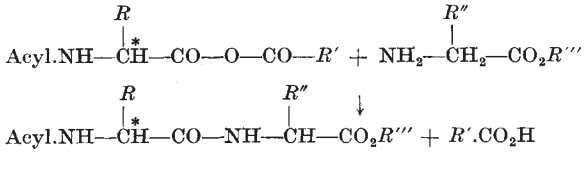
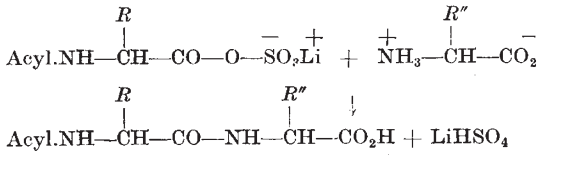
Dr. J. I. Harris (Carlsberg Laboratory, Copenhagen) read the fourth paper, describing his studies on C-terminal residue identification with carboxypeptidase. He outlined the experimental procedures and discussed the results obtained from insulin, somatotropin, α-corticotropin and tobacco mosaic virus. In general, cleavage is fastest with C-terminal aromatic amino-acids, very slow with an acidic or basic C-terminal residue and does not occur with C-terminal proline. Thus with the *B*-chain of insulin which has the terminal sequence . . . Pro.Lys.Ala., the alanine is released by carboxypeptidase, but reaction stops at that stage. With α-corticotropin, however, with the terminal sequence . . . Pro.Leu. Glu.Phe., the last three residues are split off in sequence. The summarized individual results per mole are: insulin gives one alanine and one asparagine, somatotropin, two phenylalanine; α-corticotropin, one phenylalanine, then one glutamic acid, then one leucine; tobacco mosaic virus, 2,900 + 100 threonine. The C-terminal sequences do not seem to be of critical importance for biological function. Dr. Harris, acknowledging the power of the enzymic methods, notably their very gentle experimental conditions, pointed out the need for a chemical method of study of C-terminal residues.

In the discussion, Prof. C. Fromageot (Paris) pointed out that ovomucoid is inert to carboxypeptidase but yields phenylalanine with lithium aluminium hydride. Dr. Harris felt that this must arise from some non-terminal fission. Dr. K. Schlögl advocated the Akabori hydrazine method for chemical study of C-terminal residues, to which Dr. Harris indicated the objections to a chemical method involving the complete degradation of the peptide chain.

Dr. G. W. Kenner (Cambridge) read the final paper, on mixed anhydride syntheses of peptides. He traced the development of the technique based on the reaction



from the work of Wieland, Vaughan and Boissonas ($R' = \varphi$ originally, then = Bu^i, then = OEt). There is grave danger of racemization at C* and there are difficulties in the removal of R'' (though these have been largely overcome using $R''' = CH_2\varphi$ and removing it by hydrogenolysis). To avoid these difficulties, Dr. Kenner has developed the use of mixed anhydrides of acylamino-acids and sulphuric acid, which will react, with very slight racemization, with free amino-acids and peptides in aqueous dimethylformamide solution



In the discussion, Dr. G. T. Young (Oxford), commenting on the importance of avoiding racemization, reported that, in the condensation of acetyl-L-leucine with glycine, ethyl ester configuration is retained using the Curtius azide method but lost using the Goldschmidt phosphorazo method. Prof. J. Baddiley (Newcastle upon Tyne) asked if the sulphuric anhydride method could be used to link an amino-acid to an amide NH_2 group, and to this Dr. Kenner replied that he felt it to be unlikely.

H. D. SPRINGALL

CAMBRIDGE OBSERVATORIES

REPORT FOR 1954

THE report of the Observatories Syndicate of the University of Cambridge for the year ending September 30, 1954*, is divided under the following headings: reconstruction and re-equipment; solar research; stellar photometry; other investigations; optics; buildings and grounds; lectures; and papers accepted for publication. The installation of the new 17–24-in. Schmidt telescope has been completed and tested extensively, and the original driving error—approximately a sine wave of total 6″—has been removed. The old Common 36-in. reflector has been dismantled and returned to the Science Museum, South Kensington, and the foundations for the new 36-in. reflector are ready for the telescope, which was expected to be delivered in December.

A great portion of the report dealing with solar research is devoted to the observations of the total solar eclipse of June 30, 1954, details of which have been already given in various publications. Plans were made, and preparations commenced, for observation of the total eclipse of June 20, 1955, when Dr. D. E. Blackwell will continue the work which he carried out at the 1954 eclipse—photographing the corona and zodiacal light, etc., to make accurate photometric measurements; a Sunderland flying-boat will be used, flying from the Fiji Islands over the Pacific Ocean (*Nature*, June 11, p. 1018). Prof. R. O. Redman, the director of the Observatories, and Dr. Z. Suemoto have completed the study of chromospheric line-widths, based on spectrograms obtained at the 1952 eclipse. Self-absorption and Stark effects, which are of greater importance than had been formerly supposed, having been taken into account, they have shown that the line-widths in the hydrogen Balmer series are consistent with a kinetic temperature not exceeding 10,000° K. and also that a model at 6,000° K. would represent the measures almost as well as at 10,000° K. In addition to other solar work, reference may be made to the critical examination in the 30-ft. spectrograph of two large, good-quality gratings, both with 600 lines per mm., one from Bausch and Lomb, of ruled area 20 cm. × 15 cm., and the other from the Mount Wilson Observatory, with ruled area 20 cm. × 13·7 cm.; the latter is on loan to the Observatories and "gives quite remarkable performance, theoretical resolving power being attained in the fifth order". It is to be embodied in a Babcock magnetograph for recording weak magnetic fields and Doppler effects on the sun's surface.

Under the heading of stellar photometry, it is very satisfactory to know that the Royal Astronomical Society has decided to publish in its "Memoirs" the results of the +15° Selected Areas programme of

* University of Cambridge. Report of the Observatories, for the year ending September 30, 1954. Pp. 4. (Cambridge: University Press, 1955.)

stellar photometry, thus obviating the difficulties encountered in finding the necessary funds. Investigations on the performance of the 17–24-in. Schmidt telescope, in which Prof. H. A. Brück, director of the Dunsink Observatory, co-operated by allowing the Eicher photometer to be used for measuring test plates, have shown that with a filter removing the ultra-violet below about 4000 A. star images can be measured satisfactorily to mag. 18 photographic on a 30-min. exposure (Ilford 'Zenith' plate).

Under the heading of "Other Investigations", an account is included of the test and adjustment work on the Schmidt telescope. To acquire familiarity with the instrument, a programme of photography of discrete radio sources has been undertaken, using positions provided by the Cavendish Laboratory's radio-astronomy group, and about a hundred photographs have been obtained. Up to the present, the results have not been encouraging, and it seems possible that most of these sources cannot be profitably photographed with this telescope.

In the section on optics, reference may be made to the experimental work which has been continued on the production of mirrors relatively free from thermal distortion, which would be useful for solar work, and experiments are being made with thin glass bonded with plastic glue to a mild-steel support. The assistance of the firm of Aero Research, Ltd., is acknowledged in the preparation of these disks. An investigation into the problem of assessment of optical images has been made by Dr. E. H. Linfoot and Dr. P. B. Fellgett, and a paper on the subject will appear later (*Phil. Trans. Roy. Soc.*).

During the year, twenty-four lectures on the sun were given by Prof. Redman; sixteen on optical aberration and eight on diffraction theory of the optical image by Dr. E. H. Linfoot; twenty-four on general astrophysics by Dr. D. E. Blackwell; and fifteen on elementary electronic techniques and fifteen on spherical astronomy by Mr. G. G. Yates. The Observatory Club held twelve colloquia during the year, at which the speakers included Prof. W. M. H. Greaves, Dr. J. Houtgast, Mr. G. M. Sisson and Dr. P. A. Sweet. Fifteen papers were accepted for publication in various scientific journals during the year.

MALAYAN ANNONACEAE

J. SINCLAIR has contributed to our knowledge of an important family of tropical flowering plants in his "Revision of the Malayan Annonaceae" (*Gardens' Bull.*, **14**, 2, 149; 1955; Govt. Printing Office, Singapore; 10 dollars).

The Annonaceae are confined mostly to moist tropical lowland forests, being more plentiful in the Old World than in the New. In the present revision, there are thirty-eight genera, comprising 198 native and five cultivated exotic species, making a total of 203, together with seventeen varieties.

Points of difference between the present and earlier classifications are indicated. The main taxonomic section begins with an account of the general characters of the family, including fairly comprehensive and detailed references to the main morphological characters; here special attention is paid to the petals, which are stated to be of greater diagnostic value in this family than any other organ. "They show such a wonderful diversity in size and form that it may be said the peculiarities of the family are exhibited in its petals." They are, in fact, the main basis of classification in this group of flowering plants.

Because in the Annonaceae there are orderly progressions leading from one group to another, the constituent tribes are rather ill-defined, with overlapping characters. The author has summarized the inferences of evolutionary import as follows: "There are in the family very noticeable evolutionary trends which have a bearing on classification. Since evolution proceeds neither evenly nor at the same rate, we find genera advanced in some characters and primitive with regard to others. There is a tendency to proceed from simplicity to complexity, for example, from simple petals with no distinction between blade and claw to the complex dome-shaped petals of the Mitrephoreae with their long narrow claws and united blades; from the clumsy stamen with a great deal of connective tissue to a more precise form with a filament and greater development of the pollen sacs. There is a tendency for reduction from many seeds in two rows to a single better nourished seed and also a union of parts to give more protection. The petals become united and the stamens become fewer. The greatest advance of all is where the carpels unite to form a 1-celled ovary with parietal placentation and there is thus a division of the family into two subfamilies, the Annonoideae (apocarpous forms mostly) and the Monodoroideae with a 1-celled ovary, pariental placentation and gamopetaly (Isolona and Monodora)".

GRAFTING EXPERIMENTS BETWEEN THE TOMATO VARIETIES, GOLDEN APPLE AND OXHEART

By A. J. BATEMAN*

Cytogenetics Laboratory, Christie Hospital and Holt Radium Institute, Manchester 20

IN a recent issue of *Nature*[1], reference was made to tomato-grafting experiments by Dr. L. Felföldy of Hungary, whose results have been published in English[2]. A special feature of the work was that spectacular results had been obtained with the varieties Golden Apple and Oxheart, which are known in Britain. In repeating this experiment, a closer parallel than hitherto should have been possible between Michurinist and Western experimenters. In a letter to Dr. Felföldy, I expressed my desire to repeat his work, whereupon I received seed of his own stocks. It is this identity of experimental material which emboldens me to publish one more set of results in addition to what has already appeared[3]. The work was carried out while I was on the staff of the John Innes Horticultural Institution, Bayfordbury.

Golden Apple has medium-sized, round, bilocular, yellow-fleshed, yellow-skinned fruits on simple inflorescences. Oxheart has very large, inverted pear-shaped, multilocular, red-fleshed, white-skinned fruits on branched inflorescences.

Felföldy describes his technique as follows: "The upper parts [of the tomato plants] were interchanged".

* British Empire Cancer Campaign Research Fellow.