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Holderreed

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Holdereed (1912-1994)

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Montana School of Mines
My first contact with Francis L. Holdereed was in 1964 in a meeting when I was teaching at Montana School of Mines in Butte and he was Director of Research at Anaconda Company in Anaconda, Montana. The meeting was concerned with a subvention to Astrometals Company in New York and the School to do work on the recovery of beryllium powder by an amalgam process and the work has to be installed in Anaconda Company for provisions of toxicity. The project went all right for a couple of years. At that time there was a problem of the availability of elemental sulfur which was in great demand. Incidentally, I published papers on elemental sulfur which attracted the attention of Holdereed. He hired me as a consultant to Anaconda and told me any time I wanted to work in his group I am welcome.

Anaconda Company
When a conflict in 1967 arose at the School with the Head of the Department of Metallurgy I made use of Holdereed’s invitation and I worked in the Research Division in Anaconda where I published an article with him. Few months later I moved to Tucson in Arizona in 1968 where a new laboratory was built. The company sent me to the American Mining Congress that was held in Las Vegas in 1968 to present my paper on elemental sulfur. At that time the major project was to avoid pollution of the environment by sulfur dioxide emitted during smelting.

1 See also, F. Habashi, “A personal tribute to Nathaniel Arbiter” Hydrometallurgy 96,181–182(2009)


Treadwell Corporation in Bronx, New York was developing a new hydrometallurgical process for treating chalcopyrite concentrate and recovering elemental sulfur contacted the Head Office in New York and showed the management in their laboratories the strange thing that sulfur was produced from chalcopyrite by a hydrometallurgical method. The process involved treating the concentrate with concentrated sulfuric acid:

\[
\text{CuFeS}_2 + 8\text{H}^+ + 2\text{SO}_4^{2-} \rightarrow \text{Cu}^{2+} + \text{Fe}^{2+} + 2\text{S} + 2\text{SO}_2 + 4\text{H}_2\text{O}
\]

The process was turned to the Research Division for evaluation. It had many drawbacks and most of the engineers were against. For example:
- SO₂ was still produced and must be transformed to sulfuric acid
- The method proposed to recover copper from the solution involved hydrogen cyanide to precipitate CuCN which must be reduced by hydrogen to metallic copper.
- The method produced ferrous sulfate and there was no use for it

Since the process was imposed from New York office the research engineers had to follow. A large pilot plant was built in early 1970 next to the laboratory.
In the meantime, I was engaged at Laval University in Quebec City and moved in October 1970. Few months before I left Tucson, Professor Nathaniel Arbiter resigned from Columbia University to retire in Tucson. Because of his friendship with Charles Brinkerhoff Anaconda President, he was engaged at the Research Division. While in Quebec, I heard that the plant operated for few days but, there was political turmoil in Chile that resulted in the nationalization of Anaconda properties in 1971. This caused a great confusion at Anaconda and as a result the Research Division was severely cut, Holdereed was fired and replaced by Arbiter. Few Years later, Anaconda Company completely disappeared.

**Biography**

Francis L. Holdereed was born in Cushing, Oklahoma, raised in Idaho and Washington, lived over 25 years in Anaconda, Montana then came to Tucson in 1967. He earned a Master of Science degree in metallurgical engineering from Montana School of Mines in 1940. He was a chemist at Anaconda’s reduction department in Great Falls then returned at the School of Mines as instructor. He joined Anaconda research in 1941 and in 1950 was named assistant research engineer. He became director in 1956. He published papers with Charles Arentzen and Theodore Fulmor on the recovery of alumina. He held an honorary doctorate from the Montana School of Mines in metallurgical engineering in 1964.