NEWSLETTER
INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS
AUSTRALIAN CHAPTER

VOLUME 2 NO 1 JUNE 1985

1 OBITUARY - RICHARD BARNES

Richard Barnes was severely burned on 22 February 1985, while rescuing the occupants of a burning beach house north of Jurien Bay. He died from his injuries in Royal Perth Hospital on 25 February. Our most sincere condolences go to his wife Julie and their two young children in their tragic loss.

Richard graduated from London University in 1969 and his first appointment was as hydrogeologist with the Geological Survey of Western Australia from 1970 to 1974. He then joined the Alberta Research Council in Canada as a research hydrogeologist. In Alberta he made important contributions towards understanding the hydrogeology of the Rocky Mountains. Through his initiative and love for the mountains, he completed hydrogeological mapping in very remote regions and was able to present, for the first time, a detailed description of past and present groundwater flow system features of the Rocky Mountains. He returned to Perth in 1977 to take up a senior position with Groundwater Resource Consultants. He was an invaluable member of this group until his untimely death at the age of 36, a death which has robbed the profession of an outstanding practical hydrogeologist.

Richard commanded respect and admiration from all who knew him and it was a pleasure to see and experience his zest for life. He will be sorely missed by his loving family, and by his many friends and colleagues.

2 MEMBERSHIP NEWS

2.1 New Members

F J Milne
P O Box 607
DARWIN NT 5794

Principal Engineer
Hydrogeologist, Water Div.
Dept. Mines & Energy

Robert McLaughlan
40 Richardson Street
WEST PERTH WA 6005

Hydrologist
Rockwater Pty Ltd

Denis H Hurle Hetherington
Unit 8/237 Stirling Highway
CLAIRMONT WA 6010

Hydrologist
Self employed

J D Waterhouse
91 Ann Street,
STEPNEY SA 5069

Hydrologist
Aust. Groundwater
Consultants P/L

Ramis B Salama
76 Castlereach Dr
WOODLEIGH GARDENS NT 5793

Hydrologist
Water Division
Dept. Mines & Energy

M N Verma
14 Wandi Crescent
ANULA, SANDERSON NT 5793

Hydrologist
Dept. Mines & Energy
NT Govt. Darwin

James Cox
The Geology Dept.
University of WA

Student (Ph.D)

B R Pearce
168 Flockton Street
Everton Park QLD 4053

Senior Hydrologist
Qld Water Res. Commission

Errol Hayden Briese
P O Box 118
East Brisbane QLD 4169

Senior Hydrologist
Coffey & Partners P/L

John S Pearson
P O Box 37244
WINNELLIE NT 5789

Geologist Water Div.
Dept. Mines & Energy

D G Pidsley
GPO Box 3865
DARWIN NT 5794

Engineer, Resource
Investigation Div.
Dept. Mines & Energy

Deren C Collin
P O Box 1527
ALICE SPRINGS NT 5750

Hydrologist, Dept. Mines
& Energy

Adrian Bowden
9 Carrington Grove
EAST BRIGHTON VIC 3187

Hydrologist, Aust.
Groundwater Consultans P/L

Fabio Carosone
32 Audrey Cres
BURWOOD, VIC 3125

Hydrologist
Hydroscience P/L

James L Irish
4 Camfield Street
EATON WA 6230

Civil Engineer/Hydrologist
Worsley Alumina P/L

Stephen Appleyard
3 Gordon Road
NEDLANDS WA 6009

Hydrologist University
Western Australia

Geoff W Prowse
9 Holtze Street
FANNIE BAY NT 5790

Hydrologist Water Resource
Mines & Energy, NT

Robert Britten
P O Box 4277
DARWIN NT 5794

Hydrologist

Desmond Yin Foo
P O Box 3231
Darwin NT 5794

Engineer, Water Resouces
Div. Dept. Mines & Energy

John Roger Passmore
C/- Rockwater P/L
40 Richardson Street
West Perth WA 6005

Hydrologist
Rockwater P/L (Principal)

G M Bolton
18 Thorburn Ave
Beechboro WA 6063

Groundwater Technologist
Rockwater P/L

P H Woods
C/- Rockwater P/L
40 Richardson St
West Perth WA 6005

Hydrologist
Rockwater P/L

J E Bawden
64 Station Road
East Fremantle WA 6158

Ph.D Student
University of WA

G M M Walker
P O Box 56
Rossiter Road
KOOWEERUP VIC 3981

Geologist
Geological Survey Victoria

2.2 Membership Applications

The following comments are presented in order to clarify the pro cedure and explain the sometimes considerable delays which occur in the processing of applications for membership of IAH. Applications are processed by the National Committee as they arrive and if in order, are despatched in batches to the Secretary General, Mr E Romijn when five or more applications have been received. The Treasurer, Mr A Shugg, forwards a receipt to all applicants and members upon receiving their annual membership fee.

It is imperative that applicants forward a cheque for $20 (the annual fee) with their applications as the International Council will not normally process applications without pre-payment of the first annual fee. The Secretary General collates all membership applications and presents them to the International Council for approval; this Council meets periodically (e.g. quarterly) and after it has ruled on an application, the Secretary General advises the applicant accordingly and may forward simultaneously various IAH publications which are in surplus. The procedure outlined above may take from two to five months depending upon when the International Council meets, so please exercise

patience. It should be remembered that the Members and Office Bearers of the International Council are acting in a honorary capacity and in the main rely upon the support of their respective organisations to fulfill their exacting roles.

In regard to the provision of publications, the Secretary General endeavours to provide the proceedings of the International Geological Congresses to all members at no charge and any other relevant publications that he can obtain at low cost. Organising Committees for IAH sponsored Symposia and Conferences are encouraged to produce additional copies of proceedings to cover the needs of the IAH membership.

2.3 Annual Membership Fees

Please note that your annual membership fee is now due (unless you happen to be one of the new members listed in 2.1), and should be forwarded to the Treasurer, Mr A Shugg, C/- Victorian Division of IAH, GPO Box 2355V, MELBOURNE VIC 3001; as soon as possible. Should you wish, you can of course pay your annual fee directly to the International Treasurer Prof. Dr P E Groba, however, should you elect to do so, please advise Mr A Shugg to enable our records to be adjusted.

2.4 Contributions to the Newsletter

Our Newsletter is now registered as a quarterly publication for circulation in March, June, September and December. The Executive have established a small sub-committee of three comprising W Williamson, G Stewart (Vic. Branch) and R Lakey to collate, compile, edit and distribute the Newsletter. We welcome your contributions and any comments or suggestions you might wish to make about the format or content of the letter.

To facilitate collation and publication of the newsletter, suggested deadlines for input to issues are March 8, June 7, September 6 and November 22.

3 NATIONAL COMMITTEE REPORT

3.1 Meetings

Dr C R Lawrence and Dr M Habermehl (ACT Liaison Member) attended the Academy of Science, National Committee for Hydrology meeting in Canberra recently. Dr Lawrence is a member of the Committee and Dr Habermehl attended as an invited guest representing IAH. Items of interest from the minutes of this meeting and also from a recent meeting of the Australian Geoscience Council follow.

3.1.1 Extracts from Minutes of February meeting, National committee for Hydrology. Aust. Academy of Science

a) The idea of a publication containing a review of the achievements of Australian hydrology since 1975 was put forward; possibly as a successor to "Australian Progress in Hydrology 1965-74".

b) A proposal to establish a journal on water research to be published by the CSIRO was made by Mr Wall, Editor-in-Chief of the CSIRO Information Unit. Use of the journal for publication of water related articles would be promoted as an alternative to the CSIRO Journal of Soil Sciences and overseas journals. Members of the National Committee are to consider the proposal before formally communicating with CSIRO.

c) The National Committee is seeking representation on the Australian Water Research Advisory Committee after perusal of the report of the Interim Council of the Institute of Freshwater Studies. A letter detailing matters of concern of the Committee is to be sent to the Minister for Resource and Energy Development.

d) A national hydrology symposium is to be held at the University of Melbourne in May 1987. The theme of the symposium is to be "Water and Land Resources Management : Perspectives and Prediction".

A pre-symposium tour of sites in Victoria has been recommended.

A list of suggested topics for the main program is :
1 Effect of Aborigines on the Environment
2 Land Clearing for Agriculture : its effect on salinity and hydrology
3 Impact of the introduction of hooved animals
4 Impact of de-forestation
5 The urban landscape
6 Impact of military usages of land
7 Climatic change
8 Palaeohydrology and data from sediment records
9 Ageing of present woodlands
10 Impact of mining
11 Relevance of inland drainage in terms of salt disposal
12 Coastal aquifers and seawater intrusion.

At this stage it is not known if the Proceedings of the symposium will be published.

3.1.2 Extract from Minutes of February meeting of the Executive of the Australian Geoscience Council Inc.

a) The Australian Chapter of IAH has accepted an offer of Associate Membership of the Council.

b) Representatives of IAH are to meet with representatives of the Association of Exploration Geochemists and the Soil Science Society to decide on the aims and content of a proposed symposium on geochemical baselines in the natural environment.

3.2 IAH Commissions

The Secretary has written to the Secretary General and the Chairpersons of all the IAH Commissions requesting information on their current status with a view to determining the need and desirability for an Australian input. It is intended that the results of this survey will be published in the June or September newsletter.

3.3 Membership Drives

John Milne, the Northern Territory Liaison Member, has recently launched a very successful membership drive in the N.T. Bruce Pearce, the QLD Liaison Member, is in the process of organising a similar membership drive in QLD and Chris Kidd of Australian Groundwater Consultants Pty Ltd and now stationed in New Zealand has accepted the role of Liaison Member for New Zealand. The executive wish to congratulate these gentlemen on their endeavour, and thank them for their support in developing the Australian Chapter of IAH into an effective and representative National Association.

4 INTERNATIONAL HYDROLOGICAL PROGRAMME (IHP) UNESCO PHASE II 1984-1989

The sixth session of the Intergovernmental Council of the IHP was held at the UNESCO in Paris from 22-30 March, 1984. The Council adopted a detailed plan for the implementation of the third phase in which IAH is asked to co-operate in several projects listed below:

PROJECT 2.4 Production of Manual of practice on groundwater recharge estimation for modelling purposes. Workshop to review the draft manual.
PROJECT 2.5 Symposium (1989) on conjunctive use of surface and groundwater considering their interaction.
PROJECT 4.1 Technical report on hydrology of arid and semi-arid areas. Workshop in Tunesia in 1987.
PROJECT 4.6 Report on hydrology of small isles.
PROJECT 5.1 Report on remote sensing and water resources.

PROJECT 5.3 Report on application of geophysical methods to groundwater exploration.
PROJECT 8.2 Workshop (1987) on hydrological aspects of waste disposal.
PROJECT 8.4 Workshop (1987) on impact of acid precipitation on hydrological and ecological systems.
PROJECT 10.1.3 Seminar in the Mediterranean on integrated water resources planning and management based on case studies with specific reference to coastal areas.
PROJECT 10.3 Symposium (1986) on integrated land use planning and groundwater protection management in rural areas. Report on methodologies.

Anybody who is able to contribute to one of the above-mentioned projects is kindly requested to contact the secretary general Erik Romijn. IAH Commissions will be directly involved in the IHP programme.

4.1 Background

Today the International Hydrological Programme (IHP) forms an integral part of the efforts made by the United Nations system as a whole to promote a rational policy for the development and management of water resources around the world. Realization of the significance of a scientific basis of hydrology in the development of water resources was not always appreciated. It began to increase more rapidly in the period following the Second World War. In 1950 UNESCO launched a programme of research on the world's arid zones, in which hydrology played an important role. This was followed in 1964 by the launching of the International Hydrological Decade (IHD), a truely remarkable example of international co-operation, which make a significant contribution to the understanding of the processes occurring in the water cycle, assessment of surface and groundwater resources, and adoption of a rational attitude towards water use.

But gaps were still noted, particularly in the application of scientific advances to the solution of practical problems. The General Conference of UNESCO therefore decided in 1974 to launch the long-term International Hydrological Programme with the aim of finding solutions to the specific problems of countries in different geographical conditions and at different levels of technological and economic development. The six-year period 1975-1980 represented the first phase of the IHP (IHP-I). Because of a change in UNESCO's budgetary period to coincide with other U.N. bodies, IHP-II extended only over the period 1981-1983. The IHP has now returned to six-year periods, coinciding with UNESCO's Medium-Termed Plans.

Achievements: The first phase of the IHP came to an end in 1980. The evaluation of its results, carried out in August 1981 (report of the International Conference on Hydrology and the Scientific Bases for the Rational Management of Water Resources), showed the progress which it had made possible in scientific knowledge, the practical training of hydrologists, international and regional co-operation in hydrology and the expansion of hydrological activities in developing countries.

The programme of IHP-III represents a significant departure from the earlier IHD/IHP efforts. Although the programme will continue to have a strong emphasis on the traditional hydrologic sciences, the increasing importance of rational water management has required that a much broader view of the programme be taken. This concept of IHP-III, then, has led to a much greater consideration for applications of results. It has also required that the scope of the programme give greater effort on areas and audiences which, up to this time, would not have normally been thought of as part of a programme on hydrology. The integrated approach to water resources management requires that not only technical professionals but also planners, policy-makers, decision-makers and the general public have an appreciation for the possibilities and the limitations of man's activities with respect to our water resources.

Publications

As part of UNESCO's contribution to the objectives of IHP, two publication series are issued: Studies and Reports in Hydrology and Technical Papers in Hydrology. In addition to these publications, and in order to expedite exchange of information in the areas in

which it is most needed, some works are issued in the form of Technical Documents. A list of UNESCO publications issued in the field of water sciences is available upon request.

5 STATE REPORTS

5.1 Western Australia

WA TECHNICAL MEETING : On 11 December 1984, a Technical meeting of the WA Branch was held on the 9th Floor, Mineral House. The subject of the meeting was :
"Current Hydrogeological Research Topics in Western Australia"

Speakers included : Dr Lloyd Townley - Centre for Water Research, University of WA,
Dr Allan Curtis - Division of Groundwater Research, CSIRO,
Dr Tony Allen - Hydrogeology Division, Geological Survey of WA,
Mr Paul Whincup - Hydrogeological Consultant.

Each speaker presented current research topics of his particular organization and Paul Whincup outlined research that he felt was needed. The meeting generated many questions and was enjoyed by all present. Many lively discussions occurred at the drinks session after the meeting. Thanks to all speakers and to the Mines Department for the meeting venue.

Membership News of WA Branch

Membership of the WA Branch continues to grow. Current membership stands at 44. Hopefully with the decision on membership eligibility for technical assistants, the total membership of the WA Branch will continue to increase. Dirk Megirian has recently left the GSWA to take up a position with the NT Museum.

5.2 Hydrogeology within the BMR

Groundwater Investigation within the BMR is carried out by the Hydrogeology Research Group, which forms part of the Division of Continental Geology. The Hydrogeological Group has a long involvement in research and assessment of groundwater resources, mainly at national level and generally in collaboration with State agencies and the CSIRO. Its objective is to develop an understanding of the hydrodynamics, hydrochemistry, isotope hydrology and palaeohydrology of groundwater in large, regional sedimentary basins and in fractured rocks.

Murray Basin

Hydrogeological studies are being carried out in the Murray Basin by W R Evans and J R Kellett, who collected from various State authorities the basic hydrogeological data. Additional field work concentrated on sampling water wells for hydrochemistry and environmental isotopes. This is part of a broader approach with a parallel geological study by C M Brown and A E Stephenson to provide a basinwide structural and stratigraphic framework for the regional groundwater system. There has been a compilation of a geological map of the Murray Basin at scale of 1 000 000, together with the preparation of subsurface borehole data bases and a report.

Great Artesian Basin

The extensive work so far carried out on the hydrogeology of the Great Artesian Basin was continued by Dr M Habermehl who concentrated on the examination of springs and spring deposits in the groundwater discharge regime in Queensland and South Australia. The use of Cl isotopes has shown that residence times for groundwater ranges from about 10 000 years near the recharge areas in the east to about 1.4m years near the discharge zones in the south west of the basin. During this time the waters evolve from a $Na\text{-}HCO_3\text{-}Cl$ type to $Na\text{-}Cl\text{-}HCO_3$ and $Na\text{-}Cl\text{-}HCO_3\text{-}SO_4$ waters.

Amadeus Basin

A hydrogeological study of the Amadeus Basin to determine its evolution and sedimentary framework was commenced by G Jacobson. This work is being carried out in conjunction with the ANU SLEADS program.

Fractured Rock Hydrogeology

This program is to establish the hydrodynamics and hydrochemistry of groundwater resources in fractured rock terrains as a basis for their assessment and to understand the diagenetic role of water in these systems. The project has been underway since 1954 with work concentrated in the Southern Tablelands in the vicinity of Canberra. Various recent contributions to this project have been made with emphasis on the preparation of a hydrogeological map of the ACT and an accompanying listing of basic bore data. Individual contributions have included work on hydrochemistry and geochemistry (W R Evans) and on groundwater pollution (G Jacobson). An analysis of the accumulated hydrogeological data has defined the distribution of bore water yields and hydrochemistry for the regional fractured rock aquifers.

Hunter River Valley

This program, under the direction of J R Kellett was carried out in conjunction with the CSIRO. It was designed to examine the regional hydrogeochemistry and determine the origin of saline groundwaters in the Upper Hunter Valley. The source of salt is attributed to connate Permian marine fluids contained within Triassic and Carboniferous rocks in the regional recharge zones. The saline waters discharge into unconfined sand and gravel aquifers of the Hunter River floodplain. Molecular diffusion of solutes from the matrix of marine influenced rocks towards open fractures is the explanation for the persistence of connate waters in the actively leaching regime of the Upper Hunter Valley. The naturally high background salinities in groundwaters of the Central lowlands will persist for the forseeable future and must be considered in planning for future development in the Upper Hunter Valley.

5.3 Victoria

5.3.1 Victorian Branch Meetings

Several speakers from the CSIRO Groundwater Division, Perth, presented informative accounts of their current research projects at the 4th Meeting of the Victorian Branch IAH. Dr Perry, Head of the Groundwater Division started the proceedings by outlining the broad objectives of the Division; these are to investigate the physical, chemical and biological processes affecting the quantity and quality of groundwater. Dr Perry then introduced the four guest speakers from CSIRO. The speakers and their topic were :

- Dr A Curtis : 'Chloride ion concentration in groundwater profiles and application of remote sensing in groundwater investigations'
- Dr M Sharma : 'Processes and methods of estimating recharge'
- Dr C Barber : 'Processes, both natural and man-made, affecting water quality'
- Dr D Williamson : 'Salinity - causes and remedies'.

Dr H W Nesbitt a senior lecturer in hydrogeology of the University of Western Ontario, Canada was the guest speaker at the 5th meeting. Dr Nesbitt's topic was 'Production of dilute Mg-Na-SO_4 dominated groundwaters and brines in prairie environments'.

Speakers at both meetings generated many questions and lively discussion.. Further discussions were held in the more salubrious surroundings of the Clyde Hotel.

5.3.2 Restructuring of the Water Industry

During 1983/84 the Victorian Government initiated steps to develop a corporate approach to the management of the water industry. The Government is bringing about changes through a far reaching restructuring programme which includes :

. Abolishing the Ministry of Water Resources and the State Rivers and Water Supply Commission under the Water (Central Management Restructuring) Act 1984, and replacing them by creating a new Department of Water Resources and a Rural Water Commission.

. Restructuring of local water management bodies throughout the State in accordance with the provisions of the Water and Sewerage Authorities (Restructuring) Act 1983.

. Creation of a Victorian Irrigation and Rural Water Supply Board (Legislation to be introduced to the parliament in the autumn session).

The new Department of Water Resources will provide the appropriate processes to ensure responsive State-wide resource management and planning. The new Victorian Irrigation and Rural Water Supply Board will be responsible for providing water to irrigators, and specific stock and domestic systems in rural Victoria.

5.4 New South Wales - Water REsources Commission

The Commission continues to be involved in the investigation of groundwater sources for rural town water supply. An interesting current project is at Dorrigo, where there are extensive basalts within the New England area. Of five sites drilled, four were on photolinear features coincident with a magnetic low located by a short traverse with a handheld magnetometer. Three yielded low salinity water at rates of 15-40 L/s, and the fourth yielded only a few L/s. The fifth site, which was not drilled on a magnetic low, failed to produce a supply sufficient to warrant testing. the relationship between the magnetic anomaly and the yield of groundwater is still not clear but appears to be a useful means of minimising failures. In any event, a reliable town water supply has been located at minimal cost compared to the alternative of a highly expensive river water treatment plant.

With the onset of drought conditions over considerable areas of New South Wales west of the Divide, the rate of requests from farmers and graziers for assistance in locating groundwater has quadrupled in recent weeks.

Part of the Commissions technical assistance to landholders on the location of groundwater supplied is being decentralised by the transfer of hydrogeologists George Gates and Rod Harwood to Leeton and Dubbo from about the end of May. George rejoined the Commission recently after a period with Australian Groundwater Consultants. Two new faces in the Commission's Hydrogeological Section are Adrian Blair and Sue Hamilton, recent graduates of Sydney and New South Wales Universities, respectively.

A major project under consideration is the feasibility of artificial recharge in the Namoi Valley. Preliminary examination of possibilities has been undertaken prior to formulating a plan of action to test the possibility of using excess river water (when available) for recharge of shallow aquifers by means of infiltration ponds and of deeper aquifers by injection wells.

6 SYMPOSIA, CONFERENCES AND MEETINGS UPDATE

1985 :

May 14-16 Symposium on Hydrology and Water Resources, Sydney, Australia. Contact: The Conference Manager, The Institution of Engineers Australia, 11 National Circuit, Barton, ACT 2600, Australia.

May 27-31 : INTERNATIONAL SYMPOSIUM ON REMOTE SENSING APPLICATIONS TO CONTEMPORARY HYDROLOGICAL PROBLEMS (with AGU SPRING MEETING), Baltimore, Maryland, USA. Contact: American Geophysical Union, 2000 Florida Avenue, N.W., Washington, D.C. 20009, USA.

June 9-15 : IWRA 5th WORLD CONGRESS ON WATER RESOURCES : 'WATER RESOURCES FOR RURAL AREAS AND THEIR COMMUNITIES', Brussels, Belgium. Organized by the International Water Resources Association and the Association Internationale des Ressources en Eau. Call for papers. Contact : Glenn E Stout, President, US Geographical Committee, Water Resources Centre, 208 N Romine Street, University of Illinois, Urbana, Illinois 61801, USA; or Dr L W DeBacker, Chairman of the Belgium Geographical Committee, C/- Brussels International Conference Centre, Parc des Expositions, Place de Belgique, B-1020 Brussels, Belgium.

June 25-29 : 2nd ANNUAL CANADIAN/AMERICAN CONFERENCE ON HYDROGEOLOGY : 'HAZARDOUS WASTES IN GROUNDWATER, A SOLUBLE DILEMMA'. Contact : Canadian/American Conference on Hydrogeology, 500 W. Wilson Bridge Road, Worthington, OH 43085.

July 4th : 4TH INTERNATIONAL SYMPOSIUM IN HYDROLOGY ; 'MULTIVARIATE PROCESSES OF HYDROLOGY', Fort Collins, Colorado, USA. Contact : Prof. H W Shen, Dept. of Civil Engineering, Colorado State University, Fort Collins, Colorado 80523, USA.

July 7-19 : INTERNATIONAL SYMPOSIUM ON KARST WATER RESOURCES, Antalya/Ankara, Turkey. Contact: Prof. G Gunay, Hydrogeological Engineering Department, Haeettepe University, Beytepe, Ankara, Turkey; or A Ivan Johnson, Water Resources Consultant, Woodward-Clyde Consultants, 7600 East Orchard Road, Harlequin Plaza North, Englewood, Colarado 8011, USA. (See Item 6.1.1).

August 11-15 : 21ST ANNUAL AMERICAN WATER RESOURCES ASSOCIATION CONFERENCE AND SYMPOSIUM, Tucson, Arizona, USA. Conference : 'Water Demand : Sharing a Limited Resource'. Symposium : 'Groundwater Contamination and Reclamation'. Contact : Dr Nathan Buras, Head, Dept. of Hydrology and Water Resources, Univ. Arizona, Tucson, Arizona 85721, USA.

August 18-24 : INTERNATIONAL SYMPOSIUM AND WORKSHOP ON HYDROLOGICAL APPLICATIONS OF SPACE TECHNOLOGY, Cocoa Beach, Florida, USA. This WMO co-sponsored event was originally planned to be held alongside the AGU Spring Meeting in Baltimore in May 1985. Contact: Mr A I Johnson, 7474 Upham court, Arvada, Colorado 80003, USA.

August 18-23 : INTERNATIONAL WORKSHOP ON HYDROLOGIC APPLICATIONS OF SPACE TECHNOLOGY : Input to Hydrological Models and Geographic Information Systems. IAHS/WMO sponsored. Contact : A Ivan Johnson, President, IAHS International Committee on Remote Sensing and Data Transmission, 7474 Upham Court, Arvada, Colorado 80003, USA.

August 20-24 : 21ST IAHR CONGRESS, Melbourne Australia. Contact : J D Lawson, Civil Engineering Department, University of Melbourne, Parkville N2, Victoria, Australia. No further details at hand.

September 8-13 : INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS 18TH CONGRESS : "Hydrogeology in the Service of Man", Cambridge, United Kingdom. Languages : English and French. Contact : Mr A Hunter-Blair, IAH 18th Congress, Anglian Water Authority, Ambury Road, Huntingdon, Cambridgeshire PE18 6NZ United Kingdom. (Further details 6.1.1.)

September 15-20 : INTERNATIONAL SYMPOSIUM ON ACIDIC PRECIPITATION, Lake Rosseau, Muskoka, Ontario, Canada. Contact : The Muskoka Conference '85, 6th Floor, 135 St. Clair Avenue West, Toronto, Ontario M4V 1P5, Canada.

September 17-20 : SECOND INTERNATIONAL CONGRESS OF THE INTERNATIONAL MINE WATER ASSOCIATION, Granada, Spain. Contact : Prof. R Fernandez Rubio, School of Mines, Technical University of Madrid, Rios Rosas, 21, Madrid, Spain.

September 30 - October 6 : ICSI INTERNATIONAL SYMPOSIUM ON THE GLACIER MASS-BALANCE, FLUCTUATIONS AND RUNOFF, Alma-Ata, United Soviet Socialist Republic. Contact : Prof. V Mn Kotlyakov, Organizing Committee of International Symposium, Institute of Geography, USSR Academy of Sciences, Staromentny St., 29, Moscow, 109017, USSR.

October 9-10 : INTERNATIONAL SYMPOSIUM ON MANAGEMENT OF HAZARDOUS CHEMICAL WASTE SITES, Winston-Salem, North Carolina, USA. Contact : Prof. Norman R Tilford, General Chairman, C/- Dept. of Geology, Texas A & M University, College Station, Texas 77843-3115, USA, Telephone : (409) 845 9682.

1986 :

May 11-16 : INTERNATIONAL CONFERENCE ON GROUNDWATER SYSTEMS UNDER STRESS, Brisbane. Venue University of Queensland. Sponsored by AWRC, IAH and Inst. Eng. Aust. Abstracts of no more than 250 words to be submitted by May 31. Registration fee expected to be about $200, less for students. Contact: The Conference Manager, Groundwater Systems Under Stress, Uniquest Conference Systems, Univ. of Queensland, St Lucia 4067. A second circular will become available toward the middle of 1985.

6.1 Conference Details

6.1.1 Hydrogeology in the Service of Man : Outline of technical sessions

Topic 1 Economic and Social Development

Session 1 Monday am	Groundwater in the developed World
9.9.85 Invited speaker	Dr P Cohen, USA Geological Survey, Reston Va.
	Dr M Habermehl, Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia.
Session 2 Monday pm	Groundwater in the developing World
9.9.85 Invited speaker	Dr E P Wright, Hydrogeological Adviser to the Overseas Development Administration, British Geological Survey, Wallingford UK.

Topic 2 Groundwater Quality Management

Session 3 Tuesday am	Problems associated with saline intrusion
10.9.85 Invited speaker	Prof. E Custodio, Curso Internacionale de Hydrologie Subterranea, Barcelona, Spain.
Session 4 Tuesday pm	Protection of groundwater against wastes and fertilisers.
10.9.85 Invited speaker	Dr J Vrba, Chairman IAH Groundwater Protection Commission, Stavebni Geologie, Prague, Czechoslovakia.
Session 5 Wednesday am	The age and provenance of groundwater
11.9.85 Invited speaker	Prof. J-Ch Fontes, Universite de Paris-Sud, Paris, France.
Session 6 Thursday am	The disposal of radioactive wastes
12.9.85 Invited speaker	Prof. R N Farvolden, University of Waterloo, Canada.

Topic 3 Development of Aquifers as Energy Sources

Session 7 Thursday pm	Developments in geothermal energy
12.9.85 Invited speaker	(A member of) National Energy Authority (Orkustofnun) Reykjavik, Iceland.

Topic 4 Groundwater Control; Well Hydraulics and Enginee

Session 8 Friday am
13.9.85 Invited speaker — Hydrogeology in the oil indu
Prof. C G Wall, Imperial Col — f Science & Technology,
London, U.K.

Session 9 Friday pm
13.9.85 Invited speaker — Groundwater in construction — ning engineering
Prof. (Emeritus) P W Rowe, U — ity of Manchester,
Manchester, U.K.

Field Excursions :

Mid-Congress Excursion :- Hydrogeology of the Chalk and t — at Ouse Groundwater Scheme
Afternoon, Wednesday 11.9.8
The excursion will visit sites of interest in the planni — management of a major
scheme for river regulation and inter-basin transfer usi — ndwater. It will be
possible to buy tickets for this excursion during the Co — itself. No advance
booking. Cost will be about 3.50 pounds.

Post-Congress one-day Excursion "A" :- Hydrogeology and — ion Protection of the
Southern Lincolnshire Lime
Friday 13 - Saturday 14.9.
The Lincolnshire Limestone is a partially confined, semi — ic aquifer which is
extensively exploited for water supplies. The route wi — ow the flow of water from
recharge area to confined zone, illustrating karstic fe — tracer studies, hydro-
geological appraisal, computer modelling, and applicati — protection of resources from
pollution. There will be a short introductory talk on — ifer on the evening of
Friday 13 September. Cost 48 pounds including accommod — nd evening meal on 13.9.85.
Participants will be responsible for their own evening — d accommodation after the
excursion ends at c. 1830 hours on 14.9.85.

Number of participants will be limited to 45. Deposit — s payable at time of
booking. Full payment by 1 August 1985.

Post-Congress three-day Excursion "B" :- Hydrogeology in — ristol District
Friday 13 - Monday 16 Septe — 985
14 September : Thermal Springs at Bath. Bath is an eigh — -century spa, 15 km east of
Bristol. The thermal springs have been in use since the — period. The excursion will
visit the thermal springs, Roman Baths and eighteenth-ce — Pump Rooms, borehole sites
and rock exposures of interest to hydrogeologists. Ther — be an opportunity for some
sight-seeing before returning to Bristol via the Clifton — and subsidiary hot springs.
There will be a talk on the geochemistry and origin of t — rmal waters in the evening.

15 September : Hydrogeology of Karstic Limestones in the — Hills. The Mendip Hills,
25 km south of Bristol, are an important source of water — e city. The main aquifer
is the cavernous Carboniferous Limestone and most abstra — s from springs. The
excursion will outline the karst hydrogeology and demons — he pressures on the aquifer
from large scale quarrying and show how they are managed. — day will conclude with a
visit to the underground river at Wookey Hole Caves, whe — er will be served in one of
the caverns.

16 September : The Severn Tunnel Great Spring. The raily — nel between England and
Wales, beneath the estuary of the River Severn, was const — in 1880. The tunnellers
intersected channelled groundwater in the Carboniferous l — ne, which twice flooded the
tunnel during construction. The groundwater is pumped t — urface and used for
industrial supplies. The source of the spring was prove — ter tracing in 1968.
Recent investigations have determined residence times, tr — ilutions and pollution
dangers in this submarine artesian groundwater system. T — ursion will visit the
recharge areas, sinking streams and the pumping station — ing in the tunnel.

Cost : 135 pounds, including travel, accommodation and meals from 13 September to afternoon on 16 September. Participants must make their own arrangements for an evening meal and accommodation in London on 16 September.

Number of participants limited to 45. Deposit of 15 pounds - payable at the time of booking. Full fee payable by 1 August 1985.

Booking for post-Congress Excursions : Intending participants should notify the Congress Secretary; and forward their deposits as soon as possible to :- Mr A Hunter-Blair, Secretary, IAH 18th Congress, Anglian Water Authority, Ambury Road, HUNTINGDON, Cambs, PE18 6 NZ, England.

ACCOMMODATION : The standard of comfort provided by Churchill college is extremely good - this modern college was designed to function as a residential conference centre during university vacations. The Organisers hope that most participants will stay in the College and so enable the after-session informal discourse so vital to the success of international scientific meetings. Full board accommodation for the Congress will cost 34 pounds per person per day; all rooms have single beds and wash-basins; husbands and wives can stay in intercommunicating rooms.

REGISTRATION : The fee of Congress registration is 110 pounds for members of IAH and 125 pounds for non-members. A late payment surcharge of 20 pounds will be made to all whose payments are received after 1 August 1985. The fee will cover: attendance at technical sessions (including morning coffee and afternoon tea), 1 set of Proceedings, 'Welcome' reception, University/City reception, Congress Dinner and supper at Chilford Barn (although an extra charge for the last two items will have to be levied on participants not staying in Churchill College). The fee for accompanying persons is 20 pounds; this will cover the Congress Dinner and Chilford Barn supper.

THIRD CIRCULAR : The latest details of the Congress programme and the arrangements for the various IAH Commission meetings, together with local travel information ('how to get there') will be given in the Third (and final) Circular which will be distributed to all intending participants during June/July 1985. Meanwhile you are reminded to register early (the accommodation in Churchill College is not unlimited) and that registration fees received after 1 August 1985 will be subject to surcharge.

CONGRESS AGENT : The Organising Committee has appointed Premier Travel Group, of 7 Rose Crescent, Cambridge CB2 3LL (Phone : Cambridge (0223) 63222, Telex 818822 [Answer Back PTA HOL G]) to be the official Congress Agent.