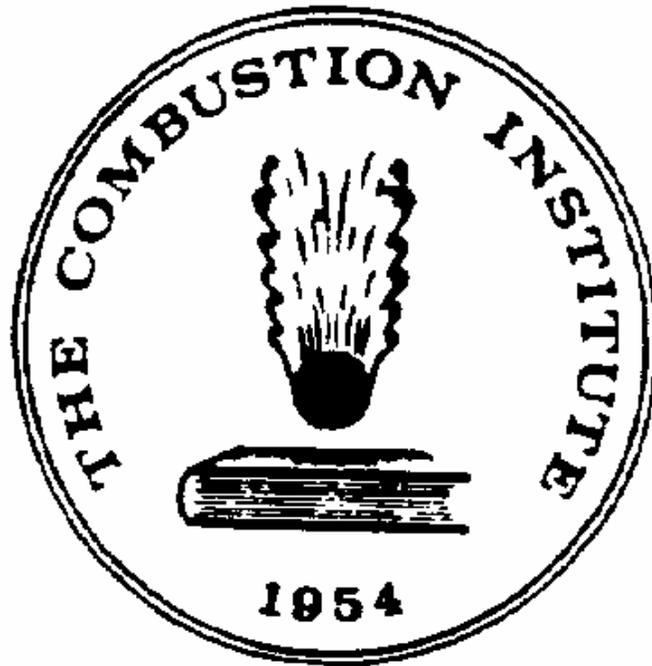


# THE COMBUSTION INSTITUTE

## (British Section)



## NEWSLETTER

VOLUME 2003-2

WINTER 2003

EDITOR:

Professor A R Burgess

E-mail: [a.burgess@ucl.ac.uk](mailto:a.burgess@ucl.ac.uk)

World Wide Web versions of this *Newsletter* at:-  
[http://www.chemeng.ucl.ac.uk/research/combustion/nl2003\\_2/](http://www.chemeng.ucl.ac.uk/research/combustion/nl2003_2/)

Earlier editions also available at:-  
<http://www.chemeng.ucl.ac.uk/research/combustion/>



# CONTENTS

• <b>Editorial</b>	4
• <b>Combustion People</b>	5
Robert F Sawyer awarded the Soichiro Honda Medal	
<i>Obituaries</i>	
Vadim V Barzykin	
D Huw Edwards	
Arthur Lefebvre	
• <b>Committee of the British Section</b>	7
• <b>British Section News</b>	8
Committee Membership	
British Section Prizes (2002)	
Publications of British Section Members	
The Hinshelwood Prize	
The Rushbrook Fire Laboratory at Edinburgh University	
• <b>First Announcement – The Spring 2004 Meeting of the British Section On Sustainable Combustion</b>	11
Cheshire Innovation Park (Shell Thornton), Monday 19 April 2004	
• <b>Minutes of the Annual General Meeting of the British Section</b>	12
held at Loughborough University on 18 September 2003.	
• <b>30th International Symposium On Combustion: Chicago, 25-30 July 2004</b>	15
• <b>Reports on meetings attended by student members of the British Section</b>	17
• <b>Impressions of ECM 2003</b>	22
• <b>Fire Dynamics Research</b>	28
Kai Luo gives a personal account of the 4 <sup>th</sup> International Seminar on Fire and Explosion Hazards held on 8-12 September 2003 in Londonderry, N. Ireland	
• <b>My American Dream</b>	30
Culture shock for Chris Lawn in the USA!	
• <b>Safe Electricity</b>	31
Ken Palmer writes about HM Electrical Inspectors of Factories and reviews a book on the subject	
• <b>Book Review</b>	35
Ian Reid reviews <i>Hydrocarbon Process Safety</i> by J C Jones	
• <b>Combustion Calendar</b>	36

## EDITORIAL

If *The Times* can go tabloid then perhaps I should make some effort in that direction too for *The Newsletter*! As a start let's dispense with the usual boring editorial and replace it with headlines.

### **THE COMBUSTION INSTITUTE (BRITISH SECTION) NEEDS YOU!**

And your students, friends and colleagues – so please see the advert in this *Newsletter* and persuade them to join. See how many travel grants were awarded this year to members; and that is only one of the many benefits of membership. Read the reports from grantees too.

### **COMBUSTION IN BRITAIN – How do we tell everyone about combustion and our achievements?**

We need to recruit students into the subject and persuade Government and Industry of the benefits to Britain of combustion studies. Ideas to our Chairperson.

**WRITE TO AND FOR THIS NEWSLETTER.** I need new contributors please.

### **SEE THE COMBUSTION CALENDAR FOR DETAILS OF:-**

**THE 30<sup>TH</sup> SYMPOSIUM IN CHICAGO  
OUR SPRING MEETING ON SUSTAINABLE COMBUSTION  
OUR AUTUMN MEETING ON PARTICULATES IN COMBUSTION**

**AND MANY OTHERS**

**INFORMATION ON TRAVEL GRANTS TO THE 30<sup>TH</sup> SYMPOSIUM WILL  
BE AVAILABLE FROM THE HON. SECRETARY IN THE SPRING**

**Tony Burgess**

*HAPPY CHRISTMAS TO ALL  
MEMBERS  
AND A SUCCESSFUL 2004*

## COMBUSTION PEOPLE

### ROBERT F. SAWYER

As a specially privileged friend of Bob's I am delighted to welcome him, his wife Barbara, and their cat, Kumo, to Britain. Bob has been here since July and for two years will be a director of the University of California Study Centre (Bloomsbury, London). I am sure the British combustion community will echo my welcome. We hope that he will participate in some of the British Section's activities while he is here; he is already a paid-up member of the Section.

As I write this piece he is flying back to Washington to receive the SOICHIRO HONDA MEDAL of the American Society of Mechanical Engineering. This medal, established in 1983, recognises an individual for an outstanding achievement or a series of significant engineering contributions in developing improvements in the field of personal transportation (see <http://www.asme.org/honors/ms71/saa/honda.html> for more details of the medal).

The citation reads *"For contributions to the understanding of the role of chemistry and kinetics in the formation of emissions from internal combustion engines, and for his efforts to develop and apply scientific knowledge for the control of air pollution from mobile sources"*.

Bob will probably be best known in Britain for his four-year tenure of the Presidency of the Combustion Institute. He has been on the Faculty of the University of California, Berkeley since 1966, the year I first met him when attending the Berkeley Combustion Symposium. His contribution to combustion has been immense and impossible to summarise here without using many pages and embarrassing Bob!

Congratulations on winning this award and welcome to Britain.

**Tony Burgess**

### VADIM V BARZYKIN

Nickolai I Kidin, Chair of the Russian Section of the Combustion Institute wrote on 26 August 2003:

*"Unfortunately, we have very sad event in Russian Combustion Community and I believe in the World combustion community also. Last week being in USA, Professor Vadim V Barzykin passed away. We consider him like one of the classics in mathematical theory of combustion and explosion. I think, I will write special obituary notice for CI Web-site but a little bit later"*.

## **D HUW EDWARDS**

The British Section Secretary received this message very recently from David Bull, Chairman of UKELG:-

"I regret to have to inform you of the death on 20th November 2003 of Professor D Huw Edwards Honorary life president and founder chairman of UKELG. His funeral is to be at 2.00 pm at St Paul's Aberystwyth on Thursday 27th November. (Family flowers only, donations to Parkinsons' Disease Research). I will attend and say a few words on behalf of UKELG and his students."

Professor Edwards was a distinguished physicist in the field of gas phase detonations and spent nearly all his career in Physics at University of Aberystwyth. Hopefully a more detailed obituary will be published in the next *Newsletter*.

## **ARTHUR LEFEBVRE**

As this *Newsletter* goes to press I was sad to hear of Arthur's death very recently. I am sorry that I have not yet received an obituary to publish, but if I can obtain one before I circulate the *Newletter* I shall include an insert.

**Tony Burgess**

## COMMITTEE OF THE BRITISH SECTION: 2003

**Chairman:** Professor C J Lawn  
Engineering Department  
Queen Mary and Westfield College  
Mile End Road  
London E1 4NS  
  
Tel: 020 7882 5279  
Fax: 020 8983 1007  
<c.j.lawn@qmw.ac.uk>

**Secretary:** Dr Yajue Wu  
(and temporary Membership Secretary)  
Dept of Chemical & Process Engineering  
Sheffield University  
Mappin Street  
Sheffield S1 3JD  
  
Tel: 0114 222 7514  
Fax: 0114 222 7501  
<y.wu@sheffield.ac.uk>

**Membership Secretary** (on leave) Dr V Dupont  
Department of Fuel and Energy  
Houldsworth Building  
University of Leeds  
Leeds, LS2 9JT  
  
Tel: 0113 233 2503  
Fax: 0113 233 0572  
<V.Dupont@leeds.ac.uk>

**Treasurer:** Professor G T Kalghatgi  
Shell Global Solutions  
Shell Research and Technology Centre  
Thornton, P O Box 1  
Chester CH1 3SH  
  
Tel: 0151 373 5703  
Fax: 0151 373 5052  
<Gautam.T.Kalghatgi@OPC.shell.com>

### Committee:

Professor A R Burgess Dept of Chemical Engineering University College London Torrington Place London WC1E 7JE  <a.burgess@ucl.ac.uk>	Dr M Brown Energy and the Environment Division Advantica Technologies Ltd Ashby Road Loughborough LE11 3GR  <martin.brown@advanticatech.com>	Professor P Gray, FRS Gonville and Caius College Cambridge CB2 1TA  <pg263@cam.ac.uk>
Dr A J Griffiths Cardiff School of Engineering Queens buildings Newport Road PO Box 925 Cardiff CF24 0YF  <griffithsaj2@cf.ac.uk>	Professor A N Hayhurst Chemical Engineering Department Cambridge University Pembroke Street Cambridge CB2 3RA  <allanh@cheng.cam.ac.uk>	Professor S Hochgreb Department of Engineering University of Cambridge Trumpington St Cambridge CB2 1PZ  <sh372@cam.ac.uk>
Dr C H Priddin Rolls-Royce Ltd P O Box 31 Derby DE24 8B J  <christopher.priddin@rolls-royce.com>	Dr I A B Reid BP Chemicals Building B, Chertsey Road Sunbury-on-Thames Middlesex TW16 7LL  <reidia@bp.com>	Dr D B Smith 29 Enfield Street Beeston Nottingham NG9 1DN  <david_b_smith@talk21.com>
Dr K Syed Alstom Power UK Ltd Industrial Turbine Segment P.O. Box 1 Waterside South Lincoln, LN5 7FD  <khawar.syed@power.alstom.com>	Dr J L Torero Institute of Infrastructure and Environment, Crew Building, The King's Buildings School of Engineering & Electronics The University of Edinburgh Edinburgh, EH9 3JN  <J.Torero@ed.ac.uk>	

# BRITISH SECTION NEWS

## COMMITTEE MEMBERSHIP

Following five nominations for the positions left vacant on the Committee by the statutory retirement after six year's service of Prof Bill Jones and Dr Mike Fairweather, a postal ballot was held during August. Prof Simone Hochgreb was duly elected, but there was a tie for second place between Dr Khawar Syed and Dr Tony Griffiths. There being no provision in the rules for such an outcome and there being some concern about the size of the Committee, it was decided to invite both Dr Syed and Dr Griffiths to serve as co-opted members for this year only.

The British Section Committee is now:

Dr M.Brown		Advantica Technologies
Prof A.R.Burgess	(Newsletter Editor)	UCL
Dr V.Dupont	(Membership Sec, co-opted)	Leeds
Prof P.Gray	(Hon. Life Member)	Cambridge
Prof A.R. Griffiths	(co-opted)	Cardiff
Prof A.N.Hayhurst	(Combustion & Flame Editor)	Cambridge
Prof S.Hochgreb		Cambridge
Prof G.T.Kalghatgi	(Treasurer)	Shell Global Solutions
Prof C.J.Lawn	(Chairman, co-opted)	QMUL
Dr C.H.Priddin		Rolls-Royce
Dr I.A.B.Reid		BP Chemicals
Dr D.B.Smith	(co-opted)	Leeds
Dr K. Syed	(co-opted)	Siemens
Dr J.L.Torero		Edinburgh
Dr Y.Wu	(Secretary)	Sheffield

**Chris Lawn (Chairman)**

## PRIZES

The **Sugden prize** for the best paper in a journal published in 2002 was awarded to:

J.F.Griffiths and B.J.Whitaker, 'Thermokinetic Interactions Leading to Knock during Homogeneous Charge Compression Ignition', *Comb & Flame* **131** (2002) 386-399.

The **Gaydon prize** for the best paper at the 29<sup>th</sup> International Symposium was awarded to:

R.P.Lindstedt and S.A.Louloudi, 'Joint Scalar Transported Probability Density Function Modeling of Turbulent Methanol Jet Diffusion Flames', *Proc Combust Inst.* **29** (2002):2147.

**Chris Lawn (Chairman)**

## PUBLICATIONS OF BRITISH SECTION MEMBERS IN 2002

A couple of publications were sent to me after the last Newsletter went to press. These are listed below.

Tsai Kuang-Chung and Dougal Drysdale, Using Cone Calorimeter Data for the Prediction of Fire Hazard. *Fire Safety Journal*, **37**, 697-706.

Tsai Kuang-Chung and Dougal Drysdale, Flame Height Correlation and Upward Flame Spread Modelling. *Fire and Materials*, **26**, 279-287.

*I was very embarrassed to find that I did not include a publication of John Griffiths in the list published with the last Newsletter, especially as it turned out that it was awarded the **SUGDEN PRIZE for 2002!** John sent me the following message, after hearing of the award, which might amuse members. "However, perhaps it's a dream because the paper doesn't seem to exist if (the publication list in) the Newsletter is to be believed!" Congratulations and apologies, John.*

J.F. Griffiths and B.J. Whitaker, Thermokinetic interactions leading to knock during homogeneous charge compression ignition. *Combust. Flame*, **131**, 386 –399.

**Tony Burgess**

## **THE HINSELWOOD PRIZE**

*At its meeting in January 2003, the Committee of the British Section agreed to set up an annual prize to recognise and encourage good work done by younger research workers in any branch or aspect of combustion. The rules are set out below; the intention is to seek nominations for the first award of the prize towards the end of 2003. These rules and procedures were finalised at the Committee's meeting on 15 May 2003.*

**The Hinshelwood Prize for Combustion** recognises meritorious work, in any branch of combustion, by a younger member of The British Section of the Combustion Institute. One aim of this annual prize is to encourage young people, not as yet well-established researchers, but who work in any area or aspect of combustion. In addition, the prize commemorates Sir Cyril Hinshelwood, who shared the Nobel Prize for Chemistry in 1956 for his work on the combustion of hydrogen. Preference will be given to candidates under the age of 35 years on the deadline for nominations.

Written nominations, which may be submitted by anyone who knows the work of the nominee, must be received by the Secretary of the British Section no later than December 31 in each year. Nominations should include the *curriculum vitae* and list of publications of the nominee and also a brief account (no more than two pages of A4) of that person's achievements.

The award shall be of a certificate and a sum of £300.

Each year the Committee of the British Section will nominate a panel, normally of three judges, who will be experts in different aspects of combustion. The chairman of the panel will be a member of the Section's Committee. The panel of judges shall co-opt extra members if they deem it necessary to select the winner of the prize.

Normally one award shall be made each year; however, no award will be made, if, in the opinion of the panel of judges, a candidate of sufficient merit has not been proposed.

The Award shall be presented at the next AGM (2004) of The British Section.

Members wishing to make a nomination should send it, accompanied by a CV and list of relevant publications, by 24th December 2003 to the Hon. Secretary of the British Section by e-mail or post:

Dr. Yajue Wu  
Department of Chemical and Process Engineering  
Sheffield University  
Mappin Street  
Sheffield S1 3JD  
E-mail: y.wu@sheffield.ac.uk

### **THE RUSHBROOK FIRE LABORATORY AT EDINBURGH UNIVERSITY**

Earlier this year (2003) a new fire laboratory was opened at the University of Edinburgh to support teaching and research within the School of Engineering and Electronics. The conversion of the laboratory to the new facility was made possible by a generous donation from Frank Rushbrook, CBE, FIFireE, who was originally responsible for creating the Department of Fire Engineering at the University in 1973. A grant for the basic equipment was given by the Fire Service and Training Trust, thus providing the opportunities to carry out research into various aspects of fire behaviour.

**Dougal Drysdale**

## **FIRST ANNOUNCEMENT – THE SPRING 2004 MEETING OF THE COMBUSTION INSTITUTE (BRITISH SECTION) ON SUSTAINABLE COMBUSTION**

**To be held on Monday 19 April 2004  
at the Cheshire Innovation Park (Shell Thornton)**

The Spring 2004 meeting of The Combustion Institute (British Section) will be held on Monday 19th April 2004 at Cheshire Innovation Park (Shell Thornton). The main themes are the use of hydrogen and biomass. The meeting is co-sponsored by Royal Society of Chemistry Energy Sector.

The meeting organisers are:-

**Chris Morley** (Consultant), Tel: 01244 336298, E-mail: <c.morley@gaseq.co.uk>  
**Martin Brown** (Advantica), Tel: 01509 282468, E-mail: <martin.brown@advantica.biz>

**Roger Cracknell** (Shell Global Solutions) is the local organiser.

The format for the meeting will be traditional involving several presentations and there will be an opportunity to display a limited number of posters. If you would like to contribute a poster or learn of further details, please contact Chris Morley.

**If you have an interest in any combustion-related topic you should join**

**THE BRITISH SECTION  
OF THE COMBUSTION INSTITUTE**

**For a very small fee there are many benefits:-**

- **substantial travel grants to Combustion Symposia & other meetings**
- **reduced fees at Section-sponsored meetings**
- **free on-line access to *Combustion and Flame***
- **reduced subscriptions to several combustion journals**
- **the Section's *Newsletter***
- **and a chance to meet like-minded people**

**Ask the Hon. Secretary, Yajue Wu, for details.**

**E-mail: <Y.Wu@sheffield.ac.uk>**

**All members are urged to try to recruit their colleagues, students, friends and even their bosses! We need a large membership to ensure that the voice of combustion is heard in Britain.**

**MINUTES OF THE ANNUAL GENERAL MEETING OF THE COMBUSTION  
INSTITUTE (BRITISH SECTION)**

**held at 1.30 pm on Thursday 18th September 2003 in the Sir David Davies Building,  
Loughborough University, Loughborough**

**Present:**

Y. Wu (Secretary)  
G. Kalghatgi

C. Lawn (Chairman)  
R. M. Woolley

K. Palmer  
W. Jones  
C Priddin  
M Brown  
D. Smith  
M Fairweather  
S. Cant  
M Lawes

S. K. Sawgha  
M. Davies  
C Sheppard  
C. Coats  
R. Woolley  
Y. Hardalupas  
C. S. Panoutsos

**1. Apologies for Absence**

Apologies for absence were received from A.R. Burgess and A. J. Griffiths.

**2. Minutes of the AGM, 16th SEPTEMBER 2002**

The Minutes were signed as a correct record.

**3. Matters arising**

The Combustion Institute Board had changed the decision made in Sapporo in July 2002 about the citation procedures for the Symposium Volumes. In Sapporo it had been agreed that the correct citation should be that which is presented on the spine of the volume and that the new citation format should not be used on issues before the 28<sup>th</sup> Volume. The new decision is that the new citation format will be used for all Symposium Volumes, because this will be of significant benefit to the careers of academics in the USA. Combustion and Flame has been asked to use the new citation format for all Symposium Volumes.

There were no other matters arising other than items on the Agenda.

**4. Chairman's Report**

The Chairman, Professor Lawn, reported that he had taken a sabbatical at Sandia Labs in California from February to July. Professor W. Jones chaired the Committee during his sabbatical leave. Dr Y. Wu has carried out most of work for the Committee. He expressed thanks to them both.

Drs Smith and Fairweather had taken on the task of looking into the promotion of combustion, aiming at schools and the general public. It was felt that a CD or web-based media are suitable methods for promotion. However any activities aiming at schools should consider issues relating to the National Curriculum. Drs Smith and Fairweather had a meeting in York with Prof David Waddington who is very familiar with education in chemistry and with the National Curriculum. Following the meeting, Dr Smith had given a talk to schoolteachers in an Education Conference to present topics relating to combustion. He will report back to the Committee about the conference and make recommendations.

Professor W. Jones has taken on the task of designing the Section's web page. The web design has been completed. The web site will be on-line very soon. The Imperial College's server will host the page. The web address is: [www.combustion.org.uk](http://www.combustion.org.uk). Section members will be informed when the web site is on-line.

**5. Secretary's Report**

**Membership 2003:**

The British Section currently has 182 members compared to 170 at the same time last year. Membership runs from January to January. A summary of the membership compared with the past three years is given below.

	absolute numbers ( % total membership)			
	Dec 00	Dec 01	Dec 02	Sept 03

<b>Number of members for year</b>	<b>219</b>	<b>194</b>	<b>185</b>	<b>182</b>
of the above, no of academics	124(57%)	92(48%)	106(58%)	93(51%)
of the academics, no of students	30(14%)	15(8%)	23(13%)	24(13%)
of the academics, no of retired members	7(4%)	9(5%)	10(6%)	10(5%)
of the above, no of non academics	95(44%)	102(53%)	79(43%)	89(49%)
of the non-academics, no of retired	20(10%)	21(11%)	19(11%)	17(9%)

## **Meetings**

### *Spring Meeting 2003*

The one-day spring meeting 2003 on "Auto Ignition" was held on Wednesday, 16 April 2003, in the Department of Engineering Science, Parks Road, University of Oxford. The meeting was very successful. A total of 65 people attended, which was way above expectation, and included people from France, Sweden, Spain, Portugal and Holland. The presentations and general discussions were excellent and the accommodation was good value.

### *European Combustion Meeting (ECM2003)*

ECM2003 will be held in Orléans, France, 25<sup>th</sup>-28<sup>th</sup> October 2003. It will be hosted by The French Section and CNRS-LCSR in Orleans. There were 12 abstracts from the UK. Probably 9 UK papers will be presented.

## **Prizes**

### *Gaydon Prize*

The Gaydon Prize is set up for the best UK paper in the International Symposium. The Gaydon Prize for the 29th International Symposium on Combustion, 2002, has been awarded to R P Lindstedt & S A Louloudi, for their paper entitled "Joint Scalar Transported Probability Density Function Modeling of Turbulent Methanol Jet Diffusion Flames" (Page 2147 of Proceedings).

### *Sugden Prize*

The Sugden Prize for 2002 has been awarded to J.F. Griffiths and B.J. Whitaker for their paper "Thermokinetic interactions leading to knock during homogeneous charge compression ignition" published in Combustion and Flame 131:386-399 (2002).

### *Hinshelwood Prize for Combustion*

The Hinshelwood Prize has been set up this year to recognise meritorious work, done in any branch of combustion, by a young researcher (under 35) in the UK. The prize will be £300 plus one year free membership. The first call for nominations will be sent out shortly to the BS members and the Heads of relevant departments in UK universities. Nominations should be accompanied by a CV and list of publications. The first award is expected to be made at the end of 2003. The rules for The Hinshelwood Prize for Combustion will be reviewed in 2004.

## **Travel Grants**

This year the British Section made eight travel awards to a total of £2500 to student members as a contribution towards the cost of presenting their papers at combustion-related conferences and meetings. Student travel grants will continue to be available and application can be made anytime prior to the meeting, with support from the supervisor. The students who received travel grants have to send in reports on their experience of the conference. These reports will be included in the British Section newsletters. Travel grants are also available to support the UK authors who will attend and present papers in ECM2003.

## **6. Honorary Treasurer's report**

1. Total assets - £80,089.44 (£1925.53 in the current account and the rest in the COIF savings account).

2. Membership income, at £2394, is about the same as it was at this time last year but lower than in 2001.

3. We have awarded students eight travel grants worth a total of £2500 so far this year. We can afford to continue at this rate but will have to reconsider if we are deluged with requests. The current criteria for awarding these have been, the student must be a member, should be the presenting author and the application should be supported by the supervisor. We award £250 for European travel and £500 for intercontinental travel. Of course every two years we will continue to make travel awards to support the Combustion Symposium – not restricted to students. This year the European Combustion Meeting will be held in Orleans in October. Travel grants of £250 will be available to British Section members presenting papers (expected to be around fifteen) at this meeting.

4. Normal expenses (Committee, secretarial, newsletter, prizes) average around £3,500 per year. Normal sources of income are COIF investment interest (~£3000), membership income and profits from colloquia (~£500) and the total is around £6000. So we still generate a surplus which is mainly used to award travel grants. We also plan to draw on accumulated funds to make travel grants.

The accounts had been audited and were adopted by the meeting.

#### **7. Election of Committee members.**

Prof. W. Jones and Dr. M Fairweather had reached the end of their 6-year service. The Chairman thanked them for their efforts as members of the Committee. A ballot for election to the Committee has taken place. The most votes were recorded for Prof S. Hochgreb and she was duly elected. However there was a tie for second place, and the British Section has no rules to resolve the tied situation. The Committee will decide how to proceed at the next Committee meeting on 2<sup>nd</sup> October. .

#### **8. Discussion of Any Other business**

Discussion took place on the tie in the election to the Committee. It was suggested that both candidates should be taken onto the Committee. However this would increase the size of the Committee which was felt to be large already. It was also suggested that there should be a one-year appointment to undertake awarding the new Hinshelwood Prize for Combustion.

There was also some discussion on the promotion activities and Dr Smith answered questions.

The meeting closed at 2.15 p.m.

**Yajue Wu, 18/9/03 (slightly edited by ARB)**

## **THIRTIETH INTERNATIONAL SYMPOSIUM ON COMBUSTION**

**To be held at the University of Illinois at Chicago, USA from 25-30 JULY 2004**

***Most of the information below is reprinted from the last Newsletter; please note, however, the new information about new submission dates and electronic submission of papers.***

The Thirtieth International Symposium on Combustion will be held during the week of 25-30 July 2004 at the University of Illinois at Chicago. Scientists, engineers and others interested in combustion are invited to attend and participate in this biennial event.

#### **PROGRAM COMMITTEE CO-CHAIRS:**

Ronald K Hanson, Stanford University, Stanford, CA USA

R Peter Lindstedt, Imperial College, London, UK

**COLLOQUIA:**

**Reaction Kinetics  
Pollutant Formation  
Diagnostics and Sensors  
Laminar Flames  
Turbulent Flames  
Heterogeneous Combustion  
Detonations, Explosions & Supersonic Combustion  
Fire Research  
Stationary Power Systems & Environmental Mitigation  
Propulsion & Engines Combustion  
Material Synthesis & Catalysis  
New Technology Concepts**

**SUBMISSION DATES AND INSTRUCTIONS FOR PAPER / POSTER SUBMISSION:**

Authors of papers to be submitted to the 30th International Symposium on Combustion are reminded that there are new instructions for paper format and length. Please read and follow these new instructions, which are available on the Call for Papers web page:

<http://www.combustion2004.org/callforpapers.htm>

The direct link to the formatting instructions PDF file is:

<http://www.combustion2004.org/FormattingInstructions.pdf>

**PLEASE NOTE THE DUE DATE FOR SUBMISSIONS IS NOW DECEMBER 9 2003**

**Enquiries to:**

Ms Sue S Terpack	E-mail: <a href="mailto:30thsym@combustioninstitute.org">30thsym@combustioninstitute.org</a>
The Combustion Institute	Tel: +1 412 687 1366
5001 Baum Boulevard, Suite 635	Fax: +1 412 687 0340
Pittsburgh PA 15213-1851 USA	

**Date for receipt of abstracts for Work-in-Progress Posters: April 14 2004**

**Instructions on submission of wipp see:**

<http://combustioninstitute.org/30thwipp.html>

**Enquiries to:**

Professor Chih-Jen Sung	E-mail: <a href="mailto:cjs15@po.cwru.edu">cjs15@po.cwru.edu</a>
MAE Dept., 415 Glennan Building	Tel: +1 216 368 2942
Case Western Reserve University	Fax: +1 216 368 6445
10900 Euclid Avenue	
Cleveland, OH 44106 USA	

**LOCATION AND TRAVEL:** Chicago is in the central United States and situated on the western shore of Lake Michigan. It has easy access by air or land. O'Hare International Airport has direct flights to and from all major cities in Europe and Asia, as well as those in the US. Chicago is also served by Midway Airport, which handles additional domestic flights and limited international flights. Both airports have subway, taxicab, and shuttle bus service to downtown, which takes approximately 25-40 minutes depending on the mode of transportation and time of day. Chicago's climate is typical for mid-America. The average daytime temperature in late July is 78-82°F (25-28°C), but can reach into the 90s°F (30s°C).

**LOCAL ARRANGEMENTS:** The main site of the Symposium is the campus of the University of Illinois at Chicago (UIC). This is adjacent to downtown and has convenient access by public transportation to other areas of interest in the city. Many attractions are a 15-20 minute walk from campus.

The Symposium will open with a Welcome Reception at the UIC Chicago Circle Center. The opening ceremony and Hottel Lecture will be held at the UIC Pavilion. Technical sessions will be held on campus. The Wednesday afternoon picnic, culminating with evening fireworks, will be held at Navy Pier on Lake Michigan. The Banquet will be held on Thursday at the Fairmont Hotel. The Farewell Reception will be held in the Lecture Center Plaza.

Chicago is one of the liveliest cities in the US and the world's convention capital. It has an abundance of events, attractions, world class dining and shopping, plus great hospitality. Over 30 million domestic and international travelers visit the city each year. Local tours are planned.

**ACCOMMODATION:** The Fairmont Hotel is planned as the main Symposium hotel. Other hotel and accommodation arrangements include the Hotel Inter-Continental, the Holiday Inn Chicago City Centre, the Holiday Inn Hotel and Suites Downtown Chicago, and the university dormitories. Additional information may be found on the website.

For additional information see:

[www.engr.uic.edu/combustion2004](http://www.engr.uic.edu/combustion2004)

## **REPORTS ON RECENT MEETINGS ATTENDED BY STUDENT MEMBERS OF THE COMBUSTION INSTITUTE (BRITISH SECTION)**

*The committee of the British Section have awarded travel grants to a number of younger researchers to allow them to attend important international meetings. There follows a selection of reports from recipients of these awards.*

### **SEVENTH INTERNATIONAL CONFERENCE ON ENERGY FOR A CLEAN ENVIRONMENT (CLEAN AIR 2003) held on 7-10 July 2003 in Lisbon, Portugal**

My first conference I feel was a very good, exciting and rewarding experience overall. It allowed me to update my knowledge on cleaner combustion technologies, to look at the

new work carried out in catalytic combustion (my field of study) and to broaden by knowledge in combustion and engineering overall.

This conference provided me with my first opportunity of presenting my work, which helped me to develop my presentation skills and gain a level of confidence and experience.

I spent some of my time looking at the different poster presentations not only at the academic contents but also at the way the work is presented in poster form. The reason for this is that I will be making a poster presentation in the near future.

The conference covered a range of topics including "Trace Elements", "The Future Use of Coal", "Particulate Emissions" and "Domestic Appliances" just to mention a selection. My presentation was put into the "Gas Turbines/ Catalytic Combustion" section.

The Conference hosted three social events; the conference banquet hosted at Beato Convent, a visit to Vale Carva country estate where traditional food and wine were offered accompanied with folk music and dances, and a concert of classical music held at a Estufa Fria (Cold Greenhouse).

The social events allowed me to socialise with the academics as well as fellow students, I found this beneficial because it allowed me to get to know new people which I would not have seen at the conference. There was a wide range of delegates attending from all over Europe and a selection from around the world.

Therefore I feel that the conference experience has been invaluable with respects to my academic progress.

**Gavin Leon Rickett (Department of Fuel and Energy, Leeds)**

More than 250 delegates from over 40 different countries met in Lisbon for one of the most important conferences in combustion science held in Europe. The major subjects of this event concentrated on combustion emissions and development of new technologies. This conference brought researchers from academia and industry to discuss the contribution of their work to the challenges to be faced in the years to come. Much of the work was related to the use of fossil fuels and biomass regarding continuous efforts to reduce emissions and improve the efficiency of well-known processes. It was also to present full-clean technologies as practical implementation of hydrogen as a competitive fuel to the near future. Personally, a lot of information was exchanged with colleagues which are researching in the field of natural gas combustion, particularly in the sub-area of turbulence studies and reduction techniques of NO<sub>x</sub> emissions. I was able to meet and share information regarding burner configurations of different kinds of burners and currently used by research groups as IFRF, ENEL, IST, UNICAMP and many others. Nevertheless, the schedule of this conference was perfect for interaction of researchers with excellence of its social events."

**Leonardo Paes Rangel (Energy & Resources Research Institute, Leeds)**

During the week of the 7<sup>th</sup> to the 11<sup>th</sup> of July 2003 I was privileged to have a paper published in the Clean Air 2003 Conference and to be then invited to present that paper to an audience of fellow researchers from the international community of combustion engineers. The principle objectives of the conference were to describe, evaluate and

compare new and innovative technologies, which maximise energy conversion while minimising undesirable emissions.

My research involves the development of a CFD based combustion and NO model, which has been applied to simulate a practical-scale, turbulent non-premixed natural gas flame studied experimentally in a furnace. The present investigation emphasised the need for accurate predictions of the structure of practical-scale flames in order to achieve reliable predictions of NO emissions from industrial combustors. In predicting burner performance and to assist in the design of efficient low-emission burners there is a requirement for accurate mathematical models of turbulent non-premixed combustion. Hence, applications can be made to improve the design of industrial sized furnaces by reducing NO<sub>x</sub> emissions.

The prospect of presenting my research at one of the largest conferences in the area of combustion and energy, and to people who were world renowned as experts in their respective fields, was both daunting and exciting to young researcher such as myself. I felt daunted, as this was the first time I had presented a paper at an international conference. I also felt excited, as I was able to publicise my research to fellow researchers from around the world, which made me realise how my research was part of an international effort to progress the area of combustion engineering. The success of my presentation provided me with the tools and experience to approach future conferences with a heightened level of confidence.

As part of the conference a number of evening meals were organised at various locations in and around the city of Lisbon. These events provided an informal forum where a young researcher such as myself was able to socialise and ultimately “network” with people involved with the conference. The evenings enabled me to exchange ideas and experiences to both expand my own knowledge surrounding my research and to also help others from the international community of combustion engineers to progress their own research. This forum reassured me that my research was both important and valid and to also appreciate the varying approaches being applied to achieve a common goal.

In summary, I place great value on the various experiences I have gained from the conference, which have provided me with realisation that an international community exists who are able to provide valuable knowledge, experience and support to all researchers such as myself embarking on new research which will ultimately help to progress the field of combustion engineering. The conference also enabled me to appreciate the varying approaches being applied to achieve a common goal. I would therefore, like to thank The Combustion Institute (British Section) for their help in allowing my to be a part of this conference and thus present my research and gain these valuable experiences.

**Sukhraj Kaur Sangha (Department of Chemical Engineering, Leeds)**

\*\*\*\*\*

## **9TH INTERNATIONAL CONFERENCE ON LIQUID ATOMIZATION AND SPRAY SYSTEMS (ICLASS 2003) held in Sorrento, Italy on 13-18 July 2003**

My thanks go to the Combustion Institute (British Section) for sponsoring my participation at this conference held in a very beautiful area, situated in the south of Italy, close to Naples, in a town called Sorrento. It is surrounded by mountains and sea, offering a very nice view.

The conference began with some opening remarks followed by a plenary lecture given by Professor Chigier. The aim of the opening lecture was to give an overview for the recent research and advances in fundamental, physics, understanding, measurements, theory and computation in the spray science and technology. This includes description of the latest development in many areas such as internal flow structure in atomizers and cavitation; fully developed sprays and entrainment; high-energy X-ray measurements in diesel engines; liquid jets injected into cross flow and direct injection gasoline and diesel engines. I found the sessions of liquid disintegration, spray modelling and engine sprays very relevant to my research interests. Many interesting papers were presented, addressing issues such as modelling approaches for the atomization process inside the injector or at the near field close to the injector tip. Another lecture was given by Zaleski, about using direct numerical simulation of high-speed jet atomization rather than the use of turbulence models like the  $k-\varepsilon$  model. Furthermore, the use of volume of fluid (VOF) method to simulate the primary atomization for rocket engines spray jets. The other interesting papers were investigating the measurement techniques and simulation of spray characteristics and formation inside both gasoline and diesel engines.

This is my first participation in an international conference. It has added a lot to my experience and my knowledge, especially in my field of modelling of engine spray atomization. Spending the last day visiting Pompeii was the right thing to do to end this great trip.

**Nazar B H Abdelkarim**  
**(Aeronautical and Automotive Engineering Department, Loughborough)**

\*\*\*\*\*

## **IRD INTERNATIONAL SYMPOSIUM ON TURBULENCE AND SHEAR FLOW PHENOMENA - 2003 held in Sendai, Japan on 25-27 June 2003**

This meeting was a real success. I was fortunate to have been to such a big Symposium as my first international conference. The Symposium had over 200 papers and 5 invited keynote papers. This number of papers was high, especially when the outbreak of SARS is taken in account. Regretfully, researchers from the affected areas, specifically China, Hong Kong, Taiwan and Singapore, were asked to refrain from attending the Symposium.

As my research interest is on LES for Turbulent Premixed Combustion, I will give an overview for the scientific program from my research interest view. The first day did not include Reacting Flows or LES sessions. Nevertheless, an adequate number of papers on numerical work, DNS and RANS was presented. Some interesting LES research was presented in Multiphase Flows sessions and RANS sessions as well. As opposed to the first day, the second day was rich in LES research. There were some LES papers for Environmental Fluid Mechanics, and two individual sessions were dedicated for LES. New work and applications were introduced in this research such as a new One-Equation Sub-grid Scale Model of LES which was introduced by Professor Kajishima of Osaka University, Japan. The last day covered more LES and Reacting Flows, giving two sessions to each of them. The Reacting Flows included, for example, LES for lifted flames, LES for turbulent non-premixed flames and LES for turbulent reacting jet.

In other terms, the event was very well organised and the site was excellent. Exploring the Japanese culture and development was another fantastic experience itself. The only

hardship in traveling to Japan is the cost, which was covered by the Combustion Institute (BS). I, therefore, would like to thank the CI for its great financial support and also thank the Symposium organiser for granting me a stipend that covered the registration fees and the accommodation.

**Ahmed M S Ali**  
**(Aeronautical and Automotive Engineering Department, Loughborough)**

\*\*\*\*\*

#### **4<sup>TH</sup> INTERNATIONAL SEMINAR ON FIRE AND EXPLOSION HAZARDS held on 8-12 September 2003 in Londonderry, Northern Ireland**

My travelling experience to N. Ireland was amazing and very much enjoyed. This was my first time to attend an international conference. I really enjoyed most of the conference sessions. The conference was on fire and explosion hazards. The presence of many internationally recognised scientists gave me a very valuable chance to meet these people. In particular to discuss with some of them our current position in combustion science and the way to move forward. I still remember my lengthy discussions with Professor G Lewis from the University of Leeds and Professor U Shepeko from Russia. The presentation I made which was on hydrogen safety attracted a large audience. The comments and questions raised by them gave me more insight into the problem. Socially, I enjoyed very much my stay at the city of Londonderry. The city looks so beautiful with the river Foyle splitting it into two sides. I used to walk daily by the river to enjoy the magnificent views. The shopping was another thing to enjoy in this city. The centre has a lot of historic gates which lead from one market to another. Walking between these gates give the impression that Londonderry was historically an important city.

**Idrees Al-Rahbi (Department of Chemical and Process Engineering, Sheffield)**

*A further report on this meeting is given elsewhere in the Newsletter*

\*\*\*\*\*

#### **FIRST EUROPEAN HYDROGEN ENERGY CONFERENCE held on 2-5 September 2003 in Grenoble, France.**

The scope of the conference was to debate long-term energy strategies organised by the international authorities and the governments of different countries and to provide a comprehensive picture of the research that is currently underway in hydrogen and fuel cell technology throughout the world. The main purpose of my visit to the conference was to present a poster on a paper that I co-authored entitled “Un-mixed Steam Reforming of Vegetable Oil for Hydrogen Production” thus increasing awareness of the research I am undertaking. I also used the opportunity of attending this conference to develop contacts with people working in similar areas to myself and to make scientific exchanges.

The conference was arranged into a series of plenary lectures and parallel sessions covering a wide range of topics including; “Hydrogen Production”; “Storage, Transportation and Distribution”; “Hydrogen Life Cycle Analysis”; “Utilisations” and finally “Finance, Economics and Safety”. The conference organisers arranged two social events; the first was a Gala Dinner at Le Château du Touvet and the second was a Welcome Reception held by the Mayor of Grenoble at the Museum of Grenoble.

The conference highlighted many important points that need to be addressed before a sustainable hydrogen economy can be implemented. The most important conclusions from the conference were that enormous investment is needed, that there must be communication between governments and industry to overcome many technical and political barriers and that there is still a tremendous amount of work to be done. This conference, however, has paved the way for Europe to be a major part in making this a reality.

I would like to thank the Combustion Institute (British Section) for their financial contribution towards attending my first international conference.

**Ian A Hanley (Energy & Resources Research Institute, Leeds)**

## **IMPRESSIONS OF ECM 2003**

***British Section members attending the European Combustion Meeting in Orléans from 25-28 October 2003 were asked to write reports for the Newsletter. These impressions have been edited slightly.***

**Chris Lawn** (Queen Mary, University of London)

As your Chairman, my experience of the meeting was probably a little different from that of the others, so I shall not dwell on the technical highlights which I am sure they will cover.....except to say that I felt the poster format worked well and that the standard of work presented was very high. The French and German groups in particular were clearly putting up their “front-line” activities. This was good for the ECM, but in the absence of an ISSN publication for this meeting, it probably means that we shall see much the same work in Chicago. Does this matter?

For the last session, there was a late decision to abandon a “political” discussion with industrial policy-makers on the future of combustion. Instead, the Chairmen of Sections were asked to report in five minutes on the posters in a particular technical category. With Bill Jones’ help, I covered the 40 posters on “Turbulent Flames”..... but rather superficially! Most participants had left for their trains by that stage, in any case. For the next meeting, I would advocate similar, but longer, sessions early in the programme, with the Rapporteurs informed in advance by a preview of the papers. These sessions could perhaps be divided by “application”, rather than technical category.

The meeting of the Chairmen of the European Sections (some 16) agreed to proceed with the next ECM in Louvain-la-Neuve in 2005, hopefully in the week 4-10 April, and Corfu in

2007. The hosting of the 2009 Meeting will be open for bids over the next year. Some Chairmen made a plea not to jeopardise the bilateral meetings between Sections, and a suggested resolution was that both International and European meetings should be on a three-year cycle. Most Chairmen were in favour of widening the scope of the meetings to include fuel-cells, gasification and CO<sub>2</sub> sequestration.

Overall, both socially and technically this was a smoothly-running and most enjoyable meeting, and our congratulations on its organisation are offered to the French Section. It was a pity that some of our colleagues from the UK were prevented from attending by their teaching commitments. The projected dates for Louvain should avoid this for the next one.

#### **Yajue Wu** (Sheffield University)

My paper was allocated in the first poster session, immediately after the first plenary lecture I found myself was involved with deep discussions with people from all Europe about various aspects of hydrogen turbulent flames. Therefore the first day of the meeting was very centred on my own research interests. Eventually in the last hours of the first day I tried to plough through the posters presented in all other rooms. My impressions were that the poster format worked very well and quality of the posters were very high. The technical papers covered a wide range from theoretical studies to practical research. The papers were categorised in the similar ways as the international symposia. The little list book was a very useful guide. I thoroughly enjoyed the interaction and conversations with the presenters. The organisation of the meeting was superb. The teams in Orléans specially impressed me. They were there all the time and provided service and help to the delegates.

The meeting was sponsored and supported by the British Section. During the meeting I also tried to carry out some duties as the secretary to the British Section. I intentionally visited all posters and met the attendees from British Section. There were 12 papers from UK and I am happy to report that all UK papers were of high quality. British Section nominated plenary lecture by Professor J Swithenbank was ranked very highly by the ECM2003 committee and therefore was accepted as the opening plenary lecture. However only 15 delegates from UK, which was about 5% of the British Section and 5% of the total ECM2003 delegates. The figure was a little bit disappointing. The timing of this meeting was very inconvenient for the UK academics. Hopefully, the success of the ECM2003 will attract more delegates from UK to attend the future meetings.

#### **Chris Coats** (Leicester University)

Having attended the 23<sup>rd</sup> Symposium at the same venue thirteen years ago, I have unavoidably found myself making comparisons between the two meetings. Apart from the obvious differences of scale (~300 participants this time as compared with about four times that number at the 1990 symposium) and season (an essentially indoor meeting this time, without the summer garden-party atmosphere of 1990), one very noticeable change was a reduction of almost 50% in the number of UK participants relative to those from the other European countries. Is this a measure of the extent to which diminishing support for combustion research in the UK over the intervening period has weakened the national effort in this field?

Comparing the work on show at ECM2003 with the Symposium proceedings, I am struck by the extent to which combustion research has moved on during this same period in terms of (i) the new low-carbon agenda now being pursued and (ii) the sophistication of

the diagnostic and computational tools that are now being deployed as a matter of routine. In respect of multiphase phenomena, ignition, emissions and acoustic problems we really do seem to be moving at last into a situation in which analytical research can directly address the complexities of combustion in practical systems in a meaningful way. This is a very impressive achievement.

The poster-based format clearly worked well but, now that so much combustion research is addressing more complex situations and crossing the traditional specialist boundaries, perhaps we need to exercise a little more imagination in the way that individual contributions to meetings of this kind are categorised. The classifications of many of the contributions as “Flames laminar”, “Flames turbulent”, “Combustion in engines and burners”, “Diagnostic methods”, etc. seemed very arbitrary to me and tended to conceal rather than illuminate the more significant cross-connections that might have been made.

All in all, a very good meeting and my thanks to the organisers for their hard work. I look forward to the next one in two years' time.

**Alison Tomlin** (Leeds University)

Probably like many other people, I have often felt that the most enjoyable part of the International Symposia have been the work in progress posters sessions and the interesting conversations that resulted. For a fidgety person like me even the most interesting presentation sessions often become a challenge after a few hours. The format of the European meeting was for me a nice change. The meeting allowed the time to browse all the posters and get a general feel for the areas of research being covered in Europe. There was also the scope to focus on specific areas of interest and to take part in some interesting discussions. I found the meeting very interactive and very fruitful. I learned about some newer areas of research such as flameless combustion and I caught up on recent developments in older topics such as mechanism development, turbulence modelling and pollutant formation. There was a wide range of topics covered and the posters were of a very high quality. It was good to see several posters and a plenary session on the further development of mechanism reduction techniques and especially to see them being applied in practical modelling situations such as turbulent flames and models of vapour deposition. It was also nice to see one or two posters making the link between emissions from combustion processes and atmospheric dispersion. All in all I found the meeting very useful and very enjoyable, so enjoyable I won't even complain about the quality of French vegetarian cooking.....

**Stelios Rigopoulos** (Imperial College)

The European Combustion Meeting 2003 brought together the combustion community in the historical city of Orleans to exchange ideas and methods, and provided a comprehensive snapshot of the current state of combustion research. The posters presented spanned all major fields of combustion, such as chemical kinetics, ignition, laminar and turbulent flames, experimental methods, solid fuels and heterogeneous combustion. In each of these fields, current trends and the state of the art were reflected in the work presented. At the end of the conference, the work done on each area was reviewed by distinguished researchers. Gaps in our current knowledge were identified and potential directions for future research were pointed out.

Both fundamental and applied work were adequately represented. Since all submitted works were presented in poster form, the average quality of the posters was very high.

Moreover, this form of presentation allowed for more interaction time between the poster authors and the audience.

Apart from the technical aspect, the conference was well organised and run smoothly from the beginning to the end. The conference dinner took place after a visit to one of the famous castles of the Loire valley, and gave us the opportunity to sample the world famous French cuisine. In conclusion, the ECM2003 was a highly successful event, and I look forward to the next event in this series.

**Nilanjan Chakraborty** (Cambridge University)

I am extremely grateful to the British Section of the Combustion Institute for the travel grant given to me for attending the European Combustion Meeting. It gave me the opportunity to present my work in the presence of eminent combustion scientists in this continent. I also had many fruitful discussions, formal and informal, with fellow combustion scientists who are engaged in DNS and LES of freely propagating flames and confined flames. The papers and posters regarding non-unity Lewis numbers were helpful for my future research endeavours. The local flame thickness variation in response to strain rate found from our DNS database seems to confirm the modelling assumptions made by a prominent German research group. The global behaviour of freely propagating spherical flame kernels in the thin reaction zone regimes presented by a prominent research group from the Netherlands was found to be similar to what we observed for the planar flames. Most importantly, a possibility of collaboration with a renowned French experimental group came up, for looking at the displacement speed behaviour for a stratified charge combustion process.

Apart from the benefits regarding in my research area, the general awareness about the huge development going on in alternative combustion processes like biomass combustion and porous media combustion was illuminating. One of the plenary lectures on integrating chemical aspects with flamelet based modelling was very useful for my current research. The social activities during the conference were also very enjoyable. The banquet dinner was certainly a remarkable experience. Altogether I enjoyed both the academic and non-academic aspects of the conference very much.

**Gavin Leon Rickett** (Leeds University)

Over 300 delegates attended the conference including representatives from France, Germany, UK, Spain and Italy just to mention a selection. The conference covered a wide range of topics related to combustion science and technology. This allowed me to get an overview of the recent advancements in combustion science although I feel that it was lacking somewhat in my field of study (catalytic combustion). The conference enabled some discussion which has helped me to plan my PhD, and overcome some of the problems, which I encounter in my work.

This was the second international conference I have attended; it allowed me to give a poster presentation for the first time. All the work which was presented was in poster format, so the quality of work in the posters was overall very good.

I think that the conference layout was good with the poster sessions being started by an invited lecture, followed by a coffee break. The invited lectures covered topics such as: Biomass combustion, Advances and challenges in the chemical kinetics of combustion and Advanced laser imaging techniques in combustion.

The conference also hosted a social event followed by a conference dinner, which allowed me to socialise with the academics and to be introduced to some of the delegates. I feel that the conference was very rewarding and motivating.

**Alan Williams** (Leeds University)

In my opinion this was an excellent meeting where there was extensive scientific exchange generated by means of the conference format adopted, mainly Poster Presentations and a handful of Plenary Lectures. The format was also a good choice because the meeting was held in a year in-between the main International Symposia and did not require extensive paper preparation.

There were five wide ranging Plenary lectures which were well attended and which covered a range of topical issues from biomass combustion via combustion challenges, flamelet models, laser techniques through to hydrogen production. The Posters themselves covered numerous topics and the viewing time of four hours a day meant that it was possible to browse in research areas often not possible in the more regimented parallel oral sessions in the International Meetings. The Posters were strong on chemical mechanisms especially at high pressures and in turbulent situations. Indeed I thought the major advances were on the chemical mechanism side where larger molecules and the resultant mechanisms were a major advance. We are moving to a stage where no one person will be able to comprehend some of the mechanisms.

On the Sunday evening the conference enjoyed an enjoyable visit to Chateau-de Meung-sur-Loire, an excellent Loire Valley castle, and the dinner there was up to the very high standard of the previous Symposia that I have attended held in Orleans. Indeed the dungeon visit was particularly appropriate for a combustion meeting.

The question was asked by Michel Cathonnet in his Plenary lecture whether combustion was on the way out. However with the current level of interest and standard of research shown in Orleans and with the constantly emerging problems it looks as if combustion research will go on for ever.

**R. M. Woolley** (Leeds University)

Having not travelled through France for some time, mostly bypassing the country en route to other destinations, the journey to and from Orléans, making non-intentional use of nearly all known forms of transport available to man (excepting cheval and cart), was one interspersed with many colourful culturally-related incidents.

Previously expecting to deliver a paper synopsis by means of oral presentation, I was a little thrown to find the structure of the conference being changed to a poster session; three days in duration. Having not attended such an event, my experiences lay with that of giving and receiving lectures, which I find most stimulating and thought provoking in nature. How unfounded any concerns I may have had with this unknown format were proven to be!

A most warm welcome by the local inhabitants of Orléans, one of these being the Mayor himself no-less, ensured the short stay in the picturesque Loire valley location to be a pleasant one. Steeped in history, and dominated by the imposing Gothic Cathédrale Sainte-Croix, the location provided a stimulating setting in which to forge future

collaborations and discuss current developments in the varied topics invited for discussion.

In traditional form, each working day began with a plenary, all of which were delivered by an eminent name in their field. This, along with a post-lunch plenary also, provided the stimulation for subsequent discussion and debate. Topics were discussed encompassing aspects of combustion science such as kinetics, experimental techniques, and future development of fuels and their applications. A well-organised series of poster presentations resulted in there being topics of interest to myself available for discussion at all times during the conference. Due to the busy nature of the event, I didn't manage to see or speak to all that I had intended and indeed found much interest in some works of which I thought may not have been at the top of my list. Most enlightening indeed! The quality of papers and presentations was such, that to drag oneself away from debate was at times impossible. The number of fields of research and different European and non-European groups that were represented was most impressive, and it was encouraging to the individual to be reminded of the large and friendly community to which we all belong, and the level of excellence to which all work is aspired to be.

All in all, a most enjoyable and beneficial event, of which, as a relative newcomer to the field of combustion research, I sincerely hope there shall be a colourful and prolonged history as it has most certainly benefited on both an individual and international level.

**Christos Nicolaos Markides** (Cambridge University)

Orléans was my first overseas meeting and the first thing that made an impression was the level of organisation and planning during the whole course of the conference. Everything had been planned to perfection and we were given a chance not only to immerse ourselves for three days in the latest offerings of combustion science and related subjects in Europe, but also to experience first hand a beautiful region of France. The definitive event must have been the visit to a medieval castle followed by a typically French dinner "experience".

The presentation of my poster was on the third day of the conference and was received with great enthusiasm and many comments. Video and audio demonstrations of the experimental autoignition reactor and the phenomena under study were available and helped to demonstrate the point of the poster better.

On the academic side, I return from this meeting feeling especially confident about the work that we have already performed here in the Department but also with a better understanding of the questions and needs of the scientific community as a whole with regards to combustion and my field (autoignition) in particular. This, I hope, will help me tremendously in the future planning of the project. I am extremely grateful for being given the opportunity to attend this meeting and for the financial support of the British Section of the Combustion Institute.

**Christos S. Panoutsos** (Imperial College)

The European Combustion Meeting 2003 was a really productive experience for me. First of all, I had the opportunity to present our work at the meeting and had many fruitful discussions on it. Second, I had the chance to meet colleagues from working on divergent combustion subjects and gain a lot of experience. I particularly enjoyed the plenary lectures of the meeting, and especially the lecture of Prof. Swithenbank on Biomass Combustion. The work presented on posters was of high quality, and I found some of the

ideas presented very interesting. The organisation of the conference by our French colleagues was exceptional and Orléans as a city was an excellent place to organise an event like that. Once again, I would like to thank the British Section of The Combustion Institute for financially supporting my participation.

## **FIRE DYNAMICS RESEARCH**

### ***A Personal Account of the Fourth International Seminar on Fire and Explosion Hazards held on 8-12 September 2003 in Londonderry, N. Ireland***

#### **Sunday 7 September**

The routes to Derry were not all direct: most would lead to one of the two Belfast airports, where one had to take an almost 3-hour bus trip to Derry. However, my bus ride was richly rewarded by the picturesque views along the winding country roads. On arrival at the City Hotel, where the Seminar was to be held, the stunning view of River Foyle gave hint of the “philosophy” behind the selection of the venue.

#### **Monday 8 September**

The Seminar opened with spectacle. A local troupe performed Irish river dance before the Lord Mayor of Derry welcomed the 200 or so participants from 25 countries. Nobel laureate John Hume then addressed the Northern Ireland issue and the on-going peace process. Subsequently, Derek Bradley opened the technical sessions by outlining the scientific challenges in fire and explosion research and its social implications. However, the local organiser, Vladimir Molkov was nowhere to be seen: he was reportedly working so hard on the Seminar preparation that he took ill just before the Seminar started. The morning plenary lecture “The Kings Cross Fire and Enquiry” was given by Sir Bernard Crossland. He explained how CFD played a crucial role in identifying the cause of the fire while expressing concern about the length and cost involved in the enquiry. There were three parallel sessions, with topics ranging from combustion fundamentals to large-scale fires and disaster management. One paper was concerned with “impact-explosion-fire” in a clear reference to 9/11.

The afternoon plenary lecture was given by Carlos Fernandez-Pello on ignition and fire spread over solid surfaces, followed by regular talks on explosions, fire physics, chemistry, flow dynamics and diagnostics.

#### **Tuesday 9 September**

Forman Williams gave a plenary lecture on “Approaches to the Scaling of Fires and Explosions through Mechanistic Considerations”. He showed elegantly how simple theoretical considerations can be used to guide researches on complex fire problems. The day’s programme was dominated by various talks on explosions. I co-chaired a session on “Vented Explosions”. It became apparent that commercial CFD codes were widely used in explosion studies but some of the researchers (especially PhD students) were clearly unaware of the limitations in the physical models implemented in the codes. One afternoon session chaired by Graham Dixon-Lewis was entitled “Hydrogen Safety”, a topic which is assuming ever increasing importance. In the evening, the cruise on River Foyle

was an enjoyable occasion, where dozens of dynamic fire scientists danced to the music of one of the top jazz bands in N. Ireland. But the highlight was the oyster-eating and Guinness-drinking contest, in which Elizabeth Williams (Forman's wife) had a comfortable win! I was standing beside her daughter-in-law, Kim, and overheard her scream "Brutal!", when the competition reached the climax.

### **Wednesday 10 September**

I gave a plenary lecture on "New Opportunities and Challenges in Fire Dynamics Modelling". Various modelling and simulation approaches to fire dynamics were reviewed and assessed. The potentials of advanced simulation approaches such as LES and hybrid LES/RANS were underlined. I then attended the session on "CFD Modelling of Accidental Combustion and Related Phenomena". There was strong UK presence (FRS, CFX-Harwell and Ulster). The study from FRS presented by Suresh Kumar in particular adopted an integrated approach to CFD modelling, smoke ventilation design and risk assessment. In the afternoon, two excursions were organised: one to the FireSERT laboratory in Belfast and another to the seaside. I was among the majority who opted for the latter. The first stop was the Bushmill Distillery. The local guides took pains to explain the differences between Irish Whisky and Scotch Whisky, but Dougal Dyrsdale, after tasting 12 different types of Whisky, "blindfolded", surprisingly concluded that Scotch Whisky was better! The second stop was the Giant Causeway, where I heard Derek cleverly explain the formation of the Causeway by mechanisms not dissimilar to those behind the cellular structures of flame balls.

### **Thursday 11 September**

Georgy Makhviladze opened the day by remembering the tragic event exactly two years ago when fireballs bursting out of the twin towers changed history and to a considerable extent fire research. The morning plenary lecture was given by Mikhail Strelets entitled "Turbulence Modelling in Convective Flow of Fires". He outlined some well-known defects of the RANS-based CFD approach and then focused on detached eddy simulation, reinforcing my own belief that LES/RANS hybrid methods may have an important role to play in fire modelling. I co-chaired a morning session on "CFD Modelling of Accidental Combustion and Related Phenomena". The five UK contributions made up the whole session, underlining the strengths of UK researchers in the field. The presentation by Jim Marsden on "Experimental and numerical studies of whirling flames" was memorable, not only because of the excellent technical content but also because the part-time PhD student at UCLan had over 26 years of fire-fighting experience with the Greater Manchester Fire Service. Two of the other papers were concerned with LES of fire and explosions, respectively, pointing to the growing importance of LES in fire modelling. The afternoon plenary lecture was given by Chris Foster on "The Importance of Scientifically led Scene Examinations Illustrated by Case Studies". All afternoon regular sessions were devoted to explosions. Miraculously, Vladimir Molkov turned up in the morning, well and fit. The day finished with the conference banquet, accompanied by Irish music and dance well into the morning hours!

### **Friday 12 September**

A plenary lecture was given in the morning by Takashi Tsuruda. He described the detailed investigation of the Monju fire that happened in one of Japan's nuclear reactors. He reviewed the lessons learnt in fire safety design and scene investigation. Other talks dealt with diverse topics such as industrial safety, fire suppression and fire safety education. The Seminar ended in the afternoon with the award ceremony. The first prize went to the deserving paper by Jim Marsden and co-authors from UCLan.

In retrospect, I was not able to attend as many talks on experimental work as I wished. However, the Seminar had a well balanced diet with high-quality presentations on theoretical, experimental and computational topics. The local organisation was flawless, combining technical effectiveness with notable hospitality. I will remember it as an enjoyable working week before the autumn teaching session starts.

Kai Luo

## MY AMERICAN DREAM

### *Our etymologically-confused Chairman returns from California after culture shock!*

When asked in a standard questionnaire whether I needed language training for my sabbatical abroad, I arrogantly replied, quoting Bernard Shaw I think (not Winston Churchill, who may have said it later), that since “we are two nations divided by a common language”, such training would not be necessary for the USA. Of course, I was quite wrong.

The realisation dawned on the first day when I found that the seniors’ apartments next to mine had a sign absolutely forbidding soliciting! It continued as I drove down the pavement, avoiding several big rigs, and made a left into the city to find a lot...a lot of parking spaces. In the mall, I suffered some sticker-shock, but at least I didn’t encounter any side-shows on the way home.

Sometime later, I hiked up Mount Diablo (in the car, of course), only to be asked at the top for directions to a bathroom. On the way up, I overtook a whole bunch of keen cyclists, no doubt anxious to avoid flats from all the rocks on that trail.

In general, sport was a problem area. When we went to the ball-park, picking up our tickets for the non-bleacher seating from the will-call, as one does, the Giants lost. This was possibly, as I learnt from the Valley Times, because they had a fill-in closer in the bull-pen. (At least they didn’t have a “silly mid-off”.) This is specialist stuff, but even at work, you will sometimes need to step up to the plate. “Kicking for touch” will not be acceptable or understood.

While on the subject of rugby (which I watched at Stanford!) and athletics generally, I should explain that my awesome hand-off in the Corporate Relays was not a Jonah Lomu imitation and did not leave the outgoing runner flat on her back, but safely stealing on the opposition. Run in triple digit temperatures, this event was nevertheless a whole lot of fun.

I learnt early on that an all-purpose response, serving to answer both “How are ya?” and “Are ya ready?” is “I’m good”. However, I was caught off-guard when a young waitress (quite presentable eye-candy) asked me whether I was “perfect”. It took a second or two realise she didn’t find me kind of cute, but was asking whether the food had hit the spot.

So beware, some words are not what they seem in the U.S of A. I have just given you the skinny. Am I saying that we should make our language more “common”? That’s a no-brainer. As we used to say on both sides of the Atlantic before that unfortunate face-off with the French over Iraq, “Vive la Difference”!

Chris Lawn

## SAFE ELECTRICITY

***Ken Palmer's article is a feature built around a book, rather than a straight review of it. The book was privately-published by N.C. Friswell this year. It is a paperback with 161 A5 pages and costs £16.50. The initial print run was only 100 and, despite having an ISBN number, may be difficult to obtain. The Newsletter editor has contact details for the author if needed.***

Whether we are in the factory, laboratory, office, home, or indeed anywhere else we expect electrical power to be available safely. Operating a switch is so routine, and we take the result for granted. We do not expect machines or equipment to overheat and ignite, nor do we expect the wiring system in the building to fail dangerously. We do not customarily refrain from touching an electrical appliance in case we receive an electric shock. Indeed any electrical failure is so rare that a proportion of the population has difficulty in replacing a fuse, or wiring a plug. Absence of electricity, due to public supply failure, causes irritation and not severe personal hazard. Overall, we are well looked after.

For our safety we can thank a relatively small number of electrical engineers, who over the decades have laboured largely behind the scenes. Principal amongst these have been HM Electrical Inspectors of Factories. At last they have received some public recognition in a book that celebrates their centenary [1], written by a retired Inspector with personal knowledge of the inside story. The Author points out that Inspectors are specialists who need a wide range of personal and technical skills; the book is their story. The Preface states that "legislation often sits uneasily with technical matters and can be reflected in a mutual lack of understanding by the respective practitioners. However in an increasingly technical world the two sides are often thrown together". Very true, and not just in electrical engineering. To put the achievements of the Inspectors, and others, in perspective the story needs to be told from the beginning, more widely than in the book.

Back to M Faraday. In 1831 he demonstrated a laboratory-scale dynamo, in which an electric current was generated by rotating a circuit in a magnetic field. Over the following decades development proceeded. Faraday was technical consultant to Trinity House, who controlled the lighthouses around the coasts of England and Wales, but not Scotland. They were interested in applying electricity as a source of light, at least to those lighthouses based on land. Power would be supplied by steam engines to generate electricity, and light produced by carbon arcs. Trials were carried out, and by 1860 systems were installed at two sites in Kent: South Foreland and Dungeness, overseen by Faraday. Maintaining reliable arcs was difficult, and no further installations were made. The production of the Edison & Swan filament lamp in about 1880 was the next leap forward, because it made domestic, commercial, and public street. lighting possible.

The first public street lighting in England was not in a large industrial city, but in the leafy town of Godalming in Surrey, in 1881. Other towns and cities soon followed, and the electricity generating stations were usually municipally owned. In parallel, electrical power was introduced for municipal public transport, especially tramcars. Early examples were at Blackpool, Brighton (Volk's electric tram), and Leeds (Roundhay) with the novelty here of pick-up from an overhead wire. By 1897 there were hundreds of generating stations in Britain, operating at various voltages, ac and dc, as well as transformer stations. Deaths due to electric shock were being reported. In 1897 a committee of the Factory

Inspectorate, in the Home Office, promulgated recommendations for electricity utilisation. The main causes of death from electric shock were known by then; arresting of breathing, or stopping of the heart. Non-fatal shocks could also be dangerous if they caused a person to fall, perhaps off a ladder, and be injured. The recommendations were simple and included the earthing of metalwork, protection of conductors by insulation or placing out of reach, insulating floors, rubber gloves, repair of live equipment limited to urgent necessity, and all work to be done under the supervision of a competent manager etc. Otherwise the current should be switched off, and the switch locked. A further, vital, recommendation was that a specially qualified person should be retained to advise the Chief Inspector of Factories on matters requiring technical knowledge of electricity. The recommendations attracted little comment or action.

For there was a snag. In 1897 electricity generating works were not subject to the Factories Act; factories were broadly defined as premises in which articles were manufactured, altered or repaired. At that date nobody was quite certain what electricity was and there was general agreement that a court of law would not consider it to be an article. It was the year in which J J Thomson discovered the electron, which he envisaged as a corpuscle with unit negative charge. An electric current was therefore a stream of corpuscles flowing from the negative to the positive terminal; within another 30 years the electron was found also to behave as a wave. Logic demanded that electricity was not an article. The solution lay in a new Factory Act of 1901, which specifically included electricity generating stations and all factory premises in which electricity was used.

To fill the gap in expertise the first Electrical Inspector was appointed by the Home Office in 1902; he was Gilbert Scott Ram. He toured the country inspecting factories and generating stations, attending inquests, and noted the great activity in the growing industry. Appended to his report for 1904 were six draft regulations which had existed for many years without controversy under the Board of Trade, who regulated electricity generation. Like the previous recommendations they covered obvious topics such as insulation, switching, enclosure, earthing and fuses. There was an immediate outcry from 185 different bodies, voicing objections to Scott Ram's draft regulations.

Why? Because the Board of Trade had never enforced their regulations. They had no appropriate manpower, whereas the Home Office had numerous Factory Inspectors available for enforcement. A public Inquiry was required by law to consider the objections. Then, as now, an eminent lawyer was normally chosen as commissioner to hold such an Inquiry. Lawyers are trained to assess both sides of an argument, but often with no inherent knowledge of the subject matter in between. So the Home Office did not appoint a lawyer as commissioner but James Swinburne; he was a past president of the Institution of Electrical Engineers and a Fellow of the Royal Society. Swinburne ran the Inquiry with both thoroughness and speed, and Scott Ram defended his draft with tenacity and skill against an army of Counsel. The book describes the battle in detail. The final outcome was the 1908 Electricity Regulations which were really far ahead of their time; they endured for 81 years in spite of all the technological change in the interval. (Maybe more Inquiries should be chaired by experts in the subject not in law!).

The Regulations laid down general safety requirements which were to be met "as far as reasonably practicable", and then detailing specific requirements subsequently. This approach was unique until it re-appeared in the 1974 Health & Safety at Work etc Act. People were separated into two categories under the Regulations: the general mass of workers for whom danger from electrical systems must be prevented, and the small select band with the technical knowledge or experience which made them capable of avoiding danger (up to a maximum of 650 volts) - but they had to be accompanied. Above 650 volts live working was forbidden. The thinking behind this was that it is reasonable to train a

man so that he knows what not to touch, but unreasonable to attempt to train him to avoid going too close.

After a few years World War I broke out, and there was a sudden increase in the use of electricity for manufacture of steel, chemicals, and for welding. Women and disabled men became involved; it became clear that an elementary knowledge of physics and chemistry was desirable. Training was put in place. The result was that there were remarkably few electrical accidents during the War.

Between the two World Wars the use of electricity continued to rise. The number of Inspectors was increased to 5, allotted on a geographical basis. By this time there were over 600 electricity supply undertakings, and 70,000 works where electricity was used for driving machinery and other purposes. The Inspectors had an uphill task, often the only action that had been taken by the occupiers was to fix a copy of the Regulations to the factory wall (a legal obligation). In 1928 there were more than 100,000 works involved, and the National Grid was being installed to concentrate the generation of electricity to a limited number of stations and to interconnect these by high voltage transmission lines. In response to the increased work load the number of electrical Inspectors was increased to 12. Scott Ram retired in 1930.

In parallel, there were several important developments in the safety of electrical equipment. Some which sparked in normal use, such as switchgear and motors, caused a potential hazard in a flammable atmosphere. Specially designed flameproof equipment was available against methane for use in coal mines, and the Inspectorate encouraged its modification for use in surface industries. Flammable gases and vapours were classified into Groups, which enabled the equipment to be certified according to Group rather than individual substances. Portable electrical tools had been causing casualties on building sites. There were discussions with a manufacturer that these should be at 110 volts, not 230; as a transformer would be required it was centre-tapped to earth so that the maximum shock would be at 55 volts: a considerable advance in safety.

In World War 2 a range of new duties was imposed on the Inspectors. Air raid shelters were often damp and the risk of electric shock from mains lighting could be appreciable (four ten-watt lamps were specified for every 50 people in the shelter), the mains were transformed down to 100 volts and centre-tapped to 50 volts. Lighting for shipyards, vulnerable to air raids, was controlled to three levels: "safety" lighting which could be left on during a raid, "movement" lighting enabling workers to move around, and "working" lighting for production. There were some serious fires in aeroplane engine testing plants, due to the proximity of flammable fuel and electrical gear. It was all right when there was a propeller attached to the engine as there was plenty of ventilation and the test cell was cut off from the control room because of the noise; but not otherwise. Regulations were put in place which continued after the War.

Post-War, in the 1950s, electricity generation and plants installed were increasing at 10% per annum, or doubling every 7 years. The workload of the Inspectors increased proportionately, but their number did not. The necessary expertise widened with the introduction of electronic control systems, which required enhanced automatic self-checking. Another major development was double- and all-insulated portable tools and equipment. Absence of an earth wire was barred under the 1908 Regulations. A special Exemption Order was issued in 1969 allowing portable tools kite-marked by the British Standards Institution to be used legally without an earth wire. The method is now commonplace, particularly with electronic equipment and tools, in the laboratory and the home. But if the item is repaired the insulation can be overstressed, which could lead to premature failure.

The next major administrative step was the Health & Safety at Work etc Act 1974, which brought the Inspectorate under the Health & Safety Executive. Non-factory premises were brought under the Act: colleges, schools, hospitals etc. Most had been following good practice anyway, but now legal requirements were put in place. As a result of the changes more Inspectors were recruited - to a peak of about 30 - and the Electricity Regulations 1908 needed updating. The result was the Electricity at Work Regulations 1989, which both in form and in content leaned heavily on the far-sighted 1908 legislation.

Which brings us up to the present. The author states that the duties of the Electrical Inspectors have changed in recent years but they are still demanding, and involve high levels of professional expertise. He comments that the result is a very rewarding job, but job satisfaction does not pay the bills. Inspectors have always been thin cats, rather than fat ones. Short biographies of many Inspectors are at the end of the book, and some of the names will call up memories for those who have worked in industry, or attended safety conferences. But all of us should salute the Electrical Inspectors, who have operated behind the scenes for our general benefit, for a hundred years.

### **Reference**

1. Friswell, N.C. Safe Sparks. Published by the Author, 2003. ISBN 0-9538592-2-3.

**Ken Palmer**

## **BOOK REVIEW**

**Hydrocarbon Process Safety by J C Jones  
Whittles Publishing, 2003  
ISBN 11-870325-54-0**

Hydrocarbon Process Safety is aimed at providing a text for MSc students or professionals. The book covers a very wide number of topics and, given the size of the book, this means that these can only be briefly introduced. For the professional, while the

text doesn't provide a detailed analysis of a particular hazard, it may be useful as a starting point on an unfamiliar topic.

An initial leaf through the book to get an impression of the style and content led me to an example of an accidental release of carbon tetrachloride and the question "How many fatalities from phosgene poisoning?" I was a bit alarmed that this might be typical but it was an example of the use of Probit equations.

The general layout is attractive with examples clearly shown, building from basic flammability issues to more generic analyses such as Hazop. The worked examples are a useful way of illustrating the different concepts and showing how to address problems. However, it would be difficult to really take on a task based on this text alone.

On flammability the author's research interest in flashpoints leads to a clear bias with little detail on flammability relationships or other areas such as autoignition except where they bear upon flashpoint determination.

The brief descriptions of each topic are somewhat unsatisfactory, and I would have preferred to drop some material in order to expand on the process safety topics. For example, accurate measurement of temperature and pressure is important but perhaps unnecessary in this text.

I believe that the section on Hazop while giving a kind of generic overview, didn't give a true impression of the detailed analysis involved in carrying out a process Hazop.

In summary, this text would be very useful in preparation for an examination on Process Safety where a brief sketch of each topic is useful. For the professional, a much more in-depth coverage is needed to ensure that all aspects of a safety case are properly analysed. Perhaps this text would serve as a starting point, perhaps on a less familiar topic.

**Dr I A B Reid (BP Chemicals)**

## **COMBUSTION CALENDAR**

***There are a number of useful websites which give information about forthcoming meetings. It seems a good idea to list some here. If members know others, please let me know and I shall add them to this list:-***

**<http://www.combustioninstitute.org>  
<http://www.combustion-net.com/calendar/calendar-current.htm>  
<http://www.afm.asso.fr>**

## 2003

### DECEMBER 2003

#### 8-9 DECEMBER

Melbourne, Victoria, Australia. 2003 AUSTRALIAN SYMPOSIUM ON COMBUSTION. A meeting co-organised by the Australian and New Zealand Sections of the Combustion Institute and the Australian Flame Research Committee of the IFRF. Details: Damon Honnery, Tel: +61 3 9905 1988, Fax: +61 3 9905 1825, E-mail: [damon.honnery@eng.monash.edu.au](mailto:damon.honnery@eng.monash.edu.au), Web: <http://ltrac.eng.monash.edu.au/CISYM-2003/>

#### 11-12 DECEMBER

Naples, Italy. ENGINES OF SUSTAINABLE DEVELOPMENT. Details: Claudio Bertoli, Tel: +39 081 717 7104, Fax: +39 081 239 6097, E-mail: [esd2003@im.cnr.it](mailto:esd2003@im.cnr.it), Web: <http://www.im.cnr.it/ESD2003>

#### 16 DECEMBER

Bath, England. ENGINES AND POWERTRAINS. A meeting of UnICEG. Details: Colin Garner, UnICEG Secretary, Mechanical and Manufacturing Engineering, Loughborough University, Loughborough LE11 3TU, England. Tel: 01509 227527, Fax: 01509 227502, E-mail: [C.P.Garner@Lboro.ac.uk](mailto:C.P.Garner@Lboro.ac.uk)

## 2004

### JANUARY 2004

#### 2-4 JANUARY

Dhaka, Bangladesh. 2<sup>ND</sup> BSME - ASME INTERNATIONAL CONFERENCE ON THERMAL ENGINEERING. Details: A K M Sadrul Islam, Tel: +880 2 861 3046, E-mail: [sadrul@me.buet.ac.bd](mailto:sadrul@me.buet.ac.bd), web: [http://bsme.wtcsites.com/2nd\\_ictc.htm](http://bsme.wtcsites.com/2nd_ictc.htm)

#### 12-16 JANUARY

Leeds, England. ULTRA LOW NO<sub>x</sub> GAS TURBINE COMBUSTION, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: [cpd.speme@leeds.ac.uk](mailto:cpd.speme@leeds.ac.uk), web: [www.leeds.ac.uk/fuel/shortc/sc.htm](http://www.leeds.ac.uk/fuel/shortc/sc.htm)

#### 15 JANUARY

Loughborough, England. ADVANCED ENERGY MANAGEMENT – RENEWABLES. A one-day course organised by the Energy Institute. Details: The Education and Training Office, Energy Institute, 61 New Cavendish Street, London W1G 7AR England. Tel: 020 7467 7100, Fax: 020 7255 1472, E-mail: [ndlm@energyinst.org.uk](mailto:ndlm@energyinst.org.uk)

#### 19-23 JANUARY

Leeds, England. FIRE DYNAMICS AND MODELLING, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: [cpd.speme@leeds.ac.uk](mailto:cpd.speme@leeds.ac.uk), Web: [www.leeds.ac.uk/fuel/shortc/sc.htm](http://www.leeds.ac.uk/fuel/shortc/sc.htm)

## FEBRUARY 2004

### 8-11 FEBRUARY

Phoenix, Arizona, USA. NATURAL GAS TECHNOLOGIES II-INGENUITY & INNOVATION. Details: Tel: +1 847 768 0783, Fax: +1 847 768 0842, E-mail: education@gastechnology.org, Web: www.gastechnology.org

### 17-19 FEBRUARY

Broadbeach Island, Queensland, Australia. 2004 IEA ASIA PACIFIC CONFERENCE ON ZERO EMISSIONS TECHNOLOGIES. Details: Tel: +61 2 9241 2955, Fax: +61 2 9241 5354, E-mail: meetings@tmm.com.au, Web: www.tmm.com.au

## MARCH 2004

### 15-19 MARCH (new dates)

Leeds, England. COMBUSTION IN BOILERS AND FURNACES. A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: cpd.speme@leeds.ac.uk, web: www.leeds.ac.uk/fuel/shortc/sc.htm

### 22-25 MARCH

Edinburgh, Scotland. FIRE SCIENCE AND FIRE INVESTIGATION. A short course. Details: Dougal Drysdale, School of Engineering and Electronics, Institute for Infrastructure and Environment, University of Edinburgh, Crew Building, The King's Building, Edinburgh EH9 3JL. Tel: 0131 650 5724, Fax: 0131 650 5736, E-mail: d.drysdale@ed.ac.uk

### 22-26 MARCH

Pokolbin, Hunter Valley, New South Wales, Australia. 2004 POWER STATION CHEMISTRY CONFERENCE. Details: Tel: +61 2 9241 2955, Fax: +61 2 9241 5354, E-mail: meetings@tmm.com.au, Web: www.tmm.com.au

### 22-26 MARCH

Leeds, England. FIRE SAFETY DESIGN, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: cpd.speme@leeds.ac.uk, Web: www.leeds.ac.uk/fuel/shortc/sc.htm

### 22-26 ? MARCH

Montreal, Canada. NATIONAL MEETING OF THE AMERICAN PHYSICAL SOCIETY. Details: American Physical Society, Meetings Department, One Physics Ellipse, College Park, MD 20740, USA. Tel: +1 301 209 3280, Fax: +1 301 209 0867, Web: <http://www.aps.org>

### 28 MARCH-1 APRIL

Anaheim, California, USA. 227<sup>th</sup> NATIONAL MEETING OF THE AMERICAN CHEMICAL SOCIETY. Details: Meetings Department, American Chemical Society, 1155 - 16th Street, NW, Washington, DC 20036, USA. Tel: +1 202 872 4396, Fax: +1 202 872 6128, E-mail: natlmtgs@acs.org

This meeting includes a Fuel Division Symposium on MOLECULAR MODELING AND REACTION CHEMISTRY.

Details: <tim.barckholtz@exxonmobil.com> or <hwang@me.udel.edu>

### **29-31 MARCH**

Edinburgh, Scotland. FIRE DYNAMICS AND FIRE SAFETY ENGINEERING DESIGN. A short course. Details: Dougal Drysdale, School of Engineering and Electronics, Institute for Infrastructure and Environment, University of Edinburgh, Crew Building, The King's Building, Edinburgh EH9 3JL. Tel: 0131 650 5724, Fax: 0131 650 5736, E-mail: d.drysdale@ed.ac.uk

## **APRIL 2004**

### **1-4 APRIL**

Lons le Saunier, France. BOIS ENERGIE 2004 (WOOD ENERGY 2004). Details: Alain PIERRE, Tel: +33 3 84 47 81 00, Fax: +33 3 84 47 81 19, E-mail: info@itebe-expo.com, Web: <http://www.itebe-expo.com>

### **13-16 APRIL**

Estoril, Portugal. 3<sup>RD</sup> EUROPEAN CONGRESS ON ECONOMICS AND MANAGEMENT OF ENERGY IN INDUSTRY. Details: Albino Reis, Tel: +351 2 29 73 46 24, Fax: +351 2 29 73 07 46, E-mail: albino.reis@mail.telepac.pt

### **18-22 APRIL**

Clearwater, Florida, USA. The Clearwater Conference: 29TH INTERNATIONAL TECHNICAL CONFERENCE ON COAL UTILIZATION AND FUEL SYSTEMS. Details: Barbara Sakkestad, Tel: +1 301 294 6080, Fax: +1 301 294 7480, E-mail: barbarasak@aol.com, Web: [www.coaltechnologies.com](http://www.coaltechnologies.com)

### **19 APRIL**

Thornton, Cheshire, England. SUSTAINABLE COMBUSTION. The Spring Meeting of The Combustion Institute (British Section) co-sponsored by the Royal Society of Chemistry Energy Sector. Details: Chris Morley, Tel: 01244 336298, E-mail: <c.morley@gaseq.co.uk> or Martin Brown, Tel: 01509 282468, E-mail: <martin.brown@advantica.biz> or The Hon Secretary of the British Section. See also this *Newsletter*.

### **19-23 APRIL**

Leeds, England. DIESEL PARTICULATES AND NO<sub>x</sub> EMISSIONS, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: cpd.speme@leeds.ac.uk, Web: [www.leeds.ac.uk/fuel/shortc/sc.htm](http://www.leeds.ac.uk/fuel/shortc/sc.htm)

### **19-24 APRIL**

Kirkenes, Norway (a six-day cruise on a Norwegian ship between Kirkenes and Bergen). ICHMT SYMPOSIUM: CHT-04 ADVANCES IN COMPUTATIONAL HEAT TRANSFER. Details: Graham de Vahl Davis or Eddie Leonardi, CFD Research Laboratory, School of Mech. & Manuf. Engineering, The University of NSW, Sydney, NSW, Australia 2052. Tel: +61 2 9385 4099 / 4254, Fax: +61 2 9663 1222, E-mail: cht04@cfm.mech.unsw.edu.au Web: <http://www.hurtigruten.com/uk/produkt.html> or <http://cht04.mech.unsw.edu.au/>

### **25-29 APRIL**

Tomar, Portugal. LEAN COMBUSTION TECHNOLOGY II: PROMISE AND PRACTICE: An Engineering Conferences International (ECI) meeting. Details: Chris Sheppard,

Department of Mechanical Engineering, The University of Leeds, Leeds LS2 9JT, England. Tel: 0113 343 2140, Fax: 0113 343 4611, E-mail: c.g.w.sheppard@leeds.ac.uk, or Derek Dunn-Rankin, Tel: +1 949 824 8745, Fax: +1 949 824 8585, E-mail: ddunnran@uci.edu, or Robert Cheng, Tel: +1 510 486 5438, Fax: +1 510 486 7303, E-mail: rkcheng@lbl.gov, Web: www.engconfintl.org/4albody.html

### **26-28 APRIL**

Leeds, England. INDUSTRIAL AIR POLLUTION MONITORING. (plus EMISSIONS MONITORING EXHIBITION on 27 April) , A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: cpd.speme@leeds.ac.uk, web: www.leeds.ac.uk/fuel/shortc/sc.htm

## **MAY 2004**

### **9-21 MAY**

Sedona, Arizona, USA. INTERNATIONAL CONFERENCE ON NUMERICAL COMBUSTION. Details: Kirsten Wilden, Tel: +1 215 382 9800, Fax: +1 215 386 7999, E-mail: meetings@siam.org, Web: <http://www.siam.org/meetings/nc04/>

### **10-14 MAY**

Rome, Italy. 2<sup>ND</sup> WORLD CONFERENCE AND TECHNOLOGY EXHIBITION ON BIOMASS FOR ENERGY AND INDUSTRY. Details: ETA – Florence, Tel: +39 055 5002174, Fax: +39 055 573425, E-mail: biomass.conf@etaflorence.it, Web: [http://www.conference-biomass.com/contacts\\_en.htm](http://www.conference-biomass.com/contacts_en.htm)

### **10-14 MAY**

Leeds, England. FIRE FLAMMABILITY & EXPLOSIONS/GAS & DUST EXPLOSION PROTECTION DESIGN, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: cpd.speme@leeds.ac.uk, web: www.leeds.ac.uk/fuel/shortc/sc.htm

### **31 MAY-3 JUNE**

Yokohama, Japan. INTERNATIONAL CONFERENCE ON MULTIPHASE FLOW. Details: Yoichiro Matsumoto, E-mail: icmf@jsmf.gr.jp, Web: [www.jsmf.gr.jp/icmf](http://www.jsmf.gr.jp/icmf)

### **31 MAY-6 JUNE**

Beirut, Lebanon. INTERNATIONAL CONFERENCE ON THERMAL ENGINEERING THEORY AND APPLICATIONS. Details: Z Saghir, Tel: +1 416 979 5000 ext 6418, Fax: +1 416 979 5265, E-mail: ictea@ryerson.ca, Web: [www.ryerson.ca/~ictea/co.html](http://www.ryerson.ca/~ictea/co.html)

## **JUNE 2004**

### **1-4 JUNE**

London, Ontario, Canada. CANADIAN SOCIETY OF MECHANICAL ENGINEERING FORUM 2004, including Symposia on COMPUTATIONAL FLUID DYNAMICS, ADVANCED VEHICLE SYSTEMS and THERMO-FLUIDS ENGINEERING. Details: Brian E Thompson - CSME Forum 2004, Department of Mechanical and Materials Engineering, Faculty of Engineering, The University of Western Ontario London, Ontario, Canada N6A 5B9, Fax: +1 519 661 3020, E-mail: edis@eng.uwo.ca, Web: <http://www.csme.ca/conferences.asp>

### **1-5 JUNE**

Jönköping, Sweden. WORLD BIOENERGY 2004. Details: Karin Haara, Tel: +46 8 441 70 80, E-mail: karin.haara@svebio.se, Web: www.elmia.se/worldbioenergy/

### **6-10 JUNE**

Bäckaskog Castle, Kristianstad, Sweden. INTERNATIONAL SYMPOSIUM ON CHEMICAL PROBLEMS CONNECTED WITH THE STABILITY OF EXPLOSIVES. The 13th Jan Hansson Stability Symposium, 2004. Organised by The Swedish Section for Detonics and Combustion affiliated with The Combustion Institute, together with The Swedish Competence Centre for Energetic Materials, KCEM. Details: Stig Johansson, E-mail: srj@telia.com.

### **21-25 JUNE**

Leeds, England. ENGINE EMISSIONS MEASUREMENT, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: cpd.speme@leeds.ac.uk, Web: www.leeds.ac.uk/fuel/shortc/sc.htm

### **29 JUNE-2 JULY**

Leeds, England. FIRE SAFETY MANAGEMENT AND RISK ASSESSMENT, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: cpd.speme@leeds.ac.uk, Web: www.leeds.ac.uk/fuel/shortc/sc.htm

## **JULY 2004**

### **6-9 JULY**(new dates)

Leeds, England. EXPLOSION PREDICTION AND MITIGATION, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: cpd.speme@leeds.ac.uk, Web: www.leeds.ac.uk/fuel/shortc/sc.htm

### **11-15 JULY**

Charlotte, North Carolina, USA. 2004 ASME HEAT TRANSFER/FLUIDS ENGINEERING SUMMER CONFERENCE. Details: Yildiz Bayazitoglu, Tel: +1 713 348 6291 ext 3136, Fax: ++1 713 348 5422, E-mail: bayaz@rice.edu, *or* Sankaraiy Gopalakrishnan, Tel: +1 323 584 1815, Fax: +1 323 586 4192, E-mail: sgopalakrishnan@flowserve.com, Web: www.asmeconferences.org/htfed04/

### **18-30 JULY**

Cesme, Izmir, Turkey. NATO Advanced Study Institute (ASI) on MICROSCALE HEAT TRANSFER WITH APPLICATIONS IN BIOLOGICAL AND MICROELECTRO-MECHANICAL SYSTEMS. Details: Web: <http://www.ichmt.org/NATO-ASI04>

### **25-30 JULY**

Chicago, Illinois, USA. THIRTIETH INTERNATIONAL SYMPOSIUM ON COMBUSTION. Details: Sue S Terpack, The Combustion Institute, 5001 Baum Boulevard, Suite 635, Pittsburgh, PA 15213-1851, USA Tel: +1 412 687 1366, Fax: +1 412 687 0340, E-mail: 30thsym@combustioninstitute.org

*Instructions on submission of papers see: <http://combustioninstitute.org/30sym.html>  
Instructions on submission of wipps see: <http://combustioninstitute.org/30thwipp.html>  
For additional information on location etc see: [www.engr.uic.edu/combustion2004](http://www.engr.uic.edu/combustion2004)  
See also this Newsletter.*

## SEPTEMBER 2004

### 5-9 SEPTEMBER

Vancouver, BC, Canada. 7<sup>TH</sup> INTERNATIONAL CONFERENCE ON GREENHOUSE GAS CONTROL TECHNOLOGIES. Details: Ted Morris, Suite 150, 10 Research Drive, Regina, SK, S4S 7J7, Canada, Tel: +1 306 337 2290, Fax: +1 306 337 2301, E-mail: [secretariat@ghgt7.ca](mailto:secretariat@ghgt7.ca), Web: [www.ghgt7.ca](http://www.ghgt7.ca)

### 5-10 SEPTEMBER

Sydney, New South Wales, Australia. 19<sup>TH</sup> WORLD ENERGY CONGRESS. Details: 19th World Energy Congress Managers, Tel: +61 2 9248 0800, Fax: +61 2 9248 0894, Web: [energy2004@tourhosts.com.au](mailto:energy2004@tourhosts.com.au)

### 13-17 SEPTEMBER

Leeds, England. FIRE AND EXPLOSION – PROTECTION AND INVESTIGATION, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: [cpd.speme@leeds.ac.uk](mailto:cpd.speme@leeds.ac.uk), web: [www.leeds.ac.uk/fuel/shortc/sc.htm](http://www.leeds.ac.uk/fuel/shortc/sc.htm)

### 20 SEPTEMBER (?)

Cambridge, England. Possible AUTUMN MEETING of THE COMBUSTION INSTITUTE (BRITISH SECTION) and AGM - PARTICULATES IN COMBUSTION. Details: Yajue Wu <[y.wu@sheffield.ac.uk](mailto:y.wu@sheffield.ac.uk)>

### 20-21 SEPTEMBER

Leeds, England. INCINERATION OF MUNICIPAL WASTE, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: [cpd.speme@leeds.ac.uk](mailto:cpd.speme@leeds.ac.uk), web: [www.leeds.ac.uk/fuel/shortc/sc.htm](http://www.leeds.ac.uk/fuel/shortc/sc.htm)

### 16-18 NOVEMBER

Leeds, England. FLAME RETARDANCY AND FLAMMABILITY OF POLYMERS AND TEXTILES, A short course. Details: Alison Whiteley, CPD Unit, School of Process, Environmental and Materials Engineering, (SPEME), University of Leeds, LEEDS, LS2 9JT, England. Tel: 0113 343 2494, Fax: 0113 343 2511, E-mail: [cpd.speme@leeds.ac.uk](mailto:cpd.speme@leeds.ac.uk), web: [www.leeds.ac.uk/fuel/shortc/sc.htm](http://www.leeds.ac.uk/fuel/shortc/sc.htm)

## 2005

### MARCH 2005

### 29 MARCH-1 APRIL

Lisbon, Portugal. 7<sup>TH</sup> EUROPEAN CONFERENCE ON INDUSTRIAL FURNACES AND BOILERS. Details: Albino Reis, Tel: +351 2 29 73 46 24, Fax: +351 2 29 73 07 46, E-mail: [conference@infub.pt](mailto:conference@infub.pt), Web: [www.infub.pt](http://www.infub.pt)

## **JULY 2005**

### **10-14 JULY**

Glasgow, Scotland. 7<sup>TH</sup> WORLD CONGRESS OF CHEMICAL ENGINEERING. Organised by the Institution of Chemical Engineers for the European Federation of Chemical Engineering. Details: Concorde Services Ltd., 4b, 50 Speirs Wharf, Port Dundas, Glasgow G4 9TB, Scotland. Tel: 0141 331 0123, Fax: 0141 331 0234, E-mail: [info@chemengcongress2005.com](mailto:info@chemengcongress2005.com)

## **SEPTEMBER 2005**

### **18-23 SEPTEMBER**

Beijing, China. THE EIGHTH INTERNATIONAL SYMPOSIUM ON FIRE SAFETY SCIENCE. Organised by the International Association for Fire Safety Science with the China Fire Protection Association, The University of Science and Technology of China and Tsinghua University. Details: web: [www.iafss.org](http://www.iafss.org), or Carol Franks, Interscience Communications, West Yard House, Guildford Grove, Greenwich, London SE10 8JT. Tel: 020 8692 5050, Fax: 020 8692 5155, E-mail: [intercomm@dial.pipex.com](mailto:intercomm@dial.pipex.com)

### **26-29 SEPTEMBER**

Washington, DC, USA. AIR QUALITY V CONFERENCE. Details: Deb J Haley, Tel: +1 701 777 3120, Fax: +1 701 777 5181, E-mail: [dhaley@undeerc.org](mailto:dhaley@undeerc.org), Web: [www.undeerc.org](http://www.undeerc.org)