

## Memorial of Fredrik William Houlder Zachariassen<sup>1</sup> February 5, 1906-December 24, 1979

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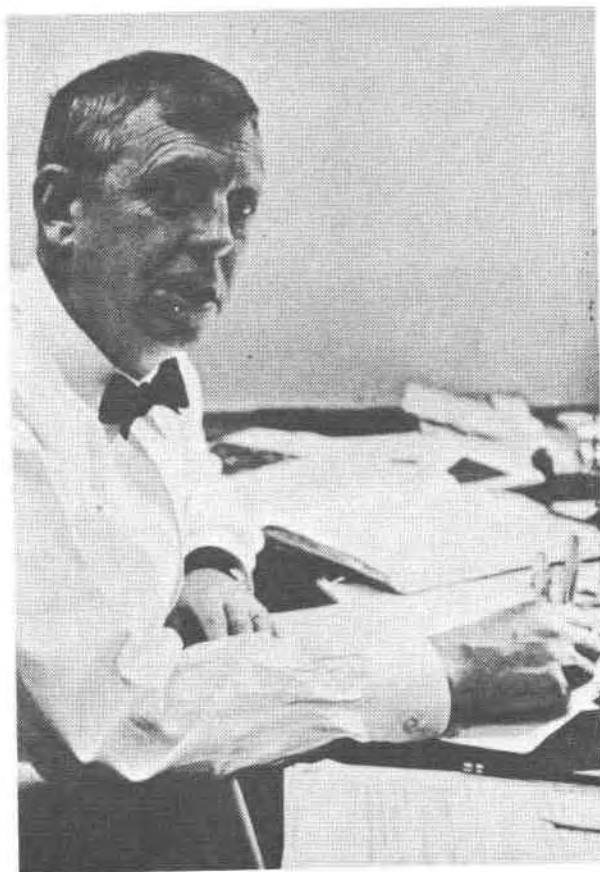
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Fredrik William Houlder Zachariassen was born in Langesund, Norway on February 5, 1906. As an American he was called by friends and colleagues "Willie" or "Zach". This created problems. A year before his death he dispelled this confusion while a lively host at a banquet: "those who have been to bed with me call me Willie, those who have not call me Zach." Such humor, never malicious but always piquant, marked his fine qualities as a human being.

What finer place to be born than at the mouth of the Langesundfjord, a byword among mineralogists of bygone years? Studying a Cappelen map of Norway (what better maps in this world exist, with all their detail, preciseness and topography) one sees that Langesund is a mere 15 kilometers from Brevik, that center of the classic nepheline syenites and foyaites which originally yielded over 30 new species of interesting minerals peculiar to such assemblages (probably the oddest being nordenskjöldine,  $\text{CaSn}(\text{BO}_3)_2$ , with the dolomite structure). One can picture the young inquisitive Zachariassen rowing from isle to isle, studying the rocks and minerals once described by the grandfather of his future bride, the famous W. C. Brøgger. Although Willie didn't name any Langesundfjord minerals (apparently that was too pedestrian an activity for him, or was it that Brøgger didn't leave a stone unturned?), he revealed the crystal structures of several of them: phenakite, eudidymite, epididymite, thortveitite, titanite, eudialite, hambergite. Of minerals from different soil we could add ten more, and of synthetic inorganic crystals increase that number by an order of magnitude (he didn't dabble with organics). This is very ambitious realizing that most of them were done on slide rule and with X-ray techniques before 1945! Only a genius could do that. One can imagine the

seeds of Zach's formative years nourished by Langesundfjord soil: the clefts of Helgeroa, the islets of Skudesundskjaer, Laaven, Stokø, Lille Arø, Mittel Arø, Store Arø. He delighted in amusing his American cognoscente of the Norwegian pronunciation of *rosenbuschite*, a Laaven mineral.

Yet he went much further than mere mineralogy and mineral chemistry. In 1932, a definitive publication on the structure of glass appeared. In 1945, the profound book, "Theory of X-ray Diffraction in Crystals". Then silence for several years. That was



<sup>1</sup> To receive a bibliography of 171 publications, order Document AM-81-177 from the Business Office, Mineralogical Society of America, 2000 Florida Avenue, N.W., Washington, D.C. 20009. Please remit \$1.00 in advance for the microfiche.

because of the Manhattan Project and classification of all information on the atom bomb project. After 1948, a spate of papers appeared, on the crystal chemistry of the 5f-series elements, the actinides: thorium, protoactinium, uranium, plutonium, americium, curium. "Impossible" stoichiometries for a crystallographer were not beyond his reach, to wit  $\text{Th}_4\text{H}_{15}$  and  $\text{UCI}_3$ . But his mind was not always on mere structures, since he also sought a synthesis of ideas. In 1931, there appeared a set of empirical crystal radii, in 1952 a new means (= direct methods) of solving crystal structures. A giant among Pygmies, it is amazing how he solved problems in the age before that tranquillizer known as the computer (whose prototype was the Babbage machine); he, in effect, did it with the greatest calculating machine of them all: his brain.

Yet Zach was not an automaton. He studied under the great Viktor Moritz Goldschmidt at Oslo and received his Ph.D. in 1928. He studied with Sir Lawrence Bragg at Manchester thereafter, then joined the faculty in the Physics Department at The University of Chicago in 1930. He was Chairman of that department from 1945–1950, then from 1956–1959; Dean of the Division of the Physical Sciences from 1959–1962 whereupon he was awarded a named Professorship.

In 1974, he became Professor Emeritus. Those were lively years in the University. In those years he weathered a familial altercation, read classics, listened to music, eyed art, endured two heart attacks and, in the end, came out a stronger more robust human being—and still smoking cigarettes and enjoying scotch! His hour of passion each work day since 1952 was "Cowboy pool" where he realized a person's character became obvious in the game. According to "Zachariasen's Axiom" the game took on a new form—if you sink the yellow ball you defeat yourself. Or translated into everyday lingo: too much planning can be disappointing and self-defeating. Constant asides and humorous expressions [Zach never swore—at most he would muster up "Fan skjaere," or "the Devil cuts" (= the deck of cards is divided)]. Yet he enjoyed the element of friendly competition.

Zach (or Willie) was a most remarkable man, a Hemingway character, a very decent human being. Julian Goldsmith, Mark Inghram, Stan Siegel, Ann Plettinger, Robert Penneman, and Masimo Marezio will miss him. Bernd Matthias, who recently departed, would have missed him. So will many others. He leaves his wife Ragni (Mossa) Durban-Hansen; a daughter, Mrs. Ellen Ellickson; and his son Fredrik.