

conducted at the Welsh plant-breeding station are primarily intended to be of service to agriculturists in Wales, and are therefore bound to be of equal value to farmers generally in elevated areas in regions of high rainfall.

The chief aim of the station is to investigate problems connected with herbage plants with the view of producing improved strains of such important plants as red clover, lucerne, the rye grasses, cocksfoot, and all other grasses suitable for inclusion in mixtures for temporary and long-duration pastures. Researches on these lines are now well advanced, interesting reports having been issued from the station on the work so far conducted. The oat crop is also re-

ceiving detailed attention; the possibility of extending the practice of growing winter oats is being explored, and endeavour is being made to produce hardier, earlier, and stiffer-strawed varieties suitable to Welsh conditions. It should be stated that the potato, barley, and root crops are not being studied at the station.

Welsh agriculturists must not expect to see the full benefits from Sir Laurence Philipps's foresight and the developments that have followed from the foundation of the station until after the lapse of a number of years—for plant-breeding is a slow and laborious business based on the gradual building up of strains each of which can only be the outcome of prolonged investigation.

The Royal Observatory, Greenwich.

THE report of the Astronomer Royal presented at the annual visitation of the Royal Observatory, Greenwich, on June 3, deals with the year ended on May 10. The observations for the seven-year star catalogue, 1915-1921, have been concluded, practically all the stars having been observed at least seven times; they include all stars in the Backlund-Hough list north of declination -28° . The determination of their proper motions is now in progress. The working catalogue in use since January last includes all the stars brighter than the eighth magnitude (with some fainter ones in sparse regions) between North Decl. 32° and 64° . It will be remembered that the zones from N. 24° to N. 32° and from N. 64° to N. 90° were covered in recent Greenwich catalogues. The epoch 1925 is adopted for all catalogues about the present time, in accordance with a resolution of the Astronomical Union.

A change has been made in the method of determining azimuth error of the transit-circle. Formerly it depended upon observations of the nine standard polars within $3\frac{1}{2}^\circ$ of the pole; a list has now been made of 70 stars the polar distances of which lie between 13° and 45° , most of them bright enough to be observed in daylight; as many of these as practicable are observed daily at both culminations, using the travelling-wire micrometer, thus greatly reducing the personality that was present in the previous method of hand-tapping used for the close polars. The latter stars will still be observed for place; their positions will no longer depend solely on double transits of Polaris, which were only obtainable for restricted periods of the year. The clock-star list has been modified by removing two very low stars and inserting eleven new ones to fill gaps.

The moon was observed on 126 nights; the average correction required to the Nautical Almanac value of the longitude is $13.38''$. After the end of 1922 Brown's tables will be used in the Almanac, and there will be a discontinuity in the errors.

Eighteen consecutive divisions of the transit circle, covering an arc of $1\frac{1}{2}^\circ$, have been obliterated from some unknown cause in recent years; new divisions have recently been cut with a small steel scriber that was screwed to the bracket holding the pointer. The new divisions are very sharp, and the errors of graduation are very small.

The distribution of temperature in the neighbourhood of the instrument has been studied; thermometers are now read outside both the north and the south walls of the observing room; they frequently show differences of some degrees, depending apparently on the direction of the wind; it is therefore somewhat difficult to know what temperature should be employed when computing refraction.

The recently published volumes dealing with the results of the observations made with the Cookson

floating telescope between 1911 and 1918, and with the observations and orbits of the double stars observed with the 28-inch refractor since 1892, have already been noticed in NATURE. The latter observations are being continued, 253 pairs having been measured during the year, of which 56 had separations less than $0.5''$.

The Thompson equatorial has been used, as before, for the photographic determination of stellar parallaxes. In all, 896 plates have been measured during the year, and the parallaxes of 48 stars deduced, with a mean probable error of $0.009''$; altogether 142 parallaxes have now been determined with this instrument.

The 30-inch reflector has been used for a photographic determination of the wave-lengths of maximum photographic intensity in stars of different colours. A grating of steel wire, 1.42 mm. in diameter, was used to produce diffraction images, the effective wave-length being found from the separation of images; the results, which were communicated to the Royal Astronomical Society, indicate that the graph connecting wave-length with spectral type is distinctly non-linear. An extension of this work, suggested by Prof. T. R. Merton, is now being commenced. A 7-inch prism has been borrowed from the joint permanent Eclipse Committee; this will be mounted in front of the 6-inch Franklin-Adams lens, for which an aluminium camera has been made; a coarse wire-grating will be placed in front of the prism.

The astrographic equatorial was used to complete the magnitude determination of stars in the Harvard polar sequence. The results, which are in good accord with those obtained at Mt. Wilson, were published in the Mon. Not. R.A.S. of last November. The instrument has now been taken to Christmas Island for the eclipse of next September. The latest report stated that the mounting had been set up, except part of the driving clock. It has been arranged to take photographs of the Kapteyn areas in zones 15° N., 15° S., and 30° S. in order to connect the northern and southern magnitude scales.

Sunspot activity declined considerably during the year; there were, however, some prominent groups, of which the largest two crossed the central meridian on 1921, May 14, and 1922, March 2.

The mean values of the magnetic elements for 1921 and the three previous years were as follows:

	Dec. W.	Hor. Force. (C.G.S.Units.)	Vert. Force. (C.G.S. Units.)	Dip.
1918	$14^\circ 27.8'$	0.18464	0.43247	$66^\circ 52.8'$
1919	$18.2'$	0.18454	0.43242	$53.3'$
1920	$8.6'$	0.18456	0.43192	$51.8'$
1921	$13^\circ 57.6'$	0.18449	0.43183*	52.0^*

* Denotes that these values are provisional.

The mean temperature for the year ended on April 30 was 50.9° F., or 1.4° above the average. October was 6.3° above the average, the warmest October for 80 years. The rainfall was 16.49 in., or 7.75 in. below the average.

Wireless time signals from Eiffel Tower, Nauen, Bordeaux, Lyons, and Moscow are recorded on a syphon recorder; a special series of rhythmic signals from Lyons, for longitude purposes, was observed between June 20 and July 12.

The Carnegie Trust and Scientific Research.

THE twentieth annual report (1920-21) of the Carnegie Trust for the Universities of Scotland contains several points of interest. In relation to scientific training and research there are three important matters to distinguish, namely, buildings and equipment; scholarships and fellowships; and part-time research assistants and lecturers. This last is a new feature of the research scheme and is to be commended as combining facility for research with experience in teaching.

So far there are thirteen of these combined posts in the four universities of Scotland and all in the departments of chemistry and physics. They are covered by an annual outlay of 3600*l.* Of the 14,419*l.* awarded to the four universities for research fellowships, scholarships and grants, nearly half is given to history, the remainder being fairly well distributed among the departments of physics, chemistry, natural history, and medicine. Of this sum 26 per cent. goes to St. Andrews, 16 per cent. to Glasgow, 15 per cent. to Aberdeen, and 43 per cent. to Edinburgh. Thus Edinburgh distinctly leads in research; but activity is specially noteworthy in St. Andrews, which, as regards the number of students in attendance, is much the weakest of the four.

As is natural, the conditions of tenure of scholarships and fellowships, which cannot be held with other remunerative appointments, lead to many resignations in the course of the year, so that of the sum initially awarded only a total of 8123*l.* has been expended. From the point of view of research this is to be regretted. The further development of the part-time assistantship scheme may in future supply a remedy.

Under the quinquennial distribution, the schemes of the universities and other institutes of learning include buildings, equipment, libraries, and endowments of chairs and lectureships. These require on the average 50,000*l.* per annum; and of this sum 72 per cent. is devoted to buildings. For new buildings in the Faculty of Arts and the Department of Zoology, Glasgow University has appropriated 91 per cent. of its share; and the new King's buildings for chemistry are absorbing 81 per cent. of Edinburgh's share. The ultimate influence of these developments on scientific research will no doubt be great; the more immediate effect will be a demand for increase of staff and a corresponding increased expenditure in the teaching of science.

Of the 65,000*l.* expended under what is known as Clause A, nearly 13,000*l.* is devoted directly to individual research; while of the remainder by far the greater part is being used for providing suitable laboratories, for extending libraries, for endowing chairs and lectureships, and for helping in the publication of books and memoirs, the influence of which on scientific progress cannot be over-estimated. In these respects the Carnegie Trust for the Universities of Scotland seems to be fulfilling admirably its high function in the advancement of science.

University and Educational Intelligence.

CAMBRIDGE.—Dr. Roderick, Emmanuel College, has been reappointed demonstrator in surgery, and Mr. E. A. Milne, Trinity College, has been appointed University lecturer in astrophysics. A grant of 50*l.* from the Worts Fund is to be made to Mr. J. L. Evans, St. John's College, towards the expenses of a journey to make researches on the economic conditions of south, central, and south-eastern Europe since the treaties of peace, and on the question of the protection of minorities under the various treaties in the same region.

It is proposed to confer Honorary Degrees on H.R.H. the Duke of Aosta, K.G., and on Col. Sir Gerald Lenox-Conyngham.

The Statute giving the University power to confer by diploma titles of degrees upon women students of a recognised institution has now been approved by His Majesty the King in Council. The University now has power to name the recognised institutions and to lay down the conditions under which students of these institutions may qualify for these titles. It may admit members of such institutions to instruction in the University as well as to the use of its libraries, laboratories, and museums, in such numbers and on such conditions as it may determine. It may allow past residence kept and examinations passed by students of Girton College or of Newnham College as partial or complete qualification for titles of degrees.

Thus after four years of struggle does the University yield what the supporters of women's higher education asked twenty-five years ago, and one is tempted to wonder what the next twenty-five years will bring, and how long it will be before the next step in this old controversy will be taken.

Col. Sir Gerald Lenox-Conyngham, Trinity College, has been appointed reader in geodesy, and Mr. W. Dawson, Gonville and Caius College, has been reappointed reader in forestry. Mr. C. Fox, Christ's College, has been re-appointed principal of the Cambridge University Training College for Schoolmasters.

Sir Ernest Moir has offered to endow a prize in the Engineering Department in memory of his son, Rex Moir, Gonville and Caius College, who was killed in the war. This offer has been accepted.

EDINBURGH.—On Thursday, June 8, Prof. T. H. Morgan, professor of experimental zoology in Columbia University, New York, delivered a lecture in the Natural History Theatre of the University of Edinburgh to a large audience of the staff and students on "Old and New Ideas about Heredity." The vice-chancellor, Sir Alfred Ewing, presided. Prof. Morgan gave an account of the more recent developments of the work on inheritance in *Drosophila* which is being carried on in his laboratory. After showing that the facts of inheritance lead to the conclusion that the Mendelian characters are carried by the chromosomes and that the hereditary factors or genes are arranged in a linear series in each chromosome, he discussed briefly the evidence available for forming a rough estimate of the upper limits of size of the factors. At the close of the lecture the dean of the faculty of law presented Prof. Morgan to the vice-chancellor for the honorary degree of LL.D. The dean remarked that the ceremony was reminiscent of the graduation proceedings of an older time when the candidate for university honours was required to maintain against all comers a thesis upon some abstruse subject of his choice, and he thought the audience would agree that Prof. Morgan's treatment