THE NEWSLETTER OF THE BRITISH HYDROLOGICAL SOCIETY

Circulation

No. 48 November 1995

Successful Fifth Symposium

Heriot-Watt University, 4th-7th September 1995

The Edinburgh Symposium was judged a great success, and much enjoyed by those who attended it. There was a full programme of lectures, papers, posters and exhibits, and a report of the wide-ranging discussions which accompanied them will appear in the next *Circulation*. A flavour of the meeting is given here in the form of a personal report by Anthony Tollow (who has presented a paper at every BHS Symposium so far) and some pictures of members enjoying the Scottish hospitality.

The BHS Fifth National Hydrology Symposium

This was a Symposium not to be missed, packed with papers of very high quality and much else besides (the formal proceedings will be reported in detail elsewhere). The organisers are to be congratulated, not only for assembling such a diversity of papers with worldwide appeal, but also for ensuring their prepublication in a proceedings volume which must now be kept near at hand for future reference. The general standard of the reviewed papers was such that all could take their place in recognised journals.

One other factor which deserves mention is the hard work put in to keep the costs of attending the Symposium down: this is much appreciated by academic and student members, who are usually on limited budgets. All the authors are to be congratulated on the hard work they put into writing and then presenting their papers. I found it very difficult to find any session that could be omitted.

The Symposium opened with the AGM of the Society on the Monday evening. However, arriving in the morning gave me time to work on my paper in the Heriot-Watt University Library and finalise it for presentation. At the end of the AGM there was a demonstration of "uisge beatha" — the water of life — which really gave a Scottish (perhaps equally well described as Scotch) flavour to the proceedings. Those attending learnt much about the production of the Scotch product and how important was the main ingredient, water. Then came the competition: become a whisky blender and win. The evening ended with a much appreciated formal dinner. Whyte & Mackay's are to be congratulated on the event, which left its mark in more ways than one. The addition of "Scottish wine" as well as wine on the tables at dinner was also very welcome.

Next morning saw the formal opening and the start of the technical sessions. Professor Mike Hall had the privilege of finishing the Fourth Symposium at Cardiff and now being given first spot in the Fifth. Later in the same session came my paper, so then I



Presidents Mike Hamlin, Sue Walker, Mike Lowing, Allan Lambert and Peter Wolf at the President's Reception in the Royal Museum of Scotland

could really enjoy the rest of the proceedings, and the exhibition in the Civil and Offshore Engineering Department. During the Conference I was able to tour the Hydraulics Laboratories and discuss the undergraduate courses and research undertaken at Heriot-Watt. This was very useful for me when I got back to South Africa, where we are trying to upgrade teaching and research at the Technikons.

The second evening saw the President's Reception: we were welcomed by a piper on the steps of the Royal Museum of Scotland. The main hall was an impressive arena and the fountains made a fine backdrop for the formal photograph of BHS Presidents and for a highland dancing display. After the excellent buffet there was tour of the "Old Town" for those who wished to explore the heart of Edinburgh, and a tour of famous watering holes too. Then it was back to the countryside and Heriot-Watt.

Most were up early for breakfast, allowing interesting discussions between delegates at the different conferences going on at Heriot-Watt: it was very useful talking to delegates from former Polytechnics and Colleges of Higher Education. However, a prompt start saw day three under way. The highlight of this day had to be the Symposium Dinner in "Rainy Hall", with a speech by Professor Jim Dooge and the "Highland Games": I only wish I had taken notes.

The last morning saw a sparse attendance at breakfast, but most were there for the start of the papers. Then at noon came the "Penman Lecture", a masterly presentation by Professor Jim Dooge. I tried to take notes, but that was only one part of the theme of the lecture with an important underlying message: it had to be attended to be appreciated. Then after a quick lunch I was off to the airport to get back to the Guildhall in London by 18:00. All went according to plan and I arrived in time to participate in proceedings to mark 100 years of the predecessors of the Chartered Institution of Water & Environmental Management. There I was able to meet many who were not able to get to Edinburgh, including Peter Midgley (NRA Southern Region), and to talk once more with Alasdair Paton, Chief Executive of the new Scottish Environment Protection Agency (SEPA), who had addressed us at the Symposium about the restructuring of the water industry and regulating authorities in Scotland.



Professor Susan Walker and Mrs Hamlin arriving in style at the President's reception at the Royal Museum of Scotland, Edinburgh



Scottish Environment Minister Lord Lindsay (centre) officially opened the Symposium. With him are the chairman of the local organising committee, Professor Paul Jowitt (left) and the BHS President, Professor Mike Hamlin (right).

The next few days saw discussions with a CNAA evaluator and external examiner for Portsmouth University, staff from Portsmouth on how to develop a "Research Ethos", together with a visit to the hydraulics laboratory at Oxford Brookes University, arranged through Armfield, the laboratory equipment manufacturers. Then I was back to South Africa after a memorable time in the United Kingdom.

The weather cooperated with the researchers in meteorology and producers of the BHS "drought busters" T-shirt, to provide parts of Scotland with its wettest September on record. Perhaps if Yorkshire Water had sponsored the T-shirts, they too might have reaped the benefit! The manner in which the Symposium was arranged,

together with the availability of University accommodation and transport all went to make it memorable. I would like to record my thanks for all the hard work put in by the local organising committees and the Institute of Hydrology.

I was very pleased to have been able, once again, to make the journey from South Africa to present another paper at another BHS Symposium. I remember the encouragement from Professor Roy Ward at the First Symposium in Hull: I did not realise then that it would mark the start of a series of papers presented at each Symposium held so far.

Finally I wish to record my thanks for the encouragement from the Society and its sponsorship in helping me to attend yet another outstanding event — this time in the capital of Scotland. I must now get down to some more research for a paper for the next Symposium in Salford, and the International Conference in 1988.

Anthony J Tollow

12th AGM of the British Hydrological Society

The 12th Annual General Meeting of the British Hydrological Society was held at Heriot-Watt University, Edinburgh, on *Monday 4th September 1995* at 5.30 p.m., immediately prior to the Fifth Biennial National Hydrology Symposium. **Professor Susan Walker** was in the Chair and 36 members were present.

Professor Walker warmly welcomed all members present and accepted apologies for absence from **Dr Hilary Smithers**. She asked the Meeting to consider the minutes of the 11th AGM, held in London on *Wednesday 7th September 1994*. **Anthony Tollow** proposed the minutes be accepted as read: this was seconded by **Peter Towlson**, and accepted unanimously by a show of hands.

Dr Paul Younger (Hon. Secretary) gave a verbal summary of the 12th Annual Report of the Hon. Secretary (see page 4), following which the 12th Annual Report of the Hon. Treasurer and the Annual Accounts were presented by **Rod Hawnt**, the outgoing Hon. Treasurer.

After some deliberation, and after persistent requests from some senior members, the Main Committee had approved a new optional membership category for recommendation to the AGM, here presented by Rod Hawnt. Under this proposed category, members aged 62 or over would have the option of paying a single Life Membership fee of £100. **Prof. Peter Wolf** suggested an amendment, to the effect that the fee due should equal five times the full annual membership fee (which would equal £100 at present): acceptance of this amendment was proposed by Anthony Tollow, seconded by Dr Richard Harpin, and the new membership category was accepted unanimously by a vote of the members present.

John Griffin gave a verbal report to the AGM on behalf of the BHS Editors. He noted with pleasure the success of the new policy on the preparation of Occasional Papers tied to meetings, and thanked all of those who had edited such volumes in the past year. John acknowledged that some issues of *Circulation* had been published behind schedule this year, but hoped that in the coming year the newsletter would appear according to the timetable.

More information from regional sections and from individual members would be welcome, and any members having suggestions for improving the style and contents of *Circulation* should contact John, who is continually scanning similar publications for ideas.

As an example of the genre, he produced a recent issue of a Dutch Hydrological Society publication, which contains information similar to that in *Circulation*, but apparently casts its net even wider to include poetry relating to hydrological features! John was not suggesting that *Circulation* emulate this particular item (especially not in Dutch!) but he remains open to suggestions from readers.

Professor Walker next announced the election of a new Honorary Member of BHS: **Dr John Rodda**. Dr Rodda is currently President of the International Association of Hydrological Sciences, and unfortunately could not attend because of prior commitments to IAHS. He was until recently Director of the Hydrology and Water Resources Division of WMO and has long been an enthusiastic supporter of BHS. The members present were very pleased that he had accepted the award of Honorary Membership. In line with precedent, Dr Rodda had informed Professor Walker that he will mark his acceptance of Honorary Membership by giving a brief talk to the Society at a forthcoming National Meeting.

The President's Prize is newly established and is intended to reward "services to hydrology". These "services" are administrative and promotional, rather than scientific efforts, but the first recipient is an eminent scientific hydrologist as well as a keen and dedicated servant of the profession: **Professor Des Walling** came forward to accept the President's Prize from Professor Walker to warm applause from everyone present.

Paul Younger announced the forthcoming changes to the membership of the BHS Main Committee. **Rod Hawnt, Tim Wyatt** and **Dr Kevin Tilford** have all reached the end of their terms of office (though Dr Tilford will continue to attend Committee meetings as the new representative of the Pennines Hydrological Group). Dr Younger praised Mr Hawnt and Mr Wyatt for the dedicated service they had given to the Society. He then welcomed **Dr Mike Acreman, Bob Sargent** and **Dr Richard Harpin** to the Main Committee: Dr Harpin takes up the post of Hon. Treasurer. Dr Younger concluded with a plea for larger numbers of nominations in future.

Professor Mike Hamlin then took the floor and delivered a short eulogy of Professor Susan Walker. Hers had been a particularly successful term of presidency, and her efforts and enthusiasm have greatly enriched the Society. All members present were keen to join Professor Hamlin in applauding Professor Walker as she handed over the presidency of the Society to his care.

As the new President, Professor Hamlin went on to reminisce briefly over the early days of BHS, as it emerged out of the successes of the IAHS Exeter meeting. In looking to the future, BHS should attempt to mark its international roots by reaching out to establish more and firmer links with overseas hydrological societies. A further vision, which Professor Hamlin invited members to share with him, was of BHS membership expanding so that we move "from being a big small society, to being a small big society". If each member could find two or three other members, we could exceed our present goal of 1000 members by the year 2000, and then aim for 1500 members.

As membership grows, so do resources, and an expanded membership would better equip BHS to assume a greater role in the wider world. The recent experiences of droughts and floods show that society at large has as great a need now of hydrological guidance as it ever had.

The AGM closed on this optimistic note. In contradistinction to most AGMs, the number of members present in the hall then miraculously increased, though it is hard to say whether this had anything to do with the imminence of the whisky-tasting display which followed the AGM!

12th Annual Report of the Honorary Secretary

The opening statement of the Honorary Secretary's Annual Report to the Society is becoming somewhat formulaic. For many years now, it has been on the following lines: "The British Hydrological Society has had a very successful year, with a steadily growing membership, a full programme of meetings, an impressive tranche of publications, a widening influence on the powers-that-be, and (not least) a healthy bank balance". Despite a personal quest for the fresh word and the *mot juste*, I am at a loss to find any better way of opening this 1995 report, for the British Hydrological Society has *indeed* had a very good year.

One of the privileges of serving the Society as Hon. Secretary is the opportunity to gain an overview of the myriad ways in which members contribute to the furtherance of the Society's aims. To deploy a cliché, BHS as a whole is much more than the mere sum of its parts. In this report, I will attempt to give a brief sketch from my particular vantage point of how the synergy of the Society has been realised over the past year, mentioning individuals where appropriate (and apologising beforehand for failing to mention all 700-or-so members by name).

The technical meetings of BHS continue to be well organised and well attended. Since the last AGM, there have been six national meetings, spanning issues of water resources planning and management, the use of weather radar in hydrology, and advances in hydrological modelling. Four of these meetings were organised in collaboration with sister societies, and three were held outside London (in Birmingham and Newcastle), a trend which should be encouraged in order to facilitate the widest participation of members in national meetings.

As in previous years, one of the best attended meetings was the three-day Postgraduate Symposium, organised and hosted by Dr Kevin Tilford at Salford University. By all accounts, this was a lively and inspiring event, which fostered closer links between hydrological research students from the various UK universities. Next year's symposium is scheduled for Newcastle, and plans are already afoot to attempt to sustain the high standards set in recent years.

The Edinburgh Symposium has been organised most professionally by a local committee headed by Professor Paul Jowitt. Particular mention must be made of the efforts of Andrew Black and Dick Johnson in editing the Proceedings. The quality of the final document is testament to the hard work they put into ensuring that all accepted papers were properly peer-reviewed. As I write, on the eve of the Symposium, I feel sure that the verbal presentations will live up to the promise of the printed texts, and that "Edinburgh '95" will be talked about for years to come.

More than 16 regional meetings have been held this year by BHS sections and the ICE Hydrological Groups in Scotland and Wales. The quality of presentations and the levels of attendance have been uniformly high, illustrating the importance of BHS's regional structure in ensuring members' participation in organisational and technical matters. Particular recognition is due this year to the Southwestern Section (long in virtual abeyance) which has risen triumphantly from the ashes with an impressive string of meetings, and with a commitment to work in support of the international conference which BHS is to hold in Exeter in 1998.

This International Conference, on the theme "Hydrology and Water Resources in an Uncertain Environment", is BHS's most ambitious project to date. It will be held at the University of Exeter from 5th-10th July 1998, and is now being organised by a committee headed by Professor Des Walling. In the meantime, BHS members can whet their appetites for international meetings by supporting the Inter-Celtic Colloquium on Hydrology and Water Management, to be held in Rennes, Brittany, from 8th to 11th July 1996.

Besides these high-profile international meetings, BHS's rolling programme of national meetings is already established in outline through to the end of 1996. However, ideas for regional and national meetings are always welcome, and I would urge all members to let myself or regional group organisers know of any themes for meetings which may have been overlooked.

Since October 1994, some subtle but important changes have been introduced into the BHS publications strategy. The most important is that the Occasional Papers series has been invigorated by establishing a direct link to meetings. It is now envisaged that two or three Occasional Papers each year will be linked to the proceedings of selected national meetings (or indeed regional meetings, where the subject matter is of wide interest). This approach has been successfully piloted this year, and three Occasional Papers (Nos 4, 5 and 6) have been produced in connection with national meetings. The papers have been distributed to members at the relevant meetings (at a special price as part of the meeting fee), but are also available afterwards from the Society's Publicity Officer (currently Professor Angela Gurnell at Birmingham University). Occasional Paper No. 6 ("Modelling River-Aquifer Interactions") currently tops the BHS best-sellers list, closely followed by No. 5 ("Hydrological Uses of Weather Radar")!

If convenors of meetings wish to produce an Occasional Paper to accompany their meeting, they are encouraged to discuss the technical and financial issues with the Hon. Secretary and the Hon. Treasurer during the early planning stage. This development does not in any way mean that Occasional Papers ***not*** linked to meetings will no longer be forthcoming: indeed the "Hydrologist's Toolbox" currently being edited by Dr Hilary Smithers will be an Occasional Paper, and anyone wishing to propose further additions to the series is guaranteed a sympathetic hearing by the Main Committee. A "style guide" for editors of Occasional Papers is available from Celia Kirby at IH.

Another key element of the BHS publications strategy is to produce one high-quality book in each non-symposium year. The first such volume, on the Rivers of Britain, is being planned for 1996, and a volume on "Chemistry and Hydrology" is being contemplated for 1998 (perhaps linked to a session at the International Conference in Exeter).

The Main Committee has discussed the possibility of a BHS journal at some length. At present, we have no plans to recommend such a move to the membership, but I would be happy to hear any opinions you may have.

BHS internal communications entered the 21st Century this year, with the establishment of an e-mail "notice-board" through the efforts of Dr Kevin Tilford. The BHS home page on the internet was also created by Kevin, and I am sure that all who have accessed these on-line services will wish to join me in thanking him for his efforts.

The role of BHS in the wider professional world continues to expand. Circulation of the BHS Research Strategy document "Sustainability in a changing world: the key role of hydrology" to governmental agencies and major industrial bodies resulted in a number of positive responses. NERC and EPSRC went so far as to state that BHS's recommendations would be taken into account during the revision of their policies.

Certain senior members of BHS have taken the time to respond to government consultation documents, and Frank Law's efforts on one such document (relating to sustainable development) resulted in the incorporation of BHS views into governmental

evidence to a parliamentary committee.

Liaison with CIWEM has borne fruit in a Memorandum of Understanding, which commits our two organisations to greater cooperation and sharing of information. CIWEM has had a particularly happy centenary year, which has seen them receive a Royal Charter. CIWEM membership must now be seen as a prime route to chartered status for many BHS members. On a related matter, Dr Kevin Tilford has expended considerable energy surveying the fate of applications to ICE from BHS members whose first degrees are not in engineering. This survey is yielding useful information on the degree to which ICE, and more particularly the Engineering Council, have indeed adopted a more enlightened attitude towards granting Chartered Engineer status to professional hydrologists with first degrees in science. Results so far are mixed, with around 50% of suitably qualified applicants being granted extensive exemptions from entry level examinations. The developing situation is still under scrutiny, and more detailed results will be made known to members when analysis is complete.

While on the subject of ICE, who provide administrative support to BHS, there are further sorrows and joys to report. Most sadly, the President of ICE, Dr E C Hambly, died on 28th March 1995. Dr Hambly was always a friend and supporter of BHS, and was particularly keen to see progress towards Chartered Engineer status for hydrologists from scientific backgrounds. BHS members' condolences were sent by our President, Professor Sue Walker. On a happier note, Louise Picton (secretary to BHS at the ICE) gave birth to a baby boy, Samuel, in March, and later decided not to return from maternity leave. Her interim replacement, Anna Hotowska, left to join the Civil Service in August, to be replaced by Richard Howard, whom we now welcome as our daily point of contact at ICE. I would like here to record my thanks to Dr John Bennett of ICE for ensuring that these personnel changes did not adversely affect the service BHS received.

The first BHS baby of the year was, of course, Catriona Nicola, daughter of our President, Sue Walker and her husband Nick. Catriona's arrival in mid-January occasioned the President-Elect, Professor Mike Hamlin, to deputise for Sue in chairing the January meeting of the Main Committee. Those of us on the Main Committee are therefore in the privileged position of knowing exactly what to expect as Mike succeeds Sue today as President. I cannot let this succession pass, however, without noting with affection the tremendous energy, enthusiasm and insight which Sue Walker brought to her BHS Presidency. The successes which I have reported here are due in no small measure to Sue, who is an extremely talented and inspirational leader. I am sure I speak for all BHS members when I thank her most warmly for all her efforts on our behalf, and wish her every success in all her future endeavours, many of which I trust will be with and for BHS.

Warm thanks are also due to Rod Hawnt (Hon. Treasurer) and Tim Wyatt, who have now completed their terms of office on the BHS Main Committee. Their many important efforts have contributed greatly to the smooth-running of BHS, and their business acumen has particularly benefited the Society. Dr Kevin Tilford relinquishes his current post on the Main Committee, but will return as Pennines Group representative in the immediate future. So although it's not quite time for a "farewell" to Kevin, this is a good opportunity to thank him for all of his efforts (mentioned elsewhere in the report) throughout the last few years.

The successors to Tim, Kevin and Rod are already known: I am glad to welcome Dr Mike Acreman (from IH), Bob Sargent (from the Forth RPB, here in Auld Reekie!), and Dr Richard Harpin (erstwhile Hon. Secretary, now returning as Hon. Treasurer) to the Main Committee. We could not have hoped for three better candidates, and I am sure they will serve BHS well. Nevertheless, the fact that all three were elected without contest is a little alarming in a Society which prides itself on operating democratically. So when nominations to the Main Committee are sought next year, please don't be shy: elections are good for the Society.

As BHS looks towards the Millennium, we can take pride in our twelve years of growth and consolidation. To mark the celebrations for the year 2000, a special project is being considered by BHS Main Committee. The brainchild of Max Beran of NERC, the Millennium Project aims to develop a multimedia educational package embodying 2000 years of hydrological data from around the British Isles. These data will encompass hard hydrometric measurements for recent decades, along with sophisticated reconstructions of hydrometeorological conditions for past centuries. If the project is to be successful, collaboration with sister societies (covering geomorphology, archaeology, etc.) will be essential. The evidence of the last few years is that BHS has the maturity to handle a visionary initiative of this sort. What do you think? The Main Committee will be happy to have your views on this, or any other matter concerning the future directions of the Society.

Dr Paul L Younger
Honorary Secretary

Edinburgh, September 1995

Drought-busters T-shirt

Just a few of this amazingly effective fashion garment are left over after the Symposium. It is available in one size (XL) only and a choice of two colours: sky blue and cloud grey, bearing the logo and text shown here. The price is only £8.50 — send your cheque (payable to the *British Hydrological Society*) to Professor Paul Jowitt, Department of Civil and Offshore Engineering, Heriot-Watt University, Edinburgh EH14 4AS. It really does work, although its power is not guaranteed beyond 1995 — nor in Yorkshire.



Travel grants

Grants of up to £100 are available to help members with the cost of attending meetings (see *Circulation 38* and any recent issue). Successful applicants are expected to produce a short report of their experiences in attending the meeting — see Rachael Dils's report on pages 7-8.

IAHS Assembly

Money from the Exeter Fund is available to help members travelling to the **IAHS 5th Scientific Assembly** in Rabat, Morocco, April/May 1997. Please apply to the Hon. Treasurer, **Richard Harpin** (tel/fax 01793 812479).

Abstracts of papers for the IAHS Assembly are due by **31st January 1996**: contact the IAHS Secretary General, Dr G J Young, Dept of Geography, Wilfrid Laurier University, Waterloo, Ontario, Canada N2L 3C5.

A hydrological mystery?

Introduction

About 6 months ago the Editor published a letter from me (*Circulation 46*, May 1995) in which I asked for explanations of a "Hydrological Mystery". The phenomenon, which I had encountered in different places in the world, concerned a diurnal variation in water level, in the absence of any artificial influences that could account for it. It was usually only noticeable at low flows when there was little natural variation in flows. So is the phenomenon real and if so is it a mystery?

Does the effect exist?

I got a large number of replies (my thanks to all of you who wrote). From them it is clear that the answer to this question is an unequivocal "yes".

One of the first replies was from **Roy Ward**: in citing an early report of observations of the phenomenon from Wicken Fen in Cambridgeshire (Godwin H., 1931, Studies of the Ecology of Wicken Fen, 1. The groundwater level of the Fen, *J. Ecology*, **19**, 449-73), he got in a justifiable plug for his book, *Principles of Hydrology*. **Frank Law** confirmed that he had come across the effect and pushed the date back with a 1910 reference to observations in Trenchford Stream near Torquay (Chapman S., 1910, *Trans IWE*, **XV**, 160, Diagram 4). The earliest date however was in a detailed paper on the phenomenon by Callède (Callède J., 1977, Oscillations journalières du débit des rivières en l'absence de précipitations, *Cahiers ORSTOM, sér. Hydrol.*, **XIV** no. 3) sent to me by **Dr Jaques Sircoulon**. He mentions observations by King (1888) in a river near the University of Wisconsin in the United States, but unfortunately King is omitted from his list of references!

In fact the phenomenon had been very widely reported. Callède presents a map which identifies 21 countries, from Sweden to South Africa, and from the USA to Madagascar.

An example of this phenomenon in the United Kingdom was sent to me by **Ian Fox** (Tweed River Purification Board), and Figure 1 is based on a copy of a level chart he sent me. The drainage of the Leet is 113 km² and the trace is fairly typical. As can be seen, the effect is not regular but is very pronounced: a variation of around 50 mm when the depth is around 250 mm. The levels reach a minimum in late afternoon and a maximum about 12 hours later. Several other readers quoted similar examples of this from their own experience.

It is therefore clear that variations in water level do occur. One question remains however: is the discharge constant or does that also vary? Again this was considered by Callède, who quotes cases where discharges were measured and were also found to vary.

The answer (?)

In the letters received and in the paper by Callède many possible answers are put forward. Some of them are:

Heavy dew: An analysis of the equivalent depths of precipitation shows that it is not enough to cause a fluctuation in flows and hence in levels.

Atmospheric pressure: Figure 2 (based on a figure in Callède's paper) shows variation in barometric pressure over the course of a day. As can be seen its fluctuation, in particular the fact that it has two peaks and troughs, rules it out as an explanation.

Temperature: The direct effect of diurnal temperature variations in changing the density and hence volume of water in the rivers is negligible. However Callède mentions the case of a colleague who noticed diurnal variations on level charts on a river which was completely dry! He therefore investigated the effect of temperature variations on the float and cable and concluded that this could give rise to diurnal variations, but only of the order of 5 mm.

Entrained oxygen: As aquatic plants are more active during the day they will give off more oxygen, which could raise water levels and (according to speculation by some readers) could become more vigorous and create in effect an increase in bed level. Both these effects would be more pronounced during the day and would tend to **increase** water levels. Since levels **decrease** during the day this is unlikely to be the cause.

Evapotranspiration: This, as many of the readers pointed out, is likely to be the answer. Figure 2 shows the close correspondence between evaporation rates and the level variations — however, as we are all aware, a perfect correlation is not necessarily a perfect solution.

The mechanism

The first thing to rule out is direct evaporation from the water surface. Even in the tropics, direct daily rates of evaporation rarely exceed 8 mm day^{-1} and the range of level variation often greatly exceeds this. It is also difficult to see how the effect of direct evaporation, which is cumulative in nature, could lead to a variation in levels.

If evapotranspiration is the cause, then its action must be in the riparian zone rather than directly on the river. To examine this Callède set up a series of piezometers at right angles to the river. One of these, 40 metres from the river, showed no variation in water table, but the other two, at 2 m and 12 m, showed variations which were synchronous with the variations in the river and of a similar, even slightly larger, amplitude. At the most distant piezometer the water table was more than 3 m below the ground level, and therefore likely to be well below the rooting zone. At the other two piezometers the depth to the water table was 1–1.5 m, within the rooting zone.

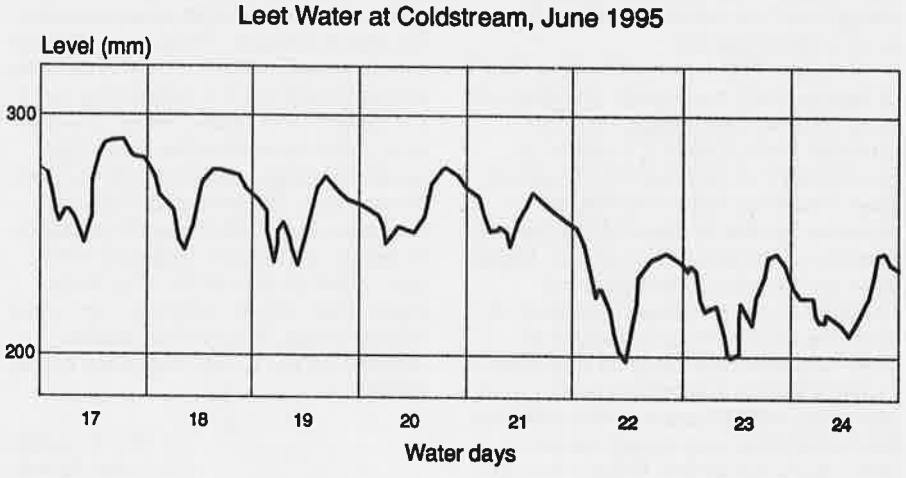


Figure 1 *Diurnal variation in the UK (after Fox)*

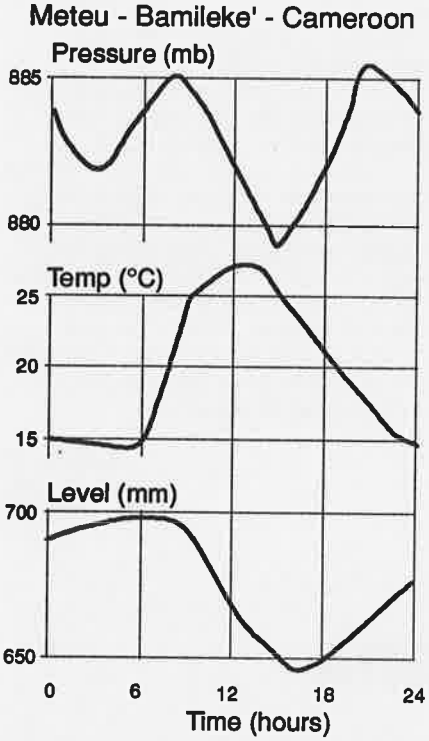


Figure 2 *Variations in atmospheric pressure, temperature and level (from Callède's paper)*

From this it was concluded that interception of groundwater flowing to the river was the most logical explanation. Callède's conclusions were reinforced by an analysis of the characteristics of the river in which it had been observed:

Climate: No effect. Rivers in a wide range of climatic zones had been reported as showing the effect.
Vegetation: Important effect. Almost all of the reported cases of the phenomenon had water-loving plants or trees in the riparian zone.
Soil: Important effect. Most of the reported cases had permeable soils in the riparian zone.
Relief: Important. A flat floodplain was observed in the majority of the cases.

Is the mystery solved?

To a large extent the answer is obviously "yes". But the solution is not complete.

Firstly, as Callède observed, the variations in level of the water table and the river were virtually synchronous, but the permeability of the soils was such that transmission of water could not have taken place so rapidly. Secondly, the phenomenon has been observed in long rivers, as Frank Law pointed out in his letter. In some of the cases analysed by Callède this was noticed as an anomaly.

So there is still room for further research. For example, is the effect due entirely to interception of groundwater flow by riparian plants or is there movement of water from the river to the riparian zone? Has the effect been reported at sites which do not satisfy the important factors identified above — and if so is the explanation still valid?

Finally, a footnote. During the summer I have been helping to supervise a study using my rainfall/runoff model HYSIM. In this particular river it proved impossible to represent fully the seasonal variation in base flow, which appeared to pick up before the autumn rains. As the river satisfied many of the above criteria, though it was too heavily influenced by abstractions and discharges for the diurnal variation to be noticed, it strikes me that interception of some of the base flow by riparian vegetation might be the explanation. So, not only have I had great fun analysing the replies to my letter, I have also learnt something useful!

Ron Manley

Phosphorus loss from agriculture to water

International workshop at Johnstown Castle, Ireland 27-29 September 1995

Increasing concern about the impact of agricultural activities on the aquatic environment provided the impetus for this much-needed workshop in Ireland, and I am grateful to BHS for a travel grant of £100 towards attending. It brought together over 120 participants from diverse backgrounds, including fertiliser manufacturing, soil science, farming and hydrology, with the aim of identifying strategies to minimise phosphorus (P) losses from agriculture. Such a wide range of interests proved beneficial, as both economic and environmental perspectives were represented and the 'real-world' applicability of scientific research was frequently questioned.

Phosphorus is an essential nutrient for agricultural productivity but excessive levels in the soil, combined with poor agricultural practices, can result in terrestrial losses that reduce the ecological quality of the receiving waters. The enrichment of P-sensitive streams, rivers and lakes can increase the occurrence of algal blooms and the rate of aquatic weed growth and can cause changes in the structure of natural populations. Excessive P loadings result in production of algal toxins, ultimately killing fish by de-oxygenation. The trophic status of freshwaters is also important from an economic perspective, since water abstracted from over-productive lakes requires expensive treatment prior to consumption.

The conference included seven scientific oral sessions, complemented by a successful poster session with over 40 contributions. The oral sessions followed a logical progression, opening with an examination of the contribution of agriculture to the overall P load in surface waters, through the processes of transport from the terrestrial environment to the drainage network, and concluding with current and future strategies to reduce P inputs to surface waters.

Several issues recurred during the presentations: recognition of site specificity, soil heterogeneity, contrasting methodologies and the spatial scale of research were the most prominent.

These points highlighted the lack of communication between disciplines and emphasised the need for greater collaboration between institutions, nationally and internationally. The importance of flexibility within legislation was also discussed in response to the heterogeneity of natural systems.

The value of an integrated hydrochemical approach to reduce diffuse P losses from agriculture became evident during the meeting. Traditional theories have associated P export with soil erosion and surface runoff, but several papers and posters suggested a greater loss of P via leaching into subsurface drainage waters. As hydrological flow pathways may be characterised by distinct P forms and magnitudes of delivery, the relative contribution from different pathways will influence the overall runoff composition and its impact on the receiving stream.

Variable source areas (VSAs) were identified as critical to P losses, particularly if the area had artificially elevated P levels from conservation measures, such as a buffer zone. The integration of VSAs and other critical hydrological areas into catchment-scale models was discussed, but the detailed hydrological data needed were expensive and time-consuming to collect.

The meeting generated many questions but produced few answers, suggesting that there is still a long way to go before P losses from agriculture can be significantly reduced. This is a risky situation, as soil P levels may unexpectedly exceed the soil's storage capacity, resulting in export to surface- and ground-water, so increasing P concentrations to environmentally unacceptable levels.

This is the worst-case scenario, but it emphasises the importance of this research and the urgency of the problem. The need for another meeting in three years' time was unanimously agreed upon and communication through e-mail and the internet was suggested. Overall the meeting successfully brought together the current research ideas in phosphorus and agriculture and I hope it has stimulated future collaboration between the participating organisations.

Rachaèl Dils
Geography Dept,
Sheffield University

British raingauge data bank

How best to search for all the raingauges that have ever led to published data for the locality you are interested in?

Those with the time will resort to a library with a full run of *British Rainfall* (1860 to 1991) such as the National Meteorological Archive at Bracknell, the Institution of Civil Engineers in Westminster or the Institute of Hydrology in Wallingford. A faster start can be made by using the Met Office RAINMASTER computer search approach; a feeling of what will be available by that route can be seen in the examples published by the Institute of Hydrology in the five-volume *Representative Basin Catalogue for Great Britain* (MAFF, 1991).

Most tantalising are the records before *British Rainfall* began publication. However a reprint of a landmark report by G J Symons to the British Association for the Advancement of Science in 1865 now fills that gap. Entitled 'On the Rainfall of the British Isles' (which then encompassed all of Ireland) this 50-page report listed, county by county, about 1700 gauges: a small map is included. A feel for measurement span comes direct from Symons himself:

'From 1677 to 1800 the returns never number more than twenty-six per annum, and averaged only four, and in subsequent ten-yearly periods the numbers average: up to 1810, 15; to 1820, 21; to 1830, 40; to 1840, 103; to 1850, 178 and to 1860, 366.'

Details are given of gauge location in the usual British Rainfall style of the Victorian era, including elevation above sea level, the observers' name and the record period. An asterisk was included by any gauge tested by Symons, with a dagger symbol for one he had visited as well.

The report has a small amount of analysis, e.g. Mean of depth of annual rain at 10 stations each year from 1815-1864, and shows how those sites had varying 25-year average falls:

1815-1839	28.80 inches
1840-1864	27.60 inches

However its chief use is as an index to data that can then be acquired (if still available) through the National Meteorological Archive.

The reprint has been produced, at cost, by the Library of the NERC Institute of Hydrology, Crowmarsh Gifford, Wallingford, Oxon OXIO 8BB, telephone 01491 838800. The aim is to stimulate the production and publication of long homogenised annual rainfall series and accompanying detailed isohyetal maps for 1881-1985 or longer. The expectation is improved water balance analysis for an era where sustainability of resources is in question. The reprint can be ordered from the IH librarian by sending a cheque for £10 (including p&p).

F. M. Law

Consultants' Register to include consultancy firms

The BHS *Register of Consultants in Hydrology*, which is sent to all BHS members for inclusion in the BHS handbook, is being updated for the coming year. For the first time the register will include consultancy firms with hydrology practices as well as independent consultants. The register provides focused advertising for your services and is available through the members to their companies. Can you afford not to be included?

In the first section, as in previous years, entries for independent consultants cover a half-page each. The format is fixed and details required include: name, title and letters, telephone and fax, address, year of birth, summary of previous employment, summary of areas of expertise, examples of recent jobs, countries of work and foreign languages. The charge for independent consultants is a modest £15. It would help if new entries are sent in on disk.

In the second section consultancy firms will be given a full page to advertise their services. The format is free, with the proviso that printing will be in black-and-white only. The charge is £100 per entry and camera ready copy is required.

If you have not already subscribed for the coming year and would like to be registered please send your details, with your cheque payable to the British Hydrological Society, to Richard Howard, BHS Secretary, c/o ICE, 1-7 Great George Street, London SW1P 3AA. The closing date is 10th December 1995.

Richard Harpin

President's Piece

In her final piece for *Circulation*, Susan Walker reviewed the current strengths of BHS, and it would be inappropriate for me to repeat what she wrote. Many of the achievements that she included in her review were due to her leadership and the personal commitment she made as President. The society owes her and the other members of her Committee a great deal.

A President taking up office needs to look to the future. We are already one of the largest Associated Societies operating under the ICE umbrella. Nevertheless, if the Society is to have the impact and influence our subject merits, we need to increase our numbers beyond the current seven hundred, and I hope that with the active participation of all BHS members we can move fairly quickly to our target of one thousand members.

Each year we recruit a significant number of new members, but in each of the last two years nearly fifty members have not renewed their subscriptions. There may be many reasons for this. One will be that some student members have returned to their own country. Another may be that people feel that four issues of *Circulation* a year was all the Society had to offer. If that were once the case it is no longer true. The activities of the various sections, often written up in *Circulation*, the Occasional Papers, the forward looking initiatives (of which the National Research Strategy is but one) and the Society's increasing influence on the international hydrological scene are all powerful reasons for remaining a member of BHS. These activities should also enable all committed members to encourage colleagues who are not yet members to join the Society.

Taking up office at the AGM in Edinburgh, and then coming second in the whisky blending competition that followed the AGM were for me a memorable introduction to the Fifth National Hydrology Symposium at Heriot-Watt University. Reports of the Symposium will appear elsewhere in *Circulation*, so I shall not comment on the event in detail. However, there are three specific points I would like to make:

The success of the Symposium was undoubtedly due to the effort put in to the detailed planning by **Paul Jowitt** and the members of the Organising Committee. The published papers were all refereed and that alone must have taken many hours of work. This is reflected in the high quality of the proceedings, which are themselves a tribute to BHS.

Secondly, I would like to thank all the authors, but particularly to congratulate those who were PhD students or had only recently been awarded their degree. The quality of their work and particularly the care they put into their presentations augurs well for the future of the Society. Not many scientific assemblies attract a significant number of participants under thirty, and when that happens, as it did here, that is a notable achievement. After making this comment in Edinburgh, one of the participants reminded me of how important the Postgraduate Symposium of PhD and MSc students has been in encouraging the younger members of BHS to take an active part in the Society's affairs.

Finally, I would like to repeat my thanks to **Jim Dooge** for giving the Penman Lecture. This lecture was originally to be given by **Professor Uri Shamir**, but because of his involvement in the delicate negotiations on water rights as part of the Israeli-Palestinian peace accord, he had to cancel his visit to Edinburgh at almost the last minute. Jim Dooge agreed, with only one week's notice, to deliver the lecture, and his wisdom in considering the potential effects of climate change will long be remembered by those who attended.

We now have the Sixth National Symposium (in Salford in 1997) to look forward to, and beyond that the first International BHS Symposium in 1998. The competition to host that meeting was won by Exeter University and the overall structure of the organising committees and their convenors was agreed at the BHS Committee meeting on 11th October.

Exeter holds a special place in the memory of British hydrologists. When the British delegates attending the general assembly of the International Union of Geodesy and Geophysics in Canberra in 1979 were discussing the way forward for IAHS, we agreed that it should organise its own scientific general assembly midway between the four-yearly cycle of IUGG general assemblies. We therefore made this proposal to the IAHS Bureau, coupled with the invitation to host the first meeting in the UK.

The meeting in Exeter in 1982 was a landmark in the life of the IAHS, and as recorded in Susan Walker's valedictory piece, it also gave birth to BHS. I have no doubt Exeter 1998 will be a similar landmark for the Society and will establish its reputation as the leading hydrological society in Europe.

The Exeter Organising Committee holds its first meeting on 10th November, to be followed by the first circular. I hope when you receive it you will put the date firmly in your diary and avoid early July 1998 when planning your annual holiday!

Michael Hamlin

Best papers at Edinburgh

The prize for the best paper presented at the Fifth BHS National Hydrology Symposium in Edinburgh was awarded to **Helen Grew** and **Andrew Werrity** for their paper *Changes in flood frequency and magnitude in Scotland, 1964-1992.*

Congratulations to them, and also to the following, whose papers were highly commended: **Sarah Douglas, Natasha Fellowes, Hilary Smithers, Judith Stunell** and **Paul Younger, Ronnie McKenzie** and **F Stoffberg.**

News from Members

Members on the move

Jeremy Benn has left Bullen Consultants to set up a new consultancy specialising in hydraulics and hydrology. The new firm, Jeremy Benn Associates, is based at The Wheel House, Water Mill, Broughton Hall Business Park, Skipton, BD23 3AG Tel. 01756 799919, Fax 01756 799449.

Also joining this new venture are **Mike Storey** and **Hugh Goldsmith.**

Meanwhile **Keith Lathem's** consulting firm in Canada has moved, but not very far. Lathem Group 's new address is 588 Edward Avenue, Unit #49, Richmond Hill, Ontario L4C 9Y6.

New members' secretary

Kevin Tilford (*tel 0161 745 5000, fax 0161 745 5060*) has a new role: to support and involve new members in the Society.

New Members

We welcome the following members to the Society:

Andersen, N.	Surbiton, Surrey
Arfa-Zangeneh, F.	St Neots, Cambridgeshire
Arkell, T.J.	Newcastle upon Tyne
Ashton, D.A.	Bridge of Allan, Scotland
Askew, Dr A.J.	Hydrology & Water Resources Divn, WMO, Geneva
Bogue, D.	Sutton Coldfield, West Midlands
Brazier, V.	Scottish Natural Heritage, Edinburgh
Brown, R.C.	Dingwall, Scotland
Chauhan, R.	Stanmore, Middlesex
Ciaccio, M.	Edinburgh
Constantakos, C.	London
Coric, S.	London
Cranston, M.D.	Institute of Hydrology, Stirling
Dixon, R.	Bromsgrove, Worcestershire
Farahmand-Razavi, A.	Dept of Civil Engineering, Birmingham University
Foster, H.J.	Rugby, Warwickshire
Foster, J.A.	Leeds, West Yorkshire
Foster, M.J.	Geography Dept, University of Dundee
Gill, E.J.	Cirencester, Gloucestershire
Hagger, A.P	Camberley, Surrey
Hallard, M.	Gorebridge, Scotland
Haynes, D.R.	Sarratt, Hertfordshire
Hepworth, N.D.	NRA North West Region, Warrington
Karami, M.	Dept of Geography, University of Sheffield
Kilmartin, Dr M.	Freeland, Oxfordshire
Leclerc, C.J.	Imperial College, London
Onanda, M.	Newcastle upon Tyne
Price, N.J.	London
Rogers, P.D.	London
Simpson, R.J.	Basingstoke, Hampshire
Siu, I.B.	Sutton Coldfield, West Midlands
Stocks, A.M.	Dept of Geography, University of Salford
Tabony, R.C.	Bearsden, Glasgow
Wellens-Mensah, J.	AESC Hydrology Division, Accra, Ghana
Wood, S.J.	Institute of Hydrology, Wallingford
Woods Ballard, B.	London

The UK Groundwater Forum

Information about what is happening beneath our feet is urgently needed. Groundwater research in the UK is fragmented and uncoordinated, yet it is important to know how to avoid wells being abandoned because of pollution, or rivers being drained as a result of groundwater abstraction.

The UK Groundwater Forum aims to set the agenda for research and bring together all concerned, from owners of contaminated land to water companies. It is an informal, open grouping, supported by a wide range of organisations and funded by the NRA and the Natural Environment Research Council. In its role of identifying and prioritising issues for groundwater research, it will complement the scientific focus of learned societies such as BHS, CIWEM and Geol. Soc., while bringing in a wider spectrum of stakeholders: government, water users, agriculturalists and waste water managers. Anyone with an interest in groundwater is welcome to take part.

The Forum's objective is to promote dialogue, consultation and partnership. The main emphasis is on sharing research ideas, resources and products, with a secondary agenda of discussing questions of data, policy and standards, so that groundwater issues can be identified and resolved cost-effectively and the findings widely disseminated.

As a starting point, the Forum has produced a research strategy report *Groundwater in the UK: A Strategic Study* (see below), outlining the most important issues for groundwater research today. The report's framework tries to stem the fragmentation of research, by providing a strategy for the benefit of all the stakeholders in groundwater. An *Issues Report*, containing papers on each major groundwater issue, will follow soon.

Groundwater in the UK: A Strategic Study costs £20: it may be ordered from FWR, Allen House, The Listons, Liston Road, Marlow, Bucks SL7 1FD (tel 01628 891589, fax 01628 472711).

For more information please contact **Sophie Fenwick**, Groundwater Forum Secretariat, BGS Hydrogeology Group, Crowmarsh Gifford, Wallingford, Oxon, OX10 8BB (tel 01491 838800, fax: 01491 692345).

❖ *Coming soon to the World Wide Web – The Groundwater Forum home page!*

Pennines student network

The Pennines Hydrological Group is trying to develop improved contacts with students in the area (i.e. England north of the Midlands). Postgraduate students are invited to present their work at relevant technical meetings.

This gives valuable experience in an informal, friendly atmosphere to talk to an audience with wide-ranging interests in hydrological subjects.

Anyone interested should first contact **Doug Wilson**, Pennines Student Representative, University of Huddersfield. Supervisors or mentors are encouraged to tell students about the network and the opportunities it offers.

Doug Wilson
University of Huddersfield
Tel 01484 472643, Fax 01484 472347
Email d.a.wilson@hud.ac.uk

PhD thesis by C W O Eeles

The editor apologises to **Charles Eeles** and **Barney Austin** for attributing Barney's PhD title to Charles in the last *Circulation*. The correct thesis title is *Parameter optimisation of conceptual hydrological models*. Charles Eeles's doctorate was awarded in Applied Mathematics by the Open University. A shortened abstract is printed here:

The form of modelling used in this research for the simulation of the rainfall/runoff regime of catchment areas is of particular importance to civil engineers in the building of works affected by high and low flows in rivers. The parametric conceptual models can also be used in the management of water resources and as a basis for assessing long-term risks associated with water storage. The objectives are to examine the problems arising from conceptual modelling with large data sets, and the effective determination of model parameters using gradient and non-gradient optimisation techniques.

A simple model package was developed from the modification of ideas current at the time, which allowed a good fit to observed hydrographs to be achieved with input data for rainfall and an evaporation loss function. Nine parameters were available for optimisation in this model (HYRROM).

The demand for the assessment of land use and catchment water yield led to the development of a more complex model with 35 parameters, based on the latest vegetation process studies.

One of the first modifications was to the criterion for convergence, which was changed from the rate of change of parameter values to that of the model coefficient of determination or efficiency of fit. The least squares objective function was investigated, and retained for model explained variance. For parameters involved in the simulation of base flows it was more effective to use a proportional function; for intense storm events an eighth power function exaggerated the information available in the data for determination of surface runoff parameters.

The simulation results from land-use changes with large data sets — from the highlands of Scotland, a clay catchment in Buckinghamshire and montane rainforest in Kenya — are compared and contrasted for both models.

Gradient and non-gradient optimisation algorithms are examined, including a genetic algorithm, and recommendations are made for the values of algorithm parameters. Hybridised algorithms are developed and tested: a combination of the Rosenbrock and Nelder and Mead Simplex techniques was found to be an efficient hybrid.

Titles and abstracts of new doctoral theses in hydrology are always welcome for inclusion in *Circulation*.

FORTHCOMING EVENTS

Meetings

One-day symposium on
SENSORS AND SENSITIVITY
London
6 December, 1995

This meeting organised by CIWEM will review progress in the practical application of current sensor technology, focussing on improvements in specification, performance and information from process instrumentation.

The afternoon sessions will include updating on the benefits of specific new instruments by the people developing those instruments.

The venue is the City Conference Centre, 76 Mark Lane, London EC3R 7JN. Details are available from the CIWEM Conference Office, 15 John Street, London WC1N 2EB (tel 0171 831 3110, fax 0171 405 4967). The cost is £176.25 for CIWEM members (£193.88 for non-members).

International Symposium on
HYDROLOGY IN THE HUMID TROPIC ENVIRONMENT
Kingston, Jamaica
17-22 November 1996

This symposium is for scientists, engineers and managers with an interest in the unique environment of the humid tropics, to provide a forum for the exchange of experiences and results. Technical papers are invited which will help to apply the present interdisciplinary knowledge of hydrology and environmental processes to this area, concentrating particularly on the western hemisphere.

Topics (not finally defined) will include island hydrology, environmental impact, urban drainage, saline water encroachment, waste disposal, modelling, data processing, remote sensing and GIS.

One-page abstracts for poster or oral presentation, in English or Spanish, are invited by **24 November 1995**, with provisional registration.

The venue is the Wyndham Kingston Hotel; sponsors include IAHS and UNESCO. There will be field tours on 20 November, and maybe after the symposium (on 23-24 November) too.

To register or for more information please contact The Secretariat, Humid Tropics Environment '96, A. Ivan Johnson, Water and Soils Consulting, 7474 Upham Court, Arvada, CO 80003, USA (Tel & Fax +1 303/425-5610).

International Conference
BUFFER ZONES:
PROCESSES AND POTENTIAL IN WATER PROTECTION
Woodstock, Oxfordshire
30 August - 1 September, 1996

Details of this meeting are being sent out in a separate flyer and by Email.

The contact is Dr Nick Haycock, Quest Environmental, tel/fax 01582 764727, email NEHaycock@eworld.com

Fifth BHS Postgraduate Symposium

Newcastle upon Tyne, 1-3 April 1996

All you fledgling and newly-fledged hydrologists out there: this meeting is for ***you***!

We want you to come and tell us about your current research, or the PhD or MSc thesis you have recently finished — or indeed, the exciting results of your first job in industry.

The Postgraduate Symposium is usually the best-attended (and arguably the best fun) of all BHS's programme of meetings. This year it will be hosted by the Department of Civil Engineering at the University of Newcastle upon Tyne.

We aim to keep the cost of accommodation as low as possible, and we intend to arrange some exciting evening activities, as well as a trip to the Kielder System in Northumberland.

For further information please contact Dr Paul L Younger, Lecturer in Water Resources, Department of Civil Engineering, Cassie Building, University of Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU
Tel 0191-222-7942 Fax 0191-222-6669
E-mail: P.L.Younger@ncl.ac.uk

Diary

16th November 1995
NERC / BHS / The Geological Society
"Pollutant Transport in Soils and Rocks"
Venue: Inst. of Civil Engineers, London
Contact: Anne Roberts, Institute of Hydrology, Wallingford OX10 8BB *(Tel 01491 692363, Fax 01491 692424 E-mail amr@ua.nwl.ac.uk)*

22nd November 1995
BHS Midlands Section
"Extreme hydrological events in the Midlands"
Venue: University of Birmingham
Contact: Paul Webster, School of Civil Engineering, University of Birmingham, Birmingham, B15 2TT. *(Tel 0121 414 5055, Fax: 0121 414 3675)*

29th November 1995
BHS/CIWEM Joint Meeting
"Regional groundwater resource modelling"
Venue: Holiday Inn, Reading
Contact: J Lawson, Sir William Halcrow & Partners, Burderop Park, Swindon, SN4 0QD *(Tel 01793 812479, Fax 01793 812089)*

4th December 1995
BHS National Meeting
"Palaæohydrology"
Venue: Inst. of Civil Engineers, London
Contacts: Dr P L Younger, Dept of Civil Engineering, University of Newcastle, Newcastle upon Tyne NE1 7RU *(Tel. 0191 222 6000 ext. 7942, Fax 0191 222 6669, Email P.L.Younger@newcastle.ac.uk)*; Max Beran, Institute of Hydrology, Wallingford OX10 8BB *(Tel 01491 6922211, Fax 01491 692430)*

6th December 1995
BHS Southern Section Meeting
"Hydrological impact of used gravel workings: management or mayhem?"
Venue: Imperial College, London
Time: 5.30 p.m.
Contact: Prof. Howard Wheater, Dept of Civil Engineering, Imperial College, London SW7 2BU *(Tel: 0171 589 5111 ext 4736/4720. Fax: 0171 823 8525)*

6th December 1995
Scottish Hydrological Group / Scottish Hydraulics Study Group
"Scottish postgraduate research in hydrology and hydraulics"
Venue: No. 3 Lecture Theatre, McCance Building, Strathclyde University
Time: 6.30 p.m. (6.00 p.m. tea)
(After a half-day postgrad. symposium)
Contact: Dr A R Black, Geography Dept, Dundee University, DD1 4HN *(Tel 01382 344433, Fax 01382 344434)*

6th December 1995
CIWEM Symposium
"Sensors and sensitivity"
Venue: City Conference Centre, London
(see Meetings *on page 11)*

11th January 1996
Welsh Hydrological Group
"Water resources management issues in Africa" – Mike Jones (Coode Blizard)
Venue: Old Course Hotel, Chepstow
Time: 5.30 for 6.15 p.m.
Contact: Linda Aucott, NRA South Western Region, Exeter *(Tel 01392 444000, Fax 01392 444238)*

1st February 1996
Scottish Hydrological Group / SHSG
"Hydrology of small-scale hydro-electric power generation in Scotland" – Richard Hackett (Edinburgh Hydro Systems Ltd)
Venue: Strathclyde University - *see above*
Time: 6.30 p.m. (6.00 p.m. tea)
Contact: Dr A R Black, *address above*

14th February 1996
Welsh Hydrological Group
"Groundwater conservation in the Mendips" – Terry Newman (NRA SW)
Venue: NRA HQ, Aztec West, Bristol
Time: 5.30 for 6.15 p.m.
Contact: Linda Aucott, *address above*

21st February 1996
BHS National/Pennines Meeting
"Practical application of quality standards in hydrometry & hydrology"
Venue: Salford University
Time: 1.15 p.m.
Contact: Dr Liz Kaar, NRA North West Region, P.O. Box 12, Knutsford Road, Warrington, Cheshire WA4 1HG *(Tel 01925 653999, ext. 2131)*

6th March 1996
Scottish Hydrological Group / CIWEM
"Shaping the future: new management for Scottish water" – Water Authority & SEPA speakers
Venue: Heriot-Watt University
Time: 2.00 – 5.30 p.m.
Fee: £15 in advance, payable to ICE
Contact: Dr A R Black, *address above*

27th – 28th March 1996
CIWEM, ICE & BHS Conference
"Water Environment '96: Supply & demand — a fragile balance"
Venue: ICE, 1 Great George St, London
Contact: Lavinia Gittins, CIWEM Conferences *(Tel 0171 831 3110, Fax 0171 405 4967)*

1st – 3rd April 1996
BHS VIth Postgraduate Symposium
Venue: University of Newcastle
Contact: Dr Paul Younger, Dept. of Civil Engineering, University of Newcastle upon Tyne *(Tel 0191 222 7942, Fax 0191-222-6669)*

11th April 1996
Welsh Hydrological Group
"Ultrasonic flow-gauging" – Richard Iredale (NRA Severn Trent Region)
Venue: Upton on Severn & Tewkesbury (Afternoon visit + evening meeting)
Contact: Linda Aucott, *address above*

15th May 1996
BHS Pennines Group Meeting & AGM
"Impact of hydrological change on catchment management"
Venue: *to be confirmed*
Contact: Dr Liz Kaar, *address above*

June 1996 (date to be confirmed)
"Floodplain restoration"
Contact: Andy Large, University of Newcastle upon Tyne *(Tel 0191 222 6342, Fax 0191 222 5421)*

8th – 11th July 1996
IAHS, BHS
Interceltic Colloquium on Hydrology and Water Management
Venue: Rennes, Brittany
Contact: Alain Jigorel, INSA de Rennes, Département de génie civil, Laboratoire de minéralogie et géotechnique, 20 avenue des buttes de Coesmes, F-35043 Rennes-Cedex, France *(Tel +33 99 28 65 30, Fax +33 99 63 67 05, E-mail: alain.jigorel@insa-rennes.fr)*

15th – 19th July 1996
IAHS
"Global Patterns of Erosion and Sediment Control"
Venue: Exeter University
Contact: Prof Des Walling, Dept of Geography, Exeter University, EX4 4RJ. *(Tel 01392 263345, Fax 01392 263305)*

Copy Deadline for Issue No. 49 9th January 1996

Circulation is the quarterly newsletter of the British Hydrological Society. It is issued free to members, but is also available on an annual subscription of £20. All enquiries concerning membership should be made to Richard Howard, Institution of Civil Engineers, 1-7 Great George Street, London SW1P 3AA. Telephone 0171 839 9836. Please address all other correspondence to the Editor, John Griffin, Institute of Hydrology, Wallingford, OX10 8BB. Telephone: 01491 692395. Fax: 01491 692424. Email b.h.s@ua.nwl.ac.uk.
Circulation is produced by the **Institute of Hydrology** and indexed in *Geosystems' Hydrotitles & GeoArchive.*