attachment) chromosome, the break must have taken place on different sides of the centromere, in one, and one only, of the chromosomes concerned in the two interchanges.

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[1] Sansome, E., NATURE, 139, 113 (1937).

Dosage and Response in Vitamin E Treatment

FOR the last two years in this laboratory we have been working to establish the relationship between dosage and response to vitamin E treatment. Some discussion of the experimental conditions that we consider necessary for this work has already been published[1,2]. We have now completed a detailed account, which we hope to publish elsewhere, of the construction of a response-curve; this is of the sigmoid type, owing to the quantal nature of the response in question.

With the kind collaboration of Dr. J. O. Irwin, it has been possible to calculate the equation to the regression line that relates the probits of the responses to the logarithm of the doses. Between 200 and 250 animals were used in the construction of this curve, and the error of the 'mean fertility dose' calculated from this curve was found to be, for $P = 0{\cdot}99$, 71–141 per cent, and for $P = 0{\cdot}95$, 77–129 per cent. Naturally, in individual tests, where 10, or at most 20, animals are used, the error will be very much higher. In one instance examined, where 10 animals formed the test group, the limits of error were, for $P = 0{\cdot}99$, 48–209 per cent.

In spite of the large inherent error, which appears to be unavoidable in this type of test, it is thought that the relationship established between dosage and response may be of use to others besides ourselves. It makes possible calculation of the mean fertility dose of a source of vitamin E when the percentage fertility from a known dose has been established; the nearer the found fertility is to 50 per cent fertility, the greater will be the accuracy of the value assigned to the mean fertility dose.

We find that, if D_M and D_T are the mean fertility and the test doses respectively, and if y_T is the probit of the percentage fertility found, then

$$\log D_M = \log D_T - 0{\cdot}35y_T + 1{\cdot}74.$$

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Sept. 23.

[1] Bacharach, A. L., Allchorne, E., and Glynn, H. E., *Biochem. J.*, **31**, 2287 (1937).
[2] Bacharach, A. L., and Allchorne, E., *Biochem. J.*, **32**, 1298 (1938).

Points from Foregoing Letters

FURTHER observations on the flow of liquid helium II are reported by Dr. J. F. Allen and A. D. Misener, showing that the velocity increases very rapidly between 2·177° and 1·15° K., and becomes independent of pressure as the area of the capillary is reduced. In no case was a purely linear flow observed, and the correction due to surface flow was found to be small.

Dr. D. H. Menzel states that the usual assumption that an appreciable intensity of the forbidden spectrum lines only occurs at high electron density is not valid. From mathematical considerations he deduces that the opposite is the case, and considers that the predominance of the forbidden lines in nebular spectra is attributable not to the effect of collisions in de-exciting an atom before it has a chance to radiate, but to the weakness of the permitted lines.

The absorption spectra, at liquid air temperatures, of a thin layer of solid hydrochloric acid in the infra-red region near 3·7μ and of the heavy variety, DCl, near 5μ, have been determined by E. Lee, Dr. G. B. B. M. Sutherland and C. K. Wu. The authors find that the Raman spectrum of hydrochloric acid at the same temperature consists of two lines at 2,709 and 2,759 cm.$^{-1}$.

The difference in the band spectrum of barium hydride, as compared with strontium hydride and other diatomic molecules, is discussed by Dr. B. Grundström, who points out that two different types of predissociation are involved.

Following upon R. Bernard's referring the auroral line 3470 to a forbidden transition of the neutral nitrogen atom, Prof. L. Vegard, after a further study of the auroral spectra, considers that a number of other lines may be due to nitrogen and oxygen atoms in different states of ionization in the auroral region.

By applying to Jupiter's satellites the slightly modified Bode's law, which was found to fit roughly in the case of those of Saturn, J. Miller infers that there is a missing satellite (after satellite No. 4) and suggests that one of the two bodies recently discovered by Dr. S. B. Nicholson may possibly fill that gap.

Dr. K. E. Bullen directs attention to the lines of evidence from different branches of geophysics, which all suggest that a change in the properties of the earth occurs at a depth of order 500–700 km. below the surface.

In view of the discovery of the Swanscombe skull, of Acheulean period, but having characteristics of modern man, J. Reid Moir inquires whether it is not justifiable to assume, as Prof. Woollard does, that man was derived from an earlier stock, prior to the branching off of the anthropoids.

A seasonal rhythm in the response of castrated albino mice to injections of œstrone, similar to that reported in the case of the action of androgen upon capons, is described by Dr. J. Duszyńska. The response is greater in spring than in autumn, being more than three times as great in May as in November. This variation affects the conclusions arrived at from biological assays by the vaginal smear methods, unless carried out in comparison with standard preparations.

A. L. Bacharach has studied the relationship of response to dosage of vitamin E. An equation is given showing the relation between the response to an experimental dose and the dose that will give 50 per cent fertility in a group of animals.