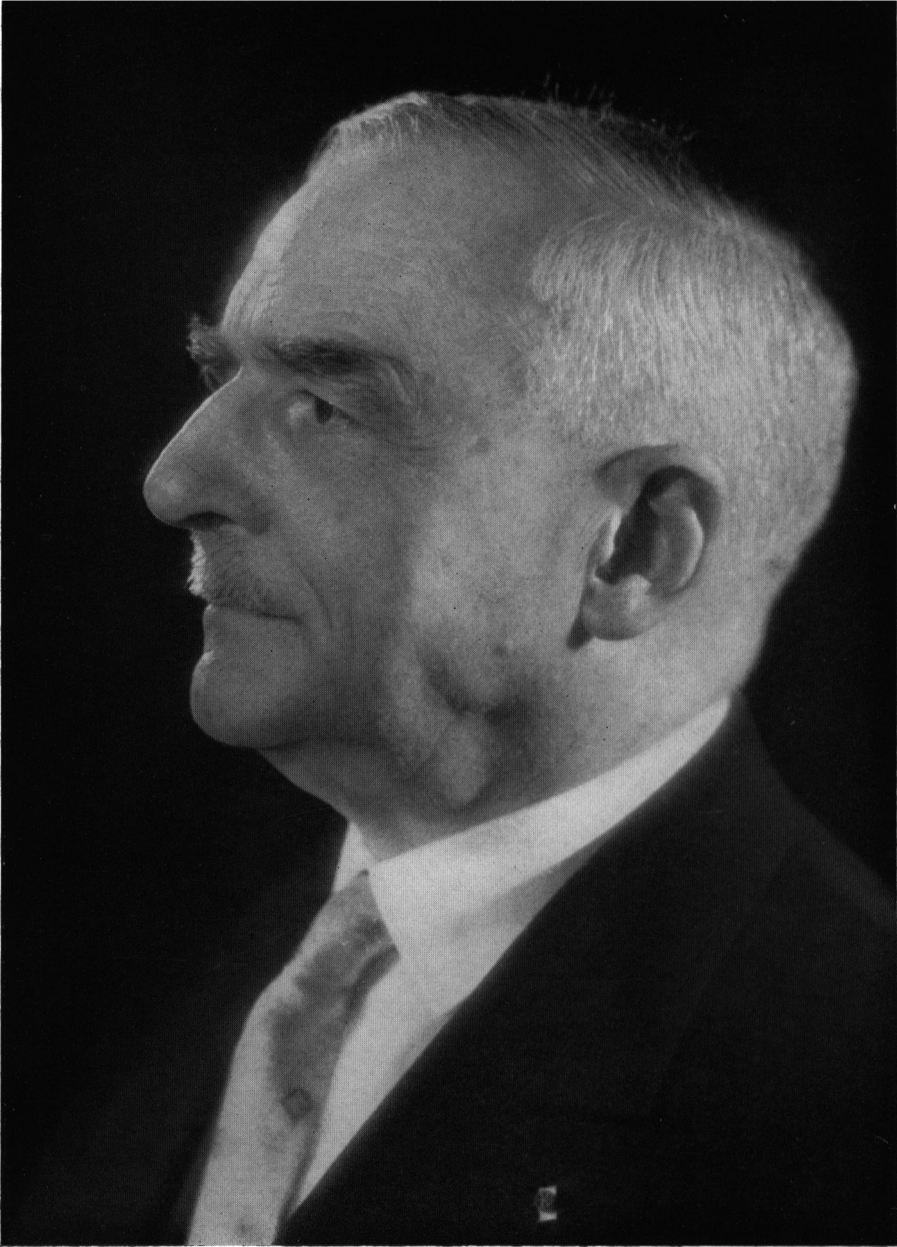




TRANSACTIONS  
OF THE  
INTERNATIONAL ASTRONOMICAL  
UNION

VOLUME X



ANDRÉ DANJON  
Directeur de l'Observatoire de Paris.  
PRÉSIDENT 1955-1958

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS  
INTERNATIONAL ASTRONOMICAL UNION  
(UNION ASTRONOMIQUE INTERNATIONALE)

TRANSACTIONS  
OF THE  
INTERNATIONAL ASTRONOMICAL  
UNION

Vol. X

TENTH GENERAL ASSEMBLY

HELD AT

MOSCOW

12-20 AUGUST 1958

EDITED BY

D. H. SADLER

(*General Secretary*)

PRINTED WITH FINANCIAL ASSISTANCE  
FROM U.N.E.S.C.O.

CAMBRIDGE  
AT THE UNIVERSITY PRESS

1960

PUBLISHED BY  
THE SYNDICS OF THE CAMBRIDGE UNIVERSITY PRESS

Bentley House, 200 Euston Road, London, N.W. 1  
American Branch: 32 East 57th Street, New York 22, N.Y.

©

CAMBRIDGE UNIVERSITY PRESS

1960

*Printed in Great Britain at the University Press, Cambridge  
(Brooke Crutchley, University Printer)*



# CONTENTS

## PART I. INAUGURAL CEREMONY AND GENERAL ASSEMBLY. REPORT OF THE EXECUTIVE COMMITTEE

|   | PAGE |
|---|------|
| Inaugural Ceremony in the House of Trade Unions, Moscow, 12 August 1958 | 5    |
| The General Assembly, 13 August 1958, 09.00 ... ..                      | 22   |
| The General Assembly, 20 August 1958, 15.00 ... ..                      | 27   |
| Report of the Executive Committee, 1955-57 ... ..                       | 38   |
| Liste des membres et hôtes ... ..                                       | 58   |

## PART II. RÉSOLUTIONS ADOPTÉES

|   |    |
|---|----|
| Commission de Finance ... ..                          | 71 |
| Comités Nationaux d'Astronomie ... ..                 | 71 |
| Commissions de l'Union (Résolutions nos. 1-66) ... .. | 72 |

(Les résolutions sont numérotées consécutivement sous les Commissions qui les ont proposées, en ordre numérique suivant les numéros des Commissions. Les numéros des résolutions associées à chaque Commission se trouvent dans la liste dans la Part III ci-dessous.)

## PART III. RAPPORTS ET COMPTES-RENDUS DES SÉANCES DES COMMISSIONS

(Dans la liste suivante on donne pour chaque Commission: les numéros des résolutions recommandées par la Commission; en cas de nécessité une référence au rapport d'une séance mixte imprimé sous une autre Commission; et le numéro du premier page du Rapport.

Les Sous-Commissions ne sont pas données séparément; leurs rapports suivent le rapport de la Commission principale, mais précèdent les comptes-rendus des séances. Les Commissions nos. 1, 2, 18 et 39 ont été supprimées.)

| No. | Commission  | Résolutions nos. | Séances mixtes avec |     |
|-----|---|------------------|---------------------|-----|
| 3   | Notations ... ..                                  | — ... ..         | — ... ..            | 83  |
| 4   | Ephémérides ... ..                                | 1, 2 ... ..      | — ... ..            | 85  |
| 5   | Bibliographie ... ..                              | 3-9 ... ..       | — ... ..            | 100 |
| 6   | Télégrammes... ..                                 | 10 ... ..        | — ... ..            | 104 |
| 7   | Mécanique Céleste ... ..                          | 11, 12 ... ..    | 4; 15 ... ..        | 109 |
| 8   | Astronomie Méridienne ... ..                      | 13-18 ... ..     | — ... ..            | 114 |
| 9   | Instruments ... ..                                | 19, 20 ... ..    | — ... ..            | 139 |
| 10  | Phénomènes Photosphériques ... ..                 | 21, 22 ..... ..  | 29; 40 ... ..       | 155 |
| 11  | Couches Extérieures du Soleil ... ..              | 22, 23 ... ..    | 29; 40 ... ..       | 164 |
| 12  | Radiation et Spectroscopie Solaire                | 22 ... ..        | 29 ... ..           | 181 |
| 13  | Eclipses du Soleil ... ..                         | 22 ... ..        | 29 ... ..           | 198 |
| 14  | Étalons de Longueur d'Onde ... ..                 | 24 ... ..        | — ... ..            | 211 |
| 15  | Etude Physique des Comètes ... ..                 | — ... ..         | — ... ..            | 234 |
| 16  | Etude Physique des Planètes ... ..                | 25-27 ... ..     | 15 ... ..           | 249 |
| 17  | Mouvement et Figure de la Lune ... ..             | — ... ..         | 4 ... ..            | 265 |
| 19  | Variation des Latitudes ... ..                    | 28-32 ... ..     | 8 ... ..            | 271 |
| 20  | Petites Planètes, Comètes et<br>Satellites ... .. | 27, 33 ... ..    | 4; 15 ... ..        | 287 |
| 21  | Luminescence du Ciel ... ..                       | — ... ..         | — ... ..            | 317 |

## CONTENTS

| No. | Commission   | Résolution nos.       | Séances mixtes avec | PAGE |
|-----|--|-----------------------|---------------------|------|
| 22  | Météores et Météorites ... ..                      | 34, 35 ... ..         | 15 ... ..           | 334  |
| 23  | Carte du Ciel ... ..                               | 36-38 ... ..          | — ... ..            | 354  |
| 24  | Parallaxes Stellaires et Mouvements Propres ... .. | 39-41 ... ..          | — ... ..            | 359  |
| 25  | Photométrie Stellaire ... ..                       | 19, 20, 42, 43 ... .. | 37 ... ..           | 369  |
| 26  | Etoiles Doubles ... ..                             | 44, 45 ... ..         | — ... ..            | 391  |
| 27  | Etoiles Variables ... ..                           | 42, 46-53 ... ..      | 29; 33; 42 ... ..   | 398  |
| 28  | Nébuleuses Extragalactiques ... ..                 | 54, 55 ... ..         | — ... ..            | 432  |
| 29  | Spectres Stellaires ... ..                         | 24, 56-58 ... ..      | — ... ..            | 440  |
| 30  | Vitesses Radiales Stellaires... ..                 | — ... ..              | — ... ..            | 475  |
| 31  | Heure ... ..                                       | 2, 59 ... ..          | 4 ... ..            | 488  |
| 32  | Selected Areas ... ..                              | 60 ... ..             | — ... ..            | 502  |
| 33  | Structure du Système Galactique ... ..             | 42, 60-62 ... ..      | — ... ..            | 509  |
| 34  | Matière Interstellaire ... ..                      | 57 ... ..             | — ... ..            | 532  |
| 35  | Constitution des Etoiles ... ..                    | 57 ... ..             | — ... ..            | 543  |
| 36  | Spectrophotométrie ... ..                          | 58 ... ..             | 29 ... ..           | 556  |
| 37  | Amas Stellaires et Associations ... ..             | 42, 43, 63 ... ..     | — ... ..            | 575  |
| 38  | Echange des Astronomes ... ..                      | 64 ... ..             | — ... ..            | 591  |
| 40  | Radio-Astronomie ... ..                            | 62, 65 ... ..         | 33 ... ..           | 594  |
| 41  | Histoire de l'Astronomie ... ..                    | — ... ..              | — ... ..            | 610  |
| 42  | Etoiles Doubles Photométriques ... ..              | 66 ... ..             | — ... ..            | 619  |

### PART IV. JOINT DISCUSSIONS

|     |  |     |
|-----|--|-----|
| I.  | Solar flares and corpuscular streams... ..   | 641 |
|     | 1. E. R. Mustel: Corpuscular streams from the plages and the physical properties of the streams ... ..   | 641 |
|     | 2. J. A. Simpson: Solar flare cosmic rays ... ..   | 642 |
|     | 3. Discussion: Remarks by T. Gold and J. A. Simpson ... ..   | 644 |
|     | 4. M. S. Bobrov: The inhomogeneities of solar corpuscular streams ... ..   | 646 |
|     | 5. A. B. Severyn: Solar flares as a pinch-effect ... ..  | 647 |
|     | 6. Walter Orr Roberts: Flare-associated phenomena in the solar corona ... ..   | 648 |
|     | 7. R. G. Giovanelli: Flare-surges ... ..   | 651 |
|     | 8. V. A. Krat and V. M. Sobolev: Hydrogen and helium excitation in the chromosphere and chromospheric flares ... ..  | 652 |
|     | 9. Z. Svestka: The new flare spectrograph at Ondrejov ... ..   | 653 |
|     | 10. Mme M. d'Azambuja: Ejections de matière absorbante au cours d'éruptions chromosphériques ... ..  | 653 |
|     | 11. Z. Suemoto and E. Hiei: Balmer series lines in flare spectra ... ..  | 653 |
|     | 12. I. S. Shklovsky: On the nature of fine structure of active regions of the Sun ... ..   | 654 |
|     | 13. N. P. Barabashev and I. M. Gordon: Some rocket-observational evidences for invisible flares ... ..   | 655 |
|     | 14. T. Gold and F. Hoyle: Flare energy from magnetic fields ... ..   | 655 |
|     | 15. G. B. Gelfreich, V. N. Ikhsanova, N. L. Kaidanovsky, N. S. Soboleva, G. M. Timofeeva and V. N. Umetsky: Bursts of microwave radio emission associated with solar flares ... .. | 656 |
|     | 16. R. Coates, S. Edelson, T. McCullough and N. Santini: I.G.Y. solar flare studies ... ..   | 656 |
|     | 17. L. I. Dorman: Cosmic rays and electromagnetic conditions in corpuscular streams, solar flares, super-corona and in interplanetary space ... ..                                 | 657 |
|     | 18. John T. Jefferies, Elske v. P. Smith and Henry J. Smith: The flare of 1957 September 18 ... ..   | 658 |
| II. | Nucleogenesis in stars ... ..  | 659 |
|     | W. A. Fowler: Introductory remarks ... ..  | 659 |
|     | 1. E. E. Salpeter: New theoretical and experimental results on helium and heavy ion burning in stars ... ..  | 661 |
|     | 2. Chushiro Hayashi, Minoru Nishida, Noboru Ohyama and Hiroshi Tsuda: Stellar syntheses of the alpha-particle nuclei heavier than <sup>20</sup> Ne ... ..                          | 663 |

# CONTENTS

|  | PAGE       |
|--|------------|
| 3. F. Hoyle: The production of elements in super-novae ... ..  | 664        |
| 4. A. G. W. Cameron: Neutron processes in giant stars ... ..   | 666        |
| 5. E. Margaret Burbidge and G. R. Burbidge: Observations on element abundances in stars ... ..   | 667        |
| 6. D. A. Frank-Kamenetsky: On some unsolved questions in the theory of the origin of the elements ... ..   | 670        |
| 7. R. Z. Sagdeyev: On the mechanism of preliminary particle acceleration in rarefied stellar atmospheres ... ..  | 671        |
| 8. P. E. Nemirowsky: Nuclear shells and the origin of the elements ... ..  | 673        |
| 9. B. A. Tverskoy: On the question of light elements in stellar atmospheres ... ..   | 675        |
| 10. General Discussion: I. P. Selinov, L. H. Aller, J. C. Pecker, W. P. Bidelman, J. L. Greenstein, F. Hoyle, Ja. B. Zeldovich, E. Schatzman, M. Schmidt, I. M. Gordon and W. A. Fowler ... .. | 677        |
| <b>III. The luminosity of cepheids...</b> ... ..   | <b>680</b> |
| 1. John B. Irwin: Cepheids in galactic clusters ... ..   | 680        |
| 2. S. C. B. Gascoigne: Photo-electric observations of Magellanic Cloud cepheids  | 684        |
| 3. Halton C. Arp: Cepheid variables in the small Magellanic Cloud ... ..   | 688        |
| 4. Gerald E. Kron: The intrinsic colours of cepheid variables ... ..   | 691        |
| 5. E. D. Pavlovskaja: On the determination of proper motions and radial velocities of short-period cepheids ... ..   | 693        |
| 6. G. Pskovsky: Estimates of the zero-point of the <i>P-L</i> relation, reduced to a unified system ... ..   | 695        |
| 7. Harold Weaver: The cepheid distance scale and galactic kinematic parameters   | 696        |
| 8. Discussion: S. A. Shevakin, L. Gratton, S. C. B. Gascoigne, Mlle R. Canavaggia, O. A. Melnikov, M. W. Feast, H. J. Smith, G. M. Iddis, K. Bahner and L. Mavridis ... ..                     | 698        |
| <b>IV. Astronomical observations with artificial satellites, rockets and balloons</b>  | <b>703</b> |
| 1. Audouin Dollfus: Observations astronomiques à bord de ballons libres: étude de la structure fine de la granulation solaire ... ..   | 703        |
| 2. Martin Schwarzschild: Solar granulation photographs from the stratosphere   | 705        |
| Discussion: J. Rösch ... ..  | 706        |
| 3. Herbert Friedman: Astrophysical measurements from rockets ... ..  | 706        |
| 4. R. Tousey: The extreme ultra-violet spectrum of the Sun ... ..  | 708        |
| 5. S. N. Vernov and A. E. Chudakov: Study of cosmic rays by rockets and sputniks in the U.S.S.R. ... ..  | 710        |
| 6. I. N. Nazarova: Rocket and satellite investigation of meteors ... ..  | 713        |
| 7. Maurice Dubin: Direct measurements of meteoritic dust using rockets and satellites ... ..   | 714        |
| 8. V. I. Krassovsky: Some new ionizing agents and properties of the ionosphere   | 716        |
| 9. Y. L. Alpert: Some results of outer ionospheric studies based on radio observations of the first sputnik ... ..   | 717        |
| 10. L. A. Shekulin: Distribution of electron concentration with height and its influence on the propagation of radio waves ... ..  | 719        |
| 11. A. N. Kazantsev: Absorption of radio waves in the ionosphere and distribution of electron concentration in the $F_2$ -layer ... ..   | 719        |
| 12. Joseph W. Siry: Satellite orbits and atmospheric densities at altitudes up to 750 kilometers obtained from the Vanguard orbit determination program  | 720        |
| 13. V. P. Tsevevich: On brightness variations of artificial satellites ... ..  | 722        |

## PART V. STATUTS, COMMISSIONS, MEMBRES

|                                       |     |
|---------------------------------------|-----|
| Statuts et règlement ... ..           | 727 |
| Composition des Commissions ... ..    | 736 |
| Liste alphabétique des membres ... .. | 745 |