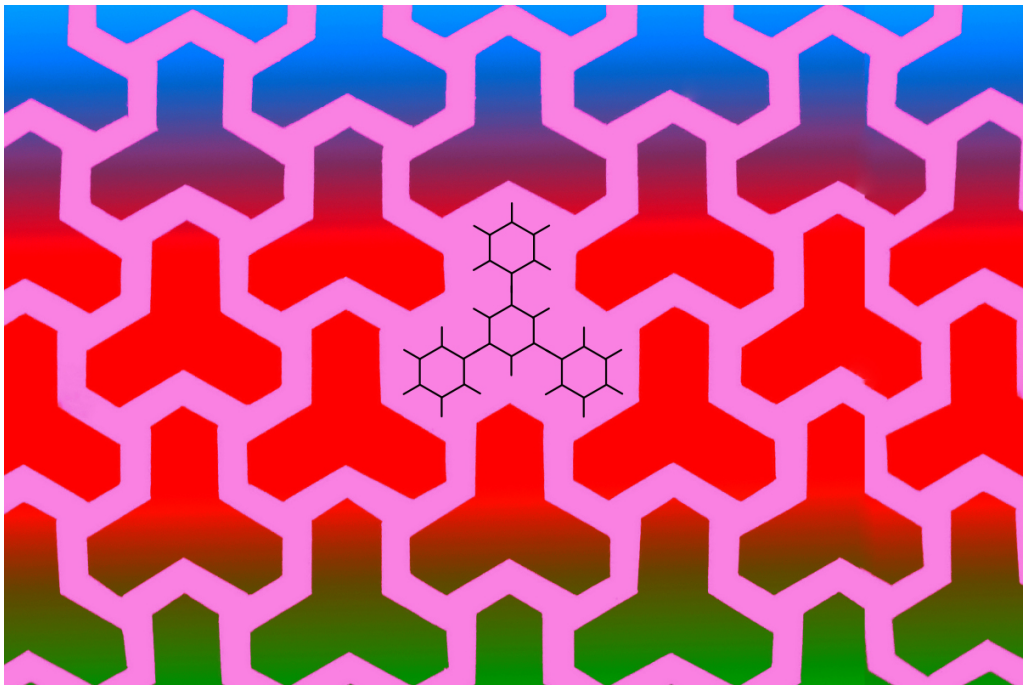
IUCr Newsletter (2021) Volume 29, number 1

International Union of Crystallography
NEWSLETTER

History of crystallography

MacGillavry–Escher–Mamedov and periodic patterns

Istvan Hargittai



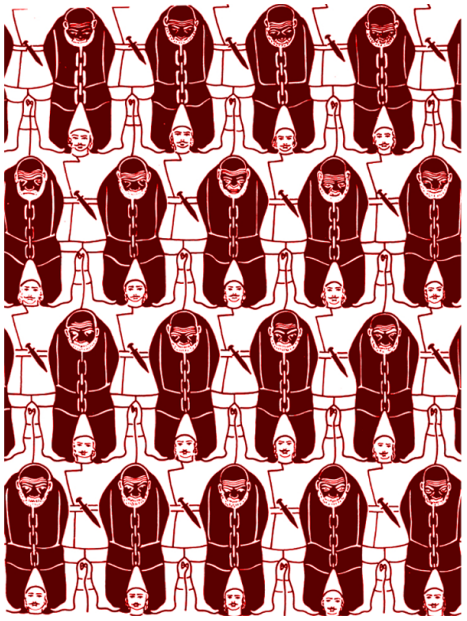
In my mind, Caroline H. MacGillavry (1904–1993) and the expansion of my interest toward crystallography have blended. I first met her when I attended my first ever scientific meeting, the 7th Congress and General Assembly of the IUCr in 1966 in Moscow, Russia. She was the coordinator of the session in which I gave a talk. Prior to the meeting, we corresponded. She was gently helpful. It was shortly after the IUCr had published the first edition of C. H. MacGillavry, *Symmetry Aspects of M. C. Escher's Periodic Drawings* (A. Oosthoek's Uitgeversmaatschappij). That edition is now a collector's item. My copy appeared in 1976. She worked with the artist on this book, who created a set of beautiful periodic drawings to fill the plane without gaps and overlaps. She discussed the symmetry aspects of these drawings making the book an outstanding tool in teaching crystallography. For me, it served as inspiration when in a few years' time I was searching for examples

of two-dimensional space groups among Hungarian folk art. By then, the rest of my family and I had been inoculated by the symmetry virus. The logo of the 12th Congress and General Assembly of the IUCr in 1981 in Ottawa, Canada, was a unit of four stylized maple leaves related by fourfold rotation and also by anti-symmetry if considering the red/white color change among the four leaves. François Brisse designed a series of two-dimensional space-group drawings related to Canada's provinces. One of his patterns displayed the periodically appearing maple leaf. I found a tiling in Lisbon, Portugal, which showed another pattern with the maple leaf as its basic motif.

Caroline H. MacGillavry from *Algemeen Handelsblat*, 1952 (courtesy of Henk Schenk); the logo of the 12th IUCr Congress, Ottawa, Canada; and a Portuguese tile decoration (photograph by the author).

However, it was the 11th IUCr Congress and General Assembly in 1978 in Warsaw, Poland, that brought me the most dramatic experience in two-dimensional space-group patterns. Khudu Mamedov (1927–1988) was their author. Mamedov came from the amalgamation of two vastly different backgrounds. His parents were nomads, and he studied at the most prestigious venues. Following graduation in Baku, Azerbaijan, he earned his PhD-equivalent degree at the Institute of Crystallography in Moscow. He founded an institute of crystallography in Baku and spent half a year what we would call today as a post-doctoral assistant at Birkbeck College in London, UK. There, J. Desmond Bernal was his mentor, and Mamedov became good friends with Alan L. Mackay. Mamedov prepared numerous periodic patterns. His goal was not so much to aid education in crystallography; rather, his motivation was to help the preservation of cultural heritage. At the Warsaw Congress, he set up a small desk in one of the busy hallways and spread out his drawings — all originals. He generated a great deal of interest among the attendees of the meeting. From the start, we engaged in conversation and continued on several occasions during the meeting. He loved to talk about his art. His drawings were most

original, and many of the visitors to his stand wanted to purchase his drawings. He politely declined. At the conclusion of the Congress, he gave me some of his drawings, and I have cherished having them ever since. We stayed in contact, and I visited him in 1982.



Khudu Mamedov in 1982 in Baku (photograph by the author) and the "Unity" hand drawing (by and courtesy of Khudu Mamedov).

One of my favorites is his drawing called "Unity," referring to the old and young generations. It is a periodic pattern, though with minute variations. There are some variations due to the hand-drawing, but even more than that. The facial expressions of the young men are more uniform than those of the old. To me, this hinted at the individuality the old men had developed during their long lives. A few years after Mamedov's death, his devoted disciples published a luxurious volume of the reproductions of his drawings. The reproductions were not facsimile copies of his hand-drawn art; rather, they were computer-generated patterns. For the geometrical topics, this hardly made any difference. Alas, the new version of "Unity" lost much of its originality. In the computer-drawn version, not only the young had uniform facial expressions, but the old did, too.

Literature

M. Hargittai and I. Hargittai, *Symmetry through the Eyes of a Chemist*, 3rd Edition (Springer, hardcover 2009, softcover 2010).

I. Hargittai, *Mosaic of a Scientific Life* (Springer 2020).

Istvan Hargittai is at the Budapest University of Technology and Economics, Hungary.

3 February 2021