a marked contrast in the two fringes of shadow. This corroborates what we have just deduced, for at this time the relative positions of the sun and earth were reversed.

In the case of Saturn we have, as another interesting detail, the excellent instance it affords of contrast. From the bright equatorial belt, the most brilliant part of the whole picture, we notice a regular gradation of tints down to the faintest parts of the rings, for it is noteworthy that the dark belts of the planet are not so dark as these. This grading is particularly serviceable for being practically that of the eye, for the colour screen and plate used were such as to give us the light from that portion of the spectrum of which the eye takes greatest cognisance. The relative effect, therefore, on the plate is the same as on the retina.

Lastly, we come to what is one of the greatest triumphs of the whole process, the self-recording of the wisps of Saturn. It was in September that these wisps were first detected visually, independently, by my assistant, Mr. E. C. Slipher, and myself. Curiously enough, they were suspected synchronously on the photographic images, and on later ones were definitely seen. They counterpart almost precisely those of Jupiter, though, of course, in very faint replica. Here comes in the beauty of the photographic method. Instead of taking but a single image, twenty or more are taken one after the other on a single plate. Meanwhile, the colour-screen is moved. Thus any detail in the image due to defect on the plate proclaims its origin by its singularity, and in the same manner the colour-screen betrays its self-written markings. If a detail is repeated on several images in place it must be real, however faint.

As we take our leave of Saturn let me point out the beautiful elliptical figures of the rings thus shown, a symmetrical correctness wonderfully pleasing to the eye, and which the best of drawings fails to reproduce.

From the detail these photographs have thus proved themselves able to depict, they mark a new departure in planetary research. While, on the one hand, they exhibit to the world at large something of the advance recently achieved in our knowledge of the solar system, on the other they constitute in themselves the beginning of a set of records in which the future of the planets may be confronted with its archived past, and which shall endure after those who first conceived such registry shall have long since passed away. They can never take the place of first-rate visual observation, but they will form a firm foundation for whatever shall subsequently be seen, and will enable such changes as must inevitably ensue to be the better collated and compared. They are the histories of the planets written by themselves, their autobiographies penned by light; and in their grand historical portrait gallery, where the planets' pasts live on for ever in immortal youth, astronomers yet to come may see the earlier stages of the great cosmic drama which is slowly but surely working itself out.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—Mr. E. M. Holmes, whose magnificent collection of seaweeds and algæ was purchased for the University some time ago, has now presented to the botanical department another series of about 2000 beautifully preserved specimens, together with a number of valuable books on algology. The possession of this collection, the finest of the kind in the world, places the University in a unique position for the study of this branch of botany.

Prof. Sidney S. Dawson has resigned the chair of accounting.

An official degree of M.Sc. is to be conferred on Prof. F. W. Gamble.

Dr. Arthur Francis Bashford, director of the Imperial Cancer Research, has been appointed to deliver the Ingleby lectures for 1911.

Prof. Charles Lapworth, F.R.S., has been appointed to represent the University at the International Geological Congress at Stockholm in August next.

CAMBRIDGE.—The general board of studies has appointed the following university lecturers:—Dr. Marr, geology; Dr. Shore, physiology; Dr. Baker and Mr. J. H. Grace, mathematics; Mr. G. F. C. Searle and Mr. C. T. R. Wilson, experimental physics; and Mr. H. O. Meredith, economics.

The special board for biology and geology has nominated Prof. I. Ikeda to occupy the university table at the laboratory of the Marine Biological Association at Plymouth for three weeks between July 15 and August 30.

GLASGOW.—Among the recipients of the honorary degree of Doctor of Laws on Thursday, June 9, were Dr. H. Dyer, C.E., first principal of the Imperial College of Engineering, Tokyo, now honorary principal of the college, and emeritus professor of the University of Tokyo; and Prof. G. O. A. Montelius, royal antiquary of Sweden and professor at the National Archæological Museum, Stockholm.

LEEDS.—On Saturday, June 11, the University held a Congregation for the purpose of installing the Duke of Devonshire as Chancellor in succession to the late Marquis of Ripon. The gathering, which included the Mayor and Corporation of the City, a large representation of Yorkshire civic and educational authorities, as well as the Court, Senate, and Convocation of the University, was held in the Town Hall. After the ceremony of installation a band of one hundred and fifty students sang a chorus from Bach's "Dramma per Musica." The Chancellor delivered a short address, in which he alluded to the hereditary interest of his family in the fortunes of the Yorkshire College and the Leeds University, and expressed himself anxious to maintain the tradition to the utmost of his power. He commended the work of tutorial university extension and the prosecution of research, especially in connection with the prevention of disease. In connection with the ceremony, honorary degrees were conferred on a number of distinguished public men, including the Prime Minister (who was born near Leeds), the Earl of Crewe, Lord Lansdowne, and the Speaker. The degree of D.Sc. was conferred on Lord Rayleigh, Sir Clements Markham, K.C.B., and Prof. Osler. Sir Hugh Bell, Bart., received the degree of LL.D. On behalf of the honorary graduates, Mr. Asquith congratulated the University upon the installation of its new Chancellor. He expressed the opinion that the new universities had justified the faith and fulfilled the high hopes of their founders, and he passed a warm eulogium upon the work of the University of Leeds. The ceremonial of the proceedings, which was picturesque without being archaic, excited great interest, and the part taken by the students met with general approbation.

ON Thursday, June 23, Dr. H. A. Miers, F.R.S., principal of the University of London, will present the prizes at the London (Royal Free Hospital) School of Medicine for Women. Mrs. Garrett-Anderson, president of the school, will occupy the chair.

WE learn from *Science* that an announcement has been made of the receipt by Western Reserve University of a gift of 50,000*l.* by Mr. H. M. Hanna, as an addition to the endowment of the medical department, and that Mr. J. Ogden Armour has made a gift of 14,000*l.* to the Armour Institute of Technology.

ACCORDING to a Reuter message from Peking, the Throne of China, approving a recommendation of its Board of Education, decrees that English shall be the official language for scientific and technical education. The study of English is made compulsory in all provincial scientific and technical high schools.

THE annual conference of the Association of Teachers in Technical Institutions, which was postponed on account of the death of King Edward VII., will be held at Birmingham on Friday and Saturday, June 17 and 18. Mr. J. Wilson, president of the association, will deliver his address on the latter day, and a paper will be read by Dr. T. Slater Price on the relations of technical institutions to the universities.

THE late Prof. J. Campbell Brown, professor of chemistry for thirty-two years in Liverpool University, left estate of the gross value of 43,101*l.*, of which the net personalty has been sworn at 42,740*l.* We learn from the *Times* that he bequeathed to the professors of chemistry of the University

of Liverpool and their successors his collection of old alchemical and similar books, to be kept together as the nucleus of a collection for the professors' private room. He left a sum sufficient to produce an annual income of 50*l.* to Liverpool University to found an advanced chemical scholarship to be called "The Campbell Brown Scholarship," and a sum sufficient to produce an annual income of 800*l.* to the University of Liverpool upon trust for the endowment of a chair of chemistry in addition to existing chairs, to be called the Campbell Brown chair, or if a chair shall have been endowed, then either for a chair for the teaching of agricultural chemistry or a chair of some other branch of industrial chemistry. He also left 5000*l.* to the University upon trust to place the income at the disposal of the Campbell Brown professor for the time being towards the cost of his apparatus and material. If the University of Liverpool shall not accept the bequest for the endowment of the chair on these conditions, the whole sums are to be given to the University of Manchester to endow a Campbell Brown chair of music. The residue of his property he left upon trust to found a series of entrance scholarships each of the value of 60*l.* per annum, to be held at the University of Liverpool, tenable for three years and renewable for a fourth. The value of the bequest for the proposed professorship is from 25,000*l.* to 28,000*l.*, of that for the advanced chemical scholarship 1500*l.*, and for the entrance scholarships 5000*l.* to 8000*l.*

AT one of the meetings of the Women's Congress held at the Japan-British Exhibition on June 8, the question of a university standard in home science was discussed. Mrs. St. Loe Strachey read a paper on the ideals of home science, and defined a university standard as meaning the attainment by a student of such a standard of knowledge as could be rewarded by the grant of a degree if it had been attained in a subject in which our universities examine for a degree. In the special courses in home science being held at King's College for Women, the teaching claims to attain to a university standard. The students are not allowed to be content with merely acquiring a knowledge of the technical processes carried on in the practice of domestic science, but are required to study at first hand the various scientific principles which underlie the proper conduct of a house or institution and the bringing up of the young. It is true, she said, that women in our universities have for many years past studied physics, chemistry, biology, bacteriology, and, indeed, the whole list of sciences mentioned in the King's College syllabus, but the point is that these subjects should be studied in a definite, coordinated course, having for its object "to provide a scientific education in the principles which underlie the whole organisation of home life." Miss Oakeley, warden of King's College Women's Department, said the new movement met the spirit of the age in its insistence that science should be everywhere, that reason should occupy all spheres, that there should be no dark corners left. The meeting seemed hardly to realise that to be thoroughly effective in improving the conditions of home-life the science teaching received by women must be begun in the school, and that many women will have few opportunities for further study after school days are over. The conditions in the schools must be improved. First, a course of practical work in science suitable for girls, and having the needs of the home before it at every stage, must be forthcoming; and, secondly, there must be a supply of well-educated mistresses who, in addition to their laboratory practice and general knowledge of science, have gained a first-hand acquaintance with household needs and difficulties, and have become experts in such arts as are required in the kitchen and laundry.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 9.—Sir Archibald Geikie, K.C.B., president, in the chair.—J. A. **Gray**: The distribution of velocity in the β rays from a radio-active substance. The β rays from some radio-active substances have been deflected in a magnetic field, and the detection of sets of homogeneous β rays attempted by the photographic method. Radium emanation was the substance first used. It was placed in a very narrow thin-walled tube, drawn out from capillary tubing, so thin that the α rays from the emanation escaped. Enough black paper was placed over the tube to absorb the α rays and to protect the photographic film from phosphorescence caused by the α rays. The β rays from the active deposit had thus to pass through very little absorbing material. If the β rays from a simple radio-active substance are emitted at an identical speed, we should therefore expect to find evidence of such, even if β rays do change slightly in velocity in passing through matter. Although several photographs were taken, no sign was found of sets of homogeneous β rays from Ra*B* and Ra*C*. Experiments were then tried with Ra*E* as radiating substance. Here we have β rays which are very nearly absorbed according to an exponential law, and if, as many writers have assumed, absorption according to an exponential law signifies homogeneous β rays, these rays should be practically homogeneous. It was found, however, that the velocities of the rays were distributed over a wide range. The results of the experiments may be summarised as follows:—(1) β rays which are absorbed according to an exponential law are not homogeneous; (2) β rays must fall in velocity in passing through matter, for, if not, the absorption coefficient of any mixture of rays must decrease as the rays pass through matter.—W. **Wilson**: The decrease of velocity of the β particles on passing through matter. In a previous paper it was shown that the velocity of β particles suffers an appreciable decrease on passing through matter. The present experiments were undertaken with the view of directly confirming this result. Homogeneous beams of rays were separated by means of a magnetic field from a heterogeneous beam given out by the active deposit from radium. These homogeneous rays passed into another magnetic field, where their velocity was measured. Sheets of aluminium were then placed in the path of the rays between the two fields, and the velocity of the emergent rays was found to have decreased by an appreciable amount. From considerations of the law of absorption found to hold for homogeneous rays, the decrease of velocity of the rays as they pass through matter could be calculated, and was found to agree with the results obtained experimentally. The results obtained are in agreement with the equations $E=k(a-x)$ and $E^2=k'(a'-x)$, where E is the energy of the rays, x the thickness of matter traversed, and k and a constants. The agreement is rather better in the former case than in the latter, but the range of velocities considered was not sufficient to differentiate sharply between them. Although the change in velocity observed was only from $2{\cdot}85\times10^{10}$ to $2{\cdot}25\times10^{10}$ cm. per sec., yet the change of the properties of the rays with respect to absorption is very large, the absorption coefficient of the former being 4·9 cm.$^{-1}$, while that of the latter is 35·2 cm.$^{-1}$.—J. N. **Brown**: The rate of emission of α particles from uranium and its products. The object of the experiments was to estimate the number of α particles emitted per second per gram of uranium in equilibrium with all its products (*i.e.* as it occurs in pitchblende). The pitchblende was prepared as a thin film, over which was placed a zinc sulphide screen. The scintillations produced on the screen by the α particles were observed through a microscope. Each scintillation corresponded to the emission of one α particle from the pitchblende. The weight of pitchblende sending particles to the portion of screen viewed by the microscope was readily obtained, and since the screen was very close to the film the number observed could be taken as half the total quantity emitted by this weight of pitchblende so long as the thickness of the film was less than the distance of penetration of α rays into pitchblende. This point was ensured by making observations on films of various thicknesses and plotting a curve between number of scintillations per minute and weight of film, the result being calculated from a film for which the curve showed the rate of production of scintillations to be proportional to the thickness. The percentage of uranium in the pitchblende was estimated, and the result finally expressed as number of α particles per second per gram of uranium in equilibrium with its products, the figure obtained being $7{\cdot}36\times10^4$. From Rutherford's result for radium the value for uranium can be obtained through a series of calculations, each of which may involve a 5 per cent. error. The value obtained in this way is $9{\cdot}1\times10^4$.—Hon. R. J. **Strutt**: The accumulation of helium in geological time, iv.