

liberation increased rapidly with increase of ether to a maximum at ether-saturation, beyond which the rate remained constant. (2) At or beyond saturation, the lecithin and chloroplast phases were seen to coalesce. (3) Ether-extracted chloroplast suspensions still required the presence of ether for activation; no lecithinase activity appeared in the ether or aqueous phases. (4) Replacement of ether by 'Dreft' or acetone caused some activation, whereas butanol, dioxane, chloroform, petroleum ether, methanol or *n*-butyl ether produced little or no activation.

The finding that diethyl ether activates the lecithinases of chloroplasts supports the explanation given² for the origin of the phosphatidic acid isolated after ether extraction of cabbage 'cytoplasm'¹¹ (which probably contained chloroplasts), and limits the use of this solvent as an extractant for chloroplast phospholipids.

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A New Method of measuring Oxygen consumed in the Metabolism of Small Animals

THE principle of replacing, by means of electrolysis, the oxygen consumed in measurements of metabolism offers the threefold possibility of having a high degree of sensitivity, of controlling the phenomenon for an unlimited time and avoiding calculation entirely. An electrolytic cell (30 per cent sodium hydroxide), capable of producing oxygen, is connected by means of a tube to the thermostatic chamber in which the animal is enclosed. The chamber is provided with a mechanical system for circulating the air and absorbing carbon dioxide, and comprises a pump and a purifier. The whole, including the metabolism chamber, the pump, the purifier, the bell-jar placed over the nickel electrode, and the connecting tubes, is hermetically sealed. Measurement and integration in time of the quantity of electricity supplied by the current generator to the electrolytic cell is done electrically.

The nickel electrode, immersed in the electrolyte, releases oxygen in quantities directly proportional to the electricity passing through it (Faraday's law); for example, 1 gm. atom of oxygen every 2×96.540 coulombs, independently of temperature or pressure.

If the oxygen released by the electrode is not consumed by the animal, it tends to produce excess

pressure in the hermetically sealed enclosure in which it is developed. This will cause a decrease in the level of the electrolyte around the electrode and, consequently, a reduction in the area of immersed surface, with a relative curtailment in production of oxygen.

A similar and opposite auto-regulating effect occurs when the consumption of oxygen exceeds the quantity released; the consequent decrease in pressure causes the level of the electrolyte to rise, with a corresponding increase in the production of oxygen.

It is obvious that the rapidity and sensitivity of the system can be varied by regulating the angle of the electrode in relation to the surface of the electrolyte, its shape, nature, the total volume of the enclosure in which the gas is released, and so on. Since the quantity of oxygen released by electrolysis is dependent solely upon the product of current and time (ampere-hour), no error in measurement is brought about by possible fluctuations in voltage at the generator.

The measuring instrument can be readily calibrated in volumes of oxygen consumed by taking into account the electro-chemical equivalent, or in calories. In the latter case 1 litre of oxygen with a respiratory quotient of 0.8 is equivalent to 4.8 kcal., and the current per hour will immediately give the calories per hour consumed by the animal.

Using this method, the average heat production of the albino mouse was found to be 30 kcal./kgm.-hour, and that of the albino rat 15 kcal./kgm.-hour.

Patents on the apparatus are pending.

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Chromosomal Inversions with Sex-limited Effects

FOR a long time it was thought that the *Drosophila* X-chromosomes were genetically very homogeneous. As one-third of the X-chromosomes in the populations are carried by the males in haploid condition, the X-chromosome genes are much more exposed to natural selection than the autosomic genes. Kerr and Kerr¹ have shown, however, that *D. melanogaster* X-chromosomes from natural populations carry a large amount of concealed variability.

The object of the present note is to present further evidence of the presence of X-chromosome variability due to gene combinations with sex-limited effects.

In the study of chromosomal variability of natural populations of *D. willistoni* and of *D. paulistorum*, X-chromosome inversions were found that present sex-limited effects.

Samples of natural populations of *D. willistoni* and of *D. paulistorum* were obtained from many regions of Brazil. The results of the analysis of these samples may be found in some papers already published^{2,3} and in unpublished observations by Prof. Th. Dobzhansky and myself.

Single females of the samples were put in vials with culture medium. The salivary-gland chromosomes of a single *F*₁ larva from every female of the sample were studied. In two *D. willistoni* samples, those from Monjolinho³ in the State of Goiaz and from Salvador (unpublished) in the State of Bahia,