

### The International Astronomical Union at Cambridge.

WELCOMED by Lord Balfour, Chancellor of the University of Cambridge, who dwelt on the value of international co-operation, by Dr. J. H. Jeans, president of the Royal Astronomical Society, who dwelt on the revolutions that astronomy has compelled in human thought, and by the Astronomer-Royal, who gave a short account of the manifold activities of the Union since its birth in 1919, the conference made a happy and successful start on July 14 in the Senate House of the University. In his address at the opening meeting of the general assembly of the Union, at which there were present more than 200 national delegates, members of the Union and invited visitors; the president, Prof. W. W. Campbell, reminded the Union that it is charged with the care of international co-operation in astronomy wherever it is necessary or useful. The principal fields of astronomical activity are represented by more than a score of committees; their reports refer to great pieces of work in which there are many students, where co-operation is required to secure a fairly homogeneous system over the entire field. He illustrated the point by a short historical account of the study of the variation in latitude. We have now a very good knowledge of the conditions that are requisite for success in astronomical co-operation, and in launching fresh schemes, as the Union must do from time to time, we must beware of starting on new and untried work with too ambitious a programme. Prof. Campbell added a strong and evidently welcome tribute to the work that the general secretary of the Union, Prof. A. Fowler, has done for it since its foundation.

Dr. G. Abetti, Dr. H. Chrétien, Lieut.-Col. F. Stratton, and Dr. F. Henroteau were appointed recorders for the meeting, and Dr. A. Wolfer was appointed vice-president for the meeting in the absence of Prof. K. Hirayama.

It was announced that Norway, Spain, Portugal and Switzerland are now full members of the Union, and the adherence of Sweden has been officially notified. There are now 22 countries in the Union, and 20 of these were actually represented at the conference. After considerable discussion, resolutions submitted by constituent bodies of the Union were submitted to committees, save one from the United States. This was a proposal that the Committee on Selected Areas should be invited to reorganise itself under the auspices of the Union. The motion was deferred until such time as Germany becomes an adhering country of the Union, a necessary condition which the American committee had hoped to see fulfilled at the Cambridge meeting.

The Union then dissolved itself into 27 committees, which for the next four days dealt faithfully each with its appropriate portion of the 122 pages of the report prepared by Prof. Fowler. It is impossible here to do more than mention very briefly some of the more important resolutions of wide interest which were ultimately adopted by the General Assembly of the Union.

The committee on standard notations appointed a sub-committee to report to the Union at a later date on a revision of the boundaries of the northern constellations. Different systems adopted by earlier writers have led to an annoying confusion in the double names allotted to stars near the boundaries of constellations.

It was agreed that for all telegrams transmitted from the Bureau at Copenhagen, mean places should be adopted, referred to the equinox at the beginning of the year. Where desired, adequate descriptions of newly discovered objects should be given.

A grant of 250*l.* a year for three years was made to Prof. De Sitter to carry out a programme of observations of azimuth at an equatorial station and at northern and southern stations, for the determination of fundamental declinations; the instrument and the observer are to be found by the Leyden Observatory. A revised list of stars to form, or to be developed into, a *fundamental* list was also adopted and recommended for as continuous observation as possible. The further study of the variations of refraction at different hours of the day and in different parts of the sky was also recommended. It was announced that Greenwich, the Cape and the Naval Observatory at Washington are to co-operate with the German astronomers in the observation of reference stars in connexion with the coming opposition of Eros in the year 1930-31.

With regard to solar physics, it was agreed to arrange that additional observations of the sun as nearly continuous as possible should be made at or about the time when magnetic storms are in progress or expected. There would have to be organised some service to supply the necessary information to the co-operating observatories. The view was expressed by M. Deslandres and adopted by the Union that it is important for the variation of the solar constant, announced by Dr. Abbot, to be studied in other countries, especially in reference to accompanying changes in meteorological elements. Strong support was given to the suggestion that a Solar Physics Observatory should be established in Japan. With regard to apparent changes in solar rotation, Dr. St. John announced that the Snow telescope as used by Adams would be reconstituted to compare its results with those given by the 150-foot tower telescope.

Several important resolutions were adopted as to standard wave-lengths. Of these the most important was the following:

The primary standard of wave-length,  $\lambda 6438.4696$  of cadmium, shall be produced by high voltage electric current in a vacuum tube having internal electrodes. The lamp shall be maintained at a temperature not higher than 320° C., and shall have a volume not less than 25 cubic centimetres. The effective value of the exciting current shall not exceed 0.05 ampere. At room temperature the tube shall be non-luminous when connected to the usual high voltage circuit. So long as the lamp used is capable of giving well-defined interference fringes with retardations of at least 200,000 wave-lengths, it is not, however, necessary to specify the volume of the tube serving as lamp. The primary standard should always be produced in a lamp which is ascertained to give retardations of at least 200,000 wave-lengths.

General Ferrié announced that the world scheme for the wireless determination of longitudes as approved at Rome has been worked out in further detail; experiments of considerable interest with diverse optical instruments have been carried out at Paris to check the conflicting views as to the relative success of small field instruments and large observatory transit circles. A number of resolutions as to the details of the scheme were adopted. Some preliminary experiments are to be carried out during the two months commencing October 1, 1926.

A strong wish was expressed by the Union that the U.S. Coast and Geodetic Survey should re-establish the latitude station at Gaithersburg so as to renew its co-operation in the study of the variation of latitude. The help of meridian observers in securing fresh

determinations of the declinations of the stars involved in this work was also strongly urged.

A research survey for all the minor planets, giving a record of available fundamental investigations on the perturbations of minor planets, was approved by the Union on the suggestion of Prof. Leuschner.

Observatories with suitable instruments were asked to arrange to secure annually photographs of the meteors of the three annual showers, the Perseids, Orionids and Geminids.

Welcome news was given by Prof. Turner as to the progress of the *Carte du Ciel*. France and Italy hope to complete their zones in eight years' time or sooner. The chief delays are at Tacubaya and Sydney, and the Union appealed to the two governments concerned for more rapid prosecution of the work.

In parallax work it was recommended that observers of trigonometric parallaxes should shape their programme, so far as possible, to meet the needs for spectroscopic and dynamical determinations. Faint stars of large proper motion are especially important. It was also agreed that photometric observers should be urged to determine carefully the magnitudes and colour equivalents of these stars.

Prof. von Zeipel reported through the Committee on Photometry that at Upsala it is proposed to determine the photographic and photovisual magnitudes of the 11,700 stars in the A.G. catalogue between  $+35^\circ$  and  $+40^\circ$ .

A grant of 6000 francs was made to Dr. Aitken at the Lick Observatory for the clerical work of the Double Star Bureau, in connexion with the extension of Burnham's General Catalogue. The use of the reversing prism in determining position angle in double stars was also approved.

During the meeting co-operative work on the important Cepheid variables was arranged. As to notation, the Union supported that of Chambers—André—Nijland. A list of variable stars needing special attention, drawn up by Prof. Nijland, was published in the report of the Committee on Variable Stars.

It was agreed that a new catalogue of the brighter and larger nebulae should be drawn up, illustrated by plates and including globular clusters. The system to be adopted for classification is to be purely descriptive. It was also recommended that in published work on nebulae the N.G.C. or I.C. number should always be used, and that steps be taken to divide the sky into zones allotted to different observatories for work on agreed lines on nebulae. It was also agreed that observatories should be encouraged to publish, whenever possible, copies of their best spectrograms.

This would be of assistance for the next stage in stellar spectral classification. A small catalogue of some 20 to 25 stars is to be prepared to serve as standards in radial velocity work.

Important resolutions were adopted amending the forms, times and modes of emission of radio time signals. For the international time system at certain times it was agreed to replace the present three dashes by six dots.

The above brief summary of the more interesting resolutions indicates that a large volume of work was got through in the various committees. In addition, much valuable material is incorporated in many of the reports of the committees, especially in the accounts of recent work. It is to be hoped that the volume of proceedings may shortly be available to the public. The reports of the committees were for the most part taken without discussion at the general assembly in its closing meetings, the one fight being over the question of the hour of commencement of the Julian day. By a large majority it was agreed that this should remain at noon. The failure of the International Research Council at its recent meeting at Brussels to make any change in the statutes governing the conditions of national adherence led to a number of statements being made by the various national delegations. The United States, Italy, Japan, Spain, Denmark, Sweden, and Canada urged that all restrictions should be removed, while Belgium, France, Poland, Czecho-Slovakia, Portugal, and Rumania contented themselves with asking the International Research Council not to block the admission of the Central Powers when they became members of the League of Nations.

The next meeting of the Union was arranged, on the invitation of the Dutch government, to take place in Holland in 1928. The committees of the Union were appointed for the next three years, including new committees on stellar statistics and on solar parallax. Officers of the Union for the next three years were elected as follows:—Prof. De Sitter (president); Profs. Cerulli, Deslandres, Hirayama, Eddington, and Schlesinger (vice-presidents); Lieut.-Col. Stratton (general secretary).

A very successful meeting closed on July 22. Generous hospitality was shown throughout by the Colleges. Amongst many interesting points referred to in the side meetings was an announcement that Prof. Adams has measured the Einstein shift in the spectrum of the companion to Sirius. The result is consistent with the theoretical view already announced, that this star, though 2000 times as dense as platinum, obeys the gas laws.

### The Field Museum of Natural History, Chicago.

THOSE connected with museums in Great Britain generally read the annual reports of museums in the United States with some envy. This is partly because those reports are produced in a style to interest the reader and to do credit to their institutions, partly because of the vigorous work they reveal. The chief factors, no doubt, are brains and enthusiasm, but these cannot operate without the other factor—sufficient funds. The report of the Field Museum of Natural History, Chicago, for 1924, which is just to hand, illustrates these points. It consists of 115 pages, of which half give a readable account of progress, and it is illustrated by 16 photogravure plates prepared in the Museum, as are all the Museum publications. That is how it is possible for the volume to bear the date January 1925.

The Field Museum corresponds to our own Natural

History Museum plus a department of anthropology. Its scientific staff, exclusive of the Director, numbers only twenty, but its expenditure last year was about 117,370*l.* The expenditure of our Natural History Museum for last year was about 97,925*l.*, and the scientific staff numbers forty-three permanent and thirteen temporary members.

The extension work of the Field Museum in public schools, the reproduction of living plants in models, and the pensions to employees are provided for by separate funds. Setting those activities aside, one notes that about 5000*l.* was spent during the year on expeditions; then there are three guide-lecturers, who, besides conducting visitors, give regular lectures illustrated by lantern and cinematograph; the printing has already been mentioned, but it should be added that this includes a large number of coloured posters