

XIIth General Assembly

Hamburg, Germany

1964

XIIe Assemblée Générale

Hambourg, Allemagne

1964

RESOLUTIONS ADOPTED

BY THE GENERAL ASSEMBLY

SUMMARY OF DECISIONS CONTAINED IN THE REPORT OF THE GENERAL ASSEMBLY

1. *Statutes and By-laws.* The revised texts of the Statutes and By-laws, as indicated on page 37, will be printed in Volume XIIC of the *Transactions*.

2. *Commissions.* The following decisions were taken (see page 43).

(a) To create a new Commission no. 45: Spectral Classifications and Multi-band Colour Indices.

(b) To create a new Commission no. 46: The Teaching of Astronomy.

(c) To re-name Commission no. 17: The Moon

(d) To re-name Commission no. 19: The Rotation of the Earth

(e) To re-name Commission no. 30: Radial Velocities

3. *Resolutions proposed by Commissions.* Some Commissions submitted resolutions, either of a financial or general character. The financial resolutions have been included in the Budget when it was considered possible to make the appropriate provision; in accepting the Budget as proposed by the Finance Committee (see page 39), the General Assembly accepted these financial resolutions; they are not reproduced here.

Furthermore, the Resolutions Committee recommended that certain resolutions were of sufficiently general importance to be considered by the General Assembly; these are included in the following resolutions.

Finally, the other resolutions adopted by the Commissions were given a general endorsement by Resolution no. 8, given below. These resolutions have not been reproduced separately here, but will be found in the reports of the meetings of Commissions in Part 3.

RESOLUTIONS ADOPTÉES

PAR L'ASSEMBLÉE GÉNÉRALE

SOMMAIRE DES DÉCISIONS CONTENUES DANS LE RAPPORT DE L'ASSEMBLÉE GÉNÉRALE

1. *Statuts et Règlements.* Le texte révisé des Statuts et Règlements, comme indiqué page 37, sera imprimé dans le Volume XIIC des *Transactions*.

2. *Commissions.* Les décisions suivantes ont été prises (voir page 43).

(a) Une Commission no. 45 est créée sous le nom de "Classifications spectrales et indices de couleur à plusieurs bandes".

(b) Une Commission no. 46 est créée sous le nom de "L'Enseignement de l'Astronomie".

(c) La Commission 17 prend le nouveau nom de "La Lune".

(d) La Commission 19 prend le nouveau nom de "La Rotation de la Terre".

(e) La Commission 30 prend le nom de "Vitesses Radiales".

3. *Résolutions proposées par les Commissions.* Un certain nombre de Commissions ont voté des résolutions d'ordre financier et d'ordre général. Les résolutions financières ont été incluses dans le budget lorsqu'il a été jugé possible d'assurer ce financement. En acceptant le budget proposé par le Comité des Finances (voir page 39), l'Assemblée Générale a accepté ces résolutions financières; elles ne sont pas reproduites ici.

De plus, le Comité des Résolutions a jugé certaines résolutions d'ordre assez général pour être considérées par l'Assemblée Générale. Elles sont incluses dans les Résolutions données ci-après.

Enfin, les autres résolutions votées par les Commissions ont été appuyées globalement par la Résolution no. 8 ci-après. Ces résolutions n'ont pas été reproduites séparément et se trouvent dans les Rapports des Commissions, dans la troisième partie de ce volume, pp. 101-386.

Resolution No. 1

Proposed by the Executive Committee/Proposée par le Comité Exécutif

On the creation of a new class of Consulting Members

The Executive Committee requests the General Assembly to approve of the introduction of a new class of Consulting Members, without at present any addition, or amendment, to the Statutes and By-laws.

Consulting Members may be appointed, at any time, by the Presidents of Commissions, on the recommendation of two or more Members of the Commission, as Members of their Commissions and participate fully in the work of those Commissions; they will receive, in some form to be decided, the Reports of the Commissions of which they are Members and will have the right to attend the General Assemblies of the Union. They continue as Consulting Members only to the end of each General Assembly, when their membership will automatically lapse unless specifically renewed.

Sur la création d'une nouvelle catégorie des Membres Consultants

Le Comité Exécutif demande à l'Assemblée Générale d'approuver la création d'une nouvelle classe de Membres Consultants, sans qu'il soit actuellement envisagé d'addition, ou d'amendement, aux Statuts et Règlements.

Les Membres Consultants peuvent être nommés, à tout moment, par les Présidents de Commissions, sur la recommandation de deux membres au moins de la Commission, comme membres de cette Commission et participer dès lors complètement aux travaux de la Commission en question; ils recevront, sous une forme qui sera décidée ultérieurement, les Rapports de la Commission dont ils sont membres et auront le droit d'assister aux Assemblées Générales de l'Union. Ils ne restent Membres Consultants que jusqu'à la fin de chaque Assemblée Générale; leur qualité de Membres Consultants disparaîtra alors automatiquement, à moins qu'elle ne soit explicitement renouvelée.

Resolution No. 2

Proposed by the Executive Committee/Proposée par le Comité Exécutif

On the register of astronomical meetings

The Executive Committee calls attention to the Register of astronomical meetings, with some international participation, maintained by the IAU Administrative Office. The main purpose of this Register is to facilitate the avoidance of inadvertent duplication of subjects and dates. It requests the General Assembly to urge all Members of the Union, and all concerned with the organization of such meetings, to inform the Administrative Office of the arrangements of all such meetings, preferably at the earliest planning stage.

Sur le registre des réunions astronomiques

Le Comité Exécutif attire l'attention sur le registre tenu par le bureau administratif de l'UAI des réunions astronomiques comportant une participation internationale. Le but essentiel de ce registre est de permettre d'éviter l'organisation inopportune de réunions sur les mêmes sujets et aux mêmes dates. Le Comité Exécutif demande à l'Assemblée Générale d'obtenir de tous les Membres de l'Union et de toutes les autorités impliquées dans l'organisation de ces réunions, qu'ils informent le bureau administratif de la préparation de telles réunions, de préférence dès les premières phases de la période d'organisation.

Resolution No. 3

Proposed by Commission 40 (Radio Astronomy) (as supported and modified by the Executive Committee) /Proposée par la Commission 40 (Radio-Astronomie) (appuyée et modifiée par le Comité Exécutif)

On frequency allocations

The International Astronomical Union:

considering that

- (a) radio-astronomical investigations are being conducted at many observatories with greatly increased sensitivity,
- (b) these investigations continue to be of prime importance to man's knowledge of the Universe, as may be illustrated by the recent discovery of the lines of the OH molecule,
- (c) by the recent investigations of radio sources and in particular the discovery of the quasi-stellar sources, radio astronomy has become one of the most promising fields of fundamental research in physics,
- (d) these investigations require large instruments and long-term planning,

supports the present proposals of the Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science (IUCAF) concerning frequency allocations for radio astronomy,

and, in addition, requests

IUCAF to consider means of improving, through the International Telecommunication Union and through national authorities, the protection available to observations of the OH line at 1664.4 to 1668.4 MHz.

Sur les allocations de fréquence

L'Union Astronomique Internationale:

considérant

- (a) que les recherches radioastronomiques ont été menées avec une sensibilité sans cesse améliorée dans de très nombreux observatoires,
- (b) que ces recherches continuent à être d'une importance primordiale pour la connaissance de l'Univers, comme le prouve la récente découverte des raies de la molécule OH,
- (c) que, grâce aux récentes découvertes des radio-sources et en particulier à la découverte des sources quasi-stellaires, la radioastronomie est devenue un des domaines les plus actifs pour la recherche fondamentale en physique,
- (d) que ces recherches exigent de grands instruments et une planification à long terme des recherches,

appuie les présentes propositions de la Commission Inter-Union des Allocations de Fréquences pour la Radioastronomie et la Recherche Spatiale (IUCAF) en ce qui concerne les allocations de fréquences pour la radioastronomie,

et demande de plus

à l'IUCAF d'étudier les moyens d'améliorer, par l'intermédiaire de l'Union Internationale des Télécommunications (UIT) et des autorités nationales, la protection nécessaire aux observations de la raie de OH dans la bande de 1664,4 à 1668,4 MHz.

Resolution No. 4

Proposed by a Joint Discussion of Commissions 4 (Ephemerides), 7 (Celestial mechanics), 8 (Positional Astronomy), 19 (Variation of Latitude), 20 (Positions and Motions of Minor Planets, Comets and Satellites) and 31 (Time)

Proposée par une Discussion Commune des Commissions 4 (Éphémérides), 7 (Mécanique Céleste), 8 (L'Astronomie Position), 19 (Variation des Latitudes), 20 (Positions et Mouvements des Petites Planètes, des Comètes et des Satellites) et 31 (L'Heure)

On the system of astronomical constants

The International Astronomical Union endorses the final list of constants prepared by the Working Group on the System of Astronomical Constants and recommends that it be used in the national and international astronomical ephemerides at the earliest practicable date.

Sur le système des constantes fondamentales

L'Union Astronomique Internationale donne son accord à l'ensemble des constantes préparé par le Groupe de Travail sur le système des constantes fondamentales et recommande qu'il soit utilisé dans les éphémérides astronomiques nationales et internationales dès que ce sera possible.

Resolution No. 5

Proposed by the Commission 12 (Radiation and Structure of the Solar Atmosphere)

Proposée par la Commission 12 (Radiation et Structure de l'Atmosphère Solaire)

On solar eclipses

During total eclipses of the Sun, important scientific observations made from the ground by professional astronomers may be hampered, or even ruined, by the vapour trails from aircraft flying in the zone of totality.

The International Astronomical Union accordingly requests the competent authorities in the countries concerned to regulate flights at the times and locations of total solar eclipses in such a way that their interference with scientific programmes be avoided.

The necessary information for each eclipse, will be provided sufficiently in advance by the relevant Working Group of IAU Commission 12 and communicated to those concerned by the General Secretary.

Sur les éclipses de Soleil

Pendant les éclipses totales de Soleil, des observations scientifiques importantes, menées par les astronomes professionnels à partir de stations au sol, peuvent être gênées, ou même empêchées, par les traînées de vapeur provoquées par des avions volant dans la zone de la totalité.

L'Union Astronomique Internationale demande par suite aux autorités compétentes des pays intéressés de limiter les vols, aux moments et dans les zones des éclipses totales de Soleil, de telle façon que leurs effets sur les programmes scientifiques soient évités.

Les informations nécessaires, dans le cas de chaque éclipse, seront fournies suffisamment à l'avance par le groupe de travail compétent de la Commission 12 de l'UAI, et transmis aux autorités responsables par le Secrétaire Général.

Resolution No. 6

Proposed by the Commission 31 (Time)

Proposée par la Commission 31 (L'Heure)

On time-signal emissions

The International Astronomical Union recommends:

- (a) that radio emissions of time and frequency provide both the epoch of U.T.2 and the unit of atomic time interval;
- (b) that all time and frequency emissions be co-ordinated;
- (c) that active studies be pursued, in co-operation with the International Radio Consultative Committee and the International Scientific Radio Union, which can lead to the adoption of a system of emitting the epoch of U.T.2 and the unit of time interval without jumps in epoch or offsets in frequency, and without losing a known relationship between the frequency and time signals.

Sur les émissions de signaux horaires

L'Union Astronomique Internationale recommande:

- (a) que les émissions radio-électriques de signaux horaires et de fréquence fournissent à la fois l'époque du T.U.2 et l'unité d'intervalle de temps atomique;
- (b) que toutes les émissions de signaux horaires et de fréquence soient coordonnées;
- (c) que l'on entreprenne activement, en coopération avec le Comité Consultatif International des Radio-communications et l'Union Radio Scientifique Internationale, des études en vue de l'adoption d'un système permettant de transmettre l'époque du T.U.2 et l'unité d'intervalle de temps sans saut d'époque ni décalage de fréquence, et sans abandonner une relation connue entre la fréquence et les signaux horaires.

Resolution No. 7

Proposed by the Commission 41 (History of Astronomy)

Proposée par la Commission 41 (Histoire de l'Astronomie)

On instruments of historical interest

The International Astronomical Union requests all concerned to save from damage or destruction astronomical instruments of historical interest; these are considered to be important documents in the history of science. Where it is not possible to preserve such instruments *in situ*, directors of observatories and others are requested to do everything possible to ensure that they are preserved in museums.

Sur les instruments d'intérêt historique

L'Union Astronomique Internationale demande à toutes les autorités responsables de protéger de tout dommage ou destruction les instruments astronomiques d'intérêt historique; les instruments scientifiques du passé sont en effet des documents importants pour l'histoire des sciences. Au cas où il serait impossible de procéder sur place à des mesures conservatoires, les directeurs des observatoires, et autres autorités responsables, sont priés de faire leur possible pour que les instruments soient transférés dans des musées.

Resolution No. 8

On the Resolutions adopted by the Commissions

Sur les Résolutions adoptées par les Commissions

Considering the impracticability of giving individual attention to every resolution adopted by each of its 36 Commissions, and having full confidence in its Commissions, this General Assembly *wishes to give its endorsement* to the Resolutions adopted by its individual Commissions, and *recommends* that astronomers give effect to these Resolutions in so far as they are able.

Prenant en considération l'impossibilité pratique d'accorder à chaque résolution adoptée par chacune de ses 36 Commissions une attention particulière, et affirmant la confiance complète qu'elle a en ses Commissions, cette Assemblée Générale *désire exprimer son approbation* des résolutions adoptées par ses différentes Commissions, et *recommande* que les astronomes appliquent ces Résolutions dans toute la mesure du possible.

Commission 8 (Positional Astronomy/L'Astronomie Position)

RESOLUTIONS

(1) Commission 8 notes with satisfaction that the chain of astrolabes repeatedly recommended by this Commission is now being completed by the essential extension into the southern hemisphere. In view of the recognized value of a continuous astrolabe chain for the improvement of the fundamental system of star-places, and in view of the particularly great need for such improvement in the southern hemisphere, the Commission strongly recommends that all southern nations which are in a position to contribute to this work make every effort to bring their observational output up to the necessary level at a very early date.

(2) Commission 8 recommends that publishing institutions make their observations and other star catalogues available in machine-readable form, preferably on punched cards.

(3) Commission 8, having considered the report of the Working Group on the systematic accuracy in declination required for latitude stars, invites the attention of all observatories engaged in positional work to the conclusion that about 10 independent catalogues of the positions of these stars are desirable, if systematic errors in declination are to be eliminated sufficiently well to permit the study of non-polar terms in latitude variation.

(4) Commission 8 notes the suggestion that the Potsdam astrolabe might be removed to some station near the Equator, and cordially welcomes this proposal in view of the scarcity of such stations and the large number in northern latitudes.

Commissions 9 (Astronomical Instruments/Instruments Astronomiques)

RÉSOLUTION

La Commission 9,

Considérant que l'avènement de nouvelles possibilités d'observation grâce à des engins extra-terrestres ne doit pas faire se relâcher l'effort d'amélioration des techniques d'observation à partir du sol,

Considérant que les progrès acquis dans la réalisation des grands télescopes optiques rendent impérieuse la nécessité de choisir leurs emplacements de telle sorte que l'atmosphère terrestre limite le moins possible leurs performances et leur rendement réel,

Considérant que l'étude, dans les observatoires existants, des corrélations entre la qualité des images données par un grand instrument et les conditions atmosphériques locales serait un apport fondamental aux critères de choix du site d'un nouvel observatoire,

Exprime le vœu que les astronomes disposant de grands instruments acceptent de contribuer à cette étude au moins en y consacrant l'effort minimum proposé par le Groupe de Travail pour la Qualité des Images et le Choix des Sites (*Bulletin UAI* no. 12 (février 1964) pages 8-10) qui a été conçu de façon à ne pas perturber les programmes courants d'observation.

Commission 10 (Solar Activity/L'Activite Solaire)

Recommendations

1. *New dual form for importance classification*

It is recommended that information about the relative intensity of a flare as well as its area be indicated as unambiguously as possible in the assigned importance. The importance evaluation for each flare will consist of two elements, a number and a letter. For flares within 65° of the centre of the solar disk, the first element will describe the area of the flare essentially in accord with the area-guides to flare importance which have been in use since the IGY. For flares $> 65^\circ$ from the centre of the solar disk, the numerical portion of the importance designation may reflect circumstances other than area in an effort to evaluate the magnitude of the flare-event that occurred on the Sun. The second element of the importance designation will indicate whether the intensity of the flare was faint (*f*), normal (*n*) or brilliant (*b*) for its respective class. At the present time, the observer's experience rather than detailed photometric guides must provide the basis for the intensity evaluation.

It is also recommended that subflares be identified by the letter *S* rather than 1— and that the number 4 replace 3+ in the areal importance classification. The recommended system of flare designation is summarized below.

Summary of recommended dual importance classification

'Corrected' area in square degrees	Relative intensity evaluation		
	Faint (<i>f</i>)	Normal (<i>n</i>)	Brilliant (<i>b</i>)
≤ 2.0	<i>Sf</i>	<i>Sn</i>	<i>Sb</i>
2.1 — 5.1	1 <i>f</i>	1 <i>n</i>	1 <i>b</i>
5.2 — 12.4	2 <i>f</i>	2 <i>n</i>	2 <i>b</i>
12.5 — 24.7	3 <i>f</i>	3 <i>n</i>	3 <i>b</i>
> 24.7	4 <i>f</i>	4 <i>n</i>	4 <i>b</i>

2. *Apparent area*

It is recommended that measured apparent area at the time of maximum intensity constitute the primary measurement of the area of the flare. It should be expressed in millionths of the solar disk (not hemisphere).

3. Corrected area

It is recommended that the apparent area of flares not more than 65° from the centre of the solar disk be corrected for foreshortening, as in the past, by multiplication by the secant of the angular distance of the flare from the centre of the solar disk. 'Corrected' area should be expressed in square degrees.

$$\left(\begin{array}{l} \text{'Corrected' area} \\ \text{in square degrees} \end{array} = \frac{\text{Apparent area in millionths of disk}}{97} \times \sec \theta \right)$$

For flares more than 65° from the centre of the solar disk, no value of 'corrected' area should be given in the *Quarterly Bulletin*, but great effort should be made to assign meaningful importance ratings to these flares on the basis of the special guides to importance evaluation for flares near the solar limb which are described in the next section of this report.

4. Importance rating of flares close to limb of Sun

For flares more than 65° from the centre of the solar disk it is recommended that the numerical member of the dual importance evaluation be based on a number of different 'guides' and not solely on considerations of area. In addition to *measured area*, the observer should give weight to *duration*, extent in *latitude* and *spectral characteristics* such as the width of the $H\alpha$ flare emission and the type of associated *prominence activity*. These various guides to importance for flares near the limb will not always yield consistent evaluations. If the observer's judgement cannot resolve the inconsistencies, he is urged to use a question mark and to explain his uncertainty by comments or remarks.

5. 'Area at time of maximum intensity' or 'maximum area' as guide to importance

It is recommended that corrected area at time of maximum intensity continue to be used as the general basis for the assignment of the first member of the dual importance designation. If a flare increases greatly in area after the time of maximum intensity, the observer should measure and report the time and value of maximum area as well as the area at time of maximum intensity. Both sets of area measurements should be included in the flare report and, if possible, in the *Quarterly Bulletin*. The importance rating of the flare should be based on the area at the time of maximum intensity, as for all other flares.

6. Intensity of flare

It is recommended that all observers with facilities for photometric measurements report the maximum intensity of as many flares and subflares as staff time permits. The intensity should be expressed in units of the continuous spectrum near $H\alpha$ and for the distance of the flare from the centre of the solar disk (local continuum).

7. Other flare characteristics

In order to provide additional information about flares it is recommended that observers indicate in their reports to World Data Centres the following special aspects of flares, if they have been observed:

- Formation of two relatively close and somewhat parallel bright filaments.
- Occurrence of an explosive phase.
- Great increase in area after time of maximum intensity.
- Onset of system of loop-type prominences.
- Unusually wide $H\alpha$ emission.
- Major sunspot umbra covered by flare.

It is further recommended that the 'remarks' included in the flare tables of the *Quarterly Bulletin* be revised to include the above categories and to provide as much information as possible about the development and morphology of flares.

8. *Systematic inhomogeneities in world-wide flare data*

In the interest of reducing inhomogeneities in the world-wide flare data, it is recommended that the editors of the flare tables for the *Quarterly Bulletin* at Meudon call to the attention of the individual reporting stations apparent systematic differences in reporting techniques or evaluation. Individual observers are urged to welcome such comments with goodwill, and to supplement them by continuing studies of their own observations of flares versus world-wide norms. It is also recommended that the solar editors at Meudon ask individual stations to review and perhaps re-evaluate their observations with respect to starting times, maximum, position or importance of a flare when these quantities are in extreme discordance with the majority of stations reporting the event.

9. *Reports of subflares*

It is recommended that observers report for subflares all of the data normally reported for flares. All subflares on the records should be reported down to apparent area 50 millionths of the solar disk. Smaller subflares should be reported if staff time and observational circumstances permit.

10. *Publication of individual observations of flares*

It is recommended that the Central Radio Propagation Laboratory of the U.S. National Bureau of Standards be encouraged and supported in its publication of the individual reports from each observing station of all flares and subflares.

IV. RESOLUTION

The secretary reads a resolution formulated by Dr Michard.

'Commission 10 of the International Astronomical Union has been informed of the plan for a Co-operative Study of Solar Active Regions during IQSY, proposed by the IQSY General Assembly, Rome 1963, and of the preliminary programme established by the Reporter for Solar Activity in the IQSY Committee. The Commission expresses its approval of this programme and requests interested astronomers and geophysicists to participate in it as far as possible.'

This resolution is accepted.

Commission 12 (Solar Radiation and Spectroscopy/Radiation et Spectroscopie Solaires)

Resolution 1. Observations of solar eclipses from airplanes flying at stratospheric or near-stratospheric altitudes can contribute important information about the Sun and the interplanetary medium. The dark sky background and the higher transmission of the atmosphere are favourable to many kinds of scientific studies. The increased duration of totality made possible by fast planes, especially for eclipses occurring in low latitudes, can also help in certain types of observation. Commission 12 of the IAU recognizes the importance of such eclipse observations and expresses the hope that facilities for airborne eclipse research will be made available to solar astronomers by appropriate companies and agencies.

Resolution 2. The past few years have demonstrated that balloon-borne telescopes are of the greatest use for observation of details of the solar photosphere, the chromosphere, and the corona. Since balloons can carry heavy equipment to stratospheric altitudes, they present great advantages: reduced extinction (particularly in the infra-red), highly improved image quality, and reduced sky background. The advantages are equally important for observations both during and outside of solar eclipses. Commission 12 of the IAU thus urges governmental and scientific agencies to give full support to the important balloon-borne experiments which are being planned for the next years.

Resolution 3. During total eclipses of the Sun, important scientific observations made from the ground by professional astronomers may be hampered, or even ruined, by the vapour trails from airplanes flying in the zone of totality.

Commission 12 of the IAU requests the competent authorities in the countries concerned, to regulate flights at the times and locations of total solar eclipses in such a way that their interference with scientific programmes be avoided. The necessary information for each eclipse will be provided sufficiently in advance by the relevant Working Group of Commission 12 to the General Secretary of the IAU.

The Commission adopted the three resolutions.

Commission 15 (Physical Study of Comets/*Etude Physique des Cometes*)

'Since observations of comets are likely to contribute efficiently to our understanding of the physics of interplanetary space as influenced by the radiative and corpuscular emission from the Sun, Commission 15 greatly welcomes a systematic effort during the IQSY (International Quiet Sun Years) to insure that cometary observations are made and reported in such a way that the maximum benefit may be gained from such observations.'

Commission 19 (Variation of Latitude/*Variation des Latitudes*)

Commission 19 of the International Astronomical Union
notes with satisfaction that the work carried out by the Central Bureau of the IPMS under the interim direction of Dr S. Yumi is of high scientific standard,

takes note of the resolution of the International Association of Geodesy concerning the direction of the Central Bureau,

accepts with gratitude the offer of the Scientific Council of Japan to locate the Central Bureau of the IPMS at Mizusawa and

nominates Dr S. Yumi to be Director of the Central Bureau of the IPMS.

Commission 19

thanks the Italian Geodetic Commission for the help it is giving in the publication of the results of the International Latitude Service,

thanks Prof. Nicolini for having agreed to continue the work of the late Prof. Carnera, and

thanks Prof. Cecchini for the diligence with which he has pursued the discussion of the observations made under his direction.

Commission 19

recommends that observatories participating in latitude observation shall publish as quickly as possible the detailed results of their observations.

La Commission 19 de l'Union Astronomique Internationale
note avec satisfaction que le travail effectué par le Bureau Central du Service International du Mouvement Polaire, sous la direction intérimaire du Dr S. Yumi est d'une haute tenue scientifique,

prend acte des vœux de l'Association Internationale de Géodésie au sujet de la direction de ce bureau,

accepte avec gratitude l'offre du Conseil Scientifique du Japon de domicilier le Bureau Central du SIMP à Mizusawa,

propose de nommer le Dr S. Yumi, Directeur du Bureau Central du SIMP.

La Commission 19

remercie la Commission Géodésique Italienne pour l'aide qu'elle apporte à la publication des résultats du Service International des Latitudes,

remercie le Prof. Nicolini pour avoir accepté de continuer le travail du regretté Prof. Carnera,
remercie le Prof. Cecchini pour la diligence avec laquelle il poursuit la discussion des observations effectuées sous sa direction.

La Commission 19

recommande que les observatoires participant à des observations suivies de la latitude publient le plus rapidement possible les résultats détaillés de leurs observations.

Commission 20 (Minor Planets, Comets and Satellites/Petites Planètes, Comètes et Satellites)

The Commission adopted the following Resolutions, each by a formal vote.

(1) 'Commission 20 recommends that the Institute of Theoretical Astronomy modify the printed list of elements in the annual ephemeris volume by removing the "S" for special perturbations, retaining the "A" for absolute perturbations, and introducing "E" for elliptic elements when there are no perturbations.'

(2) 'Commission 20 recommends that the Minor Planet Centre publish in the *Minor Planet Circulars* a list of those minor planets which need to be observed in the immediate future in order that the solution for the improvement of their elements will be strengthened appreciably. Contributions to this list shall be submitted by those engaged in the correction of elements.'

(3) 'Commission 20 recognizes as one of the most serious problems in its area of interest the continual diminution of the number of observations of minor planets. Therefore the Commission welcomes the project proposed by Dr Paul Herget to photograph an ecliptic band of the sky by means of the calibration cameras of the NASA Minitrack stations, and to blink, measure, and reduce all the minor planet positions so obtained. The Commission recommends that strong support be given to this project from all possible sources.'

(4) 'Commission 20 reaffirms the importance of continuing the programme of minor planet observations at the Goethe Link Observatory (Indiana University, U.S.A.), and hopes that adequate financial support will be continued in the future.'

(5) 'In consideration of the diminution of the number of observations of the minor planets, the Commission recommends that the Observatory of Pino Torinese again undertake the observations of minor planets.'

(6) 'In consideration of the diminution of the number of observations of the minor planets, the Commission recommends that the Astrophysical Observatory of Shemakha again undertake the observations of minor planets.'

(7) 'Commission 20 recommends that the Minor Planet Centre at Cincinnati be asked to form an Index of Positions of Comets on punched cards, similar to that already existing for minor planets; and that, in order for the Index to be of maximum value, observers should send all of their measured positions of comets, whether published or not, to the Centre. It is agreed that information from this Index will be supplied upon request.'

Commission 22 (Meteors and Meteorites/Météores et des Meteorites)

1. To publish, for 100 meteors from the large quantity of homogeneous data secured with the Super-Schmidt cameras, curves of the absolute values of photographic brightness as a function of time and height.
2. To intensify the study of meteor spectra, with emphasis on the atmospheric and persistent train features.
3. To check the existence of the dust clouds observed by Kordylevsky at the points of libration in the lunar orbit.
4. That, in studies of interplanetary dust from spacecraft and rockets, special attention be paid to its mass distribution, its velocity distribution, and its concentration near the Earth.
5. That, wherever possible, national or regional organizations be set up to assist in the search for and recovery of meteorites that may have fallen after the appearance of a very bright fireball; further, that in this connection use be made of existing institutions such as astronomical and geophysical societies, meteorological stations, radio broadcasting systems and the local newspapers.
6. To report immediately new falls and finds of meteorites to the Permanent Commission on Meteorites of the International Geological Congress (E. L. Krinov, Committee on Meteorites of the Academy of Sciences of the U.S.S.R.—Ulitzka M. U'pianovoy 3, korpus I, Moscow W-313, U.S.S.R.) for publication in the Meteoritical Bulletin, the data to include:—name, place, date, class and type, number, size and weight, and brief circumstances of fall or find.
7. To encourage the collection and study of meteoritic dust in the area of meteorite falls and meteor craters.
8. To emphasize the importance of sending, as rapidly as possible, freshly fallen meteoritic material to laboratories making isotope studies, and to compile and circulate a list of such laboratories.
9. To revise and update the Prior-Hey Catalogue of Meteorites, 2nd edition, British Museum (Natural History), 1953.
10. To encourage a more intensive study of proven meteor craters by all modern techniques, including drilling, seismic and magnetic studies, gravity survey, and the age determination of materials.

Commission 26 (Double Stars/Etoiles Doubles)

(Recommendation of Commission 26 Sub-Committee)

A Sub-Committee, consisting of van de Kamp, Kulikovsky, Muller, Strand (absent), Whitford, and v.d. R. Woolley, to discuss the disposition and management of the Lick Double Star Index Catalogues (Index Catalogue and the Catalogue of Observations) met on 27 August 1964.

The Double Star Centre at the United States Naval Observatory has the following obligations:

- (1) The sole responsibility to maintain the catalogues to date.
- (2) To furnish the other centres and the Lick Observatory with supplements when new data become available.
- (3) To furnish individuals with data from the two catalogues at cost.

The other Double Star Centres will be limited for the present to the Observatory at Meudon and to the Royal Greenwich Observatory at Herstmonceux. It may be desirable in the future to also have a centre in the southern hemisphere. Lick Observatory will be a depository without the responsibility of the centres.

The obligations of the other centres are:

- (1) To maintain the catalogues to correspond precisely to the original at the United States Naval Observatory.
- (2) To supply individuals with limited data as requested, the cost to be determined by the centre.

The Committee further agreed that it is the obligation of the double star observers to communicate to the Centre at the United States Naval Observatory:

- (1) Any errors found.
- (2) Copies of new observational data sent simultaneously to be published.

Whitford stated that he is ready to receive firm offers from the United States Naval Observatory and the designated centres to accept, at cost, copies of the catalogues.

Commission 27 (Variable Stars/Etoiles Variables)

Résolutions financières

(1) Commission 27 requests of the Finance Committee of the IAU a grant of \$700 for the publication of an English Version of the remarks in the Second Supplement to the 2nd Edition of the *General Catalogue of Variable Stars*.

(2) Commission 27 requests of the Finance Committee of the IAU a grant of \$700 for the publication of an English Version of the 2nd Edition of the *Catalogue of Stars Suspected of Variability*.

(3) Commission 27 requests of the Finance Committee of the IAU a grant of \$1000 for the publication of two sections of charts of variable stars south of declination -30° , which are being prepared by Mr Frank Bateson.

Commission 27 (Variable Stars/Etoiles Variables)

(1) There should be a centre, perhaps with the AAVSO or with the RAS, for the safe-keeping of copies, preferably on microfilm, of photoelectric observations of variable stars, which cannot, for financial or other reasons, be published in the Journals.

(2) A continuation of the *Geschichte und Literatur* was deemed desirable with greater emphasis on the current literature. Astronomers are urged to send reprints of their work on variable stars to Dr Schneller in Potsdam.

(3) The co-operation of governments, universities, and plate manufacturers in providing adequate supplies of plates for astronomical work, and especially for sky patrols, was recommended.

(4) It was resolved that a Joint Symposium with Commission 42 be sponsored in Bamberg in 1965, with an Organizing Committee consisting of one member from each of the two Commissions, and with Dr Strohmeier accepting the responsibility as local host.

(5) Resolutions (1) through (5) on page lviii of the *Draft Report* were all adopted.

(6) It was resolved that two new constellations, the LMC and the SMC, be outlined strictly for the purpose of variable-star nomination. The exact boundaries and details of the numbering system are to be left to a subcommission of 27.

(1) A list together with maps of all novae of the past 30 years was requested by Mme Lortet-Zuckermann.

(2) The members of the Commission unanimously thanked Dr Plaut for his *Catalogue of Galactic Coordinates of Variable Stars*.

(3) Prof. Kukarkin sent a message that the 3rd Edition of the *Variable Star Catalogue* is expected to be ready in 1968.

(4) Dr Detre stated that the *Information Bulletin on Variable Stars* will be continued at least 3 years more.

Commission 29 c (Stellar Classification/Classifications Stellaires)

(1) I have tried to estimate the number of symbols now in use as parameters in stellar classification. Including broad-band multicolour photometry (but excluding spectral-type symbols), they sum up to approximately 50 or 60. Most of them are chosen in such a way that they do not assist the memory. The number has a tendency to increase, and the situation is already confusing. It is very difficult to follow discussions or explanations in terms of diagrams in which three or more such symbols are involved. My recommendation is to avoid such symbols as much as possible and to make more use of the wavelengths involved. Even the first two figures of a wavelength are better than any symbol and are generally sufficient. And, of course, Fraunhofer designations are well-known and unambiguous.

(2) As we now know, only the very young objects of our Galaxy reveal the spiral structure. But not all young objects do so. The young open clusters show it well but individual stars of types O-B2 do not do so to the same extent. But there are objects among them that do indicate the spiral structure clearly: the stars responsible for H II regions. I therefore suggest that such stars should be included in luminosity classification programmes. Lists of these stars have been given by Bok, Bester and Wade, Gum, Gaze and Shajn, Sharpless, and others.

(3) There seem to be at least two different kinds of classification systems. To the first kind belong all classifications that are to be interpreted in terms of the physical properties of stars. There is little need for an extended application to stars not used in establishing the classification itself. To the second kind belong all classifications that are to be applied to completely unknown stars. As quite different systems of classification are appropriate to different types of stars, for the classification of an unknown star one must know what classification scheme to apply to it. This means, in other words, that all of these classifications need a 'preclassification' that tells one which particular classification scheme to apply to a particular star.

Commission 30 (Radial Velocities/Vitesses Radiales Stellaires)

Considering that the radial velocities of emission objects, extra-galactic nebulae, clusters and the like, are determined by the same optical methods as the radial velocities of stars, Commission 30 resolves to request the Executive Committee of the IAU to change the title of this Commission to 'Commission on Radial Velocities'.

Commission 31 (Time/L'Heure)

1. L'UAI note qu'il serait utile d'exprimer clairement la distinction entre les deux aspects de la notion de temps, à savoir, l'époque (instant) et l'intervalle de temps, et l'utilité des diverses échelles de temps.

2. L'époque du T.U. est déterminée par la position angulaire de la Terre autour de son axe; elle est demandée pour divers usages scientifiques et techniques et pour les usages civils, parfois sans délai.

3. Une unité de temps atomique (T.A.), fondée sur une transition quantique, convient comme unité d'intervalle de temps en physique et est entrée dans l'usage pratique depuis 1955. L'adoption d'une transition particulière pour la définition de la seconde physique est de la compétence de la Conférence Générale des Poids et Mesures.

4. Le T.E. est le temps qui convient à la mécanique céleste dont les travaux immédiats n'exigent la connaissance ni de l'époque, ni de l'unité d'intervalle de temps.

5. L'UAI reconnaît que les physiciens ont besoin de la seconde de temps atomique, mais insiste sur la nécessité de fournir aux usagers, d'une façon continue et sans délai, l'époque du T.U.

6. Le besoin existe donc de fournir par des émissions radioélectriques à la fois l'époque du T.U. et l'unité d'intervalle de T.A. C'est ce qui est fait depuis 1959.

7. La méthode pour fournir les deux est possible parce que

(a) l'époque du T.U.2 n'a besoin d'être connue sans correction immédiate qu'avec une tolérance de 0.1 s et

(b) la fréquence peut être maintenue constante par rapport aux étalons atomiques pendant des durées d'une ou plusieurs années au moyen d'un décalage de fréquence connu.

Dans cette méthode, on maintient la cohérence entre les signaux horaires et la fréquence de l'onde porteuse.

8. On reconnaît que d'autres méthodes de compromis sont possibles. Cependant, le système actuel semble le mieux adapté à beaucoup d'exigences courantes.

9. On reconnaît qu'il serait désirable de transmettre l'époque de T.U.2 et l'unité d'intervalle de temps sans sauts d'époque ni décalages de fréquence.

RÉSOLUTIONS

L'UAI recommande en conséquence

1. que les émissions radioélectriques de signaux horaires et de fréquence fournissent à la fois l'époque du T.U.2 et l'unité d'intervalle de temps atomique;

2. que

(a) la fréquence émise chaque année soit

$$F = F_0 (1 + s)$$

où F_0 est la fréquence nominale et s le décalage relatif. La fréquence conventionnelle de référence est

$$\nu = 9\,192\,631\,770 \text{ Hz}$$

pour l'étalon atomique à jet de césium. Cependant, si une autre fréquence atomique était adoptée par la Conférence Générale des Poids et Mesures, elle deviendrait la fréquence de référence,

(b) le décalage relatif, s , soit $50 \times n \times 10^{-10}$, ou n est un entier positif ou négatif,

- (c) les ajustements par sauts de phase soient exactement 100 ms et soient faits à 0^h T.U. du premier jour du mois,
- (d) le BIH, après consultation des observatoires intéressés, annonce au moins un mois à l'avance le décalage qui sera employé chaque année et les ajustements par sauts de phase à effectuer.
3. que toutes les émissions de signaux horaires et de fréquence soient coordonnées.
4. que l'on entreprenne activement, en coopération avec le CCIR et l'URSI, des études en vue de l'adoption d'un système permettant de transmettre l'époque du T.U. 2 et l'unité d'intervalle de temps sans sauts d'époque ni décalages de fréquence, et sans abandonner une relation connue entre la fréquence et les signaux horaires.
5. que son Secrétaire Général soit prié de porter ces résolutions et les explications préalables à la connaissance du BIPM, du CCIR, de l'URSI et de l'UGGI.

Commission 36 (Stellar Atmospheres/Theorie des Atmospheres Stellaires)

- (1) To denote a quantity that is a function of the wavelength or of the frequency, use a subscript ν if the spectral element is $d\nu$; use a subscript λ if the spectral element is $d\lambda$.
- (2) To denote a quantity that is independent of wavelength or of frequency or one whose wavelength dependence is unimportant in the context, use no subscript.
- (3) To designate the monochromatic absorption coefficient use κ with the appropriate subscript ν or λ depending upon the element of spectral range being considered, $d\nu$ or $d\lambda$. Thus κ_ν would indicate the total absorption coefficient at ν due to all sources, both line and continuous spectrum. If it is desirable to designate these contributions separately, then *in situ* state that κ_ν represents the continuous absorption coefficient and that I_ν represents the line absorption coefficient. In this case one will not have a symbol for the combined value, but should carry both symbols, κ_ν and I_ν , in the equations. If it is desired to indicate the source of the opacity use parenthesis, thus $\kappa_\nu(H^-)$.
- (4) To designate scattering coefficients use σ with subscript ν or λ . We will reserve σ with no subscripts for the radiation constant. To indicate the source of the scattering use parenthesis, thus $\sigma_\nu(e)$ for the electron scattering coefficient.
- (5) The source-function should be designated by S , with or without subscript as required.
- (6) The mean intensity (mean being taken over angle) should be designated by J . The notation \bar{I} is awkward and misleading in view of the common use of a bar over a quantity to designate an average value over frequency or wavelength.
- (7) The Planck function is designated by B_ν ; in astrophysical literature B_ν is per steradian. The monochromatic radiation flux from a star is designated by πF_ν . This flux may also be designated by $4\pi H_\nu$.
- (8) Various ways exist of defining temperature. It seems best to denote the effective temperature by T_{eff} and the electron temperature by T_e .
- (9) The letter χ with suitable subscripts is well-established for excitation and for ionization potential. This practice should be continued.
- (10) The order of the subscripts on a transition probability or like quantity are used to indicate the direction in which the transition occurs. The standard notation is to write the symbol for the initial state first and that for the final state last. There is no question of distinguishing between upper and lower levels, only between initial and final states. The product gf is unchanged whether the transition is up or down. Here g is the statistical weight of the initial state.
- (11) The commission voted in favour of representing the depth in a spectral line by

$$r_\nu(\mu) = 1 - \frac{I_\nu(0, \mu)}{I_c(0, \mu)}$$

in the case of a pencil of radiation inclined to the normal by an angle $\theta = \cos^{-1}\mu$ and in the case of fluxes by

$$R_\nu = 1 - \frac{F_\nu(0)}{F_c(0)}$$

Commission 37 (Star Clusters/Amas Stellaires)

The President then pointed out that time has come to rectify the terminology of open or galactic clusters. Since the term 'galactic' is nowadays of a purely topographical character referring to objects which are clearly members of the Galactic System (a great number of 'galactic clusters' have been detected in extragalactic objects), it appears advisable to designate those clusters by the term open instead of galactic clusters, so as to prevent designations like galactic galactic clusters or extragalactic galactic clusters. This recommendation was agreed to.

The President then introduced Alter's proposal of renumbering the Open Clusters in the second edition of the *Catalogue of Star Clusters and Associations* according to the natural system of galactic co-ordinates instead of the equatorial co-ordinates hitherto used.

Some discussion arose on the apparently different meaning of the term 'natural system' as seen either from an observer at the telescope or from an investigator of galactic structure. The proposal of G. Alter was finally agreed upon. An example of the new system of designation is given in the *Transactions IAU, 12A* (Agenda and Draft Reports), 1964, page 579.

M. F. Walker proposed the following resolution: Commission 37 requests that observers publish identification charts and photometric data for all stars observed in clusters.

APPENDIX. TABLES OF ASSOCIATIONS

Table I. Revised List of OB Associations

Table I. Revised List of OB Associations

No.	in Cluster	Cat. [16] page	of Markarian [13] No	Designation		Other Refer- ences	New	l''		b''		Some members of the association	Other associated feature	Distance pc	Refer- ences	Note
				of Morgan [11] No	of Schmidt [10] No			from	to	from	to					
1	Sgr I	1257	14	Sgr I	3 I Sgr 4 II Sgr	53 I Sgr 54 II Sgr	Sgr OB 1	4°	14°	-2°6'	+1°4'	HD 164794, 164816, 164906, 164402, 164514, 164637, 164833	NGC 6530, 6523	1560	[9]	(1)
2	Sgr VI	1255-1					Sgr OB 7(?)	10°5'	10°8'	-1°7'	-1°3'	HD 167263, 167264; BD -20°50'43, -20°50'60		1860	[10]	(2)
3	Sgr IV	1261			5 III Sgr	56 III Sgr	Sgr OB 4	11°2'	12°7'	-1°4'	-0°5'	HD 166628, 166965, 167224, 167287, 167336, 167659, 167771, 168021	Burakan	2130	[10]	
4	(Sgr II)	(1267)			6 IV Sgr	57 IV Sgr	Sgr OB 6	13°4'		+1°0'		HD 166286, 166287, 166304, 166540	NGC 6561	2000	[10]	
5	Sgr II	1267	15	Sgr II				14	19	-1°5'	+1°5'	HD 168075, 168076, 168137, 168504	NGC 6611	1700	[9]	
6	Ser I	1259			7 I Ser	60 I Ser	Ser OB 1	16°7'	18°0'	-1°6'	-0°1'	HD 169034, 169727; BD -14°50'29, -14°50'62		1600	[10]	
7	(Sgr II)	(1267)			8 II Ser	59 I Sct 61 II Ser	Sct OB 3									
8	Ser II	1265				58 III Ser	Ser OB 2	18°0'	19°1'	+1°1'	+2°3'	BD -12°49'70, -11°45'86, -12°49'82; HD 167971, 168112	NGC 6604	2000	[11]	
9	Ser III	1263	(4)	Sgr III			Sct OB 2	20	26	-2°8'	+1°5'	HD 172252, 172488, 173219; BD -09°47'42, -11°46'67, -09°47'13		730	[10]	
10	Ser-Sct II	1269-1				62 II Sct	Vul OB 4	59	62	-3'	+4'	HD 183561, 187983; BD +25°39'41, +24°38'93, +21°39'59		1020	[10]	
11	(Sct I)	(1269)					Vul OB 1	59°1'	61°5'	-1°2'	+1°5'	HD 186841, 186745-6; BD +23°37'45, +23°37'59, +22°37'82, +23°37'61	NGC 6823	2050	[10]	
12	(Vul I)	(1271)			9 I Vul	1 I Vul	Cyg OB 3	71°3'	73°8'	+1°2'	+3°4'	HD 190429(br.), 190429(ft), 190864, 190918, 190919, 227634, 190967, 227696, 227704	NGC 6871	2300	[11]	
13	Vul I	1271			10 I Cyg	5 I Cyg	Cyg OB 1	74	77	-0°6'	+2°8'	HD 192422, 192639, 193237 (P Cyg), 228841, 193443, 193514, 229059, 229221, 229227, 229234, 229238, 229239	NGC 6913	1700		
14	Cyg III	1273	16	Cyg	11 II Cyg 12 III Cyg	6 II Cyg	II Cyg	76°3'	79°2'	+2°1'	+5°4'	HD 190991, 191423, 191978, 192660, 228712, 193117, 228882, 228928, 194092; BD +40°40'61, +41°36'70		2190	[10]	
15	Cyg I	1275				7 VIII Cyg	Cyg OB 8	77	79	+0°8'	+2°2'	HD 229159, 194205, 229196, 194279, 194649, 195213; BD +38°40'54; +39°41'68, +40°41'85; Hiltner's Cat.: nos. 960, 970		1170	[10]	
16	(Cyg I)	(1275)					Cyg OB 9	80°1'		+0°9'				1500	[12]	
17	(Cyg II)	(1277)			13 IV Cyg	10 IV Cyg 12 XI Cyg	Cyg OB 2 Cyg OB 4 Cyg OB 7	81	84	-8°3'	-6°3'	HD 201795, 201819, 201349; σ Cyg		1000	[10]	
18	Cyg II	1277						84	96	-4°9'	+9°0'	HD 198512, 198895, 198931, 199216, 203938, 204722; BD +42°39'14, +43°39'13; Hiltner's Cat. no. 1042		740	[10]	
19	Lac I	1285			14 I Lac	13 I Lac	Lac OB 1	96	98	-15°6'	-18°7'	8 Lac, 10 Lac, 12 Lac		600	[9]	
20	Cep II	1281	17	Cep II	15 I Cep	14 I Cep	Cep OB 2	97	108	-0°9'	+12°3'	HD 202214, 204827, 206773, 207538, 208905		700	[11]	
21	Cep I	1287	(6)	Cep I	16 II Cep	15 II Cep	Cep OB 1	98	108	-0°7'	-3°0'	HD 235673, 209678, 209900, 210809, 235781, 235783, 211853, 235813, 212455, 235825, 213470-1, 214419, 215835, 216927; BD +53°28'27, +53°28'33, +54°27'26, +53°28'43, +54°27'64, +55°28'40	NGC 7380	3600	[11]	
22	(Cep I)	(1287)				16 IV Cep	Cep OB 5	108°3'	108°6'	-3°2'	-2°3'	HD 240168, 240171; BD +56°29'30		2090	[10]	
23	Cep III	1289			17 III Cep	17 III Cep	Cep OB 3	109°4'	112°9'	2°3'	+5°2'	HD 216532, 216658, 216711, 217035, 217061, 217086		960	[11]	

Table I—continued

No.	in Cluster	Cat. [r6] page	of Markarian [r3] No	Designation of Morgan [r1] No	of Schmidt [r0] No	Other Refer- ences	New	l^{II} from to	b^{II} from to	Some members of the association	Other associated feature	Distance Refer- pc ences	Note		
13	Cas II	1291	18	Cas II	19	V Cas	Cas OB 2	110°1' 114°0'	-1°3' +1°8'	HD 219287; BD +58°2549, +61°2408, +60°2525, +59°2735, +60°2584; Hiltner's Cat. nos. 1202, 1207, 1208		2680	[10]		
14	Cas V	1293	19	Cas V	18	I Cas	20	I Cas	Cas OB 5	114°9' 118°0'	-2°4' -1°3'	HD 108, 224424, 225094, 240464; BD +59°2829, +61°2509, +60°2615, +62°2296, +62°2299, +61°2529 +61°2550, +61°2559; Hiltner's Cat. nos. 3, 1226, 1251		2450	[10]
15	Cep IV	1293:1					[2] Cep OB 4	117°4' 118°6'	+3°9' +6°5'	BD +66°1673, +67°1585, +66°1580, +66°1661, +67°1598, +65°1973, +66°1669a, +66°1669b, +66°1674, +66°1675			?		
26	Cas IV	1203		19	II Cas	21	II Cas	Cas OB 4	119°0' 121°6'	-2°1' +2°0'	HD 1544; BD +60°39, +62°68, +63°41, +61°74, +61°77, +62°79, +61°105; Hiltner's Cat. no. 33		2650	[10] (3)	
27	(Cas IV)	(1203)			22	VI Cas	Cas OB 14	119°7' 121°1'	-1°3' +2°5'	HD 2619, 2905, 3191; BD +63°33, +63°48, +61°122; Hiltner's Cat. nos. 31, 37		1180	[10]		
28	Cas VII	1205		20	III Cas	23	III Cas	Cas OB 7	121°7' 125°2'	-0°9' +2°6'	HD 3940, 4694, 4717, 4841, 5551, 5689		2340	[10] (3)	
29	Cas I	1207	1	Cas I	24	VII Cas	Cas OB 1	122°3' 125°8'	-2°3' -0°4'	HD 4768, 6182, 236633, 7103; BD +61°220		2630	(4)		
30	Cas VIII	1209			25	VIII Cas	Cas OB 8	129°2' 129°7'	-1°5' -0°2'	BD +60°311, +60°331, +60°333, +60°339, +60°345; Hiltner's Cat. no. 164	NGC 663	2940	[10]		
31	Per I	1211	2	Per I	21	I Per	27	I Per	Per OB 1	132 136	-2°5' -5'	HD 12953, 13267, 13476, 13744, 13745, 13841, 13854, 13866, 14134, 14143, 14302, 14322, 14433, 14489, 14535, 14542, 14818, 14956, 15316, 15497, 15571	NGC 869, 884	2300	[9]
32	{ Cas VI Cas XI Cas XII Cas XIII Cam I	{ 1213 1211:2 1213:1 1211:1 1215	3	Cas VI	{ 28 30	{ X Cas XII Cas	{ Cas OB 6	{ 133°8' 138°0'	{ -0°3' +3°0'	{ HD 15629, 237007, 17520; BD +60°470, +61°411, +59°447, +60°493, +62°411, +60°497, +60°498, +60°507, +62°419, +60°586, +60°594	IC 1805	2420	[9] (5)		
33	{ Cam I (Cam II)	{ 1215 (1219)		22	I Cam	{ 31 29	{ I Cam XI Cas	{ Cam OB 1	{ 134 151	{ -3 +7	{ HD 15558, 19820, 20959, 21291, 21389, 22253, 23675, 23800, 24431, 24432; BD +60°503		900	[11] (6)	
34	Per III	1213:2			32	III Per	Per OB 3	142 152	+2 +4	HD 20365, 20391, 20809, 21091, 21375, 21479, 21551, 21699, 22192, 18537, 20315, 25940	α Per cl.	170	[9]		
35	Cam III	1217:1			33	II Cam	Cam OB 3	146°3' 147°7'	+2°0' +3°9'	HD 237211, 237213, 25914; BD +56°864, +56°866		3500	[10] (7)		
36	Per II	1217	4	Per II	23	II Per	Per OB 2	156°4' 162°1'	-13°0' -21°3'	HD 21856, 24131, 24534; 40 Per, 0 Per, ζ Per, ξ Per		400	[9]		
37	Aur I	1223	5	Aur	24	I Aur	Aur OB 1	168°1' 178°1'	-7°4' +4°2'	HD 34656, 34921, 35345, 35600, 35633, 35653, 35921; χ Aur	NGC 1912, 1960	1340	[9]		
38	Aur II	1223:1			36	II Aur	Aur OB 2	172 174	-1°8' +2°0'	HD 242908, 242926, 35610, 36280; BD +34°1059, +34°1058, +35°1141; Hiltner's Cat. no. 446	NGC 1893, IC 410	3600	[9]		
39	Gem I	1229	7	Gem	25	I Gem	Gem OB 1	187°4' 190°8'	-2°1' +4°2'	HD 42088, 42379, 42400, 43753, 43818; χ Ori, 3 Gem, 9 Gem		1500	[11]		
40	Mon I	1233	(1)	Mon I	39	II Mon	Mon OB 1	196 210	-2°5' +2°5'	HD 44637, 45910, 46484	NGC 2264	715	[9]		

Table I—continued

No.	in Cluster	Cat. [r6] page	of Markarian [r3] No	Designation of Morgan [r1] No	of Schmidt [r0] No	Other Refer- ences	New	l^{II} from to	b^{II} from to	Some members of the association	Other associated feature	Distance Refer- pc ences	Note	
32	{ Cas VI Cas XI Cas XII Cas XIII Cam I	{ 1213 1211:2 1213:1 1211:1 1215	3	Cas VI	{ 28 30	{ X Cas XII Cas	{ Cas OB 6	{ 133°8' 138°0'	{ -0°3' +3°0'	{ HD 15629, 237007, 17520; BD +60°470, +61°411, +59°447, +60°493, +62°411, +60°497, +60°498, +60°507, +62°419, +60°586, +60°594	IC 1805	2420	[9] (5)	
33	{ Cam I (Cam II)	{ 1215 (1219)		22	I Cam	{ 31 29	{ I Cam XI Cas	{ Cam OB 1	{ 134 151	{ -3 +7	{ HD 15558, 19820, 20959, 21291, 21389, 22253, 23675, 23800, 24431, 24432; BD +60°503		900	[11] (6)
34	Per III	1213:2			32	III Per	Per OB 3	142 152	+2 +4	HD 20365, 20391, 20809, 21091, 21375, 21479, 21551, 21699, 22192, 18537, 20315, 25940	α Per cl.	170	[9]	
35	Cam III	1217:1			33	II Cam	Cam OB 3	146°3' 147°7'	+2°0' +3°9'	HD 237211, 237213, 25914; BD +56°864, +56°866		3500	[10] (7)	
36	Per II	1217	4	Per II	23	II Per	Per OB 2	156°4' 162°1'	-13°0' -21°3'	HD 21856, 24131, 24534; 40 Per, 0 Per, ζ Per, ξ Per		400	[9]	
37	Aur I	1223	5	Aur	24	I Aur	Aur OB 1	168°1' 178°1'	-7°4' +4°2'	HD 34656, 34921, 35345, 35600, 35633, 35653, 35921; χ Aur	NGC 1912, 1960	1340	[9]	
38	Aur II	1223:1			36	II Aur	Aur OB 2	172 174	-1°8' +2°0'	HD 242908, 242926, 35610, 36280; BD +34°1059, +34°1058, +35°1141; Hiltner's Cat. no. 446	NGC 1893, IC 410	3600	[9]	
39	Gem I	1229	7	Gem	25	I Gem	Gem OB 1	187°4' 190°8'	-2°1' +4°2'	HD 42088, 42379, 42400, 43753, 43818; χ Ori, 3 Gem, 9 Gem		1500	[11]	
40	Mon I	1233	(1)	Mon I	39	II Mon	Mon OB 1	196 210	-2°5' +2°5'	HD 44637, 45910, 46484	NGC 2264	715	[9]	

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Table I—continued

No.	in Cluster	Cat. [16] page	of Markarian [13] No	Designation of Morgan [11] No	of Schmidt [10] No	Other Refer- ences	New	l^H from to	b^H from to
41	Ori I	1225	6 Ori	26 I Ori	40 I Ori		Ori OB 1	198° 214°	-13° -25°
42	Mon II	1231	8 Mon II	27 I Mon	41 I Mon		Mon OB 2	205 209	-2.7 +0.8
43	CMa I	1235	9 CMa		42 I CMa		CMa OB 1	222 226	-3.4 +0.7
44	Pup I	1237	10 Pup		44 II Pup		Pup OB 1	242 246	-1 +2
45	Vela I	1239	(2) Vela		45 I Vel		Vela OB 1	262 268	-2.7 +1.4
46	Car I	1241	11 Car		46 I Car		Car OB 1	283 292	-2 +2
47	Car II	1243				Unnamed [5]	Car OB 2 (?)	289.9 290.2	+0.3 +0.4
48	Cen I	1247	12 Cen		47 I Cru		Cen OB 1	301 308	-2.5 +4
49	IC 2944	1245				[6]	Cen OB 2	294.3	-1.0
50	Ara-Nor	1251	(3) Ara-Nor		48 I Ara		Ara OB 1	335 341	-3 +3
51	Sco I	1253	13 Sco	1 I Sco	49 I Sco		Sco OB 1	343.3	+1.2
52	Sco II	1249		2 II Sco	50 II Sco		Sco OB 2	347.1 353.0	+12.3 +23.3
53	Sgr V	1255			51 V Sgr		Sgr OB 5	358.8 1.5	-3.9 +1.4

Table I—continued

Some members of the association	Other associated feature	Distance Refer- No pc ences
ϵ Ori	NGC 1976	500 [11]
HD 46056, 46106, 46149, 46150, 46202, 46223, 46485, 46573, 46711, 46847, 46966, 47129, 47240	NGC 2244	1400 [11]
HD 53667, 54439	NGC 2353	1315 [9]
HD 64315; CD -27°4264, -27°4269, -28°4707, -27°4404, -25°5122, -25°5215, -29°5106, -27°4813, -28°5227	NGC 2467	2500 [13]
CD -46°4447, -45°4487, -44°4784, -46°4558, -48°4096, -45°4573, -46°4694, -48°4287, -47°4562, -45°4875	NGC 2650	1450 [13]
HD 91943, 91969, 91983, 92007, 92044	NGC 3293	2600 [5] (8)
HD 96248, 96446, 96662, 96638, 96670		1900 [5] (8)
HD 110984, 111193, 113163, 113511, 113754, 114011, 114122, 114341, 114478, 114800, 115704, 117460, 117856		1500
HD 101084, 101131, 101191, 101205		2100 [5]
HD 148937, 330950, 149065, 149277, 149298, 331044, 149452, 331003, 149589, 149658, 149834, 149855, 150135, 150168, 328686, 328678, 150423, 328869, 150675, 150958, 329032, 151213; CD -48°11078	NGC 6193	1300 [14]
HD 151804, 152003, 152076, 152147, 152218, 152233, 152234, 152235, 152247, 152248, 152249, 152314, 152408, 152424	NGC 6231	1400 [11]
π Sco, δ Sco, β Sco, ω Sco, σ Sco, τ Sco		160 [9] (9)
HD 161291, 316332, 316326, 316274, 316325, 316406, 316587, 316589, 316569, 164032; Hiltner's Cat. nos. 652, 655		2600 [10]

Table II—List of Doubtful OB-Associations

No. in Cluster	Cat. [16] page	of Markarian [13] No	Designation of Morgan [11] No	of Schmidt [10] No	Other Refer- ences	New	l'' from to	b'' from to	Some members of the association	Other associated feature	Distance pc	Refer- ences	Note
(1)	Aql I	1269·2			Aql I [1]	Aql OB 1	37·3°	-0·6°			2750	[1]	
(2)	{Cyg V Vul III	1271·3 1271·1		4	VII Cyg	{Cyg OB 5 Vul II [1]	64·2 70·0	-2·7 +6·9	HD 186980, 187459, 225985, 189779; BD +28°3438, +28°3485, +29°3814, +29°3842, +28°3598, +25°4083, +30°3980		1610	[10]	
(3)	Vul II	1271·2		3	III Vul	Vul OB 2	63·9 65·5	+0·4 +3·1	BD +28°3434, +27°3512, +29°3774, +27°3550		4130	[10]	
(4)	Cyg VI	1277·1		11	X Cyg	Cyg OB 6	83 89	-3 +5	HD 198479, 199478, 200776; BD +46°2948, +45°3230, +45°3260, +45°3341, +44°3655, +47°3302, +44°3731; Hiltner's Cat. No. 1035		1700	[10]	
(5)	Cep-Lac	1283	(5) Cep-Lac			Cep-Lac OB 1	99 103	-4 0			1700	[13]	
(6)	Cas IX	1291·1		18	IV Cas	Cas OB 9	109 118	-5 0	HD 220116, 223924, 224151; BD +60°2581		800	[10]	
(7)	Cas X	1209·1		26	IX Cas	Cas OB 10	129·8 131·8	-6·7 -6·0	HD 10063, 232522; BD +55°393, +54°395, +54°404		3800	[10]	
(8)	Ori II	1227·1		37	II Ori	Ori OB 2	186·8 189·4	-3·8 +0·9	HD 248587, 248893, 248894, 251204; Hiltner's Cat. nos. 498, 510		3240	[10]	
(9)	Pup II	1235·1		43	I Pup	Pup OB 2	242·1 245·2	-4·7 +1·2	HD 60284, 63005, 63290, 64315		4200	[10]	
(10)	Cru I	1245·1				Cru [1] Cru OB 1	295 299	-1			2700	[1]	
(11)	Sco IV	1253·1				[7] Sco OB 4	352·8	+3·2	HD 154500, 154768, 155015, 155272, 155349, 155448, 155550, 155754, 155851, 155890, 156066, 156213, 156323, 157003				
(12)	Cas-Tau	1293·2			Cas-Tau [8]	Cas-Tau OB 1			HD 221253, 224559, 829, 1976, 17 Cas, 1 Per, 61 Ari, 35 Eri, 94 Tau, 105 Tau, 15 Cam, 121 Tau, 67 Ori, 85 UMa		1400	[7]	(10)

Table III. No OB-Associations

No. in Cluster	Cat. [16]	of Markarian [13]	Designation of Morgan [11]	of Schmidt [10]	Other Refer- ences
	page No.	No.	No.	No.	
1/	(Sgr I)	(1257)		52 VI Sgr	
2/	(Ser-Sct I)	1255.2			Ser-Sct I [1]
3/	Sct I	1269			
4/	Cas III	1201			
5/	Sco III	1251.1			

NOTES TO TABLES I, II AND III

Designations and pages in Cluster Catalogue [16] noted here in brackets show that the objects have to be placed on another card after approval of this index.

- (1) The stars belonging in the Morgan index to the *two* aggregates I and II Sgr occur in Markarian's index in a *single* association Sgr I. Since the distances of both the aggregates are approximately the same, both the aggregates are included into a single association in our index.
- (2) The association Sgr OB 7 is rather concentrated and the dispersion of the distance moduli of stars is relatively small. Nevertheless, some uncertainty arises whether this group of early stars (O6 – B0) should not be joined to the association Sgr OB 4.
- (3) The associations Cas OB 4 and Cas OB 7 are close together at approximately the same distance. We have considered them as two separate objects taking into account their considerable linear dimensions. The spectral classes of both associations are a little different. (On the average, there are earlier stars in Cas OB 4 than in Cas OB 7.)
- (4) The reality of this association is not quite evident.
- (5) Schmidt's XI Cas has been defined as coinciding with Markarian's Cas VI (see note (6)). Comparing Markarian's unpublished index of stars in Cas VI we can see that it coincides with Schmidt's group X and XII Cas. Having compared Kopylov's (15) index of stars the object hitherto designated as Cas XIII (p. 1211.1) has also been joined to association Cas OB 6.
- (6) Schmidt's group XI Cas occurs in the vicinity of association Cas I. For this reason the stars belonging to it (HD 15558, 20959, 21291; BD +60°503) have been joined to association Cas OB 1 (see note (5)).
- (7) The space concentration is not very high. Nevertheless, the reality of the association seems to be confirmed; (1) the space concentration is affected by a large distance; (2) in view of the high galactic latitude the grouping does not appear to be accidental; (3) the dispersion of distance moduli is small (0.21).
- (8) The relation of the star associations Car OB 1 and Car OB 2 is not quite clear. If the two groups have to be separated, it seems that the group of hot stars about Eta Car should be defined as a separate association as well.
- (9) Scorpio-Centaurus moving cluster.
- (10) It is possible that this object should be included into Table I.

Commission 41 (History of Astronomy/L'Histoire de l'Astronomie)

1. La Commission 41 (Histoire de l'Astronomie) de l'UAI s'adresse à l'Académie des Sciences Polonaise et lui demande de faire tout son possible pour aider le Professeur E. Rybka, Président de la Commission 41 pour la période 1964-7, à continuer la publication et la distribution des Circulaires d'Information (six par an), commencées par le Président précédent à Moscou à l'Académie des Sciences de l'U.R.S.S.

2. La Commission 41 (Histoire de l'Astronomie) s'adresse à l'Académie des Sciences de l'U.R.S.S. et lui demande de faire tout son possible pour aider à la continuation de l'édition et de la distribution par le Conseil Astronomique de l'Académie des Sciences de l'U.R.S.S. de la Bibliographie courante sur l'histoire de l'astronomie (trois ou quatre parutions par an). La Commission considère cette Bibliographie comme très nécessaire et très utile pour les recherches sur l'histoire de l'astronomie dans tous les pays.

3. La Commission 41 (Histoire de l'Astronomie) considère comme désirable que jusqu'à la session suivante (en 1967) un plan détaillé soit préparé pour une Monographie Internationale sur l'histoire de l'astronomie comprenant 3-4 volumes, en commençant par l'Antiquité. La Commission demande au Président et au Vice-Président d'organiser en Pologne en 1965 une réunion du Comité d'Organisation et—le cas échéant—d'autres personnes, pour établir un plan provisoire, basé sur un échange d'opinions par correspondance.

4. La résolution concernant la sauvegarde des anciens instruments se trouve p. 96 (Résolutions adoptées par l'Assemblée Générale).

Commission 42 (Eclipsing Binary Systems/Etoiles Doubles Photométriques)

The following resolutions were approved; the name of the mover is shown in brackets.

1. That the President send to Dr and Mrs Shapley a letter conveying the greetings of the Commission and its regret at their absence. (Dr Witkowski)

2. The Commission notes with appreciation the publication by the Leander McCormick Observatory of an extensive list of spectral types of eclipsing binaries. It is hoped that the Observatory will find it possible to continue this very valuable work. (Dr O'Connell)

3. The Commission calls the attention of all workers engaged in studying stellar variations, to the enormous amount of material still available in the plate collection of the Harvard College Observatory, and recommends more extensive use of this source of information. (Dr Tsessevich)

4. The Commission requests the Academy of Sciences of the Ukrainian Republic to publish as soon as practicable the 'Atlas of Finding Charts for Variable Stars' prepared by Dr Tsessevich and Dr Kazagmas. (Dr Merrill)

5. The Commission notes with satisfaction the establishment of new observatories in the southern hemisphere, and calls attention to the importance of increased activity in all phases of work on eclipsing binaries at various longitudes in the southern hemisphere. (Dr O'Connell)

6. The Commission wishes to record its appreciation to Dr Batten for compiling his list of eclipsing binaries in need of spectrographic observation. (Dr Hogg)

7. Commission 42 endorses the work of Prof. Martynov on his Bibliography of Spectroscopic Binary Orbits and congratulates him on the completion of the fourth volume. The Commission hopes that Prof. Martynov will continue to collect this information and make it available to the astronomical community. (Dr K. O. Wright)

Motions of Thanks

The thanks of the Commission were officially extended as follows:

1. For their work on the Bibliography of Eclipsing Binaries to: Mrs Kron, Mrs Merrill, and Drs Cester, Fresa, Plaut, Plavec, Sahade, Schneller and Shulberg.
2. For their work in arranging and co-ordinating observing programs, to: Drs Gyldenkerne, Sahade and K. O. Wright.
3. For their work in arranging the Joint Discussion 'C' on Close Binaries to: Drs Sahade (Chairman), McLaughlin, Merrill, Petrie, van de Kamp.
4. To the members of the Organizing Committee for 1961-4 and to the members of the Standing Committees and the *ad hoc* Committees who have served before and during this Assembly.
5. To Drs Batten and Merrill and to Mrs Merrill, for their work before, during, and after these sessions.