

The background of the cover features a large, light-colored silhouette of a person on the left side, wearing a headpiece with a star-like symbol. Below this, there is a smaller silhouette of a cityscape with various buildings and a street. The text is centered over the white background.

The International Conference on Phenomena in Ionized Gases

a personal history 1953-2005

by Raoul Franklin

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The Conference was initiated in Oxford in 1953, by Hans von Engel and his research group. It has subsequently been held every two years in different countries in the world.

The Oxford group were away at the third in Venice when I arrived in Oxford in 1957, and my first attendance occurred in 1959 when the conference was in Uppsala, Sweden. Since then I have attended most but not all, the interruptions being due to the advent of children and to the 'attacks' Mrs Thatcher and her government made on British universities in the 1980s.

During the Cold War period, the pattern developed of the conference alternating between the Western and Eastern Blocs to allow those who could not travel freely to attend at least every other one.

In 1971 the conference returned to Oxford and I was the Organizing Secretary. During that conference it was decided that it needed a formal constitution and a mechanism for rotating the membership of the International Scientific Committee, which had been largely unchanged since the inception. That was put in place at the 1971 meeting and as a consequence I subsequently became a member of the I S C in Hans von Engel's place. This in turn led to my becoming Chairman for the 1977 conference in East Berlin.

The Berlin wall went up during the Munich conference in 1961 and thereafter the alternation began, only to come to an end in 1989, but thereafter Yugoslavia, as a country, disintegrated. The conference could really only claim to truly international in 1995 when it was in the United States for the first time, and that was reaffirmed in 2001 when it occurred in Japan. If one lumps together both East and West Germany, the conference has occurred in Germany more times than any other country.

The balance of the conference has changed over the years with fusion occupying a much larger place in the early years, and subsequently there have grown up specialist conferences in that area alone. In the middle years much basic work in plasma physics was first reported at the ICPIG – a case in point being the experimental work on Landau damping by Malmberg and Wharton at the Paris meeting. More recently the development of plasma processing has given an impetus to the need to understand electronegative plasmas in detail.

The maturity of the field covered by the conference was recognized by the establishment of the Penning Prize to honour those whose contribution had been outstanding, and a worthy first recipient was Hans von Engel. Unfortunately he was too frail to travel to the conference in 1991 and so the scroll and cash prize were handed over in a private ceremony in Oxford.

The Prize was funded for an initial period by the Phillips Company, but they withdrew their support after the first three awards, and it seemed to me that it would be far better if the Prize could be endowed so that it was guaranteed in perpetuity. The 1971 conference in Oxford had made a profit, and that led to the establishment of the Gordon Francis Fund in memory of one of Hans' research students who died prematurely. The objects of the Fund had been a prize for the best performance in the Oxford M.Sc. in the Science and Application of Electric Plasmas, and to provide assistance to travel to conferences in the field by younger scientists. The M.Sc. was discontinued in 1984. So the Fund was in a healthy state, but could not carry funding a prize of \$1000 every other year, and I decided to augment the fund to bring it to an appropriate level, with the agreement of Oxford University to add to the objects of the fund, its renaming to include von Engel, and on condition that the conference agreed to the renaming of the prize in honour of its founder.

Fortunately agreement was forthcoming from both parties, and I made gifts of appropriate magnitude over two years to secure the future of the Prize, and the recipients of the von Engel Prize to date have been Balescu, Takada, Kogelschatz, my Oxford colleague John Allen and then Michael Lieberman.

The conference in 1961 coincided with our honeymoon, and so we spent six weeks in Europe ending up at Munich. That rather set the pattern for the future, and whenever possible we attached a holiday to conferences abroad, either before or after. But the need to look after our children

meant that my wife Faith was not an attendee from 1965 to 1977 inclusive. Subsequently she was a great devotee of the conference, having participated in the planning and execution of the accompanying persons programme in Oxford in 1971.

I missed the 1965 conference in Belgrade, because our elder son had just been born, the 1981 in Minsk because that summer was spent redesigning City University, and the 1985 in Budapest because the Conservative government on re-election did not honour its promise of level funding for universities. Otherwise I have attended all since 1959 to the present giving one or more papers at each. As a consequence John Allen and I hold jointly the record for having attended the greatest number, though I acknowledge that he attended the first as a research student.

More recently I have become associated with companion conferences, namely ESCAMPIG and the GEC. ESCAMPIG the European Sectional Conference on Atomic and Molecular Phenomena in Ionized Gases alternates with ICPIG and in 1989 they approached me following the death of Norman Twiddy to become the British representative on their International Committee, and I served for a few years before making way for a younger person (Bill Graham). The Gaseous Electronics Conference in the United States predates ICPIG and was essentially the inspiration for von Engel with many of the 'fathers' in the field being associated with it.

It normally takes place in mid-October, precisely the wrong time of year for someone with a full-time university appointment. So I followed it at a distance until I retired in 1998. Since then I have attended regularly and made up for never having taken a sabbatical in the US.

I conclude with a few stories encapsulating experiences that have accompanied attendance at ICPIG rather than giving bald facts and figures.

The conference did not have an auspicious or encouraging beginning as the Physical Society (which no longer exists) gave, as its opinion, that while the conference was timely, it did not have good long-term prospects. So much for the judgement of committees! There was nevertheless a sufficiently large body of scientists active in the field that subsequent conferences were readily and willingly organized in other countries.

The fourth in Uppsala was noteworthy, amongst other things, because it brought together again von Engel and Steenbeck, who in the early 1930s had written in two volumes, the first real textbook on gas discharges and low temperature plasma physics. Von Engel left Germany in 1939 abandoning his previously promising career in Siemens; Steenbeck stayed on and after the Second World War was a senior scientist in the East German government. There is a photographic record of their meeting, but no knowledge of what they said to one another.

I have already mentioned that the Berlin Wall went up during the 1961 conference in Munich, and I was appalled to hear a senior American advocating immediate use of atomic bombs.

The 1963 conference in Paris was at a time when the subject was in ferment with a lot of new and important results coming into the public domain. I have already referred to Landau damping which had been predicted over ten years earlier but not observed experimentally. Also there was a lot of work going on worldwide on plasma and their generation by, or interaction with, radio-frequency fields. Forty years on that has a strangely modern ring.

As indicated, I missed the 1965 conference in Yugoslavia, but I was later to catch up with those who were scientifically active in the field in that country, and I am grateful to them for the occasions when we have met over the years in spite of the changes that have gone on more recently.

For me the most important thing that occurred at the 1967 conference was presentations by two young scientists for the United States, both of Chinese extraction who gave brilliant Invited Lectures which incorporated methods that were being carried over from fluid and compressible gas dynamics to plasma physics. I refer to Su and to Lam. The Lam paper in particular, using the method of matched asymptotic approximations, in other sense changed my life.

The 1969 conference in Bucharest took us behind the 'Iron Curtain' but the President there was still in favour in the West, so we were confronted by young people who knew the latest Beatles tunes e.g. The Yellow Submarine. However an important consequence of the conference was that three members of the Local Organizing Committee made their way to the West – at least one of whom (Marta Bacal) continues to be active to this day.

The 1971 conference was in Oxford, and because of my involvement occupied quite a lot of my time. I regard as our principal achievement getting the Contributed Papers to participants in their countries of origin six weeks before the conference. We used the 'Diplomatic Bag' to get them to the USSR and the United States Air Force to transport the volumes to North America. The conference was housed in six Oxford colleges with an internal mail system between them.

Prague was the venue for the next conference, and in political terms it was fraught because there had been the so-called 'Prague Spring', which led to a further clampdown on freedom of expression. Indeed one of the most distinguished workers in the field had lost his job because he (Pekarek) sought to protect his colleagues by destroying their personal files.

By contrast the 1975 conference in Eindhoven was an oasis of calm, except in retrospect the economic storm clouds must have been gathering with Phillips questioning how much of their investment should be going into the field.

In 1977 the conference moved to East Berlin and by then I had become Chairman of the International Scientific Committee. The conference was held in the Parliament building – that proscribed the dates when the conference could be held. My abiding memory of that conference was the US Americans having to line up in order to get me to verify that they had actually attended the conference if they were to gain a tax concession. The bureaucracies of West and East did not seem so far apart as they were conventionally portrayed.

Faith was able to accompany me to the 1979 conference in Grenoble and we took our own car, breaking the journey on the way. By then we were at City University, and the conference for me assumed another dimension when I spent a lot of time walking around with Fred Crawford trying to help him decide whether to abandon Stanford and accept the post of Vice-Chancellor at Aston University in Birmingham.

The impact of the first few years of the Thatcher government meant I felt I had to abandon the idea of attending the conference in Minsk 1981 and spend the summer redesigning City University. It was only many years later that we managed to visit the Soviet Union, which had by then broken up.

The next conference in 1983 in Dusseldorf was closer to home and again we travelled in our own car. The von Engels were both present and another of Hans' research students, Roy Bickerton gave one of the Invited Lectures. Ilse von Engel had felt that she could not face the painful memories she would have had if she had attended the 1977 conference in Berlin. Maecker gave the after dinner speech, and it was clear to me that some of the great names in the field would not be attending many more such conferences – Llwellyn-Jones was there but Lochte-Holtgreven, Meek, Craggs and Edels had dropped by the wayside.

The 1985 conference was held in Budapest, and one had high hopes of visiting such an historic city, but the second term Thatcher government did not honour a pre-election promise of level funding and so once again duty called, and we again spent the summer redesigning City University. Budapest had to wait until 2000 when ESCAMPIG was held in Hungary, but I was reliably informed that I was the first to register on that occasion.

1987 saw the conference return to the British Isles, but this time in Swansea, which had long been a world renowned centre for research in the field essentially due to Llwellyn-Jones who had been a research student of Townsend in Oxford and then set up a research group in Swansea which included such names as Dutton and Grey Morgan. Thoneman was also present, as he had left the Atomic Energy Authority, and plasma physics for other fields, but was a professor at Swansea.

In 1989 the conference returned to Belgrade after 22 years. Yugoslavia has strength in the subject area and ran a regular Summer School to help their younger researchers develop presentation skills in English, and I had attended two such, one at Herceg-Novi in 1970 and another in Dubrovnik in 1976. Apart from that conference where we met up with long-time friends the Anicins, I planned to show Faith the country as I had been there four times in different roles over the years.

That we achieved, visiting most of the Republics that made up the country. The most memorable was Montenegro and its former capital Cetinje, where the Palace is known as La Biljarda because the then Prince had a billiard table carried up on the backs of donkeys from the

Adriatic to complete the furniture. Unfortunately it was clear to us that the country was about to descend into chaos – as it certainly did. And that has blighted the careers of many able scientists.

The 1991 conference was in nearby Italy, but there was no feeling of impending doom, as at last it appeared that the increasing inclination of the Tower at Pisa was being arrested. The Penning Prize was announced as having been awarded to von Engel, but the actual award was carried out later in Oxford by David Davies the then British representative on the ISC.

Bochum was the setting for the 1993 conference, as they had nobly stepped into the breach when the previously expected arrangements broke down. Another of ‘the grand old men’ of the field Ecker, was nearing retirement and so it was a nice gesture on his part. We were able to meet up again with the Schluters whom we had befriended in Swansea, and they helped to give the conference a social dimension entertaining some of us in their own home, including Tsendin another leading figure who previously had been unable to travel outside the Soviet Union.

1995 gave the conference ‘respectability’ in that for the first time it was held outside Europe. The prime movers were from the Stevens Institute of Technology, and the conference was held on their campus. It gave one a different perspective on New York as it was just across the Hudson River, with the Twin Towers on the skyline. Little did we know how importantly they were to feature in world events subsequently. Fittingly the Penning Prize was awarded to an active American, Jim Lawler, who continues to be a significant figure in the field.

Toulouse, which vies with Grenoble to be the second city in France after Paris, was the venue of the 1997 conference. By then we had given up the idea of taking our own car to mainland Europe, and so flew to Lyon, and subsequently hired a car for holiday purposes which involved walking the route that Robert Louis Stevenson took with his donkey in the Cevennes.

The opening up of the Eastern Bloc countries meant that there was an incentive for them to host the conference and so it was that the 1999 conference took place in Warsaw, once again in university buildings of which they were justifiably proud. By then the name of the prize had changed to von Engel and the first recipient was Balescu.

The international dimension was given further emphasis in 2001 when the conference was held in Nagoya. The Japanese had for many years been very active in the field, and not surprisingly their participants outnumbered those from all other countries, partly because of the cost of travel, but also because of the relative strength of the yen. The conference was clearly changing its emphasis reflecting the growing importance of plasma processing and the extent to which Japanese industry was involved in such work, as well as in plasma displays.

2003 saw a return to Germany and this time to Greifswald which had been chosen to develop as a centre of excellence, after the reunification of Germany. The hosts were the university which dates back to 1794 and the two new research institutes, one concentrating on low temperature plasma physics and the other on fusion. It was of great interest to those attending to appreciate how important the Hanseatic towns on the Baltic coast had been in medieval times. Another important milestone for the conference was that for the first time the Chairman was a woman. Leanne Pitchford had trained under Art Phelps in the US, but currently co-directs research in Toulouse with Jean-Paul Boeuf. The recipient of the von Engel prize was an old Oxford colleague John Allen who had as a research student attended the first ICPIG.

The 2005 conference, in the Netherlands for the third time, was in a converted nunnery, conveniently all under one roof but with a layout that approximated to a labyrinth. For me it was the second time doubling up honeymoon and conference, following Faith’s death in 2004. The von Engel Prize was awarded to Michael Lieberman whose contribution to the understanding of radio-frequency generated plasmas for plasma processing is widely acknowledged.

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