

# Hot News

from the heat transfer society



April 1997

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## Our New President

Reg Bott, our new president, puts his success in life down to enjoying everything he does. One of his greatest pleasures is travel which he indulges in by giving courses in far-flung places like Australia, South Africa, Mauritius and Japan. It is therefore apt that he was made Grand Commander of the Order of Prince Henry the Navigator in recognition of his services to chemical engineering in Portugal.

His other honours have been the Arnold Green and Brennan Medals from the Institution of Chemical Engineering.

Reg has over 300 published papers and has played a major role as author, co author or editor of eight books.

Reg now divides his time between being a Senior Research Fellow in Chemical Engineering at Birmingham University and being Assistant Priest at St. Faith and Lawrence, Harborne. He has a distinguished research career in many aspects of chemical engineering and is best known in recent years for his work in heat exchanger fouling with particular reference to biofouling. He sees the irony of being an *hts* President who is an expert in what *stops* heat transfer rather than what *aids* it! The truth is that his research is telling us both what causes fouling and hence how best to prevent it.

It is an opportune time for Reg to be our President because there are clear signs that industry now views fouling as something which should be dealt with rather than simply tolerated. He will be able to guide us in our one-day event, *Focus on Fouling*, planned for June (see p2 for details).

We wish our President a successful year.

## Many thanks

The *hts* is extremely grateful to the Motherwell Bridge Group for the use of their London Office for committee meetings. They made this kind offer following our plea in the last *Hot News* for somewhere to hold meetings other than the noisy pubs which we have been forced to use in recent times.

## Taxing times

As you wrestle with your tax return, you might like to remember that *hts* subscriptions can be claimed against tax. The magic number which you should quote to your tax office is SAPP/T1644/31/1995/JEM. Our Honorary Treasurer reminds you that you can only make a claim if you actually pay your £7 subscription!

## Target heat transfer people

**For £250 companies and other organisations can include an insert in an *hts* mailing. The insert is then targeted at the 450 key heat transfer specialists in the industry. This is therefore an excellent way to advertise job vacancies and heat transfer events.**

Contact: Dave Evans - Tel 01235 432323, fax 01235 831981

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## Annual Dinner

The 33rd *hts* Annual Dinner at the New Connaught Rooms, London on 21 March was a great success. It was attended by around 200 Members and guests with nearly 20 companies sponsoring tables.

Reg Bott was inaugurated as our new President. In addition to receiving the *hts* tie, he was given a new emblem of office comprising two “worry balls” decorated with the *hts* yin-yang symbol and donated by the retiring President Keith Mangnall. Read into that what you may!

In proposing the toast to the guests, Reg emphasised the benefits of heat transfer to the community and stressed that we ourselves were an important community who can achieve much by working together.

The guest speaker was Martin Stanley the Chief Executive of OSO (now known as the Oil, Gas and Petrochemical Supplies Office). He talked about the OSOs valuable work for the UK and attempted to illustrate what good value for money he gave as a civil servant by his estimate that we in the room had contributed through our taxes only about 2p to his annual salary. Someone kindly gave him another 2p!

The Mike Ackrill Trophy was presented to Peter Jackson and Roy Godwin for the best presentation at an *hts* Forum. See right for more details.

Peter Johnson was made a Fellow of the society in recognition of his long service which has included 7 years as secretary, 2 years as chairman, 1993 President and currently acting as a trustee.

Two long-time members of the society, John Round and Derek Pratt were made Life Members.

A raffle was held in aid of the Derby Downs Syndrome Association. The prizes were kindly donated by APV Heat Exchangers. These include a bottle of whisky, vouchers for a restaurant meal and for a holiday.

## Focus on Fouling

Fouling in heat exchangers is estimated to cost UK industry over £700 million per annum. The

big question is “Can we do anything to reduce this or do we just have to live with it?” Following a lively discussion on this topic at the *Advances in Industrial Heat Transfer* conference at the Birmingham NEC in April 1996, the *hts* took the initiative along with HTFS to set up a one day meeting to share practical experience and to focus attention on initiatives which should be taken to progress our understanding.

The meeting will be held at the Institute of Petroleum in London on 3 July, with their support. The other participants in the organisation of this event are Kvaerner John Brown, I Chem E and ETSU. For further information, contact the chairman of the organising committee, Dave Butterworth. See the back page for contact details. We are also still looking for papers from operating companies on how they have made performance improvements from monitoring fouling.

## The Millennium

It was agreed at the recent AGM that the *hts* should consider some way of marking the year 2000. So get your thinking caps on. We will give a prize to the best, practical suggestion for some event or way to mark this important date.

### Mike Ackrill Award

**The Mike Ackrill Award is given this year for the best presentation at an *hts* Forum. The criteria were that the presentation**

- **Contains information of significant value to a sector of the heat-transfer industry especially if of topical interest**
- **Contains information which may be counted towards Continuing Professional Development (CPD) rather than simply being an advert for the companies products or services**
- **Is clearly and logically presented**

**The prize has been awarded to Peter Jackson and Roy Godwin of Callidus Technologies for their presentation “Emission control by Callidus LE Series low NOx burners”. A report on their presentation, which was on 12 September, is in the last edition of *Hot News*.**

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## Forum Evenings

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### ***Film your condensers***

At the November Forum, David Webb of UMIST took us through the theory of designing multicomponent and partial condensers. From his many years of world-leading research he addressed those universal questions like “can we rely on equilibrium methods?” and “should we use integral or differential curves?”

Integral condensation (in which the condensate remains in close contact with the vapour) is almost always assumed in design. However, David expressed the nagging doubt that differential condensation (in which the condensate separates from the vapour) might be closer to the truth leading to a lower MTD. Data on steam/methane, which has a wide condensing range, appeared to lie between the two extremes.

*Film methods* take explicit account of the detailed heat and mass transfer processes and should therefore give greater accuracy than the *equilibrium methods* used most frequently in design. Experiments at UMIST have confirmed that the film methods do best while analysis has shown when the simpler methods are likely to be safe or unsafe. A saving grace for the simpler methods is that, while they get the local condenser performance wrong, they tend to do better on overall performance with errors at inlet and outlet of the condenser cancelling out. Nevertheless, the simple methods will tend to be unsafe with higher Lewis number and condensation rate. Corrections to the simple method can be developed before getting into the complexity of full film theory.

UMIST have also studied difficult problems where the simpler methods break down completely. These include immiscible condensation and transients.

### ***The big bang***

Imagine a shell-and-tube exchanger with hot, 250 bar gas on the tube side with cooling water at 12 bar on the shell side. A typical offshore oil-and gas application. Should we design the

shell to 15 bar, say, to withstand only the shell-side operating pressure or must we design the shell to withstand the full tube-side pressure just in case a tube ruptures? This was the question posed by Colin Weil at the January Forum.

The answer to the question depends on how the shock waves and pressure waves propagate through the shell after a severe tube failure. Colin showed how this process has been modelled with some success for simple, one-dimensional geometries but we do not know whether such models will apply in the complicated geometry of a heat exchanger.

Hence, Colin has been working with The Institute of Petroleum to run tests on a complete exchanger at Sheffield University, in co-operation with the Health and Safety Executive. Watch this space to see how the tests go (with a bang!).

### ***Picture your heat transfer***

We were greatly entertained by Professor Joe Quarini of Bristol University at the February Forum who gave us an apparently light-hearted yet biting view of computational fluid dynamics (CFD).

He presented a number of examples of valuable uses of CFD which included evaluating pollution dispersion from a power station in a Swiss valley, predicting the behaviour of sewerage settler tanks and sterilising cans of baked beans (illustrated by a can kindly provided by the Barley Mow!). The common theme was that the predictions showed unexpected effects which normally agreed with such validation as was possible although some fine details were often missed. Above all, the graphics associated with CFD packages could generate extremely informative pictures which were especially attractive to senior managers and customers

However, there was rarely a guarantee that the predictions were anywhere near accurate. Indeed, Joe showed the case of a vortex tube which can generate hot and cold air from an inlet flow of ambient compressed air. So far, Joe has been unable to predict this effect using CFD.

## Annual General Meeting

This year's AGM was held at the *Barley Mow* on 6 March. Existing Officers and Members of the Committee were re-elected with the exception that Sue Baker stood down because her new work commitments made it difficult for her to attend meetings. Tony Terranova, who had been co-opted onto the Committee during the year was elected formally. The current Committee is listed below.

David Evans, Hon. Treasurer reported that the *hts* finances were in a sound state. Over last year, we made a small surplus of £480 compared with the negligible deficit of £27 in the previous year. The bank account deposits stood at nearly £4000 on 31 December 1996 which was almost £500 higher than twelve months before.

In order to save money, it was agreed that the minutes of the AGM would only be sent to those who had attended, and to Committee members. However all *hts* Members are entitled to the minutes and can request them from the Honorary Secretary.

The barman at the *Barley Mow*, Michael, was presented with an *hts* tie in recognition of the fact that he has attended more meetings than nearly all Members?

### *The 1997/98 Committee*

S Earland (Chairman)	D Butterworth
G Bowes (Secretary)	M Gough
D J Evans (Treasurer)	D Jones
G R Agar	N Smith
K Bacchus	A Terranova
R Berryman	C Weil

## Waste Heat

by L M Teedy

### *The small print*

There are many instances in heat transfer where you do not get more than one benefit at a time. One example is condensation on low-finned tubes. The fins can give a considerable increase in coefficient with low velocity vapour but you no-longer get much, if any, benefit from vapour shear at higher velocities. Similarly, serrated

fins in plate-fin exchangers give excellent single-phase enhancement but the normal two-phase enhancement during boiling is much less than for plane fins. It is almost as if some as yet undiscovered law of physics is trying to keep us in our place.

This always reminds me of discount vouchers. I often receive through the post vouchers for, say, 10% discount on car hire with a given company. When arriving at the car hire desk to claim my discount, I see that they are also offering discounts on small cars. So I ask for both discounts. "Sorry, Sir," they patiently tell me pointing to the small print on the back of the voucher which states "This offer cannot be used in conjunction with any other special offer."

When the world's greatest scientists eventually come up with the grand unifying theory, don't be too impressed by what their paper says - look for the small print on the back! The views of L M Teedy are not necessarily those of the *hts*.

## Future Events

- *Regional Forum, 9 April, Newcastle upon Tyne, "Heat exchangers at the heart of the process", Prof. Colin Ramshaw, University of Newcastle*
- *London Forum, 22 April "Improve high pressure process heat exchangers by thermal transient analysis and fatigue evaluation", John McCutchen, Yuba Heat Transfer, USA*
- *London Forum, 22 May*
- *Regional Forum, 17 June, Guildford*
- *One-day event "Focus on Fouling", 3 July, Institute of Petroleum, London*
- *London Forum, 11 September*
- *Presidents Night, 21 October*

The next *Hot News* will be printed in November. Contributions are needed by mid October, which should be sent to

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