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Final call for papers

UNIVERSITY OF NEWCASTLE



Newcastle Symposium 6 – 8 September 2000

This is the last call for papers to be presented at the Millennium Symposium in Newcastle. Abstracts are due in by *31st January*.

This will be the seventh in a very successful series of such meetings, which have all been well worth attending. The theme is *'Balancing water and land developments with human and environmental concerns'*. Contributions from working hydrologists (who might not normally submit papers to journals) and younger members will be particularly welcomed.

There will also be discussion of two major hydrological initiatives: *Catchment Hydrology and Sustainable Management* (CHASM) and *Lowland Catchment Research* (LOCAR).

Papers will be pre-published in the BHS Hydrology Symposium series.

The annual **BHS Postgraduate Symposium** will take place in Newcastle on *4th* and *5th September*, immediately preceding the National Symposium, to encourage postgraduate students to attend both events.

The **BHS Annual General Meeting** will be an integral part of the Symposium, and all members are encouraged to participate in it.

Members' views sought

Our new BHS President, **Professor Howard Wheater,** has begun a strategic review of the Society and wants to hear the views of members. Please read his President's piece on page 4 and send in your comments — it is your society!

BHS AGM

Imperial College, London
22nd September 1999

The BHS Annual General Meeting took place at the end of the National Meeting on *Recent developments and future directions in integrated catchment water quality modelling.*

Apologies for absence

Apologies were received from Terry Evans, Allan Lambert, Peter Midgley, John Rodda and Professor Peter Wolf.

President's Introduction

Frank Law introduced the meeting by highlighting some major events during the last year. The IUGG meeting had been a colossal feat of organisation by Birmingham University and a credit to the efforts of **Angela Gurnell**, **Geoff Petts** and **Paul Webster**, amongst others. **Mike Hamlin** had advised him that it had met its business plan. Frank commented that not many British hydrologists had attended. IUGG provided an opportunity to meet overseas members, who appreciated receiving *Circulation* and felt they received excellent value for their subscriptions. One BHS contribution to the IUGG meeting had been to run a short course for overseas hydrologists, for which the Society was grateful to DFID for a grant of £20 000 and to **Adrian Butler** for its organisation.

He thanked **Peter Walsh** (Hon. Secretary) for his work in organising programmes, agendas and keeping the Society's affairs in order and **Terry Evans** (Hon. Treasurer) for his stewardship of the finances, which are in good shape.

Another achievement had been the launching of the BHS Chronology, which now held 3400 events. He pleaded for more data and expressed his personal thanks to **Andrew Black**, **John Miller** and **Dave Archer** for their contributions to this project.

15th AGM held on 17 September 1998

The record of the meeting published in *Circulation 59* was approved as a correct record.

16th Annual Report of the Honorary Secretary

Peter Walsh introduced this report, which followed the tradition that the Honorary Secretary reports on the activities of the last year:

This is my first report as your Honorary Secretary and I would like to start on a personal note: little did I know what would be involved when I agreed, at short notice last year, to take on the role! However, help was at hand. The job would be impossible without the support of the Secretary at ICE. **Richard Howard**, who served the Society in that role for nearly four years, moved to a new job with the Chartered Institution of Building Services Engineers. His successor, **Lisa Stafford**, jumped in at the deep end for the July Committee and the mailing of *Circulation*. Richard and Lisa have kept the Society running: they ensure that new members are enrolled, membership lists updated, agendas and minutes produced for the committee and many other tasks. The Society is particularly grateful to them for their efficient and hard work on behalf of all members.

This year has seen a wide-ranging programme of national and regional meetings, including the annual post-graduate symposium organised by **Dawei Han** at Bristol. There has been, on average over the last 12 months, including the Scottish and Welsh Hydrological Groups, one technical meeting every fortnight across mainland UK (BHS does not organise any meetings across the Irish Sea).

This number of meetings takes a lot of organising, needs an even larger number of speakers and would not be possible without the commitment to the Society of a large number of people. We owe them all our indebtedness for ensuring that a wide variety of well-run meetings is on offer to hydrologists. The National meeting programme has been very well supported over the last year, so much so that the joint meeting with the Geological Society in February was oversubscribed and about 40 applications had to be returned. This was followed by a full lecture theatre at Birmingham in April where eight papers were presented on the floods of 1998, stimulating a very lively discussion. I can therefore confidently report that the technical programme of meetings is popular with members, and I can promise another full programme for the next year.

The Meetings sub-committee has been revived, and now operates entirely by email. As its Chairman I am grateful for the assistance provided by **Howard Wheater** and **Steve Parsons**. Planning for the next 12 months is nearly complete and an outline programme also exists for the 2000/01 national meetings.

This year the Committee has created the British Hydrological Society Bursary, worth £500, and has awarded it to the Department of Geography at Exeter for four years. They may give it to an individual student for any suitable hydrological purpose, including attendance at a symposium or to undertake fieldwork. It is not available for hardship or to replace normal sources of funding. The award was made to Exeter in recognition of the considerable contribution that members of the Geography Department have made to the foundation and sustaining of professional hydrology through the Society. This year the Bursary has been awarded to **William Blake,** a postgraduate (PhD) student, to enable him to attend a symposium in Beijing and present a paper. William's report is printed in *Circulation*.

The AGM always marks a change in the Committee membership. Whilst a majority of members continue, there are some departures. Frank Law completes his two-year term as President, which should give him some free time next year! He has worked tirelessly for the Society and the promotion of hydrology. **Kevin Tilford** steps down as the Pennines Group's representative, bringing to an end many years of service in what I am sure, and hope, will only be a temporary break. **Chris Soulsby** also concludes his term on the committee. **Celia Kirby** completes her record-breaking continuous membership of the committee as the Institute of Hydrology's appointee. The committee was unanimous in its decision to co-opt her back on to the committee immediately so that we can continue to benefit from her expertise. She produced Occasional Paper No. 10, "Hydrological Research in Britain 1995-1999", which was presented to delegates to IUGG at the reception in Birmingham, hosted by BHS and the Centre for Ecology and Hydrology.

Two nominations for the vacancies on Committee mean that we welcome **Peter Midgley** from the Environment Agency and **Roger Simpson**, a consultant, without needing a ballot.

A team of members has been busy writing chapters for the book "The Hydrology of the UK – a study of change", which will be published in December: fliers will be sent out with *Circulation*. Particular thanks are due to **Mike Acreman** for his work on this project, and to all the authors who have generously donated their fees to the charity Water Aid.

Three years ago **Paul Younger** expressed confidence that email would eventually become the main route of communication within the society and between us and the outside world. This moved one step nearer last year when the committee decided to circulate all its agendas and minutes only via email.

The BHS web site has been actively managed by **Matthew Lees** and Kevin Tilford, and attracts an average of 50 visits per week. Of these, 50% are from the UK, 10% from Europe, 10% from the USA and 30% from the rest of the world. We hope to have both membership and travel grant application forms available for download shortly.

The last few months have seen a decline in the use of the electronic mail facility *bhs-hydrology@mailbase. ac.uk*, which enables subscribers to send a message to all other subscribers using one simple email address. At the moment fewer than 25% of members are registered, although it appears that a larger percentage of the membership now has access to email. Members can join the distribution list by sending an email to *mailbase@mailbase.ac.uk* with the following content:

join bhs-hydrology *YourForeName YourSurname*

Full details are available on the web site *http://www.salford.ac.uk/civils/BHS*. The BHS hydrology mailbase is a very useful facility for sharing news or for seeking information. The Committee would be able to make more effective use of this facility to send updates about the programme and other news if all members with access to email subscribed. If you have email and are not signed on, please do so.

In concluding, Peter said it was impossible to do justice to everybody whose efforts help to ensure we have a healthy and successful society, and on behalf of the whole membership, he thanked everyone who has contributed, in whatever capacity, during the last year.

Hon. Treasurer's report

In the absence of Terry Evans, Peter Walsh presented the Trustee's Report and Accounts. He explained that these must meet the requirements of the Charity Commissioners, and then he highlighted the main features.

Membership has again increased and stands at 804. The unrestricted funds show a surplus of income over expenditure of £19007, of which £13272 came from the Exeter Conference. The Exeter Fund (restricted) had increased unrealised investment gains of £3939 during the year and the total fund now stands at £39 999.

Peter said that the finances were clearly healthy, but we should not be complacent as the value of investments may fall and the Society needs healthy reserves to underwrite major events, such as the Exeter Conference, which carry substantial financial risks. The Committee is not proposing a change in subscription rates and will review charges for meetings to achieve an outturn closer to break-even.

He concluded by saying that BHS provides excellent value and it intends to continue to offer a programme of technical meetings of a high standard at low cost.

David Rodda commented that there was a significant reduction in expenditure on printing, stationery and photocopying. Peter responded that this was because only three issues of *Circulation* had been produced in the year.

Report of *Circulation* editor

Celia Kirby presented this on behalf of **John Griffin**. She said that although there had only been three issues, these had been to the usual high standard, which was John's hallmark. The new publication schedule, devised by Peter Walsh to dovetail with Committee meetings, was necessary to keep down the Society's costs incurred via the Institution of Civil Engineers, and will help production in future. She added that production costs were reducing, as the printing industry is very competitive.

Celia thanked all those who had contributed to *Occasional Paper 10* and apologised for the omissions, in particular those from the list of courses in hydrology. Publication of the report had brought comment from some of those not included, and consideration was being given to producing an update on the Society's web pages.

Adoption of Reports and Accounts

Anthony Tollow proposed acceptance and **Paul Whithead** seconded. The accounts and reports were approved unanimously.

Award of the President's Prize

Frank Law announced that he had been supported by comments from other members in his decision to award this to **Celia Kirby** for all her work on behalf of the Society and hydrology in general, but particularly on publications. This had been done cheerfully, willing and beyond her professional duties. Celia responded that she had enjoyed making these contributions and although she 'retired' from the Institute tomorrow, she had every intention of continuing to be active in hydrology.

Any other Business

Anthony Tollow (speaking as an overseas member) wished to record that BHS is "the best investment of all the societies and institutions of which I am a member". He applauded in particular the BHS policy of keeping the cost of meetings down, citing last year's international meeting in Exeter – which he, as an overseas member, had been able to attend – as being excellent value for money.

Frank Law informed the meeting that he proposed to pass the archives, which he had inherited from previous Presidents, on to the Institution of Civil Engineers for safe keeping.

Installation of President

Frank Law introduced **Howard Wheater,** who he said had made major contributions to British hydrology and to the Society. In particular he had blessed the pre-IUGG course, held at Imperial College, where he is Professor of Environmental and Water Resources Engineering. He made a major contribution to the BHS Research Strategy – recent developments, in particular LOCAR and NICHE, demonstrated its value and offer a good start for hydrology in the new millennium.

Howard Wheater concluded the meeting by thanking Frank for his excellent stewardship of the Society. Under Frank Law's Presidency the Society had increased its membership and financial resources, held its first international conference last July, and strongly supported the IUGG Birmingham meeting this July. Frank has also been instrumental in a number of initiatives, for example in establishing the web-site for historical data and in obtaining DFID support for hydrologists from developing countries to attend a short course and the IUGG meeting. His enthusiasm, commitment and broad experience of hydrology in the UK and overseas have been invaluable in guiding the Society, and the whole meeting joined Howard in expressing its thanks to Frank.

President's prize goes to Celia

The BHS President's Prize (worth £200) was awarded by outgoing President Frank Law to **Celia Kirby** for Services to Hydrology. Through this award the Society recognised Celia's work for the wider good through hydrology, as a founder member of the Society, as editor of a wide range of publications including *Circulation*, Symposium Proceedings, the Exeter Conference volumes and numerous Occasional Papers, as well as representing the Institute of Hydrology on the main Committee for some 15 years.

New President's Piece

What does a President do? I've always wondered. Having taken up the Presidency just a few weeks ago, my diary has been filling up rapidly. The BHS Committee, meetings of ICE Associated Societies' Chairmen, the ICE Water Board, CIWEM, invitations to Parliamentary Dinners, Presidential Addresses, NGO groups and various committees.... a seemingly endless list. I must find time for some BHS activities! I hadn't realised this could be a full-time job!!

More seriously, the Presidency of BHS is an honour, but it carries with it major responsibilities: for the Society, its membership and hydrology as a scientific discipline and profession. Under **Frank Law**'s Presidency the Society has continued to develop, with new initiatives, increasing membership, a full programme of well-attended meetings and a healthy bank balance.

However, as I happen to be the incumbent as we move into the new millennium, it seems appropriate to take stock of the Society's activities and achievements and look to the future. Are we meeting our members' needs and aspirations? Are we fostering the future of hydrology in Britain in terms of its intellectual and professional development? Are we strengthening the Society's role in a changing world? What challenges do we see ahead?

I would therefore like to take the opportunity of my first President's piece to ask for your help in a strategic review. Is the Society meeting your needs? What are we not doing that we should be doing? What should be our 'blueprint for the next millennium'?

In committee we have identified a preliminary set of issues for discussion:

1. **Relationships with other learned bodies.** Is the Society distinct, does it have something to offer, and how best can we interface with our sister institutions?
2. **Policy.** Should we be more proactive in commenting on government policy, the needs of the profession in practice, and in research?
3. **Publications.** Is BHS producing significant/relevant publications which cater for members' needs and those of the profession?
4. **The internet.** How do we best use IT to promote the Society's activities?
5. **Education and training.** Do employers' needs match current provision? Are we meeting the educational challenges of a multi-disciplinary science? Are we providing adequate support for Continuing Professional Development?
6. **National/regional structure.** Is BHS meeting local needs, and those of younger members?
7. **International links.** Is our interface with IAHS working well? Should we be more proactive in international initiatives? Do we need a European Hydrological Society?
8. **Membership numbers.** Are we reaching all potential members – in the Water Industry, Environment Agency, Universities and Research Institutions? If not, what do we need to do?

Please let me, or any of the Committee, have your views on these, or any other issues. You can contact me by e-mail (h.wheater@ic.ac.uk), or fax (0171 823 9401) or by post at Imperial College, London SW7 2AZ. It is your Society: please tell us what you think! We would also welcome your more active involvement in this initiative. If you are interested in participating in a working group to discuss one or more of these issues, perhaps by e-mail, your input would be most welcome.

That seems to be more than enough for one President's Piece, but may I close with one more request? This issue of *Circulation* comes out with another circular for our Newcastle National Symposium. Please put *September 2000* in your diary – and now is the time to pop that abstract in the post!

Howard Wheater

IAHS Symposia at IUGG Birmingham

Mike Steel reports on Symposium HS1 — *Hydrological extremes: understanding, predicting, mitigating*

The IUGG XXII General Assembly was a truly large-scale conference, with two abstracts volumes totalling over 1000 pages. Symposium HS1 ran for two days (Thursday 29 – Friday 30 July 1999) and covered a variety of subjects relating to hydrological extremes. We were fortunate that many of the international delegates were able to present in English, and that the sessions were also accompanied by a number of posters. The oral presentations are summarised below according to their themes.

Understanding circulation patterns

This session began with two papers considering the effects of atmospheric and sea surface processes in rainfall generation, describing the precipitation associated with combinations of sea surface temperatures and circulation patterns for Tuscany, Italy (**Meneguzzo *et al.***) and mid-Europe (Germany and Austria: **Bardossy *et al.***). The impacts of future climate change scenarios were also considered. Circulation patterns (including sea level pressures) were then linked to the other extreme – droughts – for south Germany (**Stahl & Demuth**) and Romania (**Adler *et al.***).

Understanding nonstationarity

A wide range of papers was presented in this session. The first (**Kojiri**) used cluster-based hydrological analysis of global warming effects and neural networks to predict precipitation magnitudes and features. **Crisci *et al.*** considered the consequences of climatic variability on design storm uncertainties and related impacts in urban runoff design.

Cordery *et al.* demonstrated how a simple partitioning model using geopotential height and Southern Oscillation Index (SOI) could explain more than 65% of variance in Australian precipitation for the next season, providing a more reliable drought forecast, despite a recognised lack of understanding of the physical processes involved. The Southern Oscillation was also studied by **Krasovskaia *et al.*** to explain flood frequency in Costa Rica, although there was no clear connection with flood magnitudes. Another Scandinavian researcher, **Lindström**, described the

analysis of long Swedish flood records, which in most cases do not suggest any change in flood frequency. Even longer flood series exist in China, where recent events were compared to a 500-year history (**Liu** and **Wang**) and to global extremes. **Jayawardena** and **Gurung** looked at the effect of noise in non-linear hydrological time series analysis and prediction.

Prediction: drought

In terms of drought prediction and resource management, **Döll *et al.*** described the need to analyse water situations during three types of basin-specific 1-in-10 dry years, defined by precipitation, runoff and irrigation requirements. Drought frequency analysis in Zimbabwe (**Kjeldsen *et al.***) used one parameter from a two-component exponential distribution to identify homogeneous regions for use with the index-flood method. **Chebchoun *et al.*** considered the definition of droughts from daily mean flow series using different threshold techniques.

Prediction: floods

This session began with an examination (**Bolgov *et al.***) of the distribution function of extreme flood discharge, recommending the use of a distribution in the form of a mixture of two densities. This was followed by a more practical paper (**Archer**), describing how historical flood information might be incorporated into flood estimation, giving an alternative to regionalisation techniques. Two examples used data covering a period of over 200 years.

Steel *et al.* then demonstrated the use of synthetic runoff data to reassess flood risk in Scottish rivers, with changes of greater than 10% in the estimated value of the 100-year flood reported for three study rivers, as a result of the synthetic record extension achieved. Differences between the return periods of design storms and the floods generated were studied (**Northrop *et al.***) using a stochastic rainfall model in which rain cell origins arrive according to a clustered point process in space and time. **Reed** gave an insight into the new pooling techniques used in the *Flood Estimation Handbook* (FEH), and the software developed to provide users with a flexible tool towards risk estimation. Flood frequency analysis problems due to permeable geology were considered by **Faulkner** and **Robson**, using conditional probabilities and L-moments to develop a new method for the FEH. Finally, **Webster** described a rainfall-runoff model used to investigate the relationship between the frequency of a flood and its causative rainfall, finding considerable scatter in the relationship for permeable catchments due to the influence of alternative modes of flood generation.

Mitigation

The invited paper by **Simonovic** provided an excellent description of mitigation efforts in the Red River basin in North America. The 'flood of the century' in 1997 resulted in $400 million of costs, despite the construction of a floodway to protect Winnipeg after a flood event in 1950. Difficulties are also encountered with ice in this north-flowing river due to snowmelt occurring in the south of the catchment whilst the north is still frozen.

The other oral presentation in this session described how water resources management in Brazil might use seasonal forecasting methods to derive forecasts of flow volumes, using down-scaling and resampling procedures (**Galvao *et al.***).

I gratefully acknowledge the receipt of Exeter Fund support from the BHS to attend this conference.

Michael Steel
Dundee University

Kate Heal reports on Symposium HS5 — *Impacts of urban growth on surface water and groundwater quality*

This symposium was truly international, with papers from all continents, indicating that the impact of urban growth on hydrology is a global issue.

A range of impacts of urban growth was identified on hydrology and surface and groundwater quality, and solutions to these problems were addressed. These included structural solutions (such as wetlands, detention basins), the use of modelling to evaluate the effectiveness of different solutions, and, at a more fundamental level, planning new developments to minimise their impacts.

Many papers were very site-specific, probably for two reasons. Firstly, practical difficulties arise in data-gathering in urban situations, e.g. vandalism of equipment and the operation of automated water samplers to capture the characteristic 'first-flush' of pollutants. Secondly, results *are* site specific because of differences in land-use, climate, soil and geological conditions, and social attitudes.

Nevertheless, a general theme that arose from the symposium was the contrast between developed and lesser-developed countries (LDCs). Lack of sewerage is predominantly responsible for the impacts of urban growth on water quality in LDCs, but is perceived to be 'under control' in developed countries. The severe impacts from urban growth that occur in LDCs are due to completely uncoordinated planning and project appraisal. For example, **H. K. Ramaraju** (Bangalore University) showed slides of a septic tank that had been constructed two metres from a drinking water well, and **Chris Handley** (School of Oriental and African Studies) described how water resource development had drained the water supply of the city of Ta'iz in Yemen. Solutions to the impacts of urban growth are hard to enforce in LDCs, because of the lack of money for infrastructure and for enforcing standards. Furthermore, the solutions currently being developed in North America, Europe and Australasia may not always work in developing countries because of different cultural attitudes: e.g. the river channel is often viewed as the traditional place for waste disposal. Finally the lack of basic hydrological and water quality data in LDCs means that modelling has been developed to assess the impacts of urban growth on water resources and to evaluate different solutions.

Nevertheless, developed countries should not be complacent about the impacts of urban growth. Many of the new solutions proposed for urban drainage require further data to evaluate their performance, and maintenance agreements for BMPs remain a thorny issue.

Several papers presented during the symposium particularly challenged some of my notions of the impact of urban growth on water resources. **Sue Grimmond** (Indiana University) reported that, in North American studies, there is more evapotranspiration from urban areas than rural areas, a result of the watering of extensive green areas in the suburbs. Drawing on examples from many LDCs, **Stephen Foster** (BGS) demonstrated that urban growth increases net groundwater recharge due to wastewater and mains water leakage. In the UK, **David Lerner** (Sheffield University) identified leakage from sewerage and mains water pipes as the major source of nitrate in groundwater in Nottingham.

Discussion during the symposium sessions emphasised the need for increased interaction between hydrologists and society to limit the impacts of urban growth on water resources. One problem in all countries is the lack of integrated planning, particularly consideration of the linkages between surface and groundwater resources. Public participation is required to

tackle many urban drainage problems successfully: this could be encouraged through demonstration projects in areas with strong community leadership. Public education is also vital, particularly in schools since "the children of today are the citizens of tomorrow". It is encouraging that several studies reported at the symposium had included educational measures and questionnaire surveys of attitudes to urban drainage. We are likely to see many more of these types of studies in the future.

Finally, thanks must go to **Bryan Ellis** (Middlesex University) for putting together a varied programme and editing the accompanying Red Book, and to BHS for a travel grant which helped me to attend the Symposium.

Kate Heal
University of Edinburgh

Proceedings volumes (IAHS 'Red Books')

Five volumes of proceedings of the IAHS symposia held during IUGG 99 at Birmingham in July were pre-published in the IAHS 'Red Book' Series and are now on sale:

Hydrological extremes: understanding, predicting, mitigating *Edited by L. Gottschalk, J.-C. Olivry, D. Reed & D. Rosbjerg*, IAHS Publ. no. **255**, price £46.50, 314+x pages, ISBN 1-901502-85-6

Interactions between the cryosphere, climate and greenhouse gases *Edited by Martyn Tranter, Richard Armstrong, Eric Brun, Gerry Jones, Martin Sharp & Mark Williams*, IAHS Publ. no. **256**, price £42.50, 282+x pages, ISBN 1-901502-90-2

Impact of land-use change on nutrient loads from diffuse sources *Edited by Louise Heathwaite*, IAHS Publ. no. **257**, price £42.50, 272+viii pages, ISBN 1-901502-95-3

Integrated methods in catchment hydrology – tracer, remote sensing and new hydrometric techniques *Edited by Chris Leibundgut, Jeff McDonnell & Gert Schultz*, IAHS Publ. no. **258**, price £43.00, 284+xii pages ISBN 1-901502-01-5

Impacts of urban growth on surface water and groundwater quality *Edited by J. Bryan Ellis*, IAHS Publ. no. **259**, price £59.00, 438+x pages, ISBN 1-901502-06-6

To order any of these volumes, please contact Mrs Jill Gash, IAHS Press, Institute of Hydrology, Wallingford, Oxfordshire, OX10 8BB *(tel 01491 692442; fax 01491 692448/ 692424; e-mail jilly@iahs.demon.co.uk).*

BOOKS

Understanding the water cycle

Water – a reflection of land use, Edited by M. Falkenmark, L. Andersson, R. Castensson and K. Sundblad, Swedish Natural Science Research Council, Stockholm. 1998. ISBN 91 54603587. Price 170 Kr + 60 Kr postage.

The authors state that the aim of this book is to 'demystify' the water cycle and its key processes, in order to educate decision makers and to help to create a culture of greater awareness of water issues. The goal is a better understanding of the interconnections between water resources and human behaviour as well as enlightened policies at the national and international level.

The book arose from an invitation by UNESCO in 1989 to the Swedish Committee for the International Hydrological Programme to clarify the problems and opportunities associated with the need to close the gap between hydrology and ecology. The resulting book uses case studies provided by over 20 National IHP Committees (both developed and developing countries, and in Northern and Southern Hemispheres), to illustrate the ways in which human activities affect the water cycle.

Chapter 1 sets the scene, outlining the hydrological cycle, and illustrating how a finite resource is expected to supply the ever-expanding requirements of the human population (currently increasing by almost two million per week). Chapter 2 illustrates problems in different parts of the world (from industrial pollution in the Czech Republic and agricultural pollution in Denmark, to rainforest clearance in Brazil and salinisation of irrigated farmland in the Ukraine, soil erosion in India). Chapter 3 describes some of the physical processes involved, and Chapter 4 some of the policies and (mis)management and land and water resources. Chapter 5 describes how changes in the land use may consciously or unconsciously alter the hydrology (e.g. alterations to river flows by cultivation of the steppes in Russia, increased flash flooding on steep land in Southeast Asia where tropical forests have been replaced by intensive farming, drying of the Florida Everglades by agricultural drainage).

The latter part of the book looks to what can be done, once the problems are recognised, and how an understanding of hydrology needs to be built into a wider framework or integrated land use and water management. In case people think that this is just another 'doom and gloom' book about misuse of the environment it goes on to show that whilst some types of degradation are irreversible, in other cases it may be possible to halt or to restore. For example, the semi-arid Machakos District in Kenya was considered an environmental disaster in the 1930s as a result of soil degradation, and for many years received famine relief. Nowadays, due to soil conservation and tree planting, soil erosion has declined despite a 5-fold increase in the population and total agricultural production is much higher than before. Examples of an integrated catchment resource management approach show that often a technical solution alone is not sufficient. The participation and support of local communities is essential if a scheme is to be implemented, regardless of its technical elegance.

This is a good book for the non-hydrologist wanting to learn more of the subject, and also for professional hydrologists recognising the need to make themselves more aware of the place of their specialism within the wider social and environmental issues.

Despite the hand of a dozen contributors, the book is uniformly well produced and illustrated, and eminently readable.

For teachers and students seeking examples of good and bad management practices around the world, this is an invaluable source book, with a detailed reference list for further reading.

Mark Robinson
Institute of Hydrology

From moorland to forest: the Coalburn catchment experiment,

From moorland to forest: the Coalburn catchment experiment, M. Robinson, R.E. Moore, T.R. Nesbit and J.R. Blackie, 1998, IH Report No. 133, 64pp, Institute of Hydrology (ISBN 0 94850 86 9), £25.

The Coalburn catchment experiment was established in 1966 by the then Hydrological Research Unit, Cumberland River Authority and the Forestry Commission in order to complement work at Plynlimon. The original justification and importance of Coalburn derives from the fact that 20% of UK land areas (uplands) still provides 50% of our water supplies. During its lifetime, it has contributed to our understanding of flood runoff rates and volumes and to water chemistry changes following ploughing, planting and canopy closure. Coalburn has had a low profile, perhaps matching the modest scale of the experiment, but this does not lessen its importance. Over the years it has produced significant findings with surprising results and sometimes confounding those from other sites. Jim McCulloch concludes Section 1 justifiably with a re-phrasing

of Pliny: "New findings are always coming from Coalburn".

Although less well known than many catchment studies, it deserves recognition as one of the important experiments. It may even outlive some other famous sites and it will be no surprise if Coalburn reveals additional unexpected results in the future and contributes further to our understanding of the hydrology of upland forest catchments.

Coalburn has also provided an opportunity for many academic research studies. The report provides a concise but wide ranging account of all the work at Coalburn, spanning 30 years of data collection and analysis. It presents the results and a discussion of the deductions, with appropriate cross-references to other studies, both in the UK and abroad.

The Institute of Hydrology, Forestry Commission and the (too many to name due to repeated re-organisations) water and river management organisations in NW England have all played significant roles. Without the persistence and far-sightedness of many individuals over more than three decades in these sponsoring organisations, Coalburn may have been lost to hydrological science. It is unfortunate that an editorial oversight omitted acknowledgement of those who have retired. From my limited involvement and knowledge, I would particularly recognise the roles of Clive Marshall, Bill Binns and Tom Johnstone.

The catchment is now at canopy closure, so the experiment has covered the transition from original open moorland, through cultivation, ploughing, planting and growth of the trees. Overall, the effects of forestry are still hotly debated, due to conflicting effects of ploughing (increased runoff) and tree growth (interception).

Coalburn, at canopy closure, we are told is in transition and compared with moorland, its total water yields are lower, storm peaks once again similar (having increased) and baseflow (though still reducing) remain higher. Other important conclusions are:

- Effects of ploughing are very long lasting;
- Young forest interception is low and variable;
- Transpiration (found to be less than in many published studies) is limited by environment;
- Cloud deposition rates (<5% annual precipitation) are lower than previous assumptions;
- Stormwater quality is very varied.

Following a section on the history of the experiment the reader is presented with a discussion on the changing perceptions of forestry impacts on hydrological regimes and sections on water industry, forestry, Environment Agency interests and international perspective. The final section takes a forward look, concluding that Coalburn will undoubtedly continue to produce many more important findings. The foresight of those involved in establishing and maintaining this experiment has been very well rewarded. It is to be hoped that similar fore-sight and courage can keep the experiment alive for many more years and there will be a further report describing the response of the catchment after felling and comparing its return to moorland with its properties in the 1960s!

This is a valuable and very readable resume of the research at Coalburn, with over 100 references. It will be an invaluable reference for all professionals with an interest in forest hydrology and the consequential effects of changes on catchments. Students will also find it useful as it offers a concise overview of the subject beyond the work at Coalburn.

Peter D Walsh
Bullen Consultants

Mine drainage

BHS Pennines Hydrological Group Meeting
Water Resource Systems Research Laboratory
University of Newcastle Upon Tyne
17 November 1999

Mine water pollution is probably more problematic in the Pennines than in any other BHS region. The relative importance of this form of pollution was reflected in the strong turnout for this afternoon meeting, with 38 people making the trip from both sides of the Pennines to hear five talks on aspects of mine water hydrology.

After a brief introduction by **Peter Walsh**, the Pennines Group Chairman, **Paul Younger** (Newcastle University) presented an overview of challenges and recent advances in mine water hydrology research in a talk entitled "Mine water hydrology: the state-of-the-art". Somewhat unusually, Paul prefaced his talk with a song, accompanied on guitar, "Farewell, Johnny Miner", documenting the destruction of Britain's coal industry and thus setting the scene for the technical presentations which followed.

In the body of his presentation, Paul outlined some of the principal obstacles to effective prediction in mined systems, and some of the advances over the last seven years, particularly those documented in the recent Environment Agency R&D Technical Report W179 "Predicting mine water rebound" (of which he was lead author). Advances in direct observation were illustrated by slides of underground water surveys in Frazer's Grove fluorspar mine in the North Pennines, and in South Crofty tin mine in Cornwall. Two recently-developed approaches to modelling mixed turbulent and laminar flow in abandoned mined systems across a range of scales (GRAM and VSS-NET) were outlined. The role of 'acid generating salts' in storing acidity above the water table, to be released when the mine floods, was described, and needs for further research were identified.

Keith Whitworth (International Mining Consultants Ltd) gave a presentation entitled "Examples of minewater rebound in northern England and Scotland – towards a new modelling approach". Drawing upon his extensive experience as a mining geologist for British Coal and, more recently, as a leading investigator of mine water rebound problems for the Coal Authority, Keith demonstrated the widespread occurrence of head-dependent inflows to mines in the British coalfields. Since such inflows decrease in magnitude as water levels rise within the workings, the time needed for large mine systems to flood to surface are often considerably longer than would be predicted assuming constant inflows during rebound. By combining mine plan records of worked areas with the available information on inflow rates during mining, it is increasingly possible to predict mine water recovery rates, and final, post-rebound mine water outflow rates, with some degree of confidence. Such methods are currently being applied to the South Lancashire Coalfield on behalf of the Environment Agency.

The situation in South Lancashire was the subject of the following presentation, by **Mark Thewsey** (Environment Agency, Warrington office) in a talk entitled "Orders of magnitude: developing analogues for minewater rebound in South

Lancashire". Mark outlined the geological framework of the Lancashire coalfield, noting the presence of many mine water discharges in the northern part of the coalfield where Coal Measures strata crop out. Current concerns focus on the south of the coalfield, where the mined strata extend beneath the public supply aquifer formed by the Permo-Triassic sandstones. A rapid evaluation of the possible risks to water supply wells from rising mine waters was undertaken at the time of the last pit closures in the early 1990s. A number of discrete areas of interconnected workings were identified, for each of which detailed evaluations of the rate of mine water rise and the likely consequences of full recovery were identified. The range of scenarios identified for the different units is broad, varying from centuries for total recovery and negligible impacts on the overlying aquifer (the Cronton system), to relatively rapid recovery (on a scale of years) with the scope for significant contamination of the sandstone aquifer (the Agecroft system). Detailed modelling is currently under way (by IMC Ltd) in an effort to quantify the risks and uncertainties, which will provide a basis for rational planning of appropriate responses with the Coal Authority.

An alternative approach to mine water modelling was presented by **Russell Adams** (Newcastle University), in a talk entitled "Modelling rebound in abandoned mines: the Whittle case study". Russell first described the structure and function of the VSS-NET, which is the first ever physically-based model for water movement in abandoned mines. The code was developed between 1996 and 1999 as part of a three-year national R&D contract (funded by the EA and Northumbrian Water Ltd) entitled "Improved modelling of abandoned coalfields". VSS-NET comprises the subsurface component of the SHETRAN catchment modelling system, i.e. "VSS" (which models 3-D Variably Saturated Subsurface flow), through which is routed a 3-D pipe network model (based on the Gradient Algorithm). The pipe network represents large, open roadways in the abandoned mine systems, in which flow can be expected to be turbulent, with the VSS component representing the surrounding strata and rubbly areas of collapsed workings. The code has been successfully applied to a number of mine systems throughout the UK. Russell described what is possibly its most important application to date – to the Whittle Colliery site in Northumberland. Whittle Colliery was finally abandoned in April 1997, and mine water levels began to rise rapidly. The target watercourse for any outflow from the mine is the River Coquet, the entire channel of which is an SSSI, and which also supports a long-standing public supply abstraction at Warkworth (downstream of the mine). Using mine plans to define the layout of major roadways and worked longwall panels, and deriving an effective rainfall distribution by modelling the surface water balance of a nearby gauged catchment, the early part of the observed recovery in water levels within the Whittle workings was used to obtain a deterministic calibration of VSS-NET. The calibrated model was then successfully checked against a later portion of the recovery data. Finally, simulations for 'wet', 'dry' and 'average' periods in the future were undertaken. The latest monitoring results showed that the recovery during 1998 (a wet year) corresponded to the 'wet' curve, whilst recovery during 1999 (close to average rainfall in Northumberland) has followed the 'average' curve. The model results have helped the EA and the Coal Authority in planning for timely intervention at this site to prevent pollution of the Coquet.

The final presentation of the afternoon was by **Sean Burke** (University of Sheffield) on "Groundwater rebound at three abandoned collieries in the South Yorkshire coalfield: A first approximation using the GRAM model". The abandonment of Treeton, Thurcroft and Silverwood Collieries in the Rotherham area brought to an end some 400 years of deep mining. Only Maltby Colliery, some kilometres to the east, remains in production in this region, though its future also looks uncertain at present. The closure of the three collieries around Rotherham has at least two possible hydrological consequences: (i)surface outflows of mine water into the River Rother and/or the River Don, and (ii) increased water inflows to the active workings at Maltby Colliery (which would further damage the profitability of that mine). British Coal left no monitoring points in the area when these mines were abandoned, and it is therefore only by modelling that any assessment can be made of the likelihoods of these consequences. The GRAM code was configured for this purpose, drawing upon mine plans, records of dewatering rates, and the personal experiences of former miners (including Sean himself). One of the key uncertainties in the model was the status of a possible mined connection between the Silverwood and Maltby workings, which merged briefly in 1923 in an area of collapsed workings ('goaf'). Three possible alternatives for the connections were modelled (fully open, partially open or completely blocked). Only in the fully open case (which is considered unlikely) are no surface discharges in the Rother catchment predicted. For both the other cases, it is predicted that surface outflows of mine water can be expected by around 2004. The pressing need for mine water level monitoring in the area is underlined.

Paul L Younger
Newcastle University

Beijing symposium

The 8th International Symposium of the **International Association for Sediment Water Science** (IASWS) was held in Beijing from *13* to *17 September*. Thanks to the generous support of the BHS through a travel bursary, awarded through Exeter University, I was able to attend this conference and present some preliminary results from the first two years of my PhD research. The conference brought together participants from a variety of disciplines, including geologists, geomorphologists, hydrologists, geochemists, biologists and limnologists, all with an interest in the interactions between sediment and water. The resulting multidisciplinary perspective was an important and valuable feature of the meeting.

China was a particularly suitable location for the conference, since many of the sediment-associated problems discussed are very much in evidence in the Chinese environment, although often on a far greater scale than those experienced in the UK. The scale of the problems faced by Chinese scientists was ably demonstrated in a plenary lecture by **Bingnan Lin** (China Institute of Water Resources and Hydropower Research), who has been heavily involved with sediment studies associated with the Three Gorges Dam. He discussed the flushing of accumulated sediment from the proposed reservoir behind the Three Gorges Dam – quite a task considering the current annual sediment load of the Yangtze is ca. 0.38 billion tonnes.

The technical sessions covered all aspects of sediment research, and although not always directly relevant to my work, helped me to familiarise myself with current work in the broader field and put things very much in perspective. Lectures that were of most interest to me discussed applications of environmental radionuclides to the study of sediment problems since this is my area of research. Several workers

discussed the use of naturally occurring ^{210}Pb in determining sedimentation rates and the presentation of 25 years of observations of ^{137}Cs and ^{210}Pb in the sediments of Lake Michigan by David Edgington, one of the original workers in the field, was particularly interesting. It was also good to see presentations of work that has involved direct measurement of soil erosion and sediment storage by conventional methods, and to have the opportunity to discuss the potential application of some of the techniques that I have researched in providing additional and complementary evidence for other investigations.

My own research involves an attempt to exploit the environmental behaviour of short-lived Beryllium-7 as a tool to trace sediment mobilisation, transport and storage in river systems, from soil erosion to floodplain sedimentation. In approaching this problem I have had to consider the sediment system at quite a broad scale. It was therefore good to listen to people discuss work which focused on one aspect of the system in detail, where I have perhaps had to make generalisations. It was also good to meet students from other countries, and to get a feel for different approaches to similar problems. Putting faces and personalities to names that have become increasingly familiar over the last two years research also proved a novel experience.

This was the first international conference I have attended and certainly the most important presentation that I have made so far. I was pleased to receive encouragement and constructive feedback in a friendly, relaxed and sociable environment, which made the preliminary stresses all seem worthwhile. This was a good time to visit China's capital since the country was warming up for its celebration of 50 years of the People's Republic of China in early October. Beijing is a fascinating city and its people were always friendly and interested – although being the focus of everybody's attention can get a bit much at times. The visit was a chance to sample a very foreign culture, and the opportunity to see sites such as Tiananmen Square and the Great Wall of China (as well as to eat crispy Beijing duck in Beijing) was a real bonus.

It was a great opportunity in all respects and I am very grateful for the BHS sponsorship, which made my visit to China possible.

Will Blake
University of Exeter

New members

We welcome the following members to the Society:

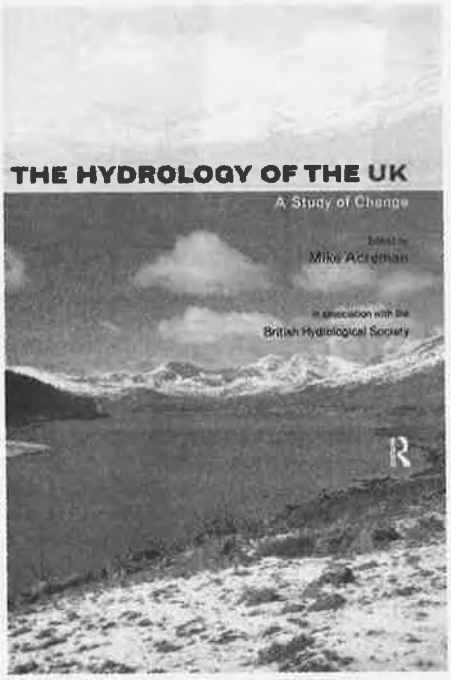
James R Ashworth ..... Gloucester
Dawn L Harrison ..... The Met Office, Bracknell

BHS authors donate fees to WaterAid

Routledge (now part of Taylor and Francis) will publish a major new book on the hydrology of the UK on 15th December 1999. "The hydrology of the UK" was initiated by the British Hydrological Society and is the culmination of two years work by 40 leading hydrologists from universities, research institutions, government agencies and private organisations across the UK. The book's editor, **Mike Acreman**, is delighted with the effort put in by all contributors, and also by their generosity, as all of the authors' fees have been donated to WaterAid, and royalties from the book will go to the British Hydrological Society.

The book focuses on the changing natural hydrology of the UK, which is influenced by climate, land use, catchment development (such as dams and groundwater abstraction), channel engineering (e.g. dredging) and many other factors: these factors themselves are continually changing. Although there is still debate about whether recent droughts and floods are the result of global warming or just natural climatic variability, past ice ages are undoubted evidence of long-term climate change. Deforestation over the past 5000 years has also caused significant changes in this country's hydrology. Recent land-use conversion, for example as a result of altering farm subsides, ensures that such changes will continue. Rapid demographic shifts and expectations of higher living standards during the twentieth century have created far increased demand for reduced flood risk, reliable public water supply, food security, better industrial goods and cheap electricity. Meeting these demands has led to the conversion of wetlands to arable land, increased river management, groundwater abstraction, the expanded use of agricultural chemicals and increased discharge of effluent. As a result, the hydrology has been altered significantly. For example, less than 10% of river reaches are free from structural modification of channel and banks and over one-half of rivers has a non-natural flow regime.

"The changing hydrology of the UK" highlights key issues that affect the fundamental hydrological processes and thus have important implications for water resource management, flood risk and environmental quality. Section I deals with climate change, land-use changes; channel modifications and catchment-scale hydrological changes (including abstraction, inter-basin transfers and dam construction). Section II assesses the effects of these pressures on UK rivers (in terms of both quantity and quality), groundwater, lakes, ponds and wetlands. Section III deals with the responses of the various organisations responsible for planning and management of water in the UK, looks at how we can achieve sustainability with respect to the hydrological cycle, assesses the role of the British Hydrological Society and outlines the needs for future research.



CIWEM awards

The Chris Binnie Award 2000 for sustainable water management

This annual award was established by the CIWEM Council in July 1998 to recognise excellence in the achievement of sustainable water management. The prize is a cheque for £500 to be used on a project related to the sustainable use of water and a framed certificate. The funds were generously provided by Chris Binnie, a Past President of CIWEM and deputy Chairman of Binnie, Black & Veatch.

Submissions are invited for the 2000 Award. Entries may relate to projects, research or other relevant work and should consist of six copies of a summary report (not more than five pages), plus related material and photographs if appropriate.

Sustainable water management can include water resources development, improvements in the sustainability of existing sources, demand management including leakage reduction, water waste minimisation, adaptation of the environment to be more sustainable to water utilisation and other subjects that the judges consider appropriate.

The closing date for receipt of submissions is **1 February 2000.**

The Ken Roberts Award for technical innovation

The Ken Roberts Award, *available only to CIWEM members and their employers,* was established jointly by CIWEM and Wessex Water plc in memory of Ken Roberts FCIWEM. A named CIWEM member must have played a leading part in the entry submitted.

Submissions may relate to projects, research or other relevant work. They should be in the form of a summary report (not more than ten pages), plus related material and photographs if appropriate (all in triplicate).

The named winner will receive a certificate and a prize of £1000, which may be used to fund a proposal related to water and environmental management, e.g. attendance at a prestigious national or international conference, or a post-graduate course of study.

The closing date for receipt of submissions is **1 March 2000.**

Presentations of both these awards will take place at the CIWEM Annual Dinner in April 2000.

To make a submission or for further Information please contact Sarah Penfold, CIWEM, 15 John Street, London WC1N 2EB *(tel 0207 831 3110, fax 0207 405 4967, email spenfold@ciwem.org.uk, website http://www.ciwem.org.uk)*

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West Sussex
RH16 3NY

Closing Date:
13th December 1999

South East Water is a subsidiary of SAUR Water Services which supplies water to 1.4 million people in the South of England. We are part of the international SAUR group which provides water supply, environmental services and engineering consultancy, design and construction services to over 30 million people worldwide.

A Vacancy has arisen at Head Office for a Water Resources Planner, based at Church Road, Haywards Heath.

The **Water Resources Planner** will fulfil a key technical support role within the Business Planning function with particular emphasis on water resources planning. He/she will play a important role in the decision making processes on resources development and submissions to our regulators. This is a new position and offers an exciting challenge within a dynamic multi-discipline team environment.

Applicants should be able to demonstrate experience in the following areas:

- Water Resources/Drought Contingency Plan preparation
- Resources developments technical appraisals
- Surface water yield review calculations
- Development/use of water resources modelling tools
- Understanding of hydrogeological processes

The successful applicant will be highly computer literate and will ideally have some computer programming experience. Degree qualified and preferably with a further qualification in water resources planning or hydrology.

The post holder will be required to work 37 hours per week.

News from members

New committee members

Welcome to new committee members **Chris Bradley** (Midlands Section), **Hayley Fowler** (Pennines Hydrological Group), **Claire Hammond** (Welsh Hydrological Group), **Ian Littlewood** (Institute of Hydrology), **Peter Midgley** (Environment Agency) and **Roger Simpson** (Simpson & Partners).

—

Dr Peter Walsh (Hon. Secretary, and Chairman of the Pennines Group) has joined the staff of Bullen Consultants, working for their Bradford office, but he will continue to be based in Carlisle.

—

Further news from former President **Susan Walker**: as reported in the last issue, Sue is sharing her time between being Professor of Physical Geography at Aberdeen University and running her own consultancy business. She has now been appointed to the Board of the North of Scotland Water Authority and also to the Terrestrial and Freshwater Science and Technology Board of NERC. Sue can be contacted by telephone or fax on 013397 41619, or by email (Susan.Walker@abdn.ac.uk).

—

Professor Paul Jowitt, a former BHS Committee member and driving force behind the 1995 BHS Symposium, has been appointed Director of the new Scottish Institute of Sustainable Technology (SISTech). SISTech is a joint venture between Heriot-Watt University (where Paul has been Head of the Civil and Offshore Engineering Department for the past ten years) and Scottish Enterprise. Its core functions

will be R&D, education and business development, and it will operate at the Scottish Borders campus at Newtown St Boswells, at Heriot-Watt's Orkney campus and in Edinburgh.

Paul has also been appointed to the Board of the East of Scotland Water Authority, one of the three public authorities responsible for water supply and sewage disposal in Scotland. He can still be contacted at his university address (email p.w.jowitt@hw.ac.uk) and would be pleased to hear from members with specific interests in sustainability.

—

Past President **Professor Mike Hamlin** has been honoured by the International Medical University, Malaysia, with a Distinguished Fellowship for his contribution (as a professional and a university administrator) to its foundation through the 1990s, while he was Principal of Dundee University. The citation notes his academic and administrative excellence and that he had the rare distinction for an engineer to be elected Fellow of the Royal College of Physicians and Surgeons of Glasgow and the Royal College of General Practitioners (and the ICE, CIWEM and the Royal Academy of Engineering).

—

Paul Holmes, who was a consultant in south-east Asia, is now a Director of Water Resource Associates Ltd (web site www.watres.com). Before leaving Kuching in Borneo, Paul developed an Isis flow and sediment model of the Sarawak River to assess the impact of the recently commissioned river barrage and waterfront redevelopment on river hydraulics.

He has comprehensively reviewed the flow record of the River Rother in Sussex, using HYSIM to marshal rainfall data and generate long-term natural flow sequences (1918-98) at key sites. WRA has recently been awarded an Environment Agency R&D contract to study this key issue of producing sensible sequences of abstraction and discharge data when actual measurements are unavailable. Paul Holmes can be reached on 01628 476798 or by email to pach@wateres.com.

Meanwhile the Managing Director of WRA, former BHS President **Mike Lowing**, still runs Chiltern Digitising Services – but from a different set of hills in West Dorset.

—

Pippa Chapman has recently moved from the Macaulay Land Use Research Institute in Aberdeen to take up a lectureship at the School of Geography, University of Leeds. She can be contacted on 0113 233 6837 or via email on p.chapman@geog.leeds.ac.uk.

—

David Price (who worked for the Institute of Hydrology until its Stirling office closed) has now moved to Glasgow, where he is a Senior Hydrologist with the Babtie Group.

Government minister visits Wallingford

Science minister **Lord Sainsbury** visited the CEH Wallingford site on *Friday 17th July* to open the Institute of Hydrology's new extensions, pictured in the previous issue.

Lord Sainsbury planted a tree in the new courtyard and heard at first hand about CEH research, specifically the IH work on flood forecasting (in collaboration with the Met Office), information dissemination through the new library and IH/BGS work on the National Water Archive, based at this site.

BHS mailbase

The number of people participating in the BHS hydrology mailbase has risen by 50% since July 1998: there are now 213 (including some non-members) taking part in this electronic information and discussion group. It is a useful way of letting people know about events that miss the *Circulation* deadline, announcing a last-minute change, unavoidable cancellation or change of venue.

You can also use it to ask for help with a particular hydrological problem or tell people about a solution to one. You do not get a deluge of messages, it is easy to subscribe – email Matthew Lees (m.lees@ic.ac.uk) – and just as easy to withdraw from the list later.

FORTHCOMING EVENTS

Course

NATURAL ATTENUATION
A short course on remediation of contaminated land and groundwater
Sheffield, UK
11–13 January 2000

This course is run by the Groundwater Protection and Restoration Group at Sheffield University, with lecturers from the Environment Agency, ICI, Shell and AEA Technology.

Fees are £560 (£370 for students). Contact Jenny Chambers, Dept of Civil Engineering, Mappin Street, Sheffield, S1 3JD *(tel 0114 222 5725, fax 0114 222 5700, email j.a.chambers@sheffield.ac.uk).* For technical details please contact Prof. David Lerner *(tel 0114 222 5743, email d.n.lerner@sheffield.ac.uk).*

Meetings

INTERNATIONAL SYMPOSIUM ON QANAT
Yazd, Iran
May 2000

This symposium considers the importance of qanat (subterranean water canals) to the water resources management of arid and semi-arid areas. The deadline for abstracts has passed, but registration may still be possible.

All correspondence should be sent to the Symposium Secretariat, No. 17, 1st Alley, Shahid Hessari St, Mirdamad Blvd, Tehran 15489, I.R.Iran *(fax +98 21 2252536, email irunesco@vax.ipm.ac.ir).*

IAHS International Symposium on INTEGRATED WATER RESOURCES MANAGEMENT
Davis, California, USA
9–12 April, 2000

This symposium (sponsored by IAHS) aims to provide a forum for technical and non-technical personnel (hydrologists, engineers, economists, biologists, sociologists, lawyers, etc.) to meet and discuss water resources issues.

Topics will include (but are not limited to) systems thinking and water resources (sustainable water resources management, water resources policy); innovative water resources management; hydrological extremes and related social issues (floods, droughts, perception, mitigation, risk management, water conflicts); the role of water science in water management; integrated river basin planning; integrated management of water quality and quantity with ecosystem protection.

Abstracts must be submitted by **15 December 1999**. Papers will be reviewed, edited and published as an IAHS 'Red book'.

Registration (by **28 January, 2000**) will cost $370, to include proceedings, refreshment breaks, tram tour of the campus, a reception and a dinner.

You may register online at http://conferences.ucdavis.edu or contact

UC Davis Conferences and Events Services *(fax: +1 530 757 7943)*. Hotel rooms can be reserved *(fax +1 530 758 8623, email info@hallmarkinn.com, web site http://www.hallmarkinn.com)*.

The Symposium Web Site is and the contact for further information is Prof. Miguel A. Marino, 139 Veihmeyer Hall (LAWR), University of California, Davis, CA 95616-8628, USA *(tel.: +1 530 7520684; fax: +1 530 7525262; email: mamarino@ucdavis.edu)*.

First announcement & call for papers
ICIWRM-2000
INTERNATIONAL CONFERENCE ON INTEGRATED WATER RESOURCES MANAGEMENT FOR SUSTAINABLE DEVELOPMENT
Roorkee, India
19–21 December 2000

Based at the National Institute of Hydrology in Northern India, this conference (in English) is internationally sponsored (UNESCO, WMO, FAO, UNDP, etc.) and will address the main issues of IHP-V.

Papers are invited: abstracts (300-500 words), including some preliminary results/conclusions, must be submitted by **31 December 1999**. A 2-day post-conference field trip is planned.

Please contact Dr B Soni, Scientist 'F' & organising secretary, ICWRM-2000, National Institute of Hydrology, Roorkee - 247 667 (U.P.), India *(tel +86 10 68413372, fax +86 10 68413372, email irtces@public.east.cn.net)*.

Diary

9th December 1999
CIWEM/Scottish Hydrological Group
"Ecologically sustainable water management"
Venue: University of Stirling
Time: 18.00 for 18.30
Contact: Katherine Bradshaw *(tel 0131 449 7995, fax 0131 449 7277, email katherine.bradshaw@sepa.org.uk)*

15th December 1999
IAHR meeting (co-sponsored by BHS)
"Hydro-informatics"
Venue: University of Bristol
Time: 11.00 for 11.30
Contact: John Davis *(tel 0117 928 7712, fax 0117 928 7785, email john.davis@bristol.ac.uk)*

12th January 2000
Scottish Hydrological Group meeting
Postgraduate research presentations
Venue: Strathclyde University
Time: 14.00
Contact: Tim Jolley *(tel 01355 574213, fax 01355 574688, email tim.jolley@sepa. org.uk)*

19th January 2000
BHS Southern Section meeting
"New developments in hydrological applications of remote sensing"
Venue: Imperial College, London
Time: 13.30
Contact: Dr Adrian Butler, Dept of Civil Engineering, Imperial College, London *(Tel 0171 594 6122, Fax 0171 594 6124, e-mail a.butler@ic.ac.uk)*

9th February 2000
BHS Pennines Hydrological Group
"The Bye/Horner Report"
Speakers: Rod Furnell (EA Hydrometric Manager, NW Region), Ian Crozier (Senior Engineer implementing the Bye/Horner Report) and David Rooke (Regional Water Manager, NE Region)
Venue: Lancaster University
Time: 13.00 for 13.30
Contact: Owen Wedgwood *(Tel 01925 653999, Fax 01925 415961, email owen. wedgwood@environment-agency.gov.uk)*

15th February 2000
Welsh Hydrological Group meeting
"Hydrological research in Welsh universities"
Contact: Steve Taylor *(tel 01222 770088, fax 01222 362094, email steve.taylor@ environment-agency.gov.uk)*

17th February 2000
Scottish Hydrological Group meeting
"North-east Scotland water resource study and yield assessment framework"
Venue: Edinburgh University
Time: 18.00 for 18.30
Contact: Tim Jolley *(see above)*

15th March 2000
BHS Southern Section and CIWEM
"Water resource – visions for the future"
Venue: Environment Agency, Reading
Contact: Dr Adrian Butler *(see above)*

22nd–23rd March 2000
Scottish Hydrological Group Conference
"Hydrology in Scotland 2000"
Venue: University of Dundee
Contact: Dr Andrew Black *(tel 01382 344433, fax 01382 344434, email a.z.black@dundee.ac.uk, http://www. dundee.ac.uk/geography/hydrolinscot)*

28th March 2000
BHS National meeting
"Flood forecasting"
Venue: Bristol
Contact: Dr Peter Walsh *(tel & fax 01228 710510, email Walshpeter@cs.com)*

25th–29th April 2000
25th EGS General Assembly
Venue: Nice, France
Details: http://www.copernicus.org/EGS/egsga/nice00/nice00.htm

3rd May 2000
BHS Southern Section meeting
"Applications of risk management in hydrological protection"
Venue: Imperial College, London
Time: 17.30 (tea at 17.00)
Contact: Dr Adrian Butler *(see above)*

17th May 2000
BHS National Meeting (full day)
"Catchment management and process studies" *(and PHG AGM: see below)*
Venue: Manchester University
Contact: Prof David Collins *(tel 0161 295 4519, email davidncollins@hotmail. com)*

17th May 2000
BHS Pennines Hydrological Group AGM
Venue: Manchester University *(during BHS National meeting – see above)*
Contact: Owen Wedgwood *(see above)*

14th June 2000
BHS Southern Section meeting
"Rehabilitation of the Rivers Darent and Kennet"
Venue: Imperial College, London
Time: 17.30 (tea at 17.00)
Contact: Dr Adrian Butler *(see above)*

21st June 2000
BHS Southern Section
Field visit to the River Darent
Contact: Dr Adrian Butler *(see above)*

27th June 2000
BHS National Meeting (full day)
"Water resources plans"
Venue: ICE, London
Contact: Prof Sue Walker *(tel/fax 013397 41619, email susan.walker@abdn.ac.uk)*

3rd–7th July 2000
IAHS/BHS 2nd Inter-Celtic Colloquium
"Water in the Celtic world: managing resources for the 21st Century"
Venue: University of Wales, Aberystwyth
Contact: Dr J.A.A. Jones, *(tel 01970 622595, fax 01970 622659, email jaj@aber.ac.uk)*

4th–5th September 2000
Tenth BHS Postgraduate Symposium
Venue: Newcastle University
Contact: Dr Geoff Parkin, WRSRL, Cassie Building, University of Newcastle upon Tyne, NE1 7RU *(tel 0191 222 6146, fax 0191 222 6502, email: geoff.parkin@ncl.ac.uk)*

6th–8th September 2000
7th National Hydrology Symposium
Venue: Newcastle University
Contact: Prof. Ian Calder, Hydrology Symposium Office, Centre for Land Use and Water Resources Research, Porter Building, St Thomas Street, Newcastle upon Tyne NE1 7RU *(tel/fax 0191 222 6563, email cluwrr@ncl.ac.uk)*

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