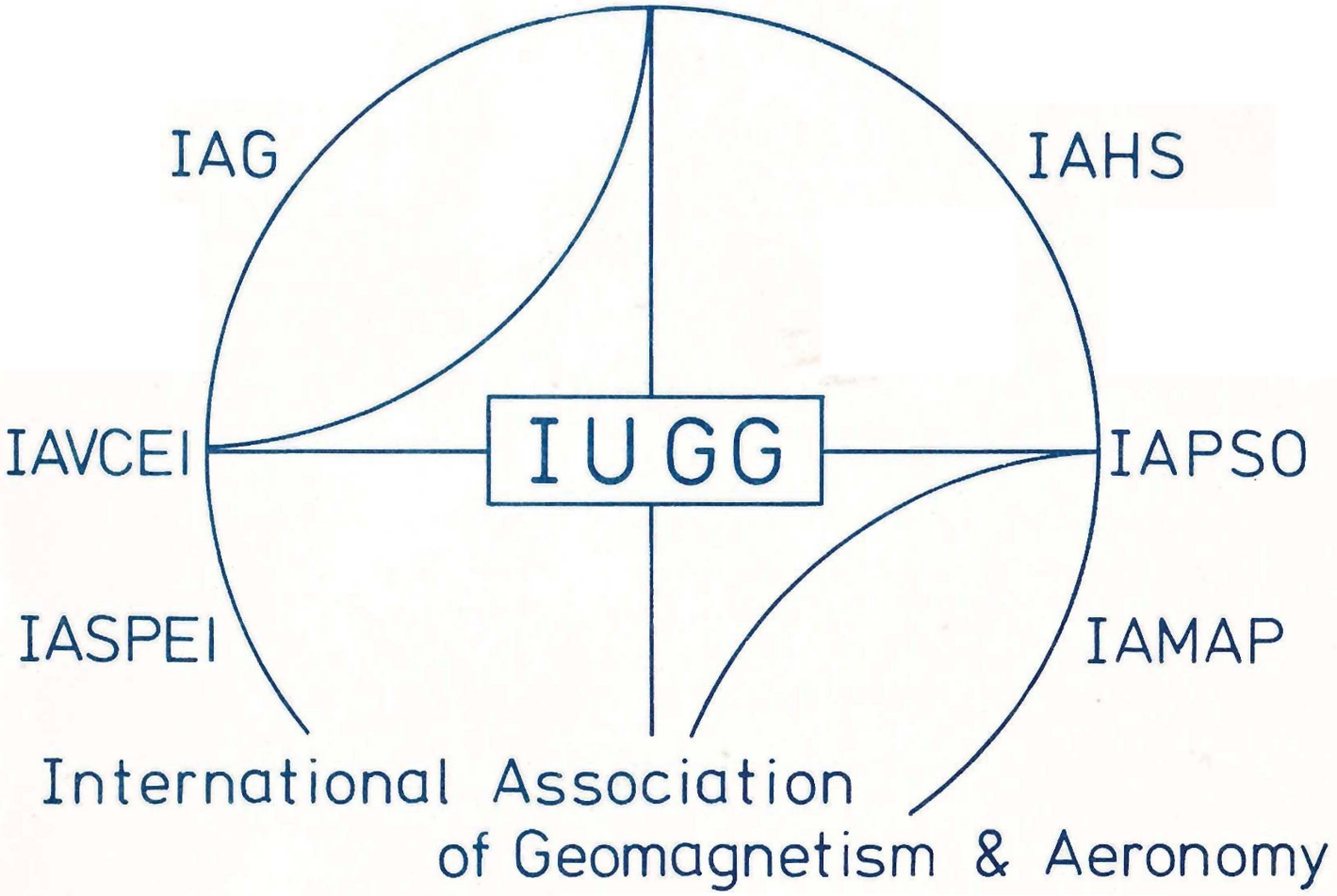
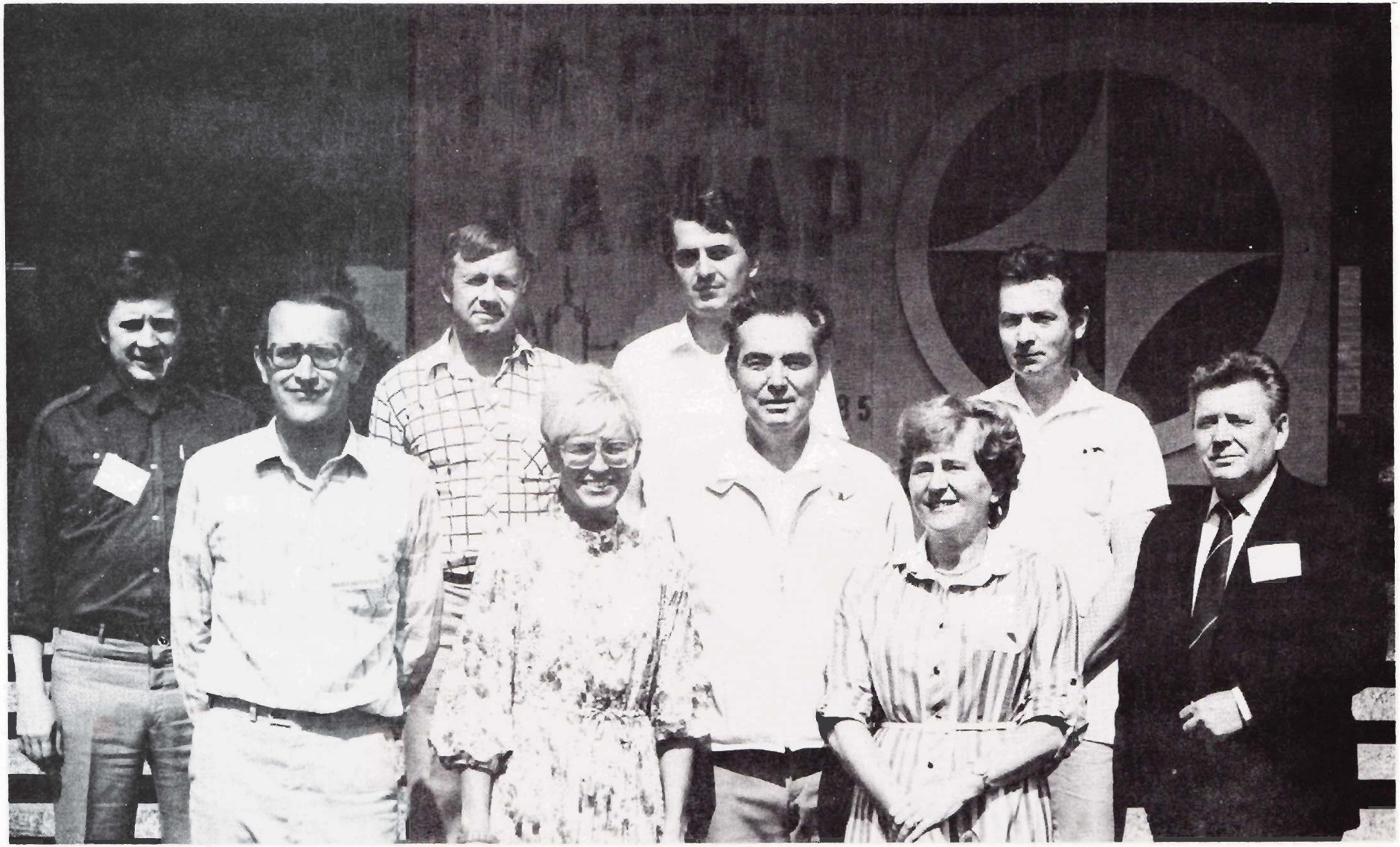
IAGA NEWS

November 1985 No. 24





The Local Organizing Committee for the 5th Scientific Assembly in Prague (Czechoslovakia), 1985:

Vojtech Velicky Ivan Cupal Tomas Zelinka Pavel Triska
Jan Lastovicka Milada Moravcova Vaclav Bucha Hana Prochazkova Oldrich Praus

[Vladimir Kropacek was not present at the time of the photograph]

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FOREWORD

The Assembly in Prague has come and gone. More than one thousand delegates attended the meeting, a significant increase on the numbers at Hamburg (IAGA: 582) and at Edinburgh (733). Many went to Prague for the meetings of the two IAMAP Commissions, who joined us at the Assembly and it was good to have this mixture of Associations.

The second conference of delegates at Prague has enthusiastically endorsed the acceptance of an invitation to hold the 1989 Scientific Assembly in Oslo (Norway). Our friends and colleagues in IASPEI will be meeting with us in Oslo, thus repeating the very profitable experience of the Madrid Assembly in 1969.

The planning for an Assembly takes fully four years; the current situation, therefore, is that "Prague" has gone, "Vancouver" is in urgent preparation and "Oslo" is under way. Rather than looking forward to the Vancouver Assembly, in this issue of IAGA News we look back at the Prague Assembly. We are all in debt to Vaclav Bucha who was responsible for the success of the Assembly. He threw the resources and manpower of the Geophysical Institute into organizing and running the Assembly. His "Local Organizing Committee" (those very good-looking people whose photograph appears inside the front cover) had not only beauty but energy, enthusiasm and ability. They were the ones who looked after room bookings, the poster sessions, the social evenings as well as all the tiny but much-appreciated details involving train tickets, postcards, stamps, change for the telephone and for the metro, et cetera. Our travel arrangements were largely in the hands of CEDOK and I heard on all sides that it was agreed that CEDOK could not have done a better job!

Your Secretary General put together the abstracts and programme books, and put up the day-to-day programme sheets. He plans to use the same system at Vancouver so, if you have complaints, criticisms or helpful suggestions, write to him NOW and tell him. [See page 45 for the full address, telex number and telephone number.]

Finally, a note on timings: The Transactions of the Hamburg Assembly are now [October, 1985] at the printers and should be available for sending out to the attendees at Hamburg very soon. I hope to have the Transactions of the Prague Assembly out late next year [1986]. Your Executive Committee is to have a "meeting of opportunity" in Toulouse (France) at the beginning of July 1986. As always, the Committee welcomes items for discussion from any member of the IAGA community. Please let me have these no later than May 15, 1986.

Michael Gadsden
Secretary General

5TH SCIENTIFIC ASSEMBLY

Prague (Czechoslovakia)

MINUTES OF THE
CONFERENCE OF DELEGATES

5 August 1985; 0930h
16 August 1985; 1400h

1. Introduction

In the absence of President Gough, Vice President Gendrin took the Chair and, after the Secretary-General notified that a quorum of Chief Delegates [see page 10] was present, he opened the meeting in this wise:

"Our President, Professor Ian Gough from the University of Alberta (Canada), has been unable to attend the very first session of this 5th Scientific Assembly in Prague, which is also the place where two IAMAP Commissions are holding their Assembly, in close connection with our Division II on Aeronomic Phenomena and InterDivision Commission on Middle Atmosphere Program.

On behalf of him I welcome all scientists from both Associations in this city.

President Gough was on duty, for the last three days, in order to represent IAGA at the Executive Committee of IUGG in Hawaii. He had to discuss the IAGA budget (and I'm sure he did that forcefully) and the program of our Association at the next IUGG Assembly in Vancouver (August 1987). He will arrive this afternoon and will be present at the Opening Ceremony this evening.

President Gough asked me to preside at this first meeting of the Conference of Delegates. In doing so, he reminded me of two acknowledgments that have to be done.

The first one is to express our gratitude to the Academy of Science of Czechoslovakia, to the Local Organizing Committee [LOC] and to your Vice President, Professor Vaclav Bucha, to have invited us in this very old place, where the first University of Central Europe was created, and to have organized with such efficiency and aimiability what will be I'm sure a very lively and productive Scientific Assembly.

In a few minutes, Vaclav Bucha will present to you his welcome address and I'm sure you'll express to him and to his colleagues your gratitude for the work they have done for the success of this Assembly.

The second message I have to convey is towards your Secretary General, Professor Michael Gadsden from the University of Aberdeen, for the enormous work he has done in organizing the

material for this Assembly, notwithstanding the absence of response of dreaming scientists or convenors. He did it in a very efficient way, in a computerized manner. But I'm sure that you have smelt within the page of our booklets the fragrance of the Scottish thistle and humour.

By having transmitted these two messages, I'll give the floor to Vice President Bucha for his welcome address and then to the Secretary General for the presentation of the administrative matters."

Vice President Bucha, on behalf of the Academy, welcomed the Delegates to the Assembly and presented his best wishes, coupled with good wishes from the staff of the Geophysical Institute, for an effective and successfaul meeting.

2. Minutes of the previous meeting

The minutes of the meetings of the Conference of Delegates in Hamburg (during the XVIIIth General Assembly of IUGG) have been printed in IAGA News No 22, pages 4-15. These were adopted as correct nem con.

3. Matters arising from the Minutes

None.

4. Report by the Secretary-General

a) The Executive Committee has met once since the last Conference of Delegates in 1983. This meeting was held in September of last year and the draft minutes of that meeting have been published in full in IAGA News No 23, pages 43-50.

The Executive Committee has granted IAGA sponsorship to six meetings:

1. Comparative Study of Magnetospheric Systems. September 1985 (France).
2. International Workshop on Data Processing. March 1985 (India).
3. Polar Geomagnetic Phenomena Symposium. May 1986 (USSR).
4. The First GLOBMET symposium. August 1985 (USSR).
5. Workshop on Geomagnetic Observatories, Surveys and Repeat Stations. Spring/Summer 1986 (Canada).
6. The Eighth Workshop on Electromagnetic Induction. August 1986 (Switzerland).

The question of reorganization of the InterDivisional Commission structure was raised before the Executive Committee at its meeting in 1984. The IAGA Leaders have been consulted on this and the matter will be a subject for continuing discussion during this Assembly.

Your Executive Committee has scheduled meetings for lunchtime on Thursday this week, and the evenings of Monday and Thursday of next week. There is to be an all-day meeting on the Saturday after the close of the Assembly. Any matters a Delegate wishes to have brought before the Committee should be notified to me at any time in the next twelve days.

Now, some administrative details for this Assembly: first, this is a Scientific Assembly. (There is a misprint on the covers of the Abstract Books which was not caught until after printing!)

Resolutions for consideration for the final meeting of the Conference of Delegates should be channelled into my office through a Divisional or InterDivisional Commission Business Meeting or through your Chief Delegate. Please may I ask that these Resolutions be passed to me no later than the day after the Business Meeting? This is particularly important for the InterDivisional Commission for Developing Countries which does not hold its Business Meeting until Wednesday of the second week, and for Divisions III and V and InterDivisional Commission on History which meet on the Tuesday.

Let me mention the day-to-day programmes of the sessions. As often happens, there will be last-minute alterations of papers withdrawn, extra papers, and some shuffling of the order of papers. Each half-day session has had its most up-to-date programme printed on a poster-size sheet and the final programme will be placed on the main noticeboard (just by the registration area) approximately 24 hours before the session. A second poster copy will be put on the door of the room in which the session is being held.

Please, therefore, will each convenor or chairman bring to my office the final details of timing and order no later than the day before the meeting and we can settle the final display together.

I have been asked to bring to your attention that sessions 01.02 and 01.10 will start this morning at 1100h.

Two unimportant but significant points: first, all the clocks in this building are exactly correct twice a day. Secondly, Rooms 11 and 12 have been interchanged and to avoid confusion I understand that Room 11 is now labelled "12" and Room 12 "11"!

Finally, Mr President and Delegates, I beg to inform you with regret that I have received notification in the last two years of the death of seven IAGA scientists:

E G Forbes
E Lauter
R Maeda
S McWilliams
S Matsushita
R S Narcisi
J F Noxon

Vice President Gendrin asked the Delegates to stand in silence in memory of these colleagues and as a sign of sorrow at the loss to the IAGA community.

5. Honorary Membership

Vice President Gendrin noted that the last matter to take a decision on at this first meeting of the Conference of Delegates is award of Honorary Membership to Dr Valeria Alexeevna Troitskaya. He said: "The principle of such an award was adopted at the Edinburgh Scientific Assembly and six distinguished scientists have been already awarded. These are

Drs Alldredge
Cardus
Coulomb
Laursen
Nagata
Nicolet

The merits of Valeria Troitskaya do not need to be described. All of you know, for one reason or another, the importance of her scientific work and the efforts she has spent in order to make our Association a living and friendly one. Her attempt to establish and to reinforce international cooperation in a discipline where it is eagerly needed cannot be overemphasized. Later this week, President Gough will remind you more about her merits. But in the meantime I formally have to ask the Conference of Delegates if any official members has an objection against this proposal." [There being none, the Vice President continued:] "If not, I declare Mrs Valeria Alexeevna Troitskaya an Honorary Member of our Association." [Applause]

Vice President Gendrin then adjourned the meeting at 0953h until Friday, 16 August, at 1400h.

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In the evening of Monday, 5 August, the Opening Ceremony and Festive Concert took place at 1900h in the Smetana Hall of the Municipal House.

Dr Jaromir Obzina, Vice-Premier of the Czechoslovak Federal Government, opened with a speech of welcome to the Delegates on behalf of the Government of Czechoslovakia. This was followed by speeches of welcome from representatives of the City of Prague (Vice Mayor Poliak) and of the Czechoslovak Academy of Sciences (Mr Nemec). President Gough, who had arrived not long before from Honolulu, responded to these speeches and expressed, on behalf of the Delegates present, our grateful thanks and appreciation of the sentiments expressed by the preceeding speakers.

The Festive Concert followed, and was given by the West-Bohemian Symphony Orchestra (conductor: Stanislav Bogunia). The entire cycle of symphonic poems, "Ma Vlast" [My Country], by Bedrich Smetana was performed to rapturous applause.

Friday, 16 August, 1400h:

At the appointed time, the Conference of Delegates reconvened, President Ian Gough in the Chair.

7. Report of the Executive Committee

The President announced that the first circular of the XIXth General Assembly of IUGG in 1987 was now available from:

Conference Secretariat
Venue West
#801-750 Jervis Street
Vancouver British Columbia
CANADA V6E 2A9

and that a few copies had been made available at this Assembly.

The Secretary-General reported on discussions concerning the future of the International Service of Geomagnetic Indices. Following the decision by the Koninklijk Nederlands Meteorologisch Instituut to cease support of this Service from the end of 1986, an ad hoc committee had been convened to advise the Executive Committee. The Executive Committee subsequently accepted without demur the recommendations of the ad hoc committee and decided to advise Professor Melchior (President of the Federation of Astronomical and Geophysical Services) that four separate institutions would be looking into the practicalities of operating the International Service of Geomagnetic Indices and would report direct to him within two months.

J O Cardus proposed (seconded by R Hide) the following resolution, which was passed unanimously:

IAGA places on record its appreciation of the services rendered to geomagnetism by the staff of the Koninklijk Nederlands Meteorologisch Instituut in producing, over many years, annual reports for the International Service of Geomagnetic Indices (published as IAGA Bulletins No 32) and other occasional collections of particular geomagnetic data and indices and thanks the KNMI for these services.

Vice President Gendrin reported on the discussion concerning the adjacent and overlapping areas of interest of Divisions III and IV. [See the Executive Committee minutes, on pages 25-26.]

The President reported on the discussions concerning the future of the InterDivisional Commissions. [See the Executive Committee minutes, on pages 26-27.] The Executive Committee had resolved to recommend to National Bodies changes in ByLaw 1 to give effect to alteration in the status of InterDivisional Commissions. He emphasized that these changes preserved the groups within the scientific community of the Association while their scientific sessions were integrated into the scientific sessions of the Divisions. He pointed out that an InterDivisional Working Group worked through two or more Divisions. W D Parkinson asked if

these Divisions were to be specified and the President replied that normally this would be the case but the arrangement would be both flexible and variable. W H Campbell spoke on behalf of D E Winch, Chairman of the External/Internal Geomagnetic Relations InterDivisional Commission; he said that the InterDivisional Commission was part of the original restructuring of the Association and had continued to be an active, forceful and meaningful part of the Association. The President commented that the changes, if approved by vote of the Chief Delegates at the Vancouver Assembly, would simply ask the members of the InterDivisional Commission to work in future more closely though the Divisions. R Hide asked if a change in the status of the History InterDivisional Commission was contemplated. The President replied that no change was in prospect for either the History or the Developing Countries InterDivisional Commissions both of which had been regarded as special cases.

9. Resolutions

Vice President Gendrin, chairman of the Resolutions Committee (J Allen, E Kazmirovsky and C Sucksdorff) reported that twentyfive resolutions had been received by the Committee and he introduced nine resolutions which had emerged from the Committee's deliberations for recommendation to the Conference of Delegates:

SPECIAL PROJECTS

1. Magnetic satellite
   Seconded by M W McElhinny; Passed by overwhelming majority (2 opposed).

2. Solar Wind Satellite
   Seconded by A Nishida; Passed nem con.

3. Participation in the International Lithosphere Programme sur la Lithosphere]
   Seconded by M W McElhinny; Passed nem con.

4. Encouragement for the ILONEM Project
   Seconded by M W McElhinny; Passed nem con.

5. Prolongation of St Santin Operations
   Seconded by J H Allen; Passed nem con.

GENERAL

6. Need for Measurements over Antarctica
   Seconded by W H Campbell; Passed (30 to 3).

7. Maintenance of Observatories (Geomagnetism and Solar Flux)
   Seconded by R Hide; Passed nem con.

8. Rapidity of Exchange of Geomagnetic Data
Seconded by D W Parkinson; Passed nem con.

9. A Programme for Geophysical Observations in the African-Caribbean and Pacific Countries
Seconded by N J Skinner; Passed nem con.

The President thanked the Resolutions Committee for working hard to cast the Resolutions into (almost) fully-acceptable shape and this expression of thanks was endorsed by the Delegate's applause.

10. 6th Scientific Assembly.

The Secretary-General announced that an invitation to hold the Association's 1989 Scientific Assembly in Oslo had been received from Det Norske Videnskaps-Akademi (The Norwegian Academy of Science and Letters) and that the Executive Committee recommended acceptance of this. The invitation was received by the meeting and accepted by acclamation. The President noted that IASPEI was to be invited to hold its 1989 Assembly at the same time and at the same place, and he welcomed this further opportunity of the two Associations working in partnership.

11. Any Other Competent Business

There was none.

12. President's Resolution.

The President, from the Chair, introduced the following resolution:

IAGA thanks its hosts in Czechoslovakia for providing the milieu and hospitality for a pleasant and effective Assembly and in particular recognizes the special contributions to the success of the Assembly made by individual members of the Local Organizing Committee [Vaclav Bucha (IAGA Vice-President); Ivan Cupal; Tomas Zelinka; Vladimir Kropacek; Jan Lastovicka; Milada Moravcova; Oldrich Praus; Hana Prochazkova; Pavel Triska; Vojtech Velicky].

In speaking to it, he said he had the pleasant and welcome task of thanking our hosts in Czechoslovakia: he summed up their qualities in one four-word phrase - "accomodating, smiling, cheerful helpfulness". The resolution was seconded by the Secretary-General and the voting was drowned by an overwhelming ovation to the members of the LOC.

In reply, Vice President Bucha, on behalf of his fellow members of the LOC, said simply "Bon Voyage; visit Prague again!" Thereupon, the President closed the meeting at 1520h.

CHIEF DELEGATES

M Scherer	Belgium
D E Smylie	Canada
Bao Zongoi	China
E Friis-Christensen	Denmark
Christian Sucksdorff	Finland
Michel Blanc	France
W Mundt	Democratic Republic of Germany
H Soffel (vice K Schlegel)	Federal Republic of Germany
Haydar A Baker	Iraq
Susumu Kato	Japan
Jaime Urrutia Fucugauchi	Mexico
Jo As	The Netherlands
R Dowden	New Zealand
Asgeir Brekke	Norway
J O Cardus Almela	Spain
V V Migulin	USSR
M A Shea (vice C G A Harrison)	USA

RESOLUTIONS

SPECIAL PROJECTS [PROGRAMMES SPECIAUX]

1. Magnetic satellite [Satellite Magnétique]
   Seconded by M W McElhinny; Passed by overwhelming majority (2 opposed).

2. Solar Wind Satellite [Satellite Vent Solaire]
   Seconded by A Nishida; Passed nem con.

3. Participation in the International Lithosphere Programme [Participation au Programme International sur la Lithosphère]
   Seconded by M W McElhinny; Passed nem con.

4. Encouragement for the ILONEM Project [Encouragement au Programme ILONEM]
   Seconded by M W McElhinny; Passed nem con.

5. Prolongation of St Santin Operations [Prolongement des Opérations à Saint-Santin]
   Seconded by J H Allen; Passed nem con.

GENERAL [DIVERS]

6. Need for Measurements over Antarctica [Necessité de Mesures en Antarctique]
   Seconded by W H Campbell; Passed (30 to 3).

7. Maintenance of Observatories (Geomagnetism and Solar Flux) [Maintien de l'Activité d'Observatoires (Géomagnétisme et Flux Solaire)]
   Seconded by R Hide; Passed nem con.

8. Rapidity of Exchange of Geomagnetic Data [Rapidité de l'Echange des Données Géomagnétiques]
   Seconded by D W Parkinson; Passed nem con.

9. A Programme for Geophysical Observations in the African-Caribbean and Pacific Countries [Programme d'Observations Géophysiques dans les Pays de l'Afrique, des Caraibes et du Pacifique]
   Seconded by N J Skinner; Passed nem con.

L'AIGA, reconnaissant l'importante amélioration de notre connaissance du champ géomagnétique par suite de la disponibilité des données de MAGSAT, notant que des satellites supplémentaires de ce type sont essentiels dans des disciplines telles que la physique de l'ionosphère et de la magnétosphère, l'exploration magnétique de la croûte et les études du noyau terrestre, souscrit aux recommandations du Groupe de Travail International sur les Satellites Magnétiques, demande instamment à nouveau qu'un programme suivi de mesure vectorielle du champ géomagnétique par satellite soit entrepris dans un futur proche, et que les mesures au sol d'accompagnement nécessaires pour fournir une référence absolue et pour modéliser le champ principal soient poursuivies et, si possible, étendues.

IAGA, recognizing the great improvement of our knowledge of the geomagnetic field because of the availability of MAGSAT data, noting that additional such satellites are essential for disciplines such as magnetospheric and ionospheric physics, magnetic exploration of the crust and studies of the Earth's core, endorses the recommendations of the International Working group on Magnetic Field Satellites, and urges again that a continuing program of satellite vector measurements of the geomagnetic field be initiated in the near future, and that the associated ground measurements which are needed for absolute reference and for modelling the main field be continued and, if possible, expanded.

L'AIGA, reconnaissant que pour comprendre le couplage entre les éléments du système magnétosphère/ionosphère/thermosphère il est indispensable de connaître les paramètres du vent solaire, qui constituent le signal d'entrée de ce système, exprime son appréciation des efforts récents déployés par l'ESA et la NASA pour étendre l'utilisation du satellite IMP-8 en recevant ses données à Redoux (Belgique), et demande instamment à toutes les agences compétentes de coopérer pour fournir une couverture aussi complète que possible de la réception des données d'IMP-8, et d'examiner la possibilité de mettre en oeuvre un nouveau satellite pour mesurer les paramètres critiques du vent solaire.

IAGA, understanding that the coupling between the solar wind, the magnetosphere, the ionosphere and the thermosphere requires knowledge of solar wind parameters, since these provide the input to the system, expresses its appreciation of the recent efforts by ESA and NASA to extend the usefulness of the IMP-8 spacecraft by acquiring data from Redoux (Belgium), and strongly urges all responsible agencies to cooperate in providing as complete a coverage as possible in the continuing acquisition of IMP-8 measurements and to consider the possibility of deploying new spacecraft to measure the crucial solar wind parameters.

L'AIGA, reconnaissant les succès obtenus par les méthodes sismiques dans l'identification des structures de la lithosphère, grâce à une coopération internationale intensive s'appuyant sur des équipements de mesure et des techniques de traitement des données uniformes, et anticipant que les méthodes d'induction électromagnétique mises en oeuvre dans des conditions comparables produiront des succès similaires, recommande aux agences compétentes de soutenir financièrement les projets de recherche associés au Programme International sur la Lithosphère, tels que le Programme Européen sur la Géotraverse, d'aider à la constitution de parcs importants d'équipements magnétotelluriques répondant autant que possible à des spécifications uniformes, et d'apporter leur soutien aux programmes favorisant la normalisation des échanges de données.

IAGA, recognizing the success of seismic methods in elucidating structures in the lithosphere, arising from intensive international cooperation with uniform measuring equipment and processing techniques, and anticipating a similar success of electromagnetic induction methods under comparable conditions, recommends funding agencies to support projects associated with the International Lithosphere Programme, such as the European Geotraverse Project, to support the creation of large pools of magnetotelluric equipments preferably with uniform specifications and to support projects that work towards standardization in data exchange.

L'AIGA, reconnaissant l'importance d'une interprétation élaborée des mesures électromagnétiques pour l'amélioration de notre compréhension de la structure, de la composition, et de l'histoire tectonique de la Terre, et notant les difficultés de l'élaboration de programmes d'ordinateur fiables et efficaces pour le traitement des données, la modélisation et l'interprétation, ainsi que l'absence des moyens de calcul adéquats dans de nombreuses institutions, appuie tout effort, tel que la création du Laboratoire International de Modélisation Electromagnétique Numérique (ILONEM), visant à fournir des moyens pour développer, tester, et comparer entre eux des programmes fiables, et à offrir des services de calcul et de modélisation aux scientifiques, tout particulièrement dans les pays en voie de développement.

IAGA, recognizing the importance of advanced and reliable interpretation of electromagnetic (EM) measurements for a better understanding of the structure, composition and tectonic development of the Earth, and noting the difficulties in developing reliable and effective computer programmes for data processing, modelling and interpretation purposes and the lack of appropriate computing facilities in many institutions, endorses every effort, such as the creation of the International Laboratory of Numerical Electromagnetic Modelling (ILONEM), to provide means for developing, testing and comparing reliable programmes and to provide computing and modelling services to scientists, especially those in developing countries.

Alors que les expériences coordonnées visant à une description globale du couplage atmosphère-ionosphère-magnétosphère ont fait l'objet d'un intérêt considérable ces quelques dernières années, et que l'intérêt pour de telles expériences va croître encore dans l'avenir, l'AIGA apprend avec inquiétude qu'il est prévu de mettre fin aux mesures de diffusion incohérente par le sondeur de Saint-Santin en 1986. Les observations à Saint-Santin ont un intérêt tout particulier dans le cadre des études globales, car Saint-Santin est le seul radar opérant à moyenne latitude dans le secteur européen, alors qu'il est indispensable de diposer de mesures dans le secteur Européen aussi bien que dans les secteurs Américain et Asiatique pour pouvoir séparer les effets de variations en temps local et en temps universel. En conséquence l'AIGA recommande aux autorités françaises responsables d'examiner toutes les mesures qui permettraient de poursuivre les opérations de diffusion incohérente à Saint-Santin pour participer à des campagnes spéciales d'observations au-delà de 1986.

Whereas global experiments to study the atmosphere - ionosphere - magnetosphere coupling have received considerable emphasis during the last few years and are expected to receive more emphasis in the future, IAGA is concerned to learn about the planned discontinuation of incoherent scatter measurements at St Santin in 1986. Observations from St Santin are particularly valuable in the context of global studies because St Santin is the only midlatitude radar station in the European sector, and because measurements in the European sector and in the American and Asian sectors are required for separating local time and Universal Time effects. Accordingly, IAGA recommends that the responsible authorities in France examine every possible way to continue incoherent scatter operations of the St Santin facility for special campaigns beyond 1986.

L'AIGA, notant que l'Antarctique est une région privillégiée pour l'observation d'une large gamme de phénomènes géophysiques essentiels pour la compréhension physique de l'atmosphère et du milieu spatial proche de la terre, et reconnaissant qu'elle se prête particulièrement bien à la coopération scientifique internationale, recommande que les agences responsables maintiennent leur soutien financier aux expériences existantes en Antarctique, et installent de nouveaux équipements pour l'étude de l'ionosphère, la thermosphère, la mésosphère, la stratosphère et la terre solide dans cette région, à l'aide d'instruments au sol, à bord de fusées, et de satellites en orbite basse.

IAGA, noting the importance of Antarctica as a unique area in which to observe a great variety of geophysical phenomena, which are essential for the understanding of the physics of atmospheric and near-Earth space processes, and recognizing its particular suitability for international scientific cooperation, recommends that funding agencies continue to support existing experiments in Antarctica and implement new installations of equipment for studying the ionosphere, thermosphere, mesosphere, stratosphere and solid Earth in these regions by means of ground-based instruments, rockets and low altitude orbiting spacecraft.

L'AIGA, reconnaissant la contribution essentielle apportée à de nombreux programmes de recherche par les longues séries temporelles de données de surveillance de l'activité solaire et géomagnétique que constituent les enregistrements des observations magnétiques et les observations du flux radioélectrique solaire à 10,7 cm, recommande fortement aux agences responsables de s'efforcer de sauvegarder l'avenir de ces programmes d'observations continues ainsi que les activités d'archivage et de diffusion de leurs résultats.

IAGA, recognizing the essential role in support of numerous research programmes of the long time-series of monitoring data describing solar and geomagnetic conditions provided by magnetic observatory records and the 10.7 cm solar radio flux observations, strongly recommends to funding agencies that efforts be made to safeguard the future of these monitoring programmes and the archiving and dissemination of their results.

n° 8

L'AIGA, reconnaissant qu'il est important de poursuivre la publication des indices géomagnétiques définitifs et des données résumées sur l'activité géomagnétique rapide en respectant un délai maximal approprié, réaffirmant sa politique de poursuite de la publication des bulletins de la série n° 32 de l'AIGA, et notant que les retards causés par un petit nombre d'observatoires portent un préjudice notable à l'utilité du réseau tout entier, demande instamment aux observatoires magnétiques d'envoyer très rapidement leurs rapports sur l'activité, leurs indices, et leurs listes de contrôle à tous les services permanents jouant un rôle dans la publication de ces bulletins.

IAGA, recognizing the importance of continued publication of definitive geomagnetic indices and of summary data on rapid geomagnetic activity in a timely manner, reasserting its policy of continued publication of the IAGA Bulletin No 32 series, and noting that delays caused by a small number of observatories have a serious adverse effect on the usefulness of the whole network, urges the magnetic observatories to report activity and indices, and to return check lists, promptly to all permanent service centres which are involved in this process of publication.

n° 9

L'AIGA, notant que 65 parmi les états du groupe AFRIQUE-CARAIBES-PACIFIQUE ont signé avec la Communauté Européenne une convention, connue sous le nom de Convention de LOME III, aux termes de laquelle des fonds seront mis à la disposition de ces pays pour la réalisation d'expériences scientifiques et le développement de la recherche, demande instamment que cette possibilité soit mise à profit pour promouvoir dans ces pays les sciences relevant de l'AIGA, et amener ainsi, entre autres bénéfices, un progrès significatif dans la direction d'une couverture véritablement globale des phénomènes géomagnétiques et aéronomiques, et recommande à la Communauté Européenne d'apporter son soutien à ces programmes dans le cadre de la Convention de LOME.

IAGA, noting that 65 countries belonging to the group of AFRICAN - CARIBBEAN - PACIFIC states have signed with the European Community a convention, known as the LOME III Convention, by which funds might be available to those countries in order to implement scientific experiments and to develop research, urges that this possibility be used for promoting IAGA-related science in these countries, thus leading among other benefits to a significant step towards a fully global coverage of geomagnetic and aeronomic phenomena, and recommends such programmes to the European Community for funding under the Lome Convention.

DRAFT

EXECUTIVE COMMITTEE

MINUTES

Technical University, Prague: August 1985

Thursday, 8th	12.30-14.00		Thursday, 15th	19.30-21.40
Monday, 12th	08.00-10.10		Friday, 16th	15.40-17.45
	17.30-22.00		Saturday, 17th	09.00-16.00

Present: President D I Gough
Vice Presidents V Bucha, R E Gendrin
Secretary-General M Gadsden
Members: K D Cole, N Fukushima, O Raspopov,
R G Rastogi, U Schmucker,
D J Williams (departed noon, Monday 12th)

I. MINUTES OF THE MEETING IN FLORENCE, 5-7 SEPTEMBER 1984

The draft of these minutes was printed in IAGA News No:23, pp 43-49.
Moved by Cole, seconded by Williams, passed as true and correct record.

II. MATTER ARISING FROM THE MINUTES NOT COVERED BY LATER ITEMS IN THE AGENDA.

Fukushima reported that the Transactions of the General Assembly (Hamburg, 1983) were now completed and that the camera-ready copy had been sent to Aberdeen for printing.

III. REPORT FROM THE SECRETARY-GENERAL.

a. Administration of the Assembly

On the initiative of President Gough, a Resolutions Committee was proposed, to consist of Gendrin (chairman), J H Allen, E Kazmirovsky and C Sucksdorff. Approved. [All three members were agreeable to serving and the final Conference of Delegates expressed appreciation of the hard and effective work done by this Committee; see p.8.]

Colleagues from IAMAP were invited to join the Executive Committee for the first part of the meeting on Monday evening. The Chief Delegate from Norway, A Brekke, and his colleague E Thrane were invited to come to the Executive Committee meeting on Thursday evening.

The Executive Committee took note of correspondence from the President of the Federation of Astronomical and Geophysical Services (P Melchior) concerning the International Service of Geomagnetic Indices and directed the Secretary-General to call a meeting of concerned parties to advise the Executive Committee when it came to consider this matter. [Agenda item IV(b) below: pp.24.]

President Gough invited Division Chairmen and Interdivisional Commission [IDC] Leaders to meet with the Executive Committee immediately after the second Conference of Delegates on Friday, 16th August. Present at this meeting were McElhinny (Internal Magnetic Fields), Nishida (Magnetospheric Phenomena), Taubenheim (Middle Atmosphere) and Zaitzev (Antarctic Research) with Executive Committee Member Rastogi to speak for the IDC on Developing Countries. The purpose of this meeting was to discuss administrative problems and to assess the effectiveness of the Assembly.

McElhinny reported that the Division I meetings were well attended, there being typically "full houses" (>77) on many occasions with 100 or so on the first day. There were many people present who were discovering IAGA for the first time and more information was needed both to be diplayed at the Assembly and to be printed in the Abstracts Book on the meaning of the organizational numbers and the titles of working groups. It should be made clear in the Assembly material that working groups are for all delegates, not for a coterie. President Gough reasserted the IAGA philosophy that anyone may attend any meeting. [Note added by the Secretary-General: It is written in ByLaw 10 that the Conferences of Delegates (and by natural extension, any of the IAGA sessions) are open to members of the public.]

Nishida reported that Divisions III and IV had jointly discussed their present structures and decided that, for the present, they were adequate to their needs but the Leaders would in future take a very close look at the overlapping of interests and the joint scheduling of symposia.

Taubenheim reported that the MAP IDC was healthy and that 70 papers had been presented at its sessions. He, and the IDC membership, were encouraged to know that their interests would be well looked after in Division II particularly through the establishment in that Division of a working group on MAP.

Zaitzev reported that the business meeting of the Antarctic IDC had been well attended (>30) and that the future of the Antarctic interests in IAGA could be adequately assured in a Joint Working Group lying between Divisions III and IV. He mentioned three projects of special interest,

Carbon Data Analysis Workshop
Joint balloon launches, 1987 to 1989
VLF experiments on stimulated and
naturally-occurring phenomena

Rastogi reported that there was a poor attendance at the Developing Countries IDC meeting in consequence of the clash with Division meetings. He noted the upcoming International Electrojet Year (1987-1988) and reported that the Data Processing Workshop [Agenda item VII(c): p.28] had attracted good UNESCO support. However, few of the participants at this workshop had come to the IAGA Assembly. There will be another workshop in January 1987. Cole mentioned the SCOSTEP Global Ionospheric Study scheduled for 1988-1989 which would involve studies of the equatorial electrojet and therefore could be of significance to IAGA science in developing countries.

b. Financial report for the year 1984

The financial report for the calendar year 1984 had been laid before the Executive Committee and it is printed on page 34.

c. Current accounts

The ledger account for the period 1985 Jan 1 to Jul 26 [see p.33] was laid before the Executive Committee. The Secretary-General drew attention to the fluctuations in exchange rate shown by these accounts when compared with the 1984 accounts. The Executive Committee took note of the excess of income over expenditure in both the 1984 accounts and the ledger accounts. The Secretary-General explained that the 1985 excess would be decreased by the printing and distribution of the Hamburg Assembly Transactions and of IAGA News No.24, all of which will come to charge in the calendar year 1985.

The Executive Committee noted that the Executive Board of ICSU had awarded $2000 towards the cost of the International Workshop on Data Processing in Geomagnetism and that this was one of five such awards, totalling $14000, made in 1985.

IV. REPORTS ON IAGA-RELATED ACTIVITIES.

a. Electromagnetic Lithosphere-Asthenosphere Sounding (ELAS)

President Gough reported on the Inter-Association Working Group [IAWG] on ELAS. He continues as convenor of the IAWG because a vice-chairman has yet to be identified. The situation will be resolved shortly. A midterm report on ELAS has been prepared for Co-ordinating Committee No.5 [CC5] of the Interunion Commission on the Lithosphere [ICL]. This report will be published as part of the midterm report of CC5 to the ICL.

President Gough reported briefly on the EMSLAB project, the largest electromagnetic sounding experiment yet undertaken on the Earth. Eighty-five stations of a magnetovariation array and five telluric stations are recording over the Juan de Fuca plate and the states of Washington and Oregon. Preliminary results should be available for the General Assembly in 1987.

b. International Service of Geomagnetic Indices (ISGI)

The President (P Melchior) of the Federation of Astronomical and Geophysical Services (FAGS) in his role also as Secretary-General of the IUGG had brought to the attention of the IAGA Secretary-General some expressions of concern about the flow of publications in the IAGA Bulletin 32 series. As a way of considering the problem in an expeditious manner, the Executive Committee had directed the Secretary-General to call a meeting to provide expert advice to the Executive Committee.

The Secretary-General reported that he had chaired an informal meeting (present: Cardus, Cole, Fukushima, Gendrin, Menvielle, Rastogi, Siebert and Stuart). The following points were made:

(i) The service is of such fundamental importance in the IAGA fields of research that discontinuation of the ISGI is not an option.
(ii) There are four national groups or laboratories that are interested in taking on the ISGI commitment and which have sufficient resources to cope with the continuing obligation. Each of the four was judged capable of running the service satisfactorily.
(iii) The meeting agreed that the Royal Netherlands Meteorological Service (KNMI) had for many years provided an excellent service to the geophysical community through the operation of the ISGI and regret was expressed that the time was now approaching when the involvement of the KNMI was perforce coming to an end.

The Secretary-General reported to the Executive Committee that he had, subsequent to this informal meeting, telexed to the KNMI asking for clarification of the current position concerning support and the reply had come that support must cease no later than the end of 1986.

The Executive Committee decided to send a statement of position to the President of FAGS and to request the four institutions to make their firm proposals to him direct. The decision as to the future of ISGI is therefore at present in the hands of the President of FAGS.

c. Relations with IAMAP

Two International Commissions from IAMAP [Meteorology of the Upper Atmosphere (ICMUA) and Radiation (ICR)] were holding their meetings coincident with the Assembly, as part of the Assembly, and their leaders had been involved in development of the Assembly programme right from the start.

President Gough welcomed some of our friends from IAMAP (Bojkov, Ebel, Gille, Godson, Hirota, Roper) to the Executive Committee meeting on Monday evening, 12th August. An earlier informal discussion between President Gough, Roper and Ebel of the Executive Committee agenda indicated that the only matter on it

of special interest jointly to the Associations was to discuss the symposium topics that had been settled at the IUGG Executive Committee meeting in Hawaii the previous week. Of these,

11. "Middle Atmosphere and its latitude dependence" (IAGA, with IAMAP): 3 half-days

was the one of immediate interest. After discussion, it was decided to recommend to the Secretary-General of IUGG a change in name:

11. "Highlights of Middle Atmosphere research" (Convenors: Paul C Simon, IAGA, and I Hirota, IAMAP): 3 half-days

Godson spoke for IAMAP in welcoming the continuing cooperation between IAMAP and IAGA, exemplified particularly in the common interest in the middle atmosphere. Cole pointed out that this overlap of interest specially involves Division II.

Roper introduced recommendations for a joint IAGA/IAMAP programme at the 1987 Assembly. These have come from general discussions between people interested in and involved with middle atmosphere research; under the general direction of Roper and Taubenheim, there should be

"Middle Atmosphere Aeronomy" (Convenors: Megie, G Thomas): 5 half-days
"Middle Atmosphere Dynamics" (Convenors: Manson, O'Neill): 3 half-days
"Differences between Arctic and Antarctic Middle Atmosphere" (Convenors: Rycroft, Labitzke) 2 half-days

There would thus be, as Roper pointed out, a total of 13 half-days devoted explicitly to the Middle Atmosphere.

V. IAGA INTERNAL STRUCTURE.

a. Divisions III and IV

The Executive Committee considered a number of letters concerning problems of congestion in the Division III programme and of scheduling sessions in the Division III and Division IV programmes taking place at the same time and covering similar areas of interest.

The Executive Committee decided that in future more thought must be given to the practicability of running Division III sessions in parallel to ease congestion. As a general rule, papers dealing with any or all bow shocks should be presented in Division IV sessions; those concerning the magnetosphere from the magnetopause in belong with Division III. When needed, a joint session of Divisions III and IV should take care of papers dealing with the magnetosheath. The time scheduled for any joint session of the two Divisions must be left clear of other

(competing) sessions. It is clear that the Programme Committee should make a rigorous and careful scrutiny of overlapping sessions for involvement of identical research interests.

b. InterDivisional Commissions (IDCs)

The Secretary-General had circulated a letter (dated 18th February, 1985) to IAGA Leaders in which he invited their comments on the future and modi operarum of the IDCs. To quote from the letter

> It is clear that, as time passes, new programmes are executed, new requirements arise and new connections between branches of the IAGA discipline appear. It follows that if the Divisions of IAGA are to be the principal foci of our research, some check on the life of IDCs is needed, to avoid swamping the Divisions numerically.

A wide-ranging discussion took place from which a consensus emerged: the History IDC and the Developing Countries IDC have relations with all the Divisions but the others have scientific relevance which belongs either in one Division or principally between two Divisions. The Joint Working Group (JWG) on the Auroral Oval and its Extension into Space was cited as a model of interdivisional cooperation. The research papers emerging from an IDC or a JWG should be presented in the sessions of a relevant Division. This would help to integrate the scientific endeavours into the wide context of a Division's area of interest. The special concerns, often of a planning or a logistic nature, are more properly left to a smaller working group which meets in the evening.

In the case of the IDC on Middle Atmosphere Program (MAP), the Executive Committee recognized that this IDC has worked well and efficiently; the many well-attended sessions at the Assembly attest to this. The Executive Committee however felt it was now time to absorb the MAP interests into Division II, with the new Division leadership that takes over at the end of the 1987 Assembly properly reflecting the enhanced presence of the MAP interests in Division II.

By unanimous votes in each case, the Executive Committee resolved to recommend to National Bodies the following changes in ByLaw 1:

> The IDC on External/Internal Geomagnetic Relations to become the JWG on External/Internal Geomagnetic Relations.
>
> The IDC on Antarctic Research to become the JWG on Antarctic Research.
>
> The IDC on Middle Atmosphere Program to be discontinued.

[The procedure is for three separate resolutions to be brought before the first Conference of Delegates at the General Assembly

in 1987 for voting. The resolutions that are passed take effect at the close of that Assembly.]

VI. IAGA SUPPORT FOR PARTICULAR PROJECTS.

At the request of Gendrin, the Executive Committee had a short discussion on the deontology of response to proposals for support, backing or sponsorship. The majority has agreed to have a broad involvement in responding to individual proposals or requests which are made between Executive Committee meetings and which call for a quick response.

VII. SPONSORSHIP OF MEETINGS.

a. Summary of actions in the past eleven months

The Secretary-General reported that IAGA sponsorship had been cofirmed since the last Executive Committee meeting to

International Symposium on the Polar Geomagnetic Phenomena
Souzdal (USSR) May 25-31, 1986.
Secretary: A N Zaitzev

First Globmet Symposium
Dushanbe (USSR) Aug 19-24, 1985.
Convenor: V A Nechitailenko

International MAP Symposium
Kyoto (Japan) Nov 26-30, 1984.
Chairman: Susumo Kato

Working Workshop on Geomagnetic Observatories
Ottawa (Canada) Jul 30 - Aug 9, 1986
Registration: R L Coles

8th Workshop on Electromagnetic Induction
Neuchatel (Switzerland) Aug 24-30, 1986.
Chairman: B A Hobbs

b. Future meetings

The Executive Committee received a request for sponsorship of the following parts of the 26th COSPAR meeting at Toulouse (France), Jun 30-Jul 12, 1986:

Symposium 1 on Active Experiments
6 Solar Wind Interactions
9 Physics of the Thermal Plasma in the Magnetosphere
12 Comets Halley and Giacobini-Zinner
Workshop IX Proposed Reference Models of Trace Constituents of the Middle Atmosphere and Data

XI International Reference Atmosphere
XV Presentation of CIRA 1986 and Comparisons with Other Models, Data and Theories

Sponsorship of these was granted, together with a token sum in partial support.

A request had been received from Oni (Nigeria) for the Executive Committee to take note of proposals to hold the First International Workshop on the Stability of the Western Sector of the African Plate; a general outline of the plan was laid before the Executive Committee. A decision on sponsorship was deferred until the documents and supporting case had been put before the Leaders of the appropriate Divisions for their recommendation. The Executive Committee noted that the proposal had been placed before the IUGG Executive Committee meeting in Hawaii the previous week. President Gough reported that the IUGG Executive Committee felt unable to sponsor this meeting as at present conceived.

A request was received from Mundt (German Democratic Republic) for sponsorship of a symposium

"Space-Time Structure of the Geomagnetic Field"
Lutherstadt-Wittenberg (GDR) Sept 22-27, 1986

President Gough was asked to offer sponsorship in category 3 [see IAGA News No.22, p.116].

Williams introduced a letter from Meng (USA) in which the first steps towards a special Sydney Chapman Centenary (1988) meeting on Auroral Physics were described. The Executive Committee welcomed these plans and would be receptive to a formal request for IAGA sponsorship.

c. Report on International Data Workshop (Pune)

Rastogi presented a detailed report on this workshop [see p.35] and this led to an extensive discussion. The Executive Committee was informed that the Workshop had been well supported, well received, and that congratulations to the organizers were in order. It had been hoped that concrete proposals of venue, topic, dates etc for a second workshop could have been made at the Assembly but this had not proved feasible. It was agreed that the momentum for a second workshop must be kept up and input from the Division leadership is to be sought.

VIII. Cooperation and activities with other bodies

a. International Astronomical Union (IAU)

The next General Assembly of the IAU will be held in New Delhi from 19 to 28 November, 1985. The IAGA representative at this Assembly is R G Rastogi.

b. International Geosphere-Biosphere Programme (IGBP)

The draft outline of a possible IGBP to study global change has been produced by the Ad hoc Planning Group on Global Change and been given wide circulation by President Kendrew of ICSU. The Secretary-General had received copies of comments on the draft plan made by Roederer in letters dated Nov 13, 1984, and Jul 9, 1985.

President Gough pointed out that the draft outline circulated from ICSU contained no discussion of solid Earth or STP topics. Williams agreed that this was an undesirable fault in the plan; agreeing with much of Roederer's criticism of the plan, Williams urged that IAGA can and should take a major and active role. Cole drew attention to a key sentence in the ICSU draft outline which reads

> ".....with biospheric interactions as the focus and discriminator in setting priorities and in establishing principal emphases."

In Cole's view, this showed how the plan for the IGBP does not adequately incorporate STP elements. Since "Man is now part of Space", STP aspects must be an essential part of any IGBP. IAGA should make its voice heard clearly, now, without delay. Williams agreed most emphatically.

The Executive Committee decided, first, to ask President Gough to write to Kendrew straightaway to express these emphatic views. Secondly, Bucha was asked to chair a working party of the five Division Leaders to prepare a list of projects involving IAGA participation at two levels:

(i) To see what can be done in the framework of the ICSU draft plan and

(ii) To study how much more effective IAGA participation could be in a widened framework.

The working party was to report back to the Executive Committee as soon as possible as the matter is urgent.

c. ICSU

The Secretary-General reported that there had been some correspondence passing between one of the IAGA National Correspondents, himself, and Tandberg, Secretary of the ICSU Standing Committee on the Free Circulation of Scientists. This concerned principally the issue of visas to bona fide scientists wishing to travel to Prague to attend the Assembly. The Executive Committee directed the Secretary-General to keep the host National Bodies of future Assemblies informed of the need to adhere to "Advice to Organizers of International Scientific Meetings", which is issued by the ICSU Standing Committee.

Gendrin mentioned that there could be problems of this nature in connection with the projected meeting of the ICSU Scientific Committee on Antarctic Research [SCAR] to be held in South Africa. He pointed out that it would be normal practice for representatives from IAGA to be invited.

IX. THE XIXth GENERAL ASSEMBLY OF IUGG.

A joint report to the Executive Committee, signed by McElhinny (Division I), Rees (Division II) and Nishida (Division III), stated that they had received a proposal from Gokhberg for a symposium on "Earth-Ionosphere-Magnetosphere Coupling by Acoustic and Electromagnetic Action". In their opinion, research in this field is currently being pursued by a few groups only and the total number of scientists involved is small in comparison with other subjects and disciplines in the three Divisions. They recommend that the results of recent research can be accommodated within the sessions already proposed for the 1987 Assembly. Gendrin recalled that symposia on this very topic have been held at the European Geophysical Society meeting (Louvain, 1984), or will be held at the forthcoming Electromagnetic Compatibility Conference (Warsaw, 1986). He thinks that it would not be wise that IAGA does not seriously consider these natural phenomena which may have important implications with respect to the study of earthquakes. He suggested that Gokhberg submit a report on the results so far obtained and that the scientific topics which should be addressed in order to progress in this field of research. Such a report could be reviewed for the benefit of the Executive Committee by three experts, viz, Dr Jdanov (for the solid Earth aspects), Dr Richmond (for the atmospheric effects) and Dr Southwood (for the electromagnetic wave propagation effects). All of them have agreed to do this. Gendrin ended by saying that this type of research could be an important area in IGBP. The Executive Committee concurred with these views and left open the possibility of a separately-scheduled symposium at an Assembly in the future, when the research field could be more mature.

President Gough reported on a number of details concerning the administration of the forthcoming General Assembly. The Secretary-General reported that he was already in close touch with McEwen (Canada) who is the designated liaison correspondent for IAGA on the Canadian National Committee for the IUGG.

President Gough also presented a list of Union symposia for the General Assembly. These had been accepted at the IUGG Executive Committee meeting in Hawaii which President Gough had attended the previous week. IAGA is formally involved at some level in 11 of the 20 symposia. These 11 are listed below:
["[n]" = n half-days. Associations are abbreviated with the code: A:ICL B:IAG C:IAGA D:IAHS E:IAMAP F:IAPSO G:IASPEI H:IAVCEI]

1.	Quo Vadimus? [2]	Union
2.	Instability within the Earth and Core Dynamics [3]	Union
4.	Variations in Earth Rotation [3]	BECGF
7.	Lower Crust Properties and Processes [3]	GHCA
9.	Evolution of Mid-Oceanic Ridges [3]	HGCA
10.	Comparative Planetology [4]	HCEBG
11.	Middle Atmosphere and its Latitude Dependence [3]	CE

[continued

12. Displaced Terranes and Continental Accretion [3] CGHA
13. Results of the EMSLAB project [2] CGHA
15. Contribution of Geophysical Sciences to Climate Change Studies [4] E+all others
20. Geochemistry and Geophysics of Transport in the Lithosphere-Asthenosphere System [3] AGHC

X. ANY OTHER COMPETENT BUSINESS.

a. Contributed papers

In order to distinguish between the acceptance of a paper, allowing the author to apply for a travel grant, and the exact specification of how, when and where the paper is to be presented, there should always be two letters of acceptance for contributed papers. One letter states that the paper has been accepted for presentation at the Assembly (and this could be sent out quite early in the process of programme compilation) and the second letter gives the author the programme details. Convenors should bear in mind that papers can be rejected and can be merged. The quality of contributed papers should be assessed with a critical eye; the convenor of a session is best placed to do this and therefore has this responsibility.

The Executive Committee agreed that assignment of 15 minutes (including discussion) to each paper is just acceptable but that 12 minutes is too short. Convenors, therefore, are asked not to schedule more than 4 papers per hour in future.

Schmucker noted that a poster session should have an introductory (oral) presentation by a "Rapporteur" who surveys what is to be seen in the poster session. To allow the rapporteur to do this, authors of posters papers should provide an outline (perhaps 1 slide and an extended summary) to the rapporteur in advance of the Assembly.

b. IAGA Mailing List

Two requests for commercial use of the IAGA Mailing List had been received. After discussion, the Executive Committee refused such use; the refusal is not related to either or both of these requests in particular but is a general one. The Secretary-General pointed out that IAGA publications, including address lists, are protected by copyright and he would recomend action be taken against any persons outwith the IAGA community who infringed this.

c. 1989 Scientific Assembly

President Gough reported that he had received an invitation from Det Norske Videnskaps-Akademi (the Norwegian Academy of Science and Letters) to hold the next Scientific Assembly in Oslo in 1989. The invitation was also presented to the Executive Committee by the Chief Delegate for Norway (A Brekke) and it was

welcomed with acclamation. The Executive Committee recommended acceptance of this invitation to the Conference of Delegates [see p.9].

Brekke also asked that in view of the special interests of Norwegian scientists the Assembly should include symposia dealing with

The Proton Aurora
EISCAT-related topics
MAC-related topics

The Executive Committee felt that these wishes could be accomodated without any problem.

d. Mathematical and Numerical Geophysics

Cain proposed to the Executive Committee in a letter that a new IDC be formed to provide a sharper focus on both analytic and numerical techinques applied to the several disciplines of IAGA.

Fukushima pointed out that there is already an IUGG Committee for this and the structure of this Committee is reviewed every four years at the General Assembly. It was felt, however, that the Union Committee showed little or no concern with the research fields covered by IAGA. Gendrin suggested that the topic should begin to be dealt with as a working group within Division V. Schmucker pointed out that an InterDivisional Workinbg Group would be a more appropriate approach.

The Executive Committee decided to ask a Division to provide a half-day synposium at the 1989 Assembly and thereby to test the need for an IDWG, which could be formally incorporated into the IAGA structure if need be at the 1993 Assembly.

e. International Working Group on Magnetic Field Satellites

Schmucker intimated that the members of this working group would like to explore the possibility of becoming an identifiable element inside IAGA. The Executive Committee asked that discussion be started with the Leaders of Divisions V and I and to be kept informed of progress.

e. Next meeting of the Executive Committee

Five out of the ten members of the Executive Committee plan to be in Toulouse (France) in 1986 for the SCOSTEP and COSPAR meetings. It was decided, therefore, to take advantage of this and to schedule a "meeting of opportunity" for July 4-6, 1986, in Toulouse.

APPENDIX TO MINUTES:

Ledger Account, 1985 Jan 1 to Jul 26

Amounts in US Dollars [$1.40 = £1.00]

Receipts:	IUGG Annual Grant	29521.95	
	IUGG, Prague Assembly	3301.87	
	Sales of Publications	913.63	
	Bank interest	2261.11	35998.56
Expenditure:	Personnel	135.52	
	Supplies and Equipment	134.67	
	Communications	999.07	
	Admin. Travel	0.00	
	Miscellaneous	29.60	1298.86
	Publications	3600.70	
	Assemblies	11652.90	
	Meetings, Symposia	-1377.05	
	Grants	3381.11	17257.66
	Excess of income over expenditure		17442.04

INTERNATIONAL ASSOCIATION OF GEOMAGNETISM AND AERONOMY
Financial Report for the year 1984
Amounts in US Dollars Exchange rate $1.15 = £1.00

RECEIPTS	IUGG	GRANTS CONTRACTS
15 IUGG ALLOCATION	19940.11	x
2 UNESCO GRANTS	x	x
3 OTHER GRANTS	x	2845.54
4 CONTRACTS WITH UNESCO, etc	x	x
5 SALES OF PUBLICATIONS	x	x
6 MISCELLANEOUS	1388.80	x
7 TOTAL RECEIPTS	21328.91	2845.54
8 CASH ON HAND AND IN BANKS Jan 1, 1984	7833.65	x
9 INVESTMENTS RESERVES Jan 1, 1984	9200.00	x
10 TOTAL	38362.56	2845.54

EXPENDITURES	IUGG	GRANTS CONTRACT
11 ADMINISTRATION	810.88	x
12 PUBLICATIONS	5266.54	x
13 ASSEMBLIES	x	x
14 SYMPOSIA SCIENTIFIC MEETINGS	7168.89	x
16 GRANTS (Permanent Services etc)	x	x
17 CONTRACTS WITH UNESCO, etc.	x	x
18 MISCELLANEOUS	0.29	x
19 TOTAL EXPENDITURE	13246.60	x
20 CASH ON HAND AND IN BANKS Dec 31, 1984	5788.61	x
21 INVESTMENTS RESERVES Dec 31, 1984	19327.35	2845.5
22 TOTAL	38362.56	2845.5

	January 1, 1984	December 31, 1984
23 ACCOUNTS RECEIVABLE	0.00	0.00
24 ACCOUNTS PAYABLE	0.00	0.00

INTERNATIONAL WORKSHOP ON DATA PROCESSING

University of Poona (India)
25 February - 9 March, 1985

The workshop, organized by the Indian Institute of Geomagnetism (Bombay), attracted 18 participants from developing countries (Afghanistan, Bangla Desh, Bolivia, Ethiopia, Greece, Indonesia, Iraq, Iran, Kenya, Malaysia, Mexico, Mozambique, Nigeria, Pakistan and Sri Lanka) and 45 from different Indian research organizations and universities participated. 9 scientists (from Australia, Egypt, the Federal Republic of Germany, Nigeria, USA, and USSR) came as invited speakers and 20 invited Indian scientists from universities and research institutes gave topical lectures covering the subjects

-Geomagnetic and aeronomic data acquisition
-Fundamentals of data processing
-Time series analysis
-Digital filtering techniques
-Electromagnetic induction processes
-Geopotential modelling
-World Data Centres

In addition, 10 invited talks and 2 popular evening lectures were delivered during the course of the Workshop. Xerox copies of most of the lectures were made available to all the participants. A few copies of these are still available from

Professor G K Rangarajan
Convenor, IWDP
Indian Institute of Geomagnetism
Colaba Bombay 400 005
INDIA

The Workshop was followed by a one-week practical course for interested participants in (i) magnetic observatory work at Alibag; (ii) computer software on data processing and analysis at the Institute of Geomagnetism in Bombay and (iii) numerical modelling of aeromagnetic and other data at the National Geophysical Research Institute in Hyderabad.

UNESCO provided travel support to several foreign participants and one invited speaker; IUGG supported travel of one invited speaker. Local hospitality, inclusive of hotel accomodation, lunch and tea during the workshop, transport, per diem allowance and an excursion trip was provided by the organizers through generous financial support from various scientific organizations of the Government of India.

INTERNATIONAL MAP SYMPOSIUM, KYOTO 1984

S Kato, Symposium Chairman

The main purpose of this symposium was to discuss some of the MAP results which were obtained so far since the MAP started in 1982. The symposium would thus be useful for coordinating our future efforts in MAP and beyond it i.e. MAC.

The meeting was held between Nov.26 and Nov.30 in 1984 at New Miyako Hotel in Kyoto. Prior to the symposium the MU radar Ribbon Cutting Ceremony was opened Nov.24. and. after the symposium. Dec 1. there was an excursion to Shigaraki district where the MU radar Observatory is located.

The symposium participants amounted to. approximately. 180 of 12 nationalities. The presented paper was. approximately. 150 of which 90 papers were presented in five oral sessions as Climatology of the Middle Atmosphere(Session I). Large-Scale Wave Dynamics(Session II). Gravity Wave and Turbulence (Session III). Transport Processes of Trace Species and Aerosols(Session IV) and MAP in the Antarctica(Session V).

The symposium was organized to put an equal enphasis between Poster Session and Oral Sessions. The session accomodating 60 papers. was given 2.5 hrs with no parallel oral session in those rooms which were specially prepared for exhibition of the posters. The most congested and. yet. prosperous-sessions seemed to be for those of Gravity Wave and Turbulence of the middle atmosphere. Novel observations by MST raders and stimulating ideas were presented and discussed.

In addition to these successful scientific sessions the attendants enjoyed social programs as reception. banquet. excursion and accompanying persons' programs.

The XXst URSI General Assembly

The XXst URSI General Assembly was held in Florence (Italy) from the 28th of august until the 6th of september 1984. Above one thousand scientists attended and about 650 papers were presented.

The scientific part of the Assembly consisted of open symposia (OS), joint scientific sessions (JS, organized by two or more commissions), and commission sessions (CS), lasting each between two to four half-day sessions. The symposia or sessions which are of direct interest to IAGA members (mainly Division III) are listed below :

OS : Active experiments in space plasmas ; Radio techniques in planetary exploration ; Data, signal, and image processing.

JS : Plasma instabilities in magnetospheres ; Ionospheric plasma phenomena ; Active and passive radiotechniques as diagnostic tools in the magnetosphere and ionosphere ; Computer modelling of plasma and radio phenomena ;

CS : Modelling of the ionosphere ; ULF and VLF waves.

The two URSI/IAGA Joint Working Groups have been prolongated and new chairmen have been elected :

- WG on Passive Electromagnetic probing of the magnetosphere : Dr U. INAN (USA) will replace Dr K. TSURUDA (Japan).

- WG on Wave Instabilities in Space Plasmas : Dr B. FEJER (USA) will replace Dr E.J. FREMOW (USA), as Commission G representative. Dr T. SATO (Japan) will remain as Commission H representative.
Commissions G and H chairmen have been elected. These are :

- Commission G (Ionospheric Radio and Propagation) :
Dr J. AARONS (USA), chairman and Dr H. RISHBETH (U.K.), vice-chairman.

- Commission H (Waves in Plasmas) : Pr R.L. DOWDEN (New-Zealand), Chairman and Dr H. MATSUMOTO (Japan) vice-chairman.

The merging of the two commissions into a single one which would ease the pressure for too many symposia on geophysical problems at the URSI assemblies and which would allow a better coordination between the scientific programs to be dealt with at the assemblies of URSI and IAGA, has been rejected by the Council. However new Inter Commission Working Groups have been created (on Incoherent scatter, on Active experiments and on Computer-aided plasma wave analysis), and the two Commissions have been asked to work in close cooperation as they already did within the past three years.

The problems of wave propagation in neutral atmosphere, in which IAGA Division II may have some interest, are dealt within Commission F (Wave Propagation and Remote Sensing) whose chairman and co-chairman are now Drs. F. FEDI (Italy) and R.K. CRANE (U.S.). The Inter Commission Coordinating Group on Remote Sensing has been maintained with Drs J. GOWER (Canada) as chairman and D. GJESSING (Norway) as vice-chairman.

The next URSI General Assembly will take place in Tel-Aviv (Israel) from august 23 to september 4. Since the next UGGI General Assembly will be held the same year, it is of utmost interest that a detailed coordination of the scientific programs be established on subjects which are of common interest for both Unions. URSI has appointed a Steering Committee for defining the scientific program of its Assembly, the chairman of which is Dr P. BAUER (Centre de Recherches en Physique de l'Environnement, CNET, 38-40 rue du Général Leclerc, 92131 Issy-les-Moulineaux, France), who could be contacted by IAGA members who would be involved in the preparation of the Vancouver program.

Dr R. GENDRIN (France) was the IAGA representative at this URSI General Assembly. He also representated IUGG.

12TH ANNUAL EUROPEAN MEETING ON ATMOSPHERIC STUDIES BY OPTICAL METHODS

3-7 September 1984

This year the meeting returned to Stockholm, the site of the first annual meeting in 1973. While the meeting included its traditional sessions on aurora, airglow and laboratory studies of interest to atmospheric phenomena,sessions were also devoted to interferometry and other instrumentation. These sessions allowed for a valuable exchange on new developments in atmospheric instrumentation. The different virtues of the Fabry-Perot and the field widened Michelson Interferometer, both used in an imaging mode, were the source of extensive discussion. However, with Professor Pierre Connes in attendance many participants were elegantly reminded of the excellent work that had been achieved by the early pioneers.

The Fabry-Perot approach appears to have been favored and developed by both American and British scientists while the Michelson Interferometer has found support among Canadian and French experimenters. Obviously each has its place and it will be of interest to follow the applications and note where each instrument is providing its greatest information.

Other CCD detector instrumentation and new channeltrons for use in the vacuum ultra-violet were carefully described and suggested that optical atmospheric scientists can offer novel approaches to never ending desire to improve measurement ability.

Edward J Llewellyn
Institute of Space and Atmospheric Studies
University of Saskatchewan
Saskatoon S7N 0W0
CANADA

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300 Years Ago .....

PHILOSOPHICAL TRANSACTIONS. For the months September, and October, 1685. Number 175, VOL XV. OXFORD, Printed at the THEATER, and are to be sold by Samuel Smith, at the Prince's Arms in St Paul's Church-yard, London; and Henry Clements, Bookseller in Oxford. 1686. [page 1149]

.....Letter, Written by Dr. Garden of Aberdeen; concerning the Causes of Several Winds etc. to Dr. Plot:

....the Atmosphere and a large Vortex of Aether beyond the Moon goes round with the Earth in its diurnal motion, which tho' according as it is removed from the Earth it may be proportionately slower in its motion, yet that portion of the Atmosphere which is nearest the Earth and surrounds it, may be supposed to keep equall pace with the Earth in its motion, and if there were no changes in the Atmospher's [sic] Gravity, I suppose it would always go along with the Globe of the Earth from West to East in an uniform motion, which would be wholly insensible to us.

"13th ANNUAL MEETING on UPPER ATMOSPHERE STUDIES BY OPTICAL METHODS", at Lysebu, Voksenkollen, Oslo 3, Norway. (19-23. August 1985.)

Norway was host for this year's meeting, held at Lysebu, just north of Oslo. It was jointly organised by K. Maseide and T.A. Sten of the University of Oslo, who carried out their tasks admirably. It attracted about 50 participants, many from Scand navia, but Canada, USA, Japan and other European countries were also represented. As usual, there was an interesting mixture of ground-based, rocket and satellite data, including some from the NASA Space Shuttle.

The opening session began with a colourful history of Norwegian auroral research, provided by Alv Egeland, who reminded us of the important work carried out at the University of Oslo by scientists such as Tromholt, Birkeland, Stormer and Vegard. Sessions were held on Atmospheric emissions and constituents, Auroral features and dynamics and Auroral pulsations. The 'Airglow and atmospheric parameters' session began with a review from Georg Witt on some current problems in airglow research. An example of this is the excitation mechanism of the 557.7nm green line emission which is still far from being well understood.

The final session consisted of discussions on observation programmes and proved to be most interesting. Fred Rees and John Meriwether gave a review of the Ground Based Optical Aeronomy (GBOA) programme in the U.S. This programme was founded, primarily, to achieve better coordination of optical observations in the States. One of the main topics is Coupling, Energetics and Dynamics of Auroral Regions (CEDAR). In addition to developing new instrumentation it is hoped to cluster equipment at particular sites and to initiate new cooperative programmes. Some of the objectives seem quite ambitious and certainly very costly, however given the resources we shall no doubt see some improvements in the application of optical technology to low-level light atmospheric studies. A problem which received much discussion at this meeting was the lack of skilled manpower that might arise if the GBOA proposals are well funded.

Another major project, discussed by A. Vallance-Jones, is the Canadian Meridian Photometer Array (CANOPUS MSP). CANOPUS, the array of automatic instruments being set up in Northern Canada, is composed of several stations which measure electric fields and currents in the ionosphere as well as optical emissions, transmitting the data by satellite and telephone telemetry to a central data analysis centre. CANOPUS was originally planned as part of the ISTP Program. It will, however, also provide support to a series of space projects including VIKING, POLAR BEAR, EXOS-D and UARS.

A Calibration workshop was arranged in parallel with the meeting by H. Lauche (Max-Planck-Institute, FRG) for those wishing to re-calibrate their standard light sources and photometers.

In summary, the meeting, and discussions after the sessions, were both interesting and stimulating. I hope the next meeting (to be held in Cambridge, provisionally scheduled for the 17th August 1986) will be equally valuable to the optical community.

R.D. Stewart,
British Antarctic Survey,
Madingley road,
Cambridge, CB3 0ET, UK.

MAGNETIC OBSERVATORY NETWORK

K L Svendsen, Cochairman of Division V, writes that the magnetic observatory network includes many stations now producing high-resolution digital data. Two lists are reproduced below which give the names of observatories giving one-minute values in at least three elements. Svendsen writes also that it should be noted that not all the results from these observatories are readily available from World Data Centers but that copies of data for specific time intervals should be available from operators of the observatories, subject to satisfactory mutual arrangement concerning expense of reproduction.

TABLE I:

Observatories producing one-minute values in at least 3 elements

Australia	Canberra, Charters Towers, Gnangara
Belgium	Dourbes
Canada	Alert, Baker Lake, Cambridge Bay, Fort Churchill, Glenlea, Great Whale River, Meanook, Mould Bay, Ottawa, Resolute Bay, St. John's, Victoria, Yellowknife
Czechoslovakia	Budkov, Hurbanovo
Denmark	Brorfelde, Godhavn, Narssarssuaq, Thule
Finland	Nurmijärvi, Sodankylä
France	Chambon-la-Forêt, Dumont d'Urville, Martin-de-Viviès, Port Alfred, Port-aux-Français
German Dem. Rep.	Niemegk
German Fed. Rep.	Fürstenfeldbruck,
Hungary	Tihany
Italy	Castel Tesino, L'Aquila
Japan	Hatizyo, Kakioka, Kanoya, Kanozan, Memambetsu, Mizusawa, Syowa
Madagascar	Tananarive
New Zealand	Lauder
Norway	Dombås
Poland	Belsk
South Africa	Grahamstown, Hartebeesthoek,
Sweden	Abisko, Kiruna, Lovö, Lycksele
United Kingdom	Argentine Islands, Eskdalemuir, Hartland, Lerwick
U. S. A.	Barrow, Boulder, College, Del Rio, Fredericksburg, Fresno, Guam, Honolulu, Newport, San Juan, Sitka, Tucson
U. S. S. R.	Cape Schmidt, Dikson, Murmansk, Tiksi

TABLE II:

Variation stations producing one-minute values in at least 3 elements

Brazil	Cashoeira Paulista, Eusebio
Denmark	Daneburg, Danmarkshavn, Frederikshab, Godthab, Kuvdlorssuaq, Nord, Savigsivik, Scoresby Sund, Sondrea Stromfjord, Umanaq, Upernavik
Finland	Alta, Kautokeino, Kevo, Kilpisjarvi, Muonio, Pello, Sorya
German Dem. Rep.	Sosa, Warnkenhagen
Japan	Husafell, Isafjördur, Tjörnes
Switzerland	Neuchâtel
United Kingdom	Halley
U. S. A.	Anchorage, Arctic Village, Cape Perry, Fort Simpson, Fort Smith, Fort Yukon, Inuvik, Lynn Lake, Norman Wells, Sacks Harbor, Talkeetna

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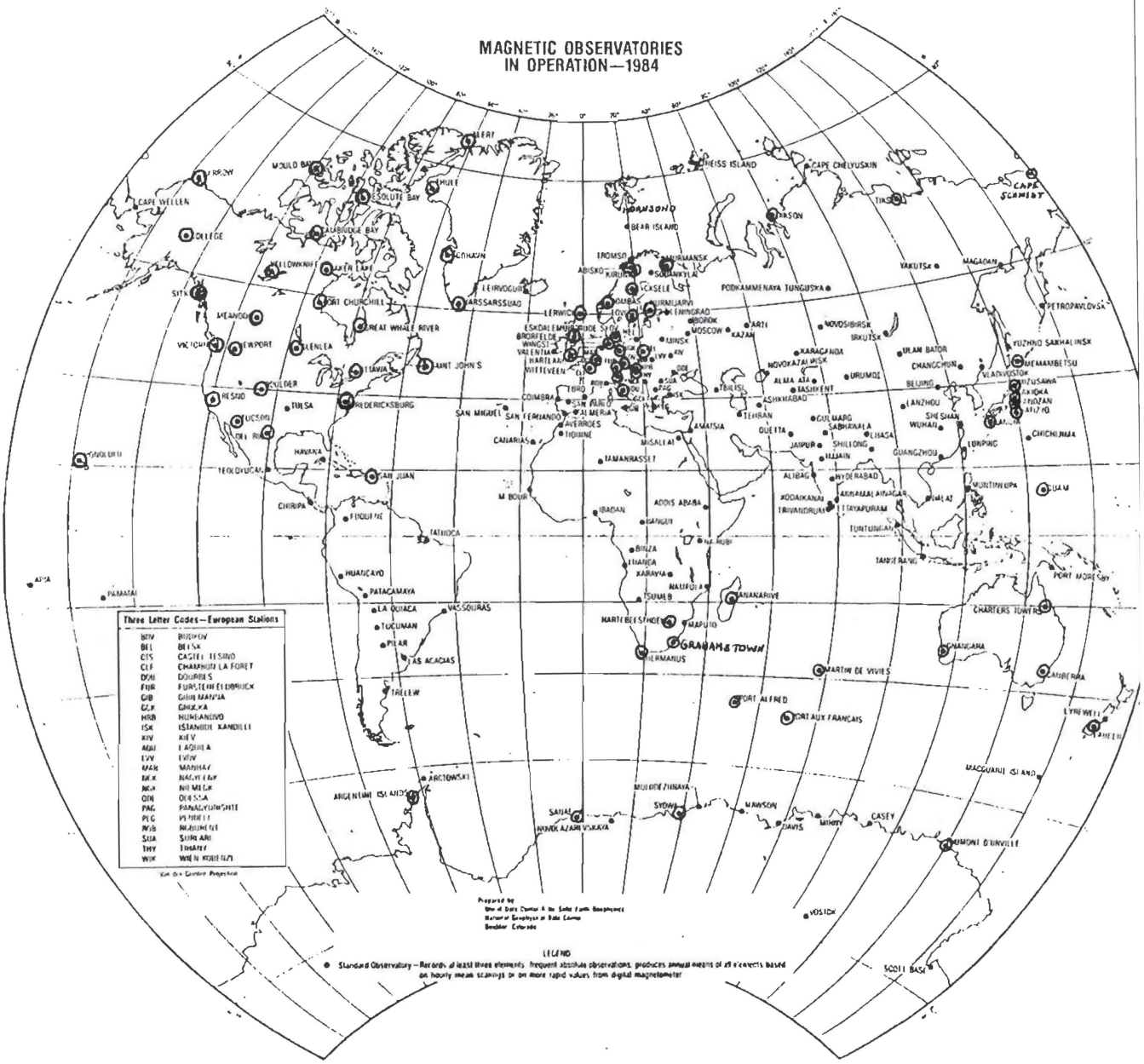
300 Years ago .....

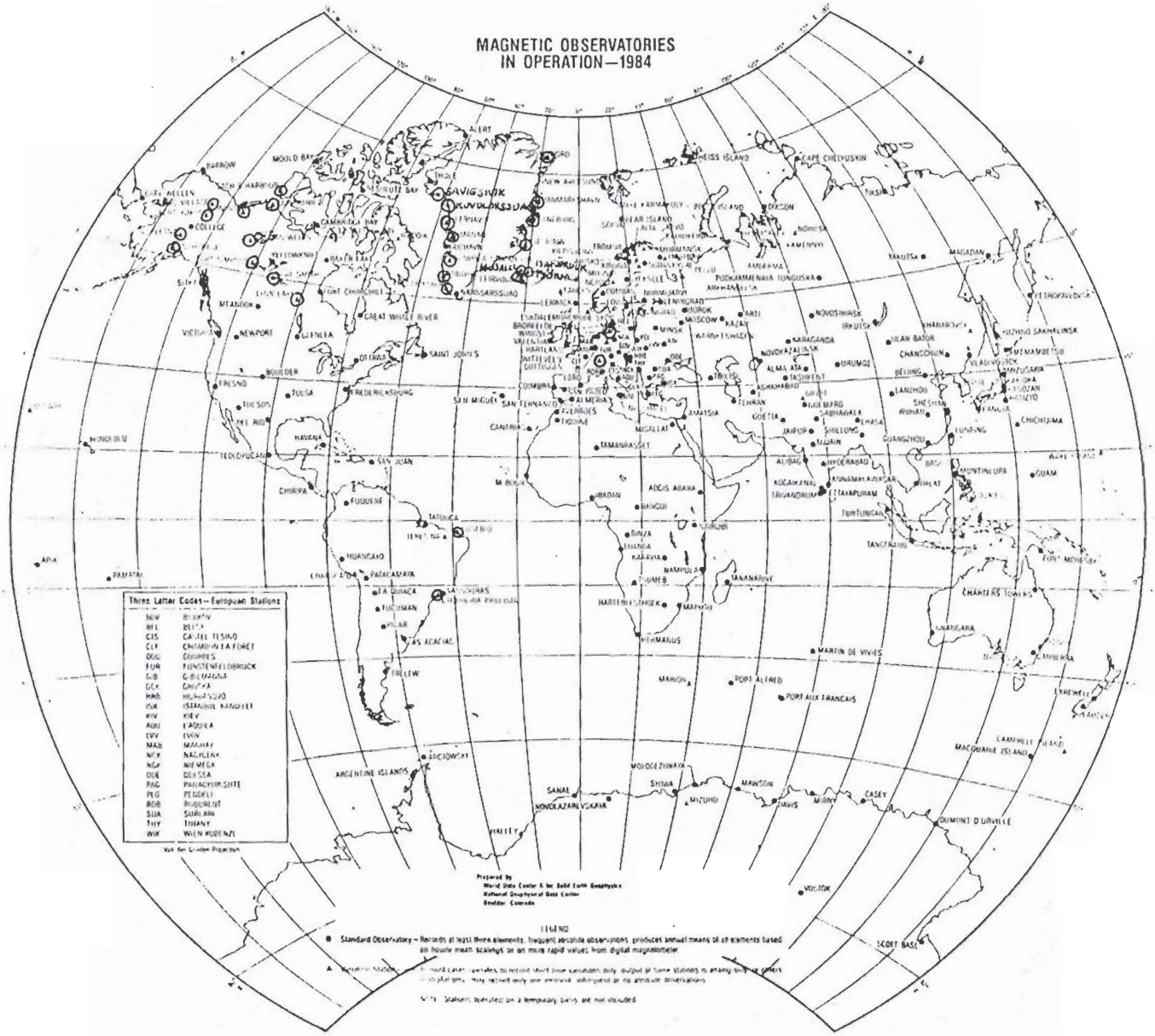
PHILOSOPHICAL TRANSACTIONS. For the month December, 1685. Number 177, VOL XV. OXFORD, Printed at the THEATER, and are to be sold by Samuel Smith, at the Prince's Arms in St Paul's Church-yard, London; and Henry Clements, Bookseller in Oxford. 1686. [page 1214]

Severall Observations of the Respect of the Needle to a piece of Iron held Perpendicular; made by a Master of a Ship Crossing the Aequinoctial Line, Anno 1684, and communicated by Mr Arthur Bayly, F. of the R.S.

Latd. 8d. 17' South, and Meridian dist. from the Lizard 17d.35' West. Here the No. point of the needle would not respect the upper end of the Iron, but rather forsake it, but the So. point would still something respect the lower end, and alter its true position about 2 points; but take the Iron and lay it aslope over the Compass, so that the upper end be towards the So. pole, and the lower end to the No. and then the No. point would respect the lower end and follow it; but if you point the upper end to the No. and the lower end to the So. the No. point will forsake it. But if you lay it Horizontall, it would do as in the foregoing observations.



Map No. 1 -- Observatories producing one-minute values in at least three elements ⊙



Map No. 2 -- Variation stations producing one-minute values in at least three elements ⓐ

NOTICES OF THE ASSOCIATION

UK National report to IAGA: 1979-1983

Mr C R Argent of the London Royal Society has copies of this report available upon request to him. The report is a bibliography of published scientific papers and is free of charge.
The address to write to is

Mr C R Argent
The Royal Society
6 Carlton House Terrace
London SW1Y 5AG UK

EUROPEAN GEOPHYSICAL SOCIETY DIRECTORY (EXTERNAL GEOPHYSICS)

The Directory contains addresses, telephone numbers, telex numbers, and cable addresses of institutions engaged in External Geophysics, listed alphabetically by country. Copies are available from the Editor of the Directory,

Dr J Lemaire
Institut d'Aeronomie Spatiale de Belgique
3 Avenue Circulaire
B-1180 Bruxelles
BELGIUM

SECRETARY-GENERAL

His full address is:

IAGA Secretary-General
Natural Philosophy Department
Aberdeen University
Aberdeen AB9 2UE
Scotland UK

The telephone number (answered 7 days a week, 24 hours a day):

(0224) 640074 or (from outside the UK)
(44 224) 640074

Telex number (machine open for reception again 7 days a week, 24 hours a day, but for transmission only during normal working hours):

73458 (Answerback: UNIABN G)

FORTHCOMING MEETINGS

Polar Geomagnetic Phenomena Symposium
Souzdal (USSR)
May 25-31, 1986

Topics include [with invited reviewers as listed]:
1. The structure and dynamics of polar current systems [Untiedt, Potemra, Pudovkin].
2. Electrodynamical processes at high latitudes [Galperin, Kamide].
3. The dynamics of substorms in relation to parameters of the IMF and solar wind [Egeland, Troshichev, Akasofu].
4. Polar geomagnetic phenomena: review and future prospects [Rycroft].

Circular No:2 was scheduled for September, 1985. Contributors should submit abstracts by December 15, 1985, to A N Zaitzev at

Soviet Geophysical Committee
Molodezhnaya 3
Moscow GSP-4
USSR
[Telephone: 130-05-46
Cable: Moscow MGG]

WORKING WORKSHOP
ON GEOMAGNETIC OBSERVATORY INSTRUMENTATION

30 July - 9 August, 1986

This will be held in Ottawa (Canada) and the object is for experienced magnetic observers (and new ones, as well) to have an opportunity to work with the current range of observatory instruments. The instruments involved will be both from individual scientists and from those commercially available. Manufacturers are to be invited to submit instruments for demonstration and assessment. The facilities of the geomagnetic laboratory of the Earth Physics Branch of the Department of Energy, Mines and Resources (Canada) will be available.

Registration will be approximately 100 dollars (US) and it is expected that living expenses will be about 50 dollars(US) per day. Further information and registration forms from

Dr R L Coles
Earth Physics Branch
1 Observatory Crescent
Ottawa CANADA K1A 0Y3

6TH INTERNATIONAL SYMPOSIUM ON SOLAR-TERRESTRIAL PHYSICS

Toulouse (France)
30 June - 5 July, 1986

This is organized by SCOSTEP in collaboration with COSPAR and will take place during the first week of the COSPAR meeting (sponsored by IAGA). The scientific programme is composed of five sections:

-Sun and Heliosphere
-Interplanetary Medium
-Magnetosphere-Ionosphere System
-Thermosphere
-Middle Atmosphere

Abstracts should be sent by 15 January, 1986, to B Hultqvist, from whom further information is available.

B Hultqvist
Kiruna Geophysical Institute
PO Box 704
S-981 27 Kiruna
SWEDEN

SCAR

(ICSU Scientific Committee
on Antarctic Research)

The 19th meeting is scheduled for 9 to 27 June, 1986, in the USA. Details of the meeting schedule are given in SCAR Circular 500. For details, contact the SCAR Secretariat at

Scott Polar Research Institute
Lensfield Road
Cambridge CB2 1ER
UK

URSI General Assembly

This is scheduled for August 24 to September 4, 1987, starting two days after the closure of the General Assembly of IUGG.

EUROPEAN GEOPHYSICAL SOCIETY

SYMPOSIUM ON

DYNAMICS AND COMPOSITION OF THE RING CURRENT

during the

EUROPEAN GEOPHYSICAL SOCIETY XI GENERAL ASSEMBLY

25-30 August, 1986; Kiel (FRG)

A special symposium on the 'Dynamics and Composition of the Ring Current' (S17) consisting of about two half-day sessions will be held during the EGS XI General Assembly in Kiel. The dynamics and composition of the ring current has become of great interest during the last few years. Data on the ring current are available from a variety of spacecraft like AMPTE, DE, GEOS, ISEE. The AMPTE program has particularly addressed ring current studies in its scientific objectives and results from that mission are expected to trigger renewed modeling efforts. Latest results have stressed particularly the importance of ionospheric source regions in addition to the solar wind for the composition and the dynamics of the storm time ring current. Therefore contributions on the ring current itself (quiet time and storm time) as well as on the high latitude ionospheric source regions and on particle acceleration and the transport into the ring current are welcome.

Conveners: E. Möbius (Max-Planck-Institut für extraterrestrische Physik, 8046 Garching, FRG)
D. Hamilton (Dept. of Physics and Astronomy, University of Maryland, College Park, MD 20742, USA)

16th International Conference on
MATHEMATICAL GEOPHYSICS
22-28 June, 1986

This conference will take place in the Hotel De Bilderberg in Oosterbeek (The Netherlands). Participation is limited to 100. Further information may be got from

Mathematical Geophysics Organizing Committee
Department of Theoretical Geophysics
PO Box 80.021
3508 TA Utrecht
THE NETHERLANDS

FOURTEENTH ANNUAL MEETING ON
ATMOSPHERIC STUDIES BY OPTICAL METHODS
17-22 August 1986

This meeting, arranged jointly by University College London and the British Antarctic Survey, will be held at Clare College, Cambridge (UK). Suggestions for contributions are invited and should be sent to

Dr D Rees
Department of Physics and Astronomy
University College London
Gower Street
London WC1E 6BT UK

MISCELLANEOUS NOTICES

"Geomagnetism 1981" Prizes

After the end of the 4th Scientific Assembly in 1981 (at Edinburgh), some money was left over after payment of all outstanding accounts. For tax reasons, this money had to remain in the UK and the Local Organizing Committee [LOC] decided to use some of the surplus to endow student prizes at the three universities from which staff members were involved in the LOC.

So far, prizes have been awarded to the students listed below:

Aberdeen University:
1985: George F Thomson

University of Edinburgh:
1983: Elizabeth Lasseter
1984: Lorna Brazell
1985: Graham Heinson and Matthew Manson (shared prize)

University of Newcastle upon Tyne:
1982: C C G Einchcomb and J C Moore (shared prize)
1983: G C Shann
1984: G C Shann
1985: R J Crabtree

Although no specific rules for the prizes have been laid down by the LOC or, it is believed, by the individual universities, in general the prizes appear to have gone to undergraduate students who have distinguished themselves in some part of their work related to geomagnetism or aeronomy.

ANNALES GEOPHYSICAE

ANNALES GEOPHYSICAE, the official organ of the European Geophysical Society (EGS) which was created three years ago, has experienced an unanticipated rapid growth. The Journal will therefore be split into two Series (A and B) at the beginning of 1986 (Volume 4).

Editor-in-Chief (Series A and B)

Stephan MUELLER, ETH-Geophysics, CH-8093 Zürich (Switzerland)

Series A will deal with the UPPER ATMOSPHERE AND SPACE SCIENCES, i.e. the Interplanetary Medium, the Magnetospheres and the Upper Atmospheres of the Earth and Planets (EGS - Section 3). The Editor of this new Series will be:

Gaston J. KOCKARTS, Institut d'Aéronomie Spatiale,
3, avenue Circulaire, B-1180 Bruxelles (Belgium)

Series B will continue to publish contributions in TERRESTRIAL AND PLANETARY PHYSICS, i.e. articles dealing with Terrestrial and Planetary Interiors - Seismology and Tectonophysics (EGS - Section 1) and Terrestrial and Planetary Boundary Layers - Oceans and Lower Atmospheres (EGS - Section 2).

Editor of Section 1 : Raul MADARIAGA, Institut de Physique du Globe,
Université Pierre et Marie Curie, 4 Place Jussieu,
Tour 14-24, F-75230 Paris Cedex 05 (France)

Editor of Section 2 : Jacques C.J. NIHOUL, Mécanique des Fluides Géophysiques
Université de Liège, B5 Sart Tilman
B-4000 Liège (Belgium).

The splitting of the journal will provide more volume for papers (more than 600 pages for either series in 1986) and, at the same time, will decrease considerably the time interval between submission and publication.
There are no page charges, and 50 reprints will be supplied free of charge.

As for the first 3 volumes of ANNALES GEOPHYSICAE the annual subscription rate for Vol. 4 (1986) will still be quite moderate if compared to other international journals :

Series A or B (640 pages each)	FF 690 for regular subscribers FF 207 for EGS members
Series A and B (1 280 pages total)	FF 1 220 for regular subscribers FF 336 for EGS members.

HISTORICAL EVENTS AND PEOPLE IN GEOPHYSICS

Selected papers from the symposia of the Interdivisional Commission on History from the General Assembly in Hamburg, 1983. Edited by Wilfried Schroeder, published by Verlag Peter Lang, Jupiterstrasse 15, CH-3015 Bern, SWITZERLAND: price 55 DM.

DECLINE IN GLOBAL GEOMAGNETIC OBSERVATIONS FROM 1976-1984

M. A. Shea
Air Force Geophysics Laboratory
Hanscom AFB, Bedford, MA, 01731, USA

J. H. Allen
National Geophysical Data Center NOAA/NESDIS
325 Broadway, Boulder, Colorado 80303, USA

ABSTRACT

Using information from the first and second MONSEE Directories, statistics were compiled on the status of geomagnetic monitoring showing the change from 1976 to 1984. There has been a decrease of about 14% in the world-wide coverage for geomagnetic monitors, with the major decreases in North America and western Europe. Reasons offered to account for this decline include: the end of IMS, reduced funding, change in institution direction, and non-replacement of departing senior personnel.

1. INTRODUCTION

The solar-terrestrial environment is monitored by a wide variety of scientific sensors located throughout the world and on space platforms. Since 1973 there has been an international program, MONSEE, dedicated to the Monitoring of the Sun-Earth Environment. This program operates under the auspices of the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) of the International Council of Scientific Unions (ICSU).

Members of the MONSEE Steering Committee are appointed by the various scientific unions, the Committee on Space Research (COSPAR), the World Data Centers, and other related international organizations. The purpose of MONSEE is to maintain current information on the scientific programs which monitor various parameters of the solar-terrestrial environment. The goal of MONSEE is the expeditious collection, exchange, and distribution of solar-terrestrial data for use by all scientists to aid them in their various scientific analyses.

Most of the major monitoring networks have specific relationships to specialized commissions or committees of one of the scientific unions. The MONSEE program serves to bring these individual efforts together and to provide an interdisciplinary focus. In addition, the committee ascertains the "health" of the solar-terrestrial monitoring activities in the community as a whole.

2. THE MONSEE DIRECTORY

Over the past few years the compilation of detailed information on the various solar-terrestrial monitoring sensors throughout the world has been a major part of the MONSEE program. In 1977 the first MONSEE directory of stations engaged in monitoring the solar-terrestrial environment was published. At the time of publication, it was recognized that the directory did not contain a complete listing of all solar-terrestrial physics monitoring stations existing at that time.

The second edition of the directory was compiled in 1984 (Shea et al., 1984). The directory presents detailed information for 1168 sensors monitoring the solar-terrestrial environment. The scientific disciplines covered are solar and interplanetary phenomena, ionospheric phenomena, flare-associated events, geomagnetic variations, aurora, cosmic rays, airglow, and miscellaneous related phenomena such as atmospheric ozone. The entries are arranged by discipline with detailed listings of geographic coordinates, dates of operation and instrument descriptions as well as names and addresses for specific information about each station.

3. CURRENT STATUS OF SOLAR-TERRESTRIAL MONITORING ACTIVITIES

Until now it has been difficult to provide an adequate assessment of the vitality of the entire area of solar-terrestrial monitoring, primarily because of the lack of a homogenous data base. With the compilation of the second edition of the MONSEE Directory it is possible to ascertain if the various solar-terrestrial phenomena are being adequately monitored. Although the second directory still does not include every sensor monitoring the solar-terrestrial environment, this publication provides the most comprehensive data base of currently operational solar-terrestrial research monitoring activities.

In comparing the statistics available from the MONSEE Directory, it becomes apparent that the solar-terrestrial monitoring effort is declining on a global scale. A total of 1245 sensors were in operation in 1976 compared with 1124 sensors presumably in operation in 1984, a net decrease of 121 sensors (i.e. ~10%). Figure 1, which summarizes these results by discipline, ilustrates that the total number of solar-terrestrial physics stations has decreased on a world-wide basis in the past eight years. Decreases are evident in most disciplines. However, a significant increase occurred in the number of flare-associated event sensors, where the newly opened OMEGA (U.S. Coast Guard) stations which contribute to the monitoring of sudden ionospheric disturbances and solar protons were added.

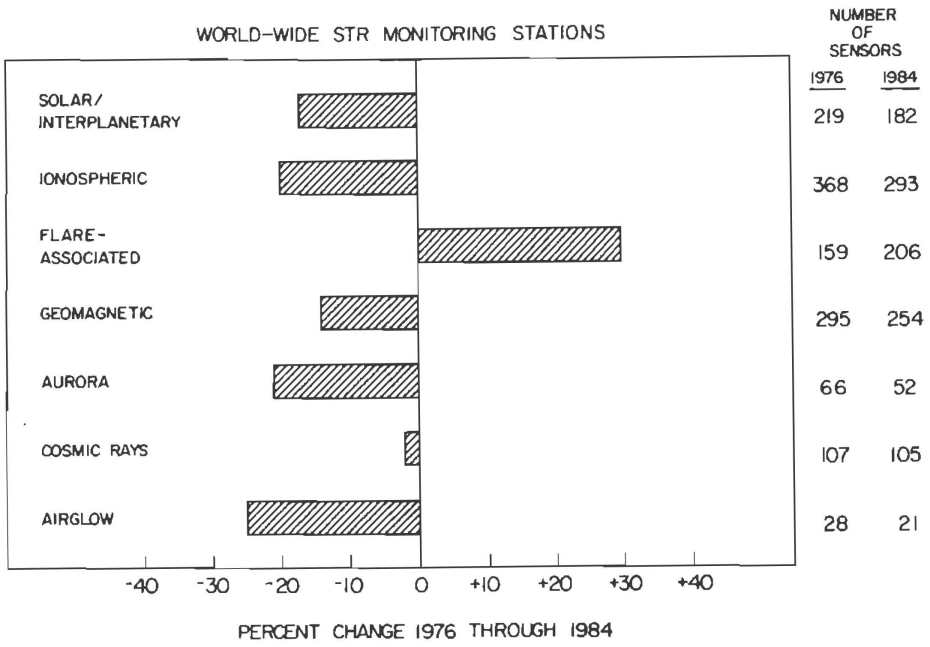


Figure 1. Relative change in the number of operational world-wide solar-terrestrial monitoring sensors between 1976 and 1984. The actual number of sensors is given on the right side of the figure.

It is noted that included in the 1124 sensors listed in the second edition of this directory are 85 sensors listed in the first directory for which no confirmation or updating information was received for the second edition. Although for the purpose of this status report these sensors are included as "currently in operation", many of them may no longer be in operation. Therefore, the approximate 10 percent decrease in monitoring sensors is a minimum estimate; the actual decrease may be significantly larger.

Figure 2 illustrates the changes in the geomagnetic area. There has been an eight percent decrease in the number of sensors for geomagnetic standard and rapid run measurements; however, there has been a major decrease of 31 percent in the number of sensors measuring magnetospheric micropulsation phenomena. Decreased instrumentation in North America, Europe and New Zealand was noted from our survey, a change attributed in part to the termination of the IMS program.

Table 1 and Table 2 summarize the contents of the current MONSEE Directory for stations where geomagnetic storms and rapid run measurements are reported, and stations where magnetospheric micropulsation phenomena are observed. The asterisk beside the station name indicates that no response was received for the latest survey. Information on the status of these stations or operating stations not included in the MONSEE Directory would be appreciated and can be sent to either of the authors of this paper.

Care should be noted in using the data in this paper without consulting the more detailed tables contained in the second edition of the MONSEE directory. In some cases the termination of a specific sensor or sensors may result from the development of a more sophisticated monitoring technique not available in 1976. For example, world-wide auroral measurements are now obtained via satellite. However, the reasons for the termination of some of the other programs are not as evident and may include the following: reduced funding, change in institution direction, and non-replacement of departing senior personnel. Nevertheless, it appears clear that in most disciplines the world-wide network of synoptic solar-terrestrial measurements has diminished in the past eight years.

REFERENCE

Shea, M. A., S. A. Militello, H. E. Coffey, and J. H. Allen, Directory of Solar-Terrestrial Physics Monitoring Stations - Edition 2, AFGL-TR-84-0237, 1984.

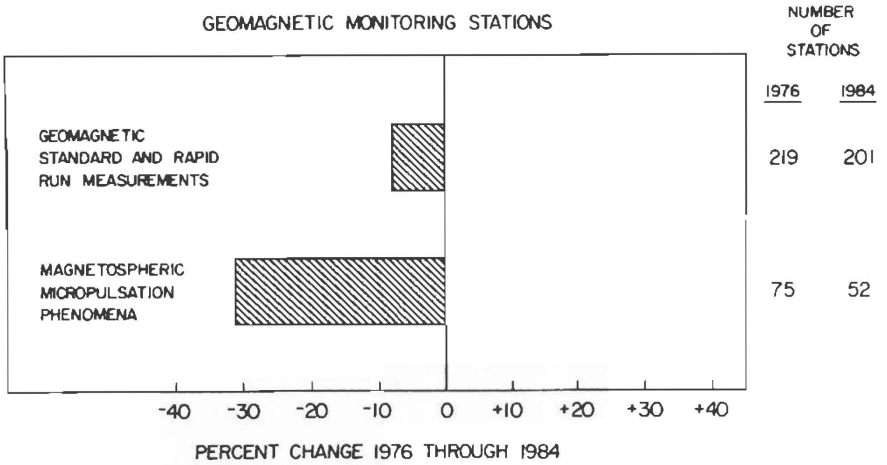


Figure 2. Relative change in the number of operational world-wide solar-terrestrial geomagnetic monitoring sensors between 1976 and 1984. The actual number of sensors is given on the right side of the figure.

D01 GEOMAGNETIC STANDARD AND RAPID RUN MEASUREMENTS

STATION NAME	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	STATION NAME	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST
ALERT, CANADA	82.50	297.50	MOSCOW, USSR	55.48	37.32
HEISS ISLAND, USSR	80.62	58.05	ESKDALEMUIR, UK	55.32	356.80
NYAALESUND, NORWAY	78.92	11.93	GREAT WHALE RIVER, CANADA	55.30	282.25
NYAALESUND, NORWAY	78.92	11.93	NOVOSIBIRSK, USSR	55.03	82.90
THULE, GREENLAND	77.48	290.83	MEANOOK, CANADA	54.62	246.67
THULE, GREENLAND	76.55	291.17	MINSK, USSR	54.10	26.52
MOULD BAY, CANADA	76.20	240.60	WARNKENHAGEN, GDR	54.00	11.07
RESOLUTE BAY, CANADA	74.60	265.10	WINGST, FRG	53.74	9.07
BEAR ISLAND, NORWAY	74.51	19.02	WINGST, FRG	53.74	9.07
TIXIE BAY, USSR	71.58	129.00	WINGST, FRG	53.74	9.07
BARROW, USA	71.32	203.38	PETROPAVLOVSK-KAMCH., USSR	53.10	158.63
JAN MAYEN, NORWAY	70.93	8.74	WITTEVEEN, THE NETH.	52.81	6.67
TROMSO, NORWAY	69.66	18.94	WITTEVEEN, THE NETH.	52.81	6.67
GODHAVN, GREENLAND	69.25	306.47	IRKUTSK, USSR	52.27	104.27
CAMBRIDGE BAY, CANADA	69.10	255.00	NIEMEGK, GDR	52.07	12.68
ABISKO, SWEDEN	68.36	18.82	VALENTIA, UK	51.93	349.75
MURMANSK, USSR	68.25	33.08	RAF UPPER HEYFORD, UK	51.56	358.85
LOVOZERO, USSR	67.97	35.02	GOETTINGEN, FRG	51.55	9.96
KIRUNA, SWEDEN	67.83	20.42	LUCKY LAKE, CANADA	51.15	252.74
APATITY, USSR	67.50	33.33	HARTLAND, UK	50.99	355.52
SODANKYLA, FINLAND	67.37	26.63	KIEV, USSR	50.72	30.30
ZHIGANSK, USSR	66.70	123.30	DOURBES, BELGIUM	50.10	4.60
*NYDA, USSR	66.60	73.00	LVOV, USSR	49.90	23.75
FORT YUKON, USA	66.56	214.78	KARAGANDA, USSR	49.82	73.08
WELEN, USSR	66.17	169.83	GLENLEA, CANADA	49.60	262.90
POKER FLAT, USA	65.13	212.52	*BUDKOV, CZECH.	49.07	14.02
*KEM, USSR	65.00	34.40	VICTORIA, CANADA	48.52	236.58
COLLEGE, USA	64.87	212.17	KHABAROVSK, USSR	48.48	135.07
COLLEGE, USA	64.86	212.15	WIEN-KOBENZL, AUSTRIA	48.26	16.32
LYCKSELE, SWEDEN	64.62	18.67	FUERSTENFELDBRUCK, FRG	48.17	11.28
ARKHANGELSK, USSR	64.60	40.50	*HURBANOVO, CZECH.	47.87	18.18
BAKER LAKE, CANADA	64.33	263.97	NAGYCENK, HUNGARY	47.63	16.72
LEIRVOGUR, ICELAND	64.18	338.30	ST. JOHNS, CANADA	47.60	307.32
LEIRVOGUR, ICELAND	64.18	338.30	NEUCHATEL, SWITZERLAND	47.00	6.57
YELLOWKNIFE, CANADA	62.48	245.53	LORING AFB, USA	46.95	292.12
DOMBAS, NORWAY	62.07	9.12	YUZHNO-SAKHALINSK, USSR	46.95	142.72
YAKUTSK, USSR	62.02	129.72	TIHANY, HUNGARY	46.90	17.89
PODKAMENNAYA TUNGUSKA, USSR	61.60	90.00	ODESSA, USSR	46.78	30.88
NARSSARSSUAQ, GREENLAND	61.18	314.57	CASTEL TESINO, ITALY	46.05	11.65
NURMIJARVI, FINLAND	60.51	24.65	NOVOKAZALINSK, USSR	45.77	62.12
*UGUT, USSR	60.50	74.00	ST. CLOUD, USA	45.57	265.81
ANDOYA, NORWAY	60.28	16.02	OTTAWA, CANADA	45.40	284.45
LERWICK, UK	60.13	358.82	MEMAMBETSU, JAPAN	43.91	144.19
MAGADAN, USSR	60.12	151.02	VLADIVOSTOK, USSR	43.68	132.17
LENINGRAD, USSR	59.95	30.70	ALMA-ATA, USSR	43.25	76.92
UPPSALA, SWEDEN	59.80	17.60	MCMATH-HULBERT, USA	42.66	276.74
LOVO, SWEDEN	59.35	17.83	L'AQUILA, ITALY	42.38	13.31
FORT CHURCHILL, CANADA	58.80	265.90	PANAGJURISTE, BULGARIA	42.31	24.11
BOROK, USSR	58.02	38.97	TBILISI, USSR	42.08	44.70
SITKA, USA	57.06	224.67	ISTANBUL-KANDILLI, TURKEY	41.04	29.04
*SVERDLOVSK, USSR	56.43	58.57	EBRO, SPAIN	40.82	.49
RUDE SKOV (RSV), DEN.	55.84	12.46	COIMBRA, PORTUGAL	40.22	351.75
KAZAN, USSR	55.83	48.85	BOULDER, USA	40.13	254.77
BROR FELDE (BFE), DEN.	55.63	11.67	SAN PABLO-TOLEDO, SPAIN	39.55	355.65

* No response to inquiries for updated information.

D01 GEOMAGNETIC STANDARD AND RAPID RUN MEASUREMENTS (continued)

STATION NAME	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	STATION NAME	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST
MIZUSAWA, JAPAN	39.11	141.21	TUNTUNGAN, INDONESIA	3.51	98.56
FREDERICKSBURG, USA	38.20	282.63	BUNIA - RUAMPARA, ZAIRE	1.53	30.02
PENDELI, GREECE	38.05	23.86	NAIROBI, KENYA	-1.33	36.81
GIBILMANNA, ITALY	38.00	14.02	EUSEBIO, BRAZIL	-3.88	321.27
ASHKHABAD, USSR	37.95	58.10	*BINZA, ZAIRE	-4.37	15.25
*SEOUL, REPUBLIC OF KOREA	37.23	126.57	TANGERANG, INDONESIA	-6.17	106.65
FRESNO OBSERVATORY, USA	37.09	240.28	LUANDA, ANGOLA	-8.92	13.17
ALMERIA, SPAIN	36.85	357.54	PORT MORESBY, NEW GUINEA	-9.42	147.15
OBS. DE MARINA, SPAIN	36.47	353.80	*KARAVIA, ZAIRE	-11.65	27.47
KAKIOKA, JAPAN	36.23	140.19	APIA, WESTERN SAMOA	-13.80	188.22
TULSA, (TUL), USA	35.91	264.22	NAMPULA, MOCAMBIQUE	-15.09	39.25
TEHRAN, IRAN	35.70	51.40	TSUMEB, NAMIBIA	-19.20	17.58
MIYAZU, JAPAN	35.32	135.11	CHARTERS TOWER, AUSTRALIA	-20.10	146.30
KANOZAN, JAPAN	35.25	139.96	CACHOEIRA PAULISTA, BRAZ.	-22.88	314.61
GULMARG, INDIA	34.08	74.24	HARTEBEESTHOEK, REP. S.A.	-25.88	27.71
HATIZYO, JAPAN	33.07	139.83	MAPUTO, MOZAMBIQUE	-25.92	32.58
TUCSON, USA	32.25	249.17	TUCUMAN, ARGENTINA	-26.80	294.80
AMATSIA, ISRAEL	31.55	34.91	GNANGARA, AUSTRALIA	-31.78	115.95
KANOYA, JAPAN	31.42	130.88	HERMANUS, REP. OF S. AFR.	-34.42	19.22
*SABHAWALA, INDIA	30.37	77.80	HERMANUS, REP. OF S. AFR.	-34.42	19.22
QUETTA, PAKISTAN	30.18	66.95	*LAS ACACIAS, ARGENTINA	35.00	302.32
DEL RIO OBSERVATORY, USA	29.49	259.08	CANBERRA, AUSTRALIA	-35.31	149.00
*CANARIAS, CANARY ISLANDS	28.48	343.74	CANBERRA, AUSTRALIA	-35.32	149.36
CHICHIJIMA, JAPAN	27.09	142.18	MARTIN DE VIVIES, AMST. IS	-37.50	77.34
JAIPUR, INDIA	26.92	75.79	TOOLANGI, AUSTRALIA	-37.53	145.47
SHILLONG, INDIA	25.57	91.88	*TRELEW, ARGENTINA	-43.25	294.68
LUNPING, TAIWAN, CHINA	25.00	121.17	EYREWELL, NEW ZEALAND	-43.42	173.35
UJJAIN, INDIA	23.02	75.78	LAUDER, NEW ZEALAND	-45.04	169.69
HONOLULU, USA	21.32	201.99	PORT ALFRED, CROZET ISLS.	-46.43	51.87
ALIBAG, INDIA	18.64	72.87	PORT AUX FR., KERG. ISLS.	-49.35	70.21
SAN JUAN, PUERTO RICO, USA	18.12	293.85	CAMPBELL ISLAND	-52.50	169.20
HYDERABAD, INDIA	17.42	78.55	MACQUARIE ISLAND	-54.50	158.95
PAPEETE (PAMATAI), F. POL.	17.34	210.25	ARGENTINE ISLANDS	-65.25	295.73
BAGUIO, PHILIPPINES	16.41	120.58	MIRNY, ANTARC.	-66.52	93.02
MANILA, PHILIPPINES	14.64	121.08	CASEY, ANTARC.	-66.54	110.36
MBOUR, SENEGAL	14.39	343.04	TERRE ADELIE, ANTARC.	-66.67	140.00
MUNTINLUPA, PHILIPPINES	14.38	121.02	MAWSON, ANTARC.	-67.60	62.86
GUAM	13.59	144.87	MOLODEZHNAYA, ANTARC.	-67.67	45.85
ANNAMALAINAGAR, INDIA	11.37	79.68	DAVIS, ANTARC.	-68.58	77.97
TILARAN, COSTA RICA	10.44	84.32	SYOWA, ANTARC.	-69.00	39.58
KODIAKANAL, INDIA	10.23	76.95	SANAE, ANTARC.	-70.32	357.66
ADDIS ABABA, ETHIOPIA	9.29	38.76	NOVOLAZAREVSKAYA, ANTARC.	-70.77	11.82
ETAIYAPURAM, INDIA	9.20	78.00	HALLEY BAY, ANTARC.	-75.52	333.05
TRIVANDRUM, INDIA	8.48	76.95	SIPLE, ANTARC.	-76.00	276.00
DAVAO, PHILIPPINES	7.08	125.58	SCOTT BASE, ANTARC.	-77.81	166.76
BANGUI, CENTRAL AFR. REP.	4.44	18.56	GENERAL BELGRANO, ANTARC.	-77.97	321.20
			SOUTH POLE, ANTARC.	-90.00	0.00

(Note: Duplicate entries indicate multiple sensors.)

STATION NAME	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST	STATION NAME	GEOGRAPHIC LAT	GEOGRAPHIC LONG EAST
*HEISS ISLAND, USSR	80.62	58.05	CHICHIJIMA, JAPAN	27.09	142.18
*THULE, GREENLAND	76.60	291.20	CHOUTUPPAL (HYDER.), INDIA	17.30	78.93
CAPE PARRY, CANADA	70.17	235.28	PAMATAI, FR. POLYNESIA	-17.34	210.65
OULU, FINLAND	65.08	25.87	NGOYA, REP. OF S. AFRICA	-28.83	31.88
COLLAGE, USA	64.86	212.15	WOOMERA, AUSTRALIA	-31.10	136.78
ANDOYA, NORWAY	60.17	16.01	BROKEN HILL, AUSTRALIA	-32.00	141.46
LERWICK, UK	60.13	358.82	MUNDARING, AUSTRALIA	-32.00	116.20
LERWICK, UK	60.13	358.82	NEWCASTLE, AUSTRALIA	-32.75	151.50
*BOROK, USSR	58.03	38.97	HERMANUS, REP. OF S. AFR.	-34.42	19.22
*BOROK, USSR	58.03	38.33	HERMANUS, REP. OF S. AFR.	-34.42	19.23
ESKDALEMUIR, UK	55.32	356.80	LAUNCESTON, AUSTRALIA	-41.67	147.16
YORK, UK	53.97	358.92	*PORT AUX FR., KERG. ISLS.	-49.44	70.42
NIEMEGK, GDR	52.07	12.68	MACQUARIE ISLAND	-54.48	158.97
HARTLAND, UK	51.00	355.52	MACQUARIE ISLAND	-54.50	158.95
HARTLAND, UK	50.99	355.52	MACQUARIE ISLAND	-54.50	158.95
BUDKOV, CZECH.	49.07	14.02	CASEY, ANTARC.	-66.54	110.36
FUERSTENFELDBRUCK, FRG	48.17	11.28	MIRNY, ANTARC.	-66.58	93.08
FUERSTENFELDBRUCK, FRG	48.17	11.28	MAWSON, ANTARC.	-67.60	62.90
NAGYCENK, HUNGARY	47.63	16.72	DAVIS, ANTARC.	-68.58	77.97
MEMAMBETSU, JAPAN	43.91	144.19	SYOWA, ANTARC.	-69.00	39.58
KINGSTON, USA	41.31	288.27	SANAE, ANTARC.	-70.31	357.60
SAN PABLO-TOLEDO, SPAIN	39.55	355.65	SANAE, ANTARC.	-70.31	357.64
KAKIOKA, JAPAN	36.23	140.19	*NOVOLAZAREVSKAYA, ANTARC.	-70.77	11.82
TULSA, (TUL), USA	35.91	264.21	HALLEY BAY, ANTARC.	-75.52	333.05
KANOYA, JAPAN	31.42	130.88	SIPLE, ANTARC.	-76.00	276.00
CANARIAS, CANARY ISLANDS	28.48	343.74	SIPLE, ANTARC.	-76.00	276.00
			SOUTH POLE, ANTARC.	-90.00	

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200 Years Ago.....

HISTOIRE DE L'ACADÉMIE ROYALE DES SCIENCES, Année M.DCCLXXXV; p 568; Paris, de l'Imprimerie Royale (1788).

"Description d'une Boussole, dont l'Aiguille est suspendue par un fil de soie", M Coulomb:

REMARQUE

Comme, dans la pratique, il est assez difficile de pouvoir se procurer une lame d'acier peu épaisse, qui soit parfaitement dressée, l'on peut, si l'on veut, se servir d'une aiguille (figure 7) suspendue horizontalement dans une boite A, dont on voit le profil à la figure 8; aux deux extrémités de la lame, sont soudés deux petits anneaux n,s d'argent ou de cuivre; l'on tend un fil de soie ou d'argent très-fin, de n en s, dont on observe la direction, au moyen des deux micromètres, avant & après avoir retourné l'aiguille: la moitié de la différence des deux directions observées, déterminera le meridien magnétique.

W I AXFORD et al.:"A UNIFYING THEORY OF HIGH LATITUDE GEOPHYSICAL PHENOMENA AND GEOMAGNETIC STORMS"

by

al. [see footnote]

The story of the 1961 Axford-Hines paper on magnetospheric convection had its origins, in my mind, in a review of motions in the ionosphere [Hines, 1959] requested of me by Millett Morgan (following a decision by David Martyn to withdraw as reviewer). In the course of that review, I was led to propose hydromagnetic coupling on open magnetic field lines as a mechanism that might inhibit corotation of the Earth's polar ionosphere.

The use of open field lines was soon challenged by Francis Johnson [AGU Spring Meeting, 1960; Johnson, 1960], who argued that the solar wind would act to carry the polar field lines "downstream" into a closed tail, resulting in a closed, tear-drop shape for the magnetospheric cavity; the polar ionosphere would then be free to corotate and to produce, via hydromagnetic coupling along the field lines, a counter-rotation at their equatorial crossing in the tail.

This picture posed its own problem to me, for an unpublished research report of the day (whose authors' names I forget, unfortunately) contained results of an idealized mathematical modeling of the deformation to be anticipated in similar circumstances, and it exhibited a cavity with front-to-back symmetry rather than an asymmetric tail.

In the late spring of 1960, Herman Bondi and his family visited Cornell University; I and my family timed a visit to coincide. (My wife and I had baby-sat the Bondi children in earlier years, when Bondi was my PhD supervisor.) Bondi, Tom Gold and I spent some small time in scientific discussion over white wine during a social evening, in the course of which I mentioned the two conflicting cavity models. Both men immediately pointed out that the intuitively expected asymmetry would require a dissipative interaction between the magnetosphere and the solar wind, just as a viscous drag produces the shape of a tear drop, but none of us pursued the consequences at the time. Axford has since pointed out to me that the supersonic nature of the solar-wind flow could serve equally to produce asymmetry; but, at the time, my mind carried in it Johnson's model of the magnetosphere plus a viscous-like interaction at the magnetospheric boundary.

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A few weeks later, I participated in a symposium in Kiruna at which auroral data recently analysed by Neil Davis [Davis, 1960] were presented on his behalf. They exhibited a pattern of motion of auroral irregularities equatorward into auroral latitudes in the midnight sector, turning to sunward along auroral latitudes in the late evening and early morning hours. When copying this pattern into my notes, I found an irresistible compulsion to "complete" it by closing it in two loops, as if it represented two circulatory cells in the high-latitude ionosphere (though I well knew that the motions might be more apparent than real, as in waves), and then by mapping the loops up the field lines and into the tear-drop tail. The circulation at the boundaries there being away from the Sun, as if produced by a viscous-like interaction, a clear conceptual link between auroral motions and the solar wind was born. (It should be recalled that the concept of frozen-field motions, as such, within a magnetosphere defined to accomodate them, had been introduced to ionospherists only a year before, by Gold, and was not yet of common currency. Today, any student of the magnetosphere could be chided, were he not to do as I had done, given the same observational stimulus.)

I had been, for two years preceding this trip, Superintendent of the Radio Physics Laboratory (RPL) of Canada's Defence Research Board (DRB) in Ottawa. Within it had been born a small DRB Theoretical Studies Group (TSG), which was about to be spun off, and I was to return from my trip as head of it alone. A year or so before the trip, DRB's representative in London - my former mentor, Jim Scott, who, incidentally, had suggested me to Morgan for the earlier review - had, over drinks I dare say, learned of a problem facing New Zealand's military attache in London: what New Zealand should do next with a young Flying Officer (if I recall correctly) who had been posted to England for PhD studies (in astrophysical hydromagnetics, under Lighthill), who would be obligated to two further years of service once his degree had been earned. Scott figured he knew the answer. Thus it was that these two representatives of Her Majesty's defence services brought together Ian Axford and me.

As Superintendent, RPL, I had been somewhat reluctant to take on, sight unseen, this young airman posing as a scientist; but intergovernment postings were decided at some level higher than mine, and responsibility for him was to become mine despite my reservations. When the spin-off of TSG was decided upon, it gave me a clear path of escape: the newcomer could be left behind in RPL. George Reid agreed to oversee his introduction to the ionosphere there (having declined my invitation to join TSG), and I felt my formal responsibility to be at an end.

Fortunately, my trip to Kiruna included a stop in England on the way. I took the opportunity then of meeting Axford, who was soon to depart for Ottawa, in large part to provide him with the courtesy of an early welcome. The most immediate result of this meeting was, however, a determination on my part to have him "posted" from RPL to TSG on my return, which itself was to be delayed several weeks by Kiruna, vacation, and the London URSI meeting. By then, my successor in RPL (Irv Paghis) had learned enough about Axford, recently arrived, to resist my attempt, but

ultimately he admitted some form of prior claim on my part and the transfer proceeded smoothly, with Axford's concurrence.

Our scientific collaboration began even before the transfer was completed, I having sketched Davis' observations and their possible explanation on a paper serviette over coffee one morning, for a few scientists of TSG (Jules Fejer) and RPL (Axford, Reid and others) alike, with responses ranging from skeptical interest through tentative encouragement to Axford's "Of course that's what it will do, just go round and round", once he was clear on the picture proposed. The administrative transfer no doubt affected the nature of the subsequent collaboration, however, for it brought us into adjacent offices in place of adjoining buildings: we were in constant communication, and any new idea or new item of observation, introduced by either, could be met with immediate response and debate. The scientific leapfrogging that followed between us culminated, after many consultations with colleagues, additions, alterations and deletions, in our 1961 paper.

References:

W I Axford and C O Hines: "A unifying theory of high-latitude geophysical phenomena and geomagnetic storms", Can J Phys 39, 1433-1464 (1961).

T N Davis: "The morphology of the polar aurora", JGR 65, 3497-3500 (1960).

C O Hines: "Motions in the ionosphere", Proc IRE 47, 176-186 (1959).

F S Johnson: "The gross character of the geomagnetic field in the solar wind", JGR 65, 3049-3051 (1960).

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500 Years Ago .....

From the THESAURUS GEOPHYSICUS ABERDONIENSIS, 1485:

Cajthmal, vt & vi: To attempt to increase the entropy of a geophysical system.

INTERNATIONAL GEOMAGNETIC REFERENCE FIELD REVISION 1985

IAGA Division I Working Group 1
(D R Barraclough, Chairman)

The International Geomagnetic Reference Field (IGRF) is a series of mathematical models of the main geomagnetic field and its secular variation. The models consist of sets of spherical harmonic (or Gauss) coefficients. The IGRF has become a widely used means of deriving values of geomagnetic components for use in, for example, studies of magnetic anomalies and investigations of charged particle motions in the ionosphere and the magnetosphere.

Since the adoption of the first IGRF (IGRF 1965) by the International Association for Geomagnetism and Aeronomy (IAGA) in 1968 (IAGA Commission 2 Working Group 4, 1969), the IGRF has been revised three times, to give: the IGRF 1975 (IAGA Division I Study Group on Geomagnetic Reference Fields, 1976); the third generation IGRF (IAGA Division I Working Group 1, 1981); and the fourth generation IGRF which is the subject of this note. Details of the derivation of the original IGRF and of its development up to 1981 have been given by Zmuda (1971) and by Peddie (1982).

Working Group 1 (Analysis of the main field and secular variations) of Division I of IAGA considered the latest revision of the IGRF during the Fifth General Assembly of IAGA held in Prague in August 1985. It recommended the following additions and modifications to the third generation IGRF:

(1) the extension of the definitive international geomagnetic reference field (DGRF) to 1980.0 by the adoption of a new model (DGRF 1980) to replace IGRF 1980;

(2) the addition of an international geomagnetic reference field for the interval 1985.0 to 1990.0 (IGRF 1985) consisting of a model of the main field at 1985.0 and a predictive model of the secular variation for use in adjusting the main-field model to dates between 1985.0 and 1990.0;

(3) the adoption of a provisional international geomagnetic reference field for the interval 1980.0 to 1985.0 (PGRF 1980), defined by linear interpolation between the coefficients of DGRF 1980 and IGRF 1985 (main field)

(4) the addition of a series of main-field models for the epochs 1945.0, 1950.0, 1955.0 and 1960.0 (IGRF 1945, IGRF 1950, IGRF 1955 and IGRF 1960).

The DGRF now spans the interval 1965.0 to 1980.0 by means of four main-field models for 1965.0, 1970.0, 1975.0 and 1980.0 (DGRF 1965, etc.). For dates between the epochs of the models linear interpolation between the coefficients of the two models on either side of the date is to be used. A similar procedure is to be used for dates in the interval 1945.0 to 1965.0 using the IGRF 1945, IGRF 1950, IGRF 1955, IGRF 1960 and DGRF 1965 models as appropriate. Extrapolation back to 1940.0 will probably be reasonably accurate, though this was not formally recommended by the Working Group.

Further revision of the DGRF is not anticipated. The pre 1965 models (IGRF 1945 to IGRF 1960) will probably be replaced by definitive models in 1987. The newly adopted DGRF 1980 model replaces the former PGRF 1975 and IGRF 1980. The present PGRF 1980 will be superseded when a definitive model of the main field at 1985.0, different from IGRF 1985, is adopted.

The spherical harmonic coefficients of all the constituent models of the IGRF are listed in Table 1. The main-field models for 1960 to 1985 have 120 coefficients each and extend to degree and order 10. The main-field models for 1945 to 1955 and the predictive secular-variation model have 80 coefficients and extend to degree and order 8. The coefficients are given in the Schmidt quasi-normalized form (Chapman & Bartels, 1940) and refer to a sphere of radius 6371.2 km. When converting between geodetic and geocentric coordinates the use of the IAU ellipsoid (International Astronomical Union, 1966) is recommended; it has an equatorial radius of 6378.160 km and a flattening of 1/298.25.

The coefficients of the IGRF models and computer programs for synthesizing field values are available from:

World Digital Data Centre C1
British Geological Survey
Murchison House
West Mains Road
Edinburgh EH9 3LA
United Kingdom

World Data Center A
National Oceanic and Atmospheric Administration
EDIS/NGSDC (D62)
325 Broadway
Boulder
Colorado 80303
U. S. A.

World Data Center A for Rockets and Satellites
Code 601
NASA/Goddard Space Flight Center
Greenbelt
Maryland 20771
U. S. A.

The membership of Working Group I-1 was: D. R. Barraclough (Chairman), W. Mundt (Vice-chairman), F. S. Barker, V. P. Golovkov, P. J. Hood, F. J. Lowes, N. W. Peddie, Qi Gui-zhong, S. P. Srivastava, R. Whitworth, D. E. Winch, T. Yukutake, and D. P. Zidarov. Valuable assistance was received from: An Chen-chang, E. R. Benton, R. H. Estes, D. J. Kerridge, G. I. Kolomiitseva, G. J. Kuhn, R. A. Langel, J. M. Quinn, M. A. Shea, C. V. Voorhies and A. K. Zunde. M. W. McElhinny is Chairman of Division I.

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Chapman, S. & Bartels, J., 1940. *Geomagnetism*, pp. 611-612, Oxford: Clarendon Press.

IAGA Commission 2 Working Group 4, 1969. International Geomagnetic Reference Field 1965.0, *J. geophys. Res.*, 74, 4407-4408.

IAGA Division I Study Group on Geomagnetic Reference Fields, 1975. International Geomagnetic Reference Field, 1975, *J. Geomagn. Geoelectr.*, 27, 437-439.

AGA Division I Working Group 1, 1981. International Geomagnetic Reference Fields: DGRF 1965, DGRF 1970, DGRF 1975 and IGRF 1980, *EOS Trans. Am. geophys. Un.*, 57, 120-121.

International Astronomical Union, 1966. *Proc. 12th General Assembly*, 12B, 594-595.

Peddie, N. W., 1982. International Geomagnetic Reference Field: the third generation, *J. Geomagn. Geolectr.*, 34, 309-326.

Zmuda, A. J., 1971. The International Geomagnetic Reference Field. Introduction, *Bull. Int. Assn. Geomagn. Aeronom.*, No. 28, 148-152.

Table 1. The International Geomagnetic Reference Field - fourth generation. Spherical harmonic coefficients of the 9 main-field models, in nT, and of the predictive secular-variation model (SV) for 1985-90, in nT/yr.

	m	n	1945	1950	1955	1960	1965	1970	1975	1980	1985	SV
g	0	1	-30634	-30571	-30507	-30411	-30334	-30220	-30100	-29992	-29877	23.2
g	1	1	-2240	-2241	-2134	-2162	-2119	-2068	-2013	-1956	-1903	10.0
h	1	1	5806	5807	5796	5780	5776	5737	5675	5604	5497	-24.5
g	0	2	-1215	-1330	-1432	-1546	-1662	-1781	-1902	-1997	-2073	-13.7
g	1	2	2972	2978	2995	3007	2997	3000	3010	3027	3045	3.4
h	1	2	-1700	-1813	-1896	-1948	-2016	-2047	-2067	-2129	-2191	-11.5
g	2	2	1588	1579	1567	1572	1594	1611	1632	1663	1691	7.0
h	2	2	497	388	263	209	114	25	-68	-200	-309	-20.2
g	0	3	1274	1293	1308	1307	1297	1287	1276	1281	1300	5.1
g	1	3	-1833	-1878	-1955	-1987	-2038	-2091	-2144	-2180	-2208	-4.6
h	1	3	-512	-485	-487	-421	-404	-366	-333	-336	-312	5.3
g	2	3	1225	1271	1293	1288	1292	1278	1260	1251	1244	-0.6
h	2	3	185	228	235	230	240	251	262	271	284	2.3
g	3	3	926	890	897	879	856	838	830	833	835	0.1
h	3	3	-5	-67	-73	-130	-165	-196	-223	-252	-296	-10.8
g	0	4	980	975	964	962	957	952	946	938	937	0.1
g	1	4	771	795	794	804	804	800	791	782	780	-0.6
h	1	4	155	171	167	150	148	167	191	212	233	3.8
g	2	4	544	532	510	492	479	461	438	398	363	-7.8
h	2	4	-280	-306	-275	-272	-269	-266	-265	-257	-250	2.2
g	3	4	-408	-402	-392	-392	-390	-395	-405	-419	-426	-1.4
h	3	4	-68	-51	-44	1	13	26	39	53	68	2.5
g	4	4	300	310	292	267	252	234	216	199	169	-6.8
h	4	4	-158	-184	-249	-254	-269	-279	-288	-297	-298	0.9
g	0	5	-286	-255	-232	-236	-219	-216	-218	-218	-215	1.3
g	1	5	341	355	360	358	358	359	356	357	356	0.1
h	1	5	-14	-8	14	12	19	26	31	46	47	0.1
g	2	5	207	201	237	229	254	262	264	261	253	-1.5
h	2	5	80	101	111	121	128	139	148	150	148	-0.2
g	3	5	-25	-3	-13	-34	-31	-42	-59	-74	-94	-3.2
h	3	5	-65	-95	-90	-115	-126	-139	-152	-151	-155	-0.1
g	4	5	-156	-160	-176	-153	-157	-160	-159	-162	-161	0.1
h	4	5	-114	-100	-111	-106	-97	-91	-83	-78	-75	0.6
g	5	5	-88	-76	-68	-64	-62	-56	-49	-48	-48	-0.1
h	5	5	83	73	77	83	81	83	88	92	95	0.0
g	0	6	68	57	47	47	45	43	45	48	52	1.4
g	1	6	67	50	57	56	61	64	66	66	65	-0.3
h	1	6	9	-1	-7	-13	-11	-12	-13	-15	-16	-0.4
g	2	6	6	15	4	-3	8	15	28	42	50	1.7
h	2	6	118	100	101	106	100	100	99	93	90	-1.1
g	3	6	-244	-261	-250	-241	-228	-212	-198	-192	-186	0.6
h	3	6	18	52	46	55	68	72	75	71	69	-0.8
g	4	6	-12	8	12	3	4	2	1	4	4	0.0
h	4	6	-9	-7	-16	-26	-32	-37	-41	-43	-50	-2.3
g	5	6	14	8	13	4	1	3	6	14	17	0.9
h	5	6	-12	-17	-6	-10	-8	-6	-4	-2	-4	-0.5
g	6	6	-100	-108	-105	-108	-111	-112	-111	-108	-102	1.2
h	6	6	-42	-21	-21	-16	-7	1	11	17	20	-0.1
g	0	7	72	67	80	72	75	72	71	72	75	0.2
g	1	7	-61	-48	-66	-52	-57	-57	-56	-59	-61	-0.6
h	1	7	-42	-44	-52	-53	-61	-70	-77	-82	-82	0.2
g	2	7	6	-3	2	4	4	1	1	2	2	-0.5
h	2	7	-39	-18	-37	-25	-27	-27	-26	-27	-26	1.0
g	3	7	6	16	4	11	13	14	16	21	24	0.8
h	3	7	2	-6	6	-8	-2	-4	-5	-5	-1	1.1
g	4	7	-44	-38	-46	-20	-26	-22	-14	-12	-6	1.0
h	4	7	-1	-8	-1	3	6	8	10	16	23	1.9
g	5	7	-2	1	-15	-4	-6	-2	0	1	4	0.4
h	5	7	25	32	29	28	26	23	22	18	17	0.3
g	6	7	18	9	8	15	13	13	12	11	9	-0.5
h	6	7	-19	-18	-20	-16	-23	-23	-23	-23	-21	0.2
g	7	7	27	11	14	6	1	-2	-5	-2	0	-0.1

h	7	7	-23	-22	-12	-18	-12	-11	-12	-10	-6	0.9
g	0	8	15	16	5	6	13	14	14	18	21	0.7
g	1	8	5	4	17	4	5	6	6	6	6	0.0
h	1	8	-7	2	12	7	7	7	6	7	7	0.1
g	2	8	-12	-8	-3	-3	-4	-2	-1	0	0	0.3
h	2	8	9	-2	1	-16	-12	-15	-16	-18	-21	-1.0
g	3	8	-21	-31	-30	-13	-14	-13	-12	-11	-11	0.4
h	3	8	0	-3	10	5	9	6	4	4	5	0.1
g	4	8	18	15	14	-5	0	-3	-8	-7	-9	-0.3
h	4	8	-13	-7	-20	-19	-16	-17	-19	-22	-25	-0.8
g	5	8	16	8	27	10	8	5	4	4	2	-0.3
h	5	8	5	6	5	5	4	6	6	9	11	0.2
g	6	8	-14	-17	-15	-6	-1	0	0	3	4	0.1
h	6	8	26	27	34	23	24	21	18	16	12	-0.8
g	7	8	1	7	1	15	11	11	10	6	4	-0.5
h	7	8	1	-6	4	-2	-3	-6	-10	-13	-16	-0.1
g	8	8	10	13	12	5	4	3	1	-1	-6	-0.8
h	8	8	-19	-22	-19	-18	-17	-16	-17	-15	-10	1.3
g	0	9				13	8	8	7	5	5	
g	1	9				5	10	10	10	10	10	
h	1	9				-22	-22	-21	-21	-21	-21	
g	2	9				4	2	2	2	1	1	
h	2	9				14	15	16	16	16	16	
g	3	9				-12	-13	-12	-12	-12	-12	
h	3	9				5	7	6	7	9	9	
g	4	9				14	10	10	10	9	9	
h	4	9				-5	-4	-4	-4	-5	-5	
g	5	9				5	-1	-1	-1	-3	-3	
h	5	9				0	-5	-5	-5	-6	-6	
g	6	9				-2	-1	0	-1	-1	-1	
h	6	9				11	10	10	10	9	9	
g	7	9				0	5	3	4	7	7	
h	7	9				10	10	11	11	10	10	
g	8	9				0	1	1	1	2	2	
h	8	9				2	-4	-2	-3	-6	-6	
g	9	9				-1	-2	-1	-2	-5	-5	
h	9	9				-2	1	1	1	2	2	
g	0	10				-5	-2	-3	-3	-4	-4	
g	1	10				-2	-3	-3	-3	-4	-4	
h	1	10				3	2	1	1	1	1	
g	2	10				0	2	2	2	2	2	
h	2	10				0	1	1	1	0	0	
g	3	10				-5	-5	-5	-5	-5	-5	
h	3	10				4	2	3	3	3	3	
g	4	10				-2	-2	-1	-2	-2	-2	
h	4	10				3	6	4	4	6	6	
g	5	10				8	4	6	5	5	5	
h	5	10				-4	-4	-4	-4	-4	-4	
g	6	10				3	4	4	4	3	3	
h	6	10				-2	0	0	-1	0	0	
g	7	10				0	0	1	1	1	1	
h	7	10				-3	-2	-1	-1	-1	-1	
g	8	10				1	2	0	0	2	2	
h	8	10				5	3	3	3	4	4	
g	9	10				0	2	3	3	3	3	
h	9	10				3	0	1	1	0	0	
g	10	10				-1	0	-1	-1	0	0	
h	10	10				-3	-6	-4	-5	-6	-6	

INTRODUCTION TO GEOMAGNETISM IN IRAQ

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Foreword The year 1984 marked the acceptance of Iraq as a member of the IUGG, and for the first time several National Correspondents were named as representatives on different international Associations, and IAGA is presently one of them.

This preliminary report of geomagnetism activities in Iraq is presented to the IAGA 5th Scientific Assembly as introductory notes on the various fields of geomagnetism in Iraq. Magnetic investigation takes the bulk of consideration, however, research is currently being conducted, and also new observatory is about to be installed for the first time in Iraq.

INTRODUCTION

The geomagnetic activities in Iraq started in early forties by the magnetic investigation (measuring the vertical component of the field), by the Iraqi Petroleum Company (IPC), where Iraq was divided into sectors and each sector divided into stations. This was done by using the loop system where the perimeter of the loops was 10x10 Km. Stations were spaced at 2 Km distance, which twice the distance taken at that time for the gravity surveys.

The instrument used during the magnetic investigation was Watt magnetometer. There is no available data on the sensitivity of the equipment and/or the accuracy of measurements as well as the position of points of measurements. However, a magnetic anomaly map was plotted for the vertical magnetic component with contour interval of 10 gamma and was publised in 1959, with scale 1:100,000 and 1:200,000.

Gibson 1949, pointed out that all magnetic anomalies have direct relation to the basement structure. Ditmar 1971 and 1972, explained that the negative magnetic anomalies reflect the presence of deep magnetic bodies, while the the positive ones reflect bodies of shallow depths.

In the year 1973/1974, a major aeromagnetic survey was carried out by the Compagnie Generale de Geophysique (C.G.G.) for the benefit of the National Iraqi Mineral Company (NIMCo), covering most of Iraq. The instrument used during the aeromagnetic survey was Cesium Vapour, optical pumping varian magnetometer, with sensitivity of $\pm$ 0.01 gamma. The territory of Iraq was covered with exception of the northern mountaineous area which is planed to be surveyed in future using helicopter technique.

Other works in geomagnetism were conducted by different establishments in Iraq in different fields, as explained below.

SPECIALISED ACTIVITIES

NIMCo, besides the aeromagnetic survey and in its interest conducted several localized magnetic surveys in order to study the suspected anomalies observed by the aerosurvey and other field trips.

Alongside the NIMCo surveys, research was carried on mainly by the universities as fulfilment for the degree of M.Sc. Also the State Organization of Antiquities was interested in and following up research in geomagnetism for the purpose of locating burried ancient ruins.

However, recently work in geomagnetism took an optimistic step by the acquisition and installing (in progress) the fully automatic magnetic observatory, which is attached to the Space and Astromony Research Centre of the Scientific Research Council.

FUTURE ACTIVITIES

Good future for magnetism can be expected in Iraq, since interest in and support for research and field projects are always present. However, the future work can be classified mainly into four points.

(1) Continuation of Aerosurvey:

In order to complete covering the whole territory of the country with airborne survey, it is planed to be carried out in near future in the mountainous areas using the helicopter technique.

(2) Field Survey:

This includes following up ground magnetic surveys on some of the anomalies revealed by the aeromagnetic survey. Moreover, some local magnetic surveys have been planned to be conducted in the aim of ore prospecting and structural studies.

(3) Research Programs:

The instalation of the magnetic observatory in Iraq have opened a wide window on research in Iraq. The research at the moment is mainly conducted by the Scientific Research Council and the universities.

(4) Training of Scientists:

Training is planed on all levels in most of the aspects of geomagnetism from handling the data to the very advanced techniques in interpretation. This was being done

and will continue to be so through cooperation with domestic and foreign organizations.

(5) Other Activities:

In the interest of using magnetic techniques in locating ancient ruins, the State Organization of Antiquities will establish a laboratory for this purpose. Also the Directorate General of Surveys have a future plane to fix stations all over the country for measuring the Declination and Inclination.

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ADVANCES OF PALEOMAGNETISM IN CHINA

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Paleomagnetism is a branch of geosciences studying the variations of the ancient geomagnetic field. Although young, it has played an important role in many domains of the Earth sciences and becomes one of the pioneer disciplines of modern geosciences.

China, known for her vast territory and complexity of the geological conditions, provides an ideal area for paleomagnetic researches.

Paleomagnetism, first introduced in China as a new branch of the Earth sciences at the end of the 1950s [8,11,14] has attracted the attention of most Chinese geoscientists. In more than twenty years, it has rapidly developed, especially during the last few years. The present work will give a brief review of the recent development of paleomagnetism realised in China during these years.

1. Achievements

a) The number of research units of paleomagnetism has increased continuously, amounting to more than thirty, with about a hundred and twenty researchers, mainly spread in the Ministry of Geology and Mineral Resouces (Institute of Geophysical and Geochemical Exploration, Institute of Geomechanics, for instance) and Academia Sinica (Institute of Geology, Institute of Geophysics, for instance).

b) An average of about ten papers have been published each year, concerning plate tectonics of China, magnetostratigraphy of continental sections and ocean cores, from Cambrian to Quaternary. S Sasajima and Wang Yongyan [9,10] carried out a paleomagnetic study on loess in Shanxi Province. On the basis of data of the material composition, paleontological characteristics and physical analysis, a correlation between the relations of the magnetostratigraphy, the chronostratigraphy of the loess sequence and the climatic variations during the Quaternary was established. They have evidently pointed out that no short reversed polarity subchron (zone) would exist within the Brunhes normal chron. The Brunhes-Matuyama boundary was found at the base

of the seventh paleosoil. Also, a comparison of the loess sequence with the variations of $\delta^{18}O$ stages in deep-sea cores and the Osaka group of Japan was done. F Heller and Liu Dongsheng [2] made a comparison of the loess data with deep-sea core results. The Brunhes-Matuyama boundary was found at -53.05m in the deep-sea core, and at 52.30m at the loess outcrop, ie between the lower part of the seventh and the eighth layers. Jaramillo subchron was taken at -67.30m to -72.5m in the core, and at 66.25m to 70.50m at the outcrop. Olduvai subchron was observed in the deepsea core, but absent at the loess outcrop. One of the authors (Liu Chun) and others [5] studied the Pleistocene volcanoes of Datong, Shanxi Province. The research of their paleointensities could help to better understand the evolution of the Earth's magnetic field at that time and the sequence of the Datong volcanoes, so as to provide important information for the Quaternary geology environment and geochronology. The results of Gold Mountain (ST) and Black Mountain (SH) indicated the existence of the Blake excursion about 0.01 Ma BP. The paleointensities of these two sites are respectively 0.331 ± 0.052 Oe for ST (0.098 Ma, with a paleomagnetic direction of $I=38.5^{\circ}$, $D=-1.6^{\circ}$), 0.350 ± 0.022 Oe for the upper part of SH (SHU, with a paleomagnetic direction of $I=40.9^{\circ}$, $D=-1.8^{\circ}$), 0.572 ± 0.015 Oe for the lower part of SH, and 0.535 ± 0.007 Oe for the baked earth. It can be noted that the similarity of the results from ST and SHU showed that they may be eruptive products of different volcanoes in the same period. And the SH basalts probably recorded the entirety of the changes of the geomagnetic field from 0.16 to 0.098 Ma with a paleointensity decay from 0.57 to 0.35 Oe.

It is well known that the horizontal motion and the motion direction of the continental plates could be measured quantitatively only by the paleomagnetic method. Zhou Y X [15] has recently made a reconstruction of Chinese blocks divided into four continental blocks (that is, the Sino-Korean block, the South China block, the Tarim block and the Tibetan block), using available paleomagnetic data, so that the first draw of the paleographic map of China from Cambrian to Tertiary was given. The results demonstrated that the main blocks forming China now moved northwards in the geological history, with some short local southward movements in the Cretaceous time for the Sino-Korean block, the South China block and the Lhasa block (the latter is a part of the Tibetan block). The suture zone between Gondwanaland and Eurasia has been traditionally believed to be represented by the Yaluzangbu suture zone. This is an interesting and important problem, on which more attention has been payed since long. Since 1980, Chinese paleomagnetists have taken an active part in revealing this suture zone. New paleomagnetic data [1] from Shenzha and Nyalam, Northern Tibet, giving a paleolatitude of about $21^{\circ}S$ in the Carboniferous, showed that this region, having belonged to Gondwanaland at this time, drifted northwards about 5700 km, so Chen X Y and Lu L Z are of the opinion that the Yaluzangbu suture zone is one of the few intercontinental suture zones, and that the Gondwanaland-Eurasia suture zone could lie further north of Tibet. Further paleomagnetic studies of rocks from Xinjiang and Qinghai provinces thus would throw, we hope, fresh light on the Gondwanaland-Eurasia suture zone problem.

Wei Q Y and others [12], after having determined the declinations and inclinations of seventeen epochs using the baked earth collected from Shanxi, Hubei, Zhejiang, Jiangxi provinces and Beijing region, obained the wandering path of virtual geomagnetic pole (VGP) during the last 6000 years of China. A comparison was done between the British wandering path, the Japanese wandering path, the Bulgarian wandering path and the Chinese wandering path. It can be seen that the paleopoles between the wandering paths from China and Bulgaria are relatively in good agreement, but the main tendency of the VGP motion is not, and that the results from Japan are in very good accordance with those from China, and that the curve from England is rather different from that from China. It is necessary to point out that the average position of paleomagnetic poles did not, even during the last 2000 years, coincide with the geographic poles.

Finally, paleomagnetic studies [3,7] have been carried out on the Sinian-Cambrian boundary stratotype section at Meishucun, Jinning County, Yunnan Province, which serves as a Chinese candidate for global stratotype section for the Precambrian-Cambrian boundary. The results demonstrated a paleomagnetic direction of $D=20.7^{\circ}$, $I=-46^{\circ}$ for the upper part of the Baiyanshao Member, $D=190.7^{\circ}$, $I=-44.6^{\circ}$ for the upper part of the Xiaowaitoushan Member, $D=195.2^{\circ}$, $I=-39^{\circ}$ for the top part of the Dahai Member, $D=241^{\circ}$, $I=-29^{\circ}$ for the lower part of the Yu'anshan Member and $D=185.2^{\circ}$, $I=-0.7^{\circ}$ for the upper part of the Yu'anshan Member. From this one can see that the magnetic reversals from late-Sinian to early-Cambrian represented a major event in the history of the Earth leading to great changes of the ecologic conditions on which organisms depended, thus stimulating the development of the organisms from soft-bodied fauna in the Precambrian into shelly fauna that started to appear from the Cambrian. So the reversed polarity occurrences at the Meishucun are of great significance to the establishment of the definition of the Precambrian-Cambrian boundary. A while later, a further detailed and systematic paleomagnetic study has been achieved on the members of this section [3] with rock samples measured on superconducting magnetometers in the USA. The results confirmed the data of the first stage of the paleomagnetic studies and gave a paleomagnetic latitude of no more than 20° during the Sinian-Cambrian time. They concluded that (i) around the Sinian-Cambrian boundary in the Meishucun section existed a mixed polarity zone, in which the Meishucun fauna went through an evolution of appearance-flourish-extinction. It is of great importance for stratigraphic correlations; and (ii) the phosphate deposits in the Meishucun region and the Zhongyicun Member were formed in low-latitude environments.

As we can see above, paleomagnetism has been used as a new and useful tool in the Earth sciences.

c) New paleomagnetic instrument study has been a weakness for a long time. In recent years, a great deal of work has been done: astatic magnetometers with a sensitivity of 10^{-7} emu/cm^3 have been offered by Beijing Geology Instrument Company to equip many laboratories. And spinner magnetometers are going to be turned out. So are thermal demagnetizers and AF demagnetizers. One

important thing to be noted in the course of the development of paleomagnetism in China is the fact that, during the interval of time from late 1950s to early 1960s the paleomagnetic studies were completed mainly on the basis of natural remanent magnetizations (NRM) of rocks, because of insufficient knowledge of this new science on the one hand, and of incapability of producing necessary instruments on the other hand. Since 1970s, the demagnetization techniques have been generalized in most laboratories equipped with modern instruments, particularly from the end of 1970s with spinner magnetometers with computer and typewriter being used. The demagnetization procedure is now considered as a necessary step for paleomagnetic analysis. And in the first years of 1980s, no paleomagnetic results could be regarded convincible without thermal treatment for sediments.

d) Up to today, two symposiums on paleomagnetism have been held, under the leadership of the Geophysical Society of China. The first one was held in May 1980 at Qingdao, Shandong Province. The second one took place in December 1984 at Nanning, Guangxi. Altogether about a hundred articles were put forth, all this shows a relatively solid base of paleomagnetism in China built up since more than twenty years for the future development. It is a pleasure to see that more interesting results have been achieved.

2. The existing problems

a) One of the tasks for the Chinese paleomagnetists is to draw precisely, by using paleomagnetic data from various tectonic units, the paleomagnetic wandering path from Cambrian to Quaternary and the latitude-distribution of all parts of China of corresponding ages. But a serious obstacle exists: remagnetization of Paleozoic rock formations.

b) It is necessary to choose standard sections to carry out systematic magnetostratigraphic studies in order to establish the paleomagnetic polarity time scale of China for facilitating international correlations. The magnetostratigraphy of Quaternary-Neogene boundary (Q/N), Triassic-Permian boundary (Tr/P), Precambrian-Cambrian boundary (pre$\in$/$\in$) is especially important. Efforts must be given on this subject.

c) The organization-arrangement and concordance of research plans between different units is a matter of importance, so as to avoid forgetting important subjects of study, for example, special attention has to be concentrated on archaeomagnetism and tectonomagnetism at the present time.

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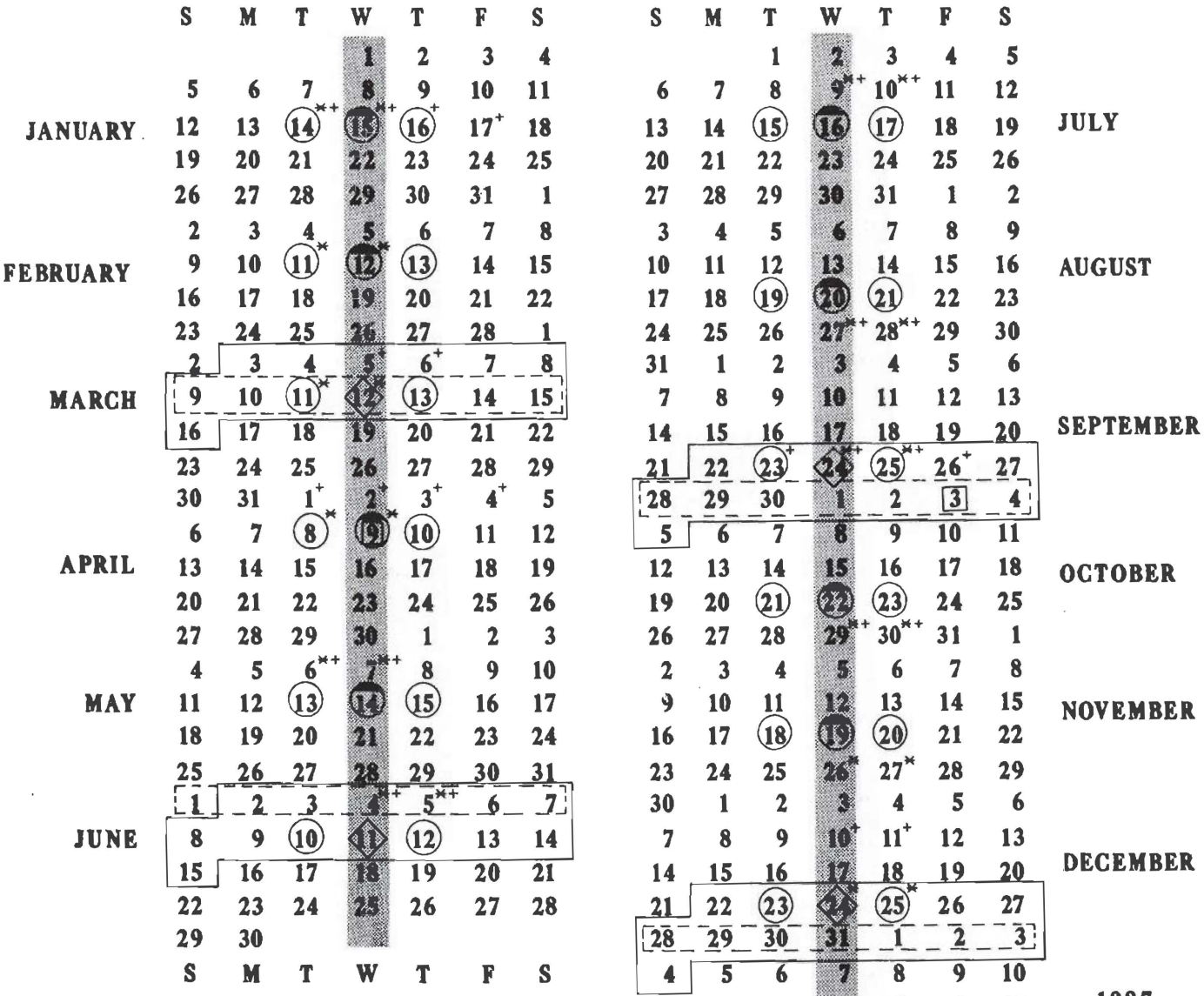
International Geophysical Calendar 1986



14 Regular World Day (RWD)

15 Priority Regular World Day (PRWD)

12 Quarterly World Day (QWD) also a PRWD and RWD

8 Regular Geophysical Day (RGD)

3 4 World Geophysical Interval (WGI)

14+ Incoherent Scatter Coordinated Observation Day and Coordinated Tidal Observation Day

9 Day of Solar Eclipse

9 10 Airglow and Aurora Period

11* Dark Moon Geophysical Day (DMGD)

EXPLANATION

This Calendar continues the series begun for the IGY years 1957-58, and is issued annually to recommend dates for solar and geophysical observations which cannot be carried out continuously. Thus, the amount of observational data in existence tends to be larger on Calendar days. The recommendations on data reduction and especially the flow of data to World Data Centers (WDCs) in many instances emphasize Calendar days. The Calendar is prepared by the International Ursigram and World Day Service (IUWDS) with the advice of spokesmen for the various scientific disciplines. For greater detail concerning explanations or recommendations your attention is called to information published periodically in IAGA News, IUGG Chronicle, URSI Information Bulletin or other scientific journals.

The definitions of the designated days remain as described on previous Calendars. Universal Time (UT) is the standard time for all world days. Regular Geophysical Days (RGD) are each Wednesday. Regular World Days (RWD) are three consecutive days each month (always Tuesday, Wednesday and Thursday near the middle of the month). Priority Regular World Days (PRWD) are the RWD which fall on Wednesdays. Quarterly World Days (QWD) are one day each quarter and are the PRWD which fall in the World Geophysical Intervals (WGI). The WGI are fourteen consecutive days in each season, beginning on Monday of the selected month, and normally shift from year to year. In 1986 the WGI will be March, June, September, and December.

The Solar Eclipses are: April 9 (partial -- maximum magnitude 0.82) covering about half of the Antarctic, moving across the south part of New Zealand, across Australia, the eastern part of Indonesia and most of New Guinea (maximum eclipse path includes the South Magnetic Pole area in Antarctica, Macquarie Island, the south part of New Zealand, the eastern part of Australia and the eastern part of New Guinea); October 3 (annular-total) beginning in the extreme eastern USSR, moving across the arctic regions, Greenland, Iceland, and across N. America except the extreme SW, across Central America and the Caribbean Sea, and ending in Colombia, Venezuela, Guyana, Surinam, French Guiana and northern Brazil (maximum eclipse (about 0.3 seconds) path in eastern USSR, Alaska, eastern Greenland and Iceland with the Sun only 5 degrees in altitude).

Meteor Showers (selected by P.M. Millman, Ottawa) include important visual showers and also unusual showers observable mainly by radio and radar techniques. The dates for Northern Hemisphere meteor showers are: Jan 3, 4; Apr 21-23; May 3-5; Jun 8-12; Jul 27-29; Aug 10-14; Oct 19-23; Nov 2-4, 17-18; Dec 12-16, 21-23, 1986; and Jan 3, 4, 1987. The dates for Southern Hemisphere meteor showers are: May 3-5; Jun 8-12; Jul 26-30; Oct 19-23; Nov 2-4, 17-18; and Dec 5-7, 12-16, 1986. Note that the meteor showers that come in the first week of May and the third week in October are of particular interest (fragments of Halley's comet) because of the approach of Halley's comet in 1986. Especially note Halley's comet approach (Perihelion February 9 at 0.59 AU) and STIP Interval XIX March 1986 -- International Halley Watch.

The occurrence of unusual solar or geophysical conditions is announced or forecast by the IUWDS through various types of geophysical "Alerts" (which are widely distributed by telegram and radio broadcast on a current schedule). Stratospheric warmings (STRATWARM) are also designated. The meteorological telecommunications network coordinated by WMO carries these worldwide Alerts once daily soon after 0400 UT. For definitions of Alerts see IUWDS "Synoptic Codes for Solar and Geophysical Data, Third Revised Edition 1973" and its amendments. **Retrospective World Intervals** are selected and announced by MONSEE and elsewhere to provide additional analyzed data for particular events studied in the ICSU Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) programs.

RECOMMENDED SCIENTIFIC PROGRAMS
PLANNING EDITION

(The following material was reviewed in 1985 by spokesmen of IAGA, WMO and URSI as suitable for coordinated geophysical programs in 1986.)

Airglow and Aurora Phenomena. Airglow and auroral observatories operate with their full capacity around the New Moon periods. However, for progress in understanding the mechanism of inter alia, low latitude aurora, the coordinated use of all available techniques, optical and radio, from the ground and in space is required. Thus, for the airglow and aurora 7-day periods on the Calendar, ionosonde, incoherent scatter, special satellite or balloon observations, etc., are especially encouraged. Periods of approximately one weeks' duration centered on the New Moon are proposed for high resolution of ionospheric, auroral and magnetospheric observations at high latitudes during northern winter.

Atmospheric Electricity. Not-continuous measurements and data reduction for continuous measurements of atmospheric electric current density, field, conductivities, space charges, ion number densities, ionosphere potentials, condensation nuclei, etc.; both at ground as well as with radiosondes, aircraft, rockets; should be done with first priority on the RGD each Wednesday, beginning on 1 January 1986 at 1800 UT, 8 January at 0000 UT, 15 January at 0600 UT, 22 January at 1200 UT, etc. (beginning hour shifts six hours each week, but is always on Wednesday). Minimum program is at the same time on PRWD beginning with 15 January at 0000 UT. Data reduction for continuous measurements should be extended, if possible, to cover at least the full RGD including, in addition, at least 6 hours prior to indicated beginning time. Measurements prohibited by bad weather should be done 24 hours later. Results on sferics and ELF are wanted with first priority for the same hours, short-period measurements centered around the minutes 35-50 of the hours indicated. **Priority Weeks** are the weeks which contain a PRWD; minimum priority weeks are the ones with a QWD. The World Data Centre for Atmospheric Electricity, 7 Karbysheva, Leningrad 194018, USSR, is the collection point for data and information on measurements.

Geomagnetic Phenomena. It has always been a leading principle for geomagnetic observatories that operations should be as continuous as possible and the great majority of stations undertake the same program without regard to the Calendar.

Stations equipped for making magnetic observations, but which cannot carry out such observations and reductions on a continuous schedule are encouraged to carry out such work at least on RWD (and during times of MAGSTORM Alert).

Ionospheric Phenomena. Special attention is continuing on particular events which cannot be forecast in advance with reasonable certainty. These will be identified by Retrospective World Intervals. The importance of obtaining full observational coverage is therefore stressed even if it is possible to analyze the detailed data only for the chosen events. In the case of vertical incidence sounding, the need to obtain quarter-hourly ionograms at as many stations as possible is particularly stressed and takes priority over recommendation (a) below when both are not practical.

For the vertical incidence (VI) sounding program, the summary recommendations are: (a) all stations should make soundings at least every quarter hour. Stations which normally record at every quarter should, if possible, record more frequently on RWDs, particularly at high latitudes; (b) all stations are encouraged to make f-plots on RWDs; f-plots should be made for high latitude stations, and for so-called "representative" stations at lower latitudes for all days (i.e., including RWDs and WGIs) (Continuous records of ionospheric parameters are acceptable in place of f-plots at temperate and low latitude stations); (c) copies of hourly ionograms with appropriate scales for QWDs are to be sent to WDCs; (d) stations in the eclipse zone and its conjugate area should take continuous observations on solar eclipse days and special observations on adjacent days. See also recommendations under **Airglow and Aurora Phenomena.**

For incoherent scatter observation program, every effort should be made to obtain measurements at least on the **Incoherent Scatter Coordinated Observation Days**, and intensive series should be attempted whenever possible in WGIs or the **Airglow and Aurora Periods.** The need for collateral VI observations with not more than quarter-hourly spacing at least during all observation periods is stressed. Dr. V. Wickwar, SRI International, 333 Ravenswood Ave., Menlo Park, CA 94025 (USA), URSI Working Group G.5, is coordinating special programs.

For the ionospheric drift or wind measurement by the various radio techniques, observations are recommended to be concentrated on the weeks including RWDs.

For traveling ionosphere disturbances propose special periods for coordinated measurements of gravity waves induced by magnetospheric activity, probably on selected PRWD and RWD.

For the ionospheric absorption program half-hourly observations are made at least on all RWDs and half-hourly tabulations sent to WDCs. Observations should be continuous on **solar eclipse** days for stations in eclipse zone and in its conjugate area. Special efforts should be made to obtain daily absorption measurements at temperate latitude stations during the period of Absorption Winter Anomaly, particularly on days of abnormally high or abnormally low absorption (approximately October-March, Northern Hemisphere; April-September, Southern Hemisphere).

For back-scatter and forward scatter programs, observations should be made and analyzed on all RWDs at least.

For synoptic observations of mesospheric (D region) electron densities, several groups have agreed on using the RGD for the hours around noon.

For ELF noise measurements involving the earth-ionosphere cavity resonances any special effort should be concentrated during the WGIs.

It is recommended that more intensive observations in all programs be considered on days of **unusual meteor activity.**

Meteorology. Particular efforts should be made to carry out an intensified program on the RGD -- each Wednesday, UT. A desirable goal would be the scheduling of meteorological rocketsondes, ozone sondes and radiometer sondes on these days, together with maximum-altitude rawinsonde ascents at both 0000 and 1200 UT.

During **WGI** and **STRATWARM** Alert Intervals, intensified programs are also desirable, preferably by the implementation of RGD-type programs (see above) on Mondays and Fridays, as well as on Wednesdays.

Middle Atmosphere Cooperation (MAC). MAC runs from 1 January 1986 through 1988. Techniques for observing the middle atmosphere should concentrate or center their observations on the RGDs, PRWDs, and QWDs. It is recommended that observing runs for studies of planetary waves and tides be at least 10 days centered on the PRWDs and QWDs. Non-continuous studies of stratospheric warmings and the effects of geomagnetic activity on the middle atmosphere must be initiated by STRATWARM and MAGSTORM alerts, respectively. For more details see the "Recommended Scientific Programs" on the reverse of the **Middle Atmosphere Dynamics Calendar for 1986**, which will be published as a special edition of the **IGC for 1986.**

Solar Phenomena. Observatories making specialized studies of solar phenomena, particularly using new or complex techniques, such that continuous observation or reporting is impractical, are requested to make special efforts to provide to WDCs data for **solar eclipse** days, **RWDs** and during **PROTON/FLARE ALERTS.** The attention of those recording solar noise spectra, solar magnetic fields and doing specialized optical studies is particularly drawn to this recommendation.

Study of Traveling Interplanetary Phenomena (STIP). STIP Interval XIX is March 1986 to coincide with the International Halley Watch. Coordination of solar, interplanetary, and cometary activity is particularly desired. Revised STIP Intervals: STIP XV 12-21 Feb 1984 solar GLE; STIP XVI 20 Apr - 4 May 1984 Forbush decrease; STIP XVII 15 May - 30 Jun 1985 alignment of Venus magnetotail with satellites VEGA 1, VEGA 2, MS-T5, PVO, and ICE; STIP XVIII Sep 1985 Giacobini-Zinner Comet fly-by by ICE.

Space Research, Interplanetary Phenomena, Cosmic Rays, Aeronomy. Experimenters should take into account that observational effort in other disciplines tends to be intensified on the days marked on the Calendar, and schedule balloon and rocket experiments accordingly if there are no other geophysical reasons for choice. In particular it is desirable to make rocket measurements of ionospheric characteristics on the same day at as many locations as possible; where feasible, experimenters should endeavor to launch rockets to monitor at least normal conditions on the **Quarterly World Days** (QWD) or on **RWDs**, since these are also days when there will be maximum support from ground observations. Also, special efforts should be made to assure recording of telemetry on QWD and **Airglow and Aurora Periods** of experiments on satellites and of experiments on spacecraft in orbit around the Sun.

For URSI/IAGA Coordinated Tidal Observations Program (CTOP) contact Dr. R.G. Roper (School of Geophysical Sci., Georgia Inst of Tech, Atlanta, GA 30332 USA) for the 1986 calendar.

The International Ursigram and World Days Service (IUWDS) is a permanent scientific service of the International Union of Radio Science (URSI), with the participation of the International Astronomical Union and the International Union Geodesy and Geophysics. IUWDS adheres to the Federation of Astronomical and Geophysical Services (FAGS) of the International Council of Scientific Unions (ICSU). The IUWDS coordinates the international aspects of the world days program and rapid data interchange.

This Calendar for 1986 has been drawn up by H.E. Coffey, of the IUWDS Steering Committee, in association with spokesmen for the various scientific disciplines in SCOSTEP, IAGA and URSI. Similar Calendars are issued annually beginning with the IGY, 1957-58, and are published in various widely available scientific publications.

Published for the International Council of Scientific Unions and with financial assistance of UNESCO.

Additional copies are available upon request to IUWDS Chairman, Dr. P. Simon, Ursigrammes Observatoire, 92190 Meudon, France, or IUWDS Secretary for World Days, Miss H.E. Coffey, WDC-A for Solar-Terrestrial Physics, NOAA, E/GC2, 325 Broadway, Boulder, Colorado 80303, USA.

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100 Years ago.....

M l'Abbé Maze à Harfleur, Compte Rendu de la 14e Session de l'Association Française pour l'Avancement des Sciences à Grenoble, 1885 (Paris, au Secrétariat, 1886). [page 121]

Sur la connexion de l'état hygrométrique à la Havane, le magnétisme du même lieu et les aurores boréales des États-Unis. - Les courbes thermométriques et hygrométriques (humidité relative) de l'Observatoire du collège de Belen, tenus par les jésuites à la Havane, sont en général d'une très grande régularité, avec un seul minimum et un seul maximum par jour; mais parfois ces courbes sont très irrégulières. Or cette irrégularité précède généralement d'un à trois jours une grande perturbation magnétique, bien sensible au bifilaire du même établissement, laquelle se manifeste également par des aurores boréales visibles aux États-Unis.

GEOFFREY A M KING
1928 - 1985

Geoff King died suddenly in Wellington (New Zealand) early in October 1985. He was born in Christchurch and his father, a school teacher, moved his family to Henderson, near Auckland. It was in Henderson that King spent his early years. He attended Auckland Grammar School and showed an intense interest in chemistry but, during his undergraduate studies at Auckland University, turned his interest to physics and graduated in 1947 with physics as his major subject. In 1948 he joined the staff of the Christchurch Geophysical Observatory (which had just been set up under J W Beagley) as an Assistant Physicist. He there began a long study of ionospheric phenomena. In 1950-51 he was Officer-in-Charge of Apia Observatory in Western Samoa, gaining experience there of geomagnetic observing techniques as well as some insight into seismic phenomena. On returning from Apia he turned his attention back to ionospheric work. He visited the USA, Sweden and Germany, spending periods of several months to a year in each place, eventually returning to New Zealand in 1957. In 1958 he left New Zealand once more, this time to spend a year in Antarctica as the ionospheric observer at the joint USA-NZ station at Hallett. Many of his ideas about the structure of the E and F regions of the ionosphere were gained during this period when he operated a synoptic observing programme requiring close scrutiny of the records.

King returned to the Geophysical Observatory and worked up his results during 1959-60. He then spent a year at the National Bureau of Standards in Boulder, Colorado (USA), where he interested himself in F-region phenomena, in particular red auroras (SAR-arcs) and their relationship to ionospheric recombination. His interest then turned to the F1-F2 transition region and he devised a method for reducing ionosonde records to N(h) profiles which considerably simplified the operation. His use of overlays for the analysis of the F-region grew out of this work, as did his analysis of the F-region during storms. In this work he discerned the role of diffusion in the transport of ionization in the F-region. He wrote papers at this time in which he discussed ionospheric disturbances and atmospheric waves, and in which he analysed the cause of spread-F.

After Beagley's retirement in 1967, King became Officer-in-Charge of the Geophysical Observatory and found to his annoyance that administrative duties greatly reduced his research activity.

In 1971, he decided to change his field of work and he moved to the biophysics section of the DSIR Physics and Engineering Laboratory in Gracefield, Lower Hutt (near Wellington). There he applied his knowledge of diffusion to biological matters. He net among biologists the same scepticism and opposition that his ideas on the ionosphere had at first produced among ionosphericists. Just before he died, he wryly claimed some advance in that his latest paper was accepted "on second presentation". He was a humanist and was considering the problems of the origin of life.

King had an ingenious enquiring mind and a stubborn nature. He received the DSc degree from the University of Canterbury for his work on ionospherics. It was claimed then that his research had done much to clarify ideas about the F-region. It may be that the ten papers he published on biophysics will clarify ideas about that subject too.

Geoff is survived by his wife, June, and five children.

- Christchurch Geophysical Observatory

ERNST-AUGUST LAUTER
1920 - 1984

Ernst-August Lauter, Ordinary Member of the Academy of Sciences of the German Democratic Republic, died untimely of cancer on 21 October 1984, at the age of 64.

Born in Rostock on 1 December 1920, he studied meteorology at the Berlin University during his wartime employment in operative weather service. After the war, he completed additional studies of physics at the Rostock University, where he received his Doctor's degree with a thesis on the ionospheric D region. The latter was his subject from the very beginning of his scientific career, started in 1947 at the Meteorological Observatory Warnemünde near Rostock. In 1951, he initiated the Observatory of Ionospheric Research at Kühlungsborn (also near Rostock) which in the sequel bore the stamp of his scientific personality and activity. Here, with enthusiastic and skilful collaborators, he developed methods for diagnostics of structure and dynamics of the mesopause region by means of ground-based radio techniques (absorption and phase heights) which provided the basis for many years' studies of the interrelations between mesospheric and stratospheric dynamics, particularly in winter and during seasonal transition periods. Consequently, Lauter was among the first to promote, in the early 70-ies, the idea of an international cooperative programme for the study of stratosphere, mesosphere and lower ionosphere, which then took shape in the present Middle Atmosphere Programme (MAP).

Already in 1950, Lauter had discovered the post-geomagnetic storm after-effects (PSE) in the D region, which studies he took up again with his collaborators in the late 70-ies with a comprehensive analysis and elaboration of the PSE mechanisms related to high-energy particle precipitation from the magneto sphere. He also first recognized the control of these effects by the interplanetary magnetic sector structure.

Advocating and fostering interdisciplinary solar-terrestrial research and international collaboration in this and related fields was Lauter's most passionate activity as one of the founders (in 1966) of the multilateral Commission on Planetary Geophysics of the Academies of Socialist Countries (KAPG), as a member of the COSPAR Bureau (1966 - 1974), as well as in his function as Secretary General of the GDR Academy of Sciences (1968 - 1972). He became the first Director of the GDR Academy Central Institute of Solar-Terrestrial Physics, founded in 196 which post he held till 1976.

Ernst-August Lauter's vivid and inspiring personality was outstanding by his enthusiasm in science and abundance of ideas, stimulating his students and collaborators by the example of h own restless work. Busy scientific studies kept him upright until his last days. His memory will be preserved by many colleagues in his country and abroad.

JT

Sean McWilliams

(1914 - 1984)

Sean McWilliams died suddenly on 18 April 1984 just two months before his 70th birthday.

Born in Maghera, Co Derry, Northern Ireland, he had a distinguished academic career in the local first and second-level educational establishments and was awarded a scholarship to St Patricks College Maynooth (a constituent college of the National University of Ireland) from which he graduated in 1935 with an honours degree in mathematics and physics. After a few years spent imparting his knowledge as Professor of Mathematics and Science at Knockbeg College, Carlow, and a further brief period as an engineer in the Department of Posts and Telegraphs, McWilliams joined the then newly-established Irish Meteorological Service as one of its first trainee recruits on 16 January 1939.

Following training courses in Foynes, County Limerick and Imperial College (London), plans to pursue further training in Bergen (Norway) had to be abandoned due to the outbreak of the Second World War. During the period 1940-1944, McWilliams served periods of duty at Valentia Observatory, Foynes, Dublin Airport and the Meteorological Service HQ before receiving his permanent posting as Officer-in-Charge of Valentia Observatory on 1 December 1944. This was the post he was to occupy until his retirement in June 1980.

Valentia Observatory had been established in 1867 and magnetic observations commenced in March 1888 with annual mean values available from 1899. There were no major changes in the magnetic programme until the early 1950s when McWilliams organised the acquisition and installation of two sets of La Cour variometers (normal and quick-run). In 1970 a proton precession magnetometer was installed. During his 35 years at the helm, there was considerable expansion in the number and diversity of activities undertaken at the Observatory. Partly as a result of this expansion, regrettably, McWilliams did not have an opportunity of attending international assemblies and of meeting many of his colleagues among the international family of magnetic observators. However, he will be remembered by those who knew him personally or through correspondence as a dedicated scientist whose amiable personality and consideration were always to the fore. He will be sadly missed.

Sean is survived by his wife Nora and his son Brendan, now following in his father's footsteps as a senior officer in the Irish Meteorological Service.

EJM

John F. Noxon

John F. Noxon died in Boulder, Colorado on 19 January 1985 at the age of 57. Noxon was the director of the Optical Aeronomy Program of the Aeronomy Laboratory of the National Oceanic and Atmospheric Administration (NOAA), a position he had held since 1977 when he joined the Aeronomy Laboratory. Prior to that he was associate director of Harvard's Blue Hill Observatory. He received his PhD in physics from Harvard University.

Noxon was a recognized leader in optical aeronomy for virtually his entire career. He pioneered studies of the day airglow while at Blue Hill Observatory. He made innovative and important measurements of ozone concentrations in the atmospheres of Earth, Mars and Venus. He made optical measurements of gravity wave propagation in the earth's atmosphere. He made the first observations of the global distribution of stratospheric NO_2, discovering the abrupt decrease in NO_2 concentration at $\sim 50^0$ latitude in the winter hemisphere, the so-called "Noxon-cliff". He made the first observations of atmospheric NO and was a pioneer in atmospheric trace species detection by optical means. And much more.

Noxon was an adventurer and explorer throughout his scientific career, obtaining observations from aircraft flights over the north pole, from ship cruises in the southern hemisphere, and from sites that included Alaska, Peru, Hawaii and Greenland. His sense of discovery was not restricted to science; he had a lifelong interest in mountaineering and made two climbing trips in the Nepal Himalayas and an ascent of Mt. McKinley in his student days.

Noxon was a broad scholar as well as a profound scientist. He was a cultured man with a special interest in music. He was a man of erudition and wit; his scientific presentations were often memorable occasions. Noxon's warm and compassionate personality, together with his intellectual depth, made him a source of inspiration to his colleagues and to the broader scientific community over the years. His creative leadership in aeronomy and his friendship will be sorely missed by very many in the community.

EEF

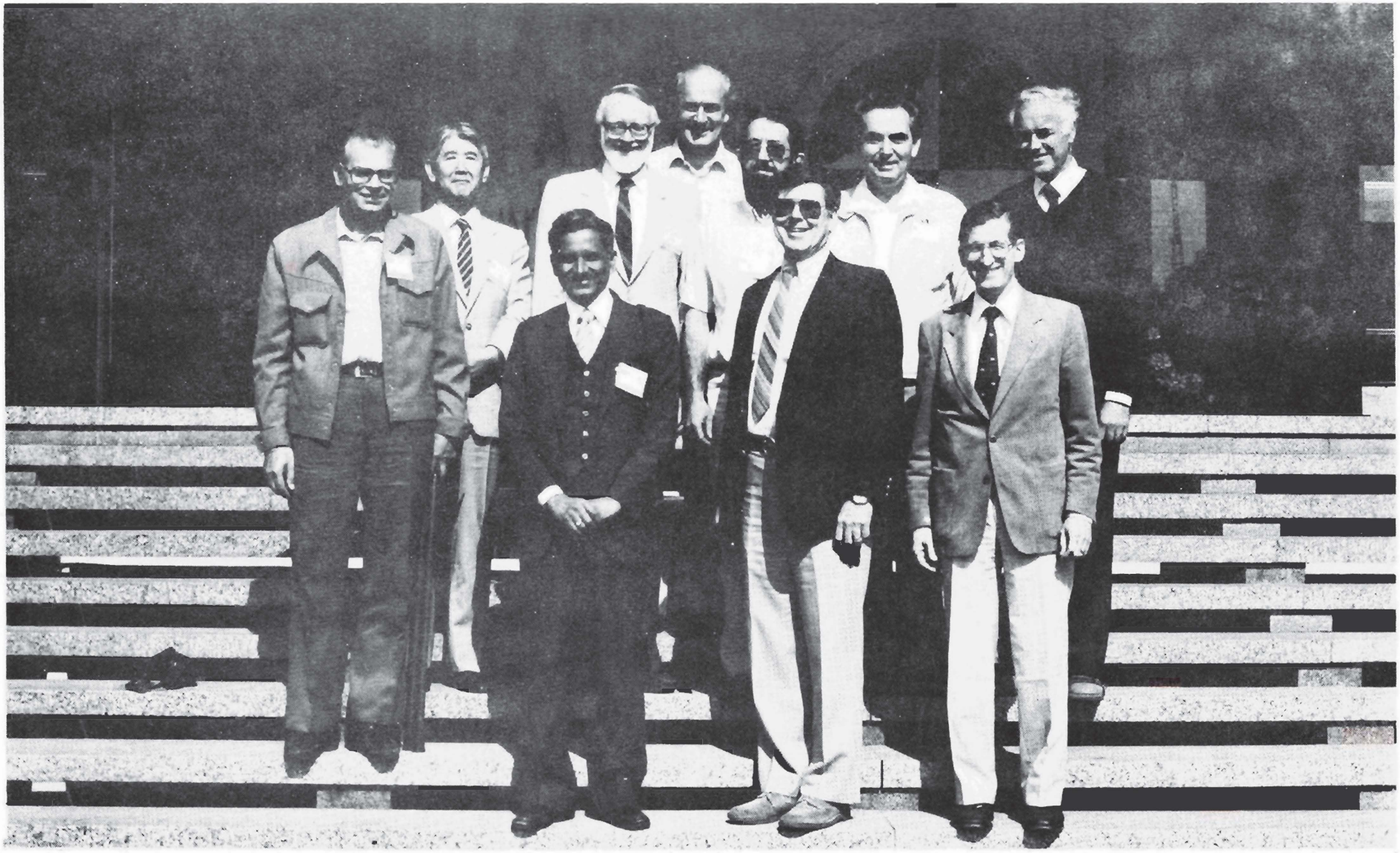
IAGA BULLETIN NO.49
TRANSACTIONS OF THE IAGA HAMBURG ASSEMBLY

This Bulletin contains the activities of the General Assembly of IAGA held in Hamburg, Federal Republic of Germany, from 15 to 27 August 1983, in connection with the XVIII General Assembly of IUGG. It was published and distributed recently to all IAGA registrants of the IUGG Assembly. This Bulletin is available from the IUGG Publications Office (39ter rue Gay-Lussac, 75005 Paris, France) at reasonable cost.

The contents of the Transactions of the IAGA Hamburg Assembly (total 183 pages) are: Acknowledgements, Brief Summary of the Hamburg Assembly, Opening Conference of Delegates, Presidential Address, Closing Conference of Delegates; Minutes of IAGA Executive Committee Meetings; Reports of IAGA Organizational Units; Programmes and Highlights of all the IAGA Sessions; Resolutions of the IAGA Hamburg Assembly (English and French texts); Statutes and ByLaws of IAGA (English and French texts); IAGA Internal Structure for the Period 1983-87; List of IAGA National Correspondents; List of IAGA Registrants of the Hamburg Assembly; Appendices (Summary reports of the IUGG Interdisciplinary Symposia sponsored by IAGA; Resolutions of the XVIII IUGG General Assembly).

This bulletin was edited by Naoshi Fukushima, the then Secretary-General of IAGA. He thanks to all those who helped him in compiling this publication, especially to the leaders of IAGA Divisions and Interdivisional Commissions, and the conveners of all scientific sessions of the IAGA Hamburg Assembly. He regrets the delay in publishing this Bulletin, especially that it did not appear before the Fifth Scientific Assembly of IAGA held in Prague in August 1985.

For information, the Programme-Abstracts booklet of the IAGA Hamburg Assembly (IAGA Bulletin No.48) is still available from the IUGG Publications Office at the cost of $11.60 per copy excluding the mail charge.



The Executive Committee of IAGA [1983 - 1987]:

Michael Gadsden
Naoshi Fukushima Ian Gough Roger Gendrin Vaclav Bucha Ulrich Schmucker
Oleg Raspopov Ram Rastogi Don Williams Keith Cole

INTERNATIONAL ASSOCIATION OF GEOMAGNETISM AND AERONOMY

(IAGA)

IAGA is one of the seven Associations in the International Union of Geodesy and Geophysics (IUGG). The objectives of IAGA are:

a) to promote studies of magnetism and aeronomy of the Earth and other bodies of the solar system, and of the interplanetary medium and its interaction with these bodies, where such studies have international interest;

b) to encourage research in these subjects by individual countries, institutions or persons and to facilitate its international coordination;

c) to provide an opportunity on an international basis for discussion and publication of the results of the researches; and

d) to promote appropriate standardizations of observational programmes, data acquisition systems, data analysis and publication.

IAGA holds an Ordinary General Assembly every four years in conjunction with each Ordinary General Assembly of IUGG. Between the Ordinary General Assemblies, IAGA holds a Scientific General Assembly, often meeting with one of the other Associations of IUGG. IAGA therefore meets every other year. The next Assembly is the IUGG General Assembly scheduled for Vancouver (Canada) in 1987.

IAGA has two types of publications:

(i) IAGA Bulletins, which include the Programme and Abstracts and the Transactions of the Assemblies; Geomagnetic Data and Indices, published annually; and special Data Summaries or Information Booklets, published occasionally.

(ii) IAGA News, which contains items and announcements of general interest to the IAGA community and which is published annually.

The Bulletins are available from the IUGG Publications Office, 39ter rue Guy-Lussac, 75005 Paris, France. The IAGA News is sent to all addresses on the IAGA Mailing List (which at present contains nearly 3000 addresses of individual scientists in some 72 countries) and is available on request from the IAGA Secretary-General.

IAGA welcomes all scientists throughout the world to join in research in "Geomagnetism and Aeronomy". IAGA is subdivided into a number of Divisions and Commissions, many of which have working groups for the study of particular subjects in their general areas of interest. On occasion, these internal IAGA groups issue their own newsletters or circulars. At the IAGA Assemblies, the groups organize specialist symposia, invite scholarly reviews and receive contributed papers which present up-to-the-minute results of current research.

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