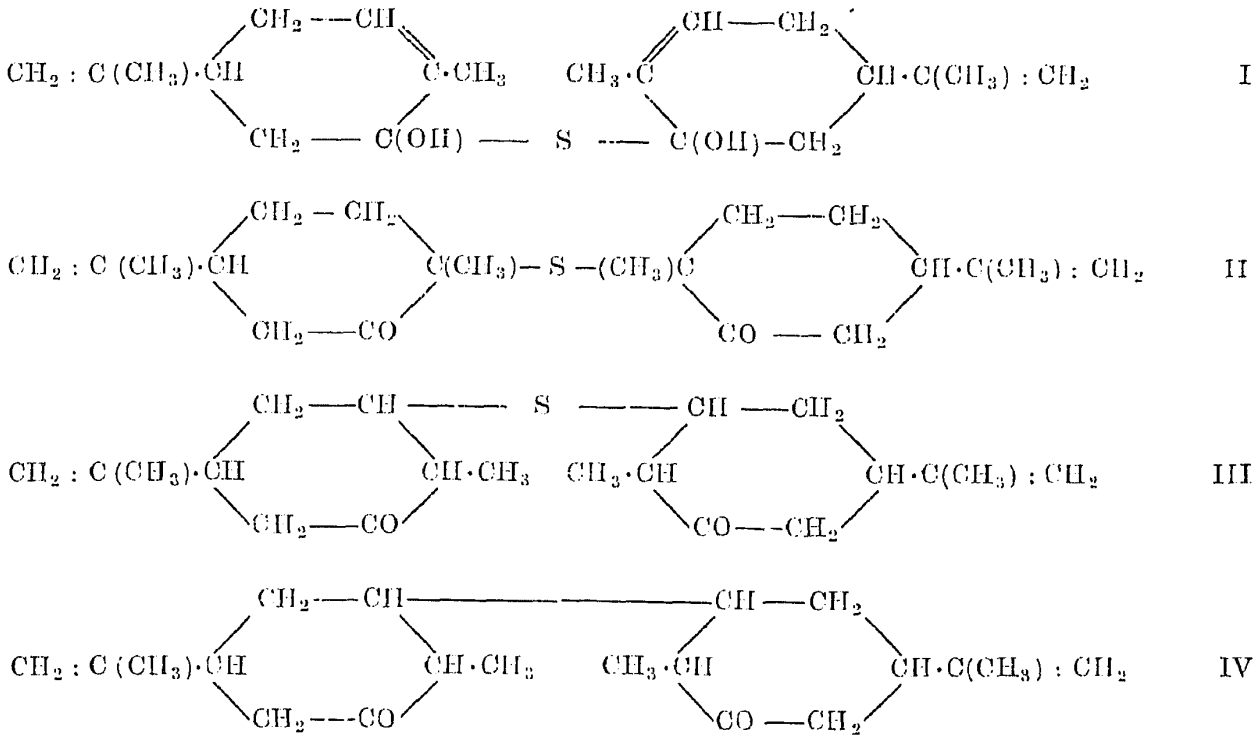
August 2, 1935.

[1] *J. Phys. Chem.*, 1935, **39**, 727, 901, 907.

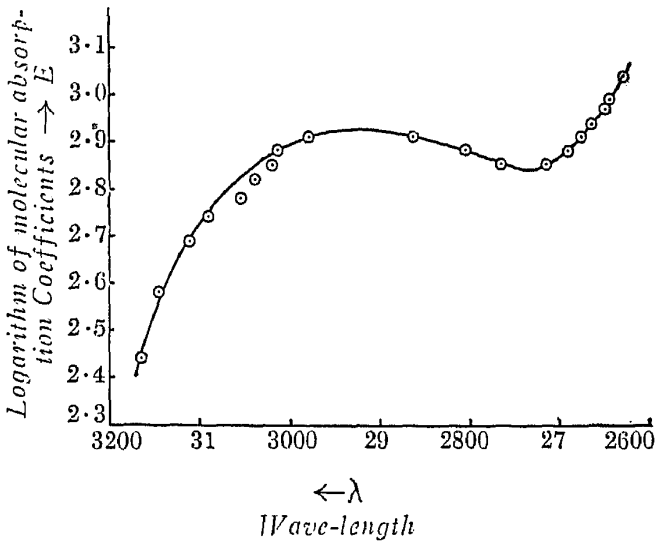
A Note on the Absorption Spectrum of Carvone 'Hydrosulphide' and Its Constitution.

ALTHOUGH the formation of crystalline additive compounds between α-β unsaturated ketones and hydrogen sulphide has been known long since,[1] the constitution of these 'hydrosulphides' is still a matter of some controversy. In the case of carvone 'hydrosulphide' for example, which consists of 1 molecule of hydrogen sulphide and 2 molecules of the ketone, the following structures have been proposed from time to time (I, II, and III).

Of these, Formula I due to Harries and Stirm[2] is based on the non-formation of any oxime, semicarbazone or phenylhydrazone by the compound, while Formula II



put forward by Wallach[3] derives its support from the formation of a dimolecular compound (IV) on addition of hydrogen. The preparation of a dicyanohydrin which readily decomposed to the corresponding dinitrile led Steele[4] to propose (III) for the compound. In order to decide between these alternatives, a quantitative measurement of the ultraviolet absorption of the compound was made with the help of the 'Spekker' spectrophotometer of Hilger. The curve of molecular extinction coefficients given below was obtained with a 1 cm. length of a solution in chloroform of 0·61% concentration. The band at $\lambda = 2900$ Å furnishes direct evidence for the existence of free CO groups in the molecule. The formula of Harries and Stirm is therefore excluded.



Absorption Spectrum of Carvone 'Hydrosulphide'.