THE INTERNATIONAL ASTRONOMICAL UNION

AT the seventh General Assembly of the International Astronomical Union which was held at Zurich during the week beginning on August 11, more than three hundred astronomers from thirty countries met (in many cases for the first time for ten years) to discuss their past results, their current problems and their future plans. The machinery of international collaboration, kept going during the War by the good offices of astronomers in neutral countries, had been overhauled at a meeting of the Union's Executive Committee at Copenhagen in the spring of 1946; and it was largely because of the spadework put in by that committee, then and since, that the full Assembly could get on with its business so expeditiously at Zurich. The Federal Institute of Technology was kindly made available to delegates throughout the week. The hundred sessions held by the forty commissions into which the Union is subdivided put no severe tax on the accommodation available, and the many mixed commission meetings, colloquia and informal lectures, though they were well attended, could always find an auditorium of ample size. It was evident that behind the smooth functioning of the local arrangements, which included (as well as the formal business) a full programme of social events and sightseeing trips for delegates and their guests, lay a tremendous amount of hard work by a most efficient organising committee, headed by Prof. Waldmeier, director of the Zurich Observatory.

After an inaugural general assembly at which warm welcomes were accorded the delegates by the civic authorities and by the Swiss National Committee of Astronomy, and were responded to by the president of the Union, Sir Harold Spencer Jones, the members devoted a short session to administrative business. The financial load on the Union has been considerably eased by a decision of Unesco to support many bodies, such as the Bureau International de l'Heure and the International Latitude Service, the world-wide scope and general scientific value of which deserve such support. The Union in its turn eased the financial burden on its less wealthy adherent countries by altering the system of paying dues. Instead of paying, as now, on a *per capita* basis, countries will in future be classified (on their own proposal, ratified by the Executive Committee) into eight categories, each paying different subscriptions. By this modification countries with large populations, such as India or China, will be relieved of the necessity of paying dues out of proportion to the extent to which astronomy has developed within their borders.

The next five working days were devoted to purely scientific matters. Discussion varied, as always, from prepared contributions to a symposium attended, perhaps, by a hundred delegates, to fierce wrangles around a table on some obscure technical point between the only three people in the world aware of its import. At the commission meetings themselves, the business was partly organisational and partly scientific, the proportion varying with the subject-matter of the commission. At one end of the building a handful of delegates might be revising the code for astronomical telegrams or the list of standard astronomical notations, while at the other a no less earnest group would be discussing the constitution of interstellar matter, or the emission spectrum of the night sky.

In the commissions concerned with positional astronomy, modern methods for improving meridian work were discussed. The Russians have successfully experimented on photo-electric recording of transits of the brighter stars, while the Washington transit circle is now fitted with cameras which record all readings photographically so as to reduce fatigue in the observers and eliminate erroneous logging of the results. New instruments are being designed, some of them (notably those at Greenwich) based on new principles chosen so as to eliminate many of the most troublesome errors that beset meridian work. Photographic astrometry proceeds apace with wide-angle lenses and now with Schmidt cameras, and the application of punched-card methods to repetitive computation is being followed by the development of automatic plate-measuring devices which feed measured co-ordinates direct to the mechanical computers. Inconsistencies recently found in the adopted system of the fundamental astronomical constants are to be attacked by a research team in the United States, and authors are urged not to make *ad hoc* alterations pending the report of this team.

The solar commissions were faced with tremendous advances in our knowledge since the previous meeting, at Stockholm in 1938. Solar-terrestrial relationships, if little better understood, are now reduced to some sort of order since the importance of solar flares and active coronal regions became clear; the coronal spectrum is no longer a mystery, even if the corona still is; and on the instrumental side astronomers now have the help of prominence cinematography, the Lyot polarization filter, and the V2 rocket for exploring the sun's ultra-violet spectrum. But with these advances have come new problems; and much time was taken up in discussing solar radio noise, corpuscular emission from solar flares, and chromospheric structure. Nor have all the long-standing problems been cleared up, as was shown when two of the liveliest controversies of the week developed around the supposed variations in the solar constant and the magnitude of the sun's magnetic field. There was a powerful appeal for further direct observations to confirm the Smithsonian measurements of the solar constant when reports of indirect checks (via the brightness of the moon and of Uranus) revealed conflicting results. As for the sun's magnetic field, so much recent work has been based on the classical results at Mt. Wilson that there was something of a sensation when it was announced that both Mt. Wilson and Hamburg Observatories had recently failed to detect the field with apparatus that had apparently confirmed its presence only a year or two ago. Whether this failure is due to a real change in the magnitude of the field or to an under-estimate of the size of the accidental errors of observation did not emerge; but a suggestion that the matter might be settled by measuring the polarization of the sun's radio emission from its north or south hemisphere during an eclipse was seized on as a hopeful way out of the quandary.

In the field of research on nebulæ, observers and cosmologists met on common ground. Recent spectrophotometric work has shown that the more distant nebulæ are redder than can be accounted for by the red-shift in their spectra, that is, the colour indices of the nebulæ increase with distance. This is conceivably an evolutionary effect: for if, as is

currently believed, the red supergiant stars in the nebulæ exhaust their internal store of nuclei available for energy generation more rapidly than other stars, the distant nebulæ, which we see in their youth, will indeed be redder than the older ones in our neighbourhood, from which the red giants have faded. But whatever the explanation, this reddening must seriously affect those nebular counts to limiting magnitudes on which depend our present observational tests of various world-models. An interesting but inconclusive discussion took place on whether the classification sequence of the external galaxies is also an evolutionary sequence; and if it is, whether the sense of evolution is not towards rather than away from the elliptical forms. The cosmologists present carried the observers with them in an appeal to present observational results in a form which would facilitate rather than preclude a comparison of the different theories of world structure; in particular, to refrain from applying dubious 'corrections' for cosmological effects which are based on a particular model and therefore exclude others from proper consideration.

In a crowded symposium on infra-red spectrophotometry, recent results obtained with photoconductive lead sulphide cells were presented. Perhaps the most spectacular are: the identification of the infra-red spectra of the Martian polar caps and of the rings of Saturn with reflexion spectra from hoar-frost deposited on solid carbon dioxide; the suggestion that the green areas on Mars are due not to vegetation but to lichens devoid of chlorophyll; and the discovery of methane high in the earth's atmosphere from telluric bands at $3{\cdot}4\,\mu$ and $1{\cdot}6\,\mu$ in the solar spectrum.

Other well-attended meetings considered the spectral sequence and its anomalies (perhaps the most important paper here was a Russian one showing that a variety of observational data could be explained if interstellar matter is concentrated into small discrete clouds about 10 parsecs in diameter), the outer layers of the sun, and current progress with the 200-in. telescope. It seems that after a little preliminary trouble with the mirror supports, all goes well with the latter. The figure is approaching perfection, which the opticians define as "correct to 1/10 wave", and the light-grasp is up to expectations.

Animated discussions took place when the commission on international observatories met. Sharp cleavages of opinion emerged on the relative value of the various proposals which had been made, all designed to show that astronomy at least can override political boundaries. It was finally decided to proceed with all the immediately practicable parts of the schemes, including plans for establishing an international telescope in the southern hemisphere, an international astronomical laboratory in Europe (including a library and optical shops and a computing centre), and an international travel fund for facilitating exchange of astronomers.

The meeting reached its climax with a conference on the cosmic abundances of the elements. Since the 1938 meeting a measure of agreement has been reached on the nuclear reactions controlling energy generation in the stars, and interest now centres on the allied problem of elemental abundances. As a result of the present conference, it is now clear that no significant differences of abundance exist between the sun, the main-sequence stars and even the planetary nebulæ and interstellar matter, and that the proportions of the elements found in the earth's crust and in meteorites differ from the cosmic proportions only in physically explicable ways. The high-luminosity stars, however, lie on a mass-luminosity curve appropriate to a much higher mean molecular weight than the sun's; and it seems likely that, as was expected from their high rate of radiation, these giants have already burned up a considerable part of their hydrogen content. While discrepancies do undoubtedly exist in certain celestial bodies, it would be fair to say that the observed abundances do fit present conceptions reasonably well. The next move is to explain how the present abundances arose, and some steps have already been taken in this direction.

At the concluding general assembly some general resolutions were passed, the lists of members and of commissions were revised and new officers were elected. The incoming president is Prof. B. Lindblad, of Stockholm; the new general secretary is Prof. B. Strömgren, of Copenhagen. No decision has yet been reached on whether to hold the next meeting, in 1951, at Leningrad or Pasadena. With a final vote of thanks to its Swiss hosts for making possible a most successful meeting, the seventh General Assembly of the Union was declared closed on August 18.

VITAMIN C IN POTATOES

By Dr. FRANK WOKES
Ovaltine Research Laboratories, King's Langley, Herts
AND
GORDON NUNN
Oakley Training College, Cheltenham, Glos.

THE vitamin C content of potatoes is known to diminish steadily during the autumn and winter, so that their contribution towards the national requirements of this vitamin is considerably diminished. The average content of vitamin C in *raw* potatoes, as found by different workers, has been summarized by Lampitt, Baker and Parkinson[1] and is indicated by the shaded area in Fig. 1. The

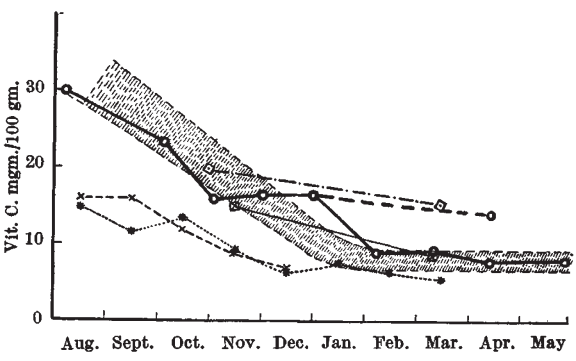

Fig. 1. Seasonal changes in vitamin C content of potatoes. The shaded portion represents average content in raw potatoes in different seasons as summarized by Lampitt, Baker and Parkinson. Results on raw potatoes stored in clamps indicated thus:
Lampitt, Baker and Parkinson (1945), □————□
Baker, Parkinson and Lampitt (1946), ◇—·—·—◇
Wokes and Nunn (1948), potatoes in clamp, ○————○
Potatoes removed from clamp to dry room, ○— — —○
Results on cooked potatoes indicated thus:
Olliver (1943), ×– – – –×
Thompson (1944), ∗.....∗