

Norman Hackerman — Scientist, Educator, Administrator

by Robert P. Frankenthal

NORMAN HACKERMAN, who died last year at the age of 95, was a giant among giants: a world renowned scientist, an outstanding educator, a highly successful administrator, and a champion for basic research. He was member of ECS for more than 60 years. His research focused on the electrochemistry of corrosion, its mechanism and the processes to prevent or inhibit corrosion. During the more than 50 years he served as an administrator, he continued as a research scientist and an educator, maintaining an active research group and teaching freshman classes. At the same time he served the government, ECS, and other technical societies in numerous capacities.

Marye Anne Fox, chancellor and distinguished professor of chemistry at the University of California, San Diego, summed up his contributions to the nation, as reported in *Chemical & Engineering News*, "More than any other American, Norman Hackerman's strong support for investment in basic research was the dominant factor in American science policy over the past 50 years, including the years he served as chairman of the National Science Board."¹ She further states that as a leader, "his voice was a strong one for the highest ethical principles, imbued with rationality, even when this involved great personal cost."¹

Among Hackerman's early scientific interests were electrokinetic potentials, related to an electrophoresis problem, and the irreversibility of the oxygen electrode. Through these, he became interested in ECS. He attended his first ECS meeting in the spring of 1946 in Birmingham, Alabama.² He was immediately impressed because "The American Electrochemical Society* was different. This was a small group of maybe 200 people in one hotel, and they talked continuously—either formally or informally—for whatever number of days the meeting lasted, which I can't remember. So I was very much impressed by that."² His first ECS publication, the paper he presented at the Birmingham meeting, co-authored with his student, D. I. Marshall, "Corrosion Studies on Electrolytic Chromium," was published in the *Transactions of The Electrochemical Society in 1946*.⁴ He chaired the Corrosion Division (1951) and served the Society as Vice-President (1954-1957) and President (1957-1958). Most noticeably, the name of Norman Hackerman was synonymous for 40 years with the

*Hackerman was mistaken. The Society's name had been changed to The Electrochemical Society in 1931.³

Journal of The Electrochemical Society (JES); he served as Technical Editor from 1950 through 1968 and as Editor from 1969 until 1990. During his tenure with JES, it grew from a small publication averaging 5 papers per issue to the world's premier journal in electrochemistry and solid-state science that it is today. Norman was successful juggling numerous jobs simultaneously. One reason was his ability to be quick and incisive making decisions. I learned this when I had the privilege of working with him for 17 years, first as a Divisional editor of JES and then as chair of the Publication Committee. His philosophy, as conveyed to the JES Divisional editors, was that a submitted manuscript should be published as long as it presented "new ideas and experiments which were reasonable, rational, did not violate firmly established 'laws' of nature, and added to our understanding of nature's forces and materials."⁵ Even a minor study might inspire others and open up a new avenue of research. He was always open to new ideas. His further thoughts on peer review and related matters may be found on pages 9-11 of Reference 3. The Society honored Hackerman upon his retirement as Editor by changing the name of the Young Author Awards to the "Norman Hackerman Young Author Awards," one in electrochemical science and technology and the other in solid-state science and technology. He had previously been honored by the Society with the Palladium Award (1965), Honorary Membership (1973), and the Edward Goodrich Acheson Award (1984), in recognition of his many scientific, educational, and administrative contributions.

The Corrosion Division honored Norman Hackerman on the occasion of his 75th birthday with a symposium entitled "Surfaces, Inhibition, and Passivation," in recognition of "his many significant contributions to the advancement of corrosion science and electrochemistry through his research, teaching, writing, contributions to ECS, and public service on science advisory boards and policy committees."⁶ Chaired by Ed McCafferty and Ralph Brodd, the symposium and proceedings volume⁶ featured 46 papers, including one by Brodd entitled "Norman Hackerman, An Appreciation." The proceedings volume also included a table listing the names of his 99 graduate students and post-doctoral fellows, as of 1986. Many more went through his laboratory in the next 21 years.

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Classics

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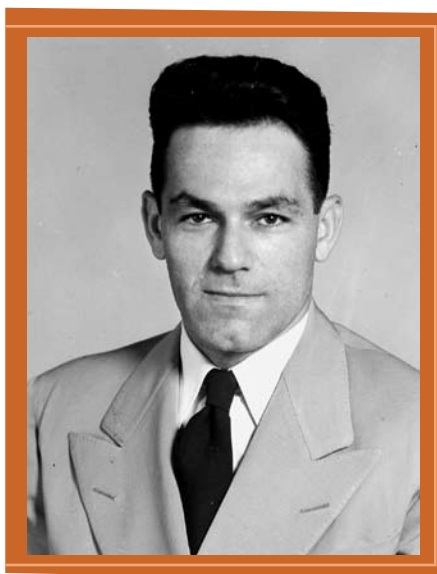
Hackerman's research covered a wide range of interests, mostly electrochemical. He published more than 250 papers. The publication, perhaps his last, "The Inhibiting Effect of Cobalt (III)-Cyclam Complexes with Substituted β -Diketones on Iron Corrosion in Perchlorate Solution," appeared in the *Journal of Solid State Electrochemistry* in February 2008.⁷ It had been submitted on April 4, 2007, shortly before his death. Two major interests of his were passivity of metals and corrosion inhibition. At the First International Symposium on Passivity held at Schloss Heilingenberg, Germany in 1957, he proposed that the passive film consists of an adsorbed layer of oxygen through which cations migrate to form an amorphous oxide on top of the adsorbed layer.^{8,9} The first of these⁸ was a major contribution at this meeting that focused on the mechanisms of passivity. Although he published many papers dealing with passivity and its breakdown, his overriding interest over his entire career was corrosion inhibition by organic inhibitors. Hackerman's name is on more than 70 publications dealing with this. Although many of his studies were of a fundamental nature, much of his work was related to industrial problems, especially with corrosion in oil and natural gas recovery and production processes.

Norman Hackerman was born March 2, 1912 to Jacob and Anne (Raffel) Hackerman, who had emigrated to the United States from that part of the Russian Empire that later became Estonia and Latvia, respectively.¹⁰ They encouraged him to get a college education, a privilege they did not have. He attended Johns Hopkins University during the Great Depression, earning his AB degree in 1932 and his PhD degree in chemistry in 1935. In 1982 Johns Hopkins honored him with its Distinguished Alumnus Award. Unable to find a full time position, he worked part-time in the chemistry faculties of Johns Hopkins and Loyola College and as a research chemist for the Colloid Corporation. According to a University of Texas Profile,¹⁰ the Colloid Corporation was developing equipment to homogenize milk. Its product was good but could not beat the competition. Hackerman is quoted as saying, "I learned a lesson: being active isn't enough. You have to be successful."¹¹

In 1940 he took a position as an assistant chemist with the U.S. Coast Guard, and the next year he went to the Virginia Polytechnic Institute as an assistant professor. In 1944-45 he joined Kellogg Corporation, where he was assigned to the Manhattan Project working on the gaseous diffusion process to separate uranium isotopes. This was his introduction to corrosion research. He never regretted his participation in the project that led to the atomic bomb. He is quoted in the blog "SciGuy" as saying, "There was a war on, you either fired a gun, flew on a plane, went on a submarine or did this. The ethics, at that time, were kill or be killed. We were losing troops at an awfully high rate."¹²

In 1945, Hackerman joined the University of Texas as an assistant professor in chemistry, quickly rising through the ranks to professor in 1950 and department chair in 1952, a position he held till 1961. He also was Director of the Corrosion Research Laboratory (1948-1961) and Dean of Research and Sponsored Programs (1960-1961). He was named Vice-President and Provost of the University in 1961

and Vice-Chancellor for Academic Affairs in 1963. Larry Faulkner, past President of the University of Texas Austin and a past president of ECS relates, "During 1963-1967, there was actually no president at UT Austin, which was led by a vice-chancellor for academic affairs. Norman Hackerman was that vice chancellor—the *de facto* president."¹³ He was officially appointed president in 1967, a position he held until 1970. At Texas he helped build the school's reputation and research budget. William Powers, the current president of the University of Texas Austin, is quoted in *C&E News* as calling Hackerman "a visionary who propelled Texas into an era of scientific inquiry with his commitment to building research capabilities, a man of undiminished energy and vitality."¹⁴ Faulkner said, during the 2003 induction of Hackerman into the Texas Hall of Fame for Science, Mathematics, and Technology, "He has become a household word among scientists in Texas. I doubt that anyone has done more to build technical strength and higher education in this great state."¹⁴



McCafferty, a past chair of the Corrosion Division, was a post-doctoral fellow (1968-1970), and Brodd, a past president of ECS, was a graduate student (1950-1955) at the University of Texas Austin. A couple of quotes from them can best describe Norman Hackerman. "Dr. Hackerman was president of the University of Texas at Austin, but he maintained his office and lab in the Chemistry Building. He directed his research group, taught freshman chemistry, and also played a lot of squash. He stopped in at our corrosion electrochemistry lab every day."¹⁵ "The interactions with Dr. Hackerman have been an exciting and rewarding experience that endures to this day. There is always activity around him and things seem to 'happen' when he is around."¹⁶ "Dr. Hackerman encouraged members of his research

group to give short informal seminars. 'Don't talk for more than 15 minutes ... if you cannot explain your work in 15 minutes, then you don't understand it'.¹⁵ "His keen insight and critical analysis unerringly focus on the key elements and identify an appropriate course of action."¹⁶

In 1970 Hackerman was appointed professor of chemistry and president of Rice University, positions he held for the next 15 years. Upon his retirement in 1985, he was named President Emeritus and Distinguished Professor Emeritus. During his time at Rice, the university launched a graduate school of management and a school of music, divided science and engineering to create separate schools of engineering and natural sciences, and established biochemistry, linguistics, mathematics, and computer science departments, and the Rice Quantum Institute. Hackerman also increased the number of faculty by more than 200 and tripled the number of endowed chairs. All this was made possible with funds from the university's endowment which Hackerman quadrupled during his tenure.¹⁶ The current Rice president, David Leebron, is quoted in a Rice news release, "In the more than two decades since he was president of Rice, Norman has been a source of advice and inspiration to higher education leaders and state and national policymakers in the areas of science and education."¹⁶ For his many accomplishments, Rice awarded Hackerman its Alumni Gold Medal for Distinguished Service in 1984 and established the Norman Hackerman Fellowship in Chemistry in honor of his 90th birthday in 2002.



After Hackerman's retirement from Rice, the University of Texas named him Professor Emeritus of Chemistry. The professorial titles at both institutions were well deserved. During all the years he was an administrator, he continued teaching and research. He was still conducting classes and supervising postdoctoral fellows at the University of Texas at the time of his death.

Norman Hackerman's career was not limited to academia. He served both his country and The Electrochemical Society. He served on numerous federal and Texas advisory committees including the National Science Board, to which he was appointed by President Lyndon Johnson in 1968 and which he chaired from 1974-1980. In 1993 the National Science Board honored him with the Vannevar Bush Award, and in 1993 President Bill Clinton presented him with one of the nation's highest honors, the National Medal of Science.

After his retirement from Rice, Hackerman served for 24 years as chair of the Scientific Advisory Board of the Robert A. Welch Foundation, one of the nation's largest sources of private funding for basic research in chemistry. In 2001 the Foundation created the Norman Hackerman Award in Chemical Research, a \$100,000 prize, to recognize the work of young researchers in Texas.

Norman Hackerman was elected to the National Academy of Sciences and the American Academy of Arts and Sciences. His list of other honors and awards is too lengthy to enumerate here. They include major awards from numerous professional societies, including AAAS and the American Chemical Society, and five honorary degrees.

It should also be noted that Norman Hackerman's life was not limited to scientific endeavors. He was an avid squash player. He played every day after work well into his nineties. It is interesting to note that Faulkner,¹³ McCafferty,¹⁵ and Brodd⁶ each mentioned the importance of squash to Hackerman.

Hackerman's wife, Gene, died in 2002. He is survived by three daughters, Patricia Berry, Sally Myers, and Katherine Walker; a son, Stephen; ten grandchildren; and three great-grandchildren.

As Larry Faulkner said, "Norman Hackerman has been one of those rare and valued great citizens who helps a large and complex society move from past to future."¹⁴

Acknowledgments

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About the Author

This ECS Classic was contributed by Robert P. Frankenthal, past treasurer (1986-1990) and past president (1993-1994) of the Society. He was named an ECS Fellow in 1995, Honorary Member in 2003, and will receive the 2008 ECS Edward G. Acheson Award this fall.

References

1. Chemical & Engineering News, **85**, 26, June 25, 2007, p. 12.
2. N. Hackerman in the "Norman Hackerman Oral History," J. J. Bohning, interviewer, Chemical Heritage Foundation, Philadelphia (1995).
3. F. A. Trumbore and D. R. Turner, "The Electrochemical Society 1902-2002: A Centennial History," p. 80, The Electrochemical Society, Pennington, NJ (2002).
4. D. I. Marshall and N. Hackerman, *Trans. Electrochem. Soc.*, **89**, 195 (1946).
5. N. Hackerman, Editorial, *J. Electrochem. Soc.*, **136**, 12 (1989).
6. "Surface, Inhibition, and Passivity," E. McCafferty and R. J. Brodd, Eds., PV 86-7, The Electrochemical Society, Pennington, NJ (1986).
7. K. Babic-Samardzija, N. Hackerman, S. P. Sovilj, and V. M. Jovanovic, *J. Solid State Electrochem.*, **12**, 155 (2008).
8. N. Hackerman, *Z. Elektrochem.*, **62**, 632 (1958).
9. G. Aronowitz and N. Hackerman, *J. Electrochem. Soc.*, **110**, 633 (1963).
10. Wikipedia (http://en.wikipedia.org/wiki/Norman_Hackerman)
11. Norman Hackerman Research Profile, Univ. Texas (2006). (<http://www.utexas.edu/research/profiles/hackerman.html>)
12. E. Berger in "SciGuy: Norman Hackerman, Texas scientist, has died." (http://blogs.chron.com/sciguy/archives/2007/06/norman_hackerman.html)
13. Larry R. Faulkner, *The Alcalde* (University of Texas alumni magazine), **96**, 1, 34 (2007).
14. http://www.utexas.edu/president/speeches/sciencefame_012003.html
15. E. McCafferty, private communication.
16. <http://www.media.rice.edu/NewsBot.asp?MODE=VIEW&ID=9694>