

# Voices from our Past

Peter J. Heaney<sup>1</sup>

**I'm guessing that most of you never got to know Howard Evans. Now that Howard has passed away, you've missed the chance to hear him talk.**

**I blame myself for that.**



Howard was an X-ray crystallographer who determined the structures of over 100 minerals during his 42 years with the U.S. Geological Survey. Our lives intersected in 1990 when I was a postdoctoral researcher with Jeff Post at the Smithsonian. Jeff and I were working on a rare mineral called bannisterite, an Fe,Mn-sheet silicate with a so-called modulated structure. Whereas most micas contain negatively charged layers bonded by cations, the silicate sheets

in modulated layer structures are connected by inverted tetrahedral bridges.

Bannisterite was the first modulated layer silicate for which a high-resolution structure was achieved, but Jeff and I were not the first to stake this claim. An Australian mineralogist named Ian Threadgold had solved the structure of the anhydrous variant. Threadgold published his results only as a brief abstract in a regional seminar volume, and he then switched careers to breed dogs in the Australian bush. Steve Guggenheim, an expert on modulated layer silicates, implored Threadgold to write up the structure properly, but to no avail. Steve had the full structure solution in his hands, but he could neither publish another person's data under his own byline nor pretend to solve a structure for which he already knew the solution.

After Threadgold's untimely death in 1990, Steve asked us to attack the problem. With Jeff's old Picker diffractometer and its PDP-11 computer, I began collecting 15,000 X-ray reflections from two bannisterite crystals from Broken Hill, Australia and Franklin, New Jersey. By the late spring we finally had the data in hand and started to process it. But after solving part of the structure, we hit a roadblock. Days of toying with new approaches turned into weeks, and it became clear that we needed the advice of a person with a lifetime of X-ray experience under his belt.

Jeff gave Howard a call, and the next day we were sitting in Howard's lab with the detritus of our failed attempts littering a lab bench in front of us. As Jeff took Howard through each of our unsuccessful tries, I could not help but remark how much Howard reminded me of Linus Pauling—partly from the wild spray of snow-white hair that sprouted around the sides of his head, but mostly it was the mannerisms of a man who is intensely in love with puzzles. Each description of a failed effort elicited a quiet but knowing chuckle.

When we completed our litany of woes, Howard told us that he had a few ideas to try over the weekend. Would we leave our data with him? I will admit to a serious skepticism that progress was imminent, but I gladly left all our real and virtual material behind for the prospect of a guilt-free interlude of thinking about anything other than crystallography.

As I walked into Jeff's office the next Monday morning, Jeff was returning the phone receiver to its cradle. He turned to me and said,

**"If you admire a scientist in the twilight of an illustrious career, grab a tape recorder and talk with her or him for an hour or two."**



Howard Evans in 1966

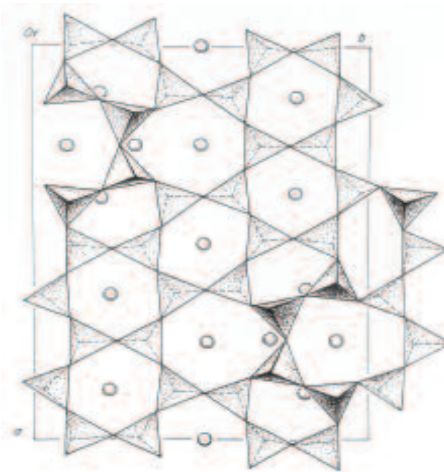
"That was Howard. He's got the *R*-factor down to 10." I was stunned. For non-crystallographers, Jeff's words require translation: "Howard has cracked the problem, and he is leaving us the final bit of house-keeping." Straight away, we headed to Reston and listened with some

wistfulness as Howard happily described how he skirted the barriers that defeated us. His ploy was entirely counter-intuitive and should never have succeeded, but Howard's bag of tricks had grown enormously large over his career. I marveled at his ingenuity.

Over the next few months, as we tussled over the remainder of the refinement, I grew to admire Howard in another way. His extraordinary grasp of anecdotal detail made him the best storyteller I have ever encountered. Howard was integral to the effort that garnered Jerome Karle and Herbert Hauptman their Nobel Prize in 1985 for the invention of the symbolic addition procedure, which solved an age-old

problem in diffraction analysis. Howard's description of their race to validate the method before an impending conference provided an edge-of-the-seat thrill each time I heard it. I resolved that I would record it on tape for future generations.

Sadly, my interview with Howard never materialized. I researched the proper approach for oral historiography and was overwhelmed by the number of thou-shalt-not pronouncements. I was distracted by the broad assortment of crises that attend every academic career. I assumed that each new year provided me with a



Howard's hand drawing of the tetrahedral sheet in the bannisterite structure. Howard, who eschewed computer graphics, had a showing of his crystallographic renditions at a local art gallery.

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fresh opportunity to make good on my promise.

That last assumption was proved devastatingly wrong when Jeff called in January 2000 to tell me that Howard had died from a heart attack. My sense of personal loss was compounded with profound regret from my procrastination. An important part of our community's history disappeared with Howard—the human element that rarely is translated through the parched papers that announce our scientific discoveries.

Physicists seem to understand better than geoscientists the importance of preserving their best stories. *Physics Today* routinely contains eyewitness accounts of lives spent in the labs of the great sages of the last century, and the American Institute of Physics (AIP) sponsors the Center for History of Physics.

The CHP offers extensive support for oral historiography in the form of grants, transcription, and curation. Bob Hazen, president of MSA and also a distinguished historian, has suggested that members of the American Geophysical Union (a subsidiary of the AIP) may be able to take advantage of the CHP, and we are exploring this possibility.

In the meantime, we all need to be a little more active in the protection of our professional heritage. If you admire a scientist in the twilight of an illustrious career, grab a tape recorder and talk with her or him for an hour or two. At the CHP website ([www.aip.org/history/ctrbro.htm](http://www.aip.org/history/ctrbro.htm)), you will find some very simple tips to optimize the quality of your interview. And don't make my mistake of waiting for a better time. For Howard, it's too late. ■

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