

in the main derived from other sources. The red clay of the Tasman Sea may be largely composed of this desert dust, and its comparison with that from the central Pacific would be of interest.

I have not yet had the opportunity of seeing the recent paper in the *N.Z. Journal of Science and Technology* referred to by Dr. Kidson.

Black snow and black rain fall in the south-west of Scotland, but when some of this was sent to Glasgow, it was determined by Mr. B. K. N. Wyllie as due to particles of slag from the Cumberland iron works (*Scottish Ski-Club Magaz.*, January 1912, pp. 153-5).

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### The Present Status of *Drosophila melanogaster*.

DURING more than two decades *Drosophila melanogaster* has occupied a prominent position in connexion with developments in biological theory. Its extreme variability was noted in 1906 by Castle, and its peculiarities in this respect were later exploited by Morgan and his associates in a long series of publications. On account of the great ease with which this fly can be maintained in cultures and of the short life cycle, it has proved most convenient for genetical investigations. Apparently, experimental work excites a disproportionate degree of credence at the present time in connexion with biological theories. Experimental work, from the evolutionary point of view at any rate, by itself alone, appears to have a definitely restricted value.

It has been known ever since Rosenberg's truly epoch-making investigations on the cytology of the hybrid between *Drosera rotundifolia* and *D. longifolia* that there are certain cytological characteristics which are of fundamental importance in connexion with the study of hybrids between species. Starting with his work on the hybrid between these two species, commonly known as *D. obovata*, Rosenberg was led to extend his observations to variable species in Nature, notably the genus *Rosa* as represented by the dog roses of Europe. Similar observations have been carried out in my laboratories on other genera of the Rosaceæ, namely, the extremely variable and exceedingly numerous American species of the genus *Crataegus* and of the equally variable American blackberries. Further observations carried on in the southern hemisphere in the case of the huge and variable genera *Eucalyptus*, *Acacia*, and *Veronica*, show that this condition is not confined in any way geographically, but is a feature commonly exemplified by large genera. This state of variability in large genera was prophetically pointed out, many years ago, by Charles Darwin in the "Origin of Species".

Those species which are the favourite material of genetical experimenters at the present time are species which have all the variability of hybrids. This condition has long been recognised in the case of the species of the genus *Eriothera*, which was brought into prominence more than two decades ago by De Vries. There are now scarcely any students of the genus who do not admit that its species are very largely contaminated by hybridisation. On the botanical side the idea of widespread hybridism in Nature is more and more hospitably received. On the zoological side we find, however, a much less degree of cordiality towards this idea. It is strongly maintained by many geneticists, for example, that *D. melanogaster* is a good species, and one of the pieces of evidence cited in this connexion is that it does not readily cross with other species of the genus. This turns out to be an untrustworthy criterion, however, because cases are known on the botanical

side of experimentally produced hybrids which will not back-cross even to their own parents.

In 1925 the present writer, in collaboration with Prof. G. C. Hicks, published<sup>1, 2, 3</sup> a number of observations on the meiotic or maturation division in the male gonads of *D. melanogaster*. These observations were rendered possible by the development of methods which made it feasible to examine a huge amount of material with a minimum amount of effort. The investigations showed clearly that the reduction division in *D. melanogaster* presents all the peculiarities of those found in natural or experimentally produced hybrids. In 1928, Belar<sup>4</sup> published some photomicrographs which, according to his view, showed the inaccuracy of the observations made by the present writer and Prof. Hicks. Belar's figures of the division of the primary spermatocytes, however, show a distinct lagging of the chromosomes in the maturation division, which is recognisable by all who are familiar with the cytology of hybrids as a distinct criterion of hybrid origin. Very recently Zuitin has published in the *Bulletins* of the Bureau of Genetics of Leningrad (vol. 7, 1929) an account of the reduction division in this species. His results confirm the accuracy of the observations made by Prof. Hicks and the writer, inasmuch as he figures the abnormalities described in our papers published in 1925. He reaches the conclusion, further, that *D. melanogaster*, as he puts it, has the cytological abnormalities of "special [obviously the meaning is interspecific] hybrids".

It will be obvious to the reader that *D. melanogaster* as an object of genetical investigation must be subject to all the reservations which should be made in the case of the study of hybrids. Probably the reluctance of geneticists in general to admit the hybrid origin of *D. melanogaster* arises out of the fear lest either the Mendelian hypothesis or the chromosome theory of heredity should be thereby compromised. It is also important to note that not only breeding experiments with *D. melanogaster* are open to such criticisms as would arise from the hybrid character of the material, but also the investigation of this and other variable species by means of radiations is likewise open to grave question. Another prominent weakness of actinic experimentation in connexion with theories of the origin of species is the fact that there is no reason to suppose that such radiations have any important influence in moulding species in Nature.

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<sup>1</sup> Jeffrey, E. C. "Drosophila and the Mutation Hypothesis." *Science*, vol. 62, No. 1592; 1925.

<sup>2</sup> Jeffrey, E. C., and Hicks, G. C. "The Reduction Division in Relation to Mutation in Plants and Animals." *American Naturalist*, vol. 59; 1925.

<sup>3</sup> Jeffrey, E. C., and Hicks, G. C. "Evidence as to the Cause of So-Called Mutations in *Drosophila*." *Genetica*, 7, 1925.

<sup>4</sup> Belar. "Die cytologischen Grundlagen der Vererbung". Handbuch der Vererbungswissenschaft, Berlin; 1928.

### The Water Balance of Plants as a Factor in their Resistance to Insect Pests.

As a result of a review of the available evidence with regard to the effect of climatic and soil conditions on the distribution of the *Dysdercus* sp., the hypothesis was put forward by one of us (E. P. M.) in 1925-26 that a disturbed water content, from whatever cause, rendered the cotton plant more susceptible to the attack of sap-feeding insect pests, such as various species of thrips. Later it was found that this hypothesis appeared also to hold true in the case of certain sap-feeding insect pests of sugar-cane, notably the