

advance of the Turks—it was not re-founded until the present century. The town lies all on the slopes of a pleasant range of hills, and still has two mosques and a minaret among its architectural remains. The University consists primarily of the Faculties of Medicine and Law. Scientifically, it occupies a special position, as nearly all its professors are Academicians, and the National Academy of Sciences takes a particular interest in its progress. In the Department of Physiology, headed by Prof. E. Ernst, visitors were able to see ingenious apparatus for measurement of rapid volume changes using a piezo-electric quartz membrane, and micro-calorimeters for recording heat-production of muscles without contact between the tissue and the thermo-couples. One of the chairs of pathology is held by Prof. C. Donhoffer (a pupil of the late J. J. R. McLeod at Aberdeen); under his leadership interesting work in nutritional science is proceeding, especially on the effects of many different factors on the selection and intake of food by the rat. In the Department of Neuro-physiology (Prof. K. Lissák) much work on conditioned reflexes is under way; this was naturally of great interest to the Russian and Polish specialists. The Institute of Anatomy and Embryology, under Prof. J. Szent-Agothay, was also full of activity, mainly on three lines: neuro-hormonal correlations studied by lesions of the central nervous system; a new approach to 'neuro-taxis' in the study of the means whereby outgrowing axons find their way to their presumptive connexions in ganglia or central nervous system; and developmental neuro-anatomy. Here Dr. G. Székely has obtained results of much interest by homoplastic heterotopic eye transplantations in the newt, giving reversed reflex reactions to prey after innervation. Learning to overcome this is possible with half an eye but never with a whole one. Lastly, in the Department of Histopathology (Prof. G. Romhányi) work is well advanced on the study of artificial birefringent fibrils of polymerized deoxy-ribonucleic acid.

Throughout the conference, Magyar hospitality was at its most charming, and the visitors carried away a deep impression of the vitality of Hungarian physiology and biochemistry.

JOSEPH NEEDHAM  
DOROTHY M. NEEDHAM

## CROSSED LAMELLAR STRUCTURE IN HIGHER PLANTS

A. B. WARDROP has directed attention to the existence of crossed lamellar structures in the cell walls of higher plants, such structures having hitherto been known with certainty to occur in some green algae (*Australian J. Bot.*, 2, 2, 154; 1954). When a number of higher plants in which it was considered that this structure might be present were examined, it was demonstrated in the phloem fibres of *Vinca major* and the tracheidal elements of the aerial root of *Alstonia spathulata*. In the latter, two types of crossed structure are recognized: in one, bands of laterally associated micro-fibrils c. 0.5  $\mu$  wide intersect at variable angles, whereas, in the other, lateral association is complete, forming a crossed lamellar structure which approaches most nearly that occurring in the algae. In the outer layer of the secondary wall of wood fibres of *Eucalyptus*

*elaeophora* and *E. regnans* there is inconclusive evidence of a crossed structure similar to that observed in the cell walls of some vessels, which consists of a loosely formed meshwork of aggregates of microfibrils. This structure is considered to be distinct from the crossed lamellar and cross-banded structures. The paper is illustrated by a number of electron micrographs.

The same author has also reported on the mechanism of the surface growth involved in the differentiation of fibres and tracheids (*ibid.*, p. 165). An electron microscopic investigation was made of the differentiating xylem elements of *Pinus radiata*, *Eucalyptus elaeophora* and *Ulmus* sp. In the tips of fibres and tracheids there is a tendency for the microfibrils of cellulose to be oriented in the direction of growth. It is considered that this orientation can be disturbed by subsequent dimensional changes in the cell. The thin areas of the differentiating cells which are involved in the so-called 'mosaic growth' have been compared with the regions of the cell wall penetrated by plasmodesmata in the storage parenchyma of potato tubers. The suggestion is made that the thin areas are regions of the cell wall penetrated by plasmodesmata, or are developing primary pit fields. The implications of this concept, with respect to intercellular readjustment and to the differences between fibres and tracheids in extension growth, are discussed.

## FORESTRY IN JAMAICA

### ANNUAL REPORT FOR 1952-53

IN the annual report of the Forest Department of Jamaica for the year ending March 1953\*, allusion is made to the devastation caused by the great hurricane of 1951 and the rehabilitation work, forestry and planting carried out in 1952. Jamaica's forest policy is outlined in the report as follows: protection and development of the Island's natural forest resources, that is, existing forest reserves and future extension thereof; afforestation of suitable accessible areas with the view of increasing timber production and eventually making the Island self-supporting; encouragement of afforestation and sound forest management on private lands; and research work on silvicultural and utilization problems.

It is obvious that considerable progress has been made by the Department, as a working plan for the production reserves has been drawn up and is being worked. It provides for three working circles—plantation, improvement and natural forest. The provisions are very similar to the earlier type of working plans drawn up in India and Burma during the latter part of the nineteenth century. However, there is a serious trouble, one which was also experienced in parts of India during the early days of the Department there. The general position regarding forest reserve boundaries, says the Conservator of Forests, continues to deteriorate and is directly attributable to land hunger of an ever-increasing population. Villagers deliberately remove the boundary stones and, when prosecuted, challenge the accuracy of the original survey, thus requiring a new survey to be made. The policy of the Department is

\* Forest Department, Kingston, Jamaica, B.W.I. Annual Report for the Year ended 31st March, 1953. Pp. 12. (Kingston, Jamaica: Forest Department, 1953.)

naturally to give up any suitable land for agriculture, but such sites are now unfortunately very few and far between.

Artificial regeneration has been making considerable strides. The most popular species is mahoe (*Hibiscus elatus*); but the use of *Pinus patula* and *Eucalyptus saligna* has again been partly increased and formed approximately one-third of the area of 620 acres planted during the year. The total area of plantations formed by the Department amounts to 6,348 acres. The general planting programme has now a fairly constant pattern: above 3,000 ft. *Pinus patula* is planted on the grassland areas and *Eucalyptus saligna* on the old cultivation areas; in the middle-elevation areas, mahoe and broadleaf (*Terminalia latifolia*) are put on the sites of better soil and *Eucalyptus* species, *Pinus patula* and *Grevillea robusta* on the impoverished sites; in the coastal region mahoe is used in the drier localities and teak on alluvial flats.

## INDUSTRIAL RESEARCH ASSOCIATIONS IN GREAT BRITAIN

ADDRESSING a meeting of the Parliamentary and Scientific Committee on July 13, Mr. G. L. Bailey, immediate past chairman of the Committee of Directors of Research Associations, said that the total income of the forty-one research associations in Britain to-day amounts to about £4.5 million, of which about £3 million comes from industry. The general object of the research associations is to encourage the use of scientific knowledge by industry, including both the acquisition of scientific knowledge and its application. More money is spent on research than on its application, and in his address Mr. Bailey concerned himself mainly with what is done to secure the application of research results in industry, although he instanced the work by Dr. A. J. P. Martin and Dr. R. L. M. Synge on partition chromatography and the new anti-corrosive composition formulated by the British Iron and Steel Research Association as outstanding examples of important achievements in pure research that are to the credit of a research association; the former arose out of a search for methods of analysis suitable for elucidating the chemical composition of wool, and the latter from a long-range detailed study of the corrosion of steel and its prevention.

Much of the research programme of the associations, said Mr. Bailey, is concerned with the development of new materials for a particular purpose or of new processes, and there are also smaller investigations and those relating to methods of testing or evaluation. Apart from the issue of reports or of scientific papers, the associations usually spend 15-20 per cent of their liaison service income on consultations originating in a direct approach from a member firm or arising out of a visit by a liaison officer for a general discussion. Such liaison work, moreover, is now tending to intensify application work at the expense of long-range research generally.

Dr. S. Whitehead, the chairman of the Committee of Directors of Research Associations, who followed Mr. Bailey, referred first to co-operation with universities and technical colleges, to which institutions the research associations make grants amounting to about £80,000 annually, their policy being usually to seek to interest universities in the inadequately explored portions of fundamental science on which

industries are based. The research associations also bear much of the responsibility for scientific representation of their industries abroad, and government departments make great use of them on specialized projects. Mostly Dr. Whitehead's address was concerned with the question of development. Apart from their success in persuading individual members to undertake development, the research associations have sought to foster the group method of sharing the cost of development. During and since the Second World War the Government has successfully used the method of research or development contracts, and research associations have also found the National Research Development Corporation very helpful. The Coal Utilization and the Electrical Research Associations and the Shirley Institute, however, have also formed development companies, and this has two main advantages: the negotiation of commercial agreements and the technical problems of commercial application require a different type of staff and management; and, apart from some convenience over taxation, the development company hopes to make profits, and its finances can be more easily kept separate from that of its non-profit-making parent. Shirley Developments, Ltd., is concentrating at first on the commercial development and exploitation of instruments, devices and machines developed at the Shirley Institute, whereas Electrical Research Association Patents, Ltd., has largely confined itself to the granting of licences on important patents. Dr. Whitehead claimed that the research associations are at least as good as the best industrial research departments in the number of projects exploited, and that they are actively pursuing all the methods by which scientific discovery can be most rapidly, generally and fruitfully applied.

At the meeting, Sir Reginald Rootes limited his remarks to research in the motor industry, on the basis of which he maintained that the Motor Industry Research Association has fostered co-operation and done much to enable the British industry to keep abreast of its competitors; it provides buildings, research equipment and facilities on its proving-ground that are more comprehensive than those which individual manufacturers could afford. He also stressed the importance of adequate financial reserves and of research associations being able to plan their work for some years ahead.

## SUB-GRAIN BOUNDARY CORROSION IN HIGH-PURITY ALUMINIUM

By M. METZGER

Columbia University, New York, N.Y.

AND

J. INTRATER

College of Engineering, Rutgers University, New Brunswick, N.J.

PREVIOUS observations of the intergranular corrosion of high-purity aluminium in hydrochloric acid have involved the general high-angle grain boundaries, and only superficial attack of the low-angle and sub-grain boundaries has been noted, except after prolonged anodic treatment<sup>1</sup>. We have observed that the sub-grain boundaries (as well as the low-angle grain boundaries) of properly heat-treated specimens are particularly susceptible to