

HOWARD F. MCMURDIE—STILL GOING STRONG

This issue of *Powder Diffraction* includes an article describing the career of Howard F. McMurdie written by Howard F. McMurdie originally for the NEWSLETTER of the Standards Alumni Association of the National Institute of Standards and Technology, NIST. (The National Bureau of Standards, NBS, was renamed NIST in the 1980s.) Mary Mrose brought the article to my attention, and I immediately felt that it should receive more international distribution both as a tribute to this remarkable individual and to inform the readers of *Powder Diffraction* of his many contributions to science in general and crystallography in particular. This article should be considered the third in the series describing the major long-time Editors of the Powder Diffraction File. The previous articles include Ben Post [*Powder Diffr.*, Vol. 5, pp. 131–136 (1990)] and Sigmund Weissmann [*Powder Diffr.*, Vol. 9, pp. 230–238 (1994)].

My own career after graduation started out at the National Bureau of Standards as a member of the Constitution and Microstructure Section at the time when Howard was the Section Chief. I joined the Portland Cement Association Fellowship in 1956, which was considered a Group within the Section. Our work involved studies on cement clinker and kiln reactions which required us to interact with many members of the Section. Much of our optical studies used the Petrographic Laboratory and the phase studies used the powder diffraction equipment of the ICDD Associateship mentioned in the McMurdie article. Thus I have known Howard for over half of his career and have also known most of the individuals mentioned in his article. I will take this opportunity to add some reminiscences of my own.

As a young scientist, I had a lot to still learn, and the Section had a large number of others with similar interests in high-temperature reactions and crystallography. It was an ideal research-oriented environment to begin a career. Much of the research equipment we used was developed at the NBS, rather than use available commercial versions. It was the goal of the Section to develop procedures as well as perform state-of-the-art research. This approach was encouraged through the leadership of Howard and probably developed in part because of his earlier investigations which required considerable innovation to obtain research data before many instruments were commercialized. I was able to complete many high-temperature diffraction studies using the diffractometer attachment designed by Dr. F. A. Mauer, and we all used the ICDD Associateship diffractometer and the early Powder Diffraction File, PDF, for Identification of our phases. Because there were so many users of the PDF cards, there was a considerable effort made not to lose a card from the file drawers. The rule was that whenever a card was removed for study, the next card in the drawer was rotated upright to protrude marking the absence. I have used and taught this rule ever since without ever losing a PDF card.

One of the major developments which affected my career was the use of the computer in crystallographic calculations as mentioned in the McMurdie article. FORTRAN was just coming into its own as a language, so many of us took classes and started writing programs. The U.S. Weather Bureau had an IBM-701 system on which we were able to obtain time before the IBM-704 was installed at NBS. Stanley Block was the lead

scientist in the development of the crystallographic calculations. In those days, you had to carry cards to the computer, make many attempts to determine all the errors, and usually be present while the code was running. Output was in real time. Later, the output was dumped to a magnetic tape for independent printing. I once got into trouble with the computer center when I followed the directives of the FORTRAN instructor and rewound all the tapes before proceeding. I wiped out 4 hours of runs by others by rewinding the master output tape.

Howard was also an editor for the *Journal of the American Ceramic Society*. Members of the Portland Cement Association Fellowship were asked by a Japanese author to help him rewrite his manuscript before he submitted it to publication. We were not in a hurry to tackle this job, so it was put aside for too long a time. We were then embarrassed when Howard brought us the same paper for review. This time we did help with the review and rewrite and also indicated to the author that we apologized for the previous oversight.

Even after I left NBS in 1960, I would often have reasons to communicate with Howard. In the development of the POWD program for simulating diffractometer traces, I used experimental data from NBS to establish the profile widths. Many of my patterns for the PDF were approved by Howard as data editor. We debated many times the best way to report peak intensities for situations where the α_1 component of one peak overlapped a strong α_2 component of an adjacent peak. This question is still not totally settled.

Howard is a perfectionist which is appropriate for anyone associated with the NBS/NIST. Another debate involving him occurred during the development of the Mineral Powder Diffraction File at ICDD. Mineralogists know that minerals are highly variable in chemistry and related physical properties. Consequently, the mineralogists were adding information to existing PDF data indicating optical properties including color. At one ICDD meeting, Howard observed that “blue, green, yellow and ruby red” had been added to the data for $\alpha\text{Al}_2\text{O}_3$, which was originally produced at NBS. It was a heated discussion that followed as to whether this addition was appropriate for such important reference pattern obtained on a very pure sample. Colors are no longer listed for these data.

Starting with the first issue of *Powder Diffraction*, Howard has reviewed most of the ceramic materials data sets that have been published up to recent times. His wide knowledge of these materials and astute ability to assess the accuracy of the data certainly have been assets to maintaining the high level of this journal.

I have had many opportunities to visit NIST during the years I have been at Penn State. I still remember a visit in 1989 when I stopped in to see Howard and saw on his wall a certificate presented by his many friends for “60 years of continuous service to NBS.” And that was 6 years ago! The most remarkable part of his career is the longevity and the continued productivity throughout. It is very appropriate that we recognize his accomplishments to the readers of *Powder Diffraction*.

Deane K. Smith
Editor-in-Chief