

twelve wedges of *lignum vitæ* were inserted symmetrically round the mirror, and appear to have eliminated the slight movement.

Fifty-five photographs of the sixth, and eleven photographs of the seventh, satellite of Jupiter were secured with the 30-inch reflector, together with 170 photographs of minor planets and comets and twelve of various nebulae. Of the latter, that of M₃₁ (Andromeda) and one of the Ring Nebula in Lyra are especially good.

The discussion of the photographs of Eros taken during the opposition of 1900-1 was completed, and a value for the solar parallax, in close agreement with the previously accepted value, was deduced.

With the astrographic telescope 188 supplementary photographs were taken, and 133 of them were passed as satisfactory. Positive copies of the plates covering zones 71°-74° are now completed, and of the 461 chart plates necessary to cover the remaining zones, 75° to the pole, seventy-five have to be repeated for the purpose of reproduction. Vol. ii. of the Greenwich Astrographic Catalogue is now complete, except for the introduction, which will contain the constants for the plates, and these have now been computed. For the area included in zone 81° (from 6h. to 24h.) and the zones 82° to the pole, viz. 254.7 square degrees, the 40m. exposure plates show 75,683 star images, or 297.2 per square degree; in the B.D. the corresponding area (1°) includes 15.7 stars. About 13,000 enlarged prints of the chart plates were made during the year.

During the period covered by the report, the sun was photographed on 210 days, and for 1906, including the Indian and Mauritian negatives, the daily photographic record of the sun's surface was complete except for one day. Twenty-three photographs of portions of the solar disc were secured with the 26-inch photographic refractor, fitted with a negative enlarger, the scale being such as to give a solar diameter of 30 inches.

The magnetic observations were carried on as usual, the principal results for the magnetic elements for 1906 being

Mean declination	16° 3' 6 W.
Mean horizontal force	4.0174 (in British units)
	1.8524 (in metric ,,)
Mean dip (with 3-inch needles)	66° 55' 17"

There were no days of "great" magnetic disturbance and eight of lesser disturbance.

The mean temperature for the year ending April 30, 1907, was 50°.5, or 0°.9 above the average for 1841-1905, the highest and lowest shade temperatures recorded being 94°.3 (August 31) and 19°.8 (December 30) respectively. Of the 4457 hours that the sun was above the horizon at Greenwich, the Campbell-Stokes instrument recorded 1687 hours of bright sunshine.

The total rainfall was 0.26 inch below the average for the sixty-five years 1841-1905, being 23.86 inches, whilst the number of "rainy days" was 148.

The performance of the chronometers sent in for the annual trial was hardly up to the high standard of recent years, and of the fourteen pocket-chronometers submitted none came up to the standard of purchase. The next trial for chronometers will commence on June 15, and for chronometer watches on August 3.

In concluding his report, the Astronomer Royal refers to the threatened danger to the astronomical efficiency of the observatory occasioned by the L.C.C. generating station near by, the principal point being the recommendation of the committee appointed to consider the matter, that the conditions be reviewed after the lapse of two years. Experiments made last summer showed that the vibrations from the present installation can be effectually damped out by keeping the film of mercury in the amalgamated trough as thin as possible, but there still remains the danger that these vibrations may so cause the large telescopes to oscillate that delicate observations, such as close double-star work, may suffer materially.

A more insidious danger is that the heated gases from the chimneys may affect the accuracy of star observations on the northern meridian, and in that case the errors would not be discovered until the observations were reduced, when, possibly, it would be impracticable to repeat the observations.

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TWO HEAVY SEISMOGRAPHS.

TWO new seismographs devised by Dr. Wiechert are now on sale by Spindler and Hooyer, of Göttingen. The fact which will strike most seismologists is the magnitude of the "stationary" mass employed. The horizontal pendulum uses a "stationary" mass of 17,000 kilo., nearly 17 tons. The mass is composed of barytes contained in a cylindrical sheet-iron vessel with a flat bottom. Its dimensions are 2 metres in diameter by nearly 2 metres in height, and, being intended to have freedom of movement horizontally, the vessel is suspended by three iron rods of 3 cm. diameter, the elasticity of which allows the necessary freedom. The next striking feature is the multiplication with which the thrust arm moves the indicator point, and this is 2200! It is brought about by means of four levers, multiplying $5 \times 5 \times 5 \times 17\frac{1}{2}$. The loss owing to the inertia and elasticity of the connecting system amounts to 5 per cent. only. "The instrument renders specially important service in the small European earthquakes where the rapid oscillations are more prominent." It is clear that this statement is justified. For local disturbances and extremely rapid elastic vibrations the instrument should be of great service, but, with such a multiplication, one is compelled to wonder how much the machine requires to be isolated in order to avoid the disturbance due to traffic. It is not surprising to find in a specimen seismogram tremors due to a gas engine $2\frac{1}{2}$ kilometres distant. Other drawbacks to the use of the pendulum are the price, 5000 marks, and the number of times the paper must require to be changed. These purely practical considerations must have weight with anyone who has real work in view.

The vertical seismograph has a "stationary" mass of 1300 kilograms, about one and a third tons. Even this is great as compared with the usual one to two hundred pounds. The multiplication, 160, is also large when one thinks of the usual 12 to 20. "The vertical apparatus often indicates the first movements of very distant earthquakes better than even the 17,000 kilo. pendulum, which multiplies 2000 times; so the Schlüter result is confirmed, from which follows that in the case of first indications we have to do with longitudinal movements." Thus runs the prospectus. The price of this pendulum, too, 2800 marks, is rather prohibitive, although the workmanship in both leaves little to be desired.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Dr. Graham-Smith, Prof. Nuttall, and Prof. Woodhead have been nominated to represent the University at the International Congress of Hygiene and Demography to be held in Berlin, September.

The general board of studies has approved Alexander Scott for the degree of Doctor in Science.

Prof. E. H. Liveing and H. Louis have been nominated examiners of the application of science to the art of mining, and Mr. C. T. Heycock an examiner in metallurgy for the diploma in mining engineering for the examination to be held in the Michaelmas term, 1907.

The Balfour studentship will be vacant at Michaelmas next. The names of applicants, together with such information as they may think desirable, should be sent on or before October 1 to the secretary, J. W. Clark, Registry of the University, Cambridge. The studentship is of the net annual value of 200l., or such larger sum as the University may from time to time determine. The student need not be a member of the University, and during his tenure of the studentship is required to devote himself to original biological inquiry.

The Vice-Chancellor announces that the advisory committee of the Colonial Office for the tropical diseases research fund recommends that a grant of 100l. for two years should be made from the fund to assist in establishing a research studentship in medical entomology in Cambridge, and that Lord Elgin is prepared to approve of the proposal. Candidates for the studentship are requested to send in their applications to Prof. Nuttall, 3 Cranmer Road, Cambridge, on or before Monday, June 17.

LIVERPOOL.—Mr. J. K. Catterson-Smith has been appointed demonstrator in electrotechnology, and Dr. G. D. Hope demonstrator and assistant lecturer in organic chemistry.

From the interest of funds bequeathed to the University by the late J. L. Bowen, the council has decided to allot 100*l.* per annum towards the permanent endowment of the lectureship on organic chemistry.

Grants have been made out of funds provided by H.M. Treasury for the following researches at present being carried out in science laboratories:—for investigation of absorptive properties of vegetable fibres; for plates to illustrate a monograph on the edible crab; for materials used in the investigation of Röntgen radiation; for apparatus for research on brass annealing; for apparatus for investigating high-temperature combustion; for research on three-membered heterocyclic derivatives; for research on continuous and momentary arcs; for suction of gases in pipes; and for research on blood pressure.

The University has decided to confer the degree of D.Sc., *honoris causa*, at the forthcoming graduation in July, on the following men of science:—Prof. A. R. Forsyth, F.R.S.; Prof. F. Gotch, F.R.S.; Dr. C. L. A. Laveran, Chef de Service Honoraire of the Institut Pasteur, Paris; Sir Oliver J. Lodge, F.R.S.; Sir John Murray, K.C.B., F.R.S.; Prof. W. Osler, F.R.S.; Prof. W. Ostwald; Sir William Ramsay, K.C.B., F.R.S.; and Sir Henry E. Roscoe, F.R.S. The degree will be conferred on Dr. Laveran *in absentia*.

MANCHESTER.—His Grace the Duke of Devonshire, who for many years has held the office of president of the Owens College, and more recently of the University, has been elected Chancellor of the University upon the resignation of Earl Spencer. The installation ceremony has been fixed for July 10, and on this occasion a number of honorary degrees will be conferred. Prof. E. Rutherford, F.R.S., whose appointment as Langworthy professor of physics and director of the physical laboratories has already been noted, is now in Manchester making arrangements for taking over the duties of his office in October.

Prof. Arthur Schuster, F.R.S., has been offered, and has accepted, an appointment as honorary professor of physics; his continued cooperation in the work of the department is thus assured.

Mr. W. H. Jackson, who has for the past five years held the position of assistant lecturer in mathematics, has been appointed assistant professor of mathematics at Haverford College, Pa., U.S.A.

OXFORD.—Mr. D. L. Chapman has been selected for the official fellowship in natural science at Jesus College. Mr. Chapman was an exhibitor at Christ Church, and since 1897 has been a demonstrator in Prof. Dixon's laboratory at the Victoria University of Manchester.

On Thursday, June 6, the Buckinghamshire Education Committee closed all their schools, so that the teachers could attend a conference, organised by Mr. C. G. Watkins, at Aylesbury, at which a number of the delegates of the Federal Conference on Education were present. Among the subjects discussed was the question as to how the rural schools might be kept in touch with the progress and development of educational life. An important difference between rural schools in the colonies and in the mother country was brought out. In the former the teachers are the best teachers, and quickly move as they are promoted according to the work that they can do. Here the best teachers go at once to the better-paid posts in towns; those in the rural districts stay where they are, as there is no system of promotion. Among those from the colonies who spoke on this and other topics were the Hon. Colin Campbell (Minister of Education, Manitoba), Mr. Frank Tate, I.S.O. (Victoria), Mr. A. Williams (South Australia), Mr. J. A. Douglas (Southern Nigeria). Mr. W. M. Webb pointed to the use that could be made of museums fixed and circulating in the training of teachers, particularly in rural districts, and he mentioned the resolutions passed at the Federal Conference with regard to a collection that should bring before teachers fresh methods and new appliances.

The board of trustees of the University of Illinois has voted that the Engineering Experiment Station be authorised to offer ten research fellowships in the college of engineering, each of an annual value of 100*l.* A pamphlet received from the University gives information concerning these fellowships, and describes the facilities for experimental work now available in the college of engineering.

We have received a copy of a brochure, presented to the British editors on the occasion of their visit to Berlin last month, which provides an instructive account of the Handelshochschule founded by the Berlin Merchants' Corporation. It is the only institution of its kind in Germany which owes its existence to the efforts of a body of business men, and is maintained solely at their expense. The school is particularly meant for commercial students who have gone through a regular apprenticeship, and, besides, have attained that degree of general training which entitles to the privilege of serving the shorter term of one year in the German Army or Navy. Exceptions are made in the case of students otherwise suitably prepared. The object constantly held in view is "to provide instruction and opportunities for research in the sciences necessary and most useful for a commercial career." The approved course of work extends over two years. The school was opened in October, 1906, and during the first session 1371 persons were in attendance on lectures. The inauguration of the scheme serves to show that German merchants possess initiative enough themselves to supply any deficiency which may exist in the State system of education.

A DEPUTATION from the British Medical Association, the Board of Hygiene and Temperance, and the 1904 Committee of the Medical Profession, waited upon the President of the Board of Education on June 6 to urge the teaching of hygiene and temperance in all schools and training colleges under the Board, and the establishment of a medical bureau in the Education Department. Mr. McKenna, M.P., in reply, said that the chief difficulty is to obtain competent teachers, and the next is to get the teachers to teach the children. To come into immediate contact with the schools, it is necessary to have teachers to teach children in 21,000 schools, and these are not available. As to medical inspection, the Bill dealing with this subject has not yet passed through the House of Commons, but it is to be pressed, and Mr. McKenna believes it will obtain the support of the House and become law. Until the Bill is passed it would be undesirable to declare in advance what the settled policy of the Board is as to the details of carrying out the proposals of the Bill. Naturally the desire of the Board will be to have expert medical advice, if the Bill passes, upon the various topics with which it is concerned, but no definite lines could be laid down now on the proposal for the establishment of a medical bureau. On the general question, Mr. McKenna expressed himself as heartily in sympathy, as the whole of the Government are, with the objects laid before him. It is most desirable for children in elementary schools to be taught hygiene and temperance.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 18 — "On Reciprocal Innervation of Antagonistic Muscles." Tenth note. By Prof. C. S. Sherrington, F.R.S.

This communication furnishes fresh examples of reciprocal innervation of antagonistic muscles. These examples are taken from the great flexion-reflex of the leg. The paper shows that in that reflex the extensors of the ankle are inhibited concurrently with excitation of flexors of the ankle. It also shows that the adductors of the hip are relaxed by inhibition concurrently with reflex contraction of the abductors, and that the external rotators of the hip similarly are relaxed by inhibition concurrently with contraction of the internal rotators. These new instances of reciprocal innervation of antagonistic muscles are important, because of the desirability of seeing how far reciprocal innervation may be considered a general or