

RESEARCH ITEMS

A Neolithic Trackway

A POSSIBLE Neolithic trackway across the Cotswolds has been traced by Miss C. A. Simpson and Miss Clifford and is described by them in *Geography* of December. It extends north-eastward from Bisley by Duntisbourne, Chedworth and Northleach to the edge of the low and swampy ground of the Windrush valley west of Bourton-on-the-Water, where it swings north and then west towards Nutgrove and beyond. In Neolithic times the limestone plateau of the Cotswolds was probably covered by low scrub and there were few trees. The valleys, however, were mainly flooded by clay and sand, and afforded marshes which restricted the crossing places. On the plateau the trackway is less easy to trace, for it was probably less well defined. Long barrows in conspicuous places were probably landmarks and also the objectives of some of the travellers. Flints and stone weapons are also useful clues. On the valley sides, however, the track is frequently sunk either in clay or limestone outcrops. Projecting spurs of firmer ground often lead to the river crossing. In some places the route follows a line of present road, but more often it is marked, if marked at all, by a narrow lane, a bridle path or even a double line of hedge. The authors' discussion of the evidence to be sought in tracing the trackway has many useful indications for such work.

Feet of Melanesians and Europeans

A STUDY of the footprints of sixty-five natives of the Solomon Islands by Clifford S. James, of the Melanesian Mission Hospital, Malaita (*Lancet*, 237; Dec. 30, 1939), affords material for contrast with those of Europeans. The longitudinal arch exists in both Melanesians and Europeans and is a definite fixed part of the anatomy. This is contrary to the view recently expressed that there is no fixed arch "in primitive races who have never worn boots or shoes". As regards differences between the foot of a European and the Solomon Islander, that of the latter is more massive and broader, especially in the male, lacking the 'elegance' (usually pathological) of the European foot. The toes of a native are straight, lie parallel with the ground, and are spread out so that the inner and outer borders of the foot are two straight lines. Occasionally the great toe is abducted so that the inner border of the foot is concave medially, and the other foot has to 'step over' the great toe. A native in walking uses his toes more than does a European; and the final push-off is from the toes. The most obvious difference in the two footprints is that the European's foot is always turned outwards to various degrees when walking, while that of the native has its inner border pointing straight ahead with slight variations one way or another. The female foot being less massive than the male, its mobility and pliability are most noticeable, especially as shown in the way the foot spreads out over the ground when the body weight is put on to it. The print of a European aged 5½ years who had never worn shoes, when superimposed on that of a native, showed striking similarities. Flat-foot does not occur among the natives.

Biological Control of a Fungus Disease

THE honey fungus, *Armillaria mellea*, is of world-wide distribution. It is widespread upon forest trees in Great Britain, and is very destructive to tea plantations in Nyasaland. R. Leach has made some interesting experiments on biological control of the disease in the last-mentioned venue (*Trans. Brit. Mycol. Soc.*, 23, Pt. 4; December 1939). Forest land has to be cleared of trees before tea bushes can be planted. The fungus attacks roots left in the soil, and later can transfer its parasitism to the economically valuable bushes, with disastrous results. Cutting a ring of bark from trees some time before they are felled, however, depletes the roots of carbohydrates, and thereby deprives *A. mellea* of an acceptable substrate. It does, in fact, effect such a large edaphic change that other organisms establish themselves in the decaying roots, and exclude the parasite, which can even be prevented from spreading by felling a belt of bark-ringed trees.

New Descriptions of Agarics

THE Aviemore foray of the British Mycological Society yielded some interesting new records of Agariceous fungi, mostly of the genus *Russula*, which are described by A. A. Pearson in the Society's *Transactions* (23, Pt. 4; December 1939). Several of the species, as *R. rosea*, *R. vinosa* and *R. gracillima*, have occurred in other countries, but a new species, *R. scotica*, is also delineated. This is similar to *R. cremeo-avellanea*, which is found in the Pyrenees; but differs in the non-reticulated spore and absence of cystidia on the pileus.

Shoot Wilt of *Prunus triloba*

THE fungus *Botrytis cinerea* is often thought of as a saprophyte, but it has been found to show active parasitism upon some plants. W. C. Moore has recently described a shoot wilt disease of *Prunus triloba*, caused by this organism (*Trans. Brit. Mycol. Soc.*, 23, Pt. 4; December 1939). New shoots wilted suddenly shortly after flowering, the bark died and it became brown. A wilted flower cluster was always associated with such shoots, and the disease appeared most severely when the weather was wet before the end of May. Pathogenicity of the organism mentioned was proved by isolation and re-inoculation.

Theory of Differential Periodicity

G. F. SLEGGs (*Growth*, 3, 173-179; 1939) puts forward a theory of gene structure and development of the organism which is based on the interactions of protein lattices. If one projects all the genes, cytoplasm and other intergenic material in every cell of the organism into one structure, the author considers that the genes are equivalent to a stack of horizontal lattices differing in spatial period. Growth then is basically a process of lateral extension of the vertical strips of the lattice system. The minimum effective fragment will be a chain of the mesh, for example, the spireme. The equipotentiality of the system lies in the fact that any vertical strip can regenerate the whole differential pattern of the

lattice stack. All genes are thought to be similar, differing only in spatial arrangement. The differential in the amino-acid frequency is believed to result from gene rotation. On this view it is possible to account for differential mitosis, the relationship between cytoplasmic and other intergenic material and growth phenomena, and evolutionary trends by the conception of rotations in a protein lattice stack.

Genetics of *Primula kewensis*

Most interesting facts have resulted from the examination of *Primula kewensis* by M. Upcott (*J. Genetics*, 39, 79-100; 1939). There are two types of tetraploids known; the first resulted from the doubling of chromosomes in branches of the diploid cross *P. floribunda* × *P. verticillata*; the second arose from backcrossing the first type to *P. floribunda*. The first contains two complements each of *floribunda* and of *verticillata* chromosomes while the second contains three sets of *floribunda* to one of *verticillata*. The diploid, sterile *P. kewensis* forms bivalents and one to two pairs of univalents. The sterility of the hybrid is not due to difficulties of chromosome pairing. Evidence has been provided of the manner in which gametes with less than the normal reduced number of chromosomes may occur. 8 per cent of the pollen grain division of the tetraploid *P. kewensis* showed "double plates"; that is, either several chromosomes lie off the main divisional plate and form a secondary plate on their own or the mitotic spindle is curved. Should the chromosomes forming the secondary plate be a compatible complement, say $n = 9$, there is a chance of gamete production with 9 chromosomes in place of the normal 18 from tetraploid *P. kewensis*. It is shown that tetraploids have consistently a lower chiasma frequency than the related diploids.

Quantitative Characters

LEROY POWERS (*J. Genetics*, 39, 139-170; 1939) describes an experiment in *Lycopersicon esculentum* and *L. pimpinellifolium*, in which the analysis of variance is applied to the study of the inheritance of the number of locules and the size of fruit. He shows how the analysis of variance may be usefully applied to genetical problems. Variances were heterogeneous for "between genotypes" and for "between generations" and, to some extent, for "between sampling blocks". The variability of the variances is a function of genotypes. There would appear to be at least three pairs of allelomorphs involved in the determination of both number of locules and size of fruits. Their interactions are geometrically cumulative, but it is shown that interactions between pairs of allelomorphs are different from those within pairs, and proper experimental methods should be adopted to keep these differences distinct.

Greenland Ice Sheet

THE advance and retreat of valley glaciers is frequently cyclic and not progressive in either direction. It is often more dependent on local topography than on changes in climate. In recent observations in north-west Greenland ("Contributions to the Glaciology of North-West Greenland", *Meddelelser om Grønland*, 125, No. 3), J. W. Wright shows that advance and retreat have occurred in the Moltke Glacier this century, but agrees that other evidence than that of valley glaciers is required for movements of the ice cap. This evidence he believes

he has found, pointing to a recent retreat of the ice cap in Inglefield Land. Several new nunataks have appeared during the last few years; their appearance is vouched for by Eskimos. A long narrow lake, on the ice-free land, but adjoining the ice cap, has lately undergone a drop in level as shown by the former strand line; presumably its outlet until recently was dammed by a tongue of the ice which has now disappeared. Further evidence of retreat is the occurrence along the edge of the ice cap of rock not yet bearing the normal covering of lichen. Lastly, Mr. Wright cites the disappearance during the last ten years of an ice cap covering a small island and the melting of the snow drifts that were perennial on the slopes east of Thule.

Microseisms and Transmission of Atmospheric Disturbances

As the result of the mathematical examination of an ideal case in which atmospheric disturbance is transmitted through a layer outside or within which a steady air current is blowing, Katsutada Sezawa and Kiyoshi Kanai (*Bull. Earthquake Res. Inst. Tokyo Imp. Univ.*, 17, Pt. 3, 548-557; 1939) arrive at some interesting conclusions. When it is possible for the disturbance to be transmitted through such a layer, the amplitude of the waves becomes a maximum for a certain range of periods, which condition would be one of the important causes of microseismic oscillation. It is possible for there to be two kinds of waves transmitted along this ideal atmospheric layer; one has a velocity comparable with that of sound waves and the other has a velocity of the order of a small fraction of the velocity of sound waves. Waves of both these kinds are transmitted only in the same or the reverse direction of the wind. The condition determining such a direction of wave transmission depends on wind velocities both in the upper and lower atmospheres. It is pointed out that microbarometric records register an aggregate of local disturbances of smaller periods, particularly those of a gravitational nature, and it may not be possible to pick out the main oscillations of smaller periods that occur in a relatively large area. For this reason it may not be possible to show any correspondence between microbarometric oscillations and microseismic oscillations.

Use of Monochromatic Image in the Spectroheliograph

M. A. ELLISON has published a paper on the formation of the monochromatic image in a spectroheliograph (*J. Brit. Astro. Assoc.*, 50, 2; 1940) which will prove very useful to solar observers. As it deals with various details too numerous to summarize in a short space, those who are interested in the subject are referred to the original paper. Briefly, Ellison considers the three possible arrangements for the 'scanning' and 'viewing' slits, and points out the advantages as well as the disadvantages of each one. He refers specially to the convenience when the slits are placed side by side, about five inches apart and parallel to one another, a method adopted by F. J. Sellers, director of the Solar Section of the British Astronomical Association. A description of the apparatus has already appeared (*J. Brit. Astro. Assoc.*, 48, 6; 1938) and Ellison has used a similar apparatus with his spectroheliograph, the results being very satisfactory. A short account is given of the Anderson prism device, which is an alternative to the slit mechanism and was applied by Hale to the spectroheliograph.