

It is clear, then, that this law is limited by the following considerations:

(1) It can only apply to those homologous series which yield a solitary curve for $\log \eta$ vs T_B/T for all their members. Since first members in homologous series generally do not lie on these curves—for reasons which will be detailed in a later publication—it will not apply to first members of homologous series.

(2) The law can only apply to those homologous series which will yield approximately straight lines for $\log M$ vs T_B . Again, it is seen that first members will be excepted.

(3) When the effects of a certain radicle, say CH_2 , are studied in different series, say alkyl iodides, n -paraffins and alcohols, the increment in $\log \eta$ due

to CH_2 will be the same only for those series which have parallel straight lines for $\log M$ vs. T_B . Thus the iodides have been found to possess smaller values for the increment in $\log \eta$ due to CH_2 than the n -paraffins, whilst the alcohols possess greater values, and the ethers have identical values.

(4) The law is approximate only, even for n -paraffins.

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¹ Hatschek, E., "The Viscosity of Liquids", 103 (1923).

² Nissan, A. H., and Clark, L. V. W., NATURE, 143, 722 (1939).

Points from Foregoing Letters

D. Y. Solandt and C. H. Best, from experiments made with rats, conclude that deficient vagus function may be associated with a diet poor in choline and that this may, in part at least, be rectified by injected choline. Thus, it is suggested that choline deficiency may result in deficient formation of acetylcholine at the nerve endings.

A. S. McFarlane and M. G. Macfarlane report the presence in vaccinia virus of two types of lipid, and of nucleic acid. The behaviour of the virus to mechanical treatment, to lipid solvents, and to the action of sodium carbonate suggests that forces are present which are able to preserve the form of the particles in the absence of any demonstrable cell membrane.

F. L. Hopwood, M. H. Salaman and A. S. McFarlane find that dried vaccinia elementary bodies which have been extracted with benzene may be completely redispersed by means of ultrasonic vibrations. The virus particles so obtained have lost none of their original infectivity.

L. Halberstaedter finds that the hamster reacts to the subcutaneous injection of benzpyrene by tumour formation like the rat and mouse. Apart from a shorter incubation period, there are no peculiar features in the formation of the primary tumours. Passaging of a benzpyrene tumour in hamsters resulted in a remarkably high percentage of animals developing metastases, which were always localized in the lymph glands. This property is regarded as a peculiarity of this strain.

Unfertilized eggs of a sea-urchin have been inseminated immediately after irradiation with alpha-rays from radium C' by M. Miwa, H. Yamashita and K. Mori. They find that the start of cleavage is delayed in some eggs, and with increasing doses of irradiation the number of eggs showing normal cleavage decreases; in some eggs cleavage stops altogether and disintegration occurs.

B. W. Doak finds that treatment of rhododendron cuttings which had already received a root-forming hormone with a mixture of certain amino-acids promotes root formation, thus substantiating a prediction by Went *et al.* that rooting of some cuttings is limited by lack of amino-acids.

Elizabeth S. Semmens states that the selective effect of polarized radiation in the hydrolysis of

starch, both in the starch grain *in vitro* and in the living plant, is confirmed by a similar action on films of boiled starch, thus showing the effect to be a physico-chemical one. That the result is mainly due to the infra-red portion of the spectrum is demonstrated by the use of heated platinum gauze as a source.

H. L. Eastlick reports that reciprocal transplants of limb primordia have been made between $2\frac{1}{2}$ and $3\frac{1}{2}$ day duck and chicken, turkey and chicken, guinea and chicken, and turkey and guinea embryos. The transplants grew attached to the body wall or to the coelom of the hosts and the limbs thus obtained are normal in appearance. The flank grafts seem to be innervated. Several chicks bearing duck and guinea limbs have hatched and in at least one instance the additional leg is increasing in size.

R. W. Wood states that the scintillations given out by the 'lantern' of a fire-fly bitten by a spider when observed under low magnification have a similar appearance to a zinc sulphide screen under alpha-particle bombardment. Study of the origins of scintillations in relation to the position of the bite might give information about the nervous system of the fly.

F. Lipmann puts forward a scheme for the dehydrogenation of pyruvic acid by *Bacterium Delbrückii* which involves the formation of acetylphosphate as an intermediate stage.

The absorption curve in the region 30μ for tetrachlorethylene dissolved in paraffin is submitted by J. Duchesne and M. Parodi. The frequencies of the two absorption bands observed are in agreement with the predictions of a theoretical discussion of the vibration spectrum of this substance.

S. K. Mukerji and L. Singh have investigated the Raman spectrum of solid *p*-diphenylbenzene, and deduce that the molecule is planar.

Dunstan's law for the relationship of viscosity with the molecular weight of members of an homologous series is derived by applying Trouton's rule to the Clausius-Clayron and Andrade equations. The limitations of the law become apparent from this derivation and it is shown by A. H. Nissan that the equation $\log \eta = K'T_B + K''$ is the fundamental one giving rise to Dunstan's $\log \eta = aM + b$ only in certain cases.