

## Insect development

A symposium on Insect Development was held by the Royal Entomological Society in London on September 18–19.

from our *Insect Physiology Correspondent*

THE biennial symposia organised by the Royal Entomological Society of London, which have now been running for fifteen years, are unusual in that their purpose is primarily educational: to provide an opportunity for entomologists to learn in comparatively simple terms, from researchers at the fringes of knowledge, what is going on in a given field of study. The latest symposium was organised by P. A. Lawrence around the topic of the genesis of pattern development at all stages from egg to adult. Of the twelve contributors more than half came from overseas. The meeting, with an attendance not far short of 200, attracted students of growth outside the insect world and they were gratified to learn that insect development was nothing like so mosaical as they appear to have believed.

H. A. Schneiderman (University of California, Irvine) gave a general survey of the wide range of work going on in the experimental analysis of determination in the cortical cytoplasm and in the imaginal disks of *Drosophila*. He did not carry all the audience with him in his distinction between 'specification' for cell commitments which are hereditary and 'determination' for commitments which are non-hereditary. K. Sander (University of Freiburg) provided an introduction to insect embryology with emphasis on the nature of movements in the embryo. Evidence from exceptionally clear time-lapse photography indicates that the centrifugal movements of the nuclei at cleavage are effected by tension generated by fibrils of the nuclear asters extending to the cortex; and that the later invaginations result from tension on the blastoderm by cells in the yolk. Using a somewhat different terminology from Schneiderman, K. Kalthoff (University of Freiburg) spoke of cell determination and differentiation, but of pattern specification and realisation. Recent work by the Freiburg group has tended to support a gradient model of determination in the cortical plasma of *Drosophila*, with some evidence that masked messenger RNA may be the chemical agent. But a generalised interpretation of these observations suggested a temporal progression from a gradient state to a mosaic state, the timing varying in different insects and

being most precocious in the highly evolved forms. This sounded very much like a modernised expression of the Seidel view of things. K. Illmensee (Institute for Cancer Research, Philadelphia) had shown that genetically labelled cleavage nuclei and blastoderm nuclei from all parts of the *Drosophila* egg could contribute to any somatic structures and even to the germ line, and that the cytoplasm of the oosome could induce germ cells elsewhere.

Turning to the imaginal disks of *Drosophila*, W. Gehring (University of Basel) described the results of injection of dispersions of genetically labelled cells into wild type hosts, and their ultimate differentiation. Whereas there was already some determination at the two ends of the germ band, at the imaginal disk stage the cells were biochemically distinct. This was well seen in the aldehyde oxidase activity acquired by the antennal disk as contrasted with the wholly negative eye disk. R. Nöthiger (University of Zurich) illustrated the immense value of clonal analysis in the study of imaginal disks. Mutants induced by X-irradiation, followed by mitotic recombination, at different points in development, can demonstrate the

timing of decision taking, and the stability of the resulting determination. J. R. S. Whittle (University of Sussex) emphasised the caution needed in the use of mutants in morphogenetic studies where, for example, biochemical abnormalities could provoke pleiotropic defects in growth. P. A. Lawrence (University of Cambridge) described the important results of Garcia-Bellido and his colleagues in Madrid in the definition of 'compartments' of the integument derived from the lineage of single cells or groups of cells and visualised by X-ray-induced mitotic recombination. Even when using such mutant cells in a polyclone which far outgrows the surrounding cells, the mutant cells never intrude beyond the compartment boundary—such as exists in the longitudinal mid-line of the *Drosophila* wing or at the intersegmental boundary of the *Oncopeltus* abdomen. Recent evidence obtained in Cambridge has made clear that this remarkable restriction depends on a failure of mutual intercellular adhesion with cells outside the compartment, a property carried by special genes. The results of further studies of the significance of this new genetic unit of development will be awaited with great interest. □

## Plant collections and conservation

Recommendations for the preservation of endangered plants have come from an international conference held at the Royal Botanic Gardens, Kew on September 2–6. Participants from 28 countries, meeting to consider the function of living plant collections in conservation and related research and public education, produced some resolutions calling for early action.

They include the following:

- A worldwide network of nature reserves and gardens oriented towards conservation should be established, and institutions in temperate countries should provide technical aid and personnel through the auspices of the International Union for Conservation of Nature and Natural Resources.
- Special attention should be given to the conservation of threatened floras of islands and areas with Mediterranean and similar climates, where many endemic species are endangered by human activities.
- Institutions with plant collections are recommended to give

priority to the local flora, so as to benefit from available specialist knowledge and to reduce the need for simulated climatic conditions. In this way institutions will be best able to advise and educate specialists and the public about the conservation of indigenous species.

- All governments are urged to ratify the Convention on International Trade in Endangered Species of Wild Fauna and Flora as soon as possible.
- Wherever possible, all living plant collections grown for conservation purposes should also be stored in the form of seeds.
- The propagation of rare and endangered species should be actively pursued by botanic gardens and other bodies maintaining living plant collections, and, when necessary, they should be supported by conservation or other appropriate organisations. Special attention should be given to economic plants and their wild relatives and to plants which may have commercial value.