

## RESEARCH ITEMS

## Rice Field Insects

AN interesting Circular, No. 632, under this title by W. A. Douglas and J. W. Ingram, has been issued by the United States Department of Agriculture (Washington, D.C., 1942) which should prove of interest outside the United States. "Insect enemies of the rice crop differ", say the authors, "somewhat from those of other field crops and the methods of controlling them are different, because the rice fields are kept flooded with water during most of the growing period." Insect damage to growing rice is caused mainly by four species: the rice stinkbug (*Solubea pugnax*), two species of lepidopterous stalk borers (*Diatraea saccharalis* and *Chilo plejadellus*) and the sugar-cane beetle (*Euethola rugiceps*). There are other insects capable of inflicting some damage if the conditions of their environment become eminently favourable, but these four are of chief importance. The stinkbug sucks the contents from the developing rice grain, causing a total loss of all grains so attacked in an early stage of their development. The stalk-borers feed within the rice stalk, resulting in the loss by death of the developing rice panicle. The adult sugar-cane beetle gnaws young rice plants prior to the flooding in the spring, and newly emerged adults attack the nearby mature stalks when the field is drained prior to harvest; the stalks fall over and are thus prevented from being picked up by the harvesting machinery. All the important insects attacking rice in the field are alluded to but the above four are fully described and methods for their control are given. This circular makes its appearance at an opportune moment—since the rice crops of the United States and India must be of the first importance to the Allied Nations.

## Hatching of Eggs

PARTRIDGES and grouse usually hatch 100 per cent of their eggs whereas domestic fowls frequently only hatch 75–90 per cent. R. K. Cole has discovered one reason for a reduced proportion of hatched eggs (*J. Hered.*, 33, 83–86; 1942). A lethal gene—talpid—was found in pedigrees of fowls showing infertility of a proportion of the eggs. Talpid causes the embryo to develop in an extremely abnormal manner. Most talpid embryos die about the eighth day of incubation, but a few may survive until the seventeenth day. The lethal gene is known to have been in the stocks of hens at Cornell for at least eight years.

## Genetics of Natural Population

*Linanthus Parryae* is a diminutive annual member of the Polemoniaceae. It is found in the Mojave Desert of California, and has white or blue flowers. The numbers of the annuals vary considerably from year to year according to the amount of rain in the desert. In the locality studied by C. Epling and T. H. Dobzhansky (*Genetics*, 27, 317; 1942) the population can be considered an isolated one. Sampling of 427 stations, each half a mile apart, was made and involved 126,100 plants. A total of 113,955 white- and 12,145 blue-flowered plants were found, but the distribution of the two types was not uniform. Indeed only 108 blue plants were found outside three distinct and separate areas. A typical U-shaped curve of the frequencies of blue-flowered plants in the sub-populations indicates that small size of population is the

chief contributory cause of the irregular proportion of blue- and white-flowered plants in the sub-divisions of the area.

## A Cancerous Neoplasm of Plants

PHILIP R. WHITE described "A Cancerous Neoplasm of Plants Produced by Autonomous Bacteria-free Crown-Gall Tissue" in a paper read before the American Philosophical Society on April 24. Cancer is characteristically an independent and unrestrained, unphysiological, invasive, and malignant growth. Primary crown galls of plants possess to a marked degree the last four of these characteristics. They cannot, however, be considered independent, since they are caused by a bacterium, *Phytomonas tumebaciens*. Nevertheless, on certain hosts, especially among the Compositae, there occur in many cases of crown-gall infection secondary tumours of unknown etiology arising at a considerable distance from the point of inoculation. Work carried out within the past two years has shown that tissues derived from these secondary tumours are bacteria-free by both bacteriological and serological tests. Tissues from the interior of secondary tumours have been isolated and grown *in vitro* for more than a year. In tissue culture they grow much more rapidly and in a much less organized manner than do tissue cultures taken from non-tumorous tissues. These tissue cultures can be grafted into either sunflower or artichoke plants, where they produce typical crown-gall tumours. Gall tissue can be transplanted from sunflower to artichoke and vice versa. In both hosts, as well as *in vitro*, they retain their characteristic independent, unrestrained and unphysiological manner of development. Their invasiveness is restricted by the rigid skeletal framework in which plant cells are regularly constrained to function, and their malignancy is likewise restricted by structural characteristics of plants. Nevertheless, it is believed that the cells of these tumours and of the tissue cultures derived from and giving rise to them, possess all the essential characteristics of cancer cells and therefore represent a new and potentially useful material on which to study the etiology of cancer.

## Auriculas

THE neat growth and pleasing flower colour of garden auriculas result from some interesting structural mechanisms, which are discussed in a short paper by Sir Rowland Biffen (*J. Roy. Hort. Soc.*, 67, Pt. 6, June, 1942). Beautiful variations in flower colour are caused by the combinations of several factors—an imperial yellow colour, an anthocyanin (hirsutin), a buff yellow colour, and a white ground. Presence or absence of wax or 'meal' in the centre of the corolla also makes an additional contribution, while green, grey and white-edged forms are brought about by the plants' occasional demonstration of the foliar nature of the corolla lobes. Green-edged and grey-edged flowers occasionally occur on the same plant, and when this happens, the former spring from the base of the plant, while the terminal flower is grey-edged. A curious factor results from the presence of a 'paste' in the centre of some flowers, and there is evidence that this is a further indication of the leafy origin of the corolla. Chlorophyll may also occur in sections of the corolla other than at the edge. Zoned flowers thus arise, and another mutation gives striped flowers. The interactions of all these and other factors are discussed in the paper.

### New Types of *Datura Stramonium*

Albert F. Blakeslee and A. G. Avery described "Nine Strikingly Diverse Types in *Datura Stramonium* with Location of their Determiners in a Single Chromosome" in a paper before the American Philosophical Society on April 24. The mutant characters discussed show wide departures from the normal type. One which has smooth, in distinction from spiny, fruits, has been classified as a distinct species, *Datura inermis*, although it differs from normals by only a single gene. This gene causes many changes beside the elimination of spines on fruits, such as shortening and thickening of petioles and internodes, increased inequality in paired branches, broadening of leaves, flattening of stigma and delayed fruiting. A type with short flowers and broad leaves is indistinguishable from another type which is determined by a different gene in another chromosome. A type which wilts in sunlight also mimics two other types brought about by different genes. One type induces early fruiting. A type has been called 'sickly' because its appearance resembles the effects of a virus disease or the environmental influence of lack of certain elements in the soil. One type usually branches with three, instead of two, forks but the environment affects the forking since plants which are genetically 3-forked occasionally have only two forks and normal plants may sometimes show three forks without being able to transmit the character to their offspring. One type brings about doubling of the chromosome number in eggs and pollen, one the production of lobed instead of round pollen grains and one causes the early death of the pollen grains affected without injuring the egg cells. By the breeding behaviour when extra chromosomes are present and by linkages between the characters in their inheritance, it has been shown that these nine types are determined by genes located in the 11-12 chromosome and at least eight of them in the .12 half. It has been further possible by these methods to establish the approximate order and position of these genes within the chromosome.

### The Lewiston-Auburn, Maine Earthquake of March 8, 1942

This earthquake has been investigated by William H. Weeks, S.J., of the Observatory of Weston College, Massachusetts (*Earthquake Notes*, 14, No. 4; April 1942). The data used were the seismograms obtained at the observatory at Weston College, together with the returned questionnaire cards supplied by the United States Coast and Geodetic Survey, with which the epicentral region was canvassed. At Lewiston, near to which the greatest intensity was attained, small objects and vases were overturned and a few dishes broken. This indicates intensity IV on the Rossi-Forel scale. The sound which accompanied the earthquake was like "snow falling from a roof". The shock was registered on the seismograms at Weston at 23h. 38m. 32s. U.T. and appeared to come from an epicentre some 128 miles north-east by north of Weston. From all the data the epicentre appears to have been near latitude 44° 10' N., longitude 70° 14' W., which is about nine miles north-west of Lewiston, and the origin time 23h. 37m. 59s. U.T. Captain Heck notes that this district had not been entirely free from earthquakes during the last three hundred years, and that an earthquake disturbed approximately the same area on February 5, 1929.

### Order in the Alloy $\text{Cu}_3\text{Au}$

ELECTRON diffraction by the transmission method has been applied by L. H. Germer, F. E. Haworth and J. J. Lander (*Phys. Rev.*, 61, 614; 1942) to investigate superstructure as produced in the alloy  $\text{Cu}_3\text{Au}$  by various heat treatments. One of the purposes of the work was to extend the field of usefulness of electron diffraction by applying it to material which has been studied for many years by means of X-rays. The customary limitation of electron diffraction to the study of surface phenomena only is believed to be unjustified.  $\text{Cu}_3\text{Au}$  was chosen because it still presents unsolved problems in spite of many years study, because in the superlattice which is formed the copper and gold atoms can readily be distinguished by their widely different scattering powers and because the alloy is fairly resistant to corrosion. The changes up to 560° C. have been studied in detail. There seems to be no sudden change in the diffraction pattern corresponding to the alleged Curie point of order. The methods developed in the research are suggested as applicable to other alloys and to mixtures of metal salts.

### Active Nitrogen

Two more papers in the series by Lord Rayleigh on active nitrogen have appeared (*Proc. Roy. Soc., A*, 180, 123 and 140; 1942). From the experiments reported in the first paper, it is clear that the behaviour of the glass walls is very complex. Traces of oxygen or other impurities affect primarily the walls of the vessel and not the phenomena in the gas space. By a special device it is shown that when the behaviour of the gas is studied away from any surface, purest nitrogen is the best, and no favourable effect in promoting the active nitrogen phenomena is produced by adding a trace of oxygen. The second paper deals with the ionization associated with after-glowing nitrogen. It is found that this ionization is completely cut off if the testing vessel is separated from the after-glow by a silica wall. The ionization cannot therefore be directly produced by light within the range from  $\lambda 1850$  to the visible. No increased current is observed when the surface action of the active gas is so vigorous as to make the testing cathode, of gold, red hot.

### Stress Systems in Aeolotropic Plates

THE stress distributors in an infinite plate containing a circular hole are greatly modified when the plate is no longer isotropic. A. E. Green continues the theoretical solution of such problems as may arise when a rivet is driven into a hole and pulled sideways (*Proc. Roy. Soc., A*, 180, 173; 1942). The aeolotropic plate is assumed to have two mutually perpendicular directions of symmetry. Some examples of stress distributions are included which have non-zero force resultants on the edge of the hole, corresponding to cases in isotropic materials for which the solution is dependent on Poisson's ratio. The use of the complex variable makes the method of solution comparatively simple, and as an introduction to the work for an aeolotropic material the same method is applied to problems of stresses in an isotropic plate containing a circular hole in order to obtain results which Bicksley (*Phil. Trans., A*, 227, 383) previously found by another method. Numerical work is carried out using the elastic constants found in experiments with specimens cut from the highly aeolotropic materials, spruce and oak.