

## In Memoriam



Paul C. Milner in 1961 when he received the ECS Turner Memorial Award.

## Paul C. Milner 1931-2005

### *An Extraordinary Friend*

One of **PAUL MILNER's** personal characteristics was his hesitancy to publicly accept any accolades; and so, in an attempt to remedy the situation, we found ourselves writing a special thank you to him, to be published in the pages of *Interface*. This past May, in the middle of writing this light-hearted piece, we learned of his death. We came to a halt, not knowing how to proceed, and deeply feeling this loss. We always looked forward to Paul's presence at the Society meetings, where he was often to be found behind the counters at registration, helping staff to solve some minor crisis; or out in the halls, unable to make much progress because of being stopped by old friends and new. The Electrochemical Society is now an emptier place.

What prompted our recent writing effort was the fact that we recently had processed the last journal manuscripts through our old manuscript submission software. Now manuscripts are processed entirely through the PXP software. (See *Interface*, Fall 2003, p. 12 and Winter 2003, p. 18 for details on the PXP system.) The old system was developed and maintained by Paul, and ECS has enjoyed the ease of use and many other benefits afforded by this "made-to-order" system. Many authors, editors, and staff owe Paul a debt of gratitude for his outstanding work, not only on the editorial processes; but in a hundred other aspects of the Society's activities.

In 1990, Paul was appointed Interim Editor of the *Journal of The Electrochemical Society* (JES) and was charged with reconstructing the editorial process. He probably had no idea that he would still be involved with JES operations some 15 years later. Database software seems to have a "shelf

life" of three years, so we marveled that we were still able to use Paul's software for over five times as long. For the first time, we were able to easily track lagtime statistics, data about the source of manuscripts, and produce data that could be used in the membership and accounting departments. That "marvel" was no matter of luck—Paul not only maintained that software, but re-wrote it many times and added a lot of bells and whistles; and he did it all on a volunteer basis.

It is harder to measure the work that Paul had done as a volunteer Information Technology (IT) consultant. In addition to the above-mentioned journals database work, Paul also developed databases to manage the Society's membership records. Through his IT work, Paul led the Society's transition from manual operations to computer systems for all key functions of the Society.

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Born in Washington, DC on August 23, 1931, Paul Chambers Milner received his BS in chemistry from Haverford College in 1952 and his MS and PhD in physical chemistry from Princeton University in 1954 and 1956. He was a General Electric Co. Fellow at Princeton in 1954-1955.

After serving in the U.S. Navy, Paul joined Bell Laboratories as a Member of Technical Staff in 1957. He carried out studies on electrochemical kinetics, reaction mechanisms, and secondary batteries with particular reference to the lead-acid and nickel-cadmium systems. He became Department Head of Electrochemical Research in 1969 when his responsibility also included work in corrosion contamination studies, electrodeposition, metal finishes, electrical contacts, and lubrication. Paul retired from Bell Laboratories in 1987.

Joining The Electrochemical Society in 1958, Paul went on to become one of its most active volunteers and valued leaders. ECS Past-President Bob Frankenthal said, "Paul was a wonderful mentor. He supported, guided, and encouraged me as I became more active in the Society. I learned much about its strengths and weaknesses and about its governance from him."

Paul was co-winner of the Francis Mills Turner Memorial Award in 1960 and served the Society in a number of functions. He was co-secretary of the Membership Committee (1960-1965), a member of the Executive Committee of what is now the Physical and Analytical Electrochemistry Division (1961-1963), a Battery Division *Journal* Editor (1962-

1969), and vice-chair (1966-1968) and chair (1968-1970) of the Battery Division. He served numerous times on both the Nominating and the Technical Affairs Committees and as a Technical Advisor to the Battery and Electrodeposition Divisions and (what is now) the Industrial Electrolysis and Electrochemical Engineering Division. In 1971, he was The Electrochemical Society Lecturer. While on the Ways and Means Committee (1981-1985), Paul was the author of a model for use in writing Division and Section bylaws.

Elected Secretary of the Society in 1974, Paul served two three-year terms during which time he was a member of the Board of Directors, the Finance Committee, and the Publication Committee. He also was chair of the Society Meeting Committee. In 1980-1981, he served as chair of the Publication Committee. He was elected Vice-President of the Society in 1981 and served as President for the term 1984-1985. Subsequently, he served for two years on the Board of Directors and for several years on the Financial Policy Advisory Committee. Paul was a member of a number of ad hoc Society committees, and acted as Society Historian during the period 1990-1995. He was a key member of the Society's Centennial Committee, providing a wealth of knowledge about the organization, its traditions, and its people. In any capacity, Paul was often the person to whom members and staff would turn with questions about history and governance.

Paul was made an Honorary Member of the Society in 1986 and elected a Fellow of The Electrochemical Society in 1990. His other society memberships included the American Chemical Society, the International Society of Electrochemistry, Phi Beta Kappa, and Sigma Xi.

Whether working on the Society's committees or behind the scenes with the ECS staff, Paul played a huge part in the Society's progress; and it is the thousands of ECS members who have greatly benefited. We know his legacy will live on in countless instances and numerous ways, advancing the profession and the scientific disciplines in the field of electrochemistry.

*This notice was prepared by Roque Calvo and Mary Yess, ECS's Executive Director and Deputy Executive Director, respectively.*

## Reminiscence about Paul Milner

by Dennis Turner, ECS Past-President

For many years Paul was an unpaid member of staff, especially at Society meetings. He seemed delighted to help run Society meetings like a member of staff. His long time Society membership and meeting attendance gave him the experience to make all the right decisions and he enjoyed it. I cherish my friendship with him since the day he joined Bell Labs. He was always available to give advice and it was good advice. People always sought him out when there was a problem and usually he had a good solution. Paul was one of a kind and a good model for people to follow.

## A Personal Reflection

by Barry Miller, ECS Past-President

I recently returned from my 50<sup>th</sup> reunion of the class of 1955 at Princeton and it reminded me that I first met Paul there. We were both working for Walter Kauzmann—Paul on his PhD and I on my senior thesis. In 1965, when Paul and I were both at Bell Labs, for my marriage license to Sandra, I needed a witness who was supposed to have known me for some time and, locally, Paul was the only person who fit the bill. He graciously accompanied us to the appropriate office in Plainfield for the purpose. We spent many pleasant evenings with Paul over the years, at our home and at his apartment in Chatham, and think of him only with the greatest fondness.

One of the things about Paul that was true over the last four decades was his total dedication to ECS. It seemed to me, especially when Paul was Secretary of the Society, that the administrative staff depended on him in all aspects of the operation and that Paul was always available. When I became *Editor* of the Journal and we were instituting the then new editorial system, Paul spent countless hours putting in the computer system for manuscript handling and getting us out of numerous difficulties. As in all things, he liked to operate selflessly behind the scenes, and the Society office staff, as well as myself, was dependent on him over an extraordinary range of activities. Surely ECS has never had anyone more devoted to its purposes than Paul and we shall miss him profoundly.

## A Friend for Thirty-Six Years

by V. H. "Bud" Branneky,  
ECS past Executive Secretary

Paul was chair of the Battery Division when I met him at the spring 1969 meeting in New York. This was the first of 44 Society meetings that provided an opportunity for conversation and cooperation in solving problems or circumstances of concern.

In 1974, Paul was elected Secretary of the Society, and Paul arranged for the smooth transition of the office of the Executive Secretary when I replaced Ernest Enck in September 1975. The following year, there was a change in the financial administrative practices of the Society, and Paul was instrumental in helping to set up the news systems and procedures.

Paul was a good listener, a gentle person, and always a gentleman. He was involved in so many of the administrative aspects of the Society, including the search for a building that ECS could call home. Paul was the one person who knew the ECS Constitution and Bylaws inside out and was always thoughtful in preparing text for any proposed changes. In 1987, when he retired from Bell Labs, he moved to Peoria, Arizona; but he never stopped providing assistance to the staff.

Most of us will remember Paul as a kind, unassuming gentleman, who devoted his life to improving The Electrochemical Society.

## In Memoriam



## Leo Brewer 1919-2005

LEO BREWER passed away on February 22, 2005. Prof. Brewer was a member of the chemistry faculty at the University of California, Berkeley for nearly sixty years and is universally recognized for founding and leading the field of high temperature chemistry. His major contributions to solid-state and gas phase chemistry have shaped the current understanding of many disciplines within The Electrochemical Society.

Brewer was born in St. Louis in 1919 and did his undergraduate studies at the California Institute of Technology and graduate work at UC Berkeley on organic reactions. After completing his PhD in only three years, he joined the Manhattan Project in 1943. His assignment was to develop a crucible to contain molten plutonium—an element that was unavailable and had unknown properties at the time of the assignment, and when it did become available would be made in very small amounts. He eventually solved the problem with cerium sulfide, which itself was new and unstudied at the time. This began his long and distinguished career in prediction and critical analyses of inorganic reactions.

Brewer's early career centered on thermodynamic measurements of inorganic species and understanding the broad implications of these measurements. Before the 1950s the complex nature of high temperature vapors was not recognized. From basic thermodynamic arguments, Brewer correctly predicted that for a vapor phase in equilibrium with a condensed phase, the relative contribution of more complex vapor species would increase as the temperature increased. During this time, a variety of high temperature gas analysis tools became available that confirmed his predictions. A good example of this is the Al-Al<sub>2</sub>O<sub>3</sub> system.<sup>1</sup> In the condensed phase, the zero and plus three oxidation states of aluminum are expected and observed. However at high temperatures a wide range of vapor species with different oxidation states are observed: Al, Al<sub>2</sub>O, AlO, Al<sub>2</sub>O<sub>2</sub>, AlO<sub>2</sub>. Note that the +3 oxidation state is not present in these gas species!

Brewer observed that chemical thermodynamic data are essential for many critical high temperature applications such as energy conversion and chemical processing. He spoke eloquently of the need for such data and met with members of Congress to make his case. He felt strongly that the task of the scientist was to release reliable data in a form that was usable to all. His deep understanding of many experimental and theoretical approaches allowed him to critically assess available thermodynamic data. His critical evaluations<sup>2</sup> continue to be of tremendous assistance to both basic and applied research.

Most of Brewer's later research was devoted to predicting the phases and stabilities of transition metal alloys. With his characteristic elegance, Brewer showed that basic valence bond theory applied not only to the non-metals, but also to

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## In Memoriam



### James R. Huff 1931-2005

JAMES R. HUFF, 73, died of cancer on May 1, 2005 at his home in Albuquerque, New Mexico. Dr. Huff received his BA in chemistry from Carleton College and his PhD in physical chemistry from Purdue University. He devoted almost his entire career to the advancement of fuel cell technology, either in R&D related efforts or program management and administration.

His initial position was as a research chemist with Allis-Chalmers (A-C) in Milwaukee. He initiated and supervised studies on the oxidation of a broad range of fuels (hydrocarbons,

alcohols, ammonia, and hydrazine) for application to fuel cells. These studies included electrochemical performance, reaction mechanisms, catalysis, and component development. Allis-Chalmers had a major program for the development of a power source for a farm tractor and eventually became a major contender in the NASA/U.S. Air Force space power program. This was one of the earliest fuel cell ventures in the U.S.

Leaving A-C for Globe-Union (also in Milwaukee) Dr. Huff focused on the investigation of anodes, cathodes, and nonaqueous electrolytes for electrochemical storage devices. With the growth of the military program for "Silent Power Sources," Dr. Huff went to the Army R&D Laboratory at Ft. Belvoir, Virginia to head up the Energy Conversion Research Division. This enabled him to become involved in, and responsible for, a much broader range of electrochemical efforts: hydrocarbon-air fuel cells, research on electrocatalysts, unique solid and liquid electrolytes (such as trifluoromethanesulfonic acid). Some of the earliest RD&E in fuel processing system technology came out of the division during this time. With his promotion to Chief of the Electrotechnology Department,

his responsibilities included overall management, administration, technical direction, and execution of an RDT&E program in power generation for the field Army. This was to provide the Army with the most advanced technology for the generation and control of electric power for both mobile and stationary military applications. Activities encompassed basic research in energy conversion, exploratory development of prototype components and systems, advanced/engineering development, and testing of prototypes and eventually total production engineering and data packages for procurement.

During the late 70s, Dr. Huff and other members of the Department became heavily involved in the U.S. government program in electric vehicles. As a result of this visibility and his strong desire to build a program utilizing polymer electrolyte membrane technology he was invited to join the staff at Los Alamos National Laboratory. After 13 years at Ft. Belvoir, he joined the team at LANL to establish and build their fuel cell vehicle program. Initially this effort was funded by the DOE battery program and eventually by the DOE vehicle program, as well as

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## In Memoriam



### Dean W. Maurer 1932-2005

Longtime friend and member of the electrochemical community, DEAN W. MAURER, nationally recognized expert on aerospace battery technology and

spacecraft power systems, passed away on March 23, 2005, in Mountain View, California.

Dr. Maurer received his bachelor's degree in chemistry from Carnegie Mellon University in 1954, and his doctorate in physical chemistry from the University of Rochester in 1958. A long-time resident of Watchung, NJ, Dr. Maurer recently moved to Sunnyvale, CA, having accepted a system engineering technical support position with Space Systems/Loral in Palo Alto, California.

Born in Berwick, Pennsylvania in 1932, Dr. Maurer made many significant contributions to the field of electrochemistry as a member of the technical staff at Bell Laboratories, Murray Hill, New Jersey. He did notable work developing the aqueous electrochemical impregnation process

for aerospace nickel/cadmium and nickel/hydrogen cells. Dr. Maurer was a member of the team that built TELSTAR-1, one of the first communications spacecraft, and continued to support the entire TELSTAR series until recently. He developed power and energy storage subsystems for numerous other telecommunications satellites for GE/Astro and later Lockheed. Due to his deep technical expertise, especially with the aqueous electrochemical impregnation process, Dr. Maurer was asked and/or volunteered to assist with the development, production, launch, and operation of many other systems. His work was vital to many U.S. Government programs across the entire aerospace field. His contributions were extensive, and made a major difference in the fields of aerospace power and electrochemical technology for the

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## In Memoriam

MANFRED BREITER (1925-2005) — With his passing, the scientific community lost an outstanding scientist with a world-wide reputation, who was still actively involved in scientific work at the Vienna University of Technology. Our group and our university lost an authoritative mentor and advisor in many respects. His friends and the

electrochemical community will miss him very much. Dr. Breiter joined the Society in 1956, and was a member of the Battery Division as well as the Physical and Analytical Electrochemistry Division. (This notice was submitted by Guenter Fafilek, Vienna University of Technology.)

BRIAN CONWAY — At press-time, *Interface* learned about the death of Brian Conway. There will be a full-length notice of his passing in the winter issue of the magazine.

MICHAEL A. POULAKOS (1953-2005), member since 1980, Electronics and Photonics.



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**ECS Visa Help**  
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that their formal letter of invitation from the Society be faxed to them or sent via e-mail in PDF format, thus avoiding postal delays. E-mail notifications to authors, informing them that their paper has been accepted, now include a link to this form.

The Society is educating prospective attendees about new visa requirements by providing a direct link from our website to the U.S. Department of State Visa Homepage ([www.travel.state.gov/visa](http://www.travel.state.gov/visa)) so individuals can ascertain whether a visa is required, identify application requirements, locate an embassy, and start the application process.

To alleviate some of the logistical problems at arrival airports, the Society meetings staff communicates with airports and customs, notifying them of major arrival dates so they can be properly staffed and otherwise prepared for our delegates. ■

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**Brewer**  
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the transition metals<sup>3</sup>. He built on the Engel correlation between transition metal electron configuration and crystal structure. He drew on spectroscopic data for the metals in their gaseous states to determine available electron configurations. Using these data, he was able to predict the effect of alloying additions and pressure on alloy structures and stabilities with amazing accuracy. In analogy to Lewis acid-base interactions in aqueous solution, Brewer's theory predicts stable configurations between transition metals with appropriate electron configurations. These are a remarkably stable series of transition metal alloys, such as ZrPt<sub>3</sub>, known as the Brewer-Engel compounds. Given the large number of metallic elements in the periodic table, Brewer's predictive tools are tremendously useful in predicting phase relationships and interactions for which there are no experimental data. This has found application in a wide range of fields including metallurgy, nuclear fuels, and catalysis.

Brewer's association with The Electrochemical Society goes back many years. He joined the Society in 1956 and he gave the Society's first plenary lecture in 1970 entitled "Electrons—The Universal Glue." He received the Olin Palladium Medal in 1971 and the Henry B. Linford Award for Distinguished Teaching in 1988. Brewer earned a long list of other significant honors, including election to the National Academy of Sciences in 1959, the E. O. Lawrence Award of the Atomic Energy Commission in 1961, and the Hume-Rothery Award of the American

Metallurgical Society in 1982. His revision with K. S. Pitzer of the text on thermodynamics<sup>4</sup> by Lewis and Randall has been widely used in courses and is a standard reference for several generations of chemists.

Behind all these major contributions was a courageous, unpretentious gentleman of the highest integrity. He treated everyone with respect and dignity and to this day has set very high standards for the field of high temperature chemistry. He directed the research of forty graduate students and nearly two dozen post-doctoral associates. Among the many values he imparted to his students and associates were self-teaching and critical analysis of experimental data. His boundless energy and enthusiasm for the chemical sciences are recalled by all who knew him. Through his courses, articles, and active participation in professional societies, he instructed and inspired a countless number of students and scientists throughout the world. ■

**References**

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2. L. Brewer and R. H. Lamoreaux, "Thermochemical Properties, Atomic Energy Review Special Issue No. 7, Molybdenum: Physico-chemical Properties of Its Compounds and Alloys," International Atomic Energy Agency, Vienna, 1980.
3. L. Brewer, *Science*, **161**, 115 (1968).
4. G. N. Lewis and M. Randall, *Thermodynamics*, Second Edition revised by K. S. Pitzer and L. Brewer, New York, McGraw-Hill, 1961.

*This notice was prepared by Nathan Jacobson ([nathan.s.jacobson@nasa.gov](mailto:nathan.s.jacobson@nasa.gov)) with help from Alan Searcy, Gerd Rosenblatt, John Gibson, Milan Jaksic, Michael Cima, and Steve Visco.*

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**Huff**  
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NASA and DARPA. During this period a major accomplishment was establishing the joint PEM program with General Motors and the growth of an on-site cooperative effort at LANL. Similarly he convinced Ballard Corp. of the validity of PEMFCs, which led to their entry into an R&D effort to develop fuel cell vehicle and stationary power plants.

Upon his retirement from LANL after 12 years, he joined Ballard Power Corp. as their U.S. representative and chief scientist responsible for technical overview of the fuel cell programs in the transportation and utility areas. He worked closely with representatives of the U.S. and Canadian governments to maintain critical funding for portable and military applications as well. The last six years of his career

were devoted to consulting and the sharing of his broad and extensive knowledge and experience with others. Throughout his career he was active in The Electrochemical Society, which he joined in 1964, and he served on several ECS committees in the 1980s. He was active in other societies as well, and made frequent presentations at all the major conferences, seminars, and meetings devoted to energy conversion technology. Dr. Huff was truly a "Fuel Cell Pioneer" who has had a major impact on the development and commercialization of fuel cells. He will be sorely missed by the community. He is survived by his widow, Juliet, and three children. ■

*This notice was submitted by John B. O'Sullivan.*

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**Maurer**  
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industry and our country. Dr. Maurer was frequently requested to participate in many symposia conducted by NASA, USAF, and other government agencies. He held 26 patents and authored many technical papers. He retired from AT&T Bell Laboratories in 1996 and joined Loral Skynet.

An accomplished equestrian and a commercial hot air balloon pilot, Dr. Maurer also served on the Board of Directors of the Mid-Atlantic Aviation Coalition and the Great Eastern Balloon Association.

Dr. Maurer is survived by his wife, Diane, of Sunnyvale CA, and Watchung, NJ; and son Dorian and daughter-in-law Donna, both of Churchville, PA. Memorial services were held in Watchung, NJ, and in Mountain View, CA, by his fellow employees at Space Systems/Loral. Dean will be sorely missed by all of us. ■

*This notice was submitted by George Methlie and Dave Pickett.*