

RESEARCH ITEMS

The European Earwig in America

IN Technical Bulletin 766 (1941) issued by the U.S. Department of Agriculture a very full account is given of this insect and of methods for its control. The authors, S. E. Crumb, P. M. Eide and A. E. Bonn, describe in the first place its distribution, where it occurs on both the eastern and western sides of North America. It appears to have been first noticed in Rhode Island, in the west, in 1911 and, in the east, at Seattle in 1907. It has also become established in British Columbia, where it was first noted in 1919. The survival and abundance of the insect are dependent mainly on the amount of desiccation to which it is subjected, it being best adapted to cool latitudes. It is omnivorous, but prefers the lower plants (algæ, lichens, etc.) to most of the higher types of vegetation. The eggs are deposited in cells in the soil in January and February and the adults begin to appear in July. A proportion of the females re-enter the soil in about May and deposit a second batch of eggs. The female watches over the eggs and first instar nymphs and will fight savagely in their protection. The earwig rarely flies, but the authors state that they have noticed as many as twenty flights in one day. Although so pronouncedly nocturnal in many of its habits, it seems to fly mostly in bright warm sunshine. It is considered that the best method of repressing this insect is by means of poisoned baits. The one found most successful on a large scale consists of a mixture of wheat bran, twelve parts by weight and one part each of sodium fluosilicate, and fish oil.

Beetles of the Family Lathridiidae

DR. H. E. HINTON of the Department of Entomology, British Museum (Nat. Hist.), has contributed an article (*Bull. Ent. Res.*, November, pp. 191-247) on Lathridiid beetles of economic importance. Altogether about thirty species of this family have been recorded among stored food products or have occurred in warehouses, granaries or mills. Among these, ten species have not hitherto been recorded from Britain. Under each species are given summaries of its distribution, life-history and the literature relating thereto. Also, for the first time, complete life-histories of five species have been worked out, and the larval and pupal stages are carefully figured. The family as a whole comprises about 520 species, all small (1-3 mm. long) and they, together with their larvæ, are found in mouldy plant and animal substances, in mycetozoa and fungi, in vegetable detritus, under bark and stones and sometimes in ant and termite nests. Both stages apparently only feed on mycetozoa and fungi, particularly moulds. It appears that none of the species dealt with is responsible for any direct injury to food, since they are exclusively fungus feeders. When present in considerable numbers, they may cause a certain amount of damage by fouling food substances with their faeces. Since they are able to transmit moulds to uncontaminated foods, they may in this way entail losses. Control measures comprise drying, heating, or fumigation. Any measures that will eliminate fungi will also be effective in getting rid of Lathridiid beetles.

Somatoplastic Sterility

R. A. Brink and D. C. Cooper (*Genetics*, 26, 487-505; 1941) have studied the development of seeds in the cross *Nicotiana rustica* × *N. tabacum*, which

rarely produces viable seeds, and in *N. rustica* × *N. glutinosa*, in which no viable seed is produced. They find that endosperm growth is retarded, hyperplasia of the nucellus occurs, and the cells of the integument between the apex of the vascular bundle and the chalazal pocket do not differentiate into conducting tissue. Where the endosperm and the embryo do grow in the first cross, it is found that they grow at the expense of the neighbouring integumental cells, which are thereby depleted of their contents. The authors consider that this somatoplastic sterility is of widespread occurrence in economic plants such as apples, pears, or seedless fruits, and is of great importance in regard to such phenomena as June-drop, poor cropping and varietal differences in fertility.

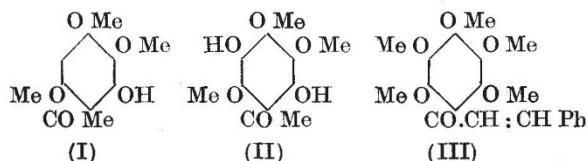
Chromosome Homologies in the Genus *Drosophila*

THE result of the intensive experimental work of the last twenty years is bearing fruit in providing an insight into the genetical composition of the chromosomes of the various species of *Drosophila*. In an important paper, A. H. Sturtevant and F. Novitski (*Genetics*, 26, 506-517; 1941) have summarized the facts from more than thirteen species of *Drosophila*. Taking the arm from the centromere to the end of the chromosome as the unit or element, it is shown that the six arms of the chromosomes of *D. melanogaster* retain their genetical identity in the remaining species. Within each element the sequence of the genes is dissimilar between the species, and it is shown that the different sequences of the genes in *D. melanogaster* and *D. pseudo-obscura* are not more alike than would result from chance. Few or no translocations have become established in these two sub-genera. A change in chromosome number would appear to occur by a special type of translocation within the heterochromatin area near the centromeres. This would more likely decrease chromosome number; hence *D. virilis*, in which the six elements are separate, is taken as the most primitive. The higher Diptera have six chromosomes. Whether these are identical with the *Drosophila* elements is unknown, but the integrity of the elements must break down in the more distantly related Diptera species.

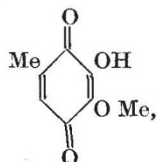
Derivatives of Pentahydroxybenzene

THERE has been an increasing interest in naturally occurring derivatives of pentahydroxybenzene, and these (calycopterin or thapsin, nobiletin, spinulosin, erianthin and pedicin and closely related compounds) are mentioned by W. Baker (*J. Chem. Soc.*, 662; 1941), who reviews recorded syntheses of pentahydroxybenzene derivatives and describes some very simple syntheses starting from pyrogallol, as a result of which, for the first time, some of these substances may now be very readily prepared. The pyrogallol was converted into 1:2:3:5-tetramethoxybenzene from which pentamethoxybenzene can be prepared by way of two intermediates. The synthetic methods make use in the final stage of the oxidation of *o*-hydroxytrimethoxyacetophenones by alkaline hydrogen peroxide to give dihydroxytrimethoxybenzenes. The catechol derivative is oxidized by aqueous ferric chloride to the quinone, various derivatives of which are described. The compound is oxidized by alkaline potassium persulphate to the pentahydroxyacetophenone derivative (II), from which the naturally occurring chalkone pedicellin (III) is synthesized. Pentamethoxybenzene, by the action of acetyl and

aluminium chlorides in ether, gives hydroxypenta-methoxy acetophenone, from which (see *NATURE*, Jan. 10, p. 52) hexamethoxybenzene can readily be obtained.



A synthesis of the mould metabolic product fumigatin, 3-hydroxy-4-methoxy-2 : 5-toluquinone,



a derivative of tetrahydroxybenzene, is also described by W. Baker and H. Raistrick (*J. Chem. Soc.*, 670; 1941).

Preparation of Deuterium Compounds

SOME experiments on the preparation of tetra-deuteroethylene $D_2C:CD_2$ are described by C. L. Wilson and A. W. Wylie (*J. Chem. Soc.*, 598; 1941). This substance has been prepared before, for example, by introducing deuterium into the ethylene molecule by exchange in presence of a nickel or platinum catalyst and by the combination of deuterioacetylene and deuterium bromide under the influence of ultraviolet light, followed by the removal of bromine from the resulting dibromoethanes by zinc. The present authors find that a mixture of isomeric dibromo-tetradeteroethanes containing about 10 per cent of ethylidene dibromide is formed by passing deuterium bromide (an apparatus for preparing which from bromine and electrolytic deuterium is described) and dideuteroacetylene over a prepared charcoal catalyst at 180° . The best sample contained 99.7 atom per cent of deuterium. The isotopic analysis was made by burning a mixture of the sample with highly purified ordinary ethylene dibromide by passing in a stream of dry air over red-hot copper oxide, purifying the combustion water, determining its density, and calculating the deuterium content by a formula. The reaction with zinc of the mixed deuterobromides in solution in purified dioxane to which one drop of deuterium oxide had been added was the method used for the preparation of tetradeteroethylene, by reaction of which with bromine pure tetradeteroethylene dibromide was obtained.

Comet Positions by Cross-bar Micrometer

W. T. HAY has described his home-made micrometer specially used for the determination of comet positions (*J. Brit. Astro. Assoc.*, 52, 1; 1941). The cross-bar micrometer consists of two metal wires (in the present case 10-amp. tinned copper fuse wire) set at an angle of 90° to one another and crossing in the middle of the field. A third wire bisects two of the right angles thus formed, and it is used for setting the micrometer in its correct position; this is attained by setting the third wire parallel to the celestial equator, so that a star will move along it when the telescope is moved in right ascension. When a comet and a star have been located in the same field, the driving clock of the telescope is stopped, allowing

the two objects, which should be north and south of the field, to drift across the field of view. The difference between the mean of the times when the star crosses the wires, say, north of the field, and when the comet crosses the other two wires on the south of the field, gives the difference in right ascension in mean time seconds, which is then reduced to sidereal seconds. Half the sum of the times required by each object to cross its wires, reduced to sidereal seconds, multiplied by 15 times the cosine of the declination, gives the difference of declination in seconds of arc. In a separate paper Hay gives the results of nine observations of Comet van Gent, and from these Davidson and Sumner computed an orbit (see *NATURE*, 148, 562; 1941) which is slightly hyperbolic.

Leander McCormick Proper Motions

A. ALI has published (*Mon. Not. Roy. Astro. Soc.*, 101, 7; 1941) the result of the preliminary work done in connexion with the study of proper motions of the faint stars in the *Publications of the Leander McCormick Observatory*, 5, 11 (1937), on the basis of the two-streams theory. Three groups, which included about 2,100 stars, were selected sufficiently far apart from each other to give a fair idea of the preferential motions. As the form of the frequency curve was found to be very sensitive with regard to the position of the absolute origin in each region, three "absolute" origins were employed in each region, their respective frequency curves being obtained. A description is given of the method for determining the three absolute origins, and three figures show the frequency curves for Group 21 and Regions 276 and 295 included in it. The frequency curves, generally speaking, are distorted by considerable irregularities, and it is difficult to analyse them by Eddington's 'trial and error' method. Indeed, the absolute origin is indeterminate, indicating the presence of systematic or relatively large accidental errors, and it is suggested that a systematic error may exist in all the galactic regions in the McCormick memoir.

Interstellar Lines in the Laboratory

THREE sharp interstellar lines at 4232.6, 3957.7 and 3745.3 Å., which had not hitherto been identified, have been reproduced by A. E. Douglas and G. Herzberg (*Astrophys. J.*, 94, 381; 1941) in a discharge through helium containing a trace of benzene vapour. They are the $R(0)$ lines of three bands, with heads at 4225.3, 3954.0 and 3743.4 Å. respectively, each of which consists of three singlet branches corresponding to a ${}^1\Pi - {}^1\Sigma$ transition. The laboratory and interstellar wave-lengths are in agreement to 0.03 Å. The only lines of these bands which would be expected in interstellar space are those coming from the lowest rotational level of the lower state, which are just the ones observed. Since the molecule BH has a ${}^1\Pi - {}^1\Sigma$ system with a (0,0) band in this region, and since the rotational constant in the lower state of the new bands is close to that for CH, the isoelectronic CH^+ is suggested as the emitter. This suggestion is strengthened by the fact that the other neutral and singly ionized hydrides of the second period of the periodic system are all well known except for three, which in any case cannot have singlet bands. The presence of CH^+ in interstellar space, as well as the neutral molecule CH discovered some months ago, seems thus to be established.