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Obituary

Gordon Cressey (1952–2025)

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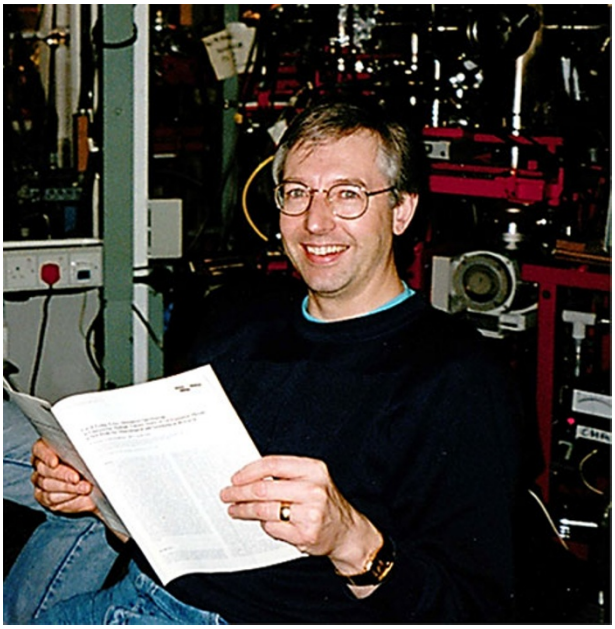

Figure 1. Gordon Cressey (1952–2025)

Gordon Cressey was gifted with an encyclopaedic knowledge of minerals and a boundless enthusiasm for mineralogy. His endearing and welcoming nature have supported many geoscientists over the years and without doubt he will have left indelible memories with all those lucky enough to have worked with him over the course of his career.

Gordon was born in Rawtenstall, Lancashire, UK, and at the age of 7 moved with his family to Margate on the Kent coast. Educated at Chatham House Grammar School, Gordon was renowned for being "a livewire with a real sense of adventure", characteristics that could be used to describe him at any stage of his life and by anyone who ever met him. Gordon spent the majority of his childhood exploring the coast and countryside of south-east England where he developed his great passion for minerals and rocks. An avid rock-climber during the late 60's and early 70's, Gordon undertook many successful adventures scaling the chalk cliffs, needles and stacks along the Kent and East Sussex coast.

In 1971 Gordon went to the University of Manchester to study Geology, graduating in 1974, and then secured a PhD in 1979 having undertaken an experimental petrology study of garnet solid solutions. The first publication from his PhD work was a single author paper in *Nature* on exsolution in almandine-pyrope-grossular garnets (Cressey, 1978). The year 1971 was not just the start of Gordon's undergraduate journey for he also met Barbara, who had enrolled on the same undergraduate course, and so began their 54-year odyssey together with wedding bells ringing in the summer of 1974. In 1977 while still writing his PhD thesis Gordon joined the Geology and Mineralogy Department at the University of Oxford as a Demonstrator in Mineralogy and with a Pembroke College Lectureship. After 6 years in Oxford Gordon joined the Department of Mineralogy at the Natural History Museum (NHM), London, in 1983.

The 1980's was a time of great change for the Museum as it devolved from the British Museum, amalgamated the Geological Museum and modernised its organisational structure, outlook and workforce. This was the perfect environment for Gordon's enthusiasm, dynamism and welcoming, inclusive nature, and he certainly thrived. Together with other members of staff, Gordon helped forge a new Department of Mineralogy with an outward-looking research perspective more aligned with national and academic strategies, and a more proactive sense of responsibility towards its stakeholders that included a huge impetus towards public outreach and engagement.

By the mid-1990's he was the Head of Mineral Sciences Division and Associate Keeper of Mineralogy, and was one of the "go to people" for the NHM Public Engagement teams. Indeed, as anyone who knew Gordon would attest, he never tired talking about minerals, and the NHM provided him the perfect platform to do this as national strategic programmes around the public understanding of science were ramped up and events such as National Science Week were brought to the fore. He would engage and enthral everyone irrespective of age, background or scientific experience, regaling mineralogical stories from curiosities to functional materials and cultural heritage to planetary processes. A mineralogical discussion with Gordon could lead you very quickly on a pioneering trail transcending scale and time, and his natural flair for science communication was showcased by a catalogue of appearances on radio and TV shows, and public, museum membership and school lectures in which Gordon brought mineralogy to life to a vast array of audiences.

Gordon was also a strong advocate for scientific content within the NHM's public galleries, particularly the Earth Galleries that were relaunched in 1996. As the emphasis and style of museum galleries evolved from being specimen-oriented towards a more visitor-experience approach he argued vehemently that the gallery content should showcase the Museum's collections and research, and be associated with scientifically accurate and contextualised

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Figure 2. Gordon at the launch of his re-imagined edition of *Crystals* published by the Natural History Museum in 1999

information. Gordon tenaciously demonstrated to the gallery developers that geological sciences are fun, engaging and awe inspiring. The Earth Galleries have evolved somewhat over the last 30 years, but in several of these it is still possible to see Gordon's influence and distinctive phraseology, while the accompanying book *Earth's Restless Surface*, co-written by Gordon, describes further the continually changing nature of Earth's landscape. Gordon continued with the popular-science style of writing and completely re-wrote the book *Crystals* (Fig. 2), published in 1999, modifying many of the figures and including sections highlighting the role of minerals, crystallography and phase transitions in many aspects of the modern world including domestic life, medicine and technology.

When Gordon joined the Museum in 1983 he also began to modernise the X-ray diffraction (XRD) laboratory which at the time of his arrival was optimised towards the Mineral Collection's curatorial activities and comprised precession, Weissenberg and Debye-Scherrer cameras. To suggest that such a task was tailor-made for Gordon would be one of the all-time great understatements. He had an incredible empathic understanding of diffraction instrumentation and was continually tweaking and modifying them for novel applications, combined methods or faster data collection. Each successful development was quickly followed by a Cressey-style wave of excitement that swept through the Department, and it was captivating (and exhausting) to experience his unbridled joy as each new discovery unfolded. Again, it's a testament to Gordon's tenacity and drive that in ∼15 years he had secured sufficient funding and repurposed numerous discarded instruments from around the UK to build the bustling and multifunctioning XRD laboratory currently housed at the NHM. A laboratory that not only facilitates research but is also fully aligned with the Museum's collection management and public engagement ambitions.

From an NHM perspective, among the most important of these developments was perhaps ushering in the 'digital age' with curved, position-sensitive detectors (PSD) and high-brightness X-ray micro-sources replacing the Debye-Scherrer cameras used by the mineral curation teams for decades. Maintaining the micro-sampling specialism these instruments also provided a linked workflow to the collection management system. Of all the diffractometers Gordon secured and commissioned at the NHM it was these PSD diffractometers that were perhaps his pride and joy. They were hugely adaptable instruments that enabled Gordon to forge applications from non-destructive and high-throughput analysis to real-time mineral dynamics and rapid, accurate quantitative phase analysis. Indeed, the development of a non-destructive X-ray micro-diffraction capability for phase identification and 2D mapping was another foundational piece in Gordon's XRD laboratory. Eliminating (or minimising) invasive sampling of collection material enables analysis of rare or unique specimens, preserving their scientific and cultural context, as well as of very small samples and crystals. Very much in line with Gordon's experimental and collaborative nature this made the laboratory accessible across the whole Museum including Earth and Life Sciences as well as Conservation and Libraries and Archive. Synergistic with these developments Gordon also established the Mineral Sciences research group, an integral part of his XRD laboratory with a collections-based emphasis on crystal-chemistry, structures and physics of minerals, and quantitative phase analysis.

During the mid- to late-1980s synchrotron sources began to open as user facilities and Gordon became one of the pioneers in the application of synchrotron science to mineralogy. Early synchrotron papers of his include a classical application of EXAFS spectroscopy identifying the site-locations of rare earth elements in the epidote structure (Cressey and Steele, 1988) and the quantification of transition metal oxidation states in minerals using soft-X-ray, L-edge spectroscopy (Cressey *et al.*, 1993). Again, his brilliant understanding of instrumentation came to the fore as he sketched a conceptualised 'combined methods beamline' offering simultaneous XRD and XAS which in 1990 became beamline 7.4 at the SRS Daresbury Laboratory, UK. Through the 1990s Gordon went on to develop many synchrotron methods for mineralogy with the majority of his time devoted to microdiffraction, fibre diffraction and X-ray Photo Emission Electron Microscopy (XPEEM) that offered non-destructive hyperspectral imaging of mineralogical textures at the micron scale.

In many ways the relatively small and open-plan nature of the SRS Daresbury Laboratory was a dream come true for Gordon. It provided him with a brand new and fully accessible audience to whom he would tirelessly enthuse the wonders of mineral sciences, and also introduced him to a broad spectrum of scientific disciplines from which he could learn and develop new ideas. A beamtime session as part of Gordon's team really was an unforgettable experience as his contagious excitement and energy levels grew and grew with every new dataset. There were many occasions where this could meld with the fatigued and sleep-deprived minds of others and spiral into a surreal adventure that may not have seemed out of place in a TV sitcom!!

Throughout his research career Gordon and Barbara shared a great interest in serpentine minerals with joint publications spanning this time and culminating in a suite of manuscripts in the late 2000's. Evident in these is Gordon's attention to detail and clarity of description in which the nature of spherical and polygonal serpentines along with the first reporting of 5-fold pseudosymmetry in chrysotile were exquisitely presented (Fig. 3 compiled from Cressey *et al.*, 2008 and 2010).

In 2011 he retired from the NHM and moved with Barbara to Cornwall, remarkably close to the Lizard Peninsula. His interest in mineralogy never waned but he did find additional foci for his limitless enthusiasm and the local community soon began to appreciate his zest for fun and his rigorous and painstaking work

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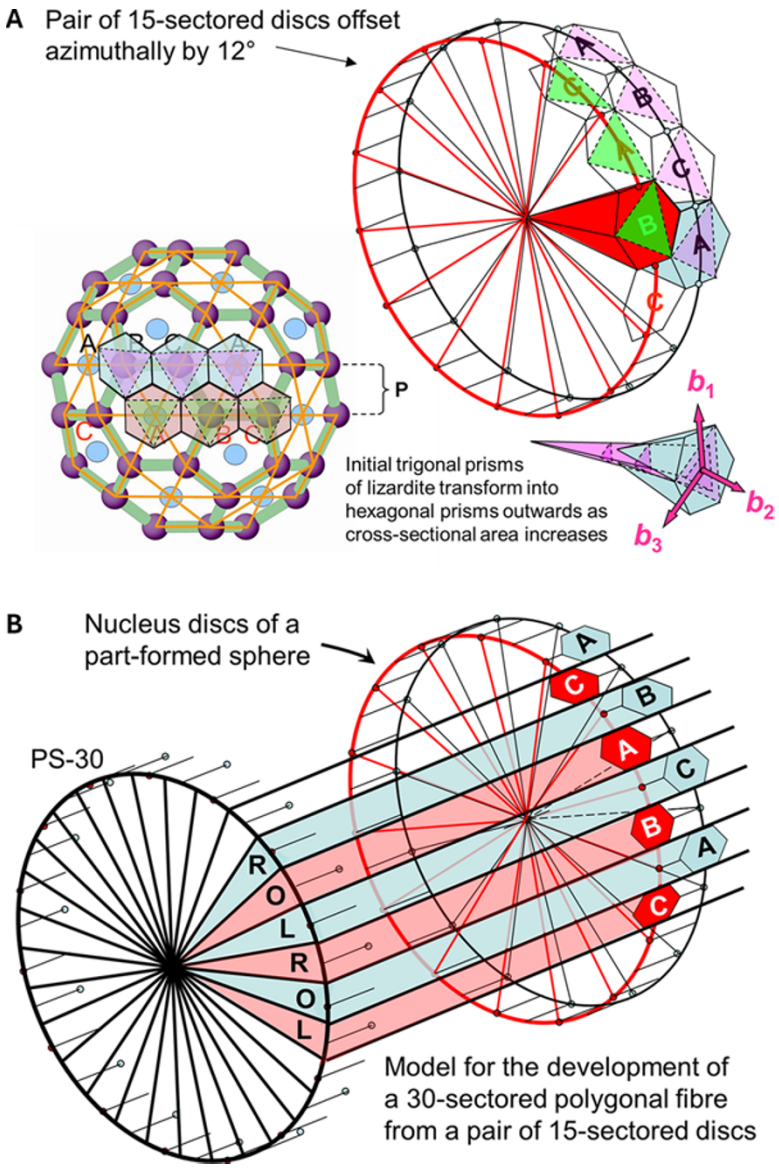

Figure 3. An example of the clarity with which Gordon could describe complex mineral processes with (A) the nucleation and initial growth of lizardite and (B) the growth of polygonal chrysotile fibres, taken from his and Barbara's notes for their 2008 and 2010 Mineralogical Magazine manuscripts.

ethic. Gordon was indeed "a livewire with a real sense of adventure" from the beginning to the very end.

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