continuous region above this X-level. One is tempted to say that the unusual band of Mulliken appears in the spectrum only due to the dipping of the C-level into the region of discrete *Eigenwerte* in X. According to the theory of Kronig (*Zeit. f. Phys.*, **50**, 347 ; 1928) the Λ of the perturbing X differs from that of the C-level by zero or $\pm$ 1. The C-level is interpreted as a $^2\Sigma$-state ($\Lambda = 0$), so the X-level must be either a $^2\Sigma$- or a $^2\Pi$-state ($\Lambda = 1$). The nature of the effect —the appearance of a great number of additional lines at high pressure—leads us to adopt the first of these alternatives as the correct theory.

Pressure effects of similar character, although due to interactions between Π- and Σ-states, have recently been reported by E. Bengtsson and R. Rydberg (*Zeit. f. Phys.*, **59**, 540 ; 1930) in the spectrum of aluminium hydride. Mr. G. Stenvinkel has interpreted this effect in terms of Kronig's theory. His hypothesis is readily applied to the effects in calcium hydride, so that we may refer to his paper (*Zeit. f. Phys.*, in press) for further details in the mechanism of the pressure effects.

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The Absorption Spectrum of Vitamin D.

IN 1929 we published evidence (*Proc. Roy. Soc.*, B, **104**, 561 ; 1929) showing that in preparations made from ergosterol by exposure to ultra-violet radiation, and subsequent removal of unchanged ergosterol, there was a close correlation between antirachitic activity and intensity of absorption for radiation of wave-length 280 mμ. On this and on other evidence we argued that it was probable that vitamin D was the substance present in these products which was responsible for the intense absorption band with heads at 280 mμ and 271 mμ (substance A). We have now obtained definite evidence that this inference is not correct, and that the reactions which occur on irradiation of ergosterol are more complex than then appeared probable.

We have succeeded by the use of light filters and other methods in obtaining preparations showing very high antirachitic power but relatively low absorption at 280 mμ. Further, by irradiating ergosterol with radiation only of wave-lengths longer than 280 mμ (through a filter of xylene), removing the unchanged ergosterol and re-radiating with short wave-lengths only (through filters of chlorine and bromine), we have often obtained during our second radiations a considerable rise in absorption at 280 mμ simultaneously with a destruction of antirachitic activity. In this way we have obtained mixtures showing high absorption closely resembling that which we defined as due to substance A (and almost certainly due to this substance) but showing only low antirachitic activity.

Thus, while it is not yet possible to say what is the true absorption of vitamin D, it is evident that the substance showing the very intense maximum at 280 mμ produced in the early stages of the irradiation of ergosterol by a mercury vapour lamp (without light filters) is not vitamin D.

This non-identity of the two substances is in agreement with the findings of Reerink and Van Wijk (*Biochem. Jour.*, **23**, 1294 ; 1929) and Windaus (*Nachr. ges. Wiss. Göttingen*, 36-57 ; 1930).

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Presence of a Yeast in the Death Watch Beetle (*Xestobium rufo-villosum* De G.).

MY attention has been directed to the paper by Campbell in the *Biochemical Journal*, vol. 23, No. 6, 1929, in which reference is made to the work of Uvarov (1928), who suggests that wood-eating insects may partially digest wood particles with the aid of the secretions or excretions of micro-organisms, or even digest the micro-organisms themselves. Campbell, as the result of his work, suggests that it is probable that intestinal micro-organisms play a prominent part in the biology of the larva. In view of these suggestions, it is thought to be of interest to direct attention to the fact that, whilst conducting an investigation under the direction of the late Prof. H. Maxwell Lefroy during 1924, I found that a yeast was invariably present in larvæ and adults of the death watch beetle. While no evidence was obtained that the yeast was actually concerned in the digestion of wood particles, a number of facts concerning the distribution of the yeast in the various stages of the insect was determined. Dr. S. G. Paine, of the Imperial College of Science, was also closely concerned with the investigation and made a number of attempts to cultivate the yeast.

Briefly, the facts ascertained with regard to the yeast were as follows :

1. Yeasts were found in large numbers in the hepatic diverticula and closely connected portions of the alimentary canal of the adult male and female insects, and also in the larvæ. They are enclosed within the cells of the hepatic diverticula of young larvæ, but free in the diverticula of older larvæ and of the adult insects.

2. Yeasts are extremely rare in portions of the alimentary canal other than those mentioned above.

3. Yeasts are to be found in large numbers in the spermathecæ and vagina of the adult female, from whence they are doubtless conveyed to the eggs.

Unfortunately, when I left the Imperial College to take up my present appointment, the work had to be discontinued. An important fact, which still requires elucidation, is the means whereby the yeasts migrate from the hepatic diverticula, in the larva, to the spermathecæ of the adult female. It would seem that this can only take place in the pupal stage, during histolysis. The yeasts also require tracing from the egg to the newly hatched larva.

It is hoped that the observations here recorded may be of assistance to those endeavouring to elucidate the metabolism of the death watch beetle.

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Integration of Sunlight.

IN their letter on this subject in NATURE of Mar. 22, p. 447, Messrs. Teegan and Rendall refer to a photo-electrolytic method. The electrolytic method of integration does not appear to be very sensitive.

For investigation of the flow of heat at a window, into or out of a room, apparatus has been devised which produces an electromotive force of 70 micro-volts for a heat flow of one British thermal unit per square foot per hour and affords a continuous record of the flow. This has been described in the *Philosophical Magazine* (**8**, 841, December 1929).

With intermittent sunshine the continuous record is naturally difficult to integrate and an integrator has therefore been devised to ' meter ' the heat flow.

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