

## Obituary



**Pieter Maarten de Wolff**  
1919–1998

On April 10, 1998, Pieter de Wolff died at the age of 78. He was born in Bandung on Java in present Indonesia. Pieter studied at the Delft University of Technology, where he got his diploma in 1941 in wartime Holland. In 1951, during his employment with the Dutch Organization of Applied Scientific Research, he obtained his PhD degree from Delft University of Technology. In 1959, he was appointed there to full Professor in the Department of Applied Physics. He remained in this post until his retirement in 1984.

The name of his chair (Theoretical and Applied Physics) was entirely apt for de Wolff, as he covered an impressively broad domain in crystallography. His achievements were instrumental and experimental as well as theoretical. One of his first major contributions was an adaptation of the focusing X-ray camera invented by Guinier in 1939. Around 1947 he improved this camera in several ways. It became a much used high quality instrument for powder diffraction. More than 1000 of these cameras, known as Guinier–de Wolff cameras, were sold by the Dutch firm Enraf-Nonius. The description of its construction in his PhD thesis clearly demonstrates the deep insight that de Wolff had into all kinds of effects.

Of the theoretical work of his early years, the study of the influence of the shape of crystallites on diffraction, and of absorption on diffraction intensities, should be mentioned. He combined ability in precise analysis with practical insight. This is, among other things, also clearly illustrated by his work on the indexing of powder patterns, in which art he became an internationally recognized authority.

He investigated many materials with powder diffraction techniques. In 1964, he came across the diagram of anhydrous  $\gamma$ - $\text{Na}_2\text{CO}_3$ , which contained a number of nonindexable weak satellite lines. He was able to index these powder lines with nonintegral indices; shortly afterwards single-crystal diffraction photographs proved this analysis to be correct. This led to a new direction of his research and to a new field in crystallography. Together with his collaborators he discovered that anhydrous soda is modulated and not lattice periodic. In 1972, he presented a very original way of describing the symmetry of this compound using a four-dimensional space group at the International Congress of the IUCr in Kyoto. His 1974 paper on ‘The pseudo-symmetry of modulated crystal structures’ was an example of a clear presentation of a complex situation. He spent the rest of his active life mainly on this class of incommensurate modulated crystal structures, both experimentally and theoretically. He succeeded in determining the modulation of anhydrous soda, made interesting studies of the physical properties of modulated structures like  $\text{Rb}_2\text{ZnBr}_4$ , developed further the theory of superspace groups and cooperated in the determination of the list of all four-dimensional superspace groups for modulated crystals. For many years we had exciting discussions on these topics during our joint Delft–Nijmegen meetings. For the IUCr he was chairman of the Committee on the Nomenclature of Symmetry.

For his work he received a number of important awards, such as the Gilles–Holst medal from the Dutch Royal Academy of Sciences for the Guinier–de Wolff camera (in 1976), the Gotlob–Werner medal from the

German Mineralogical Society (in 1986), a medal from the International Center for Diffraction Data (in 1995), and the Gregori Aminoff prize of the Swedish Royal Academy of Sciences (in 1998). Unfortunately, he was already too ill to go to Stockholm to receive the medal from the Swedish king. He was, however, very happy receiving it at his home in Delft. Only ten days later he passed away.

Those who knew him will remember Pieter as a modest, not very talkative, and very pleasant person.

Very often he attended discussions, always busy with his pipe, without saying much, but at the end he could make a remark pointing to the heart of the problem, and often putting the discussion in the right perspective. His subtle sense of humour will be remembered. The community of crystallographers has lost a prominent member.

TED JANSSEN  
FOKKE TUINSTR