

Melanism in British Lepidoptera.

MELANISM has long been a subject of special interest to British entomologists owing to the rise and spread of melanic varieties in many British species of moths and butterflies, such groups as the Geometridæ showing many examples. Records of melanism go back at least to 1850, when the dark variety *Doubledayaria* of *Amphidasys betularia* appeared near Manchester. It afterwards spread until it became the prevalent or exclusive form in Lancashire and the Midland Counties, extending also to the Continent in later years. The earlier naturalists' point of view (as represented by the writings of Tutt and of Porritt) concerning its causation, related it to the progressive darkening of the background in the neighbourhood of cities as a result of industrialisation. When this explanation was found to be inadequate, moisture was added as a cause of melanism; and Tutt concluded that moisture would darken the surfaces of rocks in rural districts just as smoke darkens surfaces in urban areas, natural selection progressively favouring darker forms which habitually rested on such darkened backgrounds.

In a recent consideration (*Journal of Genetics*, vol. ix., No. 3) of melanism, based on extended observations and breeding experiments in Yorkshire, Mr. J. W. H. Harrison discards the older hypothesis and proposes a new one. This is based on a modification of the insect's metabolism by its feeding upon substances more or less impregnated with chemicals derived from the smoke. It is pointed out that certain melanic areas, such as the vicinity of Middlesbrough, Newcastle-upon-Tyne, and Moray Firth, are among the driest in the country, having a rainfall of 25-28 in. Also, in such species as *Boarmia repandata* and *Oporabia dilutata* the melanic varieties are confined to the towns, while the type occurs in the surrounding country. The melanic forms of different districts, moreover, differ from each other, showing that they have originated locally and irrespective of each other.

Observations showed that an increase in melanism was accompanied by a striking decadence of cryptogamic plants, especially mosses, liverworts, and lichens, many species having quite disappeared from affected areas owing to smoke contamination. This effect on vegetation, and also the degree of melanism, is found to diminish as one leaves the town.

Mr. Harrison compares melanism to such a condition as alkaptonuria in man. The latter condition is known to be inherited, and may be considered a chemical mutation in which the alkapton is not decomposed owing to the absence of a certain enzyme. He suggests that the taking in with the food of small quantities of such salts as KCl, NaCl, and MnSO₄, present on the foliage in urban areas would lead to an increase in the amount of tyrosinase present, and so to an increased deposition of melanin, since the activity of various enzymes is increased by the presence of small quantities of these salts. The same interpretation is extended to melanic forms on coasts and islands, where the vegetation is impregnated with similar salts from the sea spray.

It is known that in many cases melanic varieties behave in inheritance as simple Mendelian dominants to the type (e.g. Onslow, *Journal of Genetics*, vol. ix., No. 1, on the melanic variety of *Boarmia (Tephrosia) consonaria*). In crosses with species of *Oporabia*, however, the author obtained a blend which remained true for two generations, and is interpreted as a gametic blend, the melanism being of a perfectly continuous type. Also, when the hybrids between *O. autumnata* and *O. filigrammaria* were crossed back with the parent forms, a blend resulted. In the

F₂ of the cross, however, a "pseudo-segregation" was observed, which is likened to the behaviour in *Oenothera Lamarckiana*. Many writers have suggested such a relation between hybridisation and mutation.

In this interesting and manifold study the author has discarded an original anti-Lamarckian bias, and concludes that various cases, such as the food instincts of *O. filigrammaria* and the period of emergence in a pinewood race of *O. autumnata*, are only explicable as true Lamarckian effects. Natural selection is believed to lead to the genesis of local races, "limiting the range of variation by the elimination of genetical strains less protected in any given habitat."

The haploid chromosome numbers are determined for *O. dilutata*, *autumnata*, and *filigrammaria* as 30, 38, and 37 respectively, and the behaviour of the chromosomes in meiosis furnishes a basis for a further interpretation of the hereditary phenomena.

University Developments at Manchester.

THE University of Manchester is appealing for the comparatively small sum of 500,000*l.* in order to enable it to maintain its present activities effectively and to develop new features. These embrace not only additional buildings and equipment urgently required for the extension of the School of Medicine, especially in the departments of pharmacology and pathology, and for advanced scientific study and research in other important spheres of the University's many-sided work, but also a large increase in the professorial staff, including new professorships in social and political science, physiological chemistry, law, mathematical physics, and French. The present Department of Commerce, established in 1904, is stated to be hopelessly inadequate to the needs of a great commercial centre such as that of south-east Lancashire, and demands, if it is to serve its purpose worthily, a considerable strengthening of its teaching staff. The University has recently established a new degree, namely, the doctorate in philosophy (the Ph.D. degree), granted upon a course of advanced study and research, which will necessarily involve a large expenditure in staff and equipment.

The University is committed to an expenditure of a sum of 171,000*l.* in respect, among other items, of the building and equipment of the new arts building, where it is intended to house the subjects of languages, literature, history, and philosophy, the endowment of new chairs, the reconstruction and equipment of scientific departments, and the provision of women's hostels. It is further contemplated to set up a wide extension of extra-mural teaching so as to bring the influence of the University more closely in touch throughout its wide area with the needs and aspirations of working people by means of extension lectures and systematic three-year evening courses of tutorial classes.

Already in response to the appeal of the University a sum of about 160,000*l.* has been raised, and it ought not, having regard to the population and wealth of the area the University serves, to be difficult to secure the desired sum, and even more. With the view of inducing a large number of people of small means to participate in the effort to raise the money required, a novel scheme has been launched in the form of a prospectus, such as that issued on behalf of limited liability companies, entitled "Lancashire Development, Unlimited, The University of Manchester," inviting subscriptions for new capital to the extent of 500,000*l.* divided into 425,000 cumulative participating bonds of 1*l.* each and 1,500,000 people's