

the ANALYST

THE VOICE OF THE WATER TREATMENT INDUSTRY

How Can Water Treaters Benefit From Recent Peer-Reviewed Data on *Legionella* Testing Methods?

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Why Boilers Foam and How to Prevent It

Lessons Learned From *Legionella*: When the Worst Happens—A Case Study From the UK

Can Monochloramine Offer a Long-Term Solution for Controlling *Legionella* and Waterborne Pathogens in a Healthcare Facility?

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Art Freedman: Physical Chemist, Teacher, Researcher, Pioneer, Consultant, Musician

Rob Ferguson
French Creek Software

My water treatment journey began in 1974, when I reported to Dr. Arthur J Freedman at 180 North Michigan Avenue in Chicago, Nalco's corporate headquarters. At the time, I did not realize that Art would become a mentor, consultant, technical sounding board, coauthor, and most of all, a dear friend for the decades that followed. I would like to recall a few insights learned from Art.

Art created an extraordinary training program for me. The depth of this program is typical of the thoroughness that Art directed at problem-solving and potential business opportunities. The program consisted of:

- Weekly one-on-one sessions, including directed reading assignments that ranged from introductory chapters of the company handbooks to technical literature from Green, Ryznar, Hatch, and Ralston; Langelier; and to the literature of the time—including many of Art's papers.
- Assignments in the Research and Development Laboratories as a "helper" and as a participant in short- and long-term projects.
- Specific marketing projects from inception through commercialization.
- Field trips with district reps.



Early in Art's career when working for Standard Oil Inc. (Indiana).

While others were learning to use a Langelier Index table or slide rules, Art sent me to the blackboard during one of our weekly sessions and directed me to "derive the Langelier Index." This was followed by discussions of its applicability, limits, and ways to improve it. Art viewed water treatment through the lens of physical chemistry and passed that on through these sessions and guidance on technical projects.

Art introduced me to the world of technical programming through one of these assignments, which eventually became a major part of

my position at Nalco and a lifelong career: the creation of water treatment computer modelling programs. I was assigned to work under the technical programming group headed by Dr. Harold Patzelt and Dr. Arpod Elo III. They granted me the third highest mainframe access in support of the development of water treatment modeling programs. Art made sure that his "students" had access to the tools needed to complete their tasks.

Programming assignments included the development of a program to calculate water treatment performance in utility water treatment applications. Art asked for the end result and left the implementation up to me. This was well before management by objective and was during

the initial industry efforts to digitize water treatment applications. The first programs monitored condenser performance via cleanliness and fouling factors and estimated the impact of fouling on heat rate. These programs were used to document the improvement in cleanliness after the feed of a biodegradable, and its impact upon heat rate and fuel costs. They proved that fuel savings and maintenance of design production generation capability would pay for the treatment costs with a high return on investment (ROI). Similar programs were later used to estimate the ROI for surface condenser scale control treatment approaches.

Art didn't limit his mentoring to technical matters. I recall his fatherly advice before my first International Water Conference, when he said, "Don't drink around the executives. There is nothing wrong with ginger ale."

Recollections from Others

Bob Cunningham, P.E., a principal consultant with Arthur Freedman Associates, Inc. (currently operated by Art's son Peter) and president of International Water Consultants, Inc., described the teaching ability that Art demonstrated in our many sessions in this way: "He had the rare ability of taking highly complex concepts and reducing them to everyday language that other people could understand," Mr. Cunningham recalled. "I've worked with many people in our field, and the difference between them and Art is that he was the whole package. He was a very good communicator, but he also had a complete grasp of the ever-changing science and technology."

Mike Henley, technical editor of the *Analyst*, remembers Art's wide-ranging knowledge of water treatment, which extended well beyond his deep understanding of boiler and cooling water treatment. One time while at dinner during a conference, Art told of a time when a pharmaceutical company hired him to determine the source of organics contaminating a stainless-steel storage tank holding pharmaceutical-grade water. This was after consultants with high-purity water backgrounds had failed to solve the mystery. Art spent time observing the facility's treatment system and noticed a maintenance worker cleaning and dusting the tank and adjacent equipment with a cloth. He spoke with the worker and found out the cloth had a cleaning solvent on it. As it turned out, the solvent fumes had been entering



Art Freedman in his office while with Nalco.

the tank's vent and were the source of the organic contaminant in the storage tank.

Early Life

Born in Brooklyn and raised in Larchmont, N.Y., Art attended New York University, where he earned a bachelor's degree in chemistry in 1945, and later a master's and a doctorate degree in chemistry.

From 1948 to 1954, he was a research associate, working on the analytical applications of radiochemistry at the Los Alamos Scientific Laboratory in New Mexico. Art later worked at the Massachusetts Institute of Technology.

In 1954, he moved to the Chicago area and began working for Standard Oil Co. (Indiana) (now Amoco). As a senior project supervisor, he was responsible for the development of water and process-side scaling and water corrosion test instrumentation. During his time at Standard Oil, he helped in the development of the "Corrosometer" and "Corrater," both patented devices used in measuring corrosion rates.

After leaving Standard Oil in 1959, Dr. Freedman worked as the marketing manager for Nalco Chemical Co. in Chicago. At Nalco, he was instrumental in the development of the still widely used alkaline and all-organic scale and corrosion control technology.

In 1981, Art and several colleagues founded Arthur Freedman Associates, Inc. When asked for consulting

recommendations, I would always recommend Art and his team of water treatment consultants when a thorough, technically accurate, and practical engineering approach was requested.

Art was presented with the Ray Baum Memorial Water Technologist of the Year Award in 2000 for his service to the water treatment industry by the Association of Water Technologies (AWT) at its national conference in Honolulu.

Art's ability to train and develop future water treatment chemists undoubtedly is one of the high points of his legacy.

Musician

Art also enjoyed music and was a French horn artist in local symphonies, both as a teacher and as a director. It is rumored that he taught one of his sons to play jazz on a French horn. Perhaps, many years from now, Art's heavenly symphony will have an opening for a lower brass player who also worked in water treatment.

In Closing

Art Freedman had a major impact on water treatment technology and the industry, through his direction of the development of new technology, nurturing of some of the first digital cooling water applications, and through those he introduced to the art of curing the aqueous ills of mankind. His broad interests and contributions are reminiscent of a modern-day renaissance man. Art is missed by many in the industry and those whose lives he touched as a mentor, teacher, friend and musician. ☪

Author's note: Some material presented in this article was derived from Art's 2015 obituary.

Robert J. Ferguson is the president of French Creek Software, Inc., a company he co-founded in 1989. His professional career includes positions with Nalco, Apollo, Mogul, Calgon, Chemlink, and Baker. In addition to being a water treater and student of Arts, Rob Ferguson is a euphonium and tuba player who is a regular at the New Orleans Traditional Jazz Camp. What he lacks in musical ability is made up for by unbridled enthusiasm.



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