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Robert Crispin Evans (1909–2005)

The flourishing IUCr of today, with its many journals, publications and widespread activities, can salute the memory of Robert Crispin Evans as the last of its founders. He died peacefully on 18th December 2005 at Hinchingbrooke Hospital, Huntingdon, England, aged 96. He was senior Emeritus Fellow of St Catharine's College, Cambridge.

Evans was a key figure in the first years of the International Union of Crystallography and carried undoubtedly the largest single work load. A dozen or more persons, including Paul Ewald, Lawrence Bragg and David Harker, were the main players in the formation of the Union. Robert Evans was Secretary of the Provisional International Committee (1946), then General Secretary of the interim Executive Committee (1947), and then General Secretary of the Union from its formal inauguration in 1948 for the first two triennia until 1954. In addition, he was a Co-editor of *Acta Crystallographica* from its launch in 1948 until 1960, and carried the very demanding load as Technical Editor until 1958 by which time *Acta* was three times its initial size.

Robert Evans was born in November 1909 in Wallington, Surrey, to a business family. He was at school at Repton School, Derbyshire, and then entered Clare College, Cambridge University, in 1928 to study for the Natural Sciences Tripos. He also obtained a BSc in physics from London University, which he probably took as an external student while he was an undergraduate at Cambridge. He was a research student in physics at the Cavendish Laboratory and gained his PhD in 1934. His thesis was entitled 'The evaporation of ions and atoms of the alkali metals from hot surfaces'. The problems which prompted his initial experiments

were suggested by Dr M. L. E. Oliphant. Two of the papers which resulted from his work were communicated to the Royal Society by his official supervisor, Lord Rutherford.

The first of these concerned the evaporation of positive ions of potassium from a hot tungsten surface when bombarded by an ion beam of variable energy, and the derivation of the corresponding ion work function. The second concerned the rate of evaporation of potassium atoms from a tungsten surface and the measurement of the atomic work function.

By the time the latter paper was submitted in December 1933, Evans was already a member of the staff of the Department of Mineralogy and Petrology. I have been unable to discover how this came about. C. E. Tilley had been appointed as Professor in 1931 on the retirement of A. Hutchinson. Changes were afoot including the possible promotion of J. D. Bernal, who was Lecturer in Crystallography. Tilley may have felt the need for the addition of a solid-state physicist. Be that as it may, F. I. G. Rawlins was also appointed in 1933 as Assistant in Experimental Research in Crystallography. He had published in 1929 a book on the infrared analysis of molecular structure. Before he left in 1934 to become scientific adviser to The National Gallery, Rawlins drew Evans's attention to the short book on *Kristallchemie* (1934) by O. Hassel of Oslo. Evans translated this from the German and it was published in 1935 as *Crystal Chemistry*. Evidently this aroused Evans's more serious interest in the subject, and it led on to his much more comprehensive *Crystal Chemistry* published in 1939. The preface acknowledges that he had been actively aided and encouraged by Bernal, who in 1937 had left Cambridge for Birkbeck College, London. The chapter on molecular compounds had been discussed with Dorothy Crowfoot (Hodgkin).

Crystal Chemistry omits any discussion of X-ray methods. It opens with chapters on the crystal lattice, interatomic binding forces and quantitative lattice theory (Born, London, Pauling, Bloch, Seitz *et al.*). One can see how his thesis work would have stimulated his interest in these topics. Much the larger part of the book is on systematic crystal chemistry. When his tasks with the IUCr had finished in 1960, he was able to complete a second edition of *Crystal Chemistry* in 1964.

Evans was a member of the staff in the Department of Mineralogy and Petrology at Cambridge as Demonstrator 1933–1945 and as Lecturer 1945–1977. He gave extremely well received lectures that he illustrated with models mainly conceived and constructed by himself. His lecture demonstrations of crystal optics and microscopy were notable. He built an electromagnetic mineral separator that was a great improvement on previous instruments and was much used by research students. Among other devices that he worked on with colleagues were a mechanical machine for the computation of two-dimensional structure factors and a concentrating X-ray monochromator. In essence, he was a tutorial don, who was not driven, as university staff are today, by the need to research and publish. Rather, he was a teacher and mentor to generations of students. His major academic contribution was his book on *Crystal Chemistry*.

During World War II, from 1940 to 1945, Evans was with the Ministry of Supply where he worked on shell ballistics and experimental firings. He returned to Clare College in 1945 and was elected a Fellow of St Catharine's College in 1947.

At this stage of his career, he became involved in the birth of the IUCr. By today's standards the launch of the International Union of Crystallography and *Acta Crystallographica* was remarkably free of bureaucratic procedures and delays. Before it even existed formally, the IUCr was admitted as a member of the

International Council of Scientific Unions (ICSU)! Evans wrote a lively account of the first General Assembly and International Congress of the Union held at Harvard in 1948. This account appeared in 1983 in the ACA volume *Crystallography in North America* edited by Dan McLachlan and Jenny Glusker. His opening sentence was

> On Monday 7 April 1947 F. J. M. Stratton, General Secretary of the International Council of Scientific Unions, wrote to me to say that the International Union of Crystallography had that day been admitted as a constituent member of the Council.

In brief, the origins of the IUCr lay, firstly, in a talk by Ewald in Oxford in March 1944 to the X-ray Analysis Group (XRAG) of the Institute of Physics in which he strongly urged the foundation of an international union of crystallography; secondly, from the several initiatives in 1944–45 towards a new journal for crystallography by the American Society for X-ray and Electron Diffraction (ASXRED), by XRAG and by crystallographers in the Soviet Union. XRAG, led by Sir Lawrence Bragg, arranged an international scientific conference 'X-ray Analysis during the War Years' in London in July 1946. Afterwards, the Provisional International Crystallographic Committee of 31 persons from 11 countries met on 12 and 13 July 1946 with Bragg and Harker as joint Chairmen, and Evans as Acting Secretary. This meeting, which decided to create a Union and develop a journal and other publications, was effectively the 'Zeroth General Assembly of the IUCr'.

On 17th July 1946, the new Journal Subcommittee met in Cambridge with Ewald as Chairman and Evans as Secretary. Also present were Bragg and F. J. M. Stratton (Secretary General of ICSU, the astronomer and a personal friend of Bragg, Ewald and Evans). At the suggestion of the Soviet crystallographers, *Acta Crystallographica* was adopted as the title for the journal.

The Journal Subcommittee also handled the formation of the IUCr. Bragg, Ewald and Evans sought further advice from Stratton, who was very favourably disposed. Draft Statutes and By-laws were prepared. These were approved in correspondence by the Provisional International Committee in March 1947 and then submitted to ICSU. As related above by Evans, ICSU approval came within a month, and the IUCr joined the eight Unions who had been members since the 1920's. The Journal Subcommittee became the interim Executive Committee of the IUCr, with Ewald as Chairman and Evans as Secretary.

Ewald and Evans were then heavily involved in launching the new journal. Money had to be raised, and for this the status given by membership of ICSU was vital. It led to grants from UNESCO, and helped in the raising of funds from industrial and other sources in the UK and USA. A publisher had to be chosen: Cambridge University Press was selected. Manuscripts had to be sought and printed. Remarkably, the first issue of *Acta Crystallographica* appeared in April 1948.

In July 1947, Evans received the letter inviting the fledgling Union to hold its first General Assembly and International Congress in the United States in the summer of 1948. As it happened, he had already arranged to visit the USA in August 1947. That trip gave him the opportunity for discussions about the proposed congress and to visit the American Institute of Physics, where he gained insights into journal editing and printing procedures.

Evans's responsibilities concerned the arrangement of the formal business of the Union to be transacted at the sessions of the General Assembly. Actually this formal business was transacted without real difficulty, despite Ewald's initial attempt as Chairman to create the Union by the acclamation of the entire

audience of Congress participants rather than by the votes of the official delegates. 'Evans somehow rescued me', Ewald wrote later. In fact, at that time there were only four members – the Adhering Bodies of Canada, Norway, UK and USA – indeed, when Evans was making preparations the number of formal members, as he wrote later, 'could be counted on the thumb of one hand'. Ewald and Evans, with their different styles, formed a very effective duo for the accomplishment of the necessary business. Statutes and By-laws, slightly modified from those submitted to ICSU, were adopted. Bragg was elected as first President of the IUCr, with Evans as General Secretary and Ewald as Chairman of the Commission for *Acta Crystallographica* (and thus leader of the small editorial team which had already brought out several issues of the journal). The important Commissions for *Structure Reports* (Chairman Arthur Wilson) and *International Tables* (Chairman Kathleen Lonsdale) were established; their work also had begun earlier.

A fuller description of the formation of the Union, together with an account of its development and the difficulties due to the rapid influx of manuscripts to *Acta Crystallographica* in the years after 1948, has been given by Harmke Kamminga [*Acta Cryst*. (1989), A**45**, 581–601]. Another summary was given by the present writer, D. W. J. Cruickshank [*Acta Cryst.* (1998), A**54**, 687–696].

Evans was a careful scientific and technical editor. He had a genuine interest in all aspects of print production. I remember being invited to his office in Cambridge in 1949. In those days, the text of papers was typewritten, but equations and symbols were inserted by hand. He pointed out kindly the ambiguities in my handwriting and showed me something of the way a paper should be marked up for the printer. In 1954, he gave a talk at an XRAG meeting in Cambridge about the work of an editor. He illustrated his talk by mentioning some of the problems in submitted papers. As each infelicity was mentioned, he raised his head a little and nodded gently to the relevant culprit in the audience.

In 1955, he married Betty Bond, who he had met when she was a librarian in the Scientific Periodicals Library. She survives him; they had no children. Their home in Elsworth, a village outside Cambridge, was an important focus for hospitality of all kinds and, not least, hospitality to students.

After retirement in 1977, he had two hobbies, one as a beekeeper and the other by opening his small workshop to encourage the youths of the community to learn skills in woodwork activities. He was a kindly person, generous with his wisdom, but somewhat reserved in manner. However on a public platform there was a side of Robert that could perform to great effect. He was not a joke teller, but he could make a remarkably effective and witty speech, simply by his choice of words and timing.

For his 90th birthday celebrations at St Catharine's College, the anecdotes he related included the following. The Cavendish Laboratory, where he was a research student, was enjoying its most illustrious epoch 'not only because I was there' but because no fewer than eight Nobel Laureates were there too. On one occasion, Einstein was visiting Cambridge and made a tour of the Laboratory accompanied by Lord Rutherford and J. J. Thomson, who was Rutherford's predecessor and discoverer of the electron. The party visited a practical class in which Robert was demonstrating and after their departure he was asked by one of the students 'Who were those other gentlemen with Einstein?'.

On Monday 7th April 1997, exactly fifty years after Professor F. J. M. Stratton had written to him to say that the IUCr had been admitted as a member of ICSU, Evans was invited to visit Chester to open the latest extension to the IUCr offices. He spoke of the creation and early days of the Union. One of the major reasons

for inaugurating a new Union was the desire to launch a journal of the highest standards to serve the entire crystallographic community. Appropriately, the Union's first half-century was celebrated in the place where its family of six journals was being produced with the most modern of computer technology. Very fittingly, the celebrations were enhanced by the presence of the last surviving founder of the Union: Robert Evans.

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