

writing room, and a 'kitchen' (making possible the serving of refreshments after public lectures, conferences, etc.) are also in this block. The four theatres themselves are windowless, relying on artificial light and mechanical ventilation.

Features of the building are that all external walls are free of pipes and other extrusions. The roofs slope downwards to the centre lines of each block, along which run a series of vertical ducts containing all rainwater, chemical waste and service pipes, together with fume cupboard and ventilation trunking. Services generally provided include gas, electricity (two- and three-phase a.c. and d.c.), hot and cold water, compressed air, and steam. Outlets for most of these are very generously distributed to ensure maximum future flexibility. Because of the height of the site, water pressure is boosted by compressed air to give a constant 20 lb. per sq. in. on the top floor.

Pleasant features of the completed building are two courtyards to the rear. Here seats have been built and enclose small plots in which shade trees are now being planted. The courtyards are paved with precast concrete slabs, and contain the only explicit luxuries in the whole scheme—two ornamental fountains, and a pair of Italian mosaic tile designs around large supporting pillars, immediately outside the lower lecture theatre block.

Tilden spoke of Liversidge's building as "serving for the present needs of the colony, though in all probability large additions will be necessary before long. About 200 students work in the laboratories . . ." The New Chemistry School in 1960 serves the present needs of some 2,500 undergraduates and about 100 staff and research students. These numbers are expected to increase rapidly; Tilden's remark may soon have to be made again.

PLANT PATHOLOGY IN THE BRITISH COMMONWEALTH

EVERY five years the Commonwealth Mycological Institute organizes a conference on plant diseases which is attended by official delegates from Commonwealth countries, observers from such bodies as the Food and Agriculture Organization, and invited visitors. Similar conferences on insect pests of plants are arranged by the Commonwealth Entomological Institute, the sister institute within the Commonwealth Agricultural Bureaux. This year the two conferences were held in succeeding weeks, and the final day of the Seventh Commonwealth Entomological Conference was devoted to two joint sessions at which agricultural entomologists and plant pathologists discussed topics of common interest. In the morning, developments in the study of plant viruses and their insect vectors with special reference to their bearing on control were considered, and in the afternoon the link between research work and its application in the field of plant protection was reviewed in a series of papers from Canada, the United Kingdom, Kenya and Nigeria.

On the evening of the same day the delegates to the two conferences attended a reception given by the Government at Lancaster House, where they were received and addressed by Lord Hailsham, Minister for Science.

The Sixth Commonwealth Mycological Conference was opened by A. Perera, of Ceylon, chairman of the Executive Council of the Commonwealth Agricultural Bureaux, at the London School of Hygiene and Tropical Medicine, on the morning of July 15, and this was followed by the first plenary session, at which J. C. F. Hopkins, director of the Commonwealth Mycological Institute, reported on the work of the Institute since the previous Conference, a period of expansion marked by the occupation in 1955 of a spacious new building, increase in staff, and an extension of the services offered to plant pathologists and others.

One duty of the delegates is always to review the working of the Institute and to make such recommendations as they may think fit for the next quinquennium. To aid them in this task, and to lay a foundation for their next day's visitation to the

Institute at Kew, the papers given during the remainder of the first day dealt largely with different aspects of the Institute's activities.

The primary function of the Institute was to provide an information service, and its main abstract journal, the *Review of Applied Mycology*, which surveys the world literature on plant pathology, is now in its thirty-ninth year. The exact size and extent of the literature of plant pathology are uncertain. The annual output is perhaps 5,000 items derived over the years from 2,000 current publications, but many of these items are popular and ephemeral. The 3,070 abstracts in the 1958 volume of the *Review* came from 530 different journals, 59 books, and 71 reports—a total of 660 publications—and an analysis of a series of volumes since 1925 suggested that while the scatter of papers is broadening more papers are being noticed from a few major journals. Similarly, the language scatter is on the increase, but while the proportion in French is definitely on the decline, that in Japanese, Chinese, and especially Russian is on the increase; the amount in English now stands at 60 per cent, to which another 10 per cent can be added for papers in languages other than English which have English summaries. With regard to types of disease, the number of papers on bacterial diseases is on the increase but their proportion (5 per cent) seems to be slightly less than it was; those on virus diseases have increased from 6 per cent in 1925 to 18 per cent in 1958. Papers on fungal infections have remained remarkably constant for the past thirty years at about 60 per cent of the total, and thus account for the importance of the Institute's identification service and the help it gives in cataloguing fungi from different parts of the world, especially the tropics. During 1958–59, some 4,000 identifications were made and the Institute's herbarium (Herb.I.M.I.) now comprises more than eighty thousand specimens. There are, however, still many taxonomic uncertainties, and M. B. Ellis, the Institute's chief mycologist, emphasized the benefits which accrue from working visits of both experienced and less experienced taxonomists to each others' herbaria. The herbarium is supplemented or com-

plemented by a collection of living cultures which constitutes the main section of the United Kingdom national collection of fungi, and the curator, H. A. Dade, indicated some of the collection's many contacts and uses. The most recent addition to the Institute's resources is a bacteriological laboratory for the study of plant pathogenic bacteria.

Two-thirds of the world's population is under-nourished. The losses of crops from disease are immense. According to E. Hainsworth, preventable losses from crop diseases in Kenya account for one-tenth of the entire agricultural output. In other words, he estimated that one quarter of this loss could be economically prevented by spraying or dusting with fungicides, one quarter by the use of disease-resistant plant varieties, and rather more than one half by the use of seed dressings and the preplanting treatment of seeds. For other diseases no control measures may be available, or the increase in costs from applying an efficacious control would not be commensurate with the increased monetary value of the crop. For example, as J. W. Blencowe and A. L. Wharton of the West African Cocoa Research Institute indicated, though the absolute loss of crop of cacao caused by black pod disease (*Phytophthora palmivora*) in southern Ghana and Ashanti is of the order of 23 and 16 per cent, respectively, and must represent a cash loss of several million pounds, the application of fungicidal sprays is not at present economically justified. The economics of control are, however, under experimental study.

Such data offered to the Conference give clues to modern trends in plant pathology. Up to the First World War may be considered to have been the age of the pathogen. Plant pathology was undertaken by mycologists. Emphasis then shifted to the diseased plant both in relation to the pathogen and the totality of the environment, physical, social, and economic. Plant pathology became a profession. In human medicine, increasing attention is being paid to public health, to the prevention rather than to the cure of disease, and it now seems that this attitude is also gaining ground among plant pathologists. It may be recalled that just over a century ago the Rev. Miles Joseph Berkeley, one of the founders of plant pathology, began his famous series of articles on vegetable pathology in the *Gardeners' Chronicle* with an account of the plant in a state of health. The wheel is turning full circle.

During three days of the reading of papers, some thirty contributions were made by nearly forty different authors on half a dozen main topics, all of current interest.

Throughout the world, and in diverse crops, root rots are being intensively studied. Losses in annual crops can be serious, but the problem of root rots in plantation crops and in forest trees is in many countries particularly acute. I. A. S. Gibson and N. A. Goodchild dealt with *Armillaria mellea* root rot of tea in Kenya, a paper by A. Riggenbach covered white root disease (caused by *Fomes lignosus*) and its control in *Hevea* rubber in Ceylon and R. A. Fox reported on the same disease in Malaya. These tropical examples were followed by a review by J. S. Murray (Forestry Commission) of the increasingly serious depredations caused by *Fomes annosus* among conifers in the United Kingdom. Two further papers, by D. A. Perry (Empire Cotton Growing Corporation) on a *Fusarium* wilt of cotton in Uganda and by C. D. Blake on a banana root rot in New South

Wales, provided interesting examples of root rot complexes in the etiology of which nematodes play an important part; successful control of the banana disease being by disinfecting planting material by hot-water treatment and planting in virgin areas or areas which have not carried bananas for at least five years. Such results, and the recognition of nematodes as vectors of some plant viruses, led to resolutions being adopted at the final plenary session for increased emphasis not only on investigations of root rots but also on studies of nematodes, and the desirability of including an introduction to nematology in the training of plant pathologists.

Seed pathology and seed-health testing were comprehensively reviewed at another session by Mary Noble (Scotland), P. Neergaard (Denmark), and J. de Tempe (Netherlands), the three authors of an annotated list of seed-borne pathogens prepared on behalf of the International Seed Testing Association and published by the Commonwealth Mycological Institute in 1958. All concerned with plant introductions are now aware of the extreme importance of being able to rely on any certificates of freedom of 'seed' from disease or disease-inducing organisms which the export or import regulations of their own or other countries may require, but much still remains to be done in devising reliable tests and in ensuring uniformity in their use. These papers and the discussion which followed resulted in another Conference resolution urging the improvement of seed certification schemes, and the production of seed in areas where the incidence of potentially dangerous seed-borne diseases is at a minimum—a resolution particularly appropriate to the eve of the forthcoming 'World Seed Year' being sponsored by the Food and Agriculture Organization.

The elucidation of epidemiological problems in connexion with plant diseases is dependent on reliable procedures for assessing their incidence, so that data obtained by different observers in different areas at different times shall be comparable. Further, rational and economical control measures are also often dependent on the forecasting of disease outbreaks. E. C. Large (United Kingdom Ministry of Agriculture's Plant Pathology Laboratory) gave a lucid survey of these aspects of the annual outbreaks of potato blight in England during the past twenty years where, due to the close co-operation between the meteorological service and the Ministry, the conditions which determine the progress and severity of potato blight are now better understood than in any other country, and regional forecasting is becoming increasingly accurate. In another interesting paper, L. Ogilvie and I. G. Thorpe (United Kingdom) outlined the co-operative investigation in Western Europe and North Africa of the annual spread of black rust of wheat (*Puccinia graminis*), outbreaks of which in the south and west of England in mid- to late summer have been shown to originate in North Africa in the early spring. At another session, breeding for rust resistance was reviewed in papers from the United Kingdom and New South Wales.

Viruses, diseases of various tropical crops, and fungicides were dealt with in a further series of papers and discussions. During the Conference a whole-day visit was made to the John Innes Institute on the occasion of the British Mycological Society's annual plant pathology field meeting, and during the week after the conference opportunities were made for the delegates to visit a number of research stations and laboratories.

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