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THE NEWSLETTER OF THE BRITISH HYDROLOGICAL SOCIETY

Circulation

Contents

BHS Annual General Meeting

Our new committee members

Field trip picture — under the M6

The future of hydrology: the UK perspective for *Hydrology 2020*
A workshop held at Birmingham

International Environmental Modelling and Software Society
Ian Littlewood reports from Lugano

President's piece

The origins of BHS
Michael Hamlin's Birmingham speech

The 2002 BHS Student Awards
The winners and the award process

CIWEM award for Gareth Old

Travel grants for members

Palaeoflood hydrology
A wild PhD project and a plea for help

Water for life — WaterAid

New members

Hydrologic information — where is the future?
BHS National Meeting report

Meteorology and hydrology — towards closer collaboration
BHS / Royal Met. Soc. Joint meeting

Publications: *HSJ* contents

Two recent PhD theses

MITCH (Mitigation of climate-induced hazards)

John Wiley special discounts

New international journal of river basin management

Discount on practical book
Field Hydrology in Tropical Countries

Courses

Meetings
Clyde catchment conference — Glasgow
River Restoration Centre — Bristol
EGS AGU EUG Joint Assembly — Nice
River research (NISORS) — Australia

Diary of BHS and other events

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19th BHS AGM

British Hydrological Society Annual General Meeting at the *Coach and Horses*, Weatheroak Hill, Alvechurch on 8th September 2002 (during the *8th National Hydrology Symposium*, hosted by the University of Birmingham)

This year's AGM was held on Sunday evening 8th September at a country pub, just south of Birmingham, at the start of the 8th National Hydrology Symposium. Thanks are due to Geoff Petts for arranging a suitable venue and laying on a buffet and beer-tasting to complete the evening.

The President, **Peter Walsh**, began the meeting by welcoming everyone and thanking the University of Birmingham team for arranging it.

Peter summarised the achievements of the past year, in particular the Society's efforts to gain professional recognition for hydrologists, the successful meetings programme and the launch of the BHS Student Award scheme. He announced an initiative to review and improve the Society's web site. Effort had continued to resolve problems arising out of the ICE's implementation of a new membership database. He thanked those who were leaving the Main Committee: **Peter Midgley**, who had put so much effort and energy into developing hydrology competencies, **Roger Simpson**, who led the committee's initiative to assess the needs of the regions, and **Tim Jolley**, who was stepping down as Honorary Secretary. He welcomed **Bruce Webb** as President Elect and **Andrew Black** as Honorary Secretary.

The outgoing Hon. Secretary, Tim Jolley, thanked the ICE, in particular **Tim Fuller**, for their support for the Society during the last year. He reminded members of the changes to the Main Committee in 2002: **Steve Parsons** had joined as Hon. Treasurer, **Hilary Smithers** and **Murray Dale** as elected Members. **Samantha Green** had remained on the committee to represent younger members but had stood down as South West representative, replaced by **Paul Bates**, who was co-opted onto the Main Committee.

Tim noted that the wide range of national and regional meetings had reflected members' varied interests and the dynamic nature of UK hydrology. There were five national meetings, covering hydro-ecology, land-ocean interactions, flood estimation, climate change and hydrometric networks.

Regional meetings had focused on issues such as flood prevention schemes, low flows, urban hydrology and water resource planning.

There was an active programme of regional meetings this year, with topics including new measurement technologies, sustainable urban drainage systems (SUDS) and riverbed patches. The programme in Wales suffered as a result of the hiatus in the activities of the Welsh Hydrological Group. A few changes had been proposed to the regional structure in the light of feedback from the questionnaire circulated to Regional Committees in August 2001. As a result, the Southern Region had now changed its name to South-East Region to take in members in East Anglia.

The success of all these meetings was due in no small part to the efforts and enthusiasm of the organisers, the regional committees and to all BHS members for actively supporting national and regional programmes.

In 2002-03, national meetings have been agreed on meteorology and hydrology on 16th October (jointly with the Royal Meteorological Society), and on 10th March on PMP and dam safety, low flows and water quality. Members are encouraged to keep a keen eye on *Circulation* and the web site for dates.

The 2004 International Symposium *Hydrology: Science and Practice for the 21st Century* will be held at Imperial College on 12-16th July. Main and local organising committees have been established (chaired by **Howard Wheater** and **Adrian Butler** respectively) and a scientific committee (led by Bruce Webb) has been set up to manage the scientific programme. The Main Committee approved the draft scientific programme in April and convenors are now being approached.

Occasional Paper 13, *Continuous River Flow Simulation*, was published in January, compiled from papers from the national meeting held at CEH on 5th July 2001. The Society thanks the efforts of **Ian Littlewood** and **John Griffin** for this achievement.

The *2002 Register of Consultants in Hydrology* was published in January containing 21 consultancy firms, manufacturers and independent consultants. Thanks to Steve Parsons and Tim Fuller for this initiative.

The *BHS Student Award* was launched in April. Invitations were sent to 43 UK universities with interests in hydrology at undergraduate level and details were posted on the Society's web site. 12 submissions were received by the deadline of 8th July and the winners of the £400 first prize and the two £200 runners-up prizes will be announced in *Circulation*. It is hoped that this award will promote the study of hydrology and raise awareness of the BHS at undergraduate level.

The Main Committee has continued to work with the ICE to resolve outstanding issues arising from the implementation of MEMSYS (the new membership database), in particular the collection of direct debits and the recovery of "lost" members.

Tim indicated that the level of national and regional activity and the diversity of meeting topics indicated a healthy and successful Society. On behalf of the membership, he thanked everyone who has contributed in whatever capacity to making the last year another successful year for BHS.

He announced three changes to the Main Committee: **Andrew Black** was elected unopposed as Hon. Secretary, and **Dr Sue White** and **Joe Pearce** were elected Ordinary Members (replacing Peter Midgley and Roger Simpson).

Tim closed by recording his thanks to the Society for an enjoyable, but very busy, two years. He wished his successor all the best in the coming year.

The Hon. Treasurer, Steve Parsons, reported the annual accounts and the annual membership in 2002. While the Society's financial status was very healthy, the Exeter Fund was suffering as a result of recent downturns in the financial markets. Steve reported that membership has grown steadily from 2001 to 2002. However, there was still a degree of uncertainty over the numbers because there were still unresolved membership problems arising out of the ICE's implementation of MEMSYS. Steve reported that the ICE had compensated the Society for the loss of revenue following its failure to collect the increased subscription fee of £22.

The Editor of *Circulation*, John Griffin, reported that although the size of *Circulation* had not fallen, members should still be encouraged to submit items of interest, and in particular articles for *Circulation*+. The print run had been increased to 1000, reaching beyond the membership.

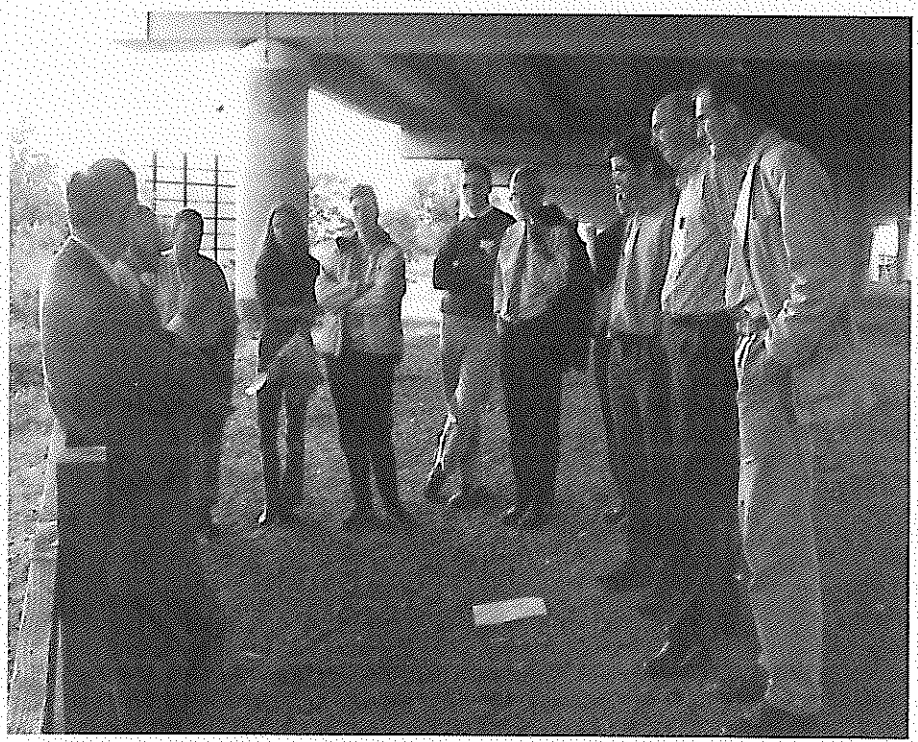
There was one question after the Hon. Secretary's report on membership numbers that was addressed by the Hon. Treasurer in his report.

Guests from the Nepalese Department of Meteorology and Hydrology introduced themselves to the meeting and gave a resumé of the status of hydrology in Nepal, emphasising the need to learn from Societies such as the BHS.

The President closed the meeting by thanking Chris Bradley and Geoff Petts at the University of Birmingham for hosting the Symposium and wishing everyone an enjoyable three days.

Our new committee members

Dr Andrew Black (University of Dundee) returns to the BHS Committee as the new Hon. Secretary. **Prof. Bruce Webb** (Exeter University) is the BHS President-Elect. **Dr Sue White** (Cranfield University, Silsoe) and **Joe Pearce** (Environment Agency, Southern Region) join as ordinary members, and **Suzanne Wales** (Halcrow) has been co-opted onto the committee.



One BHS Symposium field trip group was so engrossed by Paul Webster's words on the Tame/Rea confluence under the M6 that they completely missed the urban kingfisher, seen by some of the other, less-attentive group (photo: Max Beran)

The future of hydrology – the UK perspective

A workshop held at the National Hydrology Symposium 10 September 2002

Dr Kate Heal (University of Edinburgh) convened the workshop with the aim of consulting UK hydrologists as one contribution towards the activities of the IAHS (International Association of Hydrological Sciences) Hydrology 2020 Working Group. This working group was formed in November 2001 and comprises 11 "young" hydrologists (age ~35 years) from around the world: Kate represents the International Commission on Water Quality on it.

The group's primary goal is to identify possible and recommended directions for the field of hydrology over the next 20 years, culminating in a report on their findings as an IAHS Red Book in 2005. Outputs from the Working Group are also expected to include a workshop at the 2003 IAHS General Assembly in Sapporo, Japan, and other forms of publication, e.g. web-based output and a short, well-publicised report aimed at policymakers. Further details are at *http://www.cig.ensmp.fr/~iahs/hydrology2020/H2020WG.htm.*

Twenty delegates from the BHS National Hydrology Symposium and Postgraduate Symposium contributed to the workshop, which started with a few personal thoughts from **Chris Soulsby** (University of Aberdeen) to stimulate discussion on the future of hydrology. Chris traced the parentage of UK hydrology from its roots in engineering and the increasing contribution of physical geographers from the 1960s. He suggested that recent developments could be approximated as physical hydrology in the 1970s, chemical hydrology in the 1980s, ecohydrology in the 1990s and perhaps social hydrology in the 2000s.

Some participants suggested that hydrology has always responded to society's needs, although society does not always see it as hydrology. Chris outlined some of the challenges that hydrology faces, ranging from research challenges (better process understanding, better models, digital datasets, computing power, climate change) requiring hydrologists to work in an increasingly interdisciplinary framework, to political challenges (science policy and funding, outreach, education, the professional status of hydrology).

He suggested that the question of the future of hydrology shared some similarities to the quantum dilemma faced by physicists. Either hydrology would continue as a discrete discipline (a particle) or it would be subsumed into environmental management and engineering (a wave).

One participant questioned whether hydrology is more of an art than a science. Some participants agreed with this, citing the importance of hydrological "experience" in estimating the design flood for an ungauged catchment in a developing country where there are few gauged catchments. However my personal opinion is that uncertainties are greater in some areas of hydrology than in others.

For the remainder of the workshop the participants discussed, in small groups, four questions that are being considered by the Hydrology 2020 Working Group. The views of the workshop are summarised below around these questions.

What is the most critical bottleneck hydrological science is struggling with now?

Data quantity, reliability, management and access.
Everyone identified this as a critical bottleneck, although some participants noted that it is important to distinguish data and information. Some participants were concerned about the use of readily-accessible data without being aware of its reliability. The question posed was whether there are limits to measurement, since some hydrological phenomena are fundamentally unknowable.

The cost of hydrological software and equipment.

The gap between theory and practice.

Dealing with uncertainty.

Models that are more appropriate, but not necessarily more sophisticated.

Insufficient exchange of people (between developing and developed countries and also between disciplines within and at the interfaces of hydrology).

Public information and understanding of hydrology.
This topic generated much discussion. Some participants felt that society sometimes asked the wrong questions or had unrealistic expectations because of ignorance of hydrology. However it was also noted that hydrologists should not overlook individuals within society. Despite the fundamental role of water in affecting our lifestyle, there is little media interest in hydrology, maybe partly because hydrologists are not very good at communicating their work in an appropriate manner. Many participants identified a need for improved public understanding in the UK of probability and uncertainty, with greater use of these terms in common media, such as weather forecasts. Hydrologists could contribute by clarifying some hydrological terminology, such as the return period, which often causes confusion.

Lack of professional status for hydrologists.
Although it may be too difficult to implement, a solution to this problem suggested by some participants was to establish a professional qualification of Chartered Hydrologist, as exists in the USA. The existence of a number of routes by which hydrologists can obtain chartered status in the UK (e.g. CIWEM, ICE, RGS) weakens the professional standing of hydrologists. Some participants wondered what core competencies would be expected of a Chartered Hydrologist, since the discipline is so broad and hydrologists in the UK enter hydrology from such a wide range of disciplines.

Red tape.
Some participants from universities felt that the way hydrological research is funded results in poorer quality, short-term science, because of the limited funding available for basic research.

What are the expected advances in technology that will contribute to the future hydrology?

Continue as at present.
Most participants could foresee no one major technological advance that would radically alter hydrology in the future. It was thought that the current pattern would continue, with hydrology adopting novel technologies and methods, sometimes from other disciplines, e.g. advances in computing power, neural network modelling, the Internet, telemetry and radar.

Cheap, robust, dependable monitoring.
Most participants thought that better value for money would be obtained by improving existing technologies to make monitoring cheaper, more robust and dependable, rather than investing

large sums in developing new, expensive technologies with less clear benefits for hydrology, e.g. satellite remote sensing. However others thought that remote sensing would improve spatial coverage of hydrological data.

Information technology and communication.

Most participants thought that advances in information technology would enable hydrologists to collect, manage and disseminate data more effectively. Increased computing power would allow improved visualisation of hydrological data and model outputs, as well as assisting developments in hydrological modelling. Advances in communication (e.g. the Internet, video conferencing) would improve training of and communication between hydrologists, especially for developing countries.

Development of standardised monitoring protocols.

Improvements in upscaling and downscaling.

Longer datasets.

Some participants noted that in 20 years, hydrological datasets will be longer and therefore predictions will have lower uncertainties, assuming that monitoring networks do not deteriorate.

What are the water issues that society demands to be solved?

Too much, too little, too dirty, too expensive.

Society demands the provision of appropriate minimum quantities of water and some participants thought that this should be free of charge.

Prediction and forecasting of extremes.

Efficient management of water resources.

Provision and communication of hydrological information.

What is the speciality in hydrology that cannot be dealt with by other disciplines?

"Hydrological sense."

An understanding of the hydrological cycle in its widest sense.

Water as a fundamental resource.

Hydrology is the only discipline that examines water resources holistically.

Hydrology is the interface between other disciplines.

Thank you to all the workshop participants for contributing to a lively discussion, which was still going strong after two hours. The views of the workshop will form a valuable contribution to the Hydrology 2020 Working Group's deliberations and will also feed into the revised BHS Research Strategy.

Kate Heal
University of Edinburgh

International Environmental Modelling and Software Society

iEMSs Conference Lugano, Switzerland June 2002

This relatively new society might be of interest to BHS Members. The stated aims of iEMSs are to:

- develop and use environmental modelling and software tools to advance the science and improve decision making with respect to resource and environmental issues;
- promote contacts among physical, social and natural scientists, economists and software developers from different countries and coordinate their activities;
- improve the cooperation between the sciences and decision makers/ advisors on environmental matters;
- exchange information in the field of environmental modelling and software among scientific and educational organizations and private enterprises, as well as non-governmental organizations and governmental bodies.

To achieve these aims, iEMSs organizes international conferences, meetings and courses in environmental modelling and software; publishes scientific studies and popular scientific materials in the journal *Environmental Modelling and Software* (Elsevier); hosts a website (*http://www.iemss.org*) that allows members to communicate research and other information relevant to the Society's aims with one another and the broader community, and delivers a regular newsletter to Members

The overall theme of the iEMSs conference held in Lugano in June was *Integrated Assessment and Decision Support*, with a substantial proportion of papers dealing with water resources, hydrology, catchment management, environmental (including climate) change impacts, etc. The conference comprised five parallel sessions, with more than 250 papers pre-published in three volumes. The papers (in pdf format) can now be found at *http://www.iemss.org/iemss2002/*.

Under a 'Catchments' sub-theme there were three sessions: *Integrated Catchment Modelling; Accounting for Landuse and Landscape Controls in Hydrological Modelling*, and *Parsimonious Catchment-scale Rainfall-Streamflow Modelling*.

In the last session, organised by **Ian Littlewood**, there were 19 papers, with authors from 15 countries. It is pleasing to report that a paper in this session, *"A Soil Hydrology-Based Catchment Water Resources Model"* by **David Maréchal** and **Ian Holman** (Cranfield University) won First Prize in the 'natural' category for papers describing the work of PhD students (and presented by them).

Other speakers in this session who might be known to BHS Members included **Peter Young** (Lancaster University) on *"Data-Based Mechanistic and Top-Down Modelling"* (Invited Paper), **Rahman Khatibi** (Environment Agency) on *"Parsimonious Catchment and River Flow Modelling"*, **Ian Littlewood** (CEH Wallingford) on *"Sequential Simplification of the Effective Rainfall Part of a Rainfall-Streamflow Model for a Small Kenyan Catchment"*, **Howard Wheater** (Imperial College, London) on *"A Generic Framework for the Identification of Parsimonious Rainfall-Runoff Models"*, and **Kieran O'Connor** (National University of Ireland, Galway) on *"Structures and Performances of Five Rainfall-Runoff Models for Continuous River-Flow Simulation"*.

The next biennial iEMSs Conference, in 2004, is due to be held at the University of Osnabrück, Germany, probably again in June.

Ian Littlewood
CEH Wallingford

Picture credits

The photos of the Jubilee River opening in the last issue were supplied by the Environment Agency. Pictures from the Inter-Celtic Colloquium were by Anthony Tollow and those of floods in Scotland came from SEPA. Apologies for not giving credit at the time.

President's piece

There have been two significant events in the BHS calendar since I wrote the last President's Piece. The first was our Birmingham Symposium, the other the jointly organised meeting with the Royal Meteorological Society.

The Symposium once again demonstrated the high standard of hydrology in the United Kingdom. Our thanks are due to **Chris Bradley** and **David Hannah** for organising the meeting and social programme, and to **Paul Webster** and **John West** for the field visit. **Celia Kirby** produced the proceedings volume to the usual high standard and I recommend everyone who did not attend to buy it. Birmingham postgraduates provided excellent support on the reception desk and in the lecture theatre. **Donna Bower** deserves special mention, not only for her excellent management of the visual aid equipment, but for also winning the young author's prize for her paper, "A tool for assessing the climatic sensitivity of river flow regimes".

Past President **Michael Hamlin** spoke at the Symposium Dinner and gave us an insight into the events, over 20 years ago, leading up to the launch of the Society. This is an important phase of BHS history and I am most grateful to him for agreeing to write up this part of his speech for publication elsewhere in this issue.

Kate Heal, assisted by **Chris Soulsby**, organised an interesting discussion to get views, particularly from the younger members and postgraduates, on the future of hydrology. This is part of the IAHS Hydrology 2020 Working Group exercise, led by an international team of twelve young hydrologists, to identify possible and recommended directions for hydrology over the next 20 years. The lively exchange of views overran its planned finish time, giving Kate plenty of material from the UK to feed into the working party. Kate's report on the workshop is printed elsewhere in this issue.

Our joint meeting with the Royal Meteorological Society was organised by **Murray Dale** on the theme "Meteorology and hydrology – towards a closer collaboration", addressing recent developments at the interface of both disciplines. The papers reported some interesting and valuable developments in the distributed processing of hydrometeorological parameters and potential forecast products that could revolutionise, in particular, flood forecasting. Murray is preparing a report for *Circulation*.

This time of year sees changes to the Committee, with the departure of **Peter Midgley**, **Roger Simpson** and **Tim Jolley**. I expressed my appreciation to them at the AGM for their contributions to the Society. Tim has passed the Hon. Secretary role on to **Andrew Black**, who is no stranger to the BHS committee. We have welcomed **Sue White** to her first committee: she was an active member of the Pennines Committee until her move to Cranfield. **Joe Pearce**, who assisted Peter Midgley with the work on mapping Competencies for Hydrologists onto ICE Core Objectives and in our discussions with ICE on these contributing to qualifications for Membership, will now take the committee lead on this topic.

Bruce Webb has written a short report about our first award of the new Undergraduate Student Prize. All the judges were impressed by the high quality of the reports we received. The first prize goes to Chambers from Bristol for his work on . The runner-ups are French from with a report on and Smithers from who examined . Once again I am reassured that the future of British Hydrology will be in excellent hands.

John Griffin has had a good response to my plea in the last issue, for contributions to *Circulation*, but please keep them coming in so that others may share and benefit from your experiences and ideas.

In my speech after the President's Dinner in Birmingham, I commented that water had been in the news quite a lot recently: the European floods, the World Summit and a looming shortage, as a result of heavy groundwater abstraction, in several American states. As there is no shortage of these and many other issues requiring hydrological skills, I think we should be confident that we are all going to be busy for many years and that the role we play in finding solutions to a wide range of challenges will be increasingly important.

I also spoke about those less fortunate than ourselves, namely the 1.1 billion people without a minimum quantity of safe water, the 2.4 billion people lacking adequate sanitation and the 6000 children who die every day worldwide from diarrhoea as a result. WaterAid has made enormous strides, since its formation 21 years ago, in tackling these issues. But there is still a huge amount to do. If you do not already support WaterAid will you please consider giving a donation, or better still making a regular Gift Aid payment? Michael Hamlin also referred to this in his speech, suggesting that more effort to helping to improve these basic needs would help to generate greater stability in our polarised world. A short article on WaterAid appears elsewhere in this issue and the loose insert tells you how you can help donate or help in other ways. Please read them both and then contribute!

Peter D Walsh *walshpeter@aol.com*

The origins of BHS

Part of the speech by Professor Michael Hamlin at the conference dinner held on 10 September in Birmingham.

Most of those present today trace the origins of BHS to the IAHS Scientific Assembly held in Exeter in 1982. However, the real origins of BHS can be traced back to a sweltering day in Canberra in December 1979 during the IUGG General Assembly. For many years IAHS, one of the seven Associations that comprise IUGG, had sponsored symposia of which, for me, the most memorable were the meetings in Warsaw, Madrid and Bratislava held before the Canberra meeting.

In Canberra we discussed the proposition that IAHS should organise a Scientific Assembly midway between each IUGG General Assembly, in line with other Associations. The response was lukewarm, but eventually, as the IAHS correspondent for the UK, supported by **John Rodda** and **Jim McCulloch**, I invited IAHS to hold a Scientific Assembly in the UK in 1981. Interestingly John Rodda wrote in his column in the IAHS newsletter following the Rabat Scientific Assembly "when Mike Hamlin first advocated that IAHS should arrange scientific assemblies like certain Associations within IUGG there was some doubt about their value. Now that the 5th Scientific Assembly has been held with so much success and the 6th is being planned for The Netherlands in 2001, this doubt has long been forgotten".

In the event the first of this new series of Scientific Assemblies was held in Exeter in 1982. It was highly successful, in major part due to the input of **Des Walling** and **Bruce Webb**. The meeting made a surplus of nearly £20,000 of which half was used to fund the IAHS Tison prize for the best paper by a young hydrologist published in the *Hydrological Sciences Journal*. The other half was used to create a fund,

now administered by BHS, to help young scientists to attend IAHS Assemblies.

And now we come to the birth of BHS. At Exeter it became obvious that there was a large community of British hydrologists. The ICE hydrological groups catered for the engineers but in many other professional societies hydrologists had no particular recognition. There was some enthusiasm, not entirely shared by some engineers, for a British society that would welcome all hydrologists. These conversations, which started in Exeter, continued and culminated in the inaugural meeting on 1 November 1983 at the Royal Society, which attracted half the membership of about 350.

Our first President, **Mike Mansell Moullin** was an eminent choice. He was a geographer who worked for Binnie and Partners, the consulting civil engineers, who were still then in Victoria Street. **Mike Hall**, who is here with us this evening, was elected the first Secretary.

What do I see as BHS's major achievements? There has been an excellent programme of scientific meetings, workshops and biennial symposia. We heard yesterday about the importance of people, and this is another aspect of BHS's achievements.

We are a cohesive group drawn from a wide variety of professional backgrounds but with a common interest in, and commitment to, hydrology. BHS is run almost entirely on a voluntary basis. The cost of meetings is a fraction of those organised, for example, by CIWEM and ICE.

But perhaps most importantly, we have a society in which all members share a common bond with one another and where the tensions that existed in 1982 have been entirely broken down.

M J Hamlin
BHS President, 1995-97

The 2002 BHS Student Awards

Congratulations to Paul Chambers (University of Bristol) who has won First Prize in the 2002 BHS Student Awards for his BSc dissertation on an inundation model. Second equal were Russell Smither (University of Manchester) for his work on the 2000 Lewes flood, and Megan French (University of Lancaster) for her thesis on the hydrochemistry of the Fylde Aquifer. Abstracts of each of the winning dissertations are printed below, and Bruce Webb's article then explains the selection process.

"The influence of spatial resolution and topographic information content on the performance of a raster-based floodplain inundation model", by **Paul Chambers** (School of Geographical Sciences, University of Bristol)

This study undertakes an investigation into the influence of spatial resolution and topographic information content on the performance of a raster-based floodplain inundation model, LISFLOOD-FP. The model is run for two flood events of the River Severn using a series of DEMs with resolutions of between 1000 and 10 m and incorporating varying degrees of topographic information content. Predictions from the model are compared with satellite observations of the inundated area and a performance measure is developed to compare the predicted floodwave travel time to that observed in gauging station hydrometric data. The model is calibrated using a distributed parameterisation of the channel friction coefficients and the model's sensitivity to these parameters is illustrated using a series of Monte Carlo simulations.

It was found that the model reaches a maximum performance at a resolution of 100 m and the inclusion of high levels of topographic information content was not found to significantly increase the model performance in predicting inundation extent.

The study also addresses the problem of evaluating the distributed predictive uncertainty in flood inundation using an application of the generalised uncertainty likelihood estimation (GLUE) technique of Beven and Binley (1992). The uncertainty associated with the model predictions of the floodwave travel time and inundation extent is explicitly incorporated into the conditioning of the model through updating the likelihood weights using Bayes equation. It is shown that the methodology can reject many previously acceptable parameterisations with the consequence of a marked reduction in the uncertainty of the distributed flood probabilities predicted by the model.

"The future of insurance as a strategy for floodplain management" by **Russell Smither** (School of Geography, University of Manchester)

Risk theory demonstrates how the subject of risk can be studied in an objective or perceived manner. Following the possibility of flood insurance cover withdrawal that arose after the devastating UK floods of the winter 2000/2001, this research explores the phenomenon of flood risk and compares the objective risk of experts and the insurance industry with the perceived risk of floodplain dwellers.

The town of Lewes in East Sussex was the most affected area in the country and was the study location. The research explores the different perceptions of flood risk by individual floodplain managers and evaluates their effects on behaviour and response.

A nationwide approach is taken by an investigation into the threat of flood cover withdrawal by the insurance industry and the role that the government should perform in providing adequate flood defences. This debate concerning responsibility in floodplain management is paramount to the future of flood risk areas.

The researcher also contests the predominance of studies into the physical aspects of floods and management that is based largely on prediction and forecasting. He argues instead for a more concrete, structural approach in floodplain management that both the insurance industry and individual floodplain managers desire.

"Hydrogeochemical investigation and modelling of the Fylde Aquifer, Lancashire, UK" by **Megan French** (Environmental Science Department, IENS, University of Lancaster)

The hydrochemical characteristics, as illustrated from borehole groundwater analysis, aquifer geology and mineralogy, and from previous hydrogeological and hydrochemical studies, of the Triassic Sherwood Sandstone Aquifer of the Fylde region, north-west Lancashire, are documented, discussed and tested via geochemical modelling techniques. A conceptual framework separated a 10 km^2 region of the aquifer into four distinct zones, representative of major ion chemistries and groundwater types; 1) Ca^{2+}-CO_3^{2-} type waters; 2) Ca^{2+}-HCO_3^- type waters; 3) Ca^{2+}-SO_4^{2-} type waters; 4) Na^+-Cl^- type waters. An attempt to qualify and quantify the hypothesised processes and reaction series, associated with each of these zones, was made via flow line simulations.

Findings were in general agreement with mechanisms suggested from borehole data analysis and from previous proposals on the aquifers governing processes.

Zone 1: groundwater chemistries, dominated by carbonate dissolution, represent more modern recharged

waters in the eastern area of the aquifer. Zone 2: cation exchange process dominant, resulting in elevated levels of sodium. Zone 3: groundwater chemistry is governed by the dissolution of sulphate minerals (e.g. gypsum), which exist in confining mudstones. Zone 4: two separate processes are evident, dissolution of halite minerals and coastal saline intrusion, saline waters indicate older groundwaters, long residence times and restricted circulation.

Although this study acts in part to support past investigations, it also highlights the considerable uncertainty that is product of the speculative and assumptive nature that exists with regards to the mineralogy, chemical processes and hydraulics of the Fylde Aquifer. This thesis also demonstrates the weaknesses of many conjectural model programs, and illustrates the need for research in this area.

However, it must be recognised that so long as uncertainties and errors are addressed, modelling still provides an essential tool in the advancement of our understanding and management of natural environmental systems.

The BHS Student Awards assessment process

As Chair of the Panel that assessed the submissions for these new awards, I feel it may be of interest to Society members to share some information about how the assessment process worked.

By the submission deadline, a dozen dissertations had been received, with entries from geography, environmental sciences and engineering departments across the country, covering a diverse range of topics including flooding, groundwater hydrology, hydroecology, water quality and river channel studies.

All the submissions were of high quality. In order to select a winner and two runners up, four members of the Main BHS Committee (Adrian Butler, Ian Littlewood, Peter Walsh and Bruce Webb) were involved in assessing the dissertations against the following criteria:

- Overall achievement in project (including identification and definition of a worthwhile topic; appropriateness and implementation of methodology; suitability, accuracy and depth of analysis, and quality of the discussion in drawing conclusions and relating findings to other work);
- Originality, or uniqueness, of project (the panel sought to favour submissions which were exciting and novel);
- Relevance to hydrology (greater credit was given to dissertations which had a central focus on scientific or applied issues in hydrology and less to those that focused on river geomorphology);
- Standard of presentation (with reference to communication skills and quality of graphical material).

In order to maintain continuity in assessment, the Panel Chair read and assessed all the dissertations. The submissions were then divided into two groups of six that were read and ranked by Adrian and Ian. They each passed on their top three to Peter who made an assessment of these six projects. The final selection of the winner and two runners up was made by Peter taking into account the three best projects chosen by himself and each panel member.

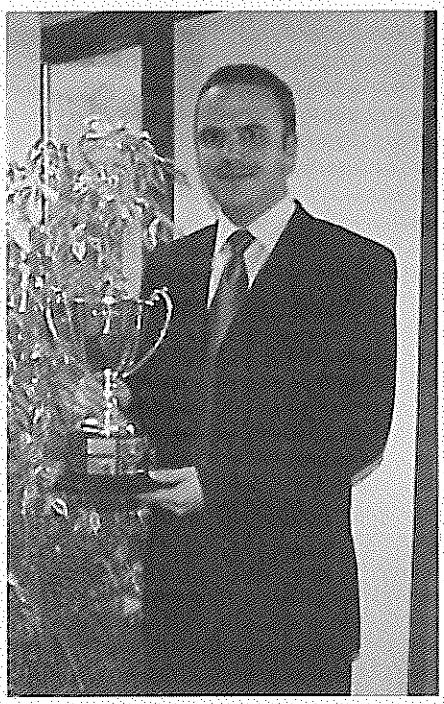
Overall, the Panel was much encouraged by the good response to these new awards offered by the Society and was very impressed by the high standard of the submissions. Details of the winning dissertation and the two runners up are given below. The authors of these projects are worthy recipients of the Student Awards and, together with the other entries received, have provided evidence of the strong young talent in hydrology that exists in this country. The Society very much hopes that the 2003 Student Awards will generate an equally good, if not better, response from UK Universities.

Bruce Webb
University of Exeter

CIWEM award for Gareth

On 9th October 2002 **Dr Gareth Old**, from the Centre for Ecology and Hydrology (CEH) Wallingford, presented a paper at the finals of the Young Authors' Competition for the Geoff Greaves Trophy. This event was organised by the scientific section of the CIWEM (Chartered Institution of Water and Environmental Management) South East Branch. It was held in Brighton, at the offices of Southern Water, and supported by Wedeco Ozotech Ltd.

Gareth's paper, entitled *"Dynamics of sediment-associated contaminants in a highly urbanised catchment: Bradford, West Yorkshire"*, was very well received and he was awarded the first prize. The CIWEM committee has endorsed the paper for publication and it will be submitted to the institution's journal. The research presented was undertaken jointly by CEH Wallingford and Leeds University, within NERC's Urban Regeneration and the Environment (URGENT) research programme.



Travel grants

Travel grants are available to help BHS members whose travel expenses are not met by an employer to attend scientific meetings. The amount will depend on the nature and location of the meeting and the case put forward.

Grants are mainly intended to help younger members, but are open to all. Successful applicants will be expected to write a short report for *Circulation*.

The Exeter Fund, looked after by BHS, pays grants to help British hydrologists take part in IAHS events.

To apply for a grant, please contact the Hon. Treasurer, **Steve Parsons**, Mott MacDonald Ltd, Demeter House, Station Road, Cambridge, CB1 2RS *(tel 01223 463926, email sbp@mm-camb.mottmac.com)*.

Copy deadline for *Circulation* No. 76 9th January 2003

Palaeoflood hydrology in northern Thailand?!

A PhD project on the wild side — and a request for help

But tropical environments aren't supposed to preserve palaeoflood evidence, are they? Well, subhumid (monsoon) tropics, actually. My PhD field site is on the magnificent Mae Chaem River, in Chiang Mai Province, Northern Thailand.

And when you 'get a goody', one of those rare rivers whose geometry and drainage is actually conducive to palaeoflood evidence preservation, despite the climate ... well, **Professor Paul Carling** (Southampton University), with a British Council LINK Project in Thailand, couldn't help himself.

Add one Australian PhD student (Renée Kidson), registered at Cambridge and co-supervised by **Professor Keith Richards**, add water (>1500 cms), mix thoroughly, and we have one hell of an opportunity.

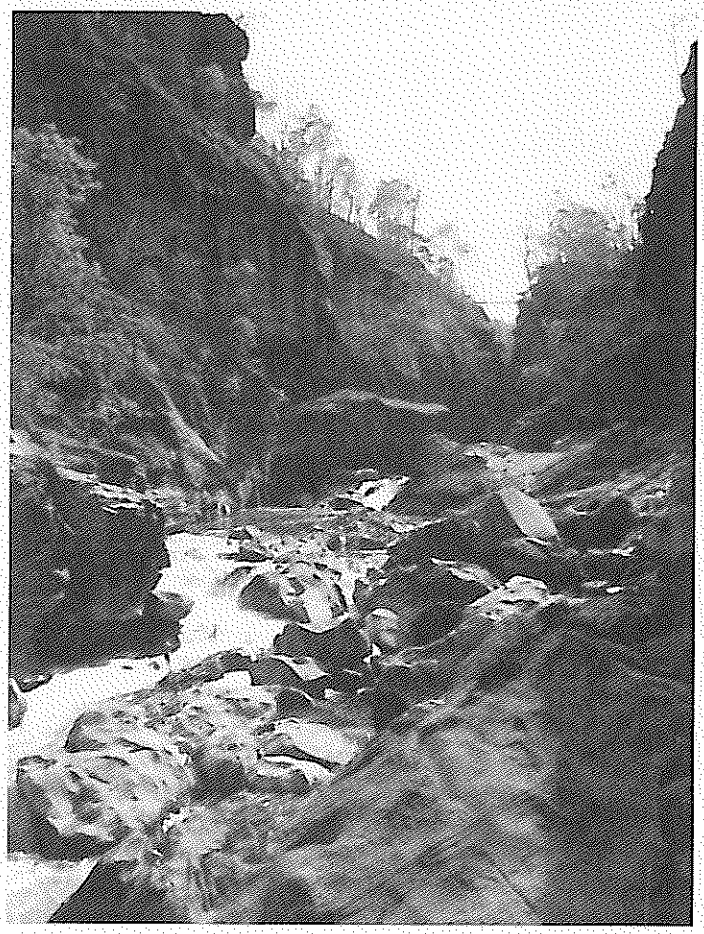
Why bother with palaeofloods?

Well, you can survey the elevation of the evidence. You can model flow in their river reach, and work out discharge of these big – really big – ancient flood events. And if you can date the deposits with incorporated organic material (courtesy of a NERC Radiocarbon Lab grant from East Kilbride), you might even have a crack at estimating their Return Period.

This is the key utility of palaeoflood hydrology: if carefully done and the correct evidence is available, it can assist in extending flood frequency graphs for a region. It can also be used to study climatic non-stationarity — all with the goal of providing a better flood forecasting perspective. There has never been a greater need for hydrologists and their expertise — look at Germany recently — particularly in this new, uncertain age of extreme natural events.

It sounds simple, doesn't it? There's just one catch, as you will see below.

Have I got a field site for you!
Would you fancy surveying this?
How about modelling it?!



This is Ob Luang (Thai: 'Gorge, Big'), on the upstream end of the reach I am building my hydraulic model for. There are all kinds of fascinating bits of palaeoflood evidence in and downstream of Ob Luang: teak logs lodged in caves high up in the gorge (a relict of the early 20th C logging days); sediment slackwater deposits containing organic material, sheltered behind bedrock spurs in gully mouths; plastic from the last series of (unusually large) recent floods. A palaeohydrologist's delight!

I am lucky that the Thai Royal Irrigation Department (RID) is a project partner, and it so happens that we have a well maintained gauging station downstream, with 50-odd years good-quality gauge data, and a met. record.

So, step-backwater modelling (using HEC-RAS) was our obvious modelling choice. I generate a surveyed long profile of the elevations of the various bits of flood evidence, and then I manipulate the model's input discharge until we have a good match for water surface elevations along the reach for different flood events. And because we have good gauging control, we can calibrate the model against real flow data to maximise accuracy.

The trouble with Manning's *n* ...

But hydraulic models, even calibrated ones, require an estimation of the roughness coefficient (Manning's *n*) specific to each discharge event. Now, I'm just a poor 1st-year PhD student and I've never done this before. So, we need to estimate Manning's *n*. There aren't that many experienced hydraulic engineers who specialise in bedrock-confined channels (funny that!), so I'm using a range of techniques: quantitative (e.g. Limerinos, Jarrett equations); qualitative (photos from Barnes (1967) and Chow (1959)); model iteration, etc.. I am also examining the effects of model scale and data resolution upon the 'calibration role' of Manning's *n*.

But here I am exploring a fourth option: an Expert Panel Approach. We have geomorphologists, hydrologists, hydraulicists, engineers, surveyors, who all have more experience than I (we hope!), so why don't I build a website, ask all our "experts" to take a peek at some photos of our key Thailand sites, and supply me with their best guess of Manning's *n* online? After all, 'expert estimation' has been the method traditionally used to select a Manning's *n* for alluvial channels for years — in fact the USGS still runs a training course on Manning's *n* estimation — so, the knowledge is out there.

Calling all Manning's *n* estimators!

And so this article is actually a plea for help. If you've looked at rivers for a while (particularly gravel ones), and you know what I'm talking about here (even if you've only 'done it' with

Manning once before!), please can you help me out!

More details are online: it is worth a look. My web address is: Manning's *n* Expert Panel Experiment (MANEPE) at *http://www.srcf.ucam.org/~rlk23/Manning/*

If you know people who can help, please email this link to them too. What will take you about five minutes (and you might even find it entertaining) will generate, I hope you agree, a very interesting set of statistics, all in the name of science. Of course I will share the published results with all the participants — that is part of the deal — and I hope there will be more to report in *Circulation*, further down the track of this research.

Renée Kidson
(email RLK23@cam.ac.uk)
Dept of Geography,
Cambridge University

New members

A warm welcome to the following new members of the Society:

Gerry Baker	University of Newcastle upon Tyne
Dr Nick A. Chappell	Lancaster University
Susan Daffern	University of Newcastle upon Tyne
Scott Ferguson	Symonds Group, East Grinstead
Simon Gaskell	URS Corporation Ltd Edinburgh
Alison R. Hanson	Environment Agency, Warrington
Tasmin Howels	University of Newcastle upon Tyne
Renée Kidson	Department of Geography, University of Cambridge
Amon P. Martin	Entec, Shrewsbury
Paul Mason	Environment Agency, Exeter
Graham Meller	ELE International, Leighton Buzzard
Ben Moon	University of Newcastle upon Tyne
Jill L. Murphy	Queen's University Belfast
Catherine Saxon	Environment Agency, Warrington
Hazel A. Sinclair	University of Sheffield
Robb Turner	Environment Agency, Preston

Water for life

In the UK it is hard to imagine life without water. Yet over one sixth of the world's population (1 billion) do not have access to safe water, and over a third (2.4 billion) lack any effective sanitation. As a result, a child dies every 15 seconds from diseases caused by unclean water and poor sanitation.

WaterAid is the UK's only major charity dedicated exclusively to providing safe water and sanitation to the world's poorest people. Set up in 1981, WaterAid now works with people in fifteen countries in Africa and Asia to help them build and manage water supply and sanitation projects and learn about safe hygiene.

WaterAid helps people like **Kironbala Tonchanjgya** *(pictured)*, who lives in Debachari in the Chittagong Hill Tracts, Bangladesh. Before, she would collect water from the river, a long walk away. The water was dirty and unsafe and her children would become sick. Now she can collect water from a handpump close to her home, her children are healthy and can go to school, and she has more time to work weaving.

Without safe water nearby, people find it impossible to escape the downward spiral of poverty and disease. However, with safe water and effective sanitation, life in communities can change dramatically. People are healthier, with fewer diseases, and with water close to people's homes the time that women and children once spent searching for water can be used for other activities: children can go to school and women can work to earn money. The positive benefits are almost unending and show that access to safe water, effective sanitation and hygiene are essential for the eradication of poverty and the future development of people's lives.

WaterAid's vision is a world where everyone has access to safe water and sanitation. The price for this vision is not high — it costs just over £15 to provide someone with safe water, effective sanitation, hygiene education and a better quality of life.

Tamsin Maunder, WaterAid
www.wateraid.org.uk
tel 020 7793 4505



Hydrologic information – where is the future?

British Hydrological Society National Meeting
Institution of Civil Engineers
18 July 2002

This meeting was attended by just over 50 members, with a particularly good attendance from the Environment Agency. The nine presentations addressed policy and planning, high flow issues as well as new technology and use of water quality data to monitor total chemical loads of rivers.

Themes included the low position of hydrometric data collection in budgetary priorities, problems with collecting accurate information on high flows, and reluctance to embrace changes in networks, technology and processing methods enthusiastically in order to improve delivery of high quality information to hydrologists and other data users. An important future constraint on hydrometry was the need for safer working practices, and the discussion underlined how this would need changes in flow monitoring technology.

Rod Furnell (Environment Agency), outlined the structure of hydrometry within the Agency, and the present and likely future priorities for collecting and providing hydrologic information. Demands for data are increasing rapidly because of Agency initiatives, such as Catchment Flood Management Plans, River Basin Management Plans, Catchment Abstraction Management Plans, and the consequences of the Water Framework Directive.

The hydrometric network has some 1300 stations, served by 220 staff spread over 26 areas. Rod also outlined changes to the structure of the Agency likely in the near future. These could change the balance between National, Regional and Area teams, with the region probably taking a smaller role, and Area teams working with a National Hydrometric Process Team to provide technical guidance. There are pressures on the Agency to increase the number of stations in the network by adding flood warning stations (meaning perhaps that a further 50 gauging stations are needed).

Tim Jolley (SEPA) then outlined the growth in hydrometric networks in Scotland, and SEPA's present priorities. Tim gave an excellent account of the history of the network, emphasising the relatively late start in systematic monitoring of rivers. Changes in policy and responsibility for river monitoring meant that growth had been uneven, with networks developing surprisingly recently in areas such as the Highlands. Current drivers for hydrometry in Scotland are the data needed to comply with the Water Framework Directive, information to address flooding issues, and quality and ecological concerns.

Rod Hawnt (Hydro-Logic) gave an entertaining account of the changes in hydrometric technology (or lack of it!) over his career. He noted the lack of a significant change in staff gauges since the "nilometers" on the River Nile of an earlier Millennium (except reduced durability?), along with important recent improvements in acoustic-Doppler current profilers, remote data capture systems (with savings in site visit frequency) and improved data processing packages that serve to make hydrometric staff much more efficient. Rod stressed the importance of being more open to new techniques in order to meet the challenges to provide the information and level of service for the future data needs outlined in the earlier presentations.

Jeremy Benn (JBA Consulting) gave a paper on behalf of **Paul Wass** on work JBA had undertaken for the Environment Agency in the north-east. This was a review of the hydrometric network, to assess its adequacy to provide information likely to be needed in the future. The assessment was largely done by interviewing Agency staff to collect perceptions about the network (as principal data users as well as data providers). This led to stations being identified as "national" (key contributors to the national hydrometric database, and therefore of very high priority), "operational" (used for flood warning, monitoring compensation flows and the like) or "planning" (short-term stations to provide additional information to meet particular planning needs). When applied to the Aire catchment this approach showed a number of stations that provided only very limited useful information, as well as a few sites for useful, new stations. As a footnote, it appeared that while steps were taken to add new stations, there was a reluctance to close the less useful ones. Jeremy stressed the potential role of "portable" temporary gauges, to provide a year or two's data at one site for planning purposes, before being moved on to new locations.

The next presentation was given by **Terry Marsh** (CEH), discussing the hydrometric network from the point of view of the National River Flow Archive, maintained at CEH Wallingford (www.nwl.ac.ih/nrfa/index.htm). The archive holds 42000 station-years of mean daily flow data for 1400 stations in the UK, and the unit now has a strategic role to provide an overview of the network. The network has been divided into "baseline" catchments, "impact" catchments, regionalisation catchments, and integrated monitoring catchments. Service level agreements have been made with organisations providing information to the archive to guarantee data quality, covering some 800 stations. One of Terry's concerns was the quality of information within the archive.

In the discussion at the end of the morning session, **Peter Walsh** raised the concern of high flow data quality, as expressed in the recommendations of the Bye report. The speakers endorsed this concern, and the issue was addressed at greater length in the afternoon presentations. **Stewart Child** (Hydro-logic) raised the issue of the density of the hydrometric network: his view was that there were more than enough gauging stations within the UK by most international standards. Terry Marsh endorsed this view, and the general feeling was that the size of the network needed to be reduced — wit fewer "planning" gauging locations — to free resources to improve quality elsewhere.

In the afternoon, the emphasis shifted to the measurement of high flows. **Mike Vaughan** (Environment Agency) outlined the work being done under an Agency R&D programme on methods of extending the range of flows for which a rating curve is accurate beyond the limits of the discharges actually measured. Mike outlined the theoretical methods considered, extending to detailed one-, two- and three-dimensional modelling (with its very heavy computational and data needs!) Research is at quite an early stage, but it is hoped to develop comprehensive recommendations on how to improve the accuracy of the high flow rating relationship, so vital for accurate estimation of peak flood discharges that underpin so much of

flood hydrology.

Stewart Child then gave a critique of high flow data in the UK. There was a wide difference in perception of the typical accuracy of information provided: some data *users* believed the information was relatively accurate (maybe ±15%), whereas the data *providers* had a more realistic idea of the accuracy (perhaps ± 50%). Steps to improve the quality of such information included the recognition of the onset of non-modular flow at structures, the use of crest tapping data on weirs, using tail-water levels when flow is non-modular, and improved flood flow discharge measurement using techniques such as ultrasonic Doppler and transit time ultrasonics. These could also have advantages where Health and Safety regulations are concerned. A consistent national approach was also needed to methods of gauging high flows, and giving priority to improving the quality of high flow data over quantity. Stewart noted that providing additional water level monitoring access points within a structure (tail-water levels or crest tappings) might increase costs by up to 10%, but fundamentally improve the accuracy of high flow estimates.

Ian Littlewood (CEH Wallingford) then reported on work done under the harmonised monitoring scheme (HMS) to compile a database of spot water quality measurements (200 sites, up to 20 determinands) with information on river flow at the time of the measurement, in order to estimate the total volumetric discharge of river contaminants. This work was started in order to estimate the contaminant inputs to receiving water bodies, notably the North Sea. Convoluting the HMS data with the national river flow archive was shown to improve the accuracy of estimates significantly (and reduce bias), and show the benefits of more sustained efforts to measure water quantity and water quality parameters in an integrated way.

The final presentation was by **John Newman**, about work he has started to use "noise" as a measure of river discharge, based on measurements made in the mountain stream outside his bedroom window. By using geophones in contact with a large rock under the main stream, John has established a remarkably strong, linear relationship between the geophone signal strength and discharge. The method seemed to be very promising, and John was seeking assistance with funding to develop the technique .

In discussions, concern focused on the accuracy of existing high flow data, and the work needed to audit the quality of information, and perhaps to improve flow estimates based on water level information, and detailed review of rating relationships. Terry Marsh mentioned recent work to re-assess the largest Thames flood on record (in the 1890s). There was a growing tendency to fail to report estimates of very high flows, the information being reported as being "out of range" of established rating relationships, thus avoiding the difficulties of estimating what the peak flow might have been. This caused serious concern, as this information is invaluable for flood studies and is effectively being lost.

The greatest concern of the meeting seemed to be the issue of resources for the hydrometric network, especially for the maintenance of the high flow dataset that was so important for all flood defence work. There were growing demands for detailed data to meet new initiatives, increasingly complex procedures and precautions needed to meet Health and Safety requirements and the physical problems of flood flow measurement, but the resources were not presently available. Technology can go some way to addressing these problems, but that also has a cost.

Steve Parsons
Mott Macdonald

Meteorology and hydrology — towards closer collaboration

BHS and Royal Meteorological Society Joint meeting Institution of Mechanical Engineers, London 16 October 2002

This meeting was conceived by members of the BHS and Royal Met. Soc. committees in early 2001, when it was realised that the two disciplines had a number of overlapping concerns and the two communities had a lot to learn from one another.

Every attempt was made to get a wide spread of speakers on meteorological and hydrological topics, but in the end there was a bias towards real-time flood forecasting. This is an exciting and topical area from several viewpoints: research, practitioner and social impact. Some research on the ground/air interface was also presented, but this topic, and the role of climate modelling and hydrology and analysis of flood-producing rainfall, can be addressed at future joint meetings.

Ken Mylne (Met Office), in a paper on recent advances in probabilistic forecasting, emphasised that forecasts were imperfect: although errors have been reduced, the atmosphere remains chaotic and can never be modelled exactly. 'Ensembles' (groups of possible outcomes from one starting position) are considered the best way to forecast, particularly with 'hard to predict' weather situations, ensuring that a measure of uncertainty is incorporated. Rainfall prediction presents specific difficulties, though downscaling forecasts helps – this has recently become operational.

James Dent (HR Wallingford, previously at the Environment Agency) gave an Agency view of forecasting precipitation from the flood hydrologist's perspective. The background to this topic was the Bye Report and the autumn 2000 floods. James explained the range of precipitation forecasts received by the EA, over timescales from ten days to the flooding event itself, and discussed the issues the hydrologist must consider. "No flood warning has been issued purely on a Met Office forecast", he said, emphasising the need for hydrological judgement in the process. He described how the products the Agency receives from the Met Office are used and looked at the needs for improvement, including better post-event analysis.

Bob Moore (Joint Centre for Hydro-Meteorological Research, Wallingford) talked about advances in flood modelling and the need for better spatial rainfall data. He had studied the way different rainfall types (stratiform and convective) affect the ability to forecast river flows in the catchments in which the rain falls. He used the River Brue catchment as an example of the importance of emphasising spatial rainfall characteristics, using a dense network of 49 gauges. The flow

hydrographs from the two forms of rainfall highlighted key differences in the river response and showed the need for radar data in flood analysis. Two challenges were to combine gridded variables to give a probabilistic first alert of flooding at a national scale, and to disaggregate rainfall to varying scales. Probabilistic modelling was the future for hydrology and meteorology.

Robert Gurney (University of Reading) examined new techniques in land-atmosphere interactions with remote sensing in hydrology. Remote sensing has long been used to estimate snow volume and depth. It could also analyse the water budget and fluxes within the atmosphere/ground interface and 'sound' into soil using microwave analysis to obtain a time series (over a year or more) of the hydrological properties at this interface. Satellites and LIDAR were also used in this field. Some scaling issues had to be resolved before the model could be used operationally.

Roderick Smith (JCHMR), Wallingford) spoke about developments in real-time moisture diagnosis and surface hydrology: why we need this information, current methods of soil moisture estimation, and a new model-based system, MOSES. This was developed at the JCHMR, is operational now with Numerical Weather Prediction (NWP) models, and it has been linked to a Probability Distributed Model (PDM) to produce runoff amounts. There was evidence that the MOSES-PDM model was working well and able to model both wetting and drying out of soils through the year.

Peter Clark (Met Office), based at the Joint Centre for Meso-scale Modelling in Reading University, had been asked to look into the future of rainfall forecasting. He spoke about prospects for convective-scale numerical weather prediction (NWP). Forecasting convective rainfall systems is very difficult, and the sub-grid-scale extent of convective storms is averaged in NWP models. To improve this, individual clouds are being modelled: the speed of propagation of a rainfall system improves greatly when model resolution increases: increasing resolution does not just add detail. Peter predicted that a 1km-resolution 6-hour forecast with a 30-second time-step for the UK could take just 10 minutes to run by 2008, with the expected increases in computing power by then.

Altogether it was a thought-provoking afternoon with a number of interesting questions on each of the presentations. Another joint BHS/RMS meeting is being held on 3 March 2003: the topic will be measuring elements of the hydrological cycle. It is hoped to continue this inter-society collaboration for future topics.

Murray Dale
Met Office

Publications

HSJ contents listing

IAHS's *Hydrological Sciences Journal* (***Vol. 47 No. 5**, October 2002*) contains the following papers:

A. J. Adeloye & M. Montaseri *Preliminary streamflow data analyses prior to water resources planning study*

Umesh C. Kothyari, Manoj K. Jain & Kittur G. Ranga Raju *Estimation of temporal variation of sediment yield using GIS*

M. Bayazit & B. Önöz *LL-moments for estimating low flow quantiles*

Chien-ming Chou & Ru-yih Wang *On-line estimation of unit hydrographs using the wavelet-based LMS algorithm*

A. Kieffer Weisse & Ph. Bois *A comparison of methods for mapping statistical characteristics of heavy rainfall in the French Alps: the use of daily information*

Michael Eisele & Chris Leibundgut *Modelling nitrogen dynamics for a mesoscale catchment using a minimum information requirement (MIR) concept*

K.V. Heal, P.E. Kneale & A.T. McDonald *Manganese in runoff from upland catchments: temporal patterns and controls on mobilization*

Laurent Bergonzini, Yves Richard & Pierre Camberlin *Variation interannuelle du bilan hidrique du lac Tanganyika (1932–1995): changement dans la relation précipitation–excédent lacustre*

Discussion: Tommy S.W. Wong: Discussion of *"Use of artificial flood events to demonstrate the invalidity of simple mixing models"* and a reply by Andreas Krein

Book reviews: *Land Use and Watersheds* edited by Mark S. Wigmosta & Stephen J. Burges; *Land Surface Hydrology, Meteorology, and Climate* edited by Venkataraman Lakshmi, John Albertson & John Schaake; *Urban Stormwater Management Planning With Analytical Probabilistic Models* by Barry J. Adams & Fabian Papa; *Dispersion in Heterogeneous Geological Formations* edited by Brian Berkowitz

*HSJ **Vol. 47 No. 6** (December 2002)* includes the following:

Scientific papers:

M.P. Rajurkar, U.C. Kothyari & U.C. Chaube *Artificial neural networks for daily rainfall–runoff modelling*

Gokmen Tayfur *Artificial neural networks for sheet sediment transport*

PaweB M. RowiDski & Janusz Kubrak *A mixing-length model for predicting vertical velocity distribution in flows through emergent vegetation*

G. Drogue, T. Leviandier, L. Pfister, A. El Idrissi, J.-F. Iffly, L. Hoffmann, F. Guex, B. Hingray & J. Humbert *The applicability of a parsimonious model for local and regional prediction of runoff*

Hocine Bendjoudi & Pierre Hubert *Le coefficient de compacité de Gravelius: analyse critique d'un indice de forme des bassins versants*

András Bárdossy & Fridjof Schmidt GIS *approach to scale issues of perimeter-based shape indices for drainage basins*

Thomas Skaugen *A spatial disaggregation procedure for precipitation*

E.A. Ampofo, R.K. Muni & M. Bonsu *Estimation of soil losses within plots as affected by different agricultural land management*

Lahcen Zouhri *Hétérogénéité des cotes piézométriques et structuration en blocs dans les aquifères côtiers marocains*

Discussion: Sheng Yue & Chun Yuan Wang: Discussion of *"A study of variability of annual river flow of the southern African region"* and reply by Berhanu Fanta Alemaw

Book reviews: *Fluid Arguments. Five Centuries of Western Water Conflict* edited by Char Miller; *Distributed Hydrologic Modeling Using GIS* by Baxter E. Vieux; *Dryland Rivers — Hydrology and Geomorphology of Semi-arid Channels* edited by L.J. Bull & M.J. Kirkby; *Risk, Reliability, Uncertainty, and Robustness of Water Resources Systems* edited by Janos J. Bogardi & Zbigniew W. Kundzewicz; Mine Water — *Hydrology, Pollution, Remediation* by Paul L. Younger, Steven A. Banwart & Robert S. Hedin.

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Members interested in consulting these publications may contact the National Hydro-Sciences Library at CEH Wallingford *(tel 01491 692266).*

Recent PhD theses

Hydrogeochemistry in Dorset

Kelvin Limbrick has been awarded his PhD from the University of Reading on *Hydrogeochemical variability since 1858 in the Chalk aquifer of south Dorset, UK: water resources implications.* Kelvin worked with Terry Marsh in the Hydrological Information Section at CEH Wallingford. The abstract follows.

A homogenous Chalk springflow record is presented that captures hydrological variability in Dorset since 1858. Such datasets are rare both in the UK and globally, and it is unique in south-west England. The absence of significant artificial influences on the flow regime reinforces its importance in documenting climate-driven variations in springflows, and, crucially, its utility for identifying any emerging hydrological trends in a warmer world. Hydrological stability is demonstrated from 1858 to 2002.

Climate change assessments suggest moderate increases in aquifer recharge over the next 100 years.

The record implies that recent droughts experienced in south-west England were less severe than historical events. Extreme droughts between 1900 and 1910 provide a fuller context within which to assess the relative severity of recent groundwater droughts in south-west England. Peak springflow during the floods of 2000/01 was equalled or eclipsed during 1886, 1891, 1894, 1935 and 1978.

A daily recharge model for the Chalk is presented: the only data requirements are daily meteorological observations. Model results suggest a root constant of 200mm is optimal for the Chalk and that AET equals PET on the outcrop for all but extremely dry years. The model is particularly useful where the application of more complex methods of recharge estimation is impractical.

Hydrogeochemical processes are described that focus on nitrate transport through the unsaturated zone. Historical data confirm a baseline concentration of around 1 mg NO_3-N l^{-1} in the regional groundwater. Spring outflow concentrations rose from 1.04 mg NO_3-N l^{-1} between 1894 and 1946 to 6.37 mg $N0_3$-N l^{-1} between 1976 and 2001. Concentrations of 9 mg NO_3-N l^{-1} during 2000/01 were the highest in a record since 1894.

Processes normally controlling nitrate variability in groundwater systems cannot explain observed nitrate seasonality in the spring outflow. An alternative explanation is suggested, and implies nitrate concentrations in the springflow will continue to rise and approach/exceed the recommended EC limit in future.

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Modelling DO in the Thames

Brian Cox has been awarded a PhD from the University of Reading for his thesis entitled *Dynamic modelling of dissolved oxygen: a case-study for the River Thames*.

This study provides a major examination of an important UK river, the Thames, in terms of the water quality issues linked to dissolved oxygen (DO) levels. The study brings together, for the first time, the wealth of monitoring information currently available and develops a new framework for describing the spatial and temporal variability.

To achieve this, a new dynamic flow and water quality model has been developed with emphasis on the suitability of conceptual structures and thermodynamic and empirical relationships describing key processes. Major processes are reviewed and updated producing a new standard of parameterisation. The modelling work provides an assessment of potential water quality change, particularly for dissolved oxygen, resulting from a changing climate.

This work shows that:

- Future climate scenarios predict higher winter and lower summer flows with increased likelihoods of drought and spate. Temperatures will be higher, causing a reduction in DO concentrations.
- Water quality is linked to flow, and a sustained period of low flows in the future could result in a marked deterioration in the quantity and quality of water available for human use.
- More integrated water management is urgently needed to counteract deterioration of water quality, taking into account the acuteness of the problems and the trans-boundary nature, diverse utility, and wide importance of large river systems.

The thesis identifies important issues that still need addressing: the availability of high quality field data, problems of process uncertainty, and the need for a reliable assessment of climate instability associated with climate change. This last problem makes accurate assessment of the distributions of extreme flows, which critically affect water quality, difficult. The analysis of the Thames data coupled with the new modelling framework developed in this thesis provides an important base for advancing water quality research in major lowland river systems.

MITCH (Mitigation of climate-induced hazards)

Murray Dale (Met Office), a member of the BHS National Committee, attended the second MITCH workshop in Barcelona in June 2002. The main aim of this workshop, entitled *'Advances in Flood Forecasting, Flood Warning & Emergency Management'*, was to "serve as a platform to promote contact between practitioners and R&D groups dealing with flood warning and emergency management".

This was a successful meeting with a range of presenters, including Jim Haywood of the National Flood Warning Centre of the Environment Agency. **Dr Creutin** of France presented a paper on operational applications of radar for flood warning, **Dr Krasovskaia** of Norway spoke about the human perception of flood risk and there were other contributors from Spain, the Netherlands, Italy and Denmark. It is anticipated that proceedings of this workshop will be available on the MITCH website ***www.mitch-ec.net*** (which already has details of Workshop 1, December 2001).

Background

MITCH is a Concerted Action funded by the EU. Past European research has made significant advances in understanding, monitoring and forecasting climate-induced natural hazard risks, such as floods, droughts and landslides. The MITCH Concerted Action seeks to translate these advances into practical benefits and has been funded by the European Commission. More details are on the web site *(see above)*.

MITCH objectives are:

- to provide a forum for discussion and debate;
- to assist hazard planning and management by disseminating start-of-the-art research;
- to match end user needs with research community capability;
- to seek implementation pathways for research results.

The Concerted Action is conducted through a series of three workshops and via the website. The workshops are covering:

- Changing climate patterns, and their implications for management and design in altering approaches to drought, flood and landslide mitigation.
- Monitoring of natural hazards, incorporating and implementing new techniques in flood forecasting and warning, dissemination and emergency management.
- Natural hazards and flood management as a part of spatial planning and the role of insurance and risk appraisal in natural disaster management

Workshop timetable

Workshop 1
'Floods, Droughts and Landslides — Management in a Changing Climate' Translating research advances into practical benefits.
Location: Delft, The Netherlands, *12-13 December 2001*. Organisers: Delft/Environment Agency.

Workshop 2
'Advances in flood forecasting, flood warning & emergency management'
Translating research advances into practical benefits.
Location: Barcelona, Spain, *10-12 June 2002*. Organisers: Padova/Barcelona

Workshop 3
'Floods, droughts and landslides — who plans, who pays?'
Translating research advances into practical benefits.
Location: GFZ Potsdam, Germany, *25-26 November 2002*. Organisers: HR Wallingford/GFZ Potsdam

For more specific information, please contact **James Dent** at HR Wallingford (j.dent@hrwallingford.co.uk).

Special offer for BHS members from Wiley

John Wiley & Sons are pleased to offer BHS members a special 20% discount on some of their best-selling books on hydrology. There is also a special BHS member subscription rate available on the journal *Hydrological Processes*.

Special journal rate

BHS members are eligible to receive 18 issues of the journal *Hydrological Processes*, giving the latest information in international hydrology during 2003, for only £85.00 per annum.

For more information about *Hydrological Processes*, including how to receive *HP Today* and new content alerts, see *http://www.interscience.wiley.com/jpages/0885-6087*.

To subscribe at this special rate, email *cs-journals@wiley.co.uk* .

20% off best-selling titles

Wiley are offering 20% off of some of their best-selling books in hydrology when you buy online. Just enter **BGL** in the discount code section of the shopping cart to receive the special member price on the following books:

Model Validation: Perspectives in Hydrological Science — £88 instead of £110 — *http://www.wileyeurope.com/cda/product/0,,0471985724,00.html*

Rainfall-Runoff Modelling: The Primer — £40 instead of £50 — *http://www.wileyeurope.com/cda/product/0,,0471985538,00.html*

Global Perspectives on River Conservation: Science, Policy and Practice — £100 instead of £125 — *http://www.wileyeurope.com/cda/product/0,,0471960624,00.html*

Well Logging for Physical Properties: A Handbook for Geophysicists, Geologists and Engineers — £140 instead of £175 — *http://www.wileyeurope.com/cda/product/0,,0471963054,00.html*

The full price will be displayed on the catalogue until the discount code is entered in the "shopping cart". The offer expires on ***17 January 2003***. If you have any queries please contact **Abi Moore** at *amoore@wiley.co.uk*. Also contact her if you are interested in having Wiley books to offer at a special discounted price to members at any training sessions or meetings.

New International Journal of River Basin Management

Water is a globally important resource, and in recent years a number of strategic frameworks for managing the water environment have been developed by national governments, pan-national organisations (such as the United Nations and the European Union), and non-governmental organisations. Documents such as the EU Water Framework Directive and the World Water Vision released during the 2nd World Water Forum promote integrated approaches to water resource management that balance supply, quality and ecological objectives. At the same time, water scientists and engineers have begun to develop the data sets, algorithms and model tools that enable such objectives to be met based on firm evidence.

As part of this response by the scientific and professional community, the International Association for Hydraulics Research *(http://www.iahr.org/)* will launch a new peer-reviewed Journal at the 3rd World Water Forum to be held in Kyoto in March 2003. The Journal intends to play a specific role in promoting a cross-sectoral approach encompassing all aspects of river and floodplain management with a truly global perspective. It aims to become essential reading for practitioners and researchers in this field.

The Journal will initially be published four times per year and papers will be accepted in all areas of river and floodplain management, including catchments, wetlands and estuarine systems. Contributions are invited now and may include (but need not be limited to) new developments and applications in such areas as:

- Integrated water resources management
- Watershed land-use planning and management
- Spatial planning and management of floodplains
- Forecasting and risk management for droughts and floods
- Floodplain, river and estuarine restoration
- Climate change impact prediction and planning of remedial measures
- Water quality management
- Operation and maintenance strategies
- Project-affected people and stakeholder participation
- Legislative and policy issues
- Socio-economic and public health issues
- Trans-boundary issues and management of international river basins
- Rural and urban catchment hydrology
- Land-atmosphere interactions
- Groundwater-surface water interactions
- River hydraulics
- Floodplain processes: flood damping, conveyance and sedimentation
- Erosion, sediment transport and deposition
- River regime and river morphology
- Water pollution and water quality
- Ecology and ecohydraulics
- Modelling approaches and applications
- Model calibration, validation and uncertainty
- GIS/MIS applications
- Decision Support Systems and other design and management tools
- Risk assessment, risk communication and risk management
- Real-time monitoring and remote sensing

The editorial board and editorial advisory panel are currently being set up. The board will include **Roger Falconer** (Civil Engineering, Cardiff) and **Paul Bates** (Geography, Bristol) in the UK, **Frans Klijn** (Delft Hydraulics) in the Netherlands, and **Pete Loucks** (Civil and Environmental Engineering, Cornell University) in the USA. Academics and practitioners interested in submitting a paper to the journal may like to consult the journal web site *http://www.iahr.org/jrbm/index.html* and can contact either of the UK editors *(addresses below)*.

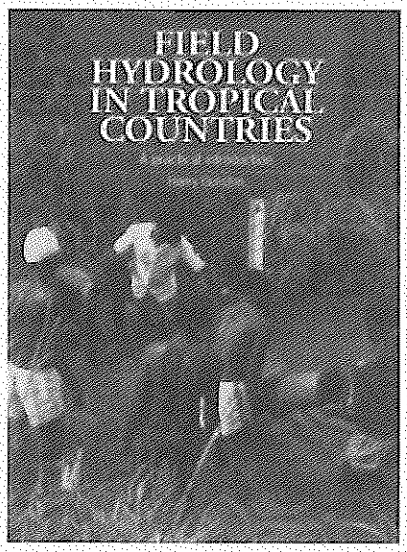
The Journal will be published by IAHR, a long-established not-for-profit international professional organisation serving the water science community. Organisations interested in collaborating with this publishing venture should contact the Publishing Manager, **Yasmin El Harchi** at *publications@iahr.org*.

Prof. Roger Falconer, Cardiff School of Engineering, Cardiff University, PO Box 925, Cardiff, CF24 0YF (tel 029 2087 4280, email FalconerRA@cardiff.ac.uk)

Dr Paul Bates, School of Geographical Sciences, University of Bristol, University Road, Bristol, BS8 1SS (tel 0117 928 9108, email Paul.Bates@Bristol.ac.uk)

Discount offer on practical hydrology book: *Field Hydrology in Tropical Countries*

Henry Gunston has been advised by the publishers of his book, "Field Hydrology in Tropical Countries" of a special promotion offer by which copies of the book will be available for a limited period at less than half of at the normal price of £12.95 (+p&p).



This book, which has been well received by "hands-on" hydrometry and hydrology practitioners in tropical countries, is based on Henry's 30 years of experience in field hydrology overseas whilst working with the Institute of Hydrology (now CEH Wallingford).

It describes the general principles of working with observers, field teams and road vehicles, as well as methods of measuring rainfall, streamflow and evaporation.

The book contains 108 pages and is illustrated with diagrams of equipment and photographs of field hydrology (both equipment and teams in action) in Ecuador, Kenya, Saint Helena, Sri Lanka and other overseas locations. It is specially targeted at those with academic qualifications in hydrology who are moving towards involvement with hydrology in the field.

Henry will maintain a small stock that he can sell at £6 inclusive of P&P. Please contact him at 6 Clement Close, Wantage, Oxfordshire, OX12 7ED *(email: henry.gunston@virgin.net).*

Henry Gunston

FORTHCOMING EVENTS

ADVANCE NOTICE

BHS International Conference — ***Hydrology: science and practice for the 21st Century***

Imperial College, London, 12-16 July 2004

The first circular and call for papers is being sent out with *Circulation*

For up-to-date information visit the BHS2004 website: **www.hydrology.org.uk/bhs2004**

Courses

The programme of professional development courses in hydroinformatics (run by Newcastle, Birmingham and Sheffield Universities) continues into the new year. For details telephone *0191 222 7439* or see the website *http://www.ncl.ac.uk/hydroinformatics/*.

Sheffield University's graduate training programme in urban land and water also continues, with risk assessment methods (December) and risk assesment and management of contaminated land and water (February) being the next course titles. Call *0114 222 5712* or email *s.l.murton@shef.ac.uk* .

A select executive course for water management professionals and decision-makers is taking place near Zürich from 5th to 12th July 2003: details at *www.iwmc.eawag.ch.*

Meetings

CLYDE CATCHMENT CONFERENCE: LIVING AND WORKING WITH THE RIVER
The Teacher Building,
14 St Enoch Square, Glasgow
Friday, 13 December 2002

The Firth of Clyde Forum, Enviro-Centre and The Clyde Heritage Trust are holding an important conference to explore the challenges faced in managing the Clyde catchment, to maximise sustainable economic development along the Clyde and to promote and protect the river and estuary.

By necessity, those living and working alongside the river are becoming increasingly aware of social, economic and environmental changes and their potential impact upon daily life. One area of particular concern is increased flood risk resulting from climate change.

Key speakers will present a range of topics affecting the Clyde today and investigate how a strategic Clyde-wide catchment management approach could be of mutual benefit to all stakeholders working and living alongside the river.

This promises to be a thought-provoking one-day conference, which should further stimulate interest and debate as to how the Clyde should be managed to achieve a sustainable balance between exciting new economic development opportunities and environmental change.

The conference fee (£45+VAT) includes lunch and refreshments through the day. To reserve your place please use the booking form on the Clyde Forum website: *www.clydeforum.org/whatson* or contact Trish McGregor *(email tmcgregor @envirocentre.co.uk).*

Call for papers
RIVER RESTORATION CENTRE ANNUAL NETWORK CONFERENCE
28–29 April 2003
Bristol, UK

The River Restoration Centre's 4th Annual Network Conference will take place in April at the Marriot Royal Hotel, Bristol. It will encompass themes of applied river research, project appraisal and setting sound objectives to ensure sustainable river restoration.

It is hoped to inform all who are interested in rivers and river management about how current research is being applied to river restoration. The views of those concerned with the conservation and ecology of rivers are particularly welcome.

This is the first call for papers (usual length 15 to 20 minutes). We wish to attract a diverse range of papers and are especially interested in hearing from people who are applying sound research: e.g. how can ecological indicators be used to set restoration project objectives?

If you wish to present a paper or poster, or simply attend, please register your interest with Jenny Mant (see below). Presenters need only initially provide a suggested title at this stage. A programme will be prepared and circulated in the New Year along with details of the exact costs (as a guide, residential fees might be around £200-£220 for RRC members).

The Tuesday afternoon site visit will be to a number of locations on the Bristol Frome. This river gives a good insight into the change in character of the river and management from semi-rural to urban.

For more information please refer to our website at *www.therrc.co.uk* or contact Dr Jenny Mant at the River Restoration Centre, Silsoe Campus, Silsoe, Bedford, MK45 4DT *(tel/fax 01525 863342, email rrc@cranfield.ac.uk).*

Call for papers
EGS AGU EUG Joint Assembly
Nice, France
06–11 April 2003

The programme includes more than 500 sessions, including union symposia, educational symposia, topical sessions, short courses, workshops, keynote and medal lectures and townhall meetings, covering all areas of Geology, Geochemistry, Geophysics and Biogeosciences from the inner part of the Earth to the outer boundary of the Heliosphere.

The deadline for discount "early bird" registration is **31 December 2002**; the deadline for receipt of Abstracts is **15th January 2003**.

Details are now on the web site at *http://www.copernicus.org/egsagueug/index.html.*

First call for papers
NINTH INTERNATIONAL CONFERENCE ON RIVER RESEARCH AND APPLICATIONS
(Formerly NISORS)
6–11 July 2003
Albury, on the Murray River, New South Wales, Australia

With increasing pressure on riverine environments, there is a fundamental need to link river management strategies with sound scientific information. We all have a role in promoting knowledge based decision making. The conference will follow the tradition of previous NISORS conferences in providing an opportunity for scientists and managers from all parts of the world, and from a range of disciplines and riverine environments, to share advances in river science and management.

The session themes will include:

- Natural variability in river systems;
- Integrating concepts of variability into models of river systems;
- The consequences of changes in natural variability to river systems;
- Restoring variability in managed river systems.

These themes are not exclusive: papers on all aspects of river regulation will be considered. Abstracts are invited, to arrive by **31st January 2003**. Papers submitted may be considered for publication in the international journal *River Research and Applications*. For further details, see the conference website at *http://www.conlog.com.au/NISORS/overview.html* .

Diary

22nd January 2003
BHS Pennines Hydrological Group
"The Water Framework Directive"
Venue: Leeds University, School of Geography Lecture Theatre
Contact: Dr Pauline Kneale, School of Geography, University of Leeds, Woodhouse Lane, Leeds LS2 9JT *(tel 113 233 3340, email p.e.kneale@leeds.ac.uk)*

30th January 2003
BHS and ICID Conference
"Land-use and flood management"
With Elliott Morley MP (Minister)
Venue: Thomas Telford Lecture Theatre, ICE, 1 Great George St, London, SW1P 3AA
Time: 10.00 *(booking essential)*
Contact: Bisi Oyekanmi, ICE *(tel 020 7665 2239, fax 020 7799 1325, email bisi.oyekanmi@ice.org.uk)*

Copy deadline for *Circulation* No. 76
9th January 2003

6th February 2003
OASIS (DFID Resource Centre) and BHS Joint One-day Meeting
Topic: UK research on water resources and poverty alleviation
Venue: CEH Wallingford, Oxfordshire
Contact: Dr Mike Acreman *(tel 01491 692443, email man@ceh.ac.uk)*

19th February 2003
Scottish Hydrological Group
"Extreme rainfall and climate change: modelling the impacts"
Venue: Theatre C, James Clerk Maxwell Building, University of Edinburgh
Time: 18.30 *(tea at 18.00)*
Contact: Mike Cranston *(tel 01738 627989, fax 01738 630997, email michael.cranston@sepa.org.uk)*

***3rd** March 2003 [not 12th as in last diary]*
BHS National Meeting + Roy. Met. Soc.
"Hydrometry in a changing environment"
Venue: ICE, London Time: 10.30
Contact: Andrew Black *(tel 01382 344433, fax 01382 344434, email a.z.black@dundee.ac.uk)*

12th March 2003
Scottish Hydrological Group AGM
"New hydro developments in Scotland"
Venue: G10 Rankine Building, Glasgow University Time: 18.30 *(tea at 18.00)*
Contact: Mike Cranston *(see above)*

16th April 2003
BHS National Meeting with the British Dam Society
"PMP and dam safety"
Venue: ICE, London Time: 10.00
Contacts: Tim Jolley & Chris Scott *(tel 01738 627 989 / 01737 774 155, fax 01738 630997, email Tim.jolley@sepa.org.uk / scottc@bv.com)*

6th–11th April 2003
EGS / AGU / EUG Joint Assembly
Venue: Nice, France *(see Meetings)*

25th April 2003
Scottish Hydrological Group / Royal Met. Soc. (Scotland) joint meeting
"Floods in Scotland"
Venue: Perth (all day)
Contact: Mike Cranston *(see above)*

10th–12th September 2003
Aqua Enviro / CIWEM Conference
"The environment — vision, values and innovation"
Venue: Harrogate, Yorkshire
Contact: Alastair Chrisholm, CIWEM *(email alastair@ciwem.org.uk)*

Advance notice — 12th–16th July 2004
BHS International Conference on "Hydrology: science and practice for the 21st century" *(see previous page)*
Venue: Imperial College, London
Contact: Dr Adrian Butler, Dept of Civil & Environ. Engineering, Imperial College, London SW7 2BU *(tel 0207 594 6122, fax 0207 594 6124, email a.butler@ic.ac.uk,)*