

Liora Handes



IAGA NEWS

December 1993

No: 32



LONG SERVICE AWARD FOR WALTER ZANDER



Professor Heinrich Soffel, the national representative for IAGA, handed the medal over to Walter Zander on 23 September 1993. In a brief address, he outlined the long tradition of geomagnetism as a discipline of science and the importance of geomagnetic observatories to the scientific and to the rest of the human community. He emphasized also the high standard of the Adolf-Schmidt geomagnetic observatory at Niemegk and that Walter Zander contributed considerably to maintenance of this high standard during his 40-years' service "behind the Curtain".

In reply, Zander said, with a solemn face and no trace of a smile, "Thank you very much, I had been waiting for this for years!" Zander began work as a baker but changed to geomagnetism after being wounded in the War.

Front cover:

Photographs of the aurora over Alaska taken by V P Hessler during the IGY/IGC.

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Franklin E Roach

1905 - 1993

Franklin Roach died two days before his 88th birthday in Tucson, Arizona. An alumnus of Wheaton College, he entered Chicago University and received his Ph.D. in astrophysics in 1934. He began his postdoctoral career at the McDonald Observatory in Texas and in 1936 moved to Tucson to teach physics and astronomy at Arizona University.

The war years were spent first at CalTech and then at the Naval Ordnance Test Station at China Lake, California. Here he met Chris Elvey, who was to remain a lifelong friend; after the war, I understand that the two of them essentially divided up the field of aurora and airglow - Elvey went to Alaska, Roach to Boulder. Before that, Roach spent a year in Paris as a Fulbright scholar and always after he would sport a French beret of the most proletarian aspect.

In Boulder from 1954 until retirement in 1965, Roach developed research in airglow and he created the Fritz Peak Observatory about 20 miles to the west of Boulder at 9000 feet in the Rockies. Roach's students included Rex Megill and Fred Rees, and the group invented an all-sky scanning airglow photometer using a Lyot filter for isolation of emission lines, and also an interference filter photometer, the turret photometer, for calibrated measurement at the zenith. Because of the need to correct emission line measurements for the underlying spectral continuum, Roach made precise measurements of zodiacal and galactic light, and of direct and scattered starlight. This latter work led on to his book, written with Janet Gordon, "The Light of the Night Sky" [LONS].

During the eleven years in Boulder, he was consultant to NASA for the Mercury and Gemini manned orbiting flights and was adjoint professor at Colorado University. For a short time, just before retirement, he was Director of what was to become the Aeronomy Laboratory.

Roach was for some years Chairman of the IAGA Commission on Airglow and was a familiar face at IAGA Assemblies in the 50s and 60s. I remember with awe his letting the Chairman of a session know that he (the Chairman) appeared to have forgotten that it was coffee time. A prolific author of research papers, he would never let the important things in life be forgotten. Roach enjoyed enormously amateur dramatics and singing, especially Gilbert and Sullivan. His entire approach to life was tremendously enthusiastic.

Roach married Eloise Blakeslee by whom he had four children, John, Janet, Charlotte and Gerry. Lou died in 1976 and Roach later married Janet, his coauthor on "LONS". He is survived by his wife Janet, his daughters Janet and Charlotte, and by Gerry, nine grandchildren and ten great-grandchildren. Roach can be said also to have been the father of airglow studies in the USA.

MG

Foreword

Another Scientific Assembly has come, and gone. Another Local organizing Committee is resting, holidaying, and wondering why they were ever crazy enough to agree to do it. Some thoughts on local organizers:

First, they are volunteers and unpaid; all the necessary costs of an Assembly [less what the organizers can squeeze out of the national body or the government, and guess how much that amounts to in many cases] have to be covered by the delegates' registration fees. Very few institutions will give the use of most of their lecture halls plus technicians plus security plus audio-visual aids for free .. it all has to be paid for and that doesn't include the telephone bills, the mailing costs, the printing and distribution of the circulars, the free coffee and tea the delegates want to have morning and afternoon, and fixing up social events.

Of course we would like to offer an Assembly with a low registration fee but reality must be faced. When I hear that three hundred dollars for two weeks is "too much", I wonder if the complainers have ever looked at registration fees of other meetings that are held around the world. Show me a two-week meeting that has a genuine registration fee (that is one without government or commercial subsidy) much lower than our fee. IAGA is pretty free of control by any but ourselves but it does mean that the Assemblies are self-supporting.

The Local Organizers in Buenos Aires did a wonderful job; their aim was to smooth over difficulties (such as a fire on Friday the thirteenth and the unplanned payment for coffee on the first day) and they did pretty well. In addition, they arranged for a world-famous pianist to play for us at the Opening Ceremony and for the National Ballet to come to the meeting hall to dance tango for us; now that is couthy.

Finally, a note that whatever is said and done some IAGA scientists will insist on presenting many papers. Here are the statistics of polypresentations for this Assembly;

If m is the number of authors with n papers credited in the abstracts book:

$n=$	1	2	3	4	5	6	7	8	9	10	11	12	13	14
$m=$	1167	365	123	78	48	21	18	4	4	3	1	2	2	0
$n=$	15	16	17	18	19	20	21	22	23	24	25	26	27	
$m=$	0	2	0	0	0	0	0	0	0	0	0	0	1	

Of course, not all these papers or authors presented in Buenos Aires and of course many of the papers had more than one author.

With all good wishes for success in research, and may your financial accounts never grow thin.

M Gadsden

Konstantin Iosifovich Gringauz

1918 - 1993

Born on 5 July, 1918 in Tula (about 200 km south of Moscow), Gringauz had a long and successful career in space physics. He holds a special position in the history of space research.

At the age of 3, he moved with his family to Samara, on the banks of the Volga, and graduated there in 1935. A radio "ham", he enrolled in the Electrophysical Faculty of the Leningrad Electrotechnical Institute. In 1941, he earned his diploma through a study of frequency modulation in the radiotechnical laboratory.

He was in Leningrad during the first few months of the blockade and was evacuated to Moscow in the winter of 1942. For most of the War, Gringauz worked in a factory that produced radio equipment for tanks and during this time passed the entry examination for postgraduate studies in ionospheric radio propagation at a radio institute in Moscow.

In 1947, Gringauz moved to Korolev's Bureau for Rocket Development and in 1949 he gained his Ph.D. In 1956, he began designing instruments which were used in Sputnik 3 for in situ measurement of ion densities. He also designed the transmitter for Sputnik 1, successfully arguing that this should be at decameter wavelengths so that Sputnik 1 could be heard around the world. At the beginning of the IGY in 1957, Gringauz had radio and Langmuir probe experiments on sounding rockets but the following year he concentrated on designing spacecraft-borne instruments for measurements in the ionospheres of Earth, Venus and Mars. In 1959, he moved with his group to the Academy of Sciences' Radiotechnical Institute as head of the space research department. He became Professor of Radiophysics in 1970 and his group soon after was renamed the Laboratory for Plasma Studies in the new Space Research Institute.

Perhaps the peak of his career came when his PLASMA experiments on VEGA 1 and VEGA 2 obtained high resolution measurements of the bow shock, the neutral and ionized envelope, and the "cometopause" of Halley's comet. For this success, Gringauz was awarded the State Prize of the USSR in 1986. He received the COSPAR Space Science Award in 1988.

Gringauz married Irina Nikolaevna Danilova in 1954 and he is survived by his wife, his daughter Tatiana, and a granddaughter Masha. A cultured and well-read person, he was known for his persistence and dedication to research with unmanned spacecraft. All in the IAGA community who had the privilege of working with Gringauz on experiments or with him on committees will know that his death parts us from a personality which was both distinguished professionally and likeable at personal level.

MIV + NFN

DRAFT

CONFERENCE OF DELEGATES
9 August and 19 August 1993
Buenos Aires, Argentina

D J Williams, President

The President opened the meeting by saying how pleasant it was for IAGA to be back in the southern hemisphere [the previous occasion was the Union General Assembly held in 1979 in Canberra, Australia]. On behalf of the Delegates, he thanked the Local Organizing Committee for the enormous amount of work they had done in bringing the Assembly into being and he looked forward to a profitable and enjoyable meeting. The Secretary General confirmed that at least half of the number of accredited Chief Delegates [see page 6] were present and that, therefore, the Conference of Delegates could proceed to discussion of the agenda [Statute 19].

1. Minutes of previous Conference of Delegates.

The draft minutes have been published in IAGA News No.30, pages 3-37. The President moved that these Minutes be accepted as a true and correct record and this was **passed**, nemine contradicente.

2. Matters arising from the Minutes.

There were no matters arising from the Minutes that were not to be dealt with later in the agenda.

3. Report of the Executive Committee

The President reported that the Executive Committee had met June 29 - July 1, 1992, in Laurel, Maryland [USA]. The current situation affecting observatories worldwide was, and still is, giving cause for concern and the program OUTREACH had been initiated at that meeting. Vice President Kono introduced a pamphlet "Program OUTREACH: How can we contribute? A report based on Japanese experience" which had been published for the Assembly by the Science Council of Japan.

The President noted that a number of organizations had contributed significant funding to enable scientists to travel to the Assembly and he mentioned specifically the International Science Foundation [support for 18-20], the International Council of Scientific Unions [support for 12-13 young scientists], and the Union grant for the Assembly. There were several other sources of support that had been of invaluable help in allowing scientists to get to the Assembly, and in particular our colleagues from South America had arranged "regional" funds in what appeared to be a most effective manner.

NOTES on other dates and programs of interest:

1. Days with unusual meteor shower activity are: Northern Hemisphere Jan 3-4; Apr 21-23; May 4-5; Jun 6-11, 27-29; Aug 10-15; Oct 20-23; Nov 17-18; Dec 12-14, 22-23, 1994; Jan 3-4, 1995. Southern Hemisphere Apr 23; May 4-5; Jun 6-11, 27-29; Jul 28-29; Oct 20-23; Nov 17-18; Dec 12-14, 1994.
2. GAW (Global Atmosphere Watch). WMO program to measure atmospheric composition -- early warning system to detect further changes in atmospheric concentrations. (See Explanations.)
3. SOLTIP (Solar connection with Transient Interplanetary Processes). Observing Program 1990 - 1997: solar-generated phenomena and their propagation throughout the heliosphere. (See Explanations.)
4. FLARES22 (FLAre RESearch at solar cycle 22 maximum). Observing Program 1990-1997: basic physical processes of transient solar activity and its coupling with solar-terrestrial environment. (See Explanations.)
5. Day intervals that IMP 8 satellite is in the solar wind (begin and end days are generally partial days): 27 Dec 1993-4 Jan 1994; 9-17 Jan; 22-29 Jan; 4-11 Feb; 16-23 Feb; 28 Feb-7 Mar; 12-20 Mar; 25 Mar-1 Apr; 6-14 Apr; 19-27 Apr; 2-10 May; 14-22 May; 26 May-3 Jun; 7-15 Jun; 20-28 Jun; 3-10 Jul; 15-23 Jul; 28 Jul-4 Aug; 10-17 Aug; 22-29 Aug; 4-10 Sep; 16-22 Sep; 29 Sep-5 Oct; 11-18 Oct; 24-30 Oct; 5-12 Nov; 18-25 Nov; 1-7 Dec; 14-20 Dec; 26 Dec 1994-1 Jan 1995. Note that there will not necessarily be total IMP 8 data monitoring coverage during these intervals. (Information kindly provided by the WDC-A for Rockets and Satellites, NASA GSFC, Greenbelt, MD 20771 U.S.A.).
6. + Incoherent Scatter Coordinated Observations Days (see Explanations) starting at 1600 UT on the first day of the intervals indicated, and ending at 1600 UT on the last day of the intervals: 11-14 Jan 1994 GISMOS, 8-9 Feb PATCHES; 15-16 Mar SUNDIAL; 12-13 Apr; 3-4 May; 8-9 Jun; 5-6 Jul GISMOS; 10-16 Aug CADITS/MLTCS; 6-7 Sep; 4-5 Oct; 8-9 Nov; 6-7 Dec GISMOS; 23-27 Jan 1995 JOULE
 where CADITS = Coupling and Dynamics of the Ionosphere-Thermosphere System;
 GISMOS = Global Ionospheric Simultaneous Measurements of Substorms;
 JOULE = Joule Heating
 MLTCS = Mesosphere, Lower-Thermosphere Coupling Study;
 PATCHES = Polar Cap Patches
 SUNDIAL = Coordinated study of the ionosphere/magnetosphere.

OPERATIONAL EDITION, September 1993

Annick Berthelie[r] continued to provide a fine service to the community and that recently there had been a valuable upgrading of the service through the provision of data on disc with the Bulletins.

The Secretary General thanked the Leaders of the Divisions and of the Commissions for the effective way in which they had created a framework of scientific sessions for this Assembly and he expressed the hope that the Delegates would agree that this was a rewarding and professionally exciting and valuable meeting.

Finally, the Conference stood for a few moments in memory of

Oscar Buneman
Konstantin Gringauz
Fred Jacka
Karl Wienert
Charles Willmann

5. Resolutions of the Association.

The President reported that the Executive Committee had decided that two IAGA Long-Service awards be made at this Assembly and announced that these would go to Walter Zander [Germany] and to Zhou Jinping [China]. This announcement was applauded. The Executive Committee recommended to the Conference of Delegates that Christian Sucksdorff be elected to Honorary Membership of IAGA. This was **passed** by acclamation.

The Conference then proceeded to the Resolutions presented from the Resolutions Committee [G Fischer, chairman; S-E Hjelt; P L McFadden; S Perraut]. The texts, in English and French, are printed on pages 7-11, and each was formally proposed by Fischer:

Resolution No.1: seconded by J Booker: **passed**, nemine contradicente.

Resolution No.2: seconded by J Dudeney: **passed**, with 2 against.

Resolution No.3: seconded by S Cowley: **passed**, nemine contradicente.

Resolution No.4: seconded by J Booker: **passed**, nemine contradicente.

Resolution No.5: seconded by J Booker: **passed**, nemine contradicente.

Resolution No.6: seconded by J Booker: After an amendment proposed by W Campbell, seconded by J Dudeney, to substitute the word "governmental" in place of "military" which was **passed** by 22 votes to 10 votes, **passed** nemine contradicente.

Resolution No.7: seconded by F J Lowes: **passed**, nemine contradicente.

Resolution No.8: seconded by M A Shea: **passed**, nemine contradicente.

Resolution No.9: seconded by I Eltayeb: After 2 minor amendments **passed** with 1 against.

Resolution No.10: seconded by C Harrison: **passed** by acclamation.

2ND REGIONAL GEODESY & GEOPHYSICS ASSEMBLY IN AFRICA

1994 November 14-25

Ibadan [Nigeria]

The Assembly will start with a plenary session with five keynote speakers on

Energy resources of the African continent for the 21st Century
Space data acquisition and the Earth resources of Africa in the 21st Century
Environmental sciences in Africa
Groundwater resources in Africa
Meteorology in Africa

This will be followed by 14 parallel scientific sessions. The attendance hoped for is 500 from countries throughout the world.

For further information, please write to

ICESA International Secretariat
PO Box 22383
University of Ibadan Post Office
Ibadan
NIGERIA

IUGG XXI GENERAL ASSEMBLY

1995 July 2-14

Boulder, Colorado [USA]

The General Assembly will be held on the campus of Colorado University. IAGA plans to have a full set of scientific sessions arranged by the Divisions and by the Commissions. As usual at a General Assembly, there will be joint sessions arranged by two or more Associations; for IAGA, there will be IAGA+IASPEI and IAGA+IAMAP sessions.

The abstract deadline has been set for 1 February 1995. The second circular is planned for February 1994 and the next issue of IAGA News, planned for late summer 1994, will have a listing of all IAGA and IAGA+ sessions with names and addresses of convenors.

Meanwhile, up to the minute information may be obtained by writing to

IUGG XXI General Assembly
c/o American Geophysical Union
2000 Florida Avenue, NW
Washington DC 20009
USA

RESOLUTION NO.1

The IAGA,

recognizing the importance of large palaeomagnetic and related data sets for addressing problems in global geomagnetism, stratigraphy and tectonics,

noting the large investment of research funds in data acquisition,

recommends that high priority be given to establishment, accessibility and maintenance of global databases for palaeomagnetism, archaeomagnetism and rock magnetism.

l'IAGA,

reconnaissant l'importance des grandes collections de données paléomagnétiques et associées au paléomagnétisme pour résoudre les problèmes de géomagnétisme global, de stratigraphie et de tectonique,

constatant l'investissement financier important consenti dans l'acquisition des données,

recommande qu'une grande priorité soit donnée à l'établissement, l'accessibilité et le maintien de banques de données globales de géomagnétisme, d'archéomagnétisme et de magnétisme des roches.

RESOLUTION NO.2

l'AIGA,

accueille favorablement le projet italien d'héberger et de financer un centre de traitement de données à Frascati pour le Réseau d'Observatoires Géospaciaux Antarctiques (AGONET), et

demande instamment aux expéditions nationales antarctiques et aux scientifiques concernés à l'intérieur de la communauté antarctique, de soutenir le centre de traitement de données de l'AGONET (ADAF) en lui fournissant des données et en participant à ses activités.

The IAGA,

welcomes the plan for Italy to host and fund a data analysis facility in Frascati for the Antarctic Geospace Observatory Network [AGONET], and

urges national Antarctic expeditions and interested scientists within the Antarctic community to support the AGONET Data Analysis Facility [ADAF] by providing data sets to it and by participating in its activities.

ELAS: NATURE OF THE DEEP CRUSTAL ELECTRICAL CONDUCTIVITY

A one-week workshop in March 1994
Moscow [Russia]

The ELAS Inter-Association Committee is arranging a workshop:

- Compilation of lower crust conductivity data
- Correlation with seismic attenuation
- Increase of conductivity in subduction zones
- Geothermal, geochemical and petrological models of the crust
- Graphite in the lower crust

Information on this workshop should be sought from

Leonid Vanyan
Shirshov Institute
of Oceanology
23 Krasikova
Moscow 117218
RUSSIA

Selwyn Sacks
Carnegie Institute
Dept of Terrestrial Magnetism
5241 Broad Branch Road NW
Washington DC 20015
USA

COSPAR

ICSU Committee on Space Research
30th Scientific Assembly

1994 July 10-21
Hamburg [Germany]

IAGA is sponsoring part of this Assembly, the sessions:

- C.1 Presentation of CIRA Part III (reference atmosphere of trace species) and comparisons of CIRA models with recent data
- C.2 Development of improved reference atmospheres of Venus and Mars and possibly other bodies of the solar system
- C.3 Southern hemisphere upper atmosphere and ionosphere
- C.4 IRI - The high latitudes in the International Reference Ionosphere
- Cl.1 Global perspective of the lower and upper thermosphere from UARS and related observing and theory and modelling programs
- Cl.2 Thermosphere-ionosphere-middle atmosphere coupling and dynamics
- Cl.3 Processes active at the ionosphere-magnetosphere interface
- C2.3 Turbulence in middle atmosphere and lower thermosphere
- D.1 Comparative studies of magnetospheric phenomena
- D2.1 Physics of collisionless shocks
- D2.2 Thermal and energetic plasma interaction processes in the inner magnetosphere
- D3.1 The three-dimensional magnetosphere

Information from:

Copernicus gesellschaft
Postfach 49
Max-Planck-Strasse 1
W-37189 Katlenburg-Lindau
GERMANY

Fax: +49 5556 4709
Vox: +49 5556 1440

RESOLUTION NO.5

The IAGA,

noting the many magnetic surveys that have been carried out by both military and civilian authorities,

urges that all institutions holding classified magnetic data consider de-classifying those data that may contribute to international geoscientific research.

l'AIGA,

considérant le grand nombre de campagnes magnétiques qui ont été menées à la fois par les autorités civiles et militaires,

demande instamment que toutes les institutions détenant des données magnétiques classées "secret", acceptent de les "déclassifier" pour contribuer à la recherche géoscientifique internationale.

RESOLUTION NO.6

l'AIGA,

prenant en compte la contribution des observatoires magnétiques à la surveillance de l'environnement à long terme, à la recherche fondamentale et aux expériences et missions satellitaires, et

considérant également l'utilisation extensive, commerciale et gouvernementale, des modèles et indices géomagnétiques provenant des données issues des observatoires magnétiques,

demande instamment aux organisations, agences et pays membres concernés, d'apporter le financement nécessaire à la continuité des observations magnétiques synoptiques et d'adopter des instruments digitaux modernes.

The IAGA,

noting the contribution made by magnetic observatories to long-term environmental monitoring, to fundamental research and to ground-based and satellite surveys and experiments, and

noting also the extensive commercial and governmental use of geomagnetic models and indices derived from magnetic observatory data,

urges relevant organizations, agencies, and member countries, to provide the resources to maintain continuity of synoptic magnetic observations and to adopt modern digital instruments.

"GEOMAGNETIC STUDIES AT LOW LATITUDES"

G K Rangarajan & B R Arora (Editors)

As part of the celebration of the sesquicentennial year of geomagnetic observations at Colaba-Alibag (1841-1991), the Indian Institute of Geomagnetism organized a symposium in December 1991. The papers of the symposium have been brought out in book form as Memoir No.24 of the Institute.

Published by the Geological Society of India (Bangalore) in 1992 as a hard-cover book of nearly 500 pages, the text has four sections: Solid Earth Geophysics; Observatories, Data Analysis and Instrumentation; Upper Atmospheric Physics; Allied Aspects. The papers include many by Indian scientists, as is natural, with a sprinkling of papers by authors from other countries and are well worth reading. [The review copy sent to your Secretary-General spends more time on his desk than in his library shelves, which says something.] Well illustrated, with up-to-date bibliography to each paper, it is proving to be a useful reference for equatorial geomagnetism and aeronomy.

Further information (availability, cost etc) should be sought from

Professor G K Rangarajan
Indian Institute of Geomagnetism
Dr Nanabhai Moos Marg
Colaba
Bombay 400 005
INDIA

NATIONAL GEOPHYSICAL DATA CENTER

325 Broadway, E/GC2, Dept 919
Boulder Colorado 80303-3328
USA

There is now a wide selection of digital data on compact disc that can be bought at reasonable [ie economical] price from the NGDC:

Flares in Hydrogen-Alpha)	STP
Regions of Solar Activity)	CD-ROM
GOES Space Environment Data	Neutron Monitor Data
Minnesota Aeromagnetic Data	Ocean Drilling Program
Solar Variability affecting Earth	The Gravity CD-ROM
Deep Sea Drilling Project	GEODAS CD-ROM
Gulf of Mexico GLORIA Data	Global Ecosystems Data
Geophysics of North America	NOAA & MMS Marine Minerals CD-ROM

There are also Solar Coronal Hole Catalogues on floppy disc and/or Report UAG-102.

Historical Solar Observations on 35mm microfilm.

****** It costs nothing to ask what is available! ******

RESOLUTION NO.9

The IAGA,

recognizing the efforts of various countries participating in the International Equatorial Electrojet Year [IEEY] Program, and

noting the importance of installing further observational equipment in some remote stations,

extends the IEEY program until the end of 1994, and

recommends that participating countries continue their support.

l'AIGA,

reconnaissant les efforts de divers pays membres du programme de l'Année Equatoriale Internationale de l'Electrojet (IEEY), et

notant l'importance qu'il y a à installer des équipements d'observation complémentaires dans certaines stations éloignées,

étend le programme de l'IEEY jusqu'à la fin de 1994, et

recommande que les pays membres poursuivent leur aide.

RESOLUTION NO.10

l'AIGA,

ayant passé des journées profitables et agréables en Assemblée,

notant que les sessions scientifiques et la participation des délégués ont été stimulantes,

remercie le Comité d'Organisation Local (Président : Juan F. Vilas) pour la courtoisie qui ne s'est jamais démentie, la serviabilité, l'enthousiasme et l'énergie qui ont permis une mémorable Assemblée Générale de l'AIGA.

The IAGA,

having spent a profitable and enjoyable number of days in Assembly,

noting that there have been stimulating scientific sessions and responses by the delegates,

thanks the Local Organizing Committee [Chairman: Juan F Vilas] for the unfailing courtesy, helpfulness, enthusiasm and energy that has given IAGA scientists a memorable Assembly.

***REFERENCE IAGA BULLETINS FOR GEOMAGNETIC DATA are published
by the INTERNATIONAL SERVICE of GEOMAGNETIC INDICES***

IAGA Bulletin n°32 - Geomagnetic Data - One volume every year

- now covers 18 years : from 1970 to 1987
- contains definitive values of geomagnetic data prepared by the ISGI collaborating Institutes for the current year:
 - IAGA Indices : aa, am (Km), Kp (ap), Dst, AE (since 1981)
 - Rapid Variations : ssc, sfe
- graphs, average values since the inception of each series, list of observatories, and explanatory text are included
- data files together with a software for visualizing the tables are on a PC diskette inserted in each Bulletin (since 1981).

IAGA Bulletin n°40 - Dst 1957-1986

- contains an homogeneous series of the definitive hourly values of Dst, prepared by M. Sugiura and T. Kamei
- graphs, average values, derivation scheme and relevant references are included
- yearly data files are provided on PC diskettes inserted in each Bulletin.

IAGA Bulletin n°54 - DGRF 1985-IGRF 1990

- contains tables and maps of DGRF 1985 and IGRF 1990 prepared by R.T. Baldwin and R. Langel
- ASCII files of DGRF and IGRF coefficients and source of a FORTRAN program kindly provided by R.T. Baldwin for computing the field elements are provided on a PC diskette inserted in each Bulletin.

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Prices are as follows (valid 1993 through 1994) :

IAGA Bulletin n°54 : one issue (diskette included)	300 FF (about 50 \$)
IAGA Bulletin n°40 : one issue (diskette included)	200 FF (about 35 \$)
IAGA Bulletin n°32 : 1970 to 1980 : each issue	50 FF (about 8 \$)
package 1970-1980 (11 Bull.)	400 FF (about 70 \$)
1981 to 1987 : each issue (diskettes included)	100 FF (about 16 \$)
package 1981-1987 (7 Bull., diskettes included)	500 FF (about 85 \$)
Diskettes alone : for former subscribers only, each	50 FF (about 8 \$)
Other former IAGA Publications from our remaining stock are FREE (list on request)	
For all orders postage expenses are EXTRA.	

DRAFT

Minutes of the
Executive Committee Meetings
August 8-19, 1993
Buenos Aires, Argentina

Present: D J Williams [President], M Kono and J F Vilas [Vice Presidents], I A Eltayeb, G Fischer, O Troshichev and M Gadsden [Secretary General]. Apologies for absence were received from R E Gendrin, G P Gregori and R A Vincent.

I. Minutes of the previous meeting.

The draft minutes had been published in IAGA News No.31, pages 3-16 [September 1992]. Proposed by Fischer, seconded by Eltayeb, that the minutes be accepted as correct; **passed**.

II. Matters arising from the Minutes

Minute V. "Practical Guides"

In the absence of Gregori who had been charged with the negotiations over the production of these Guides, Fischer opened the discussion by suggesting that the probable numbers of copies would be in the neighbourhood of 100 for the English, 30 for the French, and 20 for the Spanish versions. There is no obvious source of funds for the printing and distribution of the Guides. The Secretary General suggested that perhaps it would be satisfactory for the text of the Guide to be distributed to users on disc, as either a Word Perfect file or an ASCII file, with the user asking for a particular format. The user would be free to print out as many copies as were needed. Estimating that the cost of disc copying and distribution by airmail would be no more than £10, the Secretary General suggested that the disc Guides could be distributed free of charge, as part of IAGA's service to the community. The Executive Committee **agreed** that the Secretary General should explore this, with attention paid to establishing the actual cost and examining possible conflicts of compatibility between differing computer operating systems.

Minute VI. Proposal for a change to Statute 7.

The Secretary General reported that he had received notice of a change to Statute No.7, to be debated and voted upon at the General Assembly in 1995, by which the following paragraph is added to the Statute:

Notwithstanding the terms of Statute 7, the Secretary General shall be elected at the General Assembly in 1995 for a term of 6 years in the case of a fresh appointment or for 2 years in the case of re-election."

Kono pointed out that such a change, were it accepted and passed, would require an alteration to the third paragraph in the Statute so that the Secretary General's term of office is specified in years rather than in "periods". [A "period" is defined in Statute 5 as the interval elapsing between the end of one ordinary General Assembly and the end of the next]. This was accepted and the Secretary General agreed to approach

**IAGA's Permanent Service on Comparisons of Magnetic Standards
Offer their Spare QHM's to Observatories**

Since the establishment of the IAGA permanent service on Comparisons of Magnetic Services at the Edinburgh meeting of IATME in 1936, the Danish observatories Rude Skov and Brorfelde (since 1981) have housed instruments owned by IAGA. The main function of the service has been to send calibrated instruments (mainly QHM's) to observatories requesting, to make comparisons with their own instruments.

The demand for this service has decreased over recent years, with no requests for QHM's received in the past 5 years. It is proposed to make the stock of (approximately 30) QHM's available to observatories in need of them in sets of two. The instruments may be used for fieldwork as well as for standard observatory measurements, and are suitable for observations over a wide range of values of the geomagnetic field.

The instruments will be supplied free of charge if no changes to the instruments constants are needed; where changes have to be made to suit a particular observatory the charge will be US\$700 per instrument.

Requests for the QHM's should be addressed to :

The Danish Meteorological Institute
Solar-Terrestrial Physics Section
Lyngbyvej 100
DK-2100 Copenhagen
DENMARK

**Peng Feng-Lin:
An apology.**

By one of those unfortunately common but nevertheless inexcusable inversions of images in the visual cortex of your Secretary-General, the name Peng Feng-Lin was printed throughout IAGA Bulletin No.53 as Peng Leng-Fin. I understand that there is no such word as "Fin" in Chinese which is a saving grace but I ask all to take note of the correct spelling of Peng Feng-Lin's name.

The President reported that three All-Union Symposia of possible interest to the IAGA community had been proposed for the General Assembly:

- (1) Geochemistry
- (2) Scale and chaos in geophysics
- (3) Planetary & cooperative planetary studies

The Executive Committee **supported** the President in giving backing to these topics at the Union Executive Committee meeting to be held in Paris, 17-18 November 1993. On the question of "Union Lectures", the Executive Committee **recommended** that they be restricted either to being a keynote lecture at the commencement of an All-Union Symposium or to being an evening lecture that is given at a time when there will be no conflict with the Associations' daytime scientific sessions.

Finally, the Secretary General noted that the following IAGA scientists had died since the last Executive Committee meeting and that he was seeking obituaries for each: Oscar Buneman; Konstantin Gringauz (*); Fred Jacka(*); Karl Wienert; Charles Willmann (*). [The text is to hand for those with stars placed after the name and the obituaries will appear in the next issue of IAGA News.]

IV. Report from the President

The President reported that he had, at the request of the President of the Union [Helmut Moritz], made a detailed submission to the Union Executive Committee on the subject of Union funding. A review of the trends in allocation of Union funds had shown that there was a distinct secular change with an ever-increasing fraction going to Union activities and consequently an ever-decreasing fraction going to the Associations. A heavy weighting of funding was now going to special committees and commissions of the Union with, in one case, a Union committee receiving a higher annual allocation than one of the Associations!

A letter from J O Cardus, Chairman of the Union Finance Committee, had recently been received and copies were circulated to the members of the (IAGA) Executive Committee. The President announced that he had invited Cardus, Ashour, Roederer, and Spilhaus to meet with him and with the Chief Delegates for an unminuted discussion on Union affairs; the meeting subsequently took place and resulted in a frank and open discussion of IAGA's relationship with the Union Bureau.

Bengt Hultquist [President, SCOSTEP] was invited to join the Executive Committee to present an invitation to hold the 8th Scientific Assembly (1997) in Uppsala (Sweden), a town situated 70 km north of Stockholm and 35 km from the international airport. With a population of 150,000, there is plenty of accommodation available [1150 beds in 850-950 hotel rooms] in the central area and a further 250 beds in university dormitories. There are 12 meeting rooms (with five holding more than 300 seats) and an adjacent concourse area.

IEEY DATA ORGANIZATION AND ANALYSIS

São José dos Campos, SP [Brazil]

19-23 October 1992

Many active leading scientists and groups in IEEY studies were able to meet and discuss (a) some of the preliminary results from IEEY studies already realized; (b) outstanding problems of the equatorial electrojet to be focussed within the rest of the activities planned for the IEEY; (c) IEEY coordinated campaigns for 1993; (d) data coordination and archiving; (e) data exchange and coordinated analysis.

There was a consensus on the need for extending the IEEY activities beyond the originally scheduled March 1993 conclusion for the IEEY to continue until the end of 1993. [N.B. See Resolution No.9 on page 11.]

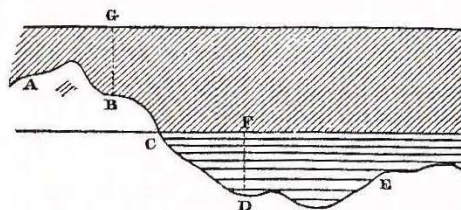
There were a few absences of speakers communicated at the eleventh hour which caused some reshuffling of the original programme but all who attended agreed that the workshop was a success.

Mangalathayil Ali Abdu
Aeronomy Division
Instituto Nacional de
Pesquisas Espaciais
São José dos Campos.

124 years ago:

Herschel, JFW: "Outlines of Astronomy" (tenth edition), page 187; London, Longmans Green and Company [1869].

(286.) Suppose that instead of air, the earth and ocean were covered with oil, and that human life could subsist under such circumstances. Let ABCDE be a continent, of which the portion ABC projects above the water, but is



covered by the oil, which also floats at an uniform depth on the whole ocean. Then if we would know the depth of any point D below the sea level, we let down a plummet from F. But, if we would know the height of B above the same level, we have only to send up a float from B to the surface of the oil; and having done the same at C, a point at the sea level, the difference of the two float lines gives the height in question.

awards, the Executive Committee discussed the philosophy of the Long Service medals, established four years ago with the first four medallists being announced at the 1989 Assembly in Exeter. The Executive Committee reaffirmed that the purpose of the awards was to recognize openly the great contributions made to the IAGA scientific community by "unsung heroes", often working in observatories. Research scientists are not usually eligible because they have received their reward through publication and, at a personal and individual level, through the adrenalin boosts experienced during the analysis of data and the discovery of new knowledge. Voting for each candidate took place and two candidates received no opposing votes. The Executive Committee **noted** that three medallists had been announced at the General Assembly in 1991 and the Executive Committee **decided** it would be appropriate to make two awards at this Assembly. The Executive Committee **chose**

Walter Zander [Germany]

Jinping Zhou [China]

as this Assembly's medallists.

Christian G Sucksdorff [Finland] was proposed for Honorary Membership of IAGA and the Executive Committee **agreed** unanimously to recommend this award to the Conference of Delegates.

VI. Sponsorship of meetings by IAGA

ELAS: "Nature of the Deep Crust Electrical Conductivity" [Moscow, Russia; March 1994]. A request from the cochairmen for this meeting [L L Vanyan and Selwyn Sacks] had been received. The Executive Committee reviewed the proposed program and **granted** IAGA sponsorship for the meeting [see page 45 for details].

Dieter Bilitza, Chairman of the URSI/COSPAR Working Group of the International Reference Ionosphere [IRI] had made a request [dated June 28, 1993] for sponsorship of "Off-Median Phenomena and IRI" [Trieste, Italy; 19-22 October 1993] and "The High Latitudes in IRI" [Hamburg, Germany; 20-21 July 1994]. The Executive Committee **refused** this for the first meeting, on the ground that the request had been made too late to satisfy the requirements of sponsorship but **granted** sponsorship to the second meeting.

The Secretary General drew to the attention of the Executive Committee some problems of funding that are affecting the series of biennial Workshops on Electromagnetic Induction. These workshops, which are an excellent example of successful and productive specialist meetings, look for some support from the Union; in the past few years, the level of support has markedly diminished because of increasing numbers of conflicting claims on Union funds. The Secretary General has written to the Secretary General of the Union to suggest that it is short-sighted and ultimately counterproductive to decrease the funding of well-established workshops, such as the Electromagnetic Induction Workshops, in favour of groups

11th WORKSHOP ON
ELECTROMAGNETIC INDUCTION IN THE EARTH

Wellington [New Zealand]
26 August - 2 September 1992

The first time the biennial workshop has been held in the Southern hemisphere, nearly 120 participants (including 22 students) from 19 countries attended. Sessions included

- Distortion effects on MT data and their removal
- Novel laboratory studies of relevance to EM induction
- Induction studies in geothermal and volcanic regions
- Tectonic interpretation of regional conductivity models
- New mathematical methods in modelling and inversion
- Contributions by EM studies to multidisciplinary geoscientific transects
- EM studies of global geodynamic processes
- New data-acquisition and data-processing techniques

Some 120 papers were presented, including 6 reviews of advances since the last Workshop and 6 invited presentations. Panel discussions were held and ensured lively debate on topical issues concerning the induction community (eg the interpretation of lower crustal anomalies in terms of carbon or fluids).

An excursion lasting from Friday afternoon to Sunday evening took 80 of the participants to the central volcanic region of the North Island. This region contains most of New Zealand's geothermal fields and includes the spectacular volcanoes of Tongariro National Park.

A preWorkshop workshop was held during which 25 participants presented their own interpretations of previously-circulated MT data sets. This illustrated for the first time both the variety of interpretation techniques used by workers from around the world and the huge advances made in interpretation of MT data in recent years.

The 12th Workshop is planned for 8-14 August 1994 in Brest [France] - see page 46 - and will be preceded by a MT Data Interpretation Workshop in Cambridge [UK] on 5-6 August 1994.

Malcolm Ingham
Victoria University of
Wellington
New Zealand.

had been held at the behest of the President to provide a forum for discussion among representatives of institutions responsible for running observatories, and other interested parties, of the problems in obtaining resources needed to maintain and to extend the global magnetic observatory network. The meeting had begun with brief descriptions of Program Outreach, of a Task Group reporting to the US Geodynamics Committee, and of recent developments in the INTERMAGNET project. The need to demonstrate efficiency and cost-effectiveness of observatory operation through the use of modern equipment and modern methods of data dissemination was stressed and led to proposals to establish observatories that would serve the needs of more than one area of geophysics and of other sciences. It was noted that scientists should help the case for supporting observatory work by full and proper acknowledgement of the origin of the data upon which their research was based. Arguments on scientific need carry limited weight in some countries and it was suggested that the profile of observatory work should be raised by drawing attention to the commercial value of observatory data and data derivatives [such as the IGRF and geomagnetic activity indices]. In receiving the report, Executive Committee **welcomed** the news that Kerridge had offered to prepare a glossy, coloured, brochure to describe magnetic observatory work in a format that might appeal to funding agencies and, subject to availability of limited funds, this brochure would be published by IAGA.

The Secretary General reviewed the relationship between IAGA and the International Service of Geomagnetic Indices which is operated for the ICSU Federation of Astronomical and Geophysical Data Analysis Services [FAGS] by Michel Menvielle and Annick Berthelie. Production of the Series 32 Bulletins has been commendably maintained at a high level of efficiency and the Secretary General noted that the Bulletins would henceforth contain a disc file with the data. This is a notable improvement in quality of service to the IAGA community. There were some difficulties of an administrative nature in the issuing of invoices from the IAGA Secretariat; these difficulties are sure to be resolved in the near future without requiring the intervention of the Executive Committee. The Union has been asked by the President of FAGS [E Tandberg-Hanssen] to appoint a fresh Directing Board for ISGI. The Executive Committee **nominated** the following for this board, subject to acceptance by the individuals: C Barton [Australia; Chairman], T Araki [Japan], R Coles [Canada], M Menvielle [France; Director, ISGI]. The Executive Committee confidently looks forward to a further period of fruitful cooperation between IAGA and FAGS.

IX. Miscellaneous Items

R Macnab had written to the Secretary General to suggest that poster presentations in absentia be allowed at an Assembly; the current policy at IAGA Assemblies is "no author present,

MAGNETIC ANOMALY MAP OF THE WORLD
(Scale one to ten million)

N.M. Solovieva, Editor
All-Union Geological Institute (VSEGEI)
St. Petersburg, Russia

A new map portraying the distribution of magnetic anomalies over most of the Earth's surface is in its final stages of preparation at the All-Union Geological Institute (VSEGEI) in St. Petersburg, Russia. Developed with the participation of Chinese specialists, the map draws together data from 173 sources. It is constructed on a pseudocylindrical projection covering 28 separate sheets. Data are shown in contour form at intervals of 100–200 nT over continental and certain oceanic areas. Over the remaining oceanic regions where observations are sparse, data are shown in profile form.

Mapped anomalies were adjusted by varying the levels of selected reference profiles so that their integrals, i.e. the sums of their positive and negative anomaly values, equalled zero. The extents of these profiles were determined on the basis of a spectral expansion developed by L. Oldridge. This technique yielded a consistency of presentation over the whole map area, while preserving the spectrum of magnetic features due to crustal sources.

The margin of the map will include a schema that outlines the origins and distributions of the constituent data sets, as well as a brief description of each set.

By presenting a unified portrayal of the world's magnetic field, the map will highlight the global characteristics of magnetic anomalies and their relationships to major structural features of the continents and oceans. The breadth of the presentation coupled with its level of detail will offer a foundation for regional tectonic analyses bearing on intercontinental and interoceanic correlations. The map will also serve as a valuable resource for comparisons and investigations of large scale geodynamic phenomena such as sea floor spreading and plate subduction & collision. Additionally, it will be useful in the development of different derivative maps of a geological nature, necessary for the compilation of prognostic-metallogenetic maps over large regions.

Queries relating to the map project and to its production schedule, as well as advance requests for copies of the map, may be addressed to Dr. N.M. Solovieva or Academician A.D. Scheglov at VSEGEI, Sredny Prospect 74, St. Petersburg 199164, Russia (Fax: 812-213-5738). The map's purchase price has not yet been established, but will be announced in due course.

X. Any other competent business

The Secretary General had received a letter from S O Ogunade, in which he protested at the registration fee of \$400 that was being charged for registration at the Assembly. He suggests that the Executive Committee, in addition to its duty to uphold the ICSU "charter of facilitating the participation of all scientists in scientific meetings regardless of creed or race" should also add "economic status" to the rubric. For information, the Secretary General read to the Executive Committee the text of Statute 5 of ICSU:

"5. In pursuing its objectives in respect of the rights and responsibilities of scientists, ICSU, as an international non-governmental body, shall observe and actively uphold the principle of the universality of science. This principle entails freedom of association, expression, information, communication and movement in connection with international scientific activities, without any discrimination on the basis of such factors as citizenship, religion, creed, political stance, ethnic origin, race, colour, language, age or sex. ICSU shall recognize and respect the independence of the internal science policies of its National Members. ICSU shall not permit any of its activities to be disturbed by statements or actions of a political nature."

The Executive Committee **confirmed** that this was the basis of IAGA's operations in holding Assemblies and **agreed**, without a vote, that to require a Local Organizing Committee to establish a scale of registration fees that was adjusted according to national origin would be against the spirit and the letter of the ICSU Statute 5 governing equal treatment of all bona fide scientists. Fischer reminded the Executive Committee that in setting the location of an Assembly, the Executive Committee seeks a willing host and the Local Organizing Committee's business is to organize not to decide or to influence policy toward Developing Countries. Eltayeb strongly felt that IAGA can always find ways and means to help scientists in difficult situations.

The Secretary General reported that complaints about polypresentations had recurred and agreed to list the statistics of papers and authors in the next issue of IAGA News [see page 1].

Finally, the President thanked the Local Organizing Committee for providing most satisfactory facilities for the Executive Committee to carry out its business effectively. At this Assembly, the Local Organizing Committee had functioned so well, without the need for interference from the President or from the Secretary General, that both President and Secretary General had actually been able to attend a number of the scientific sessions!

A correction on the annual Declination values at the Teoloyucan Magnetic Observatory

Hernández, E., and Orozco, A.

Abstract

A correction is reported in the annual Declination value for 1922 published in the annual Teoloyucan yearbooks. The correct value is $9^{\circ} 11' 12''$ instead the reported $8^{\circ} 11' 12''$.

For this reasons we are now publishing here a table of corrected values for the magnetic declination (table 1) using the Teoloyucan Yearbooks. We ask the people who are using this Teoloyucan Yearbooks to change the corresponding values.

Note the jump in 1978. This change was due to the change of the Teoloyucan Magnetic Observatory to its current location; anyway the changes on D at the new location follow the same trend as before.

Please feel free to write to the Teoloyucan Magnetic Observatory for any consult on this matter.

REFERENCE:

SANDOVAL, O.R. 1950. Elementos magnéticos en la República Mexicana, Servicio Geomagnético, Instituto de Geofísica, U.N.A.M. (México) pp 76.

COMPUTATION OF AK EQUIVALENT AMPLITUDE

A. BERTHELIER and M. MENVIELLE

International Service of Geomagnetic Indices
 C.R.P.E./C.N.R.S., 4 Avenue de Neptune
 F-94107 SAINT MAUR DES FOSSES CEDEX - FRANCE

In order to estimate the average level of the activity during a UT day at a given observatory, it is of common use to calculate either the sum ΣK of the eight local K indices of the day, or the daily average AK of the eight equivalent amplitudes aK.

K indices, aK equivalent amplitudes

Let us first remind that a K index is the code corresponding to the class in which ranks the range of the observed variations during a given 3-hour UT interval, after eliminating the diurnal regular variation. The limit of the classes are defined according to a quasi logarithmic scale, which means that the K codes behave more or less as the logarithm of the observed ranges, and that accordingly the sum ΣK behaves as the product of the observed ranges.

On the other side, the daily average AK of equivalent amplitudes aK depends linearly on the activity, and therefore can be considered as a better estimate of the average activity of the day.

The K indices are converted back into aK equivalent amplitudes through conversion tables. The existence of different conversion tables could give rise to confusion. The aim of this short note is to indicate which conversion table gives the aK values that are the closest to the measured range, and consequently to recommend its using.

Conversion tables

Two conversion tables have been introduced :

(1) The first table consists in the amplitudes of the middle of each K class, at a given station. We will call it "mca-table" (for middle class amplitudes table). The values for a K=9 lower limit $L9=500\text{nT}$ are given in Table 1. At stations having a different value of L9 they are calculated by multiplying these values by $L9/500$.

This table has been first proposed by Bartels (*IATME Bull. 12e*, 1951), and was used in particular by Mayaud for building the planetary indices *aa* and *am* (see Mayaud in *AGU Monograph 22*, 1980, and references therein). It must be stressed that the use of the mid class amplitudes has been proven to give a good statistical estimate of the ranges, provided that the distribution of magnetic activity be log normal, as discussed by Mayaud (1980).

(2) The other commonly used table has been introduced slightly later by Bartels and Veldkamp (*J. Geophys. Res.*, 59, 1954). Its values, which are given in Table 1, are the weights for converting K indices into aK, for a K scale built with $L9=250\text{nT}$. This means that at stations having a different value of L9, equivalent weights will be obtained by multiplying these values by $L9/250$, a point which is sometimes forgotten at present. This table, which also appears in the introduction of the *IAGA Bulletins 32* series until 1987, is hereafter called "wak-table" (for weighting aK table).

MAGNETIC FIELD MODELS

1995 (6th) Revision of the International Geomagnetic Reference Field [IGRF]

Working Group V-8 invites submission of spherical harmonic models as candidates for the 1995 revision of the IGRF. There will be an IGRF model for epoch 1995.0 which will be a provisional model to be replaced by a definitive model at some later time; a secular variation model to cover the interval 1995.0 to 2000.0; and a definitive model [the DGRF] for epoch 1990.0.

It is assumed that, as in the past, main field models will be truncated at degree and order 10, with secular change models truncated at degree and order 8. Coefficients of candidate models should be submitted to Working Group V-8 before 31 December 1994. Please address correspondence on this matter to the Working Group chairman:

C Barton
Australian Geological Survey Organisation
GPO Box 378
Canberra
AUSTRALIA ACT 2601

Vox: +61 6 249 9111
Fax: +61 6 249 9986
email: cbarton@bmr.gov.au

DGRF Models for 1940-1900?

A subset of Working Group V-8 has been set up to investigate the possibility of producing DGRF models for 5-yearly intervals from 1940 back to 1900. It is planned to make a recommendation at the 1995 Assembly on the feasibility of doing this. The subset consists of

D R Barraclough [Chairman]	V P Golovkov	A Jackson
R A Langel	N W Peddie	J M Quinn

DGRF1985 and IGRF1990

IAGA Bulletin No.54, Tables and Maps of the DGRF1985 and IGRF1990 [R Baldwin and R Langel] has recently been published. The Bulletin contains a description of the International Geomagnetic Reference Field, with contour maps and tables of 5degree square grid values of the field elements and their annual changes. Copies are available from the International Service of Geomagnetic Indices [ISGI / SIIG] in Paris:

Annick Berthelie
Bureau des Publications SIIG
CRPE, 4 Avenue de Neptune
94107 Saint-Maur-des-Fossés Cédex
FRANCE

For telephone, telefax, telex, INTERNET, SPAN and EARN numbers see page 41.

Given the fact that the **mca**-table is for $L9=500\text{nT}$ and the **wak**-table for $L9=250\text{nT}$, one can see on Table 1 that the two tables are equivalent for middle activity values ($K=2$ to 6). However they differ both at lower activity ($K=0, 1$), where the **wak**-table gives values underestimated as compared to the **mca**-table, and at higher activity ($K=7, 8, 9$) where it gives overestimated values.

We have taken the opportunity of the new facility of deriving K indices by computer for comparing results obtained using these two tables.

A Numerical Test

We have used a data set formed by a one year sample of minute values of horizontal magnetic components recorded at Crozet observatory. We used the FMI algorithm for computing K indices. For each 3-hour interval rK is the range of perturbations from which K index is derived. We then used the **mca**-table and the **wak**-table to obtain the two "equivalent amplitude" values : $a1K$ and $a2K$ respectively (adjusted for $L9=500\text{nT}$ in both cases). The corresponding daily averages are noted RK , $A1K$ and $A2K$.

For comparing AK and RK values we have built dispersion graphs on 28 steps, following the limits of the 3Km classes (Menvielle and Berthelier, *Rev. Geophys.*, 30, 1992). Results are shown for $A1K$ and $A2K$ with respect to RK on Figure 1 and 2 respectively. In the case of $A1K/RK$ the maxima follow the diagonal, which clearly indicates that the **mca**-table gives a good approximation of the range values. In the case of $A2K/RK$ one can see (Figure 2) that $A2K$ remains lower than RK for the lowest range values : this corresponds to the too low values of aK given by the **wak**-table for $K=0$ and $K=1$. We cannot discuss here the tendency for the higher values because they are not sufficiently represented in our present sample.

CONCLUSIONS

These numerical results confirm that the aim of providing a good statistical estimate of the range of perturbations measured by K indices is well achieved by using the **mca**-table. Let us insist on the fact that this simply comes from the statistical properties of the activity, as discussed by Mayaud (1980).

In order to avoid confusion about the meaning of the AK values, it was decided during the last IAGA meeting in Buenos Aires (August 1993), that the IAGA Working Group V-5 on Geomagnetic Indices **strongly recommends the use of the mca-table for computing the AK values** circulated by the observatories through printed publications (data sheets and yearbooks) or numerical data files (in particular for use in electronic networks as INTERMAGNET, E-Mail, or other file transfer procedures). The **mca**-table is given above in this note in Table 1 for $L9=500\text{nT}$, with the rule that values must be multiplied by $L9/500$ when $L9$ is different from 500nT .

It must be checked by people using one of the four algorithms for computer derivation of K indices acknowledged by IAGA (Vienne, 1991) that the version they have has been updated to give the correct AK value. This has been done for the versions distributed by now by ISGI and by the Australian Geological Survey Organisation (*see address in the Note about K Computer Derivation, same issue*).

COMPUTER DERIVATION OF K-INDICES

Extract from the minutes of the meeting of the Working Group IAGA V-5 (Geophysical Indices), held during the XXth IUGG General Assembly, in Vienna, August 1991.

During the IAGA 6th Scientific Assembly hold in Exeter (1989) an ad-hoc committee was set up in order to organize the comparison of computer methods of K-index derivation (M. Menvielle, C. Sucksdorff and N. Papitashvili). This committee decided the following procedure :

- The computer K-methods should be tested using the magnetic data of a one year period from 12 observatories. The data were available on request at the Finnish Meteorological Institute (Helsinki, Finland). The test procedure is described in Menvielle (*Geophysical Transactions*, **36**, 313, 1991).
- The results will be presented and discussed during a special session at the XXth IUGG General Assembly (Vienna, 1991).

At the Vienna meeting seven teams have presented their results which were analysed by the ad-hoc committee. Following his suggestion, the IAGA Working Group V-5 (*Geophysical indices*) decided to acknowledge the following methods :

1. "USGS" : the method developed by the United States Geophysical Survey is described in Wilson (*J. Geomagn. Geoelectr.*, **39**, 97, 1985);
2. "AS" : the Adaptative Smoothing method is described in Jankowski et al. (*Annales Geophysicae*, **6**, 589, 1988) and in Novozynski et al. (*Geophys. J. Int.*, **104**, 85, 1991);
3. "FMI" : the method developed by the Finnish Meteorological Institute is described in Sucksdorff et al. (*Geophysical Transactions*, **36**, 344, 1991);
4. "LRNS" : the Linear-phase Robust Non-linear Smoothing method is described in Hattingh et al. (*Annales Geophysicae*, **6**, 611, 1988) and in Hattingh et al. (*Geophys. J. Int.*, **99**, 533, 1989);
5. "HS" : the Hand Scaling traditional derivation process remains the basic reference and a still accepted method, following the rules described in the "Atlas des Indices K" by Mayaud (*IAGA Bulletin n°21*, 113pp., 1967)

Thus, from now on, these five methods of derivation of K-indices are acknowledged by the International Association of Geomagnetism and Aeronomy.

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Thus, from now on, these five methods of derivation of K-indices are acknowledged by the International Association of Geomagnetism and Aeronomy.

Each observatory may use any of these methods, and must indicate on the K sheets and in headings of K files which method has been used, and the selected values for the adjustable parameters, if any.

In the case of observatories involved in the computation of K-derived planetary indices, it was decided that the agreement on the the selected method is required from the scientist in charge of their elaboration and dissemination (M. Menvielle for *aa* and *am*, *Km* and M. Siebert for *Kp*).

The ISGI Publication Office, located at C.R.P.E., 4 Avenue de Neptune, 94107 SAINT MAUR DES FOSSES CEDEX, is in charge of the circulation of the codes to be used for computer derivation of K indices. The codes are available on request as ASCII files on floppies at the PC standard, together with the directions for use (in particular input/output formats, and description of adjustable parameters, if any).

1990.0 MAGNETIC CHARTS FOR MEXICO

C Cañon, E Hernandez, H Nolasco and A Orozco

The magnetic charts for the Republic of Mexico for epoch 1990.0 have been printed and are ready for distribution to interested people. The set consists of three charts:

Magnetic declination
Horizontal component
Total intensity

Each chart also has the isoporic lines for annual change in the element. The charts are based on approximately 60 repeat stations distributed over all the territory of Mexico. The curves were traced using the Surfer program.

If interested in obtaining the set of charts, please send \$US30 [by cheque or money order payable in Mexico City to the order of "Instituto de Geofisica - UNAM"] and the charts will be sent to you by airmail.

For more information, or to order the charts, please contact

A Orozco/E Hernandez
Dept de Geomagnetismo
Instituto de Geofisica - UNAM
Cd Universitaria, Del Coyocán
Mexico DF 04510
MEXICO

MAGNETIC FIELD MODELS

1995 (6th) Revision of the International Geomagnetic Reference Field [IGRF]

Working Group V-8 invites submission of spherical harmonic models as candidates for the 1995 revision of the IGRF. There will be an IGRF model for epoch 1995.0 which will be a provisional model to be replaced by a definitive model at some later time; a secular variation model to cover the interval 1995.0 to 2000.0; and a definitive model [the DGRF] for epoch 1990.0.

It is assumed that, as in the past, main field models will be truncated at degree and order 10, with secular change models truncated at degree and order 8. Coefficients of candidate models should be submitted to Working Group V-8 before 31 December 1994. Please address correspondence on this matter to the Working Group chairman:

C Barton

Australian Geological Survey Organisation

GPO Box 378

Canberra

AUSTRALIA ACT 2601

Vox: +61 6 249 9111

Fax: +61 6 249 9986

email: cbarton@bmr.gov.au

DGRF Models for 1940-1900?

A subset of Working Group V-8 has been set up to investigate the possibility of producing DGRF models for 5-yearly intervals from 1940 back to 1900. It is planned to make a recommendation at the 1995 Assembly on the feasibility of doing this. The subset consists of

D R Barraclough [Chairman]

V P Golovkov

A Jackson

R A Langel

N W Peddie

J M Quinn

DGRF1985 and IGRF1990

IAGA Bulletin No.54, Tables and Maps of the DGRF1985 and IGRF1990 [R Baldwin and R Langel] has recently been published. The Bulletin contains a description of the International Geomagnetic Reference Field, with contour maps and tables of 5degree square grid values of the field elements and their annual changes. Copies are available from the International Service of Geomagnetic Indices [ISGI / SIIG] in Paris:

Annick Berthelier

Bureau des Publications SIIG

CRPE, 4 Avenue de Neptune

94107 Saint-Maur-des-Fossés Cédex

FRANCE

For telephone, telefax, telex, INTERNET, SPAN and EARN numbers see page 41.

TRAINING TO PROMOTE IAGA SCIENCES IN DEVELOPING COUNTRIES

C Agodi Onwumechili
69 Lansdowne Drive
Hackney, London E8 3EP
UK

The Interdivisional Commission for Developing Countries [ICDC: Chairman C A Onwumechili) has held several workshops for young scientists and technicians to promote research and data collection in developing countries in the IAGA sciences. The objective is to build up a critical mass of researchers, observers and technicians in the developing countries that can participate more effectively in the solution of scientific and developmental problems in the IAGA sciences. The workshops of ICDC have been successful but constitute only a drop in the ocean. There is need to train many more young scientists, observers and technicians. Financial problems limit the number of training workshops the ICDC can hold.

My discussions with groups and individuals at the Scientific Assembly in Buenos Aires have led me to explore the following additional approach. A number of developed as well as developing countries conduct training programmes relevant to IAGA sciences for researchers, observers and technicians. The programmes are institutional, national or regional in scope and regular or occasional in occurrence. It will be a great help if some of the organizers of these training programmes can arrange for the free or heavily subsidized participation of one or a few trainees from developing countries.

I hereby request organizers who can help to contact me. I am in a position to link them with trainees who can benefit from the training and contribute to IAGA sciences afterwards. Even if they like to identify the trainees through their own contacts, I should still like to know of their generous help. This appeal is to both developed and developing countries.

A correction on the annual Declination values at the Teoloyucan Magnetic Observatory

Hernández, E., and Orozco, A.

Abstract

A correction is reported in the annual Declination value for 1922 published in the annual Teoloyucan yearbooks. The correct value is $9^{\circ} 11' 12''$ instead the reported $8^{\circ} 11' 12''$.

For this reasons we are now publishing here a table of corrected values for the magnetic declination (table 1) using the Teoloyucan Yearbooks. We ask the people who are using this Teoloyucan Yearbooks to change the corresponding values.

Note the jump in 1978. This change was due to the change of the Teoloyucan Magnetic Observatory to its current location; anyway the changes on D at the new location follow the same trend as before.

Please feel free to write to the Teoloyucan Magnetic Observatory for any consult on this matter.

REFERENCE:

SANDOVAL, O.R. 1950. Elementos magnéticos en la República Mexicana, Servicio Geomagnético, Instituto de Geofísica, U.N.A.M. (México) pp 76.

ANNUAL MEAN VALUES OF MAGNETIC DECLINATION AT THE TEOLOYUCAN MAGNETIC OBSERVATORY.				
YEAR	DECLINATION (east)		YEAR	DECLINATION (east)
1914	8° 49' 36"		1954	9° 14' 36"
1915	8° 51' 00"		1955	9° 10' 42"
1916	8° 59' 42"		1956	9° 10' 36"
1917	9° 05' 00"		1957	9° 07' 00"
1918	9° 06' 36"		1958	9° 06' 06"
1919	9° 07' 42"		1959	9° 05' 12"
1920	9° 09' 36"		1960	9° 02' 30"
1921	9° 11' 54"		1961	8° 59' 30"
1922	9° 11' 12"		1962	8° 53' 30"
1923	9° 13' 24"		1963	8° 45' 48"
1924	9° 14' 00"		1964	8° 47' 30"
1925	9° 14' 42"		1965	8° 43' 06"
1926	9° 18' 12"		1966	8° 37' 36"
1927	9° 19' 54"		1967	8° 32' 24"
1928	9° 20' 48"		1968	8° 30' 00"
1929	9° 23' 30"		1969	8° 24' 54"
1930	9° 25' 30"		1970	8° 18' 36"
1931	9° 29' 12"		1971	8° 13' 12"
1932	9° 30' 36"		1972	8° 09' 36"
1933	9° 33' 48"		1973	8° 07' 12"
1934	9° 36' 06"		1974	8° 00' 00"
1935	9° 37' 30"		1975	7° 55' 24"
1936	9° 39' 00"		1976	7° 47' 30"
1937	9° 39' 24"		1977	7° 39' 06"
1938	9° 40' 00"		1978	7° 33' 43" *
1939	9° 40' 42"		1979	8° 04' 34" *
1940	9° 41' 48"		1980	7° 43' 13" *
1941	9° 40' 54"		1981	7° 40' 31" *
1942	9° 41' 30"		1982	7° 31' 26" *
1943	9° 39' 30"		1983	7° 23' 47" *
1944	9° 38' 30"		1984	7° 23' 03" *
1945	9° 39' 06"		1985	7° 18' 48" *
1946	9° 37' 00"		1986	7° 21' 25" *
1947	9° 37' 12"		1987	7° 23' 08" *
1948	9° 28' 24"		1988	7° 20' 03" *
1949	9° 25' 00"		1989	7° 16' 38" *
1950	9° 21' 36"		1990	7° 14' 02" *
1951	9° 18' 42"		1991	7° 11' 26" *
1952	9° 15' 42"		1992	7° 07' 00" *
1953	9° 14' 36"		1993	7° 06' 05" *
1954	9° 14' 36"			

* Annual mean from absolute values

MAGNETIC ANOMALY MAP OF THE WORLD
(Scale one to ten million)

N.M. Solovieva, Editor
All-Union Geological Institute (VSEGEI)
St. Petersburg, Russia

A new map portraying the distribution of magnetic anomalies over most of the Earth's surface is in its final stages of preparation at the All-Union Geological Institute (VSEGEI) in St. Petersburg, Russia. Developed with the participation of Chinese specialists, the map draws together data from 173 sources. It is constructed on a pseudocylindrical projection covering 28 separate sheets. Data are shown in contour form at intervals of 100–200 nT over continental and certain oceanic areas. Over the remaining oceanic regions where observations are sparse, data are shown in profile form.

Mapped anomalies were adjusted by varying the levels of selected reference profiles so that their integrals, i.e. the sums of their positive and negative anomaly values, equalled zero. The extents of these profiles were determined on the basis of a spectral expansion developed by L. Oldridge. This technique yielded a consistency of presentation over the whole map area, while preserving the spectrum of magnetic features due to crustal sources.

The margin of the map will include a schema that outlines the origins and distributions of the constituent data sets, as well as a brief description of each set.

By presenting a unified portrayal of the world's magnetic field, the map will highlight the global characteristics of magnetic anomalies and their relationships to major structural features of the continents and oceans. The breadth of the presentation coupled with its level of detail will offer a foundation for regional tectonic analyses bearing on intercontinental and interoceanic correlations. The map will also serve as a valuable resource for comparisons and investigations of large scale geodynamic phenomena such as sea floor spreading and plate subduction & collision. Additionally, it will be useful in the development of different derivative maps of a geological nature, necessary for the compilation of prognostic-metallogenic maps over large regions.

Queries relating to the map project and to its production schedule, as well as advance requests for copies of the map, may be addressed to Dr. N.M. Solovieva or Academician A.D. Scheglov at VSEGEI, Sredny Prospect 74, St. Petersburg 199164, Russia (Fax: 812-213-5738). The map's purchase price has not yet been established, but will be announced in due course.

Progress report

**COMPILATION OF MAGNETIC DATA IN THE ARCTIC AND
NORTH ATLANTIC OCEANS**

Jacob Verhoef, Ron Macnab, and Members of the Project Team
Atlantic Geoscience Centre
Geological Survey of Canada
Dartmouth Nova Scotia
CANADA

Project Associates: Walter Roest, Jafar Arkani-Hamed, Skip Kovacs and Shiri Srivastava.

The eighth report on the status of a project to compile magnetic observations from the Arctic & North Atlantic Oceans and adjacent land areas. The report is usually issued on a semiannual basis but the edition scheduled for November 1992 did not appear; the latest report was published in May 1993.

Begun in late 1988 at the Atlantic Geoscience Centre (a division of the Geological Survey of Canada), the project has been acquiring and merging data sets from numerous organizations in order to create a digital data base of coherent magnetic observations. The data base will be used in quantitative tectonic interpretations and for the automated production of accurate maps. The project is scheduled for completion by the middle of 1994 at which time three sets of products will be released to the geoscientific community:

Data Grids defining the regional magnetic fields; where necessary, data will be filtered to protect contributors' proprietary interests.

Maps portraying the regional magnetic fields, compatible with General Bathymetric Charts of the Oceans: scale 1:6 million north of 64 degrees and 1:10 million between 35 and 80 degrees.

Project Report will be a comprehensive document describing the assembled datasets and their sources and explaining procedures for their handling and processing.

The May 1993 progress report includes three coloured maps showing the magnetic anomaly, the regional bathymetry and topography, and the major tectonic features. In addition there are thirteen pages of general background information, and news of activities in the Project.

11th WORKSHOP ON
ELECTROMAGNETIC INDUCTION IN THE EARTH

Wellington [New Zealand]
26 August - 2 September 1992

The first time the biennial workshop has been held in the Southern hemisphere, nearly 120 participants (including 22 students) from 19 countries attended. Sessions included

- Distortion effects on MT data and their removal
- Novel laboratory studies of relevance to EM induction
- Induction studies in geothermal and volcanic regions
- Tectonic interpretation of regional conductivity models
- New mathematical methods in modelling and inversion
- Contributions by EM studies to multidisciplinary geoscientific transects
- EM studies of global geodynamic processes
- New data-acquisition and data-processing techniques

Some 120 papers were presented, including 6 reviews of advances since the last Workshop and 6 invited presentations. Panel discussions were held and ensured lively debate on topical issues concerning the induction community (eg the interpretation of lower crustal anomalies in terms of carbon or fluids).

An excursion lasting from Friday afternoon to Sunday evening took 80 of the participants to the central volcanic region of the North Island. This region contains most of New Zealand's geothermal fields and includes the spectacular volcanoes of Tongariro National Park.

A preWorkshop workshop was held during which 25 participants presented their own interpretations of previously-circulated MT data sets. This illustrated for the first time both the variety of interpretation techniques used by workers from around the world and the huge advances made in interpretation of MT data in recent years.

The 12th Workshop is planned for 8-14 August 1994 in Brest [France] - see page 46 - and will be preceeded by a MT Data Interpretation Workshop in Cambridge [UK] on 5-6 August 1994.

Malcolm Ingham
Victoria University of
Wellington
New Zealand.

**19TH ANNUAL EUROPEAN MEETING ON
ATMOSPHERIC STUDIES BY OPTICAL METHODS**

1992 August 10-14
Kiruna [Sweden]

The conference contained 64 oral papers, including 23 invited papers, and 52 poster contributions. In the Opening Session Lennart Nordh (Stockholm Observatory) described ODIN, a planned Swedish spectroscopic satellite to be launched in 1996. The first topical session was devoted to Stratospheric Ozone (experiments, laboratory studies and modelling). David Fahey (NOAA, Boulder) gave an invited talk on the NASA airborne stratospheric expedition-II, also with the intention to overview what is true and not true in the intense ozone debate. Session II on Mesospheric and Thermospheric emissions and radiative transfer (EUV to sub-millimetre) was started with an invited talk by Richard Wayne (University of Oxford) on recent laboratory studies on the excitation of molecular emissions. The smallest session was that on Scattered Radiation, containing two invited talks by Randy Gladstone (University of California, Berkeley) and Georg Witt (MISU, Stockholm). Reports on auroral work were spread to two sessions, Session IV: Nightside, Dayside and Polar Cap Aurora (substorms, dynamics, ionosphere, currents, convection, coordinated satellite and ground-based auroral imaging observations, mapping), and to Session VI: Auroral Spectroscopy and Auroral Tomography. Three invited talks were given on polar cap and dayside aurora by Alv Egeland (University of Oslo), Yasha Feldstein (Izmiran, Moscow) and Gulamabas Sivjee (Embry Riddle Aeronautical University, Daytona Beach). John Jasperse (Phillips Laboratory, Hanscom) presented the combined theory for the electron-proton-hydrogen atom aurora. Neutral wind and convection was discussed separately in Session V, where new results from WINDII - the wind imaging interferometer on the UARS spacecraft were presented by Gordon Shepherd (York University, Toronto).

A special session was devoted to Artificial Optical Excitation and Active Remote Sensing, introduced by an invited lecture by Paul Bernhardt (Naval Research Laboratory, Washington). A considerable interest was given to the last topical session on Instrumentation, Facilities, New Techniques and Opportunities gathering altogether 27 contributions. Several new satellite programs were described, e.g. CLUSTER and TIMED. The optical meetings welcome technical papers from the industry and this time a contribution was given by Bruce Johnson (Litton Electron Devices, Tempe).

The scientific program ended with a summary session in which Alv Egeland gave his view on auroral research towards the year 2000. The whole conference ended with an animated open debate, particularly on the ozone issue in which Kjell Henriksen (University of Tromsø) played a central role.

Ake Steen
Swedish Institute
of Space Physics
Kiruna SWEDEN

IEEY DATA ORGANIZATION AND ANALYSIS

São José dos Campos, SP [Brazil]

19-23 October 1992

Many active leading scientists and groups in IEEY studies were able to meet and discuss (a) some of the preliminary results from IEEY studies already realized; (b) outstanding problems of the equatorial electrojet to be focussed within the rest of the activities planned for the IEEY; (c) IEEY coordinated campaigns for 1993; (d) data coordination and archiving; (e) data exchange and coordinated analysis.

There was a consensus on the need for extending the IEEY activities beyond the originally scheduled March 1993 conclusion for the IEEY to continue until the end of 1993. [N.B. See Resolution No.9 on page 11.]

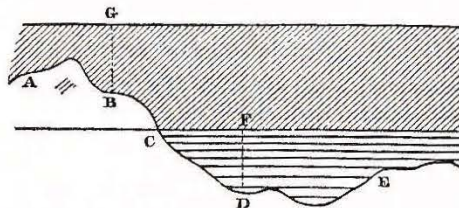
There were a few absences of speakers communicated at the eleventh hour which caused some reshuffling of the original programme but all who attended agreed that the workshop was a success.

Mangalathayil Ali Abdu
Aeronomy Division
Instituto Nacional de
Pesquisas Espaciais
São José dos Campos.

124 years ago:

Herschel, JFW: "Outlines of Astronomy" (tenth edition), page 187; London, Longmans Green and Company [1869].

(286.) Suppose that instead of air, the earth and ocean were covered with oil, and that human life could subsist under such circumstances. Let ABCDE be a continent, of which the portion ABC projects above the water, but is



covered by the oil, which also floats at an uniform depth on the whole ocean. Then if we would know the depth of any point D below the sea level, we let down a plummet from F. But, if we would know the height of B above the same level, we have only to send up a float from B to the surface of the oil; and having done the same at C, a point at the sea level, the difference of the two float lines gives the height in question.

Late notice:

Working Group V-4

has published "**A Catalog of National Magnetic Surveys and Charts**", compiled by L R Newitt [Geophysics Division, Geological Survey of Canada, 1 Observatory Crescent, Ottawa, Ontario, Canada K1A 0Y3]. It is listed as Geological Survey of Canada Open File Report No.2751, and contains contact address, summary of survey data available, charts, mathematical models, references, for observatories from Antarctica to Zimbabwe.

This is the updated and expanded catalogue begun, and published in draft, by Neville Skinner in 1985.

Thoroughly recommended for authoritative reference information and copies of it can be obtained by writing to Larry Newitt at the address given.

**IAGA's Permanent Service on Comparisons of Magnetic Standards
Offer their Spare QHM's to Observatories**

Since the establishment of the IAGA permanent service on Comparisons of Magnetic Services at the Edinburgh meeting of IATME in 1936, the Danish observatories Rude Skov and Brorfelde (since 1981) have housed instruments owned by IAGA. The main function of the service has been to send calibrated instruments (mainly QHM's) to observatories requesting, to make comparisons with their own instruments.

The demand for this service has decreased over recent years, with no requests for QHM's received in the past 5 years. It is proposed to make the stock of (approximately 30) QHM's available to observatories in need of them in sets of two. The instruments may be used for fieldwork as well as for standard observatory measurements, and are suitable for observations over a wide range of values of the geomagnetic field.

The instruments will be supplied free of charge if no changes to the instruments constants are needed; where changes have to be made to suit a particular observatory the charge will be US\$700 per instrument.

Requests for the QHM's should be addressed to :

The Danish Meteorological Institute
Solar-Terrestrial Physics Section
Lyngbyvej 100
DK-2100 Copenhagen
DENMARK

**Peng Feng-Lin:
An apology.**

By one of those unfortunately common but nevertheless inexcusable inversions of images in the visual cortex of your Secretary-General, the name Peng Feng-Lin was printed throughout IAGA Bulletin No.53 as Peng Leng-Fin. I understand that there is no such word as "Fin" in Chinese which is a saving grace but I ask all to take note of the correct spelling of Peng Feng-Lin's name.

Working Groups V-8 and V-4

Working Group V-4 [Magnetic Surveys and Charts] decided at the 1993 Assembly that its main functions had been accomplished and that there was no longer a need for it to continue as a separate Working Group. The members of the Working Group and its remaining functions are to be absorbed into Working Group V-8 where a considerable overlap of interests exists. The principal responsibilities moving with V-4 into V-8 are

Maintenance of a catalogue of magnetic field surveys, models and charts [L Newitt, Canada]

Supervision of IAGA standards for reporting and classifying magnetic repeat station schemes [C Barton, Australia]

Publication of an IAGA guide for conducting magnetic repeat station surveys [L Newitt, C Barton, D Gilbert and J Bitterly]

As a consequence of the expanded rôle that Working Group V-8 now undertakes, its name has been changed to

Analysis of the global and regional geomagnetic field and its secular variation

Working Group V-9

The magnetic anomalies working group of Division V produces an annual newsletter which is available to anyone who is interested in acquisition, processing or interpretation of magnetic anomaly data. The newsletter hopes to achieve a balanced coverage of all geographic regions and of magnetic surveys at all scales from satellite magnetometry to prospect-scale aeromagnetics and ground magnetics.

Any news items concerning recent or upcoming magnetic surveys, conferences, brief technical notes, or opinions about the way forward, will be gratefully received by the Editor. Those who wish to receive copies of the newsletter should also write to the Editor:

David Clark
CSIRO Division of Exploration & Mining
PO Box 136, North Ryde
NSW 2113
AUSTRALIA

IAU Working group on Adverse Environmental Impacts on Astronomy

The Union has nominated Michael Gadsden to membership of this Working Group. Light pollution of the night sky has seriously affected ground-level airglow and auroral optical observations. Now we have space debris scattering sunlight and threats of advertising billboards in orbit to contend with. We have perforce accepted Man's chemical and radionuclide contamination of the upper atmosphere. This Working Group is another attempt to try to get restraint accepted as a worthwhile object.

***REFERENCE IAGA BULLETINS FOR GEOMAGNETIC DATA are published
by the INTERNATIONAL SERVICE of GEOMAGNETIC INDICES***

IAGA Bulletin n°32 - Geomagnetic Data - One volume every year

- now covers 18 years : from 1970 to 1987
- contains definitive values of geomagnetic data prepared by the ISGI collaborating Institutes for the current year:
 - IAGA Indices : aa, am (Km), Kp (ap), Dst, AE (since 1981)
 - Rapid Variations : ssc, sfe
- graphs, average values since the inception of each series, list of observatories, and explanatory text are included
- data files together with a software for visualizing the tables are on a PC diskette inserted in each Bulletin (since 1981).

IAGA Bulletin n°40 - Dst 1957-1986

- contains an homogeneous series of the definitive hourly values of Dst, prepared by M. Sugiura and T. Kamei
- graphs, average values, derivation scheme and relevant references are included
- yearly data files are provided on PC diskettes inserted in each Bulletin.

IAGA Bulletin n°54 - DGRF 1985-IGRF 1990

- contains tables and maps of DGRF 1985 and IGRF 1990 prepared by R.T. Baldwin and R. Langel
- ASCII files of DGRF and IGRF coefficients and source of a FORTRAN program kindly provided by R.T. Baldwin for computing the field elements are provided on a PC diskette inserted in each Bulletin.

Mail Orders to :

Bureau des Publications SIIG - ISGI Publications Office

CRPE, 4 Avenue de Neptune - 94107 Saint-Maur-des-Fossés Cédex (France)

Téléphone : 33 (1) 45 11 42 40 - Télex : 264 498 - Télécopie : 33 (1) 48 89 44 33

Electronic Mail : INTERNET : aberthel@ st-maur. cnet.fr

SPAN : "CRPEIS :: ABERTHELIER" - EARN :: "ABERTHEL @ FRCRPE51.BITNET"

Prices are as follows (valid 1993 through 1994) :

IAGA Bulletin n°54 : one issue (diskette included)	300 FF (about 50 \$)
IAGA Bulletin n°40 : one issue (diskette included)	200 FF (about 35 \$)
IAGA Bulletin n°32 : 1970 to 1980 : each issue	50 FF (about 8 \$)
package 1970-1980 (11 Bull.)	400 FF (about 70 \$)
1981 to 1987 : each issue (diskettes included)	100 FF (about 16 \$)
package 1981-1987 (7 Bull., diskettes included)	500 FF (about 85 \$)
Diskettes alone : for former subscribers only, each	50 FF (about 8 \$)
Other former IAGA Publications from our remaining stock are FREE (list on request)	
For all orders postage expenses are EXTRA.	

VERSIM Newsletter
IAGA/URSI Joint Working Group on
Remote Sensing of the Ionosphere and Magnetosphere

At the 1991 IAGA General Assembly in Vienna, the VERSIM-sponsored half-day symposium on *Wave-induced particle precipitation* was successful, with 17 papers presented. A full report of the symposium appeared in VERSIM Newsletter No. 3. The VERSIM business meeting held in Vienna is also reported in the same Newsletter. The change in name of the working group was confirmed.

Three newsletters have been distributed since the Vienna meeting. The mailing list now stands at 102 scientists from 22 countries. Interest in the VERSIM field seems to be growing, particularly with regard to the extension of receiver networks to study lightning-induced electron precipitation, and also the detailed studies of magnetospheric VLF/ELF wave generation and propagation in the high latitude regions through the use of AGOs (Automatic Geophysical Observatories) in Antarctica.

Drs A J Smith (UK) and U S Inan (USA) continued to serve as co-chairmen of the working group, on behalf of IAGA and URSI respectively.

To be put on the mailing list for the VERSIM Newsletter, please contact:

A J Smith
British Antarctic Survey
High Cross
Madingley Road
Cambridge CB3 0ET
UK

International Commission for Earth Sciences in Africa
[ICESA]

Professor Ebun Adefunmilayo Oni, the Vice Chairman and Vice President of ICESA, writes to say that Newsletter No.2 is now available by writing to her at

Department of Physics
University of Ibadan
Ibadan
NIGERIA

The Newsletter is in English and French, with each contribution printed in both languages, and contains a number of articles and lists of great interest to all in the IAGA community. Professor Oni, who is the editor of the Newsletter, points out that printing and distribution is expensive and she would have no objection to receiving a contribution towards these costs when orders for the Newsletter are sent. There is to be a Second Regional Geodesy and Geophysics Assembly in Africa [see page 46] and the first announcement should be available from Professor Oni's office by the end of 1993.

"GEOMAGNETIC STUDIES AT LOW LATITUDES"

G K Rangarajan & B R Arora (Editors)

As part of the celebration of the sesquicentennial year of geomagnetic observations at Colaba-Alibag (1841-1991), the Indian Institute of Geomagnetism organized a symposium in December 1991. The papers of the symposium have been brought out in book form as Memoir No.24 of the Institute.

Published by the Geological Society of India (Bangalore) in 1992 as a hard-cover book of nearly 500 pages, the text has four sections: Solid Earth Geophysics; Observatories, Data Analysis and Instrumentation; Upper Atmospheric Physics; Allied Aspects. The papers include many by Indian scientists, as is natural, with a sprinkling of papers by authors from other countries and are well worth reading. [The review copy sent to your Secretary-General spends more time on his desk than in his library shelves, which says something.] Well illustrated, with up-to-date bibliography to each paper, it is proving to be a useful reference for equatorial geomagnetism and aeronomy.

Further information (availability, cost etc) should be sought from

Professor G K Rangarajan
Indian Institute of Geomagnetism
Dr Nanabhai Moos Marg
Colaba
Bombay 400 005
INDIA

NATIONAL GEOPHYSICAL DATA CENTER

325 Broadway, E/GC2, Dept 919
Boulder Colorado 80303-3328
USA

There is now a wide selection of digital data on compact disc that can be bought at reasonable [ie economical] price from the NGDC:

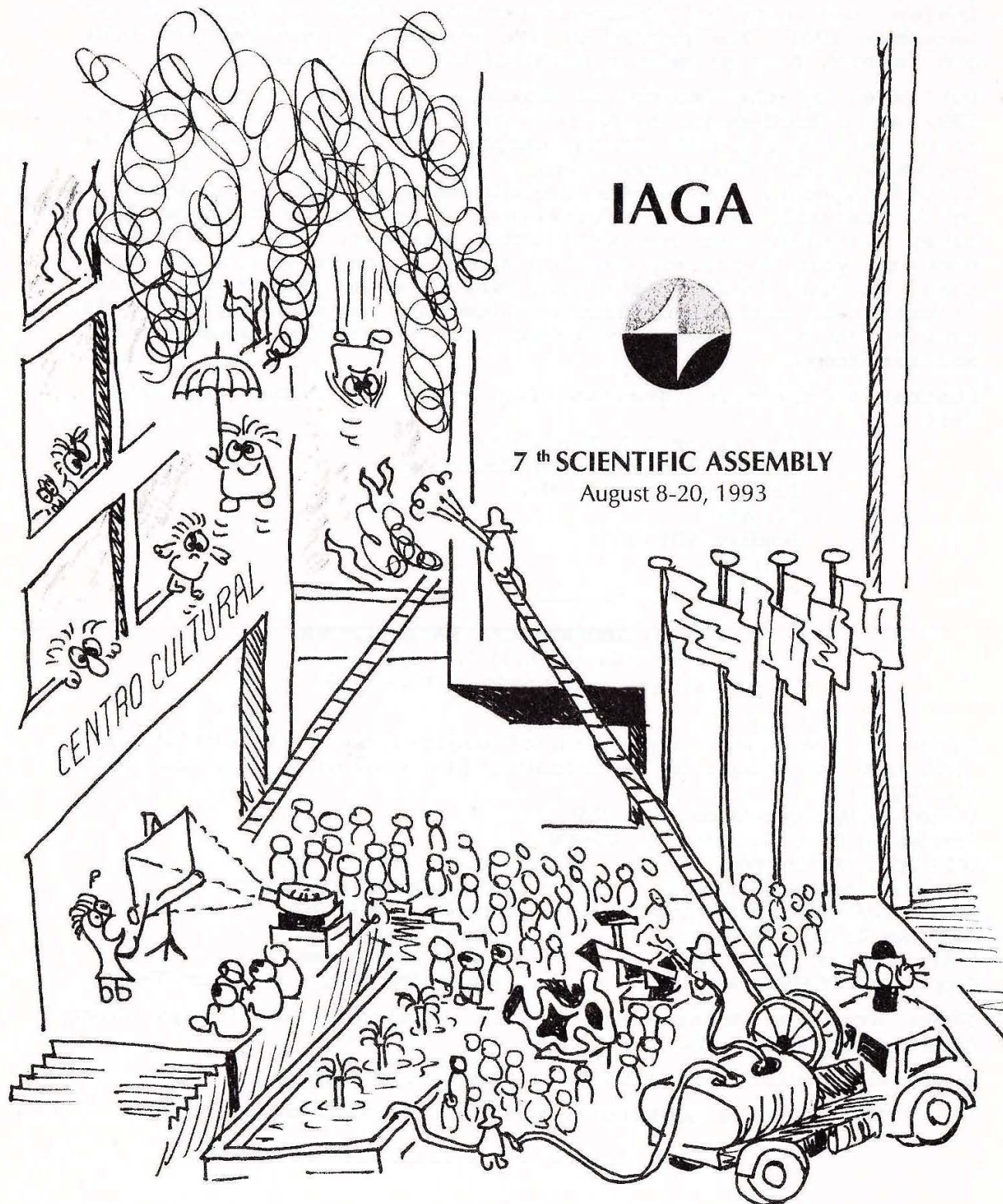
Flares in Hydrogen-Alpha)	STP
Regions of Solar Activity)	CD-ROM
GOES Space Environment Data	Neutron Monitor Data
Minnesota Aeromagnetic Data	Ocean Drilling Program
Solar Variability affecting Earth	The Gravity CD-ROM
Deep Sea Drilling Project	GEODAS CD-ROM
Gulf of Mexico GLORIA Data	Global Ecosystems Data
Geophysics of North America	NOAA & MMS Marine Minerals CD-ROM

There are also Solar Coronal Hole Catalogues on floppy disc and/or Report UAG-102.

Historical Solar Observations on 35mm microfilm.

****** It costs nothing to ask what is available! ******

AN AUSTRALIAN VIEW OF THE ASSEMBLY
ON 13 AUGUST 1993 [which was a Friday]



ELAS: NATURE OF THE DEEP CRUSTAL ELECTRICAL CONDUCTIVITY

A one-week workshop in March 1994
Moscow [Russia]

The ELAS Inter-Association Committee is arranging a workshop:
Compilation of lower crust conductivity data
Correlation with seismic attenuation
Increase of conductivity in subduction zones
Geothermal, geochemical and petrological models of the crust
Graphite in the lower crust

Information on this workshop should be sought from

Leonid Vanyan
Shirshov Institute
of Oceanology
23 Krasikova
Moscow 117218
RUSSIA

Selwyn Sacks
Carnegie Institute
Dept of Terrestrial Magnetism
5241 Broad Branch Road NW
Washington DC 20015
USA

COSPAR

ICSU Committee on Space Research
30th Scientific Assembly

1994 July 10-21
Hamburg [Germany]

IAGA is sponsoring part of this Assembly, the sessions:

- C.1 Presentation of CIRA Part III (reference atmosphere of trace species) and comparisons of CIRA models with recent data
- C.2 Development of improved reference atmospheres of Venus and Mars and possibly other bodies of the solar system
- C.3 Southern hemisphere upper atmosphere and ionosphere
- C.4 IRI - The high latitudes in the International Reference Ionosphere
- Cl.1 Global perspective of the lower and upper thermosphere from UARS and related observing and theory and modelling programs
- Cl.2 Thermosphere-ionosphere-middle atmosphere coupling and dynamics
- Cl.3 Processes active at the ionosphere-magnetosphere interface
- C2.3 Turbulence in middle atmosphere and lower thermosphere
- D.1 Comparative studies of magnetospheric phenomena
- D2.1 Physics of collisionless shocks
- D2.2 Thermal and energetic plasma interaction processes in the inner magnetosphere
- D3.1 The three-dimensional magnetosphere

Information from:

Copernicus gesellschaft
Postfach 49
Max-Planck-Strasse 1
W-37189 Katlenburg-Lindau
GERMANY

Fax: +49 5556 4709
Vox: +49 5556 1440

**12TH WORKSHOP ON
ELECTROMAGNETIC INDUCTION IN THE EARTH**

1994 August 8-14
Brest [FRANCE]

This workshop will be held at l'Université de Bretagne Occidentale and will continue the very successful series of biennial workshops under the sponsorship of IAGA and largely organized by working group I.2. Papers will be accepted on all aspects of electromagnetic induction in the Earth and oceans. Details of specific sessions and call for papers will be in the 2nd circular [posted in December 1993 to all who have requested]. Final registration date will be in April 1994. Registration fee will be approximately 700 FF full, 350 FF for students. Address for correspondence:

12th Workshop on EM induction
c/o Pr P Tarits
Département des Sciences de la Terre
Université de Bretagne Occidentale
6 Avenue le Gorgeu, BP 452
F-29275 Brest cedex
FRANCE

**WORKSHOP ON GEOMAGNETIC OBSERVATORY INSTRUMENTS,
DATA ACQUISITION AND PROCESSING**

1994 September 18-24
Dourbes [Belgium]

Organized by Working Group V.1, the workshop will include the results of one-month comparison runs of magnetometers and lectures/discussions:

Observatory practice
Diflux: theodolite supply, automatic measurements
Absolute procedures and standardisation
New scalar magnetometer design
Real time indices and special events detection

For further information:

Magda Francotte
Centre de Physique du Globe
B-5670 Dourbes
BELGIUM

Tel: +32 60 399311
Fax: +32 60 399421
Telex: 51239 GEOPHY B
Email: jr@meteo.oma.be

2ND REGIONAL GEODESY & GEOPHYSICS ASSEMBLY IN AFRICA

1994 November 14-25

Ibadan [Nigeria]

The Assembly will start with a plenary session with five keynote speakers on

Energy resources of the African continent for the 21st Century

Space data acquisition and the Earth resources of Africa in the 21st Century

Environmental sciences in Africa

Groundwater resources in Africa

Meteorology in Africa

This will be followed by 14 parallel scientific sessions. The attendance hoped for is 500 from countries throughout the world.

For further information, please write to

ICESA International Secretariat

PO Box 22383

University of Ibadan Post Office

Ibadan

NIGERIA

IUGG XXI GENERAL ASSEMBLY

1995 July 2-14

Boulder, Colorado [USA]

The General Assembly will be held on the campus of Colorado University. IAGA plans to have a full set of scientific sessions arranged by the Divisions and by the Commissions. As usual at a General Assembly, there will be joint sessions arranged by two or more Associations; for IAGA, there will be IAGA+IASPEI and IAGA+IAMAP sessions.

The abstract deadline has been set for 1 February 1995. The second circular is planned for February 1994 and the next issue of IAGA News, planned for late summer 1994, will have a listing of all IAGA and IAGA+ sessions with names and addresses of convenors.

Meanwhile, up to the minute information may be obtained by writing to

IUGG XXI General Assembly
c/o American Geophysical Union
2000 Florida Avenue, NW
Washington DC 20009
USA

International Geophysical Calendar 1994

(See other side for information on use of this calendar)

	S	M	T	W	T	F	S		S	M	T	W	T	F	S	
							1							1	2	
JANUARY	2	3	4	5	6	7	8		3	4	5+	6+	7	8	9	JULY
	9	10	11*	12*	13+	14+	15		10	11	12*	13*	14	15	16	
	16	17	18	19	20	21	22		17	18	19	20	21	22	23	
	23	24	25	26	27	28	29		24	25	26	27	28	29	30	
FEBRUARY	30	31	1	2	3	4	5		31	1	2	3	4	5	6	AUGUST
	6	7	8+	9+	10	11	12		7	8	9*	10*	11+	12+	13+	
	13	14	15*	16*	17	18	19		14+	15+	16+	17	18	19	20	
	20	21	22	23	24	25	26		21	22	23	24	25	26	27	
	27	28	1	2	3	4	5		28	29	30	31	1	2	3	
MARCH	6	7	8	9	10	11	12		4	5	6*	7*	8	9	10	SEPTEMBER
	13	14	15*	16*	17	18	19		11	12	13	14	15	16	17	
	20	21	22	23	24	25	26		18	19	20	21	22	23	24	
	27	28	29	30	31	1	2		25	26	27	28	29	30	1	
APRIL	3	4	5	6	7	8	9		2	3	4+	5+	6	7	8	OCTOBER
	10	11	12*	13*	14	15	16		9	10	11*	12*	13	14	15	
	17	18	19	20	21	22	23		16	17	18	19	20	21	22	
	24	25	26	27	28	29	30		23	24	25	26	27	28	29	
MAY	1	2	3+	4+	5	6	7		30	31	1	2	3	4	5	NOVEMBER
	8	9	10*	11*	12	13	14		6	7	8*	9*	10	11	12	
	15	16	17	18	19	20	21		13	14	15	16	17	18	19	
	22	23	24	25	26	27	28		20	21	22	23	24	25	26	
	29	30	31	1	2	3	4		27	28	29	30	1	2	3	
JUNE	5	6	7	8*	9*	10	11		4	5	6*	7*	8	9	10	DECEMBER
	12	13	14	15	16	17	18		11	12	13	14	15	16	17	
	19	20	21	22	23	24	25		18	19	20	21	22	23	24	
	26	27	28	29	30				25	26	27	28	29	30	31	
	S	M	T	W	T	F	S		1	2	3*	4*	5	6	7	1995
									8	9	10	11	12	13	14	JANUARY
									15	16	17	18	19	20	21	
									22	23+	24+	25+	26+	27+	28	
									29	30	31					
									S	M	T	W	T	F	S	

⑪ Regular World Day (RWD)

⑪⑥ Priority Regular World Day (PRWD)

⑪② Quarterly World Day (QWD)
also a PRWD and RWD

⑤ Regular Geophysical Day (RGD)

⑩ ⑪ World Geophysical Interval (WGI)

14+ Incoherent Scatter Coordinated
Observation Day

③ Day of Solar Eclipse

⑬ ⑭ Airglow and Aurora Period

11* Dark Moon Geophysical Day (DMGD)

NOTES on other dates and programs of interest:

1. Days with unusual meteor shower activity are: Northern Hemisphere Jan 3-4; Apr 21-23; May 4-5; Jun 6-11, 27-29; Aug 10-15; Oct 20-23; Nov 17-18; Dec 12-14, 22-23, 1994; Jan 3-4, 1995. Southern Hemisphere Apr 23; May 4-5; Jun 6-11, 27-29; Jul 28-29; Oct 20-23; Nov 17-18; Dec 12-14, 1994.
2. GAW (Global Atmosphere Watch). WMO program to measure atmospheric composition -- early warning system to detect further changes in atmospheric concentrations. (See Explanations.)
3. SOLTIP (Solar connection with Transient Interplanetary Processes). Observing Program 1990 - 1997: solar-generated phenomena and their propagation throughout the heliosphere. (See Explanations.)
4. FLARES22 (FLare RESearch at solar cycle 22 maximum). Observing Program 1990-1997: basic physical processes of transient solar activity and its coupling with solar-terrestrial environment. (See Explanations.)
5. Day intervals that IMP 8 satellite is in the solar wind (begin and end days are generally partial days): 27 Dec 1993-4 Jan 1994; 9-17 Jan; 22-29 Jan; 4-11 Feb; 16-23 Feb; 28 Feb-7 Mar; 12-20 Mar; 25 Mar-1 Apr; 6-14 Apr; 19-27 Apr; 2-10 May; 14-22 May; 26 May-3 Jun; 7-15 Jun; 20-28 Jun; 3-10 Jul; 15-23 Jul; 28 Jul-4 Aug; 10-17 Aug; 22-29 Aug; 4-10 Sep; 16-22 Sep; 29 Sep-5 Oct; 11-18 Oct; 24-30 Oct; 5-12 Nov; 18-25 Nov; 1-7 Dec; 14-20 Dec; 26 Dec 1994-1 Jan 1995. Note that there will not necessarily be total IMP 8 data monitoring coverage during these intervals. (Information kindly provided by the WDC-A for Rockets and Satellites, NASA GSFC, Greenbelt, MD 20771 U.S.A.).
6. + Incoherent Scatter Coordinated Observations Days (see Explanations) starting at 1600 UT on the first day of the intervals indicated, and ending at 1600 UT on the last day of the intervals: 11-14 Jan 1994 GISMOS, 8-9 Feb PATCHES; 15-16 Mar SUNDIAL; 12-13 Apr; 3-4 May; 8-9 Jun; 5-6 Jul GISMOS; 10-16 Aug CADITS/MLTCS; 6-7 Sep; 4-5 Oct; 8-9 Nov; 6-7 Dec GISMOS; 23-27 Jan 1995 JOULE
 where CADITS = Coupling and Dynamics of the Ionosphere-Thermosphere System;
 GISMOS = Global Ionospheric Simultaneous Measurements of Substorms;
 JOULE = Joule Heating
 MLTCS = Mesosphere, Lower-Thermosphere Coupling Study;
 PATCHES = Polar Cap Patches
 SUNDIAL = Coordinated study of the ionosphere/magnetosphere.

OPERATIONAL EDITION, September 1993

Konstantin Iosifovich Gringauz**1918 - 1993**

Born on 5 July, 1918 in Tula (about 200 km south of Moscow), Gringauz had a long and successful career in space physics. He holds a special position in the history of space research.

At the age of 3, he moved with his family to Samara, on the banks of the Volga, and graduated there in 1935. A radio "ham", he enrolled in the Electrophysical Faculty of the Leningrad Electrotechnical Institute. In 1941, he earned his diploma through a study of frequency modulation in the radiotechnical laboratory.

He was in Leningrad during the first few months of the blockade and was evacuated to Moscow in the winter of 1942. For most of the War, Gringauz worked in a factory that produced radio equipment for tanks and during this time passed the entry examination for postgraduate studies in ionospheric radio propagation at a radio institute in Moscow.

In 1947, Gringauz moved to Korolev's Bureau for Rocket Development and in 1949 he gained his Ph.D. In 1956, he began designing instruments which were used in Sputnik 3 for in situ measurement of ion densities. He also designed the transmitter for Sputnik 1, successfully arguing that this should be at decameter wavelengths so that Sputnik 1 could be heard around the world. At the beginning of the IGY in 1957, Gringauz had radio and Langmuir probe experiments on sounding rockets but the following year he concentrated on designing spacecraft-borne instruments for measurements in the ionospheres of Earth, Venus and Mars. In 1959, he moved with his group to the Academy of Sciences' Radiotechnical Institute as head of the space research department. He became Professor of Radiophysics in 1970 and his group soon after was renamed the Laboratory for Plasma Studies in the new Space Research Institute.

Perhaps the peak of his career came when his PLASMAG experiments on VEGA 1 and VEGA 2 obtained high resolution measurements of the bow shock, the neutral and ionized envelope, and the "cometopause" of Halley's comet. For this success, Gringauz was awarded the State Prize of the USSR in 1986. He received the COSPAR Space Science Award in 1988.

Gringauz married Irina Nikolaevna Danilova in 1954 and he is survived by his wife, his daughter Tatiana, and a granddaughter Masha. A cultured and well-read person, he was known for his persistence and dedication to research with unmanned spacecraft. All in the IAGA community who had the privilege of working with Gringauz on experiments or with him on committees will know that his death parts us from a personality which was both distinguished professionally and likeable at personal level.

MIV + NFN

Fred Jacka
1925 - 1992

Fred Jacka, upper atmosphere physicist, died in Adelaide on October 16, 1992. He was born at Ouyen, on March 14, 1925, in north-western Victoria, Australia. He gained his PhD degree at Melbourne University.

The years 1947-1949 saw him on the first expedition to Heard Island with the Australian National Antarctic Research Expeditions (ANARE). He was the Chief Scientist of the Antarctic Division from its formation up till 1965. At the Antarctic Division, then located in Melbourne, his responsibility included not only the development of studies of upper atmosphere, aurora and cosmic rays, but also providing general support, through his instrument workshop, for other scientific work in geology, geophysics, and biology.

Fred Jacka was first and foremost an experimental physicist with a keen ability to design optical instruments. In the 50's he developed parallax photography, all-sky cameras and photometry for auroral studies, simultaneously developing and deploying instruments for the detection of cosmic rays. One of his principal efforts in upper atmosphere physics then was the determination of the location of the southern auroral zone and the frequency of occurrence of auroras there. This Australian work complemented similar work being done in the northern hemisphere principally by scientists in USSR and US. He fostered in his group, theoretical studies related to the aurora, as well as the interaction of the solar wind, the magnetosphere and the ionosphere. Physicists who went on expeditions with ANARE were greatly helped by Fred "to find their feet" through his wise counselling and support.

In 1965 he was appointed to the post of Director of the newly created Mawson Institute for Antarctic Research within the University of Adelaide. Here he had a charter to conduct research in or related to Antarctica, and to be the curator of the records of Sir Douglas Mawson, the famous Antarctic explorer and scientist. In this new position he was able to pursue the development of a variety of optical instruments with the help of colleagues including many graduate students. The instruments were proved out at the Mt Torrens observatory for eventual deployment and use in Antarctica. In this he was assisted by the Antarctic Division itself. With his colleague co-authors, he made numerous important original contributions to upper atmosphere physics. Topics to which he contributed greatly are photometry of the aurora, development of Fabry-Perot and dual Fabry-Perot interferometers for auroral and airglow studies, remote sensing from the ground, of temperatures and wind speeds in the region of space where orbiting satellites move, the influence of magnetic activity on the upper atmosphere, internal atmospheric gravity waves, dynamics of the thermosphere, dynamics of the sodium layer, development of a lidar system for studies of the stratosphere and troposphere. Fred also applied his talents in optics to the application of lasers to the treatment of tumours, collaborating with medical colleagues in Adelaide. With his wife Eleanor, he prepared Mawson's Antarctic diaries as a book. This work stands as a most important resource for scholars of the life of Sir Douglas Mawson.

He was the author or co-author of some 70 publications. His co-authors numbered about 35. Together these publications span a host of different aspects of upper atmospheric physics, the application of lasers in medical practice, in addition to biographical work on Sir Douglas Mawson.

His courage in coping with illness in the latter part of his life was monumental. He will be remembered by his numerous friends and colleagues as a person of great talent, courage and humanity, with a zest for life and a fine sense of humour.

He is survived by his wife Eleanor and children Tamara, Marcus, Joe, Xanny, Kate and Sally.

KDC

Franklin E Roach

1905 - 1993

Franklin Roach died two days before his 88th birthday in Tucson, Arizona. An alumnus of Wheaton College, he entered Chicago University and received his Ph.D. in astrophysics in 1934. He began his postdoctoral career at the McDonald Observatory in Texas and in 1936 moved to Tucson to teach physics and astronomy at Arizona University.

The war years were spent first at CalTech and then at the Naval Ordnance Test Station at China Lake, California. Here he met Chris Elvey, who was to remain a lifelong friend; after the war, I understand that the two of them essentially divided up the field of aurora and airglow - Elvey went to Alaska, Roach to Boulder. Before that, Roach spent a year in Paris as a Fulbright scholar and always after he would sport a French beret of the most proletarian aspect.

In Boulder from 1954 until retirement in 1965, Roach developed research in airglow and he created the Fritz Peak Observatory about 20 miles to the west of Boulder at 9000 feet in the Rockies. Roach's students included Rex Megill and Fred Rees, and the group invented an all-sky scanning airglow photometer using a Lyot filter for isolation of emission lines, and also an interference filter photometer, the turret photometer, for calibrated measurement at the zenith. Because of the need to correct emission line measurements for the underlying spectral continuum, Roach made precise measurements of zodiacal and galactic light, and of direct and scattered starlight. This latter work led on to his book, written with Janet Gordon, "The Light of the Night Sky" [LONS].

During the eleven years in Boulder, he was consultant to NASA for the Mercury and Gemini manned orbiting flights and was adjoint professor at Colorado University. For a short time, just before retirement, he was Director of what was to become the Aeronomy Laboratory.

Roach was for some years Chairman of the IAGA Commission on Airglow and was a familiar face at IAGA Assemblies in the 50s and 60s. I remember with awe his letting the Chairman of a session know that he (the Chairman) appeared to have forgotten that it was coffee time. A prolific author of research papers, he would never let the important things in life be forgotten. Roach enjoyed enormously amateur dramatics and singing, especially Gilbert and Sullivan. His entire approach to life was tremendously enthusiastic.

Roach married Eloise Blakeslee by whom he had four children, John, Janet, Charlotte and Gerry. Lou died in 1976 and Roach later married Janet, his coauthor on "LONS". He is survived by his wife Janet, his daughters Janet and Charlotte, and by Gerry, nine grandchildren and ten great-grandchildren. Roach can be said also to have been the father of airglow studies in the USA.

MG

Charles Willmann

1923 - 1992

Charles died suddenly on March 25, 1992, during a meeting at the Hall of the Institute of Astrophysics and Atmospheric Physics in Tõravere [Estonia].

Born in Parnu [Estonia] on March 18, 1923, his career was seriously disrupted by the Second World War. After graduating from Parnu Gymnasium in the summer of 1941, he worked briefly as a sailor before being mobilized into the Red Army. He spent the winter of 1941/42 in the Leningrad blockade and afterwards, to the end of the war, he served in the artillery. Obligated to continue his military service after the war, he graduated from Tallinn Pedagogical Institute by correspondence as a teacher of physics and he worked for some years at a secondary school.

Since 1953, he was active as an amateur astronomer. His first investigations were on variable stars but soon after this he began observations of noctilucent clouds which remained his main interest until the end of his life. In 1962, he became a professional scientist in the Institute of Physics and Astronomy of the Estonian Academy of Sciences. In 1963, he defended his PhD thesis and from 1963-1967, he was Vice Director of the Institute. There he organized an International Data Centre for Noctilucent Clouds. Towards the end of the 1960s, he initiated the scientific direction of atmospheric research aboard the Soviet orbiting stations, which continues to the present day. Since 1975, regular observations of noctilucent clouds, atmospheric aerosol layers and various optical phenomena have been carried on. In total, Charles Willmann published 120 scientific papers and 90 popular papers.

KE

**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 standardisations 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 Assembly, often meeting with one of the other Associations of IUGG. IAGA therefore meets every other year. The next Assembly is the XXIst General Assembly, scheduled for Boulder, Colorado [USA] in July 1995.

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 IAGA Bulletins are available at low cost from the Secretary-General of IAGA. The IAGA News is sent free of charge to all addresses on the IAGA Mailing List (which at present contains nearly 2500 addresses of individual scientists in some 72 countries) and is available on request from the 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.