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EDITORIAL

This special edition of the *Newsletter* is my contribution to the celebration in 2004 of the 50 years since the British Section of the Combustion Institute was formed. The fact that this is the first and only issue this year has a lot to do with my very happy travels in the first part of the year and some subsequent rather less pleasant months since. I have been advised that I should follow our political masters in Whitehall and not say sorry for the lateness of this edition; rather that I should say that I should have liked to apologise!

I was disappointed not to have been in Chicago this Summer to join in the international celebrations of the formation of the Combustion Institute, but, included in this *Newsletter* are reports from members who did.

David Smith wrote a short historical piece about the British Section for publication at the Chicago Symposium. It is reproduced here. My wife and I seem to feature prominently in it! To counteract this, we should be grateful for further contributions from members, especially those with very long memories. I have added a short story from Peter Padley from the Cambridge Symposium. The Section hopes to compile a comprehensive history of the Section. Please send me anything you think is interesting. We are hoping to collect together a detailed archive of Section activities. Look in your filing cabinets!

Felix Weinberg gave a fascinating personal account of the early days of the Section at the dinner in Cambridge which followed the Autumn meeting of the Section. The meeting was excellent and is described in this edition. The dinner was at least as good and brought together many old and new friends including a past President of the Institute and his wife. Felix's reminiscences are something worth preserving and passing on to all members, not just those present at the dinner. So I asked him for a script to publish here. Unfortunately he only had notes, but promised to record his speech on a dictation machine at home. Because I had no proper Dictaphone to replay the recording, Felix re-recorded it through loudspeaker, microphone and a normal cassette recorder! I then played it back, phrase by phrase on my cassette player and typed it two-fingered! I am sure that you will feel that these were tasks worth performing. The Combustion Institute has been an important part of my life and I am sure others feel the same way about it. The Symposia are not only very important for their technical content; they are true symposia; "meetings to discuss a particular subject - philosophical or other friendly discussions - drinking parties with conversation". Many of our best friendships have grown out of the activities of the Institute, both local and international.

Now comes my usual appeal for members to write to and for this *Newsletter*. We need new contributors please. An idea aired rather unsuccessfully a few years ago was for research students and their supervisors to send me their thesis titles and short descriptions of their ongoing research projects. It wouldn't take much effort to do this. I look forward to a massive response. Related to this is the task I have attempted for the past few years of listing members' publications for the previous year. The 2003 list is included with this *Newsletter*. The next *Newsletter* will probably not appear till late Spring 2005 and will contain your publication lists for 2004. So as soon as you have a complete list (please don't send me partial lists – they can cause confusion) send it to me please.

Enjoy this enlarged edition and let me have contributions for the next.

Tony Burgess

COMBUSTION PEOPLE

ALLAN HAYHURST

Congratulations.

Allan has been made an Honorary Professor at the Krakow University of Technology. We shall be interested to hear of his duties.

Thanks

Allan Hayhurst has stepped down as the Editor of Combustion and Flame for all countries outside the U.S and Japan. He has served the Journal unstintingly for four years as Editor, and another six before that as Deputy Editor. The Committee of the British Section have expressed its thanks to him on behalf of all members, and appointed him an Honorary Life Member. A detailed appreciation of his service appeared in the September edition of Combustion and Flame. The new Editor, joining Jim Driscoll of the University of Michigan, is Katharina Kohse-Hohinghaus of Bielefeld University.

A. G. GAYDON FRS

Dick Gaydon, as he was known by all his friends, died on 16th April, 2004 peacefully at home, in the 93rd year of his life. During much of his long and productive life he held the Warren Fellowship of the Royal Society and the Chair of Molecular Spectroscopy in the Department of Chemical Engineering and Chemical Technology of Imperial College, having distinguished himself as an experimental spectroscopist studying flames and shock waves and, particularly, as an author of half a dozen popular texts in these fields.

Alfred Gordon Gaydon was born on 26th Sept. 1911 in Hampton Wick. He entered the Physics Department of Imperial College from Kingston Grammar School in 1929 and, after graduation in 1932, joined Arthur Fowler's research group for two formative years which kindled his lifelong interest in experimental spectroscopy. Thereafter Dick Gaydon moved to Didsbury, near Manchester to work for the Shirley Institute of the British Cotton Industry Research Association.

It was there, in 1936, that an accident occurred which was to have a profound effect on the rest of his life. An explosion during the distillation of an ether led to the loss of one eye and, after a series of operations, to the loss of the eye lens in the other. He had to use a highly convex spectacle lens and was left with a narrow angle of vision, often obscured by floaters. Characteristically, he made light of this handicap, to the point where casual acquaintances were unaware of any impediment. In fact, he spoke of his unique ability of seeing some way into the ultraviolet (due to the absence of the absorption of the eye lens in that spectral region) as an asset to a spectroscopist. It was somewhat disconcerting, if one left one's sunglasses lying about, to be told that they "were no good because they let the UV through".

In the year following the accident, Dick Gaydon returned to Imperial College, obtained his PhD and joined Sir Alfred Egerton's Department of (then) Chemical Technology in 1939, where he remained until his retirement. He held research fellowships, notably the Royal Society Warren Fellowship from 1954; the title of Professor of Molecular Spectroscopy was conferred upon him by the University of London in 1961.

Dick Gaydon's researches in flame spectroscopy are well known to the combustion community. They included studies of flames at very low pressures, chilled flames,

preheated flames, the effects of inhibitors, the use of deuterium as tracer to follow chemical precursors - all of which greatly increased our knowledge of the underlying chemical and physical processes. What is perhaps less well known is that in the mid 40's, there was some controversy regarding correct values of dissociation energies. In particular, there was considerable doubt concerning the true value for the dissociation energy of the nitrogen molecule – crucial to the prediction of the range of the shock waves produced by the early atomic bombs. Dick Gaydon collaborated with Sir William Penney who attended the Los Alamos bomb trials. In the event, the results of these trials were in line with the high value for nitrogen which Dick Gaydon had determined spectroscopically in 1944. Dick Gaydon was also quick to recognise in the late 50's that shock tubes provided an ideal means to extend his spectroscopic studies to higher temperatures and more controllable conditions. Initially, he developed a novel spectroscopic method to follow the progress of the temperature behind shock waves, using this to observe the vibrational relaxation and dissociation of molecules and, later, to study the initiation and propagation of detonation waves. He also used a shock tube to study combustion processes, including pyrolysis and carbon formation, by following the emission spectra of free radicals formed behind shock waves. Much of this work was carried out in collaboration with Ian Hurle.

Dick Gaydon's work resulted in some 150 papers; (39 in Proc. Roy. Soc. alone) and in the six major books, which appeared in several editions, listed below with their years of publication:

Identification of Molecular Spectra (with R.W.B. Pearse) 1941, 1950, 1963, 1976;

Spectroscopy and Combustion Theory 1942, 1948;

Dissociation Energies, 1947, 1953, 1968;

Flames, their Structure, Radiation and Temperature (with H.G. Wolfhard) 1953, 1960, 1970, 1979;

The Spectroscopy of Flames, 1957, 1974;

The Shock Tube in High temperature Chemical Physics (with I.R. Hurle) 1963.

Dick Gaydon had a gift for writing with great clarity. These books, most of which are still in print, are written in a simple lucid style, avoiding long convoluted sentences and often substituting simple physical analogies for complex mathematics. The more recent advent of an arsenal of novel laser spectroscopic methods led to a renaissance of interest in his fundamental work, which is still extensively referred to.

These activities brought Dick Gaydon early international recognition. His many awards included the DSc of the University of London (1941), Fellowship of the Royal Society (1953), an Honorary Doctorate of the University of Dijon (1957), the Rumford Medal of the Royal Society and the Bernard Lewis Gold Medal of the Combustion Institute (both in 1960). Last year, the British Section of the Combustion Institute established the Gaydon Award for the best paper by a British author in one of the International Symposia of the Combustion Institute.

On his retirement in 1973, Dick Gaydon stayed on at Imperial College as Professor Emeritus and Senior Research Fellow, but his main undertaking was bringing his books up to date. In particular he brought out the 4th (1979) edition of *Flames, their Structure Radiation and Temperature* on his own, without any participation by his coauthor, H.G. Wolfhard. Commuting was always difficult and, having completed this task, Dick Gaydon

then moved to the country near Arundel and made a smooth and almost complete transition to his other major interest which he followed throughout his life, whenever time permitted.

Aside from rowing for Imperial College in the years before his accident, his major lifelong passion was a fascination with all things natural and, in particular, with butterflies and moths. He was a mine of information on birds as well as everything that grew, from grasses to fungi, which made going for a walk with him a particular pleasure. His encyclopaedic knowledge of butterflies and moths found expression in a spectacular collection of his own colour photographs of a great variety of species from wherever he travelled across the world. This was a startling achievement, considering his impaired eyesight and inability to judge distances but, unlike those of more conventional collectors of skewered corpses of lepidoptera, all his specimens survived.

His wife, Phyllis, whom he married in 1940, predeceased him by more than two decades, in 1981. In 1998, Dick Gaydon suffered a pulmonary aneurism and, for a while, he was not expected to survive. His subsequent recovery and continued well-being owed much to the devoted care of his daughter and son, Julie and Bernard.

Dick Gaydon was a kindly, modest man with an enduring love of nature, who will be greatly missed. His work will not be forgotten by the combustion community; whenever students wonder about the colour of flames, they will be referred to his publications.

Felix Weinberg

ARTHUR H. LEFEBVRE (1923-2003)

Many of members were saddened to learn late last year of the death of Arthur Lefebrve. Arthur was a truly great combustion engineer, a gracious and generous man of keen mind and firm view who loved his subject. He was also a renowned raconteur and anyone who had the pleasure to enjoy one of his many after-dinner discourses will have vivid and happy memories of him.

His legacy to gas turbine combustion is immense and within this field he was widely recognised as a pioneer and father of many of today's combustor design tools and methods. His contributions are extensive and include 150 journal papers, 13 patents and 3 textbooks. It would be fair to say that no self-respecting gas turbine combustion engineer would be without copies of Arthur's books "Gas turbine combustion" and "Atomisation and sprays" on their book case. Arthur was a very active member of the Combustion Institute and often attended British Section meetings, when he was in the UK. Many of our older members will recall their many lively and rich interactions with Arthur, especially in the early days of the Combustion Symposia.

Arthur was educated at Long Eaton Grammar School and then achieved an eternal BSc in Engineering from the University of London gained in 1946 from studies at University College, Nottingham. He received a PhD from Imperial College in 1952 and was awarded the Unwin Prize for an outstanding thesis. His doctoral research study was entitled ''The combustion of hydrocarbon air mixtures at constant pressure and constant volume'', and was carried out under the direction of two distinguished combustion scientists namely Sir Owen Saunders and Sir Alfred Egerton. In 1975 he acquired the higher degree of Doctor of Science (DSc) from Imperial College for pioneering contributions in the field of gas turbine combustion science and engineering; this became the field to which he dedicated the rest of his life.

In 1952 Arthur joined the Aero Engine Division of Rolls-Royce Limited in Derby where he set up its first combustion research and design group. There he made many exemplary contributions in gas turbine combustor design and development. At Rolls-Royce Arthur first develop the 'θ-parameter' correlation that underpins much of the design and development methodology for modern gas turbine combustors and his novel combustor concepts were subsequently incorporated into the RB211 engine that powered the Lockheed 1011, Boeing 747 and some Airbus manufactured aeroplanes. He also invented a novel afterburner design for military aircraft and this reputedly became the most lucrative patent in the Roll-Royce's history.

In 1961 he moved to the College of Aeronautics at Cranfield as Professor and Head of the Department of Aircraft Propulsion in preference to taking the position of Chief Research Engineer that was on offered to him at Rolls-Royce. This was typical of Arthur's firm views and clear mind in that he envisaged greater opportunity for innovation within the academic sector. The Department greatly benefited and grew substantially in student numbers and research reputation. He was also one of the first academics to introduce the concept of the specialist short courses for industry in gas turbine technology. His own "legendary" gas turbine combustion course was initiated in 1962 and continues today. Up until very recently he was always a contributor and of course a wonderful after dinner speaker on Thursday nights as those of us who had to speak after him rapidly learnt to our peril! What was clear was that students went away from this course, not simply honoured to have been taught by the great man, but greatly enthused for the topic of combustor research.

The 60's was an era wherein the gas turbine engine was undergoing sustained technology change, especially increases in engine pressure ratio which created numerous combustion problems amongst which was the problematic area of fuel injection. At this time most combustors used pressure-swirl atomisers and engineers were increasingly struggling with problems of excessive soot in the primary zone and associated problems of excessive smoke emissions, reduced liner lifetimes and poor outlet temperature pattern factor. Arthur's pioneering work identified the problem as one of improper fuel placement within the primary combustion zone due to 'spray cone collapse', a phenomena that is now well understood. This led to Arthur's invention of the 'pre-filming airblast atomizer' concept. This single invention was to become a great favourite of Arthur's and is now a ubiquitous fuel injection system for almost all aero gas turbines and many liquid fuelled stationary systems. This was, arguably, his most significant engineering achievement and the one that has had the greatest impact on all our lives. His very active international research profile, combined with the increasing popularity of the gas turbine short courses and the growth in his department proved so successful that, in 1971 he was appointed as the Head of the newly formed School of Mechanical Engineering, Cranfield.

In 1976, Arthur accepted an appointment to become the head of the School of Mechanical Engineering at Purdue University in th USA. As at Cranfield, Arthur's leadership and research once again produced sustained growth, and graduate enrolment in the Mechanical Engineering department increased by 36 percent in just four years. Arthur's strong interest research continued and therefore, in 1980, he accepted the newly created Reilly Chair of Combustion Engineering at Purdue University and remained in that post until his retirement in 1993. His Purdue years (1976—1993) were full of outstanding research output. He completed his 145th journal paper and published his three books, Gas Turbine Combustor Design Problems, Gas Turbine Combustion, and Atomisation and Sprays. These books have now been translated into many languages including Japanese and Chinese indicating the truly global impact of Arthur's work.

After retiring in 1993, Arthur was concurrently made an Emeritus Professor at both Purdue and Cranfield Universities. He continued to lecture regularly on the Cranfield gas turbine combustion short course until 2002. He was also invited to contribute to short courses in many other universities including UC Irvine, Karlsruhe, UMIST and Warwick. He maintained his research collaborations and consultancies both in USA and UK, and contributed regularly to the ASME's International Gas Turbine Institute Conferences, the Combustion Institute International Symposia and ILASS Conferences until 2002.

Professor Lefebvre received many world-class honours and awards including: ASME Gas Turbine Award (1984), ASME R. Tom Sawyer Award (1984), AIAA Propellants and Combustion Award (1990), Marshal Award from the Institute of Liquid Atomization and Spray Systems, ILASS, (1993), IGTI Scholar Award (1995), IGTI Aircraft Engine Technology Award (1996), and ASME George Westinghouse Gold Medal (2002). He received a higher DSc (1975) degree from London University, and an honorary DSc (1989) degree from Cranfield University. He was a Fellow of ASME, a Fellow of the Royal Aeronautical Society and a Fellow of the Royal Academy of Engineering.

Arthur was a true great amongst combustion engineers and scientists and someone who has left an immense legacy. Arthur was also not afraid of controversy and he had little regard for the contributions of CFD and laser diagnostics to practical combustor design. Arguably this is changing but we would all do well to aspire to a few of Arthur's many and substantial achievements.

One of many of Arthur's favourite jokes, which could be adapted to variety of victims was: "I came across Professor X and one of his PhD students the other day, a good man Professor X, very bright and I thought intelligent. However he had his PhD student shinning up the University flagpole with a tape measure in his mouth. Good gracious I said what have got that poor chap doing? In a somewhat resigned tone Professor X explained that the Vice Chancellor was very concerned at the height of the flag pole and whether it would interfere with the view from his new office and that as an experimental sort he had been 'donated' the task of measuring it. But, but I said surely you could lower the flagpole using the pivot point on the bottom? At this point Professor X with a withering look snapped - damn it man we know how long it is, we now need to find how high it is!"

Perhaps we can all learn from Arthur's gracious wit and charm, we can certainly learn from the many examples he has left us. I am sure we will all miss this charming giant of a man. The field of Combustion Engineering has lost a true legend.

He is survived by his wife Sally to whom he was married for over 50 years and by two sons David and Paul, a daughter Anne and six grandchildren.

Edited from a contribution from Doug Greenhalgh
Cranfield University

D. HUW EDWARDS

Professor Huw Edwards, who died on 20 November 2003, was a native of Bynea, near Llanelli and the son of John and Annie Edwards. After attending Llanelli Boys Grammar School, Huw went to Aberystwyth in 1943 and gained a first class degree and a doctorate in Physics. He then moved to Cambridge to work with the Agricultural Research Council and gained a further PhD.
Huw returned to his old department in 1954 and thus began his distinguished career as an international scholar at Aberystwyth. Even before his retirement in 1989, Huw had been suffering from Parkinson's disease, and he bore this with remarkable fortitude and without bitterness for the rest of his life

Huw's scientific field was that of gas dynamics and explosions. Over the years, he supervised 40 research students many of whom carried on in similar scientific areas of research.

In the 1960's Huw was invited to a gathering of the world's most distinguished gas dynamicists, Professors Soulouhkin, Oppenheim, Strehlow ,Wagner and Manson which resulted in the first International Colloquium on gas Dynamics of Explosions and Reactive

Systems, in Brussels in 1967. He remained on the international committee of this organisation and an active participant at its meetings until his retirement.

In 1981 he organised a meeting in Aberystwyth of an organisation known as Euromech, attended by over 100 invited guests, to discuss “Uncontrolled Blasts and Explosions in Industry”, and to link the academic research knowledge to real world safety problems. They came from all over Europe even from the Soviet Union. They came from Universities, from Industry, from consultancies and from Government agencies. The meeting was a resounding success. A small committee got together there and then, in Pantycelyn Hall, and founded a new organisation known as UKELG (United Kingdom Explosion Liaison Group) of which Huw was to be chairman and later honorary life president. UKELG has now been in existence for 23 years as the only informal, yet regular, forum for the exchange of current views and activity on explosion research in UK.

Huw published over 50 scientific papers. Not trivial “stamp-collecting”, or repetitious ones these, but thoughtful, complete meaty treatese noted for the care exercised in obtaining novel experimental data and even more importantly to the time and thought devoted to a careful understanding and analysis. They have stood the test of time - the highest accolade for a scientist’s work.

Neither a self-publicist nor a frequent traveller, Huw’s way, by and large, was to keep hard at work and mostly in Aberystwyth. But despite this, people from far and wide beat a path to his door - attracted by the topicality and excellence of his work. So it was that industrialists from ICI, Shell, BP, British Gas, Rolls Royce, CEGB, MOD, the US Air Force and innumerable other concerns have blessed Huw with a supply of intriguing problems as well as research grants - they also recruited many of his students.

As regards his career it was of course centred on the Department of Physics in the University of Wales Aberystwyth where, in addition to his own research activities, he worked with colleagues on undergraduate teaching as well as supervision of technical and research staff. Originally, he was appointed ICI research fellow in 1956, then as University Lecturer in 1958 and senior lecturer in 1965. Outside Aberystwyth he was from the earliest days counted amongst the giants of gas dynamics worldwide. Later, having gained the highest Cambridge University degree, that of Doctor of science, U.W. Aberystwyth, in 1979, promoted him to be Reader in Physics. In 1983, at a conference banquet in Poitiers he was awarded the coveted Numa Manson Gold Medal - as only its forth recipient ever. The citation is “for outstanding contributions to Gas Dynamics of Explosions and Reactive Systems especially towards advances in the knowledge of Shock and detonation waves”. Shortly afterwards the University awarded him a Personal Chair in Physics - still a rare and distinguished honour.

Even in retirement Huw continued with his scientific work, Typical of a man whose hallmark was humility, he chose to move out of his professorial office back into the laboratory, alongside research students and postdoctoral fellows. These young students valued the fact that, in addition to their busy research supervisor, they had immediate recourse to one of the greatest men in their chosen field, as well as to his dry but sparkling sense of humour!

Professor Edwards made an extremely important contribution to science for which he is famed worldwide. His passing is mourned by the scientific colleagues and friends he made all around the world in the course of his career and not least for his former research students who became part of his extended family.

J. H. BURGOYNE

Dr J. H. Burgoyne, who died on 16 December 2003 aged 90, was an internationally renowned consultant, who specialised in the field of safety engineering, with a particular emphasis on fire and explosion. John Henry Burgoyne, always known as Jack, was born in Luton on 4 August 1913, the only son of Sir John Burgoyne, OBE and Florence Burgoyne, *nee* Farrow. He was educated at Luton Modern School and afterwards at Imperial College, London, where he was awarded a first-class honours degree in Chemistry in 1933. He then transferred to the Chemical Technology Department where he undertook research for a PhD under Professor W. A. Bone on the combustion and ignition behaviour of aromatic and alicyclic hydrocarbons. This work sparked in him a permanent interest in combustion research and he went on to publish an impressive series of papers on the flammability characteristics of a wide range of hydrocarbon fuels, ways of reducing the risk of explosion and methods of flame inhibition and extinction. As a result of this work, he was awarded a DSc at the early age of 27.

In 1946 Burgoyne was appointed a Lecturer (and subsequently Senior Lecturer and Reader) in what had become the Chemical Engineering and Chemical Technology Department at Imperial College. He took on numerous research students and he was an outstandingly good supervisor, helping his students whenever they needed assistance but always allowing them to develop their own ideas. His work with his students resulted in the publication of a further substantial number of papers, many of which remain fundamental sources of reference today. Much of his work in the fields of combustion engineering and combustion safety was complemented by that of his friend and colleague, Charles Cullis, who was, in the early 1960's, Reader in Combustion Chemistry in the same Department. In addition to pursuing his scientific interests, Burgoyne demonstrated his skill as an organiser, being largely responsible for the detailed planning of a major extension to his Department's original building.

During Burgoyne's time at university his work received widespread recognition outside academia. Research contracts were awarded to him by Industry and Government Departments to investigate such practical problems as crankcase explosions in marine engines, explosions in flour mills and the spontaneous heating and ignition of palm kernels. From time to time he visited scenes of accidental fire and explosion where he conducted scientific investigations into the causes of these incidents. He demonstrated a flare for unravelling the most complex cases by his meticulous attention to detail and his application of lateral thinking, supported by his enormous wealth of knowledge of combustion science. It was not long before the insurance industry routinely commissioned reports from Burgoyne on fire and explosion incidents. These often resulted in litigation requiring him to appear in court as an expert witness and his ability to explain complex technical issues clearly and succinctly earned him an unrivalled reputation in the High Court.

Burgoyne left Imperial College in 1964 in order to undertake full-time consulting. Much of his work in this field was commissioned by Insurance Loss Adjusters. This provided a regular source of fire and explosion scenes to examine. Whenever there was a dispute over the cause of an incident, he often found himself in opposition to Bob Maisey, a consulting electrical engineer who also investigated fires and explosions for the insurance industry. In 1968 he and Maisey merged their practices to form Dr J. H. Burgoyne and Partners. In the early 1970's Burgoyne was appointed as a Visiting Professor in Industrial Safety at City University and later also as a Visiting Professor at the University of Sheffield. For several years he was Chairman of the Safety in Mines Research Advisory

Board, a Member of the Advisory Committee on Major Hazards and President of the Association of Consulting Scientists.

In 1978 Burgoyne retired from the firm which he had formed but remained in close contact with his former partners. He was never happier than when asked to help resolve a knotty problem and he invariably added a new dimension to the analysis. This invaluable support created the ethos of striving for technical excellence which spread throughout the partnership as it expanded. Burgoyne was too a shrewd businessman and his good counsel was often sought during discussions on business development. At about the same time he was appointed by the Department of Energy to chair a Committee of Inquiry into Offshore Safety and he was later congratulated on the speed with which he produced the subsequent report, often referred to as the Burgoyne Report, which was published in 1980. In recognition of this he was awarded a CBE.

Burgoyne was a rather reserved and private person, a little difficult to get to know at first but ultimately a very loyal and staunch friend, whose legacy of justice and truth ensured that he always did right by those whom he encountered. He was never one to seek the limelight but when required to do so rose to the occasion with his usual professionalism. He was a long-standing and active member of the Methodist Church and he had a keen interest in classical music and was at one time a proficient organist.

Jack Burgoyne married Margaret Tupholme who came from Sheffield in 1944. She survives him together with their only son, John, who is Professor of Management at Lancaster University and also at Henley Management College.

Charles Cullis

ERNST R. G. ECKERT

Dr. Ernst Eckert, a pioneer in the sciences of heat transfer and thermodynamics, died in St. Paul, Minnesota on 8 July 2004, two months before he would have reached the age of one hundred.

Eckert was internationally known for his work with the early development of jet engines and later for discovering ways to increase rocket efficiency. He was among the first group of Regents' Professors at the University of Minnesota, where he taught from 1951 to 1973. A symposium and dedication of a memorial library, originally planned as a birthday celebration, was held on 13-14 September 2004 at the university.

Eckert was born in 1904 in Prague. He graduated from the German Institute of Technology in Prague in 1927 and received his doctorate in 1931. Intrigued by photographs of turbulence and separation of flow of heat, in 1934 he chanced upon Abriss der Stromungslehre, Ludwig Prandtl's introduction to fluid mechanics. This was a turning point in his intellectual development. It required a leap of the imagination to see that Prandtl's boundary layer theory could be applied not only to the flow of air over the wing of an air-plane but also to the complex processes involved in heat transfer. After study with an expert in radiative heat transfer, Ernst Schmidt, at the Institute of Technology in Danzig, in 1937 Eckert followed Schmidt to the Aeronautical Research Institute in Braunschweig, Germany, where Schmidt was head of engine research. During World War II he specialised in rocket and jet engine basic research and was involved in the problem of aerodynamic heating in connection with the supersonic flight of the V-2.

After the war he was among 260 German scientists invited by the US Government in 1945 to work in America under "Operation Paperclip." He joined the staff of the Wright-

Patterson Air Force Base in Dayton, Ohio, to continue his research on jet propulsion. In 1949 he moved to the Lewis Laboratory of NACA in Cleveland.

In addition to being named to the prestigious National Academy of Engineering in 1970, Eckert held seven honorary doctorates, authored more than 550 papers and books and received several medals for his contributions to science. His book "Introduction to the Transfer of Heat and Mass", published in 1950, is still considered a fundamental text in the field. Later on he became interested in solar energy.

Dr. Richard Goldstein, a colleague and former student of Eckert said that he was an excellent mentor to junior faculty and researchers, and he had a reputation for being warm and kindly. He was also a leading figure in bringing engineering in the East and West together during the Cold War years.

Eckert received several honorary doctorate degrees and awards, including the American Society of Mechanical Engineers' first Max Jakob medal for outstanding engineering in 1961, and a Fulbright Award in 1962.

Edited by Tony Burgess
from http://www.me.umn.edu/divisions/tht/symp2004/ and other sources

Please let me have news of combustion people to put in this section.

Tony Burgess

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BRITISH SECTION NEWS

MINUTES OF THE ANNUAL GENERAL MEETING OF THE COMBUSTION INSTITUTE (BRITISH SECTION) *held at 2.00 pm on Monday 20 September 2004 in the Møller Centre at Churchill College, Cambridge.*

Present:

Y. Wu (Secretary)	C. Lawn (Chairman)	G. Kalghatgi	S. Scott
D. Smith	A. Hayhurst	W. Green	A. Burgess
V. Dupont	P. Lindstedt	G. Rickett	F. Weinberg
J. Dim	A Rees	A. Tomlin	R. Sawyer
M. Delishatsios	A. Williams	S Mosbach	R. Stone
W. Jones	A. Snegirev	M. Braithwaite	S. Cant
C. Priddin	D. Greenhalgh	J. Qiao	S. Hochgreb
B. Moss	T. Lovas	C. Morley	T. Griffiths
Y. Hardalupas			

1. Apologies for Absence

Apologies for absence were received from D. Drysdale and P. Gray.

1. Minutes of the AGM, 18th September 2003

The Minutes were signed as a correct record.

2. Matters arising

The Chairman, Professor Lawn, reported that a ballot for election to the Committee had taken place in the AGM 2003. The most votes were recorded for Prof S. Hochgreb and she was duly elected. However there was a tie for second place between Dr A. J. Griffiths and Dr K. Syed. The Committee met on 2nd October 2003 after the AGM and agreed that both Dr Griffiths and Dr Syed would be co-opted to the Committee.

Dr C.H. Priddin has served his full term on the Committee and the Chairman expressed thanks for his service. As a result of the 2003 election, the Committee will continue to co-opt Dr A. J. Griffiths and Dr K. Syed. Therefore there is no need for an election this year.

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

4. Chairman's Report

The Chairman, Professor Lawn, reported that Dr. D. Smith has written up a history of the Section. It has been circulated to members. The article will be included in the Newsletter.

ECM2003 was a successful meeting. The call for abstracts for the next meeting ECM2005 has just closed. Greece will probably be the host for ECM2007.

Professor W. Jones has set up the Section's web page. The web address is: www.combustion.org.uk. Dr. C Morley is managing and maintaining the web-site. Combustion topics of current interest in everyday life or special topics (with links), and resources for teaching combustion in schools will be developed in the future.

Professor A.N. Hayhurst retired from his post as Editor for Combustion and Flame in August. The Committee recognised the significant contribution Professor Hayhurst has made to Combustion and Flame, and invited him to be an Honorary Life member of the Committee.
The Chairman expressed his particular thanks to the Secretaries and the Treasurer, and to Professor A. Burgess for producing the Newsletters.

5. Secretary's Report

Membership 2004:
The British Section currently has 186 members. The membership had been maintained at the same level as last year. Membership runs from January to January. A summary of the membership compared with the past three years is given below.

	absolute numbers				
	Dec 00	**Dec 01**	**Dec 02**	**Dec 03**	**Sept 04**
Number of members for year	219	194	185	194	186
of the above, no. of academics	124	92	106	124	126
of the academics, no. of students	30	15	23	30	32
of the academics, no. of retired members	7	9	10	13	15
of the above, no. of non academics	95	102	79	70	60
of the non-academics, no. of retired	20	21	19	16	11

Meetings

European Federation meeting 2003
The ECM2003 was held on 25th-28th October 2003 in **Orléans, France. The meeting was in poster format with invited plenary sessions. Prof. J. Swithenbank gave the first plenary lecture for the meeting.** There were 12 papers from the UK and authors who received travel grants sent in reports that were published in the Newsletter. The papers supporting the posters were published on CD, and will be on the ECM web-site for public access.

Spring Meeting 2004
The one-day spring meeting on "Sustainable Combustion" was held on 19th April 2004 in the Shell (Cheshire) Innovation Park. The Royal Society of Chemistry and IOP were the co-sponsors. A total of 45 people attended. There was very interesting technical content both in the presentations and general discussion.

30th International Symposium on Combustion, Chicago, USA
The 30th International Symposium on Combustion was held at the University of Illinois at Chicago from July 25th to 30th 2004. This Symposium marked the 50th anniversary of the founding of the Combustion Institute**.** There were 26 accepted papers from UK. The British Section sponsored 20 authors to present their papers.

Travel Grants.

Student Travel Grants 2004
This year the British Section made two student travel awards of £800 in total 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 at any time prior to the meeting with support from the supervisor.

List of Student Travel Grants Awards 2004:

Amit Bhave, Cambridge University Ian Hanley, Leeds University

30th International Symposium on Combustion
A total of 20 travel grants (total value of £8000) were also made to support the UK authors who attended and presented papers in the 30th Symposium.

List of Awards:

C.F. Kaminski	C.N. Markides	I.S. Burns	K.J. Hughes
C.J. Lawn	M. Lawes	I.S. Kim	S.A. Scott
J. Singh	F Cerru	J. F. Griffiths	S. Gashi
K.H. Luo	R.I. Backreedy	R.P. Lindstedt	A. Kronenburg
M. Kraft	H. Huang	S. Rigopoulos	J.R. Dawson

Travel Grants to the ECM2003
A total of 11 travel grants (total value of £2750) were made to support the UK authors who attended ECM2003.

List of the ECM2003 travel grant awards:

G. Rickett	C. N. Markides	N. Chakraborty	C. Coats
A. Williams	R. M. Woolley	Y. Wu	S. Rigopoulos
A. Tomlin	C. S. Panoutsos	C. Lawn	

Prizes

Sugden Prize
The Sugden Prize for 2003 has been awarded to M. Balthasar and M. Kraft for their paper 'A stochastic approach to calculate the particle size distribution function of soot particles in laminar premixed flames', published in Combustion and Flame 133:289 (2003).

Hinshelwood Prize for Combustion
The Hinshelwood Prize has been set up to recognise meritorious work in any branch of combustion by a young researcher (under 35) in the UK. The prize is £300 plus one year's free membership. The first Hinshelwood Prize has been awarded to Dr G J Sharpe of Birmingham University. The rules for the prize will be reviewed in 2004.

6. Honorary Treasurer's report

1. Our current total assets are £71951.

2. We have made 24 travel grants, mostly for the Chicago Symposium, worth £9600 so far this year. We are using our accumulated funds for this. Last year our expenditure exceeded income by £2265. This year this deficit will be over £6000. This is in line with the views expressed in previous AGMs that we should reduce our accumulated funds.

3. Membership income so far is £2408, about the same as at this stage last year.

4. Detailed account balance sheets are available.

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

6. The membership fees of the British Section will be increased to £20 from next year. This will be the first increase for many years.

7. Any Other Business

There was discussion on the rate of reduction of the accumulated funds. The general feeling was that it would be many years before the British Section hosted another International Symposium. Therefore the accumulated funds shouldn't be reduced too rapidly.

The meeting closed at 2.15 p.m.

Yajue Wu 20/9/04 (edited for the Newsletter)

BRITISH SECTION COMBUSTION INSTITUTE WEB-SITE

This site is now live. It can be viewed at www.combustion.org.uk

TRAVEL GRANTS

Student Travel Grants 2004

This year the British Section made two student travel awards (total £800) to student members as a contribution towards the cost of presenting their papers at combustion-related meetings. Student travel grants will continue to be available and application may be made anytime prior to a meeting with the support of the student's supervisor.

The following awards were made during 2004 and reports on the meetings attended are published later in this *Newsletter*:

Amit Bhave, Cambridge University
Ian Hanley, Leeds University

30th International Symposium on Combustion

Twenty travel grants (total £8000) were made to support the UK authors listed below who presented a paper at the Symposium:

R. I. Backreedy	KJ Hughes	R. P. Lindstedt
I.S. Burns	C.F. Kaminski	K. H. Luo
F Cerru	IS Kim	C.N. Markides
J. R. Dawson	M. Kraft	S. Rigopoulos
S. Gashi	A Kronenburg	S. A. Scott
J. F. Griffiths	M Lawes	J. Singh
H Huang	CJ Lawn	

EDUCATIONAL MATERIAL ON THE BRITISH SECTION WEB-SITE

The Committee has been giving some thought to how best to arrest the decline in the level of combustion research activity in the UK That this is taking place may be a matter for debate. We did have an extremely pleasing number of papers accepted for the Chicago Symposium, as this issue of the Newsletter testifies, but over the last two decades, our membership has declined and industrial activity is now rare. We believe that we should be taking steps to inform school-children and under-graduates about combustion science, in the hope that the population at large will be better informed about the importance of combustion, and that more students will find it worth studying in depth.

After discussions with school teachers, we have become convinced that the Web offers the only viable route to reaching a large number of pupils. With our own Web-site (www.combustion.org.uk) now running well for the membership thanks to the efforts of Bill Jones and the Web-master, Chris Morley, the obvious route is to assemble educational material there or make links to appropriate sites. Dramatic demonstrations would be particularly attractive, provided we can supply a commentary that gives a little of the scientific background.

We should like to hear your ideas on what should be included. Please talk to a member of the Committee.

Chris Lawn
Chairman British Section

BRITISH SECTION OFFICERS

At a recent committee meeting all the current officers were re-elected to serve for 2004-5. The rest of the committee expressed their thanks and that of the members of the Section for the work that the officers had done over the past year.

BRITISH SECTION PRIZES

For each year since 1986 the Section has awarded the **Sugden prize** for the best paper published by a member anywhere in that year. While the judging panel always does its best to consider all relevant papers, wherever they are published, it may be that some possibilities are missed. The Committee therefore wishes to remind members that they are encouraged to nominate papers published in any journal during 2004 for consideration. At least one author must have been a member of the Section at the time of publication.

Since the **Gaydon prize**, which has recently been instituted, is for the best paper with at least one British Section author at the previous International Symposium (Chicago 2004), there is less likelihood that any papers will be missed. Nevertheless, the views of the membership on worthy recipients will be welcomed.

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 including a description of their accomplishments in industry if appropriate.

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 (2005) 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 2004 to the Hon. Secretary of the British Section by e-mail or post:

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

The Sugden Prize for 2003

The Sugden Prize for 2003 has been awarded to M. Balthasar and M. Kraft for their paper 'A stochastic approach to calculate the particle size distribution function of soot particles in laminar premixed flames' published in *Combustion and Flame* **133**,289 (2003). This prize was presented to the authors at the recent Autumn meeting of the Section in Cambridge.

The Hinshelwood Prize for Combustion 2003

The first Hinshelwood Prize has been awarded to Dr G J Sharpe of Birmingham University. Congratulations to Dr Sharpe.

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TRENDS IN FIRE RESEARCH

Notice of the Spring 2005 meeting of the Combustion Institute (British Section)

The Spring 2005 Meeting will be in honour of Professor Dougal Drysdale on his retirement from The University of Edinburgh in September 2004. The topic will be Trends in Fire Research. The meeting will be held on Tuesday 19 April preceded by a dinner on the evening of Monday 18 April in London at a location still to be announced.

Members will be circulated with more details later. The organiser of this meeting is:-

Jose L. Torero
School of Engineering and Electronics
The University of Edinburgh
The King's Buildings
Edinburgh, EH9 3JL

Tel: 0131-650-5723
Fax: 0131-650-5736
E-mail: jltorero@staffmail.ed.ac.uk

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EUROPEAN COMBUSTION MEETING - ECM2005

The next European meeting will held in Louvain-la-Neuve, Belgium from 3 - 6April 2005. The organization of the meeting will be similar to that of Orleans (ECM2003). Preliminary information will be displayed on the website www.cstr.ucl.ac.be/ECM2005/. Contact:

Prof. Jacques Vandooren,
Chairman of the Belgian Section of the Combustion Institute,
CSTR Laboratoire de Physico-Chimie de la Combustion,
Université Catholique de Louvain,
Place Louis Pasteur, 1,
B-1348 Louvain-la-Neuve,
Belgium.

Tel: +32 10 472727 or +32 10 472761
Fax: +32 10 47 24 68
E-mail: vandooren@chim.ucl.ac.be

A BRIEF HISTORY OF THE BRITISH SECTION

The Section was formed essentially at the same time as the International Institute, largely under the influence of Sir Alfred Egerton, to whom (upon his death) the Proceedings of

the 1960 Symposium in Pasadena were dedicated. Although no record of the first meeting of the British Committee is available, the 1954 Symposium in Pittsburgh lists three members, Sir Alfred Egerton, Stanley Clarke (Joseph Lucas, Burnley, makers of engine ignition systems) and Peter Lloyd (National Gas Turbine Establishment). Others active in the early days were R.G.W. Norrish, J.W. Linnett and A.R. Ubbelohde.

It is clear from these earliest names that the Section had both academic and industrial involvement. This has continued, as has its wish to represent the full range of combustion science and engineering interests in its activities. In 2003, it had 194 members, comprising 123 academic and 71 industrial. It has always encouraged students to join; last year there were 30. Their special membership rate also applies to retired members; last year there were 29 such. The activities of the Section are overseen by a Committee, comprising 12-15, again endeavouring to represent the full span of combustion.

Particularly over the past few years, industrial membership has shown a gradual decline, largely resulting from the declining emphasis placed on combustion by Government and industrial organisations, including research-funding bodies. The view sometimes seems to be that combustion has been around a long time, so surely we know it all by now! Given the vast changes in choice and use of energy occurring now and set to continue and probably to accelerate, such a view seems grossly short sighted. It is causing increasing concern to members of the British combustion community, who sees its task as providing a counter-force to this, but it is an uphill struggle.

One of the main ways the Section communicates with members is through a Newsletter, produced several times a year. This has been highly successful, largely to the efforts of its editors. The last three of these have been Derek Bradley, Brian Tyler and now Tony Burgess. Each has carried it forward and made their own distinctive contributions to its development. More recently, this has been augmented by a web site. As well as providing a wider range of information to members, this can address a wider interest group and act as a possible recruiting mechanism.

The main Section activity has been and remains the organisation of one-day technical meetings - normally held in Spring and Autumn of each year. There used to be a third around early December. A major factor in these last being discontinued was an occasion when the meeting had to be cancelled at the last-minute because of inclement weather, with a sudden fall of snow playing havoc with road and rail transport. (Many of our European colleagues must continue to be surprised at how regularly such disruptions happen in Britain, given our relatively mild winters.) Late cancellations always provide severe headaches for organizers. This was no exception; lesson learned.

The Committee endeavours to make these one-day meetings varied in subject matter. A selection from the past decade includes Combustion in Gas Turbines; Industrial Combustion Hazards; Auto-ignition; Numerical Simulation in Combustion; and Flame Chemistry, to single out but a very few. The size of audience varies but is generally in the range 40-100. To increase their impact, meetings are normally held in conjunction with another group with a combustion interest, e.g. from Institute of Physics, Royal Society of Chemistry, or Institute of Mechanical Engineers.

Political developments in Europe have given a new dimension to our activities. We have been delighted to work with other European Sections in the organization of joint meetings. As well as their technical objective, these meetings provide enjoyable social occasions. In some cases, attempts have also been made to use them to stress a political message about the significance of combustion knowledge and so, hopefully, aiding Governments' future energy policies.

On an international level, the main events are the biennial Combustion Symposia. The British Section has been fortunate to organize four of these. Below are a few anecdotes, which hopefully capture some of the flavour of these meetings.

London/Oxford in 1958: Because it was over 40 years ago, few memories survive. But Tony Burgess, then a student (well it was a long time ago) does recall his supervisor, Charles Cullis, giving him £10 to cover attendance. This is the only Symposium held on split sites. The meeting began in London, with an inaugural lecture in the famous Lecture Room of the Royal Institution (where previous lecturers have been Faraday, Davy and Rumford). Then, with the permission of the Lord Mayor, Sheriffs and Corporation of the City of London, a Sunday evening gala banquet was held amid medieval splendour in the Guildhall. The traditional "Loving Cup Ceremony" lent emphasis to what Sir Alfred Egerton termed "the Brotherhood of Science - friends in search of truth" - still true today in the Institute.

Attendees then decamped to Oxford in a special train drawn by one of new gas turbine-powered locomotives, provided by British Rail. Unfortunately a technical fault occurred and the loco had to be replaced by a standard unit (plus ça change, …). The main technical part of the meeting was held here, with many delegates accommodated in the somewhat spartan surroundings of the old Colleges. Away from the main technical sessions, an informal discussion was held one evening on the topic "The Study of Combustion: Is it an Art or Science?", presided over by Prof. A.R.J.P. Ubbelohde. Worth repeating?

Cambridge, 1964: Having sampled the delights of Oxford, six years later the Symposium moved to the equally ancient surroundings of Cambridge. Again, much accommodation was provided in the colleges, which, although splendid architecturally, retained some of their historical character in a rather too practical way. One of the local organisers remembers a US guest and his wife, staying in college, asking if a shower was available. The Porter's face fell; he had never heard of showers - washing facilities were still provided by jugs of hot water being brought to bedrooms. Another problem arose with a couple booked into Pembroke College. The College Porter became very excited - a woman had never slept in the college before (?!). A rapid re-think was needed and the couple moved into a hotel.

Cambridge provided many delights for the Social Programme. The Banquet was held at Woburn Abbey. This sounds very grand, except for the fact, not fully appreciated by the organisers, that it was not in the Abbey itself but in a marquee in the grounds. It was a very cold night and the guests, in particular the accompanying visitors, were therefore not pleased that the speaker at the banquet felt it was the occasion for another long, and not very scintillating, plenary lecture.

Leeds in 1978: The Wednesday Outing was to the memorable Roman city of York, with its city walls and many ancient sites. As the entertainment, a baroque string quartet played in the Assembly Rooms. With the ancient surroundings of such a venue, surely nothing could go wrong. Unfortunately it did. Hoyt Hottel, stepping into the road, was hit by a passing vehicle and rushed to hospital for treatment to a nasty injury to his skull.

One of the cultural strengths of northern Britain is traditional brass bands and the Tuesday evening concert featured one. Derek Bradley spent considerable time over the previous three years, listening to possible choices before finally selecting one, the Imperial Metals Band. Subsequently, they came very close to winning the national brass band competition. Among the items on the programme was Tchaikovsky's "1812 Overture". To play on the combustion theme, it had been hoped to simulate the battle's cannon fire by real explosions; a serious snag arose - it proved impossible to synchronise these with the music. Nevertheless, Bernard Lewis was delighted with the evening and asked if he might go backstage afterwards to talk with members of the band.

The banquet was held in a marquee in the grounds of Harewood House The terrain was not entirely flat and one attendee recalls a somewhat doddery waitress knocking over a glass of wine while serving soup at the

start of the meal. The table sloped towards his wife and so the wine cascaded into the soup bowl, the contents of which flowed straight into her lap.

Edinburgh in 2000: This is still too recent to allow a proper perspective. But the organizers are grateful to Dan Seery, then Institute President, for effectively selecting the venue for the Welcome Reception. The local organizers had hoped to use the Royal Museum of Scotland for the banquet but it proved unable to cope with sufficient numbers. But, some months ahead of the Symposium, Dan was checking out facilities. While passing the Museum, he was shown it as a venue we had hoped to use. He quickly realised its potential for the Reception, and so it was back in the schedule – with Dan proved correct.

The Wednesday outing was at Oxenfoord Castle for an afternoon of Highland Games and BBQ. Although the skies were gloomy, no rain fell, even though a few miles away in Edinburgh itself, rain poured down.

Problems of acoustics arose in McEwan Hall: architecturally splendid but not designed as lecture hall. Further problems arose with the space for poster displays. Conflicts always tend to occur in meeting all requirements: one wants suitable lecture rooms and space for posters, close to each other and, ideally, to reception/registration areas. Few venues can manage all these constraints.

It's still too early for the author who was closely involved with arrangements for the meeting to have any real perspective on the event. But, if readers wish to contribute their own impressions, please send them to the editor.

David Smith

Editor's note: This article was prepared by Dave Smith using the reminiscences of members and it was used as the basis for the contribution from the British Section to the booklet compiled for the 50th Anniversary celebrations in Chicago.

An additional memory of the Cambridge Symposium comes from Peter Padley:

I have thought of one enduring memory, which may only be of appeal to me, but I share it with at least yourself. At the Eighth (Cambridge) Symposium, there was a Reception (organized by myself as 'Symposium Local Secretary') in the Dorothy Cafe. The Dorothy Café (an undistinguished name of itself) was in fact a Cambridge, indeed British, institution, sadly long gone.. It was perhaps the last 'Café' in Britain to continue the tradition of the afternoon 'tea dance'. The Reception on this particular occasion was no sherry and cheese affair. There was perhaps the most outstanding evening buffet I have ever attended, complete with a truly splendid 'orchestra', playing 'proper' popular music. One of the details I had to organize was the 'private' suite, hosted by Professor R.G.W. Norrish, as Head of Physical Chemistry, the Department responsible for managing the event. Most guests -there were some 750 people at that Symposium - some 'Café'!) had safely left, fully and most happily satiated, by about 1.30am However, jollities continued in the 'private suite' until about 3am when the manager most apologetically and deferentially spoke to me, to enquire whether there was any chance of impressing on Professor Norrich that there were tiresome things called licensing hours, and even a generous interpretation of our special licence for that night meant that he really had to find some way of bringing our proceedings to a close. R.G.W. was (characteristically on such occasions) was not for having his personal Symposium terminated, but we did work out a most civilised compromise, The Manager arranged for a suite of furniture (three-piece suite plus assorted armchairs) to be arranged, with considerable tact, outside the Café in Sydney Sussex Street!. It was a pleasant warm night and there was no traffic whatsoever

and so for an extra hour the 'Symposium' continued in this bizarre manner - a scene available for capture for anyone who would have wished for an unusual news item! We don't get characters like R.G.W. these days, nor, sadly, are times such when their eccentricities would be viewed with such patience and understanding.

Perhaps other members have interesting stories to tell. It is hoped to expand this history and members are invited to contact the editor with any interesting information and experiences about the activities of the British Section.

Tony Burgess

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.

ACCESS TO COMBUSTION AND FLAME VIA SCIENCE DIRECT

Members of the Combustion Institute can have full internet access to Combustion and Flame. The instructions which follow are on our British Section web site and the Pittsburgh site:

www.combustion.org.uk

http://combustioninstitute.org/Registration%20instructions_CI%20SD microsite.html

INSTRUCTIONS:

ACTIVATE PERSONAL ACCESS TO COMBUSTION AND FLAME by going to:

https://cs.sciencedirect.com/activate/combustflame/members

Note that “https://” MUST be entered for this URL – “http://” will not work. This is to ensure that your registration details are secured when you enter them into the registration form.

Enter the Activation Code combust3843. **This is for use by Combustion Institute Members only.** After entering, click on "submit".

Complete the user profile. You will be asked to fill out a form and choose a password. A username will be assigned. Both username and password will be case sensitive. After registration you can directly login with your new username and password.

Note! - please do NOT use special characters, such as ö, ä, æ when entering your personal details into the form.

In the future you can go straight to:

http://www.sciencedirect.com/combustflame

and enter your personal username and password in the login bar on the top of the page.

If you encounter any problems registering, please note that older browsers may not support SSL encryption, which is required for secure data transmission. Also, cookies must be enabled in your browser to support the registration process.

Should you require any assistance, please do not hesitate to contact the Customer Support department which, for customers in Europe is:

Telephone: +31 20 485 3767
Fax: +31 20 485 3432
E-mail: **nlinfo@sciencedirect.com**

BACKFILES
Combustion Institute members can access abstracts of the new Combustion and Flame Backfiles dating back to 1957. This is part of a major project by Elsevier to source and provide access to all journal articles back to Volume 1, Issue 1.

SUSTAINABLE COMBUSTION

A report of the Spring Meeting of the Combustion Institute (BS) held at Shell Thornton on 19 April 2004

The Spring 2004 meeting was on "Sustainable Combustion" and was held at Cheshire Innovation Park (Shell Thornton) on 19 April 2004. Shell Global Solutions kindly supported the meeting and Roger Cracknell was the local organiser. There was a reasonable attendance of 45, but the organisers would have slept better at night if half of them hadn't registered after the already tight deadline.

What exactly is meant by "sustainable" was never spelled out and the speakers had various takes on this.

Roger Cracknell of the hosts Shell was concerned with the manufacture of hydrogen on board a vehicle from hydrocarbon engine fuels, for use in fuel cell auxiliary power, combustion augmentation and exhaust catalyst regeneration. He had found that most gasoline components could be easily reformed, although heavier olefins tended to deactivate the catalyst. Heavier fuels tended to coke, but the "Gas to Liquid" fuels were less susceptible.

Valerie Dupont of Leeds described hydrogen manufacture by "unmixed reforming". The catalyst bed (typically Ni/NiO with $CaO/CaCO_3$) is successively reduced and oxidised by being fed with fuel/steam and air, producing a hydrogen and a CO_2 stream alternately. Experiments with a laboratory rig using methane found that coke was a 20% product, but this was not a problem since it was continuously oxidised, and 75% hydrogen selectivity with negligible CO production could be achieved. Future work will examine sunflower oil as a fuel.

Jonathan Puttock of Shell Global Solutions was concerned with hydrogen combustion hazards. This included jet flames, for example from a ruptured pipe, which are invisible during the day. Impressive videos of explosions in spaces with obstacles were shown. Hydrogen turned out to be not as violent as its high flame speed might have suggested, because of its sensitivity to flame stretch and its low density. Overpressures can be predicted by a phenomenological model.

Kevin Kendall of Birmingham described solid oxide fuel cells which are potentially the most efficient way of converting chemical to electrical energy. The fuel and air are separated by an ionic conducting ceramic membrane operating between 500 and 1000ºC with catalyst coatings. They are commonly applied as a pre-stage to increase the efficiency of a normal combustor. Siemens-Westinghouse make pressurised systems with gas turbines and overall electrical efficiencies of 70%, but are still expensive and with low energy densities. Birmingham's devices are small tubes, to avoid thermal shock problems and are targeted as a pre-stage for natural gas domestic boilers, where high efficiencies are not essential.

Jenny Jones (Leeds) is working on the classification of biomass fuels to assess their quality, since much of the biofuels available are diverse waste products. Alkali and alkaline earth metals in the ash (especially of grasses) can lead to slagging and fouling. We learned that the composition of rice straw ash was very similar to that of glass! The EPSRC's Supergen programme is addressing a range of techno-economic issues to facilitate biofuel use.

Tony Griffiths (Cardiff) discussed gasification of biomass, including wood and municipal wastes. The combustible gases produced are used in a number of ways, including in gas turbines. Gasification provides an attractive alternative to direct combustion, especially

from wastes, if cost effective gas clean-up can be applied, but most projects are only at the prototype stage.

John McMullen (Ulster) gave a talk with a more political tone in which he argued that the neglect of fossil fuel research in the European 6th Framework programme was unjustified. Power plant replacement in Europe and expansion in the developing world mean that a considerable number of coal-fired plants will need to be built in the next 25 years. With appropriate research they could be cost effective, reduce CO_2 emissions by increased efficiency and work towards sustainability by providing a route for introducing biomass or ultimately CO_2 capture.

The one and only perfect future was not on display at this meeting, but we saw glimpses of some of its possible components.

Chris Morley and Martin Brown

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

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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.

PARTICLES IN FLAMES

A report of the Autumn Meeting of the Combustion Institute (BS) held in Cambridge on 20 September 2004

The 2004 autumn meeting was held in the Møller centre at Churchill College, Cambridge on 20 September 2004. The Møller centre provided some excellent food and facilities that conveniently held just the right number of delegates. A tower with exterior balcony also offered a panoramic view of the Cambrige skyline but strong winds rather limited enjoyment of this – it would have been a great place for lunch on a sunny September day.

The conference, which also included the AGM of the British Section and the award of the Sugden Prize for 2003 and the newly instigated Hinshelwood Prize, concentrated on the formation of particles in flames and the modelling of such processes. The keynote speakers in the morning were Prof S E Pratsinis (ETH Zurich) and Prof P Roth (Duisburg-Essen).

Prof Pratsinis noted that current world production of particles using flame-like techniques is worth over $12 billion per annum and went on to outline how flame synthesis of a TiO_2 catalyst for NO_x breakdown offered significant improvements in efficiency over conventional wet synthesis methods. He also discussed the use of Si to limit the size of ZnO crystals so that all crystals would accumulate at the same size (chosen to give so called 'quantum dots') rather than establishing a self-preserving distribution.

Prof Roth had a striking illustration of the effects achievable with nano-particles – he highlighted data on the melting point of CdS which drops dramatically as the particle size decreases below 100nm. However, Prof Roth focussed on the formation of iron oxide from
$Fe(CO)_5$, speaking of the kinetic studies he had undertaken using a shock tube and some simulation work where the results showed considerable sensitivity to certain 'reverse' reaction rates. Finally he described how 'super-para-magnetic' silicon oxide can be made.

The morning concluded with the presentation of the Sugden and Hinshelwood prizes of the British Section. The Sugden prize was awarded to Dr M Kraft (co-incidentally the conference organiser) and his colleague Dr M Balthasar for their paper "A stochastic approach to calculate the particle size distribution function of soot particles in a laminar premixed flame", *Combustion and Flame* **133**:289 (2003). Dr G J Sharpe received the Hinshelwood prize for outstanding work by a younger researcher.

The afternoon sessions consisted of 7 shorter presentations.

Allan Hayhurst (Cambridge) described work on metal oxide formation, where concentrations were so low the particle distribution barely changed after inception was completed in the region near to the burner face. Much of the data he presented was collected using a 'Differential Mobility Spectrometer'.

Nick Collings from the manufacturers, Cambustion (www.cambustion.co.uk), outlined the principles of this instrument and mentioned some of the work done to develop its useful operating range. Cambustion also exhibited one of these instruments – a DMS500 - to delegates and demonstrated it using some cans of smoke.

Roy Crookes (Queen Mary) gave some details of how soot particles vary depending on the conditions in which they form and grow, in particular how leaner flames in his spray burner led to larger primary soot particles but with extended spacing between the graphitic layers.

Murray Height (ETH Zurich) presented some of his work carried out at MIT in which iron particles in flames are involved in the production of single walled carbon nano-tubes.

Barry Moss (Cranfield) presented detailed simulation/calculation results for a kerosene combustor which showed encouraging agreement with optical measurements taken on a range of ray paths leading to a single sampling port.

Mike Westwood (Huntsman) told us of a model taken from papers published by Prof Pratsinis a few years ago that his firm have found useful when applied to their TiO_2 reactors. He said they had also been able to use more recent models to calculate more detailed particle population information in simple flow situations, but they were not yet able to generate such information for more complex flows.

Peter Lindstedt (Imperial) noted that flamelets parameterised by mixture fraction cannot provide an accurate description of turbulent flames and described some of his transported PDF work. He emphasized the importance of accounting for radiation in order to model temperature accurately and showed successful predictions of flame properties.

At the end of the conference a dinner was held in Churchill College to commemorate the 50^{th} anniversary of the British Section of the Combustion Institute. Felix Weinberg entertained the diners with his account of the history of the British section and some of its notable figures.

Robert Patterson

Editor's note: This report was extracted and edited from:-

www.cheng.cam.ac.uk/research/groups/como/pictures.autumn_meeting.html

which also includes some photographs taken at the meeting.

THE BRITISH SECTION: THE FIRST FIFTY YEARS

Felix Weinberg

After the dinner to celebrate the Fiftieth Anniversary of the British Section, held on the evening after the Autumn Meeting at Cambridge, Felix gave a fascinating talk about some of his memories of the early days of the Section. I felt that it should be read by the whole membership and I persuaded him, much against his better judgement, to allow me to publish it here. My Editorial tells of how this was achieved. It has been slightly edited but is almost exactly how it was given.
Tony Burgess

Ladies and Gentlemen, or rather fellow members of this august Institute: I do not generally do anniversaries. However, this is such a special occasion and I felt very honoured to have been asked - even though I am quite clear this is not due to my brilliant insights into combustion research but rather to my extreme old age! There is, I suspect, an underlying assumption that, although I can't remember what happened yesterday, events of fifty years ago are still clearly etched on my mind. That may turn out to be a fallacy in the case of someone who might have only about seven neurons left! I thought the late Bob Hope put it rather well when he was asked "how does it feel to be old?". He said something like "To tell you the truth, I don't feel anything before noon and then it's time for my nap".

I'm not quite sure what Chris (Lawn) expected of me but I thought it would be appropriate to reminisce a bit and to pay tribute to a few people who are sadly no longer with us, all of whom did great things for the British Section. So, if I don't mention anyone here, it is only because you all appear to be still alive.

The first of my heroes must unquestionably be Sir Alfred Egerton. When I first met him I was a humble Research Assistant and he was Head of Department, yet shortly after that he gave me, as a wedding present, three volumes of one of the first editions of Count Rumford's Essays. This was over fifty years ago, but they're still a treasured possession of mine. Sir Alfred then worked on the role of peroxidic radicals in knock. Together with Powling he developed the first premixed flat-flame burner and he was involved in many other research programmes which are still relevant today. The former President of the Technion once told me that he had been Sir Alfred's Ph.D. student during the war and his project involved running London buses on methane.

As you know, Sir Alfred was the founding Chairman of the British Section. Perhaps it is less well known that he also edited *Fuel* and was the founder and first editor of *Combustion and Flame*. He was the organiser of the Oxford Combustion Symposium and, of course, he was also Physical Secretary of the Royal Society, he was Director of the Salters Institute, he chaired dozens of other committees, he was the planner of the first extension to our Department – to mention just a few of his activities. He was also a talented painter (we still have several of his pictures). I discovered that he was also a pioneer of colour photography when on one occasion we turned up for a party a week early. The Egertons of course would not let us go, and he showed me large glass photographic plates taken with one of those bellows cameras, superimposing three exposures taken with different colour filters which resulted in really wonderful fine-grain colour photographs. Sir Alfred's knighthood was actually for scientific services to India. He was involved, with the help of Peter Moore, in setting up the Indian Institute of Technology, I believe.

Of course Sir Alfred **did** come from a privileged background. I find that what many combustionists have in common is that at some time in their youth they blew up perhaps a garden shed – well, Sir Alfred described with much glee how he demolished the servants' quarters. He had a sly sense of humour: In the difficult times after the war he had problems in procuring most things required in expanding the Department, including laboratory furniture. He told us how he had to indent for "physical tables" in order to get some laboratory benches.

Yet in spite of all this activity, he was always totally available and unhurried. He greeted everyone with a smile and in all the years that I have known him I never heard him say a censorious word about anyone. He died in 1959 aged 72. Many years later I asked Lady Egerton, who survived him by almost 20 years and who remained in touch with us – in fact Jill just reminded me that she knitted baby clothes for our twins – how he managed to get through all this mountain of work. She told me that he very often got up at four o'clock in the morning and then worked solidly until it was time to go to College!

The Treasurer of that founding British committee was J. S. Clarke - Stanley Clarke. He directed Joseph Lucas' engine ignition systems and he had that vision that fundamental research had something to contribute to industrial engineering practice. That was **not** regarded as self-evident at the time, even within his own organisation. I was consultant to Lucas Aerospace at Burnley for many years (very probably due to his influence) and the place was full of people who had deep empirical knowledge of where to drill holes in a flame-tube if you needed to shorten the flame - together with a sound contempt for academics. I think they felt that we unnecessarily complicated problems - rather as expressed by Poul Anderson when he said "I have yet to see any problem, however complicated, which, when you looked at it in the right way, could not become still more complicated". Actually their point of view is understandable if you consider how far the internal combustion engine or the jet engine was developed with nothing more than simple thermodynamics, well before any combustion theory came on the scene. However, Stanley Clark, under the influence of attending these Symposia, introduced a Longwell-Weiss highly-stirred combustor to Burnley and they actually published papers relating blow-out to flame-tube loading in a jet engine. They seconded Alfred Harrison to do a PhD with me. We were studying the effect of radicals from plasma jets and showed that by injecting radicals that way you could greatly extend the stability of lean burning with very small amounts of electrical power. I guess we were about thirty years too early! However, I believe that it is due to the influence of enlightened industrialists like J. S. Clarke that nowadays it isn't unusual to meet mechanical engineers with amazing knowledge of detailed radical chemistry or, for that matter, physical chemists who are very handy with CFD.

The second Chairman of the British Section was Jack Linnett. He was, at various times, Professor of Physical Chemistry at Cambridge, Master of Sydney Sussex College, he was on the Council of the Royal Society, he was President of the Faraday Society and eventually became Vice Chancellor of Cambridge University. In 1954 he was also my PhD examiner, after which I never felt quite the same about his beetling eyebrows. That unease persisted until many years later when we sat next to each other at the dinner following my Plenary as Professor of Combustion Physics, at which he proposed the vote of thanks, and it turned out that we shared a common interest in stick insects. To be more accurate, his family seemed anxious to dispose of them and we were looking for some inoffensive pets for our children. They had a rabbit but he was so aggressive that you had to be very careful about how you approached him. Now you might well think that stick insects are not as cuddly as rabbits, but on the other hand you can't transmit rabbits in a brown paper envelope. What I had no knowledge of at the time was anything regarding the love life of stick insects. It turns out that you don't need two of them to produce a large family; a female will do. They lay eggs in huge numbers with very little provocation, nor

are the next generations inclined to stay inside jam jars. Well, to cut a long story short, there was a mass escape and when they were all over the curtains Jill flipped - God knows why. I will spare you the gruesome details of how to dispose of a large number of stick insects in case there are any animal liberation activists amongst you.

Jack Linnett's obituary appeared in the very first British Section Newsletter. I have this historic document here. It is dated December 1975. Actually what I have here is my draft for the committee, but it wasn't changed. It turns out that I have a complete file on my years as Chairman. One reason that I can't leave Imperial College is my six full filing cabinets there. The first item in the Newsletter reads

> *Professor J. W. Linnett, F.R.S., Master of Sidney Sussex College, Cambridge, died of a heart attack in the Athenaeum on 7th November, only five weeks after ceasing to be Vice-Chancellor of the University. He was 62.*

I'll leave the Newsletter for your inspection because it occurs to me that many of the younger members of the Section may never have seen a document produced with Roneo stencils.

Next, I would like to say a few words about Morris Sugden - I should say **Sir** Morris Sugden but we all knew him as Morris - and also Colin Quinn of Shell Research. I wanted to celebrate particularly what they did for the finances of the British Section. Morris of course died only twenty years ago, so many of you will have known him and have your own memories. Morris Sugden was yet another combustionist who was greatly distinguished and so very busy that it is amazing that he did so much for the British Section. He was, at various times, Physical Secretary of the Royal Society; he was Master of Trinity Hall. At the Tokyo Symposium, Morris astonished everybody by giving the banquet speech in Japanese. Of course he got a standing ovation for that. Some years later during a sabbatical at Tokyo University, I asked my Japanese friends what he said. They said they had no idea, as nobody could actually understand him. Having known Morris, I suspect that he dug up some ancient form of Japanese - you know the kind that is now only spoken by the Imperial household. At the time I am talking about he was running Shell Research and I remember him telling me how he was **not** looking forward to pinning some kind of annual awards on to the chests of deserving Shell employees because of how careful he had to be in pinning them on the ladies. Morris was Chairman of the British Section until 1976.

I need to say a few words about the financial relations with the American Headquarters. I have to be a little careful because we have with us, in Bob Sawyer, a past President and his First Lady, but he is practically a member of the British Section anyway (*in fact he is now a fully paid up member! Editor*). The Combustion Institute was incorporated in the State of Delaware on the first of July 1954 and, for the first fifty years, all the Presidents were American. To begin with also, all the finances were handled in the US. For the early Symposia we applied for travel grants to Pittsburgh. Well, Morris soon realised that a serious source of income for the British Section could only arise from us organising major meetings, and he got the Combustion Institute to agree to sponsor the first European Symposium. That was the first Combustion Institute - sponsored Symposium in between the International Symposia that was held outside America. It was held at Sheffield University. As Chairman of its Programme Subcommittee, I am scarred by some painful memories of the Symposium, but it was the first major boost to our finances.

I took over from Morris as Chairman of the British Section from the time of the Sixteenth Symposium (1976, at MIT) to the Eighteenth Symposium at Waterloo, and that also included the Seventeenth Symposium at Leeds. At the time Raymond Friedman was

President. As it so happened I knew Ray very well, ever since the Fourth Symposium where we both had papers on measuring temperature distributions in flat flames. He used thermocouples; I used refractive index methods. Well, we discussed finances when he stayed with us on his way to inspect Leeds and we came to what was then quite a unique financial arrangement. The International Combustion Institute would underwrite any major losses, but the British Section would be allowed to keep any profits. (I believe that subsequently this arrangement turned out not to be very popular with Pittsburgh, though I understand that nowadays profits are shared.) In return, we agreed not to apply to Pittsburgh for travel grants in future. Morris Sugden was chairman of the appeals committee for Leeds. He mounted a highly successful appeal and, together with the brilliant efforts of all the people at Leeds University, the Symposium made a substantial profit. Colin Quinn, who sadly also died recently, was Treasurer and he was instrumental in registering the British Section as a charity, which has important tax implications. That is how the financial health of the British Section was first established.

I had better not go on for too long. Although I have concentrated on a handful of individuals who are no longer with us, it is clear that the main strength of the British Section has always been that people who didn't really have **any** time to spare, nevertheless chose to, and managed somehow, to devote themselves to its outstanding success - a tradition that continues to this day.

I assumed that I was expected to speak of the past but what about the future? I was actually rather taken aback by Chris' quotation from Bernard Lewis in which he implied that all the major work in combustion had already been done. That is certainly not how it developed in my view. I remember Walter Berl, at one of the early Combustion Symposia, recounting the advice of his Ph.D. supervisor. Walter was in the process of looking for a research topic and his advisor said to him "Be sure to chose a subject that will not be solved in your lifetime". That, of course, was much more than fifty years ago, and I think he chose the right subject. It always seemed to me that King Alphonso of Castille might have been speaking about combustion when he said in the Thirteenth Century (actually I believe that he was having the Ptolemaic system of natural philosophy explained to him) "If the Lord Almighty had consulted me before embarking on Creation, I should have recommended something simpler". As I see it, I don't think that any of you need worry about having picked a subject that will be solved in your lifetime and, in view of this happy thought, I should like to propose a toast to the next fifty years of the British Section.

THE THIRTIETH INTERNATIONAL SYMPOSIUM ON COMBUSTION, 25–30 JULY 2004, CHICAGO, USA

Members receiving travel grants from the Section to help them attend the Symposium were asked to contribute a short article to the Newsletter about their experiences. Most did! The result, somewhat edited appears here. I have taken out parts which duplicate information and I have omitted most references to how grateful members were to the organisers and to the Section for the grants.

Tony Burgess

When applying for the support of the British Section to travel to the 30th Combustion Symposium I was naturally aware of the requirement to write about my impressions of the meeting. It worried me at the time that my close involvement would make it difficult to do so. How true. It now seems a long time ago, but shortly (about 10 minutes) after it was announced in Hakone that Ron and I would take on the job of technical co-chairs for the meeting, Elaine Oran kindly quoted Heinz Wagner "This job will give you many enemies and the worst is that you will not know who they are". Thankfully, the main impression that remains is that we genuinely are a scientific community and one that has consistently grown in strength over the last 50 years.

The continuing quality and interest in the meeting is reflected by the fact that 772 papers from 34 countries were submitted of which 321 could be accepted for presentation. It simply remains the premier meeting place to report scientific advances. There were 310 submissions from the US, followed by Japan with 104, the UK with 56, Germany with 50, France with 42, China with 30, and all others with lesser numbers. It was good to see that the British Section has done well. The scale of the meeting is perhaps better apparent from the fact that in excess of 500 reviewers provided more than 3000 reviews during the period December 2003 to February 2004 in order to provide guidance to the 33 Colloquium Co-Chairs in assembling the programs for the 12 constituent colloquia.

The idea of introducing five Fiftieth Anniversary Lectures to celebrate the advances (past, present and future) appears to have been well received. Furthermore, having had the pleasure of reading the associated papers, I am convinced that their value will remain. The topical reviews covered areas from astrophysics to fuel cells – surely an indication of the breath and vitality of our field. In a sign of the times, however, Andrei Starikovskii could not give his Friday lecture on plasma combustion due to travel difficulties. The lecture was instead delivered by Dr Julian Tishkoff of the AFOSR who did such an excellent job that many did not realize until rather late what had happened. Given that we could not confirm the difficulties until the day of the banquet, an award of some sort would have been in place. Travel difficulties also affected one of my students who could not obtain a visa in time. I am thus well aware of the disappointment that such trouble can cause and my hope is naturally for greater stability in the future.

Chicago was probably a pleasant surprise for most visitors. The city is clean, friendly and with an excellent choice of restaurants and food for thought. The local organizers deserve much credit for their efforts - as does Ed Law for his tireless efforts in keeping all things on schedule. Perhaps most of the readers of this column are so used to seeing gratitude expressed to Sue Steiner Terpack that little notice is taken. However, one of the technical co-chairs for the next meeting did suggest that he would not take on the job unless Sue remained in place. Very wise, and I look forward to an excellent meeting in Heidelberg.

Peter Lindstedt

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The old… Having missed attendance at the Japan meeting and having been intimately involved with organisation at Edinburgh, I am a few years adrift from experiencing the combustion symposia as a "paying guest". I have very fond memories of my early experiences. (Perhaps, in the fullness of time, Richard will look back on this one in a related sort of way.) Much of the beguiling simplicity of the early days has long since gone, but how it has all matured into a slick and professional operation! For that the credit must go to Ken Brezinsky and his colleagues on the ground in Chicago, and to the programme chairs, Ronald Hanson and Peter Lindstedt, for academic matters. My technical interest was drawn more to the chemical kinetic presentations than has been the case hitherto, and excellent work there was presented in these sessions. Do I detect a greater "applied" content than has been the case in the past? However, it was a special privilege to enjoy the plenary lectures commemorating the 50th anniversary. This really was a distinguished part of the meeting.

My experiences of Chicago go back even further than that of the symposia and it was great to have the chance to re-visit this wonderful city – timed perfectly for the opening of the "millennium park" apparently! Yes, projects are very late and over budget in the US too, but it least it is a magnificent legacy to the city – which is more than can be said for structures closer to home.

and the new… I felt very privileged to attend the Symposium. With such a high standard and wide variety of lectures I was often torn between two or more. Each day began with a plenary lecture, all of which were interesting and informative, particularly the review of the history progress and future aims of computational combustion. The conference marked the 50th anniversary of the Combustion Institute which is also, coincidentally, the age of computer simulation. Dr. Charles Westbrook, whose respected reaction mechanisms I have been working with, took this theme on board in relation to combustion chemistry modelling, a field of great interest to me.

Another highlight for me was the presentation of our own contributions by my supervisor Prof. John Griffiths in the kinetics forum. The talk on "The role and rate of hydrogen peroxide decomposition during hydrocarbon two-stage ignition" was well received by the international audience and this gave me great confidence.

Chicago provided a great venue for the Symposium. The city skyline is awesome, dominated by impressive skyscrapers. Many of these buildings were the first of their kind and catch the imagination with ornate pinnacles.

For a first year student such as myself, the Symposium provided an excellent opportunity to enhance and consolidate my knowledge, and to put faces to many of the names I have read.

John Griffiths and Richard Porter

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This was the first time that I had had the opportunity to give a talk at a major conference. My presentation was well attended and generated a lively discussion at the end. I had been slightly apprehensive that I might be asked some tough questions about my work but was relieved to find that that I could answer them all satisfactorily. Most of the papers on diode laser sensing were concerned with absorption spectroscopy, whereas my contribution was on diode laser induced fluorescence. Only the latter is capable of achieving measurements with high spatial resolution. The conference was a good chance to get an idea what other research has been done recently in my own area of interest and also to gain an insight into some other aspects of the field. The large number of parallel

sessions meant that there was a lot of rushing around between lecture rooms. There were numerous opportunities to interact with other researchers, forming contacts that could lead to future collaborations. I also got some time to explore Chicago and find some of the local blues clubs!

Iain S. Burns

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The 30th International Symposium on Combustion, marking the 50th anniversary of the Combustion Institute, did not fail to impress. A selection of plenary lectures, covering important fields of combustion research such as combustion theory and modelling, turbulent combustion, diagnostics and chemical kinetics, epitomised the effort and the achievements made in these areas by the combustion community during the twentieth century, as well as pointed the way towards unresolved issues that we must address in the future, particularly in turbulent combustion. Apart from these plenary lectures, a number of topical reviews occupying a time slot of two normal presentations were delivered by eminent researchers. It was refreshing to see that along with established areas, such as LES for turbulent combustion (J. Janicka and A. Sadiki), these reviews covered lesser-known topics such as astrophysical combustion (E. Oran), plasma supported combustion (A. Starikovskii) and an excellent review of fuel cells by R. J. Kee (paper jointly with H. Zhu and D. G. Goodwin).

Stelios Rigopoulos

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This was my first Symposium and nothing had prepared me for the size of the gathering. The sheer amount of work being presented was impressive, especially given the breadth of subjects covered. A week was certainly not long enough to take everything in. The plenary lectures were one highlight of the Symposium, being both informative and, in some cases, quite entertaining. It can be difficult sometimes to understand very detailed work outside one's own particular field. However, the plenary lectures managed to give a good introduction to various aspects of combustion, understandable to all, without losing too much in terms of the quality and depth of the technical information presented.

The posters also proved to be interesting. At other conferences, posters tend to take second place to the paper presentations. This was not the case at the Symposium; the poster rooms were full of lively discussion, catalysed by the high quality of work on display. In some respects, presenting poster seemed to have distinct advantages over giving a paper. Posters seem to provide a superb way to get people talking in detail about your work, without the time constraints imposed on the question time in a formal presentation. It is also an excellent way of meeting new people and making research contacts. Of course, the stress associated with giving a poster is rather less than that for a paper presentation; I was personally very daunted by giving a paper presentation (mainly because the quality of audience was very high!).

During the Symposium we met one brave environmentalist, who was accosting delegates to gain support for new measures to limit mercury emissions from coal-fired power stations. I don’t think he realised that there was a conference on, or what it was about. Ironically, he would have benefited from some of the paper presentations that day.

Chicago itself is a wonderful city, with some impressive architecture. Of course, it was very difficult to get a decent cup of tea in Chicago; those staying in the self-catering

accommodation will probably sympathise with our plight. Our sole means of making tea (a lone pan left in our flat by mistake), was removed on the Wednesday!

All in all, it was a very good Symposium with very interesting work being presented. I gained much from the experience of presenting a paper, both in terms of the resulting discussions with international experts and also in making good contacts with other researchers. I look forward to the 31st Symposium in Heidelberg, but will be sure to take some tea bags and the wherewithal to boil water.

Stuart Scott

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The organisation of the colloquium was excellent as many sessions were happening at the same time permitting to always attend a conference related to one's field of interest. Moreover, the work-in-progress poster sessions provided an easy way to meet scientists and discuss about common subjects of work. Also, it broadened my knowledge by discovering other aspects of the research currently performed in combustion. The five plenary lectures celebrating the 50th anniversary of the Combustion Institute were an excellent way to review a broad spectrum combustion research fields.

On the social side, the organisation of concerts and diners by the committee were excellent. These were genuine opportunities to relax and meet people in an informal environment. The knowledge and experience gained during the Symposium will benefit me greatly.

Fabien Cerru

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I haven't been to a conference of this scale before, and I really enjoyed every aspect of it, academic and non-academic. The conference was really well organised. The technical program consisted of seven parallel sessions of oral presentations of contributed papers, and also work in progress poster sessions, which were presented throughout the week. Every morning the program started with a plenary lecture that was given by distinguished scientists in the combustion field in order to commemorate the 50th anniversary of the Combustion Institute. The balance for these lectures was also very good. The review included achievements and advances made in combustion science during the last 50 years, and made some predictions to what we aim to achieve in the future. Theory, computational simulations and advanced experimental methods were covered. Being a student, I found these lectures extremely valuable, as they gave a very good background of combustion science. For the parallel sessions, I usually tried to attend the ones that were of direct relevance to my work.

The poster sessions presented more up to date work in all areas of combustion, and I found these much more interactive and very interesting, during which I had a chance to widen the scope of my knowledge in the other areas of combustion science, different from my own.

In this conference I presented a paper and a work in progress poster. In the paper, "Curvature and wrinkling of premixed flame kernels – comparisons OH PLIF and DNS data", we compared and analysed advanced experimental results obtained from laser diagnostics, with state of the art three-dimensional numerical simulations, in order to improve the understanding of the fundamental processes involved in turbulent premixed flames. The session I presented was in turbulent premixed flames that lasted one full day,

and included presentations on both experimental methods and computational modelling. My paper was very well received, and I had some very useful discussions during that day, that will help me to carry out my present PhD work more successfully. I have also made some very useful contacts with several groups for future collaborations. The overall conference was a success, and I feel it was extremely productive for me.

Sara Gashi

❸❶th ❸❶th ❸❶th ❸❶th ❸❶th ❸❶th

Chicago – what a great City for a Symposium and to celebrate the 50th Anniversary of the Combustion Institute. I tried to visit as many presentations as I could absorb, in particular outside my direct research area, but the sheer size of the Symposium and the many parallel sessions made it difficult to cover all the interesting lectures and – after more than 5 days – to give the deserved tribute to the last lecture that I attended.

The Symposium is a very good venue to meet everyone, the satellite workshops are even better to discuss present and future research projects. I participated in the "7th Workshop on Turbulent Diffusion Flames" that promotes collaboration of experimental and computational researchers on specific topics of non-premixed combustion. One of the workshop's aims is the direct comparison of computational results of different international research groups and it thus provides an important insight into the quality of the various results. Needless to say, that the British contributions were of leading quality and generated countless discussions.

I used some of my time during the Symposium to put the finishing touches on the organisation of the "Workshop on Conditional Moment Closure" that was held the Saturday after the Symposium. The community that is most active in CMC modelling is relatively small and scattered all over the globe. This is why we decided to seize the opportunity of the global character of the Symposium and introduced special informal workshops on CMC the Saturday after the main event. (Almost) all the major CMC modelling groups participated and the very open discussions have given lots of impetus for new research ideas and international collaboration. All in all, three very good meetings.

Andreas Kronenburg

❸❶th ❸❶th ❸❶th ❸❶th ❸❶th ❸❶th

The 30th Symposium coincided with the 50th anniversary of the Combustion Institute and, as such, each morning eminent researchers in combustion theory, turbulent combustion, laser diagnostics, elementary reactions and computational combustion gave an anniversary lecture on the development and future of their research fields. After a couple of interesting but non-engaging presentations, an exemplary plenary lecture was given by Katharina Kohse-Höinghaus on laser diagnostics. The rousing applause she received at the end echoed this sentiment. On the Thursday morning Juergen Troe delivered what I thought was an equally good presentation and jokingly remarked that he unfortunately had to present after Katharina. Unfortunately on Friday I didn't attend C.K. Westbrook's lecture as I elected to work on my presentation that was later in the afternoon.

To start my first Symposium I attended the laminar flame dynamics section of which one of the British contributions was particularly interesting. For the final morning presentation I moved to the turbulent flames session to see the presentation by J. Hult et al. For me, this was one of the outstanding papers of the combustion Symposium. It experimentally measured extinction and re-ignition events in a turbulent jet diffusion flame using simultaneous multi-scalar and PIV measurements. Multi-scalar laser measurements were

certainly a technique that was well represented in the Symposium. Unfortunately, many of the presentations I attended included very impressive results but spent too much time on the experimental setup at the expense of an in-depth analysis. I made a mental note to improve my own future presentations in this way.

By the end of the first day I was glad to have met up with many post-doctorate colleagues that I have met over the last couple of years at various other conferences. Over the week I predominantly attended the turbulent flames, diagnostics and any other sessions that had presentations covering the broad field of combustion instability and laser diagnostics. Although one session was aptly titled 'flame acoustics and instabilities' perhaps many more sessions under this heading would have been useful considering the number of papers concerned with the subject. I didn't even get a chance to take a few hours off to attend some cultural sites, as there was always a paper presentation I was interested in attending.

On Wednesday afternoon I had my first wander around the city with some colleagues. I was very impressed by Chicago. Early in the evening we headed down to the Navy pier for the arranged picnic. After the picnic (I think a buffet dinner is actually a more apt description) there was live music adjacent to the dinner venue, which a group of us enjoyed listening to. Those in the know realised that the beer was $1 cheaper outside of the dinner venue and ventured outside to bring back rounds. The evening finished with an excellent fireworks display.

Unfortunately my presentation was on the final day, first in the afternoon and to top it off there was a change of session chair at the last minute. Arriving early I was surprised to find out that the new chair was Jay Keller, one of the biggest contributors to the field of pulse combustion. This of course only made me more nervous especially as I had the only pulse combustion paper in the Symposium! However, after introducing myself we had a great conversation. Hopefully it was the first of many.

James Dawson

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This was my first time to experience the US and my first time to attend such a huge and high standard international conference. I was so excited that I began to prepare the travel in the middle of April, getting my visa to the US, booking the flights and accommodation, contacting my friends who are in the US. Knowing that my boss will present our paper, I set my main objective to the Symposium to expand my horizon and communicate with other colleagues who are doing the similar research in hope to stimulate some new idea.

The Symposium was structured in three parts. I enjoyed the most in the plenary lectures since they provide me the historical background and comprehensive view of each selected subject. I also enjoyed the poster section because where I can discuss freely with the authors to understand what their notions are and what they are doing. However, I spent most of the time in going around oral presentations. I was really astonished by knowing so many scientists who have been doing combustion research and so many subjects on combustion research are carrying out by these fellow combustion scientists. At the opening ceremony, the president, Prof C. K. Law, asked us to imagine what the combustion research look like in 50 years. A question suddenly occurred to me: Would we accept one of the many scenarios that is by then we do not have to use combustion as the main power supply any more because people has begun to worry that so much carbon-dioxide and other pollutants produced through combustion might eventually destroy our habitat?

Haitao Huang

❸❶th ❸❶th ❸❶th ❸❶th ❸❶th ❸❶th

Arrived the Saturday afternoon to Chicago. No problems getting to UIC, efficient train service run by the Chicago Transit Authority – think of the underground from Heathrow to central London, but imagine it for just £1! Very pleasant accommodation in Thomas Beckham Hall, lots of university sports facilities nearby, with an excellent view from my 4th. floor room of the adjacent Baseball pitch that hosted numerous games during my stay. The location for the meeting was ideal, being about 20 minutes walk from the city centre, and with lots of restaurants close by, especially in 'Greektown' 5 minutes walk away. Given my presentation was on Tuesday morning, I concentrated on final preparation and practice of it beforehand, which paid off as I was very pleased with how my talk went. After that I was able to relax more, and enjoy the rest of the meeting.

In general I thought the meeting was well organised, the Tuesday evening blues concert was excellent, and not quite what I expected due to the extrovert nature of the singer getting a lot of audience participation in the show. The Sunday beforehand and Wednesday afternoon gave me plenty of time to have a look round the city, which is very striking, on a scale that dwarfs anything here in the UK. Wednesday evening's event was a meal on the Navy Pier jutting out into Lake Michigan, with excellent views back towards the city. This was the one aspect of the organisation that could possibly have been better, although the meal was very good, selling drinks for $6 for a bottle of beer seemed excessive. Fortunately however, further down the pier was a beer garden with a live band playing and more reasonable beer prices, that attracted a significant number of the participants once the meal had finished.

Kevin Hughes

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The wide variety of combustion topics covered provided me with a chance to see what the wider combustion community is interested in and challenged by. As far as my specific topic, experimental turbulent autoignition is concerned: I was very pleased with the high standard of work presented. I had the chance to meet and discuss relevant issues with many people from around the world and also from a variety of backgrounds: mechanical and chemical engineers, experimentalists, mathematicians and more.

The social events were very pleasing and it was refreshing to meet up and discuss with my colleagues outside the usual context of the university environment. Overall, the event proved to be for me a great opportunity to reunite with and also meet many more people that are interested in combustion and to share ideas and knowledge with them. It was held in wonderful city that I will remember for the ample food and good music!

Christos Nicolaos Markides

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It was a great opportunity to meet other people who have same interest over the world. I was very happy to present my work and be proud of contributing something useful to combustion community. It was the first time to attend the conference and really welcoming and friendly environment. Presenting my work was the main thing to attend this conference but knowing other people and changing information were also one of important learning.

This conference clearly provides the future of combustion. Yet the combustion theory is not saturated, more interaction needed between physical (experiment) and computational works that suggests there are a lot of unknown nature of combustion.

The program was parallelised to 7 sections, if it was just fewer sections then it would be good to attend all other interest presentations.

Many people presented in similar interested area such as 'scalar dissipation rate', 'PDF', '2nd order moment closure', 'double condition'… etc. that was really interesting and that may help and direct my study.

Ik Soo Kim

❸❶th ❸❶th ❸❶th ❸❶th ❸❶th ❸❶th

The Symposium got off to a good start at the reception in which we were able to meet with old friends and to ascertain who had failed to make it this time. This process was made more pleasant by the plentiful supply of food and very limited supply of (free) drink. In addition to chats with researchers from across the globe, I had the rare chance to re-establish relations with colleagues from my own University.

The meeting was arranged in the usual well-tested format, with the inevitable large number of parallel sessions (7) and poster presentations. This resulted in a very enjoyable, though intense, time in which there was rarely little of interest, and often, several 'must see' presentations running concurrently.

At least the plenary lectures (or 50th anniversary lectures this year) have not yet been made parallel. These were joint papers, though not joint presentations, who's authors represented a substantial list of leading experts in the field. Their technical content was, in general, to the very high standard expected. Unfortunately, presentation skills, in some, left much to be desired. One of the exceptions was Katharina's talk on laser diagnostics. This was both entertaining and educational, and represented a worthy example for the less experienced (and too experienced) presenters in the audience. However, during her talk, I was struck by the lack of references to British work in the field. Is this a fair reflection of UK impact on laser diagnostics?

My own formal contribution to the proceedings was contained in two papers on laminar burning rates and instabilities. My co-authors and I received useful positive feedback both during the formal questions and informally over coffee. One question, initially raised by Ed Law and subsequently by others during several presentations in the subject was 'have you considered plotting the product of laminar burning velocity and density ratio rather than just burning velocity'? The answer in almost all cases was 'No'. It remains to be seen whether we experimenters will bow down to Ed's wishes, or greater insight, for future publications. Continuing in my area: it was notable that, with few exceptions (modesty forbids the naming of names), measurements of laminar burning velocity were presented only at conditions in which stable flames were readily attained. Clearly, burning rates in unstable flames requires further work.
Of the non-technical formal events, I have mixed views. The trip to the mini version of Blackpool's golden mile (Navy Pier) left me with the view that we might have better used the time to reduce the number of parallel sessions. However, the banquet was good, though light on the drink, and the speeches were enjoyable, as was the company on my table.

Technically, the meeting went well. There were no technical hitches in any of the sessions that I attended. Sessions ran on time, information desks were well manned, computer

clusters were available to check email and to read electronic copies of papers. Buses appeared on time, plenty of sticky buns and coffee were available during breaks etc. etc.

The most important reason to visit a Symposium is to meet and have discussions with others with similar interests. Ample opportunity was provided for this and, for this reason alone, the Symposium was a considerable success. It also provided spin-offs in that I was able to take a detour to Detroit to visit research labs in the automotive industry. Finally, based on my overall experiences of the thirtieth Symposium, I now eagerly await the thirty-first.

M. Lawes

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After a rather hectic summer, my memory of the Symposium in Chicago has faded to a large extent. However, compared with previous Symposia, the 30th Symposium had some memorable features.

Well Balanced Technical Programme:
The co-chairs Ron Hanson and Peter Lindstedt must have done a great job, judged by the claim that they never had a disagreement. The interdisciplinary nature of combustion was fully reflected in the programme. One could have a snapshot of all types of combustion research in the world, from classical theoretical analysis to new experiments on carbon nanotubes. The downside was, as it had always been in previous Combustion Symposia, the difficulty to pick up the relevant talks from 7 parallel sessions. In the end, I had almost random walks between the lecture theatres, leading to quite interesting discoveries!

Special 50th Anniversary Lectures:
These lectures were quite unique, as the occasion was. Each lecture was delivered by one main speaker, with contributions from several leading experts on that topic. The challenge of summarizing combustion research in the past 50 years proved to be too much for some, while others succeeded in handling it with great sense and sensitivity.

Large Eddy Simulation in Vogue:
There were a large number of papers on LES for the first time in Combustion Symposia, suggesting that the methodology was gaining acceptance within a wider combustion community. However, truly ground-breaking work was difficult to find, and validation of LES results was still an unsolved problem.

Good Local Organization:
I was impressed by the smooth running of the parallel sessions. Bus services to the hotels were also surprisingly frequent. The social programmes were enjoyable, which contributed to my good overall impression of the 30th Symposium.

Kai Luo

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Let me start by saying that Chicago was an excellent place to celebrate the thirtieth anniversary of the Symposium. I found the city of Chicago most impressive and the canine boat tour of the Chicago architecture on the river and Lake Michigan a real eye-opener. We decided to stay in the student accommodation, which was - after we had collected the toilet paper, installed the shower curtain, and managed to avoid the air conditioner - a nice place.

The technical programme was very good and I had problems to attend all the interesting lectures because there were so many. I also liked the topical reviews. It was impressive to

see how much the understanding of combustion had evolved over the last 50 years. The technical programme was also interesting but the opportunity to discuss different ideas with collaborators and colleagues was sometimes even more exciting. Also the Work In Progress posters and the discussions were very stimulating. However, some of the posters were difficult to access and it would have been nice if they had been closer to the main hall where the food and coffee were served.

At the end of a rather exhausting week I spent some time in Chicago. Jan Hessler from Argonne Research Laboratories took me to the Berghoff to have some Sauerkraut preparing us for the next combustion Symposium in Heidelberg.

Markus Kraft

❸❶th ❸❶th ❸❶th ❸❶th ❸❶th ❸❶th

Conference:
The International Symposium on Combustion is one of the prestigious conferences in the area of combustion and its uniqueness is because of its attendees, who are authorities in the different areas of combustion, and the quality of the papers and posters presented. This enables a platform to discuss interdisciplinary research and create avenues of collaboration.

Experience:
Each day of the conference started with a plenary talk from an eminent lecturer. They not only brought forward their experience, almost equivalent to or more than my age, but also provoked discussions which would stimulate and navigate the future in that particular area. The two plenary lectures titled “Combustion at the focus: Laser diagnostics and control” and “Computational Combustion” delivered by *Kohse-Hoinghaus* and *Westbrook* respectively particularly attracted my attention for their expertise in bringing forward different elements of the subject in a simplistic fashion and conjoining them to clearly layout the progression in the field.

During the day, there were paper and poster presentations, which were followed by question and answers. The presentations were divided into the sessions with a particular theme. The relevant sessions to my research were Nanoparticles, Pollutants: PAH & Soot, and Laminar flames together with interesting interdisciplinary topics such as the New Technologies. My paper was presented in the session “Nanoparticles” titled “Stochastic modeling of soot particle size and age distributions in laminar premixed flame” and was discussed in good merit. Other papers in the session were presented by d’*Alessio et al.* (Universati degli Studi di Napoli, France), *Violi et al.* (University of Utah, USA), *Frenklach et al.* (University of California at Berkeley, USA), and *Balthasar et al.* (University of Cambridge, UK).

The breaks were dominated by going through the posters, which contrary to my belief encouraged more discussion than papers. This was probably because of no time issues and informality in presentation. Our group had four posters on different days and attracted number of business cards.

The conference was not “All work and no play”. There were number of activities planned by the conference organizers, which included Jazz music, fireworks at the Navy Pier, and a banquet recognizing the authorities in the area of combustion. I was also able to spare some evenings to catch glimpse of important buildings, museums, and theme parks to get a feel of the lifestyle of Chicago. The weather during the conference was warm, a much looked forward change to the English weather.

In summary, it was a wonderful event with enriching academic experience in a beautiful city.

J. Singh

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It normally falls to me to report on the two 'business' meeting, the Members' and Section Chairs' meetings, but in fact there were really no new developments of general interest from those meetings. A continuing concern, as I mentioned in my notes on the Sapporo meeting, is whether the level of paper acceptances (321 out of 771 submissions, or 42%, this time) is 'right'. My impression was that even more high-quality contributions than usual were relegated to the poster sessions this time. Some 20 of these came from the British Section. I personally would not be in favour of increasing the number of parallel sessions, now running at seven, nor of increasing the number of oral presentations in a day. But with the considerable effort that is involved in condensing work into the Symposium format, and the generally rigorous review process (said to have been tightened up this year), there might well be a case for expanding the Proceedings to three volumes and for reviving the 'Contributed Poster' format.

Every Symposium, topics that are not exactly new, but that have not received much attention in the past, come to the fore. Of course, the identification of these depends on the interests of the individual and his diligence in reading the literature, so it is very subjective. However, for me, the large number of contributions on micro-scale combustion, involving combustion chamber dimensions of a few millimetres, was significant. There were about 9 oral presentations and 9 posters on this topic. Currently, little work is being done on this in the UK, even though it is an attractive topic for universities, where the technical skills to mount such experiments can often be found.

Another hot topic (or perhaps not so hot), is that of MILD or flameless combustion, in which the reactants are preheated, but the lean premixed and distributed reactions give rise to low peak temperatures. (There seems to be some doubt as to whether the excellently descriptive MILD terminology really is an acronym...'Moderate or Intense Low Oxygen Dilution'…as a leading group from Naples claims). Although this mode of combustion is being explored for furnace and gas turbine applications, the most heavily researched application is to Homogeneous Charge Compression Ignition engines. Pulsed Detonation Engines were also prominent in the presentations, particularly among the posters, and Micro-gravity Combustion continues to be very much in vogue.

Finally, I should record my impression that the excellent facilities of the University of Illinois were nicely exploited ensuring a very well-organised and enjoyable Symposium.

Chris Lawn

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This is a brief account of the major aspects of the Board Meeting, hopefully of interest to *Newsletter* readers. Although nowadays, certain urgent items can be dealt with via e-mail, major Board discussions take place at the biennial Combustion Symposia. Indeed, organisation of these Symposia is a major concern of the Board, the present meeting and those 2 and 4 years ahead.

The Board heard that attendance at Chicago was 1090 technical delegates and 116 accompanying guests (wives and families). As these figures were given at the beginning of the meeting, final ones will have climbed a little, due to late registrations. (As an incidental comment: symposia held on US soil seem to attract smaller attendances that those in Europe and certainly fewer accompanying guests, presumably because Europe

beckons as a venue for summer vacation. We also heard detailed reports from the organisers of the technical events (main program, work-in-progress posters program) and of the social program. (Apologies for use of the word 'program'; the Americanism dominates Symposium discussion.)

Looking ahead two years, the Symposium will be held in Heidelberg. Plans presented to the Board show every indication of the technical and social programs being particularly enjoyable. An important Board decision is always the selection of a site for the meeting in four year's time. This time, two options were under consideration: Montreal (McGill University) from the Canadian Section, and San Francisco from the US Western States Section. Differences between the detail, though not overall quality, of the bids was particularly marked. After due consideration, Montreal was chosen. Early indications promise an enjoyable event.

Another important decision of the Board is the Editors of the Institute's journal, Combustion & Flame. It arose this year, following the retirement of Allan Hayhurst, reported elsewhere in the *Newsletter*. With the selection of Katharina Kohse-Höinhaus from Germany, the journal, for the first time in its history, now has a non-UK editor.

Every two years brings some change to Board membership. This year's changes are not itemised here, though details may be obtained from me. But one point is very worthy of note. Ed Law's term of office as President finished and the new President taking over is Brian Haynes. The particular significance of this is that, for the first time in its history, the post moves outside the US: Brian is Australian. (This is entirely in line with the recent strategy (gently) to internationalise the Institute)

The Institute's finances are, of course, crucially important for any healthy organisation and their discussion always takes up considerable time at Board meetings, this year being no exception. These deliberations are not reported here in any detail, though members may contact me for more detail. Suffice it to say, the Institute's finances are healthy and any 'tinkering' that goes on is to ensure that they can best serve the interests of members.

Many other matters were considered at the meeting. But I trust this gives a flavour and covers those of most consequence for our Section.

Dave Smith

REPORTS OF OTHER MEETINGS ATTENDED BY MEMBERS

Impressions of the 10th Siam Numerical Combustion Conference held on 9-12 May 2004 in Sedona, Arizona, USA

Having had the opportunity to present my research findings at the 9th SIAM Numerical Combustion conference in Sorrento, I was keen on presenting my work at the 10th conference in Arizona. Thanks to the gracious grants from the British Section of the Combustion Institute and Shell Global Solutions bursary, I could present my recent work at the conference.

The registration event on 9 May provided a good chance to catch up with other researchers as well as to know some new people. The poster session was particularly helpful and exhibited the work related to chemical kinetics, instabilities and various computational aspects. On Monday 10 May, the first lecture by Thomas Jackson from UIUC on simulation of heterogeneous solid propellant combustion was very interesting in terms of the multi-dimensional model developed, its scalability and parallel computing structure. Following the lecture, it was quite a privilege to present the first talk in the "Engines" session. I enjoyed presenting as well as answering the questions raised by the eminent audience. To be honest, I was quite excited with the number of papers involving stochastic approaches implemented for simulating combustion engines. It was indeed invaluable to discuss some modelling issues with researchers from CNRS, Sandia and University of Michigan.

Having completed my own presentation, attending other presentations was more relaxing. The mini symposium (11 May) related to homogeneous charge compression ignition engine modelling proved to be the most relevant and interesting series of presentations. The talks given by D. Haworth and H. Pitsch were indeed very helpful in understanding some novel approached to HCCI modeling. The grand finale of the conference on the 12 May was the morning-session lecture delivered by Michael Frenklach on the Numerical modelling of soot particle formation. It was a very enjoyable as well as a thorough lecture on particle size modelling.

Overall, I believe that the best part of such conferences is the Q&A sessions following the presentations. Such sessions were indeed fruitful in terms of learning about the recent advances and the problems faced in combustion modelling.

Many thanks to the Combustion Institute for their financial support which helped me attend this important conference.

Amit Bhave
Department of Chemical Engineering
University of Cambridge

228th American Chemical Society National Meeting
Philadelphia, Pennsylvania, USA, 22-26 August 2004

6th International Conference: Science in Thermal and Chemical Biomass Conversion
Victoria, British Columbia, Canada, 30 August-2 September 2004.

Towards the end of August and the beginning of September 2004 I attended two international conferences. The first conference was the 228th American Chemical Society National Meeting and was held at the Pennsylvania Convention Centre in Philadelphia, PA, USA from 22-26 August 2004; here I gave a 30 minute oral presentation in the chemistry of renewable fuels and chemicals section entitled *Production of hydrogen from sunflower oil.* The ACS is the largest scientific society in the world and with over 13,000 delegates in attendance it was by far the largest conference I have ever attended. I

arrived just in time for the reception for international attendees which was an enjoyable start to the week's events. The first session I attended was entitled Fuel Cell Chemistry and Operation which discussed the advances in fuel cell technology as well as hydrogen production and storage technologies. The second session I attended was entitled Fuels for the Future, Leading the Way with Chemistry. This session covered a range of interesting and controversial topics such as Hubbert's Peak - the impending world oil shortage and the energy challenges facing the world in the 21st century and chemistry's role in providing a solution. On the first day of the conference I was contacted by the Press Office at ACS as they had written a press release on the paper I was presenting. This lead to a media frenzy resulting in over 15 newspaper articles and 60 web articles being published on my project, I also gave a radio interview to WHP Philadelphia and BBC Leeds the day before my presentation. I received a positive response from the audience after my presentation and after all the excitement of the press interest had started to die down it was time to move on to the second conference I was in North America to attend.

The second conference was the 6th international conference in the thermo-biomass conversion series entitled Science in Thermal and Chemical Biomass Conversion and was held in the Victoria Conference Centre at the Fairmont Hotel in Victoria, Vancouver Island, BC, Canada from 30 August-2 September 2004. There were just fewer than 200 delegates in attendance at a combination of presentations and workshops covering the scientific, technological, environmental, economic and commercial aspects of thermal and chemical biomass conversion. At this conference a poster on my project entitled *Demonstration of Unmixed Steam Reforming of Vegetable Oil* in the Bio-diesel division was presented. The main topics covered by both oral and poster presentations where combustion, pyrolysis processes and products, bio-diesel, gasification products and feed preparation systems. The workshops discussed Liquid fuels, analysis, bio-diesel, catalysis and hydrogen. I participated in the Hydrogen workshop which raised many important points on hydrogen production, storage and utilisation as well as the technical advances needed and limitations faced whilst implementing a sustainable hydrogen economy. The conference organisers arranged two social events; the first was a tour and dinner at the beautiful Butchart Gardens, Vancouver Island. There was also a Gala Dinner held at the Fairmont Hotel. This gave me the perfect opportunity to talk among delegates in more relaxed surroundings. Overall I enjoyed both conferences immensely. I would like to thank the Combustion Institute British Section for their financial contribution towards attending both international conferences. This experience has been invaluable for the progression of my PhD and for that I am sincerely grateful. I would also like to thank the Royal Academy of Engineering for their financial contribution and my supervisors Dr Valerie Dupont and Dr Andrew Ross for their help and support.

Ian A Hanley
Energy & Resources Research Institute
University of Leeds

ADVANCED COMBUSTION MODELLING

A report of a meeting of COCCFEA on 17 September 2004 at Cranfield University to celebrate PROFESSOR KEN BRAY'S 75TH BIRTHDAY

The Consortium on Computational Combustion for Engineering Applications (COCCFEA) held the meeting at Cranfield University, 17 September, 2004. This happy event was attended by about 45 participants in the presence of Ken Bray. The meeting was also honoured by the presence of three overseas guests, Michel Champion from Poitiers, Luc Vervisch from Rouen and the recently retired President of the Combustion Institute, Ed Law from Princeton. Kai Luo opened the meeting by greeting all participants and reminding people that there could be no more appropriate an occasion to celebrate the achievements of a giant in combustion modeling. He mentioned the names of those who sent congratulations on Ken's birthday: Brian Haynes (new President of the Combustion Institute), Paul Libby, Fred Lockwood, Norbert Peters, Chris Sheppard, Alex Taylor and others. Ed gave the first presentation of the day entitled "Combustion Chemistry and Modelling", which was a masterly survey of chemical kinetic modelling and the relationships of flame properties to instabilities, interspersed with anecdotes of Ken's Princeton connection. Michel's talk on "Turbulent Combustion Modelling" focused on his research in collaboration with Ken in recent years. He showed examples of further development of Ken's earlier theories on turbulent premixed combustion and "en passant" reminded us of the Bray number. Luc's talk "LES and Modelling of Turbulent Combustion" covered recent developments in LES, many of which were inspired by Ken's modelling work. He showed progress made in modelling and simulation of the very challenging problem of partially premixed combustion.

Derek Bradley gave a talk entitled "Burning Rate Advanced Yardsticks" (acronym BRAY). To him, KNC meant Knowledge, Nice and Courtesy. His talk surveyed current problems in flamelet modelling and highlighted the difficulty of determining the flame speed or speeds. Stewart Cant's talk "From Modelling to DNS of Premixed Turbulent Combustion" demonstrated Ken's penetrative analytical power by showing that many of Ken's early theoretical predictions were later confirmed by DNS, often at not inconsiderable computational cost! Other COCCFEA members who gave a talk included Bill Jones, Andreas Kronenburg, Peter Lindstedt, Nodas Mastorakos and Robert Prosser.

The day's event included a photo session just before lunch. At the end of the meeting, a big birthday card and a digital camera purchased from private contributions were presented by Bill Jones to Ken as gifts. Ed read out the letter from Brian Haynes. Ken thanked everyone.

The evening highlight was the birthday dinner. With few glasses washed down, Barrie Moss took us further down memory lane to Ken's early work in Southampton University, which formed the basis of the BML model by the Bray, Moss, Libby troika. Over the convivial dinner, Kai thanked everyone for making the event special and memorable, especially the speakers for the high quality technical programme, and Karl Jenkins and other Cranfield staff for the excellent local organisation.

On reflection, the event was a happy, enjoyable and historic occasion. Everything went extremely well, except perhaps the un-predicted breakdown of Kai's car on the way to the meeting, due to apparent combustion system malfunction! Who says combustion is a mature science?

Derek Bradley and Kai Luo

CURRENT RESEARCH IN COMBUSTION

A Forum for Research Students and Young Researchers

A report on a one-day meeting of the Combustion Physics Group of the Institute of Physics supported by the Combustion Institute (British Section) and sponsored by the BFRC and the EPRC.

Although the meeting was held on 18 September 2003, unfortunately this report arrived two days after the last Newsletter was printed. It is still worth publishing however. (Editor).

A one-day meeting on current research in combustion physics was held on 18 September 2003 at Loughborough University. The bi-annual meeting arranged by the Institute of Physics (IoP) – Combustion Physics Group and was supported by the Combustion Institute and sponsored by the British Flame and EPSRC. It drew over 60 delegates from all parts of the combustion community within the UK.

Thirty-one poster and six oral presentations were given by young researchers drawn from 9 academic institutions that covered a wide variety of combustion applications and fundamental research. The presentations ranged from the numerical modelling of atomisation in co-axial jets to turbulent auto-ignition of hydrogen and acetylene in a duct and the modelling the efficiency of gas-fuelled automotive engines. The introduction of new skills into field such as neural networks used in the control of waste incineration plants and the recognition that, to assess the health effects of soot emissions it is necessary to characterise particulate matter, demonstrate that the potential for new work within the combustion field is still growing. The potential impact of our work within society should also not be underestimated.

All of the presentations given were of a very high standard and there was plenty of opportunities for the delegates to give feed-back to the presenters. There was also the opportunity for delegates to become re-acquainted with old colleagues and to form new contacts with other workers within the field. Five prizes were given for presentations made during the meeting, four sponsored by the IoP – Combustion Physics Group and one by the EPSRC.

The IoP – Combustion Physics Group *Felix Weinberg Prize* for the best oral presentation during the meeting was given to John Wood of Cranfield University for his talk on 'Validation of a turbulent burning velocity closure model for partially pre-mixed combustions using PIV'. The runners-up prize in the oral category was given Darren Luff of Imperial College for his talk on 'The extinction of forced and unforced turbulent premixed counterflow flames'.

The IoP – Combustion Physics Group *Felix Weinberg Prize* for the best poster presentation during the meeting was given to Ian Burns of Cambridge University for his poster on 'Diode laser two-line atomic fluorescence thermometry in flames'. The runners-up prize in the poster category were Mazhur Hussain of Cranfield University for his poster on 'Operating liquid-fuel air blast injectors in low-pressure test rigs: strategies for scaling down the flow conditions'.

The EPSRC Prize for public understanding was awarded to Andrew Smallbone of the University of Leeds for his poster presentation on 'A comparison of various predictive spark ignition knock models'.

Ralph Boyce

FIVE ARROWS

Research scientists and engineers are well advised to know where their support comes from, financial and technical, and why. An entertaining way of finding out the general principles is to read the recent biography of Victor, the 3rd Lord Rothschild of Tring [1]. During his lifetime (1910-1990) he carried out academic research, administration of research in both the public and private sectors, and the application of science to military

and political ends. Later in life for a few years he was also the reluctant chairman of the British branch of the family bank. So, in following his career the happenings behind the scenes are illuminated for general application, and not just in the UK. An additional dimension is his connection to his elder sister Miriam (1908-), also an academic scientist. The transition from merchant banking to biological research is unusual, and evolved among several generations of Rothschilds, in the UK. The biography [1] necessarily discusses the past history only briefly, and more detailed accounts are given in other publications such as by Cowles [2] and others that are referenced.

The story began in Frankfurt, in Germany, and still the banking centre, where Mayer Rothschild starting dealing in coins for local numismatists in the mid 18th century. He soon realised that coin and gold in bulk gave wider opportunities, so he became a banker carrying out transactions between the German princes and London and Paris. During the Napoleonic wars government gold, from all sides, was circulated round Europe using the Rothschild network to pay the armies; governments had no means of doing this and knew all about it. The business prospered and after the wars banks were opened in Naples and Vienna. Together with Frankfurt, London and Paris the five branches, each headed by a son of Mayer, adopted the emblem of Five Arrows for the multinational family business (it still is the emblem). In the 19th century London and Paris came to predominate, and Victor's ancestry was from the London centre. Because of the Rothschild habit of marrying within the family there were many cousins in the British and French branches. The British branch rose to commercial dominance in the second half of the 19th century; for instance it found £4 million overnight to enable the Government to finance the purchase from Egypt of a large block of shares in the Suez Canal, and without upsetting the exchange rate of sterling. At this time Victor's ancestors were acquiring major estates in the Chiltern hills, often from impecunious Dukes, augmented by smaller properties further afield. .

Grandfather, the first Lord Rothschild, inherited Tring Park from his father, a house originally built by Wren but which was modernised and extended although it remained chronically short of bathrooms. Like many of the Rothschild family he excelled in philanthropy (overt and covert) and hospitality. He established a 'welfare state' in the town of Tring by providing all the townspeople with free medical and nursing care, free housing, and old age pensions. Unemployment was abolished by putting the jobless on to the estate payroll. Every morning wagons with coffee and rolls were sent round the estate for the benefit of employees. Three other Rothschild estates in the neighbourhood had special characteristics. Halton House, near Wendover, had its own orchestra which Victor's great-uncle used to conduct; he was an aesthete but not a scientist. Mentmore, nearby, was designed and constructed by Joseph Paxton, following his success in 1850-51 in designing, fabricating, erecting, and fitting out the Crystal Palace for the 1851 Exhibition, all in 10 months. Whilst Mentmore was being constructed cousins from the French branch of the Rothschilds came to view the spectacle; they asked Paxton if he would build them a comparable house, but of twice the size. He agreed, and did at Ferrières east of Paris. The French cousins were in effect applied botanists as well as bankers: they concentrated on world class vineyards in the Bordeaux region. Waddesdon Manor, near Aylesbury, was built by a Rothschild originally Viennese but naturalised British, in the style of a French chateau. It was famed for its hospitality.
Prime Minister Herbert Asquith, who stayed there, related that early in the morning there was a knock on the bedroom door, and a footman entered and pulled back the curtains. He was followed by a large trolley pushed by a servant. The conversation ran:

"Good morning, Sir. Tea, coffee, or a fresh peach, Sir?"
"Tea, please."
"China, Indian or Ceylon tea, Sir?"
"China, please."

“Lemon, milk or cream, Sir?”
“Milk, please.”
“Jersey, Hereford or Shorthorn milk, Sir?”

All those decisions, and before breakfast too.

In due course Victor’s bachelor uncle, the 2nd Lord Rothschild, inherited Tring. He was a passionate collector of zoological specimens, alive or dead, from arachnids to zebras. For neglecting his duties at the bank he was rusticated to Tring, where he could spend all his time with his collection and with the aid of two highly qualified curators carry out zoological research. This is where serious interest in biology first emerged. The curators also educated Miriam, who did not attend formal school or undergraduate teaching (‘not necessary for a girl!’) but was taught the requirements needed for scientific research. Victor’s father was also interested in zoological research; he met his future wife (Victor’s mother) whilst collecting fleas in the Carpathian mountains. By the late 1930s Victor had inherited his title, his uncle and father both having died. The zoological collection at Tring became part of the British Museum, now open to the public.

At this time Victor was at Cambridge, firstly as a self-financed undergraduate and secondly as a research fellow at Trinity college. His field was the fertilisation of eggs, particularly those of sea urchins (Echinoidea), which required micro-manipulative techniques. Even a Rothschild had to make some of the metering equipment himself; the Zoology department had a very limited budget for apparatus. The question was, when a sperm fertilised an egg, what prevented other sperm from invading subsequently. The answer was an immediate change in the electrical properties of the surface of the egg. Further research was suspended by the outbreak of World War 2, and Victor eventually found himself in the anti-sabotage unit. Because of his deftness in micro-manipulation, and also as a pianist, he was drafted to bomb disposal. Not the bombs that were dropped from aircraft, but those planted in British cargo ships by enemy agents in foreign ports. Unfortunately there were no training techniques or manuals available, so procedures had to be evolved by error-free applied research. As a further complication some of the bombs were themselves booby-trapped. Victor’s technique was to actually dismantle the bombs, rather than to attempt to detonate them safely which was often impractical on board ship. Occasionally he drove back to London with all the components of a bomb in the boot of his car. He successfully dismantled more than 100 bombs, and was awarded the George Medal. President Truman subsequently gave him an award for assistance to the US military in counter-sabotage. He moved on to the anti-sabotage protection of Prime Minister Winston Churchill, who received gifts from well-wishers that needed to be checked against explosives, toxins etc. When bottles of vintage brandy arrived, an extra bottle was requested for test purposes. After clearance any residue was not wasted but was absorbed by the testers. On another occasion a ham was given to Churchill who announced that he would have some for breakfast the next day; this was an order. There was not time for a formal analysis, so a slice of the ham was fed to the Medical Research Council office cat which continued to purr happily. Churchill had his ham for breakfast. Meanwhile Miriam spent time at Bletchley Park on wartime code-breaking projects. Here she met a cryptogamist (= expert on seedless plants) who had been drafted there under the misapprehension that he knew about codes and ciphers.

In 1949 Victor became for 10 years Chairman of the Agricultural Research Council, responsible for Ministry of Agriculture research stations. But the arrangements were restrictive because the Ministry controlled the budget and the Council was regarded as advisory only. The constraints on research were administrative and political rather than scientific, not an atmosphere in which scientific originality was likely to thrive. The frustrations also led to in-fighting within the Council. It was far from an ideal set-up for

running scientific research; hopefully lessons have been learned permanently. But Victor did at least become a Fellow of the Royal Society during his tenure as Chairman.

It must have come as a relief to move to Shell, the multinational oil Company, initially as a consultant in 1958, rising to Research Director of the entire Company by 1970. With an annual budget of up to £500 million the deciding of priorities was essential. Work could be scientifically interesting and significant, but if it led nowhere commercially it ought to cease. But deciding whether it did lead nowhere was sometimes difficult to predict. Victor invented what became known as the customer-contractor principle: in simple terms the customer had a problem or idea, the contractor (one of the Shell Laboratories) worked on it and the customer paid the cost. In real life things are not that simple: the customer may not realise that his problem existed or was long-term rather than urgent, the contractor may have to define the work and write the programme, the exercise may require extended time, the particular Laboratory must have the necessary skills and programme slot available. Victor attempted to introduce flexibility by organising research on 3-year contracts, but the Shell board resisted and annual budgets stayed. 10% of the income was allotted to blue-skies research, outside the customer-contractor scheme, which enabled the Laboratory to work on some of its own ideas. Although imperfect the scheme did at least have a logical rather than an authoritarian basis. Victor took a particular interest in the Thornton Laboratory, near Chester, where Morris Sugden FRS was on the staff and much of the work was combustion related, and organised informal meetings with trade union officials (Victor was politically slightly left of centre). He was horrified to discover that the hourly paid staff had to queue outdoors each week for their wage packets, even when it was raining hard, and that their washrooms were always filthy. The Laboratory Director, presumably unaware, was pressed into corrective action; illustrating the general point that top management should regularly walk round the site and observe rather than stay in their offices (it encourages the researchers too). In 1970 Victor retired from Shell and the Thornton trade union officials gave him a farewell present.

On the day that he attended a retirement lunch with the Shell board he returned to his office (a praiseworthy action in itself) to find a message asking him to telephone a Mr Trend "who said he was a secretary". He was in fact Sir Burke Trend, Cabinet Secretary under the new Prime Minister Edward Heath. Victor was asked by Heath to become Head of what was to be known as the Think Tank; he agreed but negotiated a salary equal to that of the Prime Minister, in order to have a high place in the Whitehall pecking order. This achievement of the customer-contractor principle was not made known to those much lower in the pecking order. For many readers the Think Tank will be the most interesting chapter in the biography. Burke Trend was the previous author of the Trend Report, yet another set of traffic cones on the motorway of Government R & D. From Oxford he had a dazzling career, mainly in the Treasury, never putting an administrative foot wrong. In Whitehall he was regarded as a supreme bureaucrat; Oxford thought of him as a Man of the World. But his experience meant that his Report was more concerned with financial and organizational means rather than scientific motorway destinations. He and other senior Whitehall figures regarded any committee which reported directly to a Minister, without the Report being homogenised by a civil service hand, as unwelcome since it had the capability of rocking the boat. Worse still, the Think Tank reported directly to the Cabinet as a whole; it had the capability of rocking *all* the boats. The Cabinet Secretary could not of course directly oppose the wishes of Ministers but he had other weapons. As Prime Minister Harold Wilson said "there are no fingerprints on Burke Trend's dagger". So Victor and Burke Trend fought a type of duel; they were both civil servants at the time. Victor arrived in Whitehall in a state of innocence; initially he concluded that the entire country was run by two men (Cabinet Secretary and the Head of the Civil Service) neither of whom he had heard of previously. Currently with more intensive government, catalysed by semi-literate e-mails, the number would be greater

perhaps by 100%. But the two jobs were recently down-sized into one, which would limit the increase. What the other 499 998 civil servants did was not disclosed.

Victor's technique was to take a problem, chosen either by Cabinet or the Think Tank, and distil the essence down so that a firm conclusion was reached at the end of a short report. Short enough to incline Ministers to read it. For example, energy supply and particularly oil, was investigated in 1972-73. On the basis of supply and demand it was foreseen that the price of crude oil ($1.90/barrel in 1972) might triple in 10 years. The Cabinet pricked up their ears and thought about it. Contemporaneously a lively young scientist in a multinational oil company (not Shell) wrote a paper under the title of "what would happen if the price of oil doubled overnight" and sent it up his management line, hoping his foresight would be praised. It soon bounced back "it is not Company policy to encourage such wild speculation, which must cease forthwith". In the autumn of that year the price of oil quintupled, because of war in the Middle East, so the British Government were more alert than the oil major. Victor was also involved in the concluding negotiations for the super-sonic Concorde; his dealings with the appreciative French were lubricated by bottles of Bordeaux premier *cru* from his private cellar.

In parallel with specific investigations the Think Tank was required to examine the actions of individual Departments to encourage joined-up Government. Victor soon discovered that Departments had their own aims, not necessarily known to each other or to Ministers. The function of a Department is not to enforce Ministerial policy but to *administer* it. In other words to make the square peg of policy fit into the round hole of reality. Skilled work with a chisel may be needed. Sometimes a hole opens and there is no Ministerial peg, so the Department has available their own set of pegs already shaped. Victor identified these pegs by arranging a series of working lunches with the Permanent Secretary of each Department; the menu was sandwiches and a fruit drink containing a high concentration of brandy. Information flowed. Departmental aims were sometimes long-term, overlapping several Ministers, and the operators perceived it as logical although they themselves were occasionally tinged with immodesty. For example:

(i) "I know we have had these Inquiries before, but they have not produced the result that we want" [3]

and

(ii) "I may have my faults, but being wrong is not one of them" [4].

Safety Warning: do not attempt (ii) at home.

Alert readers will have realised that this situation, still in existence, has application to the funding of public sector scientific research. There is the conventional route of application to a Research Council, possibly with support from Europe. A Minister may be willing to demand research on a topic in which he is particularly interested, but this could be short-term if he moves away. A Department might produce funds for research on a subject that is beneficial to them long-term. The half-life of a Department is usually much greater than that of a Minister. Success will depend on how the proposal is packaged.

Alongside his work with the Think Tank Victor was asked to consider the organisation of Government R & D; the result was not traffic cones but a permanent Diversion on the scientific motorway. He concluded that the customer-contractor principle should apply, in order to give value for tax-payers' money. Political and academic uproar ensued because of the perceived threat to scientific freedom. Victor received sarcastic messages congratulating him on at last uniting the scientific Establishment (in opposition). Even Miriam had to explain that she was not her brother's keeper. She was elected FRS in

1985, the wheels having taken 15 years to turn. She joked that one of the reasons for the delay was that she was Victor's sister. They set a record by being the first sister and brother to be elected Fellows in the 300-year history of the Society. In due course the government accepted the use of the customer-contractor principle for research, and the result is still visible. Events proved that the scientific Establishment is not especially equipped with foresight; after Victor's death one of his daughters, herself an eminent academic, married. Her husband was shortly to become a Nobel Laureate (economic sciences), President of the Royal Society, and Master of Trinity College, Cambridge. If these events had been foreseen by the Establishment the reaction could have been more subtle.

After four years Victor left the Think Tank in 1974, which continued for another 10 years, but without the initial verve, or influence on science policy. He also left the scientific arena and spent a few years with the family bank, to sort out succession problems, but was not enamoured of banking. He died in 1990 and his son Jacob became the 4th Lord Rothschild. He is a successful career banker who has upheld the family tradition of philanthropy. He refurbished Waddesdon, taken over by the National Trust and open to the public. He also financed the renovation of the entrance foyer of the National Gallery in London: look upwards and see. After Victor's death the bank set up a trust at the Centre of Mathematical Sciences at Cambridge to encourage the teaching of mathematics in schools, and to assist in the education of gifted children from poor backgrounds.

So, after a full life, his memory stays with us and his influence on the organisation of research continues to be visible.

References

1. Rose, K. Elusive Rothschild. Weidenfeld & Nicolson, London 2003.
ISBN 0 297 81229 7

2. Cowles, Virginia. The Rothschilds. Futura Publications Ltd., London 1975.
ISBN 0 8600 7206 1

3. Private Communication.

4. Pliatzky, Sir Leo. Obituary. Daily Telegraph London, 6 May 1999.

Ken Palmer, April 2004

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

2004

NOVEMBER 2004

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, web: www.leeds.ac.uk/fuel/shortc/sc.htm

22-26 NOVEMBER
Leeds, England. SPARK IGNITION ENGINE 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

25 NOVEMBER
London, UK. FORUM ON CARBON ABATEMENT FOR FOSSIL FUELS.
Details: **http://www.apgtf-uk.co.uk/docs/Forum2004%20Flyer%209Aug04.doc**

DECEMBER 2004

7-8 DECEMBER
London, England. INTERNAL COMBUSTION ENGINE PERFORMANCE AND EMMISSIONS. Details: Stephanie Love (C622), Institution of Mechanical Engineers, One Birdcage Walk, London SW1H 9JJ, England.
Tel: 020 7973 1312/1317, Fax: 020 7222 9881, E-mail: s_love@imeche.org.uk,
Web: http://www.imeche.org.uk/groups/combustion/forthcoming/2004_events.htm

14 DECEMBER
Nottingham, England. ENGINE FUELLING, COMBUSTION AND EMISSIONS CONTROL. 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

2005

FEBRUARY 2005

14-18 FEBRUARY
Chernogolvka, Moscow Region, Russia. 13TH SYMPOSIUM ON COMBUSTION AND EXPLOSION. Details: Tel : +7 252 22595, Fax : +7 096 524 9676
web : http://www.icp.ac.ru/conference/symp2005

MARCH 2005

8-11 MARCH
Santiago, Chile. SIXTH INTERNATIONAL SYMPOSIUM ON SPECIAL TOPICS IN CHEMICAL PROPULSION (6-ISICP). Details: Catherine Escobar Besoain, 6-ISICP Symposium Secretariat, Tel: (56-2) 274 67 14, Fax: (56-2) 274 27 89,
E-mail: info6isicp@ing.puc.cl, web: www.6-isicp.cl

13-17MARCH
San Diego, CA, USA. CHEMISTRY OF CARBON MATERIALS AND NANOMATERIALS. Details: http://oasys.acs.org/oasys.htm.

20-23 MARCH
Philadelphia, Pennsylvania,USA. FOURTH JOINT MEETING OF THE US COMBUSTION INSTITUTE SECTIONS. Details: http://www.mem.drexel.edu/ci2005

29 MARCH-1 APRIL
Lisbon, Portugal. 7TH 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, web: www.infub.pt

31 MARCH-3 APRIL
Paris, France. MONDIAL BIOENERGIE. Details: François BORNSCHEIN,
Tel: +33 3 84 47 81 00, Fax: +33 3 84 47 81 19,
E-mail: info@itebe-expo.org, web: http://www.itebe-expo.org

APRIL 2005

3-6 APRIL
Louvain-la-Neuve, Belgium. EUROPEAN COMBUSTION MEETING (ECM2005). Details from the British Section Secretary or Jacques Vandooren, Chairman of the Belgian Section of The Combustion Institute, CSTR Laboratoire de Physico-Chimie de la Combustion, Université Catholique de Louvain, Place Louis Pasteur, 1 B-1348 Louvain-la-Neuve, Belgium. Tel: +32 10 472727 or +32 10 472761, Fax: +32 10 47 24 68, E-mail: vandooren@chim.ucl.ac.be, web: www.cstr.ucl.ac.be/ECM2005/

6-8APRIL
Sesimbra, Portugal. THERMODYNAMICS 2005. The conference will feature the 2005 Lennard-Jones Lecture sponsored by the Royal Society of Chemistry.
Details: **http://www.thermodynamics2005.web.pt**

11-15 APRIL
Lexington, Kentucky, USA. WORLD OF COAL ASH. Details: Tel: +1 720 870 7897,
Fax: +1 720 870 7889, E-mail: info@acaa-usa.org, web: www.worldofcoalash.org
18/19 APRIL

London, England. FIRE RESEARCH: THE SPRING MEETING OF THE COMBUSTION INSTITUTE (BRITISH SECTION) in honour of Dougal Drysdale's retirement. Details: Jose Torero, E-mail: jltorero@staffmail.ed.ac.uk or The Combustion Institute (British Section) Hon Secretary. *See also this Newsletter.*

MAY 2005

10-12 MAY
Castiadas, Sardinia, Italy. SECOND INTERNATIONAL CONFERENCE ON CLEAN COAL TECHNOLOGIES FOR OUR FUTURE. Details: www.cct2005.it

10-13MAY
Hangzhou, China. THE 8TH INTERNATIONAL CONFERENCE ON CIRCULATING FLUIDIZED BEDS (CFB8). Details: E-mail: **cfb8@zju.edu.cn**,
web: **http://ceee.zju.edu.cn/CFB8**

17-20 MAY
Paris, France. (ICCHMT 2005) FOURTH INTERNATIONAL CONFERENCE ON COMPUTATIONAL HEAT AND MASS TRANSFER. Details: Jean Sicard, ENS, Cachan, E-mail: sicard@dgc.ens-cachan.fr, web: http://wwwpriv.lmt.ens-cachan.fr/~4thICCHMT/ or A. Rachid Bennacer, University of Cergy-Pontoise, E-mail: Rachid.Bennacer@iupgc.u-cergy.fr, web: www.u-cergy.fr/rech/labo/equipes/eevm/icchmt05/

JUNE 2005

5-10 JUNE
Antalya, Turkey. INTERNATIONAL SYMPOSIUM ON HEAT AND MASS TRANSFER IN SPRAY SYSTEMS (SPRAY 05). Details: Faruk Arinç, ICHMT Secretary-General, Mechanical Engineering Department, Middle East Technical University, 06531 Ankara, Turkey. Tel: +90 312 210 5214 or 1429, Fax: +90 312 210 1331 or 1266, E-mail: arinc@ichmt.org, web: http://www.ichmt.org/Spray-05, or Professor Norman Chigier, Department of Mechanical Engineering, Carnegie-Melon University, Pittsburgh, PA 15123, USA, Tel: +1 412 268 2498, Fax: +1 412 268 3348, E-mail: chiger@andrew.cmu.edu

21-24 JUNE
Lisbon, Portugal. ECCOMAS THEMATIC CONFERENCE ON COMPUTATIONAL COMBUSTION. Details: Congress Secretariat, Carlos Monteiro, IDMEC, Instituto Superior Técnico, Av. Rovisco Pais, 1049-001 Lisboa, Portugal,
Tel: +351 21 8417186, Fax: +351 21 8475545,
E-mail: compcomb@navier.ist.utl.pt, web: navier.ist.utl.pt/compcomb05

23-26 JUNE
Billings, Montana, USA. 19TH INTERNATIONAL CONFERENCE ON LIGNITE, BROWN, AND SUBBITUMINOUS COALS. Details: Deb J Haley, Tel: +1 701 777 3120,
Fax: +1 701 777 5181, E-mail: dhaley@undeerc.org, web: www.undeerc.org

27-30 JUNE
Lisbon, Portugal. CLEAN AIR 2005 - EIGHTH INTERNATIONAL CONFERENCE ON ENERGY FOR A CLEAN ENVIRONMENT. Details: Maria Fernanda Afonso, (Conference Secretary), Research Group on Energy and Sustainable Development, Instituto Superior Tecnico - Technical University of Lisbon, Dept. Mechanical Engineering, Av. Rovisco Pais, 1049-001 Lisbon – Portugal, Tel: +351 21 8417378, Fax: +351 21 8475545,
E-mail: cleanair2005@vianw.pt, web: http://navier.ist.utl.pt/cleanair

JULY 2005

10-14 JULY
Glasgow, Scotland. 7TH 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

13-15 JULY
Istanbul, Turkey. (HEC-2005) INTERNATIONAL HYDROGEN ENERGY CONGRESS & EXHIBITION. Details: http://www.ihec2005.org

31 JULY-5 AUGUST
Montreal, Canada. 20TH INTERNATIONAL COLLOQUIUM ON THE DYNAMICS OF EXPLOSIONS AND REACTIVE SYSTEMS. Details: ICDERS 2005, Department of Mechanical Engineering, McGill University, 817 Sherbrooke St. W., Montreal, Quebec H3A 2K6, CANADA. Tel: +1 514 398 6298,
E-mail: icders.eng@mcgill.ca, web: http://www.icders.mcgill.ca/

SEPTEMBER 2005

12-15 SEPTEMBER
Jyväskylä, Finland. BIOENERGY IN WOOD INDUSTRY.
Details: http://www.finbioenergy.fi/bioenergy2005

13-16 SEPTEMBER
Brighton, England. 3RD EFFE WORLD CONFERENCE ON EXPLOSIVES AND BLASTING. Details: E-mail: efee@tylerevents.co.uk, web: www.efee-web.org

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, 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

21-22 SEPTEMBER
Braunschweig, Germany. VERBRENNUNG UND FEUERUNGEN - 22ND GERMAN FLAMEDAYS. Details: Diana Wilhelm, VDI Wissensforum IWB GmbH, Postfach 101139, 40002 Düsseldorf, Germany. Tel: +49 02 11 62 14 368, E-Mail: Wilhelm@vdi.de

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, web: www.undeerc.org

AUTUMN 2005
LEAN COMBUSTION. Possible topic for the Autumn Meeting of the Combustion Institute (British Section). AGM of Section at this meeting. Details: The Hon Secretary of the Section.

OCTOBER 2005

20-21 OCTOBER
London, England. MEETING TOMORROW'S CHALLENGES TODAY - 2005 BRITISH FLAME DAYS. Details: **http://www.combustion-centre.ifrf.net/meetings/BritishFlame2005-CallforPaper.pdf**

2006

MAY 2006

21-23 MAY
Cleveland, Ohio, USA. Spring Technical Meeting of the Central States Section.
Details: http://www.cssci.org

AUGUST 2006

6-11AUGUST
Heidelberg, Germany. 31st INTERNATIONAL SYMPOSIUM ON COMBUSTION.
Details: www.combustion2006.org

13-18 AUGUST
Sydney, NSW, Australia. THIRTEENTH INTERNATIONAL HEAT TRANSFER CONFERENCE. Details: Graham de Vahl Davis, Tel: +61 2 9385 4099,
Fax: +61 2 9663 1222, E-mail: g.devahldavis@unsw.edu.au, web: www.ihtc-13.com

2008

SUMMER 2008
Montreal, Canada. 32nd INTERNATIONAL SYMPOSIUM ON COMBUSTION.

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Marie Curie Fellowship at the Technical University of Lodz, Poland.

There is a vacancy for a young scientist to work in the combustion laboratory at the Technical University of Lodz, Poland for one year. It is a fellowship in the Marie Curie ToK project (6th FP) with salary about 3200 Euro per month. The merit of the project is related to combustion of homogeneous gas mixture from the point of view of engine application.

Details of the call are available at: **http://mc- opportunities.cordis.lu** – (in table with Host Fellowships/RTN.)

Details of this opportunity were sent by Professor Jozef Jarosinski on 15 October 2004 and were circulated by e-mail to members by e-mail the same day.

BY CI(BS) MEMBERS IN 2003

As before, members were invited to send me their list of publications for the previous year (2003). It is obvious that not everyone did so but, hopefully, this compilation will be of use and interest. Sadly, not all members have sent me their lists. Although the list involved a considerable amount of editing, I have not tried to inflict on it a particular style and have retained that sent to me by authors. I have tried to remove duplicates. The list is in alphabetical order of the surname of the first-mentioned author.

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