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FINAL REPORT

November 1952

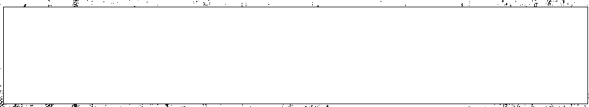
CHAPTER EIGHT

INTERNATIONAL ASTRONOMICAL UNION

ROME MEETING

SEPTEMBER 1952

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CHAPTER EIGHT

INTERNATIONAL ASTRONOMICAL UNION

NOTE MEETINGS

SEPTEMBER 1952

I. Introduction

1. The International Astronomical Union (I.A.U.) met in one form or another from 3-13 September 1952. It is one of the member unions of the International Council of Scientific Unions. Among other member unions which hold meetings and symposia of interest to the Air Force are the following:

1. International Union of Pure and Applied Physics
2. International Union of Geodesy and Geophysics (I.U.G.G.)
3. International Union of Pure and Applied Chemistry
4. International Scientific Radio Union (I.S.R.U.).

2. In addition to these and other important member unions, there are several mixed commissions and joint commissions. Important examples of these are the following:

1. Joint Commission on High Altitude Research Stations
2. Mixed Commission on the Ionosphere
3. Joint Commission on Solar and Terrestrial Relationships
4. Joint Commission of Spectroscopy.

These are working groups which develop the details of international cooperation in areas of science in which more than one scientific union is interested. At the Rome meeting of the I.A.U. two of these commissions held sessions. These were the Commission of Spectroscopy and the Commission on Solar and Terrestrial Relationships. The activities of the latter will be described briefly in this chapter, that of the former in a separate

II. Composition of the I.A.U.

1. For a full understanding of the I.A.U. it might be useful to list the various commissions. These commissions, some forty-two in number, cover the entire field of astronomy and are made up of specialists. Official membership in the I.A.U. is obtained only through election to one of the commissions. The commissions report once every three years and review the major advances in their areas, and make recommendations for further research. The general assemblies are held once every three years and the program consists of Commission Meetings at which the reports are presented and discussed. In addition Special Symposia are held in conjunction with these meetings. The list of commissions follows.

2. List of Commissions of the I.A.U.

1. Joint Commission on Solar and Terrestrial Relationships

2. Joint Commission of Spectroscopy

3. Notations

Commission des notations, des unités et de l'iconographie des publications

ii. Ephemerides

Commission des éphémérides

iii. Astronomical Constants

Sous-Commission des constantes astronomiques

5. Bibliography

Commission des analyses des travaux et de bibliographie

6. Telegrams

Commission des télégrammes astronomiques

7. Celestial Mechanics

Commission de la mécanique céleste

8. Meridian Astronomy

Commission de l'Astronomie méridienne

8a. Photographical and Visual Observations

Sous-Commission pour l'observation photographique et
visuelle d'étoiles jusqu'à la 9^{me} grandeur

9. Instruments

Commission des instruments astronomiques

10. Photospheric Phenomena

Commission des phénomènes photosphériques

11. Outer Layers of the Sun

Commission des couches extérieures du soleil

11a. Motion Pictures of Prominences

Sous-Commission pour la cinématographie des protubérances

12. Solar Radiation and Solar Spectroscopy

Commission de la radiation solaire et de la spectroscopie solaire

13. Eclipses of the Sun

Commission des éclipses du soleil

14. Standard Wave-lengths

Commission des étalons de longueur d'onde et des tables de spectre

14a. Tables of Intensities

Sous-Commission des tables d'intensités

15. Physical Study of the Comets

Commission pour l'étude physique des comètes

16. Planets

Commission pour les observations physiques des planètes et
des satellites

17. The Moon

Commission du mouvement et de la figure de la lune

18. Geographical

Commission des longitudes par télégraphie sans fil

19. Latitude Variation

Commission de la variation des latitudes

20. Minor Planets, Comets and Satellites

Commission des positions et des mouvements des petites planètes,
des comètes et des satellites

20a. Periodic Comets

Sub-Commission en short-period comets

21. --

22. Meteors

Commission des météores, de la lumière zodiacale et des
problèmes analogues

22a. Zodiacal Light

Sub-Commission de la lumière zodiacale et de la lumière
du ciel nocturne

22b. Meteor Star Maps

Sub-Commission des cartes stellaires

23. Carte du Ciel

Commission de la carte du ciel

24. Parallaxes and Proper Motions

Commission des parallaxes stellaires et des mouvements propres

25. Photometry

Commission de photométrie stellaire

25a. Magnitude Sequences

Sub-Commission des séquences de magnitudes

26. Double Stars

Commission des étoiles doubles

27. Variable Stars

Commission des étoiles variables

27a. Naming of Variables

50X1 les variables

28. Extragalactic Nebulae

Commission des nébuleuses extragalactiques

29. Stellar Spectra

Commission des spectres stellaires

29a. Novae

Sous-Commission des "novae"

29b. Spectra of Variables

Sous-Commission des spectres des étoiles variables

29c. Molecular Bands

Sous-Commission des bandes moléculaires dans les spectres stellaires

30. Radial Velocities

Commission des vitesses radiales stellaires

30a. Fundamental Radial Velocities

Sub-Commission on standard velocity stars

30b. Standard Wave-Lengths

Sub-Commission on wave-lengths

30c. Spectroscopic Double Stars

Sub-Commission...

31. Time

Commission de l'heure

32. Selected Areas

Commission des "selected areas"

33. Stellar Statistics

Commission de la statistique stellaire

34. Interstellar Matter

Commission de la matière interstellaire et des nébuleuses planétaires

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35. Constitution of the Stars
Commission de la constitution des étoiles
36. Spectrophotometry
Commission de la spectrophotométrie
 - 36a. Standards of Line-Intensity
Sous-Commission des étalons d'intensité des raies
 - 36b. Theory of Stellar Atmospheres
Sous-Commission pour la théorie des atmosphères stellaires
37. Stellar Clusters
Commission des amas stellaires
38. Exchange of Astronomers
Commission pour l'échange des astronomes
39. Creation of International Observatories
Commission pour la création d'observatoires internationaux
40. Radioactive Observations
Commission pour les observations radioactives
41. History
Commission pour l'histoire de l'astronomie
42. Photometric Double Stars
Commission des étoiles doubles photométriques

III. Program of the Meeting

1. The significant items on the program are given below.
 - a. September 3 - Meeting of the Joint Commission on Solar and Terrestrial Relationships.
 - b. September 4 - Inaugural Ceremony and Opening General Assembly.
 - c. September 5, 8, 10 and 12 - Commission meetings.
 - d. September 6 - Symposium on Stellar Evolution.
 - e. September 7 - Visit to the Vatican Observatory at Castel Gandolfo.

- f. September 9 A.M. - Meeting of the Joint Commission of Spectroscopy.
- September 9 P.M. - Symposium on Astronomical Instrumentation.
- g. September 10 A.M. - Meeting of Joint Commission of Spectroscopy.
- h. September 11 P.M. - Symposium on Astrometry of Faint Stars.
- i. September 12 - Closing General Assembly of I.A.U.

IV. The Russian Delegation

Ambartsumian, Victor A., Prof. Dr.

President, Academy of Sciences, Armenian SSR, Yerevan, USSR -

I.A.U.: Vice-President.

Khanadse, Eugene, Prof. Dr.

Director, Astrophysical Observatory, USSR -

I.A.U.: Comm. 32, 34.

Kharakin, Boris, Prof. Dr.

Director, Sternberg Institute of Astronomy, Moscow, USSR -

I.A.U.: Comm. 6, 27.

Kulkovskiy, Peter, Dr.

Lecturer at the Moscow University, USSR -

I.A.U.: Comm. 27.

Martynov, Dmitry, Prof. Dr.

Director, Leningrad Observatory, USSR -

I.A.U.: Comm. 5, 27, 42.

Masevich, Alla, Dr.

Senior scientific collaborator at the Sternberg Astronomical
Institute, Moscow, USSR.

Melnikov, Oleg, Prof. Dr.

Dept. Head, Pulkovo Observatory, Leningrad, USSR -

I.A.U.: Comm. 9, 12, 23, 36.

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Nemiro, Andrew, Dr.

Senior assistant, Pulkovo Observatory, Leningrad, USSR -

I.A.U.: Comm. 8.

Oraevsky, Paul, Dr.

Scientific collaborator, USSR Academy of Sciences, Moscow, USSR -

I.A.U.: Appointed by USSR National Committee for Astronomy.

Rlabov, Jerry, Dr.

Senior scientific collaborator at the Sternberg Astronomical
Institute, Moscow, USSR.

Severny, Andrew, Prof. Dr.

Director, Star's Observatory, Crimea, USSR -

I.A.U.: Comm. 25.

Zverov, Mitrofan, Prof. Dr.

Asst. Director, Pulkovo Observatory, Leningrad, USSR -

I.A.U. Comm. 6, 31.

V. Discussion of the Russian Delegation

1. In addition to the twelve Russian astronomers who actually attended this meeting, this section will contain a brief discussion of two other Russian scientists whose names came up during conversation that the writer had with some of the Russians who were present. These are V. I. Krasovskii, whose infrared work has been discussed in other chapters of this report, and E. N. Shklovskii, who is one of the most interesting astronomers working in Russia today.
2. The papers that have been published by the twelve Russians who were present and by Shklovskii and Krasovskii are listed below by title and number as they appear in Science Abstracts, Section A.

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9.

a. Ambartsumyan, V. A.

1) 1952 - none.

2) 1951

(1) Stellar associations and the origin of stars. 1564.

(2) Distribution of hot giants in the outer parts of spiral galaxies. 2348.

3) 1950 - none.

4) 1949

(1) Stellar associations. 6720.

5) 1948 - none.

6) 1947 - none.

b. Kharadza, E.

1) 1952 - none.

2) 1951 - none.

3) 1950

(1) Investigation of optical absorption in the galaxy from the colour excess of faint stars. 5457.

4) 1949 - none.

5) 1948 - none.

6) 1947 - none.

c. Brasovski, V. I.

1) 1952

(1) Identification of the night-sky spectrum around 10,000 Å. (with V. T. Lukashenya) 4612. (very interesting)
(dispersion 175 Å/mm; resolving power down to 5 Å)

(2) Reproducibility of Weinel's results relating to the night sky spectrum around 8000-9000 Å. (with V. T. Lukashenya) 7759.

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10.

(3) On the question of infrared radiation from the night sky and polar aurorae. (with P. A. Payeretski and M. I. Vordukhovich) 7761.

2) 1951

(1) On the mechanism of the illumination of the night sky. 6614.

(2) Counting of oscillations as a method of astronomical investigation. 6439.

(3) Influence of water vapours and carbon oxides and nitrogen on the luminescence of the night sky. 6152.

(4) Details of the night sky spectrum between 9500 and 12,000 Å. (with V. T. Lulashenya) 6582.

3) 1950

(1) Night sky radiation in the infrared region. 3597.

(2) New information about the radiation of the night sky in the region 8200-12,000 Å. 7410.

(3) Nature of the infrared radiation of the night sky. 6152.

(4) Infrared observation of the galactic centre. (with A. A. Kalinyak and V. T. Vikonov) 2885.

4) 1949 - none.

5) 1948 - none.

6) 1947 - none.

d. Inkerman, B.

1) 1952 - none.

2) 1951 - none.

3) 1950 - none.

4) 1949

(1) Variable stars and the structure of stellar systems. 2891.

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11.

5) 1946 - none.

6) 1947 - none.

e. Kulikovskiy, I.

1) 1952 - none.

2) 1951 - none.

3) 1950 - none.

4) 1949 - none.

5) 1948 - none.

6) 1947 - none.

f. Marshak, E. J.

1) 1952 - none.

2) 1951

(1) On a for-titton paper by M. A. Kovalev. 11.

3) 1950

(1) Determination of the space density of stars from photographs in two wave-lengths. 212.

4) 1949 - none.

5) 1948 - none.

6) 1947 - none.

g. Lasevich, A. G.

1) 1952

(1) On the evolution of stars of the main sequence. (with V. S. Serzhin) 11.

(2) The law of loss of stellar mass, deduced from the theory of the internal structure of the stars. 42.

2) 1951

(1) Problem of the evolution of stars in dispersed clusters.

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(2) Investigation of the mass-luminosity relation.

(with J. P. Poretsky) VI, 6002.

3) 1950

(1) Evolution of the sun accompanied by corpuscular radiation. 5441.

(2) Stellar evolution accompanied by corpuscular radiation, considered from the point of view of the internal constitution of the stars. 5441.

4) 1949

(1) The internal constitution of an early type giant. 3920.

(2) Stellar models. 3921.

5) 1948 - none.

6) 1947 - none.

Majority, Class

1) 1948 - none.

2) 1947 - none.

3) 1946 - none.

4) 1949 - none.

5) 1948 - none.

6) 1947 - none.

Minority, A.

1) 1948 - none.

2) 1947 - none.

3) 1946 - none.

4) 1949 - none.

5) 1948 - none.

6) 1947 - none.

1. Orlovsky, Paul

- 1) 1952 - none.
- 2) 1951 - none.
- 3) 1950 - none.
- 4) 1949 - none.
- 5) 1948 - none.
- 6) 1947 - none.

2. Alabov, S.

- 1) 1952 - none.
- 2) 1951 - none.
- 3) 1950 - none.
- 4) 1949 - none.
- 5) 1948 - none.
- 6) 1947 - none.

1. Severny, A. B.

- 1) 1952 - none.
- 2) 1951

- (1) Investigation of the fluctuation in the luminance of solar prominences. 312.
- (2) An experiment in phosphor photography of solar protuberances in the infrared. 3247.
- (3) Spectrophotometry of chromospheric eruptions. (with E. M. Mustel) 8460.
- (4) An interference filter for the study of the sun and its application. (with A. B. Gilver). 7454.

3) 1950

- (1) On the stability and oscillations of gaseous spheres

14.

(2) Interference light filter for astrophysical purposes. (with A. P. Gilyang) 2385.

4) 1949

(1) Non-static stellar atmospheres. 2287.

(2) On the origin of extra galactic nebulae. (with A. G. Solovyanov) 2413.

5) 1948 - none.

6) 1947 - none.

n. Sokolovskii, I. I.

1) 1952

(1) Excitation mechanics of the luminescence of polar lights. 2227.

(2) Emission of hydrogen lines in the spectra of polar lights. 2911.

2) 1951

(1) On the possibility of determining the distance of the "point" sources of galactic radiation. 609.

(2) Problems of the dissipation of planetary atmospheres. 2275.

(3) Identification of the infrared emission of the night sky with the vibration-rotation lines of the hydroxyl OH molecule. 3992.

(4) A computation of the concentration of the coronal ions in the excited quantum states. 7470.

(5) Computation of the concentration of the coronal ions in ground quantum states. 7472.

(6) Radio stars. 8114.

3) 1950

(1) The problem of the anomalous distribution of densities

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(1) On the ionization of the chromosphere protuberances. 2112.

(2) A new theory of solar eruptions and the sudden disturbances caused by them in the D-layer of the ionosphere. 2076.

4) 1946

(1) On the ionization of the solar corona. 2066.

(2) Galactic radio-emission. 2010.

(3) On the monochromatic radiation of the galaxy and the possibility of observing it. 2074.

(4) Problem of the identification of the coronal line λ 344.4 μ . 2071.

5) 1946 - none.

6) 1947

(1) Absorption of radio waves by the galaxy and the sun. 2007.

n. Zyarnov

1) 1952 - none.

2) 1951 - none.

3) 1950 - none.

4) 1949 - none.

5) 1948 - none.

6) 1947 - none.

3. A reading of the abstracts shows that in Sevany, Zarnov and Chidlovski, we are dealing with very able and active people. Sevany was definitely the most alert and one of the most able astronomers at the Rome meeting. He spoke English well, participated in many consultation meetings and in sub-committee meetings. He is interested in a wide range of problems, and was familiar with the work of Chidlovski and Zarnovskii in upper atmospheric problems. At one of the sessions, Sevany called

attention to the successful photography of solar protuberances in the infrared around $10,000 \text{ \AA}$, and on direct question by the writer, stated that he had used the technique that Krasovski had employed for the infrared night sky studies. This application to solar photography was new to the U. S. experts, and hence Severy's future publications will bear watching. There appears to be a pattern of original infrared photography by unusual methods in the work of these three Russians.

4. Perhaps the most interesting of the Russians is I. S. Shilovski. The writer believes that it will be possible to learn a great deal about the evolution of scientific effort in Russia by taking note of the pattern of a scientist's publications as a function of time. For example, an American astronomer such as H. Fred L. Spiller of Harvard, has developed from a relatively specialized student of meteors and comets, to one of our leaders in upper atmospheric physics. His published papers reflect the developments in the latter field.

5. If now one examines Shilovski's papers during the 1947-1952 post-war period, it is to be noted that from an earlier interest in the study of the solar corona, he has gone to such things as the infrared radiation in the night sky, to a theory of solar eruptions and the physics of the ionosphere, as well as to studies of the mechanisms of auroral displays. This is a significant evolution, since Shilovski's papers in the upper atmospheric fields are recent. It is certainly safe to conclude that Russian interest in fundamental upper atmospheric problems is being extended and that we can look for further developments.

6. Severy and Charadse were both reasonably well informed regarding Russian efforts in the upper atmosphere. Of the two, Severy appeared

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to be the better informed. Both of them were quite proud of the work of Shklovski and Lurkovski, so it appears reasonable to conclude that these two represent the top level of effort in the field.

7. In reply to a direct question regarding Russian activity in the field of upper atmospheric rocket research, Kharadse simply stated that he did not know about this field. It is hard to interpret this reply, since it seems unlikely that any good Russian astronomer would have failed to have learned about rocket studies of the upper atmosphere. The writer's conclusion here is that there is some planning going on in an effort to imitate the U. S. upper atmosphere rocket program, but that it is at an early stage.

8. An examination of the publications of the Russian delegates during the 1947-1952 period shows in a startling way that except for Ambartsumian, Jevany, Masovich, Kukarkin and Kharadse, the most prolific publishers in Russia were not delegates to the meeting. Comments on this will be made elsewhere, but it can be pointed out here that the participation of the Russians in the meetings appeared to correspond fairly well to what one might expect from their published scientific records. It is surprising that the delegation included so many who were not very well known; and so many who really did not participate. The most active members of the delegation were Ambartsumian, Kukarkin, Masovich and Jevany. Two of the principal announced participants in the Symposium on Stellar Evolution, Drs. S. A. Shajn and V. G. Fetislov, did not come to Rome for reasons which were given at the Symposium. It is clear that Russia did not send anything resembling its "first team" to this very important meeting. The future activities

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of such people as Trajan and Tseschov, as well as of others who did not come to this meeting, will be worth watching. These may reveal evidences of trends in the politics of science in Russia.

VI. The U. S. Delegation

William Harold Lee, Prof.

Director, Landon McComick Observatory, University of Virginia, Charlottesville, Va., U.S.A. - I.A.U.: Comm. 20, 31.

Blade, Walter, Jr.

Staff member, Mount Wilson and Palomar Observatories, Pasadena, Cal., U.S.A. - I.A.U.: Comm. 25, 26, 27, 28, 29, 30.

Harpendick, Robert, Dr.

Director of the Goodsell Observatory, Northfield, Minn., U.S.A. - I.A.U.: Comm. 30. (Generalist).

Coburn, William H., Prof. Dr.

Professor, Ohio State University, U.S.A. - I.A.U.: Comm. 11.

Down, Fred, Prof.

Director of the Mount Wilson and Palomar Observatories, Pasadena, Cal., U.S.A. - I.A.U.: Comm. 9, 21, 32.

Royd, Constantine, M.D.

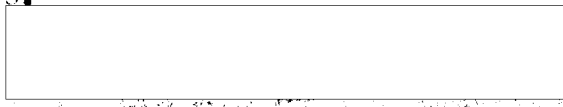
Staff member, Massachusetts Institute of Technology; member of the American Astronomical Society, Arlington, Mass., U.S.A.

Trower, Dick, Prof.

Director, Yale University Observatory, New Haven, Conn., U.S.A. - I.A.U.: Comm. 12, 7, 16, 17, 20, 12.

Carpenter, Martha Stahr, Prof. Dr.

Assistant Professor of Astronomy, Cornell University, U.S.A. - I.A.U.: Comm. 10.



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Clarence, [unclear]

Director, U. S. Nautical Almanac, U. S. Naval Observatory,
Washington, D. C., U.S.A. - I.A.U.: Comm. I, 1, 20.

Dodson, Helen M., Dr.

Associate Professor of Astronomy, University of Michigan, Ann Arbor,
U.S.A. - I.A.U.: Comm. II.

Dunham, Theodore Jr., Dr.

Research Associate, Harvard College Observatory; Research Associate,
University of Groningen; Scientific Director, Center for Astrophysical
Research, Inc., Rochester N. Y., U.S.A. - I.A.U.: Comm. I, 29, 30, 31.

Eckert, William John, Dr.

Director of Science International Business Machines Corporation,
New York, U.S.A. - I.A.U.: Comm. I, 27, 28, 29.

Erwin, Frank M., Dr.

Director of the Lowell Light Observatory, Chairman of the Astronomy
Dept., Lowell University, Middletown, U.S.A. - I.A.U.: Comm. I, 32.

Felt, Clinton S., Dr.

Asst. Director, OGDAS Laboratories, Wesleyan University, Windsor
Locks, Conn.; Secretary, American Association of Variable Stars, U.S.A. -
I.A.U.: Appointed to American Astronomical Society.

Gosner, Joseph H., A.B., M.A.

Astronomer, U. S. Naval Observatory, Washington, D. C., U.S.A.

Gosner, Elsie Jane, Mrs., Ed. Sc., M.A.

Astronomer, U. S. Naval Observatory, Washington, D. C., U.S.A.

Hall, John S., Dr.

Director, Equatorial Division, U. S. Naval Observatory, Washington,
D. C., U.S.A. - I.A.U.: Comm. I, 21, 22, 23.



Harrison, George R., Jr.

Dean, School of Science, U.S.A. - I.A.U.: Comm. 14.

Harwood, Margaret, Miss

Director of Maria Mitchell Observatory, Nantucket, Mass., U.S.A. -
I.A.U.: Comm. 27.

Herrick, Samuel, Dr.

Professor of Astronomy, University of California, Los Angeles,
Cal., U.S.A. - I.A.U.: Comm. 7.

Huffer, Charles Morse, Prof.

Secretary of the American Astronomical Society, Washburn Observatory,
Madison, Wisc., U.S.A. - I.A.U.: Comm. 42.

Jacchia, Luigi, Dr.

Research Associate, Harvard College Observatory; Research Associate,
Massachusetts Institute of Technology, Cambridge, Mass., U.S.A. -
I.A.U.: Comm. 22.

Jenkins, Francis A., Prof. Dr.

Professor of Physics, University of California, Berkeley, U.S.A. -
I.A.U.: Joint Commission on Spectroscopy.

Kaplan, Joseph, Prof. Dr.

Professor of Physics, University of California, Los Angeles, U.S.A. -
I.A.U.: Comm. 22.

Kuiper, Gerard P., Prof.

Professor of Astronomy, University of Chicago, Director of the
Yerkes Observatory, Williams Bay, Wis., U.S.A. - I.A.U.: Comm. 16,
24, 26, 33, 36, 42.

Mack, Julian Ellis, Prof.

Professor of Physics, University of Wisconsin, U.S.A.

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Markowitz, William, Dr.

Astronomer, U. S. Naval Observatory, Washington, D. C., U.S.A. -

I.A.U.: Comm. 19.

Matthews, Thomas A.

Harvard College Observatory, Cambridge, Mass., U.S.A. - I.A.U.:

Appointed U. S. National Committee I.A.U.

Mayall, Margaret Walton, Mrs.

Pickering Memorial Astronomer & Recorder A.A.V.S.O, Harvard College

Observatory, Cambridge, Mass., U.S.A. - I.A.U.: Comm. 27, 29.

McDonald, Sophia L., Prof. Dr.

Professor of Mathematics, Berkeley, Cal., U.S.A. - I.A.U.: Comm. 20.

Meggers, William F., Dr.

Chief, Spectroscopy Section, National Bureau of Standards, Washington,

D. C., U.S.A. - I.A.U.: Comm. 14.

Moore-Sitterly, Charlotte, Mrs.

Physicist, National Bureau of Standards, Washington, D. C., U.S.A. -

I.A.U.: Comm. 14. (Wife to: Sitterly, Bancroft W., Professor).

Nassau, Jason John, Prof.

Director of Warner & Swasey Observatory, Case Institute of

Technology, Ohio, U.S.A. - I.A.U.: Comm. 29, 37.

Page, Thornton Leigh, Dr.

Deputy Director, Operations Research Office, The Johns Hopkins

University, Chevy Chase, Maryland, U.S.A. - I.A.U.: Comm. 28.

Rice, Donald A., Mr.

Chief, Section of Gravity and Astronomy, U. S. Coast and Geodetic

Survey, U.S.A. - I.A.U.: Comm. 18, 19.

Richardson, David, Mr.

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Head, Spectros

Bausch &

Lomb Optical Company, New York, U.S.A.

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Rosch, Franklin G., Dr.

Research Physicist, U. S. Navy Dept., Washington, D. C., U.S.A. -

I.A.U.: Appointed by National Research Council.

Savedoff, Malcolm Paul, Dr.

U. S. National Science Post-Doctoral Fellow at Leiden Observatory,

U.S.A. - I.A.U.: Appointed by U. S. National Committee of Astronomy.

Schwarzschild, Martin, Prof.

Professor of Astronomy, Princeton University Observatory, U.S.A. -

I.A.U.: Comm. 35.

Shane, C. D., Dr.

Lick Observatory, Mt. Hamilton, Ca., U.S.A. - I.A.U.: Comm. 23, 36.

Shapley, A. H., Mr.

Physicist, National Bureau of Standards, Washington, D.C., U.S.A. -

I.A.U.: Comm. 10.

Shapley, Harlow, Dr.

Director of Harvard Observatory, Cambridge, Mass., U.S.A. - I.A.U.:

Comm. 27, 39.

Shapley, Marthe B., Mrs.

Research Staff member Massachusetts Institute of Technology, U.S.A. -

I.A.U.: Comm. 27, 41. (Wife to: Shapley, Harlow, Dr.).

Shortley, George, Dr.

Deputy Director, Operations Research Office, Johns Hopkins University,

U.S.A. - I.A.U.: Comm. 14.

Singer, S. F., Dr.

Physicist, U. S. Embassy London - U.S.A.

Sitterly, Bancroft W., Dr.

Professor, The American University, Washington, D. C., U.S.A. -

I.A.U.: Appointed by U. S. National Committee on Astronomy, National

Research Council

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Smith, Elske v. P., Mrs.

Student at Harvard College Observatory, Cambridge, Mass., U.S.A.

(Wife to: Smith, Henry J.).

Smith, Henry J., Jr.

Student at Harvard College Observatory, Cambridge, Mass., U.S.A.

Sollenberger, Paul

Director, Time Service, U. S. Naval Observatory, Washington, D. C., U.S.A.

- I.A.U.: Comm. 18, 19, 31.

Struve, Otto, Dr.

Director of the Leuschner Observatory, University of California,

Berkeley, Cal., U.S.A. - I.A.U.: Vice-President.

Swensson, John Walter, Dr.

Research assistant, Institut d'astrophysique de l'universite de Liege -

U.S.A. - I.A.U.: Designe par Comite National Belge d'Astronomie,

Appointed by U. S. National Committee for Astronomy.

Swope, Henrietta H., Miss

Research assistant, Mt. Wilson & Palomar Observatories, Pasadena,

Cal., U.S.A. - I.A.U.: Appointed by American Astronomical Society.

Thomas, Richard Nelson, Prof.

Associate Professor of Astrophysics, University of Utah, U.S.A. -

I.A.U.: Comm. 13, 35.

Van Dierbroeck, George, Prof.

Astronomer emer., Yerkes Observatory, Williams Bay, Wisc., U.S.A. -

I.A.U.: Comm. 13, 15, 20, 26.

Watts, Chester E.

Astronomer, U. S. Naval Observatory, Washington, D.C., U.S.A. -

I.A.U.: Comm. 8, 9, 17.

Weaver, Harold F., Dr.

Associate Professor of Astronomy, University of California, Berkeley,

U.S.A. - I.A.U.: Comm. 25, 27, 29.

Whipple, Fred L., Dr.

Chairman, Department of Astronomy, Harvard University, U.S.A. -

I.A.U.: Comm. 20, 22.

Wood, Frank Bradshaw, Dr.

Executive Director of the Flower and Cook Observatories of the University of Pennsylvania, Philadelphia, Pa., U.S.A. -

I.A.U.: Comm. 27, 42.

VII. Discussion of the U. S. Delegation

1. Seven members of the U. S. Delegation were officially appointed by the Department of State and the National Research Council to represent the U. S. These were J. J. Nassau, secretary and chairman, U. S. A. National Committee; I. S. Bowen, D. Frouwer; C. W. Clemence; F. L. Whipple; G. P. Kuiper; O. Struve, chairman of the delegation.

2. The members of the U. S. Delegation were prominent in the conference as participants in commissions and in symposia. Some of them impressed the writer as having the qualities needed to do a good job of obtaining scientific intelligence during the meetings, and also during visits before and after these meetings. Their names will be listed below for possible future reference. Their particular interests will also be indicated. Reference can be made to list of delegates for the professional positions of these people.

- a. Dr. Helen W. Dodson, solar astrophysics
- b. Dr. George R. Harrison, spectroscopy
- c. Dr. F. A. Jenkins, spectroscopy
- d. Dr. F. E. Roach
- e. Mr. A. H. Sharley

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- f. Dr. S. F. Singer
- g. Dr. H. N. Thomas
- h. Dr. F. L. Whipple.

Dr. G. E. Kron of the Lick Observatory of the University of California is an outstanding U. S. expert in methods for the detection and measurement of radiation. In a later chapter, we will develop the idea of devising new methods for detecting possibly USSR experiments by the study of radiation emitted at large distances. The instrument which we would like to examine, and if possible exploit, is the spectrograph. Dr. Kron knows the receiving end of an astronomical telescope, and how to record its observations, as well as anyone. He is worth considering as a possible member of a scientific intelligence team for future meetings of the I.A.U. In Section XIV, under the heading "Proposed Preparation for Future Meetings," we suggest that a group such as that given above be contacted and prepared for future participation in meetings. Further comments on the U. S. Delegation will appear in the chapter on "People".

VIII. Other Interesting Delegates

1. Woolley, Richard v.d.P., Prof.

Director Commonwealth Observatory, Mt. Stromlo, Australia -

I.A.U.: Comm. 9, 12, 13, 19, 25, 26, 36, 40.

2. Nicolet, Marcel, Prof. Dr.

Chef du service du Rayonnement, Institut meteorologique de

Belgique, Brussels - I.A.U.: Comm. 12, 22, 40.

3. Swings, Pol, Prof.

Directeur de l'Institut d'Astrophysique de l'Universite de

Liege, Belgique - I.A.U.: Comm. 29.

4. Heard, John F., Prof.

Director of the David Dunlap Observatory, Richmond Hill,
Ontario, Canada - I.A.U.: Comm. 30.

5. Buchar, Emil, Prof. Dr.

Directeur de l'Institut d'astronomie et de géophysique à
l'Université technique de Prague, Tchécoslovaquie - I.A.U.:
Comm. 18, 19.

6. Guth, Vladimir, FN, Dr.

Director of the Observatory Skalnaté Pleso, Slovak branch of
the Central Astronomical Institute, Tatranska Lomnica,
Czechoslovakia - I.A.U.: Comm. 17, 20, 20 a, 22.

7. Link, Frantisek, Dr.

Director, Central Institute of Astronomy, Ondrejov u Prahy,
Czechoslovakia - I.A.U.: Comm. 9, 11, 13, 22, 22a, 33.

8. Nechville, Vincent, Doc. Dr.

Docent d'astronomie à l'Université Charles, Prague,
Czechoslovakia - I.A.U.: Comm. 24.

9. Perek, Lubos, Dr.

Assistant of the Astronomical Institute of the Masaryk
University, Brno, Czechoslovakia.

10. Strömgren, Bengt, Prof. Dr.

Director, Yerkes and McDonald Observatories, Williams Bay,
Denmark
Wisc. - I.A.U.: Secretary General.

11. Madwar, M. Reda, Prof.

Director of Royal Observatory, Helwan, Egypt - I.A.U.:
Comm. 18, 28, 31.

12. Barbier, Daniel, Dr.

Astronome à l'Observatoire de Paris et à l'Institut d'Astro-
physique,

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13. Chalange, Daniel, Dr.
Astronome titulaire de l'Observatoire de Paris, France -
I.A.U.: Comm. 12, 29, 36.
14. Dufay, Jean, Prof.
Directeur des Observatoires de Lyon et de Haute Provence,
France - I.A.U.: Comm. 9, 15, 22, 25, 34, 36.
15. Herman, Reneo, Dr.; MSc
Astronome adjoint a l'Observatoire de Paris, Meudon, France -
I.A.U.: Comm. 15.
16. Kourganoff, Vladimir, Dr.
Maitre de recherches au Centre National de la Recherche
Scientifique, Paris, France - I.A.U.: Comm. 36.
17. Lallemand, Andre
Astronome a l'Observatoire de Paris, France - I.A.U.: Comm. 9.
18. Schatzmann, Evry, Docteur
Institut d'astrophysique de Paris, France - I.A.U.: Comm. 35.
19. Grotrian, Walter, Prof. Dr.
Direktor des Astrophysikalischen Observatoriums, Potsdam,
Deutschland - I.A.U.: Comm. 10, 13.
20. Kienle, Hans, Prof. Dr.
Direktor der Landerssternwarte zu Heidelberg-Königsstuhl,
Deutschland - I.A.U.: Comm. 9, 36.
21. Kiepenheuer, Karl-Otto, Prof. Dr.
Direktor des Fraunhofer Instituts, Freiburg-Schauinsland,
Deutschland - I.A.U.: Comm. 10, 11, 13.
22. Miczaika, Gerhard, Dr.
Wissenschaftl. Assistent an der Badischen Landessternwarte,
Heidelberg-Königsstuhl, Deutschland - I.A.U.: Comm. 29.

23. Allen, Clabon Walter, Prof.
Professor of astronomy, University College, London, Great Britain - I.A.U.: Comm. 3, 10, 11, 13, 36.
24. Blakett, P. M. S., Prof.
Director Physics Laboratory, University of Manchester, Great Britain - I.A.U.: Comm. 40.
25. Rosseland, Svein, Prof. Dr.
Director of the Institute of Theoretical Astrophysics, Oslo University, Norway - I.A.U.: Comm. 9, 35, 38.
26. Oort, J. H., Prof.
Director of the Observatory of Leiden, The Netherlands - I.A.U.: Comm. 23, 28, 32, 33, 34, 39.
27. De Jager, Cornelis
Astrophysicist at the Sonnenborgh Observatory, Utrecht, The Netherlands - I.A.U.: Appointed by The Netherlands National Council of Astronomy.
28. Bakker, Cornelius J., Prof.
Director of the Zeeman Laboratory, Amsterdam, The Netherlands - I.A.U.: Joint Commission for Spectroscopy.
29. Rybka, Eugeniusz, Prof. Dr.
Director of the Observatory of Wroclaw University, Poland - I.A.U.: Comm. 25.

IX. Discussion of Delegates in Section VIII.

1. The discussion of most of the delegates who are listed in Section VIII will be given in Chapter Nine. However a few general remarks can be made; as for example, that none of the delegates from Czechoslovakia were present, even though they are listed as participating in the Congress.

This was particularly disappointing since several of the delegates were members of Commission 22, of which the writer is a member. France had an unusually large and distinguished delegation, as did Germany, England, Belgium, Holland and the host country Italy. The number of delegates from a given country does not reflect the relative activity of that country in astronomy, since distance, exchange restrictions and other considerations enter in determining the number. The distribution of delegates among Commissions is a better criterion. When a current list of Commission memberships is issued, it will be worth analysing from the point of view of distribution among the various countries. This analysis is trustworthy, since the commissions are made up by inviting the most active people in the various fields to join. The current Commission memberships are available in Volume I of the Draft Reports, however the writer has not analysed these lists.

X. Comments on the Meeting of the Joint Commission on Solar and Terrestrial Relationships on September 3.

1. The most interesting item in the meeting of this Commission was the symposium on solar-terrestrial phenomena. Because of the Volta Congress, which took place Sept. 14-19 and unfortunately had to be missed by this writer, the various topics were only briefly discussed at the I.A.U. meeting. The topic of the Volta Congress was Solar Physics. The titles of the papers at the September 3 meeting in Rome at least give us an idea as to the kind of investigations now in progress. The discussions and presentations were in general not of very high order, which only reflects the complexity and vagueness that characterize this important field. The speakers at this meeting were R. Bureau, Y. Nagihara, J. S. Hey, K. O. Kiepenheuer, M. Laffineur,

D. H. Menzel, E. W. Newton, M. Nicolet, J. A. Simpson and E. Vassy. Severny and Melnikov were present, and Severny showed considerable interest in several of the papers, entering in the discussion. Strangely enough, when Vassy presented a new idea as to how solar activity might affect the lower atmosphere, Severny did not enter the discussion. This problem is probably the most important one in the entire area of solar-terrestrial studies. Since this Commission issues a complete report, attention is called here to this, with the recommendation that this field be closely followed by those interested in geophysical intelligence.

XI. Comments on the Meetings of Commissions

1. The principal business at commission meetings had to do with the discussion and approval of draft reports. The writer was obviously unable alone to cover the meetings of all of the Commissions, but he did attend as many of these as possible. An examination of the general programme will show that Commissions were arranged in related groups, so that Commissions having to do with related subjects could meet together.
2. In several cases, informal symposia were arranged and held in addition to the commission meetings. It is notable that with the exception of the Russian astronomer Severny, none of the Russians present joined the informal symposia as active participants.
3. A striking characteristic of the commission meetings which the writer was able to attend, was that there were seldom more than two Russians present at any single meeting. There were never more than six sessions at any time, so that the Russians were able to cover the Congress very effectively.

4. It is also notable that the character of the Russian delegation was such as to make it impossible in many cases to have qualified people to cover the meetings. For example, the two Russians who covered the meetings of the Commissions in Group III - Physics of Earth and Planets, were clearly not qualified to do a good job. Whether this means that the Russian astronomers who controlled the attendance at the Rome meetings, are not particularly interested in these problems, or that the leaders of Russian science were not too interested, is difficult to say. It is consistent with the experience in Zurich (1940), where an excellent symposium on the upper atmosphere was not attended by any of the Russians. In Zurich however, the Russians did not divide their forces as they did in Rome, where it was clear that they were interested in really covering the meetings.
5. The chairman of two of the sessions attended by the writer were clearly friendly to the Russians. These were the sessions attended by the astronomer from the Netherlands, Dr. Minnaert; and by the Frenchman, Dufay from Lyon.
6. The Russians were alert as they could be considering language barriers and other difficulties. They often asked questions and picked up all of the material that was made available. The contrast with Zurich was very striking and every aspect of Russian behavior showed planning. The two Russians, generally assigned to a given session, usually sat together and also with one or two well-known French or other left wing astronomers. Several of the Frenchmen acted as if they were being paid to help the Russians.
7. The meeting of Commission 10 on Photospheric Phenomena was a very interesting one, particularly because of Severny's contributions.

Severny proposed Dr. Walter C. Roberts of the High Altitude Observatory of Harvard University and the University of Colorado as Chairman of a sub-commission for the cinematography of solar protuberances. He also presented a supplement to the published draft report. He stressed that he had contracted flare and prominence pictures taken in the infrared helium line at $10,830 \text{ \AA}$, and in the hydrogen line at $65,630 \text{ \AA}$. He showed the photographs, and it was interesting to the writer that none of the U. S. experts present questioned Severny as to his method of obtaining a photograph at $10,830 \text{ \AA}$ of an occurrence which changes with time. When the writer asked about this, Severny replied that he had used the same method as Krasovski used, i.e., an electron image converter. This meeting revealed without question the intense Russian interest in solar physics, and in view of our own extensive Air Force support of this type of work, a special effort should be made to study the work of Severny and others, and to watch its developments.

8. Severny again played an active role in the meetings of Commission 11-11a and of Commission 12. These commissions deal with the outer layers of the Sun, motion pictures of prominences, and with solar radiation and solar spectroscopy. It was in Commission 11 where the ionospheric effects of solar flares were discussed. Severny gave the writer the impression here that USSR interest in the work of these commissions is based on a growing interest rather than on real accomplishment on their parts. For example, Dr. Minnaert, who presided over Commission 12, pointed out several problems of considerable significance. Among these was the study of the solar constant, energy distribution in the solar spectrum, study of line profiles. Minnaert is probably quite familiar with Russian activity in these areas, and

his presentation of the urgency of certain areas of solar research, carried with the implication that Russia was not ahead in these fields.

9. We will undoubtedly repeat statements regarding the importance of all studies in solar physics, and in solar-terrestrial relationships. The conclusion from a number of indications at Rome is that we are well ahead of Russia in these areas. The U. S. should exploit this advantage. The Air Force program in this field, as well as possible related programs elsewhere should be helped. Such problems as long range weather forecasts, temperature forecasting and the forecasts of communications conditions in the ionosphere, will depend on our knowledge in this area. One must always remember that astronomers are ingenious and are constantly demanding improved techniques and equipment. The relatively low cost exploitation of work in this area will repay in terms of our national scientific advances.

10. In June of 1952, just prior to the writer's departure for Europe, he suggested to the President of the University of Colorado, Dr. R. L. Stearns, that the complex of solar studies now underway at the High Altitude Observatory in Climax, Colorado, and in Boulder, be brought together as an Institute of Solar-Terrestrial Studies. This Institute will require much long range help, and every agency of the Defense Establishment, as well as other sources of support, should concentrate on its promotion. We are ahead, and we should stay ahead.

XII. Comments on the Symposia and on the General Assembly.

1. The following symposia were held in Rome:

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Symposium on the Evolution of Stars

- V. A. Ambartsumian - Introductory Discourse for the Symposium on the Evolution of Stars.
- V. G. Fessenkov - Corpuscular Radiation as a Factor in the Evolution of Stars.
- G. A. Shajn and V. Th. Wase - Some Results of Researches on the Diffuse Gaseous Nebulae and their Relation to Cosmogony.
- Note: Only one of these three Russians was present, but excuses were made for the absence of Shajn and Fessenkov, both very prominent astronomers.
- B. Lindblad - On the Evolution of Stellar Systems.
- J. H. Eort - Expanding Motions in Groups of Early-Type Stars.
- W. Baade - Basic Facts of Stellar Evolution.
- F. Hoyle - Role of Accretion on Stellar Evolution.
- J. L. Greenstein and M. Schwarzschild - The Chemical Composition of the Stars and Its Relation to Stellar Evolution.

Symposium on Problems of Astrometry of Faint Stars

- M. S. Zverev - Catalogue of Faint Stars: an Astrometric Problem.
- A. Blaauw - Problems of Stellar Astronomy Connected with the Study of Absolute and Relative Motions of Faint Stars.
- A. N. Leutsch - The Use of Extragalactic Nebulae in Problems of Astrometry and Stellar Astronomy.
- A. Kopff - The Development of a Fundamental Catalogue of Weak Stars.
- J. Lersink - On the Catalogue of 3300 Faint Stars.
- J. Cbrt - On the Measurement of Proper Motions with Respect to Extragalactic Nebulae.

- E. W. Rybka - On the Organization of Meridian Observations of the Catalogue of Faint Stars.
- S. Vasilevski's - Investigation of the Precision of Determinations of Star Positions in Respect to the Extragalactic Nebulae.
- A. N. Vyssotsky - On the Reference of Faint Stars to the Fundamental System.
- D. Brouwer - On the Astrometric Work of the Yale Observatory.

Symposium on Instruments

- E. H. Ingham, Cambridge, England - The Schmidt Camera and its Variations.
- A. Couder, Paris - Concerning Astronomical Thermal Phenomena in Reflecting Telescopes.
- A. Lallemand, Paris - Electronic Receivers.
- I. S. Bowen, Pasadena - The 200" Telescope.
- F. L. Whipple - The Schmidt Meteor Camera.

2. It is to be noted that the Russians organized the symposia on stellar evolution and on the astrometry of faint stars, and they certainly dominated these meetings to a point, where many in the audience showed resentment. The twelve Russian delegates were like noisy children, in that their impact on the meeting was much greater than their contributions warranted. In this, they were ably aided by the French astrophysicist E. Schatzmann, an able astronomer, who did everything he could to help the Russians. He is well known for his extreme left wing sympathies, and his behavior at the Rome meetings confirmed this in no uncertain manner. The selection of the USSR delegation was based on their plan to exploit their activity in the areas covered by these two symposia, and in this way to give an impression of accomplishment, which was far greater than their real status in astronomy.

3. There were a number of unofficial symposia, the most elaborate of which was the one on "Spectra of Variable Stars". Other interesting ones were on upper atmospheric problems, with emphasis on meteor studies, and on recent results in radio-astronomy. Harlow Shapley of Harvard gave an evening lecture on "Extragalactic Problems".

XIII. Comments on the Draft Reports, I.A.U.

1. On pages 11, 15 and 16 of Volume I, 1952 Draft reports, one will find a list of observatories which subscribe to the astronomical telegrams and circulars which announce the discovery of new objects. This includes observatories in Poland, Czechoslovakia, Hungary, and Russia. This list will be useful for planning and identification purposes, as well as for other reasons.
2. On page 34, in the report of Commission 10, a list of observatories which collaborate internationally on the study of sunspot development is given. The absence of Russian observatories is to be noted.
3. On page 51, in the report of Commission 12, the reference to telluric lines may be of significance in connection with the use of sky radiations and other geophysical and astrophysical methods in the detection field.
4. A very good bibliography accompanies the report of Commission 12, and this will be useful to show who are new to the solar physics field. It does not look as if the past interest of the Russians is as much on the experimental as the theoretical side. This agrees with the impressions gained in Rome.

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5. It is unfortunate that the report of Commission 13 on solar eclipses is not better documented by a complete bibliography. However, it is a good report, and in view of the interest of Air Force Geophysics Research Directorate in solar eclipses, attention is called to this report.

6. The report of Commission 14 is notable because of the absence of Russian participation. This agrees with their failure to cooperate with the Joint Commission for Spectroscopy which will be reported in another chapter.

7. In contrast with Commission 17, Commission 15 on the Study of the Physics of Comets is marked by the extent of Russian interest. Swings' suggestions on pages 90 and 91 are very interesting, because of the importance of cometary emitters like CN, CH, NH₂, etc., in the spectroscopy of combustion.

8. Because of the special significance of meteors, night airglow and other luminous phenomena of the atmosphere, special attention is directed to the report of Commission 22. This Commission has a fair representation from Russia and Czechoslovakia, but unfortunately such people as Fesenkov and Link were not in attendance. The chairman of the sub-commission, Dr. Dufay, appears to be particularly well informed on Russian activity in the field and is known as a communist.

9. The report of Commission 29 on the Spectra of Stars is one of the most important and complete one in the entire series. The report of the sub-commission on molecular bands in stellar spectra may be of particular significance to practical and theoretical spectroscopists. No particularly outstanding work of Russian origin is reported.

10. The report of Commission 34 on Interstellar Matter and Galactic Nebulae is also an important one. The chairman of this Commission, Dr. O. Struve, has included in the report on pages 285-288, a report by E. K. Kharadse and V. V. Sobolev of important advances in this field by the USSR astronomers.

11. Particular attention is called to the report of Commission 36, on Spectrophotometry. It is here where advances in photomultipliers and other radiation detection devices will be revealed. An extremely good and extensive bibliography is given. This chapter should be thoroughly and carefully analysed. It is recommended that consideration be given to the analysis of this and other reports, since this Report does not pretend to do more than point the way.

12. The report of the Sub-Commission for the Theory of Stellar Atmospheres and Transfer of Radiation is another one which is well documented, carries many possibly significant practical inferences and in particular has a very challenging section (pages 319-323) on urgent problems concerning stellar atmospheres. The section 3 of this part of the report, which deals with hydrodynamics and electromagnetism, contains material which will affect research in a number of fields (e.g. aerodynamics and meteorology), which are of great practical and immediate interest to the Air Force. It is to be noted that the Dutch astrophysicist Minnaert, who is a good linguist and well acquainted with the Russians, is chairman of this sub-commission.

13. Volume II of the Draft Reports starts out with administrative matters, including the much reported controversy which led to the failure to hold the 8th General Assembly in Leningrad in 1951.

No attempt will be made here to analyse this controversy. This part of the Draft Reports will be of interest to agencies which are analysing USSR attitudes in various fields.

14. Commission 35 on the Constitution of Stars, is one in which the Russians are well represented, and the report is well documented. It is here where nuclear physics and astrophysics overlap. The intelligence interest is therefore clear. The report is in Volume III on pages 32-42.

15. Commission 40 is a new one on Radioelectric Observations. It met for the first time at Rome. Its report is very significant, because here we have an electronic technique being applied to astronomy, and hence the reports of this Commission should reflect electronic advances, more than any other phase of astronomy. In fact, this is about the only Commission which could include USSR representatives, and in preparing for the coverage of the 1955 meeting of the I.A.U., a lot of attention should be given to this Commission.

XIV. Proposed Preparation for Future Meetings.

1. The description of the Rome meeting of the I.A.U. has brought out the existence of a careful preparation on the part of the Soviet participants prior to their actual arrival in Rome. One can only surmise what went into the preparation, but certain conclusions that have been pointed out in the earlier sections appear to support the fact that long range preparations had been accomplished. Whether or not this becomes the pattern for future meetings remains to be seen. The Russians are not members of the International Union of Geodesy and Geophysics, although in view of their techniques at the I.A.U. meeting,

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it would not be at all surprising if they tried to join this union. The writer knows of several high level indications that they would be welcomed into the U.G.G.I.

2. In contrast to the way in which the twelve Russian delegates were organized, the approximately sixty U. S. participants were not aware of the implications of this meeting. The only U. S. organization was that of the U. S. A. National Committee, headed by C. Struve, and set up as a voting unit on matters which came before the assembly. On the other hand the U. S. delegation represented a very powerful potential group from the point of view of scientific intelligence. This was true as well in the case of the U. S. delegation to the 1951 Brussels meeting of the U.G.G.I. This delegation numbered approximately eighty, and covered all of the fields of geophysics.

3. There are many indications of the increased interactions involving astrophysics, geophysics, pure physics and applied physics and chemistry. Solar and terrestrial interaction studies could be basic to long-range weather forecasting, and to the understanding of communications necessary for military operations. The writer has shown several possible relationships between upper atmospheric physics and important applied areas. The intelligent, well-planned and fruitful coverage of international meetings will become an increasingly significant factor in the building of an effective intelligence service. In what follows, a proposed program for achieving this will be tentatively outlined. In doing this, the writer cannot take into account whether or not the Air Force or any other agency will be in a position to undertake the project. He can only outline it, and indicate his conclusions as to the possible method of carrying out the program.

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4. There are two forthcoming meetings for whose coverage plans should be initiated very soon. The first of these is the meeting of the U.C.C.I. to be held in Rome in September of 1954. Of particular interest to the Air Force at this meeting will be the series of symposia on the upper atmosphere which will be arranged by a committee headed by the writer. A similar, but more modestly conceived symposium was held in Brussels in 1951 and was very well received. The success of that meeting led to the setting up of a Mixed Committee on the Upper Atmosphere, which is charged with arranging the Rome 1954 program. The second of these meetings is the next I.A.U. meeting, which is to be held in Dublin in 1955. There will be other symposia, committee meetings, etc., at the U.C.C.I. meeting than the one on the upper atmosphere, and of course there will be the many opportunities for informal contact between scientists that the relatively leisurely programs of these meetings will afford.

5. How can the U. S. prepare for obtaining the maximum amount of intelligence from these sessions? In the case of the I.A.U. the answer appears to be relatively simple and straightforward. A few key people in the probable U. S. delegation should be brought together for the purpose of discussing this question. The indications are clear that no such discussion group has ever been set up. The initial discussion group should be small and it should consist of some of those who were delegates to the Rome meeting. The writer is reasonably certain that several of the Americans present were aware of something "unusual" about the Russian delegation. It would be interesting to bring a few of these people together for the purpose of evaluating the Rome meeting from the intelligence viewpoint, and for the purpose of designing a program for better coverage of the

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next meeting. The writer was impressed by the fact that several of the U. S. delegates would have had excellent opportunities for obtaining valuable information had they been aware of the need for this. The earlier sections of this report mention several examples of this.

6. There exists an excellent potential group of geophysicists, particularly in atmospheric physics, who could obtain valuable information at the Rome meeting of the U.S.G.I. It is quite likely that most of them are not aware of the many wasted opportunities that have existed in the past, wasted simply because of a lack of experience and orientation. In geophysics the opportunities are more indirect, since the Russians are not members of the U.S.G.I. However, the importance of the upper atmosphere, as one views the future developments, is so great that no opportunity can be wasted, even if indirect. Here also it would be possible to name such a group and to bring them together for a study of intelligence in relation to their present and possible future roles in geophysics. The advantages of this group over a possible one in astronomy lies in their greater individual experiences with scientific and technical problems of interest to the military.

7. From the viewpoint of the writer's experience it looks as if the most significant problem in obtaining the maximum of intelligence from scientific meetings is that of orientation and awareness. How one can overcome this weakness in the cases of nearly all potentially valuable people is indeed a difficult task. One approach would be to identify those who would be interested and to set up some kind of discussions for them prior to their attendance at meetings.

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8. If this program is to be carried out with full recognition of our complete scientific intelligence needs, this should be done on the highest possible level. If it is to be related directly to Air Force needs as its particular frame of reference, then AFIC could carry out the necessary preparations. It is difficult to decide between these alternatives, although the writer's feeling is that a special frame of reference is more pliable than one which is too general. One must have a few important questions in mind in order to avoid confusion and diffuseness.

9. Recognizing the desirability of establishing such a program on the Air Force level, at least for its initial trial, the procedure might be as follows:

- a. Determine the future meetings of greatest interest to the Air Force.
- b. Obtain the names of a few probable participants and write them to meet for the purpose of discussing the problem. The first such group should be carefully selected and probably related to a field such as the upper atmosphere, meteorology, electronics or some other field of immediate and long-range interest to the Air Force.
- c. From such a meeting it should be possible to determine the desirability of orientation programs for those who are willing to participate in such a project. It should be possible also to determine the probable cost of the program, its administration, etc.

10. In view of the difficulties which lie in the way of any intelligence effort, every possible improvement is important. Scientific intelligence will generally not appeal to most scientists because of its difficulties,

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and because of a certain feeling of sensitiveness regarding its aims. It may be that each person should be contacted and oriented individually. This would be a large task even with a relatively few people. The actual technique of accomplishing all of this must be carefully evaluated. That the opportunities must not be wasted appears to be reasonably certain.

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