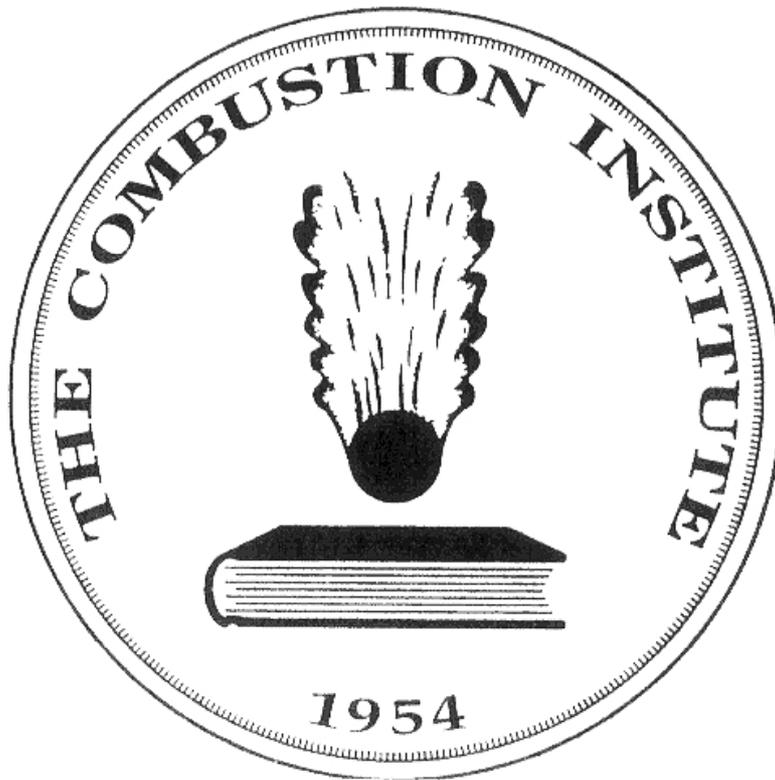


# **THE COMBUSTION INSTITUTE**

## **(British Section)**



# **NEWSLETTER**

**VOLUME 2012-1**

**Spring 2012**

**EDITOR: Dr G. Rein**

**E-mail: G. Rein@imperial.ac.uk**

**Digital version of this and past *Newsletters* at:- <http://www.combustion.org.uk>**

## CONTENTS

• Committee of the British Section	3
• Editorial	3
• Combustion People	4
• 34 <sup>th</sup> International Combustion Symposium	5
• Publications by members 2011	5
• Section Awards	5
• Records of the British Section	5
• Have we lost the plot?	7
• Publishing Science, Profits and the Public Interest	11
• The Flame Challenge – UK finalist	12
• Faraday's Famous Lectures	13
• Combustion Links and Calendar	13

### THE BRITISH SECTION OF THE COMBUSTION INSTITUTE

For a modest fee there are many benefits:-

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

Please encourage associates to join the Section, especially research students recruited at the start of this academic year

Details from the Hon. Secretary, Professor Simone Hochgreb.

E-mail: [sh372@cam.ac.uk](mailto:sh372@cam.ac.uk)

or download application forms from

<http://www.combustion.org.uk/membership.html>

## COMMITTEE OF THE BRITISH SECTION: 2011-12

**Chairman:** Professor W. P. Jones  
Department of Mechanical Engineering  
Imperial College London  
South Kensington Campus  
London, SW7 2AZ  
Tel: 020 7594 7037

<w.jones@imperial.ac.uk>

**Secretary:** Professor S. Hochgreb  
Department of Engineering  
University of Cambridge  
Trumpington St  
Cambridge, CB2 1PZ  
Tel: 01223 764098

<sh372@cam.ac.uk>

**Membership Secretary** Dr K.J. Hughes  
SPEME  
Energy Building  
University of Leeds  
Leeds, LS2 9JT  
Tel: 0113 343 2503  
Fax: 0113 246 7310  
<K.J.Hughes@leeds.ac.uk>

**Treasurer:** Dr N. Morgan  
Shell International Petroleum Company Ltd  
Shell Technology Centre  
Thornton, P O Box 1  
Chester CH1 3SH  
Tel: 0151 373 5639  
Fax: 0151 373 5052  
<N.Morgan@shell.com>

### Committee

Professor P. Gray, FRS  
Gonville and Caius College  
University of Cambridge  
Cambridge, CB2 1TA  
<pg263@cam.ac.uk>

Professor A. J. Griffiths  
Cardiff School of Engineering  
Queen's buildings  
Newport Road, PO Box 925  
Cardiff, CF24 OYF  
<griffithsaj2@cf.ac.uk>

Professor Y. Hardalupas  
Department of Mechanical Engineering  
Imperial College London  
South Kensington Campus  
London, SW7 2AZ,  
<y.hardalupas@imperial.ac.uk>

Professor A. N. Hayhurst  
Chemical Engineering Department  
University of Cambridge  
Pembroke Street  
Cambridge, CB2 3RA  
<anh1000@hermes.cam.ac.uk>

Mr. B. Jones  
Kausis Consultancy  
7 Lodge Drive  
Belper  
Derbyshire  
DE56 2TP  
<bj224@cam.ac.uk>

Professor M. Kraft  
Department of Chemical Engineering  
and Biotechnology  
University of Cambridge  
Pembroke Street  
Cambridge, CB2 3RA  
<mk306@cam.ac.uk]>

Professor R. P. Lindstedt  
Department of Mechanical Engineering  
Imperial College London  
South Kensington Campus  
London, SW7 2AZ  
<p.lindstedt@imperial.ac.uk>

Professor R. Stone  
Department of Engineering Science,  
University of Oxford  
Parks Road,  
Oxford, OX1 3PJ  
<richard.stone@eng.ox.ac.uk>

Professor E. Mastorakos  
Department of Engineering  
University of Cambridge  
Trumpington Street  
Cambridge, CB2 1PZ  
<em257@eng.cam.ac.uk>

Dr G. Rein  
School of Engineering  
King's Buildings  
University of Edinburgh  
Edinburgh, EH9 3JN  
<G.Rein@imperial.ac.uk>

### EDITORIAL

As is shown on the cover, I have finally responded to my own increasing unease that it is time for the Editorship of this Newsletter to be taken up by a member of the Section who is younger, more vibrant and certainly better informed on current combustion affairs than me. Guillermo Rein, who is eminently placed to satisfy these criteria, has accepted an invitation from the Committee to become Editor – notwithstanding also having been recently appointed to a Senior Lectureship in the Department of Mechanical Engineering at Imperial College London.

Guillermo has contributed items to this edition, but he has generously accorded me one final self indulgence to put this edition together. It remains only for me to wish Guillermo well, both as Editor and in his new appointment, and trust that you will find something of interest and enjoyment in this final offering of mine.

**John Griffiths**

## COMBUSTION PEOPLE

### **Allan Hayhurst**

Allan retired as Chairman of the British Section at October 2011, having guided the Section since 2006. The Section has flourished during this period, embracing the highly successful ECM meeting at Cardiff, last year. Very many members will have known Allan for a considerable time before he took the helm of the Section, particularly in his editorial connection with *Combustion and Flame*, first as Associate editor (1994 – 2000) and then as UK / European Editor (2000 – 2004).

A Lancastrian by birth, Allan moved south to Cambridge to read Natural Sciences, after serving his National Service in the RAF. His membership of the Section began in the very early 1960s, as a research student in the Department of Physical Chemistry at Cambridge, no doubt encouraged by Morris Sugden, who was his research supervisor. Allan's research topic was "Ionisation in Flames" and, as is so commonly the case for many of us, his interest in this introduction to combustion has remained – with papers published on it as recently as 2003.

Allan's subsequent research interests cover a wide range of subjects, initially to include the physical chemistry oriented topics of measurements of free radicals and of the diffusion coefficients of species in flames. In fact, long before we knew each other personally, Allan's name became known to me when I was a research student, in the mid 60s, from a Proc. Roy. Soc. paper connected with free radical sampling directly to a mass spectrometer. It must have been one of the earliest contributions to that very difficult experimental field. However, as a result of his next appointment, as a research fellow in Chemical Engineering at Cambridge, Allan made a transition to investigations of pollutant formation from fluidised beds, and to other more engineering-orientated aspects of combustion.

Throughout the 70s Allan held posts on the academic staff in the Department of Chemical Engineering at Sheffield University, but he returned to Chemical Engineering at Cambridge, at the end of that decade, ultimately to have the title of Professor of Combustion Science conferred. In this later period, Allan's research activities diversified further to include: combustion, pyrolysis and gasification of coal, biomass, carbons and wastes; production of inorganic nanoparticles in flames; cool flames, oscillatory combustion and explosions; magnetic resonance imaging of fluidized beds; capture and sequestration of CO<sub>2</sub> by calcium compounds; and chemical looping combustion. Much of this vast scope of research has been undertaken in association with John Dennis, Paul Fennell and Stuart Scott. Allan's contributions to the International Combustion Symposia began with a paper submitted to the 15<sup>th</sup> Symposium, in Tokyo, which is when he and I got to know each other. The subsequent number of Symposium papers runs well into double figures as does his attendance at these prestigious meetings.

Prior to taking office as Section Chair, Allan served on the committee as an ex-officio member in his editorial capacity for *Combustion and Flame*, during which time he was a member of the organising committee (or was sole organiser) of numerous Combustion Institute meetings. These included the highly successful Anglo-German Symposium at Queens' College, Cambridge (1993) and the 28<sup>th</sup> International Combustion Symposium at Edinburgh, in 2000. Allan's very substantial contributions to combustion research and his commitment to The Combustion Institute were justifiably rewarded by the award of the Alfred C Egerton Medal, at the 33<sup>rd</sup> International Combustion Symposium and, as a life member of the Committee, we are delighted that Allan's involvement with the British Section is set to continue.

**John Griffiths**

### ***Hinshelwood Prize winner 2010: Dr Salvador Navarro-Martinez***

Salvador is currently a Lecturer in the Department of Mechanical Engineering at Imperial College London. He obtained his first degree (Ingeniero Industrial) at the University of Zaragoza, Spain and, during these undergraduate studies, he did a research placement in the University Joseph Fourier of Grenoble, France, where he carried out surface tension measurements of non-Newtonian fluids.

In 1998, he moved to the UK, where he began postgraduate research in the Department of Aeronautics and Astronautics in the University of Southampton, on the topic of Numerical Simulation of Hypersonic Flows. After his PhD, he moved to the Department of Mechanical Engineering in Imperial College, where he worked as a Research Assistant on Turbulent Combustion Modelling. His major contributions were the development of sub-grid combustion models for Large Eddy Simulations, specifically the development of the LES-CMC model, based on the Conditional Moment Closure approach, and the stochastic field method, which allowed a straightforward implementation of the LES-PDF methodology.

Both studies were recognised by the award of the Sugden Prize from the British Section for the most significant contribution to combustion research in 2005 and 2007. Since then, the methods developed have been applied to lifted flames, auto-ignition flows, non-premixed and premixed configurations as well as spray

flames. In 2009, Salvador was awarded a Royal Society University Fellowship in the topic of Droplet Size Distributions in Spray Atomization

## **34th INTERNATIONAL SYMPOSIUM ON COMBUSTION AND TRAVEL GRANTS**

Thirty three papers have been accepted for presentation from British Section members at the 34th Symposium. Of this total, 14 papers come solely from the UK. There are five papers with a Corresponding Author from the UK and collaborations with authors in other countries. There are also 12 papers with a Corresponding Author from another country and collaborations with authors in the UK. (*Note that there is a slight discrepancy in this breakdown.*) Acceptance for publication in the proceedings is a separate editorial process.

Grants of £250 will be available to the presenter of an accepted paper at the Symposium. Such an award covers papers accepted for oral presentation, but excludes work-in-progress posters. Applications will only be considered from those who have been members of the British Section in both 2011 and 2012. No more than one award per paper will be made. Awards will be considered on an individual basis by the British Section Committee; the Committee's decision will be final. Contact the Section Secretary, by 22nd June, 2012: [simone.hochgreb@eng.cam.ac.uk](mailto:simone.hochgreb@eng.cam.ac.uk)

### **PUBLICATIONS BY SECTION MEMBERS IN 2011**

To help Guillermo with one of the duties as Newsletter Editor, I will be responsible for collating the members' publications list. Please will you send entries for inclusion to me (as ".doc" if an attachment) at [J.F.Griffiths@leeds.ac.uk](mailto:J.F.Griffiths@leeds.ac.uk). The preferred format is for the first author's surname to lead: the listing is created alphabetically, based on this name.

**John Griffiths**

### **SECTION AWARDS**

#### **Gaydon Prize**

The Committee approved modified rules for the Gaydon Award to reflect the current distinction between papers presented at the International Combustion Symposium and those published in the Proceedings of the International Symposium. The header of the rules will now read:

*"An award shall be made for the full paper, with at least one British Section member as author and published and accepted for oral presentation in the Proceedings of the International Symposium, which makes the most significant contribution to combustion research."*

The full text of the rules is available at <http://www.combustion.org.uk/>

#### **Sugden Award and Hinshelwood Prize**

Please refer also to the website for details of nominations for these Section awards.

### **RECORDS OF THE BRITISH SECTION**

*As a result of his extensive knowledge and experience of British Section affairs, Dave Smith was asked if he might be willing to compile a record of Officers and Committee members and also to document the one-day and related meetings promoted by the Section and other statistics. This is work in progress, but Dave has kindly passed on the information that he has gathered to date. I am reproducing parts of Dave's research below in order to see if members have additional information or can correct any discrepancies. I have added some details also, so errors are more than likely to be of my making.*

**John Griffiths**

#### **Officers of the British Section Committee**

Through the decade from 1954, the records show that Sir Alfred Edgerton (Imperial College) was the first Chairman of the Section, followed, in 1960, by Dr J.W. Linnett (Oxford). The Secretarial role was taken up successively by Dr J.S. Clark (Joseph Lucas), Mr N.P.W. Moore (Imperial College) and Dr W.G. Parker (College of Advanced Technologies, Birmingham). It is not evident who acted as Treasurer, but a number of possibilities include Dr Peter Lloyd (NGTE, Farnborough), Dr Clarke, Mr S.L. Bragg (Rolls Royce) and Professor O.A. Saunders (Imperial College).

The picture becomes clearer from around 1966 and, in addition to the elected Ordinary Members, an ex-officio post was created for the UK / European Editor of Combustion and Flame, or an alternate as Deputy /

Associate Editor. The people who have held these various roles from 1966 are set out below. Dave Smith was also an ex-officio member from 1996 - 2002, in his capacity as a Director of the Combustion Institute. Some of the dates may not be exact, if only because changes of Officers do not normally occur at the end of a calendar year.

It is conspicuous that a number of people have given service to the Section over a considerable number of years, and this applies in particular to the people who have served in an editorial capacity for Combustion and Flame. However, one name that does not show in this connection is that of Dr R.F. Simmons (UMIST), who acted as Deputy Editor from 1972 – 83. Bob may have been an elected member of the Committee, but he did not have an ex-officio post because he served under successive Editors throughout that considerable period. As Dave also reminded me, my perception that Shell Thornton members had always held office as Treasurer was not correct, both Graham Dixon-Lewis and Brian Tyler having played their part. At least the bank account still remains at an Ellesmere Port branch: I do not think that has ever been moved.

	<b>Chair</b>	<b>Secretary</b>	<b>Treasurer</b>	<b>Ex-officio</b>
1964-68	Mr S.L. Bragg	Prof. W. G. Parker	Dr J.S.Clarke / Dr T.M. Sugden	Prof P.G. Ashmore
1969-75	Dr T.M. Sugden	Dr C.F. Cullis	Dr G. Dixon-Lewis	Prof P.G. Ashmore / Prof J.N. Bradley
1976-81	Prof F.J. Weinberg	Prof J. A. Barnard	Dr C.P. Quinn	Prof J.N. Bradley / Prof K.N.C Bray
1982-86	Prof. D.Bradley	Dr D.B. Smith	Dr B.J. Tyler	Prof K.N.C Bray
1987-91	Prof P. Gray	Dr D.B. Smith	Dr B.J. Tyler	Prof D. Bradley
1991-6	Prof K.N.C. Bray	Dr J. Sykes	Dr J. Rosenfeld / Dr C. Morley	Prof D. Bradley
1996-2000	Prof K.N.C. Bray	Prof J.F. Griffiths	Dr C. Morley / Prof G.T. Kalghatgi	Prof D. Bradley
2000-02	Prof C.J. Lawn	Dr A.S. Tomlin	Prof G.T. Kalghatgi	Prof A.N. Hayhurst
2002-05	Prof C.J. Lawn	Dr Y. Wu	Pr. G.T. Kalghatgi / Dr R.Cracknell	Prof A.N. Hayhurst
2006-11	Prof A.N.Hayhurst	Dr Y. Wu / Prof S Hochgreb	Dr R.Cracknell	Prof R.P. Lindstedt
2011/2012	Prof W.J. Jones	Prof S Hochgreb	Dr N.Morgan	Prof R.P. Lindstedt

### ***One-day and other meetings of the British Section***

There is some information about meetings going back to about 1980 but, from 1991, the record is much more complete, as shown below. Many of these meetings have been co-promoted with the Combustion Physics Group of the Institute of Physics or with UKELG. This documentation gives a useful perspective of the range of topics covered, and how combustion activity has shifted over the last 20 years. Perhaps also it may serve to prompt thoughts on new topics that might be addressed or old ones that might be revisited. Please let the Secretary have any observations or comments.

<b>Date</b>	<b>Title of Meeting</b>	<b>Venue</b>
1991 Spring Autumn	The role of volatiles in the combustion and gasification of coal	Cambridge University
1992 Spring Autumn	Formation & Control of Unwanted Products of Combustion Fundamentals of Combustion in Reciprocating Engines	British Gas, London Leeds, Mech Eng
1993 Spring Autumn	Anglo-German Combustion Symposium Auto-ignition in Engines: Cause and Control	Cambridge, Queens' UC, London
1994 Spring Autumn	Acceleration of Confined and Unconfined Flames	Shell Thornton
1995 Spring Autumn	Catalytic Combustion Combustion in Gas Turbines	Cranfield University Rolls Royce, Derby
1996 Spring	<i>Joint Meeting with Portuguese Section</i>	Madeira

	Autumn	Numerical Simulation in Combustion	Leeds University
1997	Spring	Flame Chemistry	Cranfield, Mech Eng
	Autumn	Treatment of Droplets and Particle Motion in Combustion	Queen Mary College London
1998	Spring	Fundamentals of Buoyant Flames	Fire RS, BRE, Watford
	Autumn	Lean Burn Combustion	Cranfield University
1999	Spring	Industrial Combustion Hazards	Leeds University
	Summer	<i>Joint Meeting of the German, French and British Sections</i>	Nancy, France
	Autumn	Combustion Theory	Cambridge University
2000	Spring		
	Summer	<i>28th International Combustion Symposium</i>	Edinburgh
	Autumn	Combustion Modelling and Verification	Leeds University
2001	Spring	Turbulent Flames - Modelling & Measurement	Imperial College London
	Autumn	Incineration of Waste Materials	Cambridge University
2002	Spring	Work-in-Progress Poster Meeting	QMC, London
	Autumn	Autumn Research Meeting	Cranfield University
2003	Spring	Auto-ignition	Oxford University
	Autumn	Young Researchers' Meeting (IOP)	British Gas, L'borough
2004	Spring	Sustainable Combustion	Shell Thornton
	Autumn	Nanoparticles in Flames, Materials Synthesis, Soot Formation & Particles in Engines	Cambridge University
2005	Spring	Fire Research: Current Trends & Future Perspectives	Fire RS, BRE, Watford
	Autumn	Fundamentals and Applications of Dilute Combustion	Cambridge University
2006	Spring	Limits in Combustion Systems	Oxford University E.ON UK, Power Technology
	Autumn	Combustion of Bio-fuels	
	Winter	Combustion technologies for reducing emissions of CO <sub>2</sub> to the atmosphere	Cambridge University
2007	Spring	<i>4th European Combustion meeting</i>	(Crete)
	Autumn	Atomisation and Spray Combustion	Imperial College London
2008	Spring	Transportation Biofuels	Leeds University
	Autumn	IOP meeting?	Cambridge University
2009	Spring	Optical measurements in Combustion	Imperial College London
	Autumn	Soots	Shell Thornton
	Winter	Turbulent Combustion Today and Tomorrow	Cambridge University
2010	Spring	Combustion Phenomena in Fire Science	Edinburgh University
	Autumn	Combustion in Gas Turbines: Present and Future Challenges	Engineering University
2011	Spring	<i>5th European Combustion Meeting</i>	Cardiff University
	Autumn	Clean Coal	Leeds University

## HAVE WE LOST THE PLOT?

### Introduction

About 12 months ago, Paul Fennell wrote an interesting article for the Section Newsletter (June 2011). Somewhat provocatively entitled "Has the UK forgotten how to do combustion Science", he compared the paper submission and acceptance rates for various countries for the 32<sup>nd</sup> and 33<sup>rd</sup> Symposia. Although not giving a direct answer to his leading question, he did reach some significant conclusions.

In Newsletter 96/3, I wrote an article along broadly similar, though more historical, lines. This presented a breakdown of papers presented at the Combustion Symposia, according to the authors' countries. That article updated a previous one, at July 1987.

Among train spotters, people with exaggerated interest in detail are called rivet counters. I hope that I don't suffer from a similar syndrome but I have now extended my analysis up to the most recent (Beijing) symposium. The methodology is simple:

- All symposia are included, from the Third (held in 1949) to the Thirty Third. The first two symposia are not included. They were held long before the Combustion Institute was formed, in 1928 and 1937, under the auspices of the American Chemical Society, and so do not form part of the main series.
- Authors of papers are categorised by country. Where authors come from more than one country, a split is made according to the number of institutions from each country. With the internationalisation of research, this is increasingly common and, to my mind, wholly welcome.
- Contributions from the following countries are compared: US, UK, France, Germany and Japan. This choice is entirely pragmatic. It made more sense 30-40 years ago, when these countries provided the major input. More recently, again linked with internationalisation, other Institute Sections have played an increasingly dominant role (e.g. in Europe: Italy, Sweden, Netherlands, Denmark; in Asia: Korea, India, China, Taiwan (ROC); Canada,... I certainly don't intend any disrespect for the very significant input they make. My justification is that including all would render the picture very confusing, it would not easily permit historical comparison back to the earliest Symposia, and so obscure my main aim of how UK combustion research is faring?

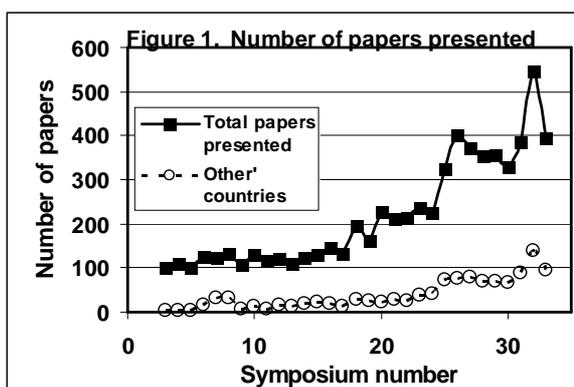
As a footnote to this introduction, I appreciate that there are more subtle and comprehensive ways in which one might assess the health of combustion research in the UK. That would be vastly more complex and I do not have the necessary resource.

### **Increasing Size of the Symposia**

To provide some general context, I thought it worth looking at how the Symposia have grown in size. Figure 1 demonstrates that the Symposia have grown significantly over the years, from about 100 papers initially up to 400 or more now.

The pressure to include more papers has been accommodated in a number of ways. First, the number of parallel sessions has increased. I believe the early symposia were single session. This has now grown to 4, 6 and now typically 7 parallel sessions. At the 2002 Board meeting, the suggestion was made to go even further, possibly up to 10, though this was rejected. Another suggestion (again not accepted by the Board) was to reduce paper presentation time from the current 20 minutes to 5-10. Another ploy which was used at the 32<sup>nd</sup> Symposium (Montreal) was to have some accepted papers presented as posters rather than orally, though I don't think this was universally appreciated. This paper growth has had another consequence: since the 26<sup>th</sup> Symposium (Naples, 1996), Symposium Proceedings have been published as two-volumes.

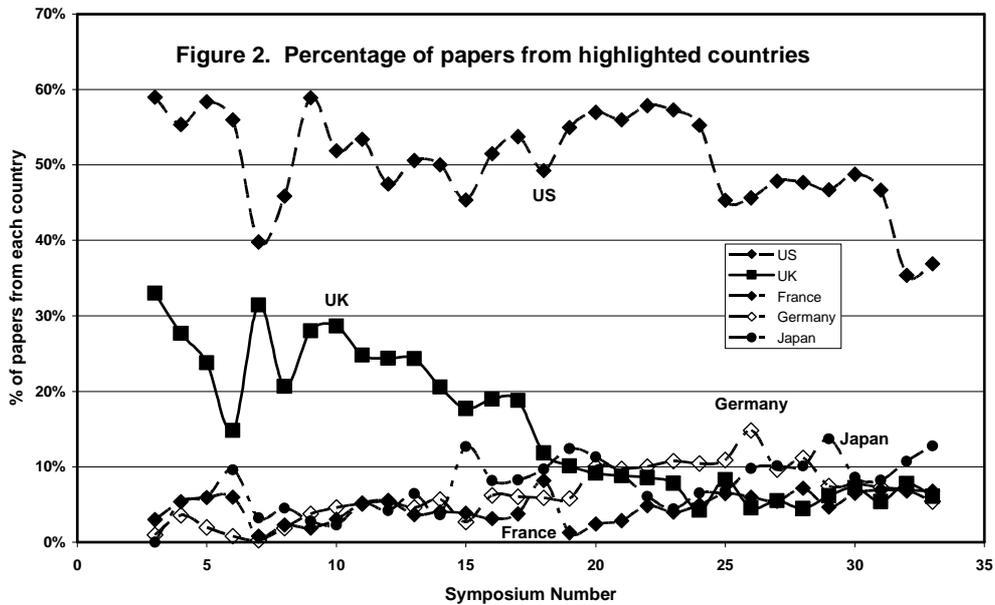
As noted in the Introduction, one reason for the increased symposium size is the greater input from what I have loosely and disingenuously collated as 'other' countries, i.e. those which played small part in the early years. This is illustrated in Figure 1, which shows a growth from essentially zero in the earliest symposia to more than 20% of all papers now.



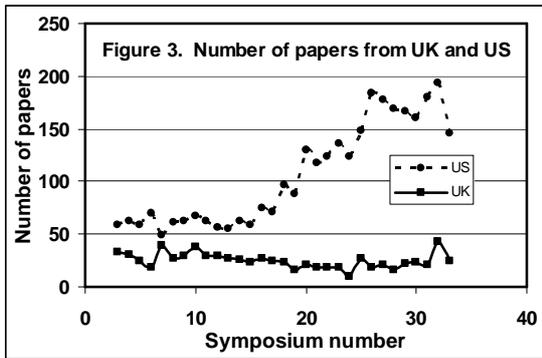
### **How has UK fared over the years?**

The full analysis shows a complex pattern and I have tried to present it in several ways. The first slice (Figure 2) shows the percentage of papers over the years for those countries highlighted in the Introduction, i.e. UK, US, France, Germany and Japan. Being constrained to black on white makes it a very complicated graph, but I think several points do emerge from the confusion.

The earliest symposia were essentially US/UK affairs, with an approximately 2:1 split, and little input from elsewhere. Since then the US percent has dropped from about 60% to less than 40% most recently, while the UK contribution has dropped more sharply from 33% to 6%, at Beijing. Inputs from France, Germany and Japan have all grown steadily and, ignoring inevitable fluctuations, over the last 10 symposia these three countries plus UK each lie within a 5 - 15% band.



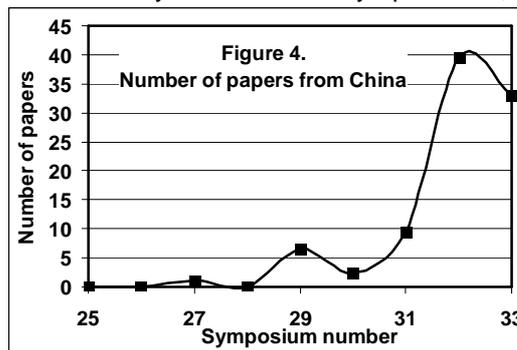
This percentage drop in UK input is partly due to the 'dilution' effect of increased internationalisation. In order to try to eliminate this, I show in Figure 3 the actual number of papers (rather than %) that we have presented, again using the US as a yardstick.



This shows markedly different patterns for the two countries. The number of US papers presented has grown roughly threefold (60 to 180-ish). In contrast, we have stayed in a 20 - 40 band, though with a slight overall decrease.

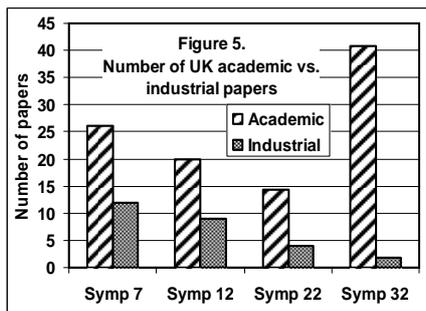
### Role of China

As an aside from the main theme of the article, I was interested in the contribution from China. Until fairly recently, the Chinese combustion community has had essentially no role in the Symposia but, as Figure 4 shows, this is now changing dramatically. In the last two symposia, their number of papers has equalled, even exceeded, those from UK, France or Germany. My guess is that such growth will continue and that we will see an increasing impact.



### Academic vs. Industrial Input from UK

Some British Section members will know that I spent my working life in combustion research within British Gas (as it was when I joined). I have, therefore, been particularly interested to what extent industrial labs have contributed to the symposia. And so, in my previous



analysis of symposium presentations, I examined the balance between academic and industrial papers from the UK.

I continue this here, by looking at just four symposia spread over 40 years: the 7th (1958), 12<sup>th</sup> (1968), 22<sup>nd</sup> (1988) and 32<sup>nd</sup> (2008). The pattern shows a remarkable, though perhaps not surprising, shift. Figure 5 clearly shows a steady drop in the proportion of papers from industry, from almost 31% to barely 4% now.

It is also instructive to look at those industries which contributed to the 7<sup>th</sup> Symposium: the

Government labs; Rocket Propulsion Establishment, Westcott, near Aylesbury; Explosive Research & Development, Waltham Abbey; Fire Research Establishment, Boreham Wood; National Gas Turbines Establishment, Farnborough; Coal Research Establishment, Stoke Orchard; and from private industry; Rolls Royce; Joseph Lucas; CAV; United Steel Companies, Rotherham; Armstrong Siddeley. Many members will not remember the last of these (though I'm sure our esteemed, retiring editor will); they were luxury car makers, when cars really were cars. Anyone interested in their model range can check this link: [http://en.wikipedia.org/wiki/Armstrong\\_Siddeley#Model\\_list](http://en.wikipedia.org/wiki/Armstrong_Siddeley#Model_list)

(JFG comment. Dave tantalised me with this comment. The contribution from the "Combustion Department" of A.S. to the 7<sup>th</sup> Symposium was, "A Theoretical Analysis of Multi-stage Reaction Rate Controlled Systems." It was based on the landmark Longwell and Weiss study in an adiabatic stirred flow reactor. On a more telling note, given that the Symposium was held in London and Oxford, 21 UK companies, and the Institute of Fuel, made financial contributions to support it. I think only three of those industrial names survive today, certainly in closely related form.)

There are at least two (not exclusive) reasons for the drop in industrial input. First, symposia are increasingly dominated by fundamental research. This concern was raised at the Heidelberg Symposium (2006) by Roman Weber (previously of the International Flame Research Station in Ijmuiden, Netherlands and now at the Technical University of Clausthal (Germany). His full argument is presented in the Section Newsletter, Vol 2007-1, March 2007, but briefly he expressed two specific concerns:

1. "The gap between combustion technology and combustion fundamentals has never been as wide as now." I am not sure I agree with him on that. I think recent developments in e.g. diagnostics and modelling mean that we should be in a better position to start to bridge the gap.
2. "We are almost exclusively academic people" – meaning symposia attendees. A check of the attendance lists of recent symposia indicates this is indeed so.

If this diagnosis is correct, it inevitably follows that industry will see our symposia as increasingly irrelevant to them.

The second reason for lower industrial input from the UK is more parochial. In earlier symposia, significant input came from publicly owned energy industries: gas, electricity and coal. Their privatisation and subsequent break-up in the 1980-90s led to a substantial drop in their research activity. Members aware of my political views will know I opposed this at the time. One unfortunate but easily foreseen consequence has been the decimation of relevant combustion research. But private industry associated with combustion, with the dazzling exception of Shell Thornton up to the present, also seems to have backed away from research. And the result? In the 22<sup>nd</sup> Symposium, there was input from Shell (3 papers), British Gas and the Coal Research Establishment; in the 32<sup>nd</sup>, from Shell, BP Exploration and Johnson Matthey.

I do not see how the Section can have any impact on the second reason for industrial research decline. But I do think we could consider whether the Symposium content has become unbalanced.

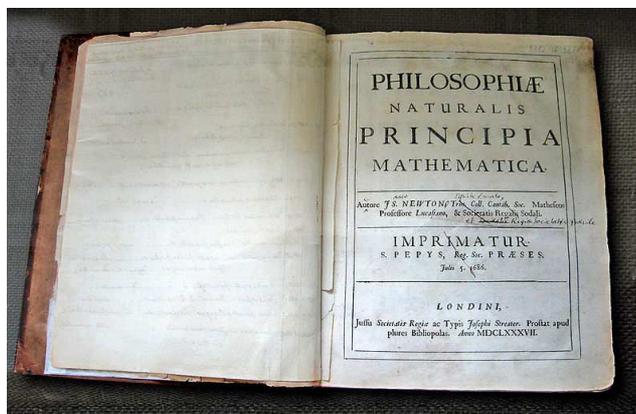
## Conclusion

I think that I've presented a mixed but, I hope, not too gloomy a picture. In many ways, combustion symposia continue to be huge successes. But I seriously think the Institute needs to look at what it is aimed at, i.e. more or less exclusively academically based research, or a better balance between fundamental and applied activity. And on the UK scene, perhaps the British Section should seriously consider whether it could engage more with applied/industrial combustion interests here.

David Smith

## PUBLISHING SCIENCE, PROFITS AND THE PUBLIC INTEREST

News erupted over the past year, starting with an article by George Monbiot on the obscene profits of academic publishers in August 2011. This has been followed by a number of articles, and the announcement by Fields Medal Winner Timothy Gowers not to submit articles to Elsevier journals on 21 January 2012, leading to a movement which collected 9000 signatures of scholars who pledged to refrain from working for publishers which restrict free sharing as authors, reviewers or editors.



*Philosophiæ Naturalis Principia Mathematica* ([wikipedia](#))

In parallel, Sir Mark Walport, director of Wellcome Trust, the second largest non-governmental funder of medical research, found out from moving from his prior job as an academic that he could not download publications which he might have published himself at his new organization. As a result, the Wellcome Trust is now launching a high calibre scientific journal free on the web. The momentum behind open source publishing is clearly gaining ground by the day. But first, let's do the numbers that have led to the belated outrage directed in particular at Elsevier:

1) The market: the academic publishing market was around 19 million USD, 43% controlled by Elsevier, Springer and Wiley, whilst the remainder fragmented among over 2000 publishers [1]. These numbers are from 2002, so assuming steady growth of 3%, the absolute numbers could be over 30% higher.

2) These big three publishers control all top journals (Nature, Science, and the top journals in other scientific realms). Given that most libraries need these subscriptions, and most authors need to be published in the top journals to be considered for academic promotion, this gives the journals stupendous bargaining powers. Interestingly, the numbers on what they charge different universities are not necessarily available, as prices paid by universities are covered by confidentiality clauses with publishers. According to David Prosser, executive director of Research Libraries UK, "British universities spend around Â£200m a year on subscriptions to electronic databases and journals, which is around 10% of the block grants the institutions receive from government", that means, a sizable fraction of the overhead.

3) As a result, profit margins for these publishers are mind-boggling: Elsevier has just boasted results for 2011, with a profits/revenue ratio of (27%) which are similar to 2010 (27%) [2], and Springer not far behind with 18.6% for 2011 [3].

Before we all run out and buy some stock, let us consider for a moment what allows this state of affairs:

1) Research is produced, written up, reviewed, corrected, formatted and uploaded by each one of us, with additional hours devoted by the many editors and assistant editors -- for no pay.

2) We give the publishers the rights to own the labour and the good name of the journals, which are associated with the eminence of the editorial boards, for historical reasons: the various societies outsourced the formerly tedious job of editing to companies. Interestingly, the companies have automated the publishing job, but we still do all the editing, proofreading and fact checking.

3) We pay them through our university overheads or our direct downloads for the privilege of maintaining the servers that automate the process, and for the pleasure of negotiating bulk deals to buy back what we produced for incredibly high prices.

4) We proudly point to our list of publications on these journals during promotion and tenure decisions. The more prestigious and expensive (which correlates with the number of citations, as these are disseminated

further) the journal, the more points we get.

In summary, this is a strange state of affairs, which is maintained through our complacent inertia, as this seems too big a problem to attack. It is also not a new issue, but one which has proven resilient to change, which is why the profits and the charges to our libraries continue. Other societies in our field of fluid mechanics in combustion ([SAE](#), [AIAA](#), [ASME](#)) can be even worse, providing less service in readying papers for publishing than journals, for higher charges, but creating an audience and the appearance of peer review. Whereas there continues to be significant movement in open source publishing, the evolving picture of open access may not lend itself to a grand ending, but rather a series of small steps.

1) Insist on maintaining the copyright, and deposit material in archival repository such as dspace: many journals, including Elsevier, allow this, but the fine print is still moving and uncertain.

2) Consider publishing open source journals (PLoSOne), or society journals (AIP, RSC) which charge libraries significantly less.

3) Work with the different societies in the field to understand the costs of breaking the oligopoly of publishing, given that online publishing tools are so widely available: keep the peers and their review, but understand whether the same or better service in delivering on-line archival material can be obtained.

Finally, there remains the issue of the indexing and how we are all subject to the vagaries of Thomson-Reuters and its ownership of the largest abstract indexing engine. But that will be the subject of another article.

#### References

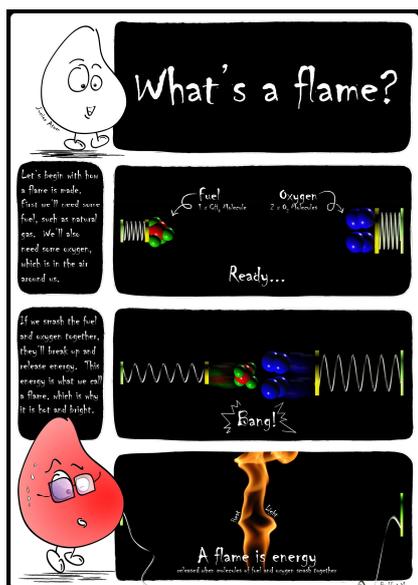
1. G. S. McGuigan, R. D. Russell, The Business of Academic Publishing: A Strategic Analysis of the Academic Journal Publishing Industry and its Impact on the Future of Scholarly Publishing, Electronic Journal of Academic and Special Librarianship, v. 9, n. 3 (2008).
2. Reed Elsevier 2011 Results.
3. Springer press release 2011 Results.

Article also published online in the Blog of the British Section of the Combustion Institute at <http://combustion-uk.blogspot.co.uk/2012/04/publishing-science-profits-and-public.html>

Simone Hochgreb

### The Flame Challenge – UK finalist

**Editor Note:** *The Flame Challenge* is a competition set up by Alan Alda to explain the science of a flame to a jury of 11-year-old students (<http://www.flamechallenge.org>). The entry of Larry Li and Villian Lo from Cambridge was shortlisted as finalist from 14 UK entries. The colour of the cartoon is not reproduced here.



The idea to create a comic strip came out of a brainstorming session between me and my girlfriend - who, fortuitously, is an architect and can therefore draw very well. We were looking for neat ways to combine words and graphics, something simple but not too simple, and something that was not a video because we wanted teachers to be able to print it and stick it up on their walls. So that's how our comic strip idea was born. At first, we had over 15 frames, with lots of atomic detail and even a bit about global warming. In the end, though, we shortened it to four frames in order to keep the message short and simple. To resonate with the target age group (11-year-olds), we also developed a new cartoon character: Junior Atom. In the last frame, she is seen sweating and wearing sunglasses owing to the heat and light from the flame. Incidentally, that photo of the flame came straight out of my PhD work with Dr. Matthew Juniper.

For those interested, some of that work will be presented at the upcoming Symposium in Warsaw, Poland.

Larry Li and Villian Lo ([lkbl2@cam.ac.uk](mailto:lkbl2@cam.ac.uk))

## FARADAY'S FAMOUS LECTURES

### The chemical history of a candle (150th anniversary edition)

Michael Faraday (edited and introduced by Frank James)

Oxford, UK: Oxford University Press

2011 | 152pp | £14.99 (HB)

ISBN 9780199694914

*Reviewed by Bill Griffith*

Faraday's six Christmas lectures, delivered at his famous bench in the Royal Institution and accompanied by many demonstrations, were to be his last. He was 70 and gave two lectures in late December 1860 and the remainder in early 1861 to an audience averaging 650 'juveniles'. They were published in 1861 in William Crookes's *Chemical News*, and in the same year as a book. The *Candle* has never been out of print; this edition marks its 150th anniversary, and includes the rather difficult-to-read facsimile notes which Faraday used for the lectures.

Faraday uses the candle as a symbol to talk about the nature of combustion - how the oxygen from air is needed, how water and CO<sub>2</sub> are produced and the hidden role of hydrogen. The text is lyrical and beautifully expressed, communicating his obvious enthusiasm, authority and sense of excitement. There were many accompanying demonstrations, often involving explosions and bright lights. Endearingly, Faraday talks about himself and the audience as 'we philosophers' and, on one occasion, as 'we juveniles'.

Frank James provides an elegant, well-referenced and informative introduction, recounting the history of the Christmas Lectures and of the *Candle* in particular (Charles Dickens published some earlier versions of these lectures in his *Household Words*). He speculates on what has kept this text alive for so long - it apparently is still used for teaching purposes in Japan and China. It is of course fine literature, as he points out, but clearly not cutting-edge science. I think we regard it with such warm affection because of the power and excitement which it still conveys and its literary qualities. As an 1861 review in the *Daily News* said: '[it] is so simple and engaging that the youngest reader is charmed'.

If you have never read the *Candle* you are in for a treat. This edition is reasonably priced, well illustrated and handsomely produced.

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<http://www.rsc.org/chemistryworld/Issues/2011/November/Reviews/FaradaysFamousLectures.asp>

*Readers will recall that I highlighted Faraday's lectures in a previous Newsletter and I posed the question, "To whom was Faraday referring when he cited earlier work by 'old Hooker'?" The extensive introduction that accompanies this new edition resolves the issue. Frank James tells us that "old Hooker" was a an error in transcription of Faraday's shorthand notes and that he was referring to work by Robert Hooke, published in 1677, in which there is magnificent image of a diffusion flame stabilised on the wick of an oil lamp.*

## COMBUSTION LINKS AND CALENDAR

Some online listing for combustion-related events are:

<http://www.combustion.org.uk/events.html>

<http://www.combustioninstitute.org>

<http://www.afm.asso.fr>; <http://ukelg.ps.ic.ac.uk>;

<http://www.iop.org/activity/groups/subject/comb/calendar/index.html>

<http://www.see.ed.ac.uk/fire/conferences.html>

2012

**11 – 15 June**

Copenhagen, Denmark

**ASME Turbo Expo**

Details: <http://www.asmeconferences.org/TE2012>

**19 June**

Imperial College London

**British Section One-day Meeting on Laser Diagnostics for Combustion**

Details: Prof. Yannis Hardalupas at [y.hardalupas@imperial.ac.uk](mailto:y.hardalupas@imperial.ac.uk)

**24 – 29 June**

Princeton, USA

## **CEFRC Summer School on Combustion**

Details: <http://www.princeton.edu/cefrc>

**22 – 27 July**

Cracow, Poland

## **9th International Symposium of Hazards, Prevention and Mitigation of Industrial Explosions (9th ISHPMIE)**

Details: <http://www.ishpmie.gig.eu/eng/a865>

**29 July – 3 August**

Warsaw, Poland

## **34<sup>th</sup> International Combustion Symposium**

Details: <http://www.combustion2012.itc.pw.edu.pl/>

**2 September**

Rottmannsaal, Heidelberg-Handschohsheim, Germany

## **3<sup>rd</sup> Workshop on Turbulent Combustion of Sprays (TCS 3)**

Details: <http://www.uni-heidelberg.de/group/mfc/researchAreas.htm>

**12 September**

Oxford, UK

## **BSCI Autumn meeting on Alternative fuels**

Details: Prof. Richard Stone at [richard.stone@eng.ox.ac.uk](mailto:richard.stone@eng.ox.ac.uk)

**24 - 26 September**

Palermo, Sicily

## **7th International Symposium on Turbulence, Heat and Mass Transfer (THMT-12)**

Details: <http://www.thmt-12.org/>

**15 – 17 October**

University of Maryland, USA

## **International Symposium on Fire Investigation Science & Technology (ISFI)**

Details: <http://www.isficonference.com/index.html>

**17-20 October**

Hefei, China

## **9th Asia-Oceania Symposium on Fire Science and Technology**

Details: <http://aosfst.csp.escience.cn>

## **2013**

**25- 28 June**

Lund University, Sweden

## **6th European Combustion Meeting**

Details: <http://www.ecm2013.lth.se>