insecticides in the soil and the processes of root-hair infection by nodule organisms.

Investigations in the Botany Department have shown that the higher yields of improved strains of barley and beet are not due to higher net assimilation-rates or greater leaf area but to a more effective translocation of the products of photosynthesis. It appears that the efficiency of photosynthesis cannot be significantly increased by breeding. Ecological studies of weeds have cast doubt on the efficacy of temporary leys as a means of eradicating wild oats.

The emphasis of the work of the Biochemistry Department is on the nature of enzyme action. The enzyme from bracken that destroys vitamin B has been prepared in a stable form, and its action has been studied by improved methods. Studies of tobacco mosaic virus have shown that the whole virus is not essential for infectivity, but that a low level of infectivity is associated with fragments of it. Some parts of the enzymic processes by which viruses lose their infectivity on storage in the laboratory have been examined as a preliminary to studying the mechanism of attack on susceptible hosts.

Members of the Plant Pathology Department are also studying the tobacco mosaic virus and have shown that infectivity may reside in the nucleic acid fraction and antigenic specificity in the protein. Five viruses infecting leguminous plants were identified and five more in cereals and grasses. This raises the very interesting question as to whether the beneficial effects of ploughing-up and re-seeding old leys may be partly due to the elimination of virus-infected grasses and clovers. Important work continues on sugar-beet virus and, on the mycological side of the Department, on potato blight.

The Nematology Department has paid particular attention to bud and foliar nematodes. Work is continuing, in association with the Biochemistry Department, on the hatching factors given out by potato roots, and preliminary studies have been made of the factors affecting hatching of eggs from cysts of beet eelworm and on the movement and activity of larvæ in soil.

The Insecticides Department is working on the persistence and fate of insecticides in the soil. The factors influencing the toxicity of insecticides are also receiving attention. Toxicity is, for example, influenced by temperature, and the effect of change of temperature on speed of action differs for the different insecticides. Further work has been done on the mode of action of the organo-phosphorus insecticides. It is known that they affect choline esterase, and a comprehensive study of this enzyme as it occurs in insects is being made. The effect of plant protection chemicals on beneficial insects have been further investigated and techniques devised for the diagnosis of poisoning in bees.

The Entomology Department has carried out regular surveys of Rothamsted and Woburn farms for pest insects which will be of the greatest value to those carrying out experiments in these areas. Investigations have been started of the influence of climatic factors on insects: in the field on the effect of microclimate on growth, and in the laboratory on the relation between fat metabolism and temperature. Work on the wheat bulb-fly has continued, with special attention being paid to the reaction of the larvæ to plant exudates.

In the Bee Department a very important advance has been made in the study of European foul brood. *Streptococcus pluton*, an organism suspected of causing the disease, has been isolated in pure culture, and it has been found that this organism and *Bacillus eurydice* have both to be present in a larva to cause the disease. Di-*n*-decyldimethylammonium bromide promises to be an effective control. Further studies have been made of the nature of 'queen substance'. It has been found that 'queen substance' received in regurgitated food from other workers is sufficient to inhibit development of the ovaries in the absence of a queen. It has also been shown that mammalian hormones such as androsterone, as well as extracts from queen ants, inhibit ovary development.

In the Statistics Department the electronic computor is now fully occupied, and an interesting application is the analysis of some of the very long-term experiments at Rothamsted. A useful account of the computor and its capabilities is given at the end of the report. Nation-wide surveys of fertilizer practice and cattle diseases are in progress.

Progress reports are also given by the Field Experimental Section, the farms at Rothamsted and Woburn, the Soil Survey of England and Wales and the advisor in tropical soils. The report closes with the review articles on soil structure and the electronic computor referred to above. R. M. S. Perrin

ASTRONOMY AT THE CAPE OF GOOD HOPE

THE Report of Her Majesty's Astronomer at the Cape of Good Hope to the Secretary of the Admiralty for 1956* appears under seven headings. In the first of these, "Buildings and Grounds", reference is made to the amount of maintenance work that has been carried out, with the result that the general condition of the buildings and grounds is now very satisfactory. A new building has been erected to house the Lyot heliograph, and the new 65-h.p. fire pump, mentioned in the report for 1955, was installed in January—fortunately in time to prevent large grass fires in February and March in adjoining properties from spreading into the Observatory grounds.

Under "Instruments", accounts are given of the work carried out with the reversible transit circle, the Victoria telescope, the astrographic telescope, the 18-in. reflector, the photoheliograph, and the new d.c. amplifier (No. 6) for the astrographic photometer, which was started in 1955. The first visual observations made with the 18-in. reflector showed that a number of minor modifications were necessary, and when the report was compiled it was hoped that the instrument would be brought into routine use during the first half of 1957. A third Brown recording potentiometer has been purchased for use with the instrument.

* Report of Her Majesty's Astronomer at the Cape of Good Hope to the Secretary of the Admiralty for the year 1956. Pp. 11. (Cape of Good Hope: The Observatory, 1957.)

"Observations and Reductions" includes the routine work with the reversible transit circle, with which a total of 11,801 transits were observed during the period under review, and 530 observations were also made of the Sun, Moon, the planets and Ceres and Vesta. Of the other nine sections of this programme, reference may be made to "Proper Motions", for the determination of which 68 plates were taken with the astrographic refractor. Owing to the poor condition of the axes of the telescope, which made precise guiding of long exposures very difficult, this programme was not stressed during 1956. After the renewal of the main bearings early in 1957 every effort will be made to complete this programme as quickly as possible. Among matters of interest in "The Radcliffe Section" special mention may be made of the work of Dr. D. S. Evans, who obtained measurable spectra of five regions, in *NGC* 253, using the Newtonian spectrograph. It was possible to identify the nearer edge of this extragalactic nebula and to trace out its spiral arm system, and the spectrograms show that the system is rotating with the arms trailing. It may also be mentioned that a start has been made with the production of an atlas of southern extragalactic nebulæ: this atlas will consist of enlarged prints from selected plates, each plate being accompanied by a short description.

One disconcerting feature is mentioned under "Personal Establishment", which may not, however, be confined in its implications to the southern hemisphere. Only one Observatory officer of those recruited since the War remains on the staff, most of the others having resigned at one time or another to take up more remunerative employment. H.M. Astronomer, Dr. R. H. Stoy, adds the following comment: "This once again emphasizes the many representations that have been made to the Admiralty that the conditions and prospects at present offered are completely unattractive to potential recruits".

Under "Miscellaneous", reference is made to the regular meetings of the Cape Centre of the Astronomical Society of South Africa, and on the second and fourth Saturday evenings of each month members of the Centre have been in attendance, when the weather is fine, to show members of the public celestial objects through the 6-in. telescope. These meetings have been well attended and greatly appreciated by the public.

LINNÆUS

THE Swedish Linnean Society this year celebrated its fortieth anniversary. There are twenty or so Linnean Societies (that of London being the oldest); but the Svenska Linné-Sällskapets differs from the rest in being concerned solely with Linnæus.

The Årsskrift for 1956–57 (Vols. 39–40. Pp. 198+24. Uppsala: Almqvist and Wiksells Boktrykeri *AB.*, 1957) is admirably produced. It is surprising how, year after year, a considerable volume is issued throwing further light on aspects of Linnæus's life, writings, associations and period, and this, of necessity, with little reference to the mass of material at Burlington House in London. (Incidentally, this material still needs a good deal of sorting by someone thoroughly competent in Swedish and Latin—and able to read Linnæus's writing—such as Dr. A. Hj. Uggla, secretary and editor of the Swedish Society, who has given such valuable service in this connexion.) The first paper in the present volume is "Linnæus and Cornwall" by Spencer Savage. Its title might lead one to think that Linnæus had contrived to visit the county during his short time in England in 1736, but it refers to his interest in Cornish mineralogy. W. Borlase, vicar of Ludgvan, well known for his "The Natural History of Cornwall", was asked by his friend, John Andrew, then studying medicine at Leyden, to send a "little box" of various ores and mundics apparently to gratify the curiosity of Boerhaave. The minerals sent were shown to Linnæus who, in the opinion of Boerhaave, "understands the nature of all kinds of mettals the best of any one in the World". Gronovius undertook their naming and sent a list following Linnæus's nomenclature. A further collection was forwarded, and, with their names, Gronovius sent a copy of a report he had received from Linnæus on the liquefaction of copper. (A third set of minerals was sent, after Linnæus had left Leyden, but no copy of this was found in Borlase's papers at Penzance and Truro.)

A. J. Boerman writes about Linnæus's candidature for his medical doctorate. To save both time and money, many Swedish medical students took their degree at the University of Harderwijk previous to hearing Boerhaave's lectures at Leyden. Before presenting and defending his thesis Linnæus had to show that his general medical knowledge was of the standing expected of a doctor. It is known that he had written his thesis before leaving Sweden; but the day after arriving at Harderwijk he had to prepare a manuscript for his Candidatus Medicinae. The text of what appears to be a fair copy of the Latin original (Linnean Society, London) is given and its English translation. There is certainly much still to be learned about Linnæus's activities in Holland.

The remaining eight principal papers are in Swedish. Carl-Axel Torin writes on Linnæus as 'rusthållare' in the horseguards. At that time landlords, as part of their tenure, had to procure and maintain a number of soldiers for the standing army, and provide them with a small plot of land. The archives of the regiment show that when Linnæus acquired Hammarby in 1758 he was responsible for four dragoons and their horses. During the Seven Years War two of these dragoons lost their lives and Linnæus had much difficulty in replacing them.

A long contribution by Gunnel Hazelius-Berg and Sigurd Wallin deals with Linnæus's wardrobe at Hammarby, with much contemporary allusion. It is amusing to find that the three-cornered hat, covered with pale green silk with a rose-coloured band, so often figured as his Dutch doctor's hat, is simply one of the kind received by the successful candidates for the medical doctorate at Upsala.

Nils Sylvén gives a catalogue of the plants of Linnæus's native parish, collating his data with those given by Linnæus, and Assar M. Lindberg, recording the tradition that three ecclesiastical families in Småland—Lindelius, Tiliander and Linnæus—took