

## Obituary

### Isamu Nitta 1899–1984

Professor Isamu Nitta passed away on 16 January 1984 following surgery for stomach cancer. He was a student of chemistry in the University of Tokyo from 1920 to 1923, where he majored in organic chemistry. After graduation, he became a research associate for the next nine years at the Institute of Physical and Chemical Research in Tokyo. It was his good fortune there to become a disciple of S. Nishikawa who introduced space-group theory and Laue photography into crystal structure analysis. The most important of the five papers he published during this period is that on the crystal structure of pentaerythritol in 1926. Previous workers had reported that the valency distribution of the central carbon atom in this molecule was tetragonal pyramidal. He pointed out, however, that the assigned space group was incorrect and that it should be either  $I4$  or  $\bar{I}4$ , which allowed the tetrahedral nature of the central carbon atom to be further explored. He was sent abroad by the Institute to extend his studies and published a paper with D. Coster and W. I. Thijssen on X-ray spectroscopy: he also spent half a year with P. P. Ewald studying crystal optics.

Nitta was appointed in 1933 as Professor of Physical Chemistry at the newly established Osaka University. Among his earliest papers, there was one published in collaboration with one of the present authors (TW) in 1937 on the determination of the crystal structure of pentaerythritol, in which they established the tetrahedral valency of the central carbon atom on the basis of a two-dimensional electron density distribution, quite independently of the paper reported the same year by Llewellyn, Cox and Goodwin. The anisotropic thermal expansion of pentaerythritol in the low-temperature tetragonal phase was next determined by X-ray methods and the results showed the characteristic features of a hydrogen-bonded layer structure. Further X-ray study revealed that pentaerythritol undergoes a phase transition at about 190 °C from tetragonal to cubic. This complicated transition was caused by the onset of intermolecular rotation and orientational disorder of the molecule as a whole. These and other findings stimulated Nitta and his co-workers to investigate the thermodynamic, electrical and optical properties of pentaerythritol in both phases on the one hand, and to undertake X-ray studies of the orientational and rotational disorder in other molecular crystals on the other. The latter studies are related to the plastic crystal phase, as named by Timmermans in 1938, and form a significant approach to the physics and chemistry of premelting and the liquid state. In the difficult years during and following World War II, Nitta and his collaborators continued their structural studies assiduously

and published a number of important papers on organic and organometallic structures, such as that on tropolone hydrochloride. After retiring from Osaka University in 1960, Nitta devoted his efforts over the next eight years to establishing a Faculty of Science in the traditional private Kwansai Gakuin University. In 1963, Nitta and his collaborators determined the structure of bromoanhydro-tetrodoic lactone hydrobromide,  $C_{11}H_{14}O_7N_3Br.HBr$ , a derivative of tetrodotoxin which is a poisonous animal alkaloid isolated from swellfish (Puffer). These results were of great help to Hirata, an organic chemist at Nagoya University, and his group in determining the chemical structure of tetrodotoxin. The following year, at the Third International Symposium on the Chemistry of Natural Products held in Kyoto, three different groups lead by Hirata at Nagoya, Tsuda at Tokyo and Woodward at Harvard, USA, respectively presented papers on the structure of tetrodotoxin. All came to the same conclusion.

In his professional career, Nitta was Dean of the Faculty of Science at Osaka University from 1942 to 1947 and again from 1955 to 1959. He was also Dean of the Faculty of Science at Kwansai Gakuin University from 1961 to 1967. Nitta also held numerous offices in national and international bodies: he was a Co-editor of *Acta Crystallographica* from 1953 to 1963. He was elected to membership on the Executive Committee of the IUCr between 1957 and 1963, serving as its Vice-President from 1963 to 1969. He was President of the Chemical Society of Japan from 1963 to 1964 and President of the Crystallographic Society of Japan from 1955 to 1958. He was honored by election as a member of the Japan Academy, awarded the Order of Cultural Merit in 1966, and received additional medals in recognition of his scientific accomplishments.

This eulogy would be incomplete without reference to Nitta as a man. Coming from an academic family, he was a man of gentle disposition and modest personal needs. All his students and co-workers cherish memories of his friendly, sincere personality and his wise guidance. Academic discussions were always as man to man, never as master to disciple. He was, however, tough in negotiating administrative matters.

Crystallographers at home and abroad will remember Professor Nitta as a plenary lecturer at the Ninth International Congress of Crystallography held at Kyoto, Japan, in 1972 and they will sorely miss him.

Y. SAITO  
T. WATANABÉ