

A tribute to Fred Brinckman

Personal history

Born 24 June 1928, Oakland, California, the elder of two sons, to Frederick Edward Brinckman, Sr, and Rose Mittelman Brinckman.

Married Margaret Jean Hess on 23 December 1954; two sons, Paul Dent Brinckman (33) and Brian Edward Brinckman (30).

Educational record

B.S. University of Redlands, Redlands, CA, 1954

A.M. Harvard University, Cambridge, MA, 1958

Ph.D. Harvard University, Cambridge, MA, 1960

Thesis: Preparations and properties of vinylhaloboranes and vinylgermane and exchange reactions of organohaloboranes

Professional positions

United States Naval Ordnance Laboratory, Corona, CA

Research Chemist and Head, Propellant Branch, 1960-1961

United States Naval Propellant Plant, Indian Head, MD

Scientific Staff Assistant and Head, General Research Division, 1961-1964

National Bureau of Standards, Gaithersburg, MD

Research Chemist, Chemical Stability and Corrosion Division, 1964-1978

Group Leader, Chemical and Biodegradation Processes Group, Institute for Materials Science and Engineering, 1978-1988

Research Chemist and Bioprocessing Coordinator, Polymers Division, 1988-1993

Retired 23 July 1993

Career appointments

R. Merton Visiting Professor of Geoscience, Johannes Gutenberg University, Mainz, Germany, 1978-1979

Adjunct Professor of Inorganic Chemistry,

University of Maryland, College Park, MD, 1985-1986

Harold A. Iddles Lecturer, Department of Chemistry, University of New Hampshire, Durham, NH, 1990

Member Planning and Oversight Panel, Chesapeake Research Consortium, Solomons, MD 1990-1992

Other activities

United States Army Corps of Engineers, Technical Sergeant, Alaska, 1954-1956

Panel Member, United States Civil Service Board of Examiners, Washington, DC, 1962-1964

Scoutmaster and Teacher, Boy Scout Troop 1323, Laytonsville, MD, 1966-1978

President, Upper Rockcreek Civic Association, Derwood, MD, 1970-1974

Awards and Fellowships

Mayr Foundation Scholarship, University of Redlands, Redlands, CA, 1953

Teaching Fellowship, Harvard University, Cambridge, MA, 1956-1958

Predoctoral Research Fellowship, National Institutes of Health, Washington, DC, 1958-1960

Silver Medal Award, US Department of Commerce, Washington, DC, 1990

Professional affiliations

American Chemical Society, 1946

Fellow, American Institute of Chemists, 1974

Fellow, The Royal Society of Chemistry (UK), 1986

Affiliate, International Union of Pure and Applied Chemistry, 1989

Biography

Frederick Edward Brinckman, Jr was born and raised in the state of California. He did his undergraduate studies at the University of Redlands in Redlands, California, just outside San Bernadino. There he met Margaret Jean (Meg) Hess, who subsequently became his wife. He received his Bachelor of Science degree in 1954,

then went into the Signal Corps of the United States Army, where he served for two years and achieved the rank of Technical Sergeant. During this period he married Meg and lived in Anchorage, Alaska, working in communications and managing some of the heavy equipment used by the Corps.

After his discharge in 1956, Fred went to Harvard, where he joined Professor F. G. A. Stone's group and investigated organoboranes. After receiving his Master's degree in 1958 and his Ph.D. in 1960, Fred moved back to California, together with Meg; there he joined the Naval Ordnance Laboratory in Corona. The following year, as part of an internal research program reorganization, Fred transferred to the Naval Propellant Plant in Indian Head, Maryland. In 1964, he joined the National Bureau of Standards, which subsequently moved to its present quarters in Gaithersburg, Maryland. Fred, Meg and their two sons had various residences during this period (at one point, Fred was commuting 100 miles each day). Finally, in 1966, they moved into their newly built house in Derwood (Maryland), where they would stay for the next quarter-century.

At the Bureau, Fred joined the Chemical Stability and Corrosion Division, working on a variety of projects involving fluorine compounds and resonance spectroscopy. On the other side of the world, however, events were developing that would drastically change Fred's research direction (and that of many others). During the 1950s and 1960s, an increasing number of poisonings by methylmercuric compounds in Japan (Minamata Disease), Iraq and elsewhere, were reported. This took on a whole new aspect in 1969, when Jensen and Jernelov¹ showed that aquatic organisms could convert inorganic mercury compounds to mono- and di-methylmercuric derivatives. Through discussions on this finding with Warren Iverson, Tom Coyle and others at the Bureau, Fred realized that the formation and dispersal of methylmercuric compounds in natural waters opened up new investigative challenges. Applying the principle that the biological activity of any element depends on its chemical form, Fred realized that analytical investigations of natural waters could not be limited to the total concentrations of specific elements, but had to include each particular chemical form, or species, present. The analytical techniques at that time were inadequate for the task; new techniques and instrumentation had to be developed.

Fred's first publication in this area² involved bacterial degradation of the pesticide phenylmercuric acetate. His next publication³ was the first of many on the application of a chromatography-atomic absorption spectroscopy combination to aqueous samples. Gaithersburg lies within easy driving distance of Chesapeake Bay—the greatest estuary in the USA, known for its shellfish and crabbing industry and also a major inland waterway; Baltimore, with its great harbor and vast shipping, lies only a few miles northward. Here was the perfect location for investigation of environmental aqueous speciation—and not only for mercury; the increasing use of antifouling paints containing tri-n-butyltin compounds on ship hulls, with concomitant escape of these compounds into bay waters, raised fears of contamination of local shellfish or crustaceans, possibly giving rise to a Minamata-type disaster.

During the 1970s Fred shifted his research emphasis into this area. His most frequently cited paper⁴ contains the following statement, illustrating a guiding principle:

Moreover, evidence exists suggesting that, for some metal species, biotransformations and abiotic reactions, such as methylation or dealkylation, will occur stepwise to produce ionic intermediates. Consequently, future assessment of the primary fate of kinetically important forms of certain metals in the environmental media requires means for their direct speciation as trace reactive intermediates probably occurring in their most polar (ionic) forms as solvates in liquid samples.

Fred joined efforts with Dr J. Michael Bellama of the University of Maryland to sponsor a special symposium, held in March 1978 at the Anaheim (California) American Chemical Society meeting, on organometals and organometalloids in the environment. The papers of this symposium were subsequently published in a hard-cover volume. It was at this symposium that the author first came to meet Fred personally, although we had been corresponding. Also in 1978, Fred became Group Leader of the Chemical and Biodegradation Processes Group, whose nucleus consisted of Drs Warren Iverson, Kenneth Jewett, Rolfe Johannesen, Gregory Olson and Edward Parks, and Mr William Blair. Other research scientists, especially Dr Bellama, and students would be associated with this group as collaborators over the years; this included many foreign guest

workers from England, Germany, Israel, Italy, etc. The author himself spent a sabbatical leave at Gaithersburg in 1982 and remained associated with the Group for the remainder of its existence.

During the 1980s, Fred and his group continued to advance the borders of knowledge in this area; the majority of his publications appeared during this period. Among his contributions during this period was the demonstration that quantitative structure-activity relationships could be ascertained and verified for biologically active organometals.⁵⁻⁹ He received increasing recognition for his contributions, including the US Department of Commerce Silver and Gold Medal Awards for Excellence. He served on a variety of panels and committees, including (along with this author) the Organizing Committee that arranged a special Symposium in honor of the centennial of the late Frederick Challenger, pioneer worker in biological methylation of metals and metalloids.

All of this says very little about the man himself. Fred gave generously of his time to activities outside the laboratory. He cared for people, too. He helped his co-workers in many ways. One group member, Dr Parks, was hearing-impaired. Fred and the other Group members learned sign language, and special equipment was brought in. Subsequently, Dr Parks was nominated for a Presidential Award for Handicapped Persons. Fred helped other Group members finish their doctorates, and aided other individuals, including the author, in various ways. In the laboratory, he was a vital, dynamic, energetic individual. Ideas proliferated from him, like the microorganisms his Group studied; the strongest of these grew and flourished. One Group member wrote: 'Fred expected a lot of his Group, but he was the first to stand up for his people. When praise or recognition came his way, he never failed to give credit to his coworkers.' At infrequent intervals, Fred became angry or irritated, but this never lasted. His energy and enthusiasm for science radiated out in the office, on the lecture platform, at the laboratory or instrument bench, or aboard a research vessel gathering samples of water or sediment.

The National Bureau of Standards, being part of the Department of Commerce of the United States Government, has always been sensitive to politics. For this reason, Fred's Group's name and internal position changed during the 1980s. As a result, he carried out a number of projects unrelated to the Group's main thrust. In 1988, the Bureau was transformed into the National

Institute of Standards and Technology (NIST). This caused internal structural changes, one result of which was the dissolution of Fred's Group. Fred himself encountered health problems at this time, and his last years with NIST were relatively inactive.

On Monday 26 July 1993, people at NIST threw a farewell party for Fred as he officially retired. His colleagues paid tribute to him and presented him with a fishing rod as a token of appreciation. Fred and Meg have sold their long-time house in Derwood and have taken an apartment in Washington, D.C. They will divide their time between that and their country cottage in Lost River, West Virginia, and the fishing rod will get ample usage.

The impact that Fred has had, both in environmental science and on the people who have worked with him, will last a long time and is exemplified by the papers in this tribute issue.

Acknowledgements I am thankful and grateful to Meg Brinckman for supplying many of the details that are so important in preparing an article like this. I also thank Dr Gregory Olson for providing information and insight, Professor Peter Craig for the invitation to prepare this tribute, and to Fred Brinckman himself, the founder of many feasts.

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5. Loughlin, R B, French, W, Johannesen, R B, Guard, H E and Brinckman, F E *Chemosphere*, 1984, 13: 575; *Chem. Abstr.*, 1984, 101: 34265j
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Bellama, J M *Appl. Organomet. Chem.*, 1991, 5: 33; *Chem. Abstr.*, 1991, 114: 139649j

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Published papers

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2. Brinckman, F E and Stone, F G A Vinylgermane: preparation and polymerization. *J. Inorg. Nucl. Chem.*, 1959, 11: 24; *Chem. Abstr.*, 1959, 53: 21353h
3. Brinckman, F E and Stone, F G A Reactions of organo-boron dihalides. *Chem. Ind.*, 1959, 254; *Chem. Abstr.*, 1960, 54: 265d
4. Brinckman, F E and Stone, F G A Organoboron halides. II: The vinylhaloboranes—a preliminary study of their preparation and properties. *J. Am. Chem. Soc.*, 1960, 82: 6218; *Chem. Abstr.*, 1961, 55: 23315i
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- acetate by mercury-resistant bacteria. *Appl. Microbiol.*, 1973, 26: 321; *Chem. Abstr.*, 1974, 80: 10947e
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