mammal population during the past autumn. Southern also noted a very low reproductive-rate among the resident population of tawny owls on the Wytham Estate, Oxford, and there was some evidence that foxes, and also stoats, had produced smaller litters than usual this year.

Dr. N. W. Moore (Nature Conservancy) described very striking reductions in the breeding of buzzards, few birds having produced eggs in areas affected by myxomatosis; but in the areas to which the disease had not spread by spring of this year, the reproduction-rate was normal. There is also evidence that buzzards are moving about much more than previously, although spread in the range of buzzards has been taking place for some years.

Hares appear this year to be colonizing areas vacated by rabbits, and to be more frequently found in woods than hitherto; they also appear to be more abundant than in 1954, but it is too early to impute these changes to the effects of myxomatosis. The situation is also complicated by a number of introductions of hares into Cornwall, Pembrokeshire and elsewhere.

There is already good evidence of the recovery of the rabbit population in areas which were considered to be largely cleared by the disease. Southern stated that at Wytham Estate, near Oxford, only three rabbits' tracks were seen during the winter of 1954-55, whereas many thousands of rabbits were present before the onset of myxomatosis; now twenty burrows have been reopened. Similar reports came from several parts of Britain.

Dr. A. S. Thomas (Nature Conservancy) reported striking botanical changes following the great reduction of rabbits. He took photographic records of particular areas before the onset of myxomatosis, and compared these with more recent photographs. Detailed records of the changes have also been made since March 1954 along transects in ten places, mostly on declared or proposed Nature reserves on the chalk; the total length of these transects is more than 23,000 ft., and fifty point quadrats are recorded on every 100 ft. once or twice yearly. The early results of this method are very encouraging. The grasses are higher, there is much better ground cover and a greater range of species, especially of the more palatable grasses and clovers which were grazed by the rabbits. Woody plants, especially ling and gorse, which were closely grazed by rabbits, have made much growth; in the case of gorse the shoots have been up to 18 in. long in twelve months.

There has been not only marked vegetative growth, but also a wonderful show of flowers, both of the common ones like cowslip and rock rose and also of the less common orchids, which have appeared in profusion in places where they were not previously noticed, because rabbit grazing prevented flowering. One interesting result of the disappearance of rabbits has been the great profusion of ragwort in some places during the summer; the plants colonized rabbit-grazed turf, but rabbits also prevented many of them from flowering.

Many plants which have been relatively common in areas of intense rabbit infestation have owed their abundance to the fact that they are unpalatable or poisonous and could flourish when rabbits ate down and killed more palatable species. Such plants include viper's bugloss, hound's tongue, deadly nightshade, stinging nettle and elder, all of which flourished on the disturbed and manured soil around rabbit holes. It is too early to look for marked

changes in these plants; but already elder bushes are suffering in some places from the absence of rabbits, because increased stocking with cattle to utilize the increased grass has resulted in the barking and killing of elder. Increased stocking should also control the growth of other woody plants which are appearing in grassland areas now that they are no longer being eaten back by rabbits.

Mention was made by Mr. H. N. Southern (Bureau of Animal Population, Oxford) of the great increase in tree cover on the Wytham Estate, Oxford; ash and particularly oak saplings are appearing where they were scarcely seen before.

Mr. W. Ives, scientific liaison officer in London of the Commonwealth Scientific and Industrial Research Organization, Australia, spoke of the remarkable changes which have occurred in the vegetation in Australia since the rabbit population was reduced, saying that grass is now growing well in places that had been virtually desert, and that, in some areas, land capable of carrying one sheep previously now carries two cows.

KENNETH M. BACKHOUSE
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BIOCHEMICAL AND MICRO-BIOLOGICAL RESEARCH IN HUNGARY: SOME IMPRESSIONS

A GENEROUS invitation to spend three weeks this summer as guest of the Hungarian Federation of Technical and Scientific Societies (METESZ) enabled one of a party of six British and four French scientists to see something at first hand of recent academic research in biochemistry and microbiology in post-war Hungary. Damage and losses suffered during the War, the economic and social revolution and the reorganization of academic research under the aegis of the greatly enlarged and reconstituted Academy of Sciences have resulted in big changes and considerable expansion in research programmes. At the same time, they have inevitably led to many administrative difficulties, and heavier teaching responsibilities (associated with an increase of more than four-fold in the number of university students).

Academic research is also still handicapped in many parts of the country by shortage of specialized equipment. The more complicated laboratory apparatus such as high-speed centrifuges, spectrophotometers, electron microscopes, etc., is not manufactured in Hungary and has to be imported from the U.S.S.R., Germany and Czechoslovakia. This means that such instruments are only rarely available. There have also been delays and difficulties in obtaining radioisotopes, which are now, however, beginning to arrive from the Soviet Union.

Hungarian biochemistry has suffered much from the departure of Prof. A. Szent-Györgyi, together with several of his most valued younger colleagues, to the United States in 1947. This gap, however, is gradually being filled by the younger generation of biochemists led by Academician F. B. Straub (a former pupil of Szent-Györgyi), director of the Institute of Medical Chemistry in the Medical University of Budapest, and by Prof. E. Szörenyi, head of the Biochemical Institute of the Academy. Straub's department of sixteen workers is devoted primarily to a study of protein synthesis. In spite of old and unsuitable accommodation (the city was

terribly damaged during the siege early in 1945 and much rebuilding is still needed), this group has been doing important work and has recently succeeded in demonstrating the production of amylase by a mitochondrial preparation from homogenates of pig and pigeon pancreas and the formation of pepsinogen by homogenates of gastric mucous membrane. Other work includes the study of induced penicillinase synthesis by protoplasts of *Bacillus cereus* (Dr. M. Kramer) and the development of a technique of reversible 'haemolysis' of red blood cells (Dr. S. Manyay) whereby they are rendered temporarily permeable to adenosine triphosphate and other substances, without actual disruption of the cell membrane.

A group of young and enthusiastic protein chemists at the Biochemical Institute has a wide programme which includes (a) the study of scleroproteins, in particular the relationship between procollagen and collagen in mammalian skins and fish swim bladder (Dr. I. Komyat); (b) a comparative immunochemical investigation of serum albumens from horse, donkey and mule (Dr. F. Antoni); (c) an enzymological comparison of crystalline triosephosphate dehydrogenases from yeast, mammals and crustacea (Dr. P. Elödi); and (d) the specificity and speed of action of proteinases (for example, trypsin) on homologous and heterologous proteins (Mrs. G. Szabolcsi).

One of the most distinguished figures in Hungarian microbiological research is Academician G. Ivánovics, director of the Microbiological Institute in the Medical University of Szeged, who is well known to many British and American microbiologists. This University was moved from Kolozsvár when Transylvania was handed over to Roumania after the First World War. The buildings are relatively new, well designed and pleasantly situated in one main group in this attractive town of 100,000 inhabitants on the River Tisza. Prof. V. Bruckner, of Budapest, has recently succeeded in synthesizing a D-glutamic acid polypeptide, which Ivánovics has found to be chemically and immunologically similar to the polypeptide he originally isolated from the capsule of *Bacillus anthracis*. Ivánovics is also studying the properties of a high-molecular weight substance—'megacin'—isolated from *Bacillus megaterium* after ultra-violet irradiation, which appears to be a type of 'bacteriocin', specifically able to lyse cultures of *B. megaterium*. Other work in this Institute includes research on animal viruses, typing of influenza strains, etc., and some interesting studies by Dr. L. Alföldy on a bacteriophage of *Pseudomonas aeruginosa* having properties intermediate between those of a virulent and temperate phage.

Another medical university is in Debrecen—a quiet town of about the same size as Szeged 140 miles due east of Budapest, with important historical traditions (it was declared the capital of the short-lived independent Hungarian Republic during the war of liberation led by Lajos Kossuth against the Hapsburg dynasty a century ago). Its main university was founded in the fourteenth century only a few years after the University of Budapest; but most of the present buildings are comparatively new and the medical university was built during and after the First World War in a pleasantly wooded park on the outskirts of the town. It consists of well-designed separate buildings for each department and related hospital clinics, connected by a system of underground corridors. Here, in the Institute of Pharmacology under the leadership of Prof. T. Vályi-Nagy, a small

group of microbiologists is studying antibiotics. An interesting new compound—'primycin'—produced by a species of actinomyces isolated from the intestine of the wax moth, has been crystallized and found to inhibit the growth *in vitro* of both *Mycobacterium tuberculosis* and *Staphylococcus aureus* at a concentration of 0.02 $\mu\text{gm./ml.}$ It is unfortunately too toxic for general use, but some promising preliminary results are reported after local application in superficial infections. Among other work, the inhibitory action of streptomycin on growth of the organism which itself produces this antibiotic (*Streptomyces griseus*) is being studied by Dr. G. Szabó.

Back in Budapest, at the Institute of Microbiology of the Medical University, an opportunity was afforded of seeing a technically very well-produced film, shown by Drs. I. Juhász and J. Vadász, of the remarkable phenomenon of cell regeneration from an apparently acellular degenerated mass of granular protoplasm formed after treatment of a strain of *Salmonella enteritidis* with high concentrations of penicillin.

Finally, specific mention should be made of the Institute of Genetics in Budapest where, apart from other work on higher plant genetics, Prof. B. Györfy has recently established a microbiological section comprising five workers covering a wide range of subjects: (a) heterokaryosis in *Penicillium* (Dr. Igali); (b) streptomycin resistance in *Serratia marcescens*; (c) nucleic acid chemistry (Dr. Thomas); and (d) transformation, by deoxyribonucleic acid extracts, of *Rhizobium* species (Mrs. R. Balassa), using streptomycin-resistance and ability to form nodules on the alfalfa plant as genetic characters, which appear to be transmitted independently of each other. After early difficulties, not unconnected with the attitude to genetics prevailing five years ago, when Györfy's department was in danger of becoming a subsidiary section of the Agricultural University, his Institute is now being fully supported, as an independent research centre, by the Academy.

All this, of course, represents nothing more than a glimpse at some of the research work at present being done in Hungary. Although far better supported than before the War, academic research still suffers, perhaps, from the relatively greater emphasis laid on applied research—in industry and in the technical and agricultural universities. This is understandable—perhaps inevitable—in view of the determined efforts at industrialization of what was primarily an agricultural community. It shows itself, especially, in some shortages of specialized equipment and the great difficulties in obtaining technical assistants, who are attracted into industrial establishments by salaries up to twice those which they can earn in institutes of pure research (a problem not exclusive to Hungary).

Although excellent library facilities (which compare favourably in some cases with those provided in similar British research centres) have allowed Hungarian scientists to keep closely in touch with recent advances in the West, this cannot compensate for the rarity of direct personal contact. Unfortunately, during the past few years, opportunities for direct contact have been largely restricted to countries in Eastern Europe. One of the most lasting impressions obtained from this recent visit was the repeatedly expressed desire to re-establish closer contact with Western scientists. The more favourable political climate should make it easier to remove the obstacles still present (on both sides) to a freer exchange of

visits, and might perhaps even abolish some of the restrictions to normal trade relations which at present prevent the import of badly needed British scientific research equipment into Hungary. A conversation with Academician Bognár, general secretary to the Hungarian Academy of Sciences, gave grounds for hope that the Academy might actively support projects for a more liberal exchange of visits of individual scientists between Britain and Hungary in the near future.

Meanwhile, it is encouraging to learn that a party of Hungarian scientists has recently visited Britain, under the auspices of the World Federation of Scientific Workers and the British Association of Scientific Workers; and that METESZ is to repeat its group invitations (begun in 1954) to British and French scientists next year. METESZ and its hard-working and imaginative secretary (Dr. E. Valko) and assistant secretary (Mrs. Barbara Striker) are indeed to be congratulated on having taken one of the first steps to break the ice. M. R. POLLOCK

DEVELOPMENT AND WELFARE IN THE BRITISH COLONIES

THE schemes made under the Colonial Development and Welfare Acts, covering the period April 1, 1954–March 31, 1955, which are detailed in the latest return*, bring the total commitments for development and welfare schemes under the Acts to £123,402,271, and for research schemes to £12,908,139, of which £14,757,289 and £533,548, respectively, are for the year in question. Of this last sum, £133,157 is for agriculture, £83,767 for medicine, £54,413 for locust control, £47,589 for insecticides, £25,553 for social science, £9,042 for economic research, £6,795 for products research, £6,200 for fisheries and £2,250 for tsetse and trypanosomiasis.

Of the actual research schemes, £104,024 was for the establishment and maintenance for two years of the East African Scientific and Industrial Research Organization, a further £42,500 for the East African Medical Survey, £50,000 for the establishment and maintenance of the Colonial Road Research Section at the Road Research Laboratory, Harmondsworth, a further £37,750 for the maintenance of the Anti-Locust Research Centre and extra-mural activities, £31,483 for the purchase of buildings at Kavete for the East African Veterinary Research Organization, £22,329 to establish an Agricultural Research Station at Aden, £17,780 for silvicultural research in Nyasaland, a further £16,365 to maintain the Ebinu Livestock Experimental Station in British Guiana, a further £16,663 for the Desert Locust Survey and £14,390 for the maintenance of the Colonial Insecticides Research Unit at Porton.

In West Africa, £10,955 was provided for the establishment of a Standing Advisory Committee for Agricultural Research and a further £5,306 for the establishment of the West African Building Research Organization, as well as £4,500 for a social and anthropological investigation of the State of Gambia, Gold Coast. In East Africa, a further £8,100 was provided for control of coconut palm pests in

Zanzibar; in the Western Pacific, a further £6,332 for investigation of means of controlling *Amblyopelta cocophaga* and other coconut pests in the British Solomon Islands; in Sarawak, £4,300 for an investigation into the control of pepper disease; and in the West Indies, a further £4,230 for cytogenetical research on sugar cane and £6,780 for a pilot scheme for establishment of a Nutritional Research Unit in Jamaica.

Among the major development and welfare schemes of particular scientific interest are the following: in East Africa, a further £700,000 for the desert locust control campaign and £785,438 to intensify African agricultural development in Kenya during 1954–55; in Malaya, £408,250 for the construction of a road between Temerloh and Maran, linking the west and east coasts, £204,000 for the establishment of rural health centres, and £410,000 for the construction of a teachers' training college at Penang in British Guiana, and a further £72,750 for geological survey, as well as £35,000 for aerial survey and £20,833 for hydrographic and hydrological surveys. In British Honduras, a further £38,075 was provided for the artificial regeneration of pine, £29,555 for rice investigation and £45,200 for afforestation of pine savannah. Among a series of grants to the University College of the West Indies are £10,000 for the establishment of a Department of Chemical Technology and a further £10,000 for scientific equipment. £11,450 was provided for rice research in the British Solomon Islands Protectorate, and £33,500 for an aerial survey of Fiji. In West Africa, besides £99,314 for senior staff housing for the Nigerian College of Arts, Science and Technology, a further £150,000 for road development in the Cameroons and various contributions to Fourah Bay College (including £27,000 for additional laboratory and library accommodation), a supplementary contribution of £3,763,351 to the Development Plan for Nigeria includes substantial grants, distributed over all the regions, for agriculture (totalling £615,113), general education (£527,828), technical education (£455,478), forestry (£83,315), leprosy control (£217,793), medical and health (£884,909), veterinary (£125,244) and fisheries (£38,437).

ECONOMIC DEVELOPMENT OF BASUTOLAND, BECHUANALAND AND SWAZILAND

A WHITE Paper on the High Commission Territories of Basutoland, Bechuanaland and Swaziland* gives a concise picture of the economic development and social services in these three territories, to which since 1945 nearly £14,144,000 has been granted or earmarked. Of this, nearly £3½ million was from Colonial Development and Welfare Funds available for 1945–56, and a further £3 million has been allocated under the 1955 Act for the period to 1960. The Colonial Development Corporation has embarked on projects in the Bechuanaland Protectorate and in Swaziland, for which capital sanction of £7,299,000 has been given; of this amount, £4,424,000 had been spent by the end of 1954, and, according to present plans, full development of these projects may involve expendi-

* Colonial Development and Welfare Acts: Return of Schemes made under the Colonial Development and Welfare Acts by the Secretary of State for the Colonies, with the Concurrence of the Treasury, in the Period from 1st April, 1954, to 31st March, 1955. Pp. 32. (London: H.M.S.O., 1955.) 1s. 3d. net.

* High Commission Territories: Economic Development and Social Services. Pp. 20. (Cmd. 9580.) (London: H.M.S.O., 1955.) 9d. net.