

1996 Scientific Achievement Award: Dr. James H. Lindsay's Research is a Driving Force In Automotive Form & Function



At this year's SUR/FIN® banquet in Cleveland, attendees applauded and cheered when Dr. James H. Lindsay was announced as the 1996 recipient of AESF's Scientific Achievement Award. Well-known throughout the Society and the industry for his easygoing manner and cheerful approach to any situation, Dr. Lindsay was nominated by the Detroit Branch for his many accomplishments as a research professional, as well as for his years of dedication to the AESF and to the advancement of surface finishing in the automotive industry.

Dr. Lindsay (and his father before him) may have had more influence on the function of the automobiles in your life—even if they have not all been General Motors products—than you could possibly realize. In learning more about Dr. Lindsay and the accomplishments that have made him a well-deserving recipient of the AESF's most prestigious award, it is interesting to have an understanding of his family background.

Like Father, Like Son

Many fathers dream that their sons will follow in their footsteps, and the senior James H. Lindsay was an excellent role model: He was a plating engineer for his long career at General Motors (GM) in Detroit and Flint, MI; his efforts focused on the improved performance of chromium deposits for decorative trim; he was involved with initial research into micro-cracked chromium deposits and was closely associated with the develop-

ment of the CASS test; and he was the author or co-author of a number of papers on plating.

A true professional who believed in the importance of technical associations, the elder Lindsay was a key member in the then-AES Detroit Branch. An AES national president in 1969–70, one of his major efforts was to strengthen the Society's international membership and increase its international ties. In this respect, he was highly involved with the development of the Australasian Institute of Metal Finishing. Upon retirement, he was widely respected as the technical editor of the AES journal (then known as *Plating*), serving from March 1974 through January 1977. A National Honorary Member, he died in 1980.

There are many parallels in the lives of the Lindsay father-son team. As a teenager, the young Jim Lindsay had a vague awareness of his father's work, but it was an actual plating demonstration by his chemistry teacher that made everything click. He decided on a career in the plating industry. Then, like his father, Jim joined General Motors immediately upon graduation from high school, when he started his undergraduate program at GM Institute. (A graduate of the Institute with a bachelor's in mechanical engineering, Jim also holds a master's in materials engineering from Rensselaer Polytechnic Institute, and a PhD in metallurgy from The Pennsylvania State University.) His continuing career covers more than 30 years of significant research and development in plating

systems, with important contributions made to GM and the entire finishing industry.

Currently a staff research engineer with GM Research & Development Center, his research is in the area of advanced surface coatings—electroplated plastics, functional vacuum deposits, electrodeposition on aluminum for wear and decorative applications, high-speed electroplating and electroforming and electrogalvanized and related coatings for sheet steel.

Early in his career with the company, Dr. Lindsay was involved with process engineering (production electroplating, die-casting and heat-treating) at what was then the largest decorative plating facility in the world: The Ternstedt Division of GM in Flint, MI. Then in 1969, he accepted a research position on the technical staff at Bell Laboratories, where he worked on the development of coatings processes in the areas of sputtering and vacuum deposition for novel electrical contact surfaces.

From 1972 until he rejoined GM in 1977, Dr. Lindsay was a research professional for Udylyte Corporation, working with proprietary plating and surface finishing processes and equipment. While at Udylyte, he developed a flow cell design for continuous plating of a ternary bearing alloy, as well as special flow cells for copper electrowinning. He also researched electrodeposited CrO_x and NiO_x deposits for solar energy applications.

Jim also shares his father's dedication to the AESF, having joined the

Society in 1964 as a member of the Saginaw Valley Branch. He became affiliated with the Detroit Branch in 1977, served on the Branch Board of Managers, and was Branch president from 1985–86. In addition, Jim continues to be active on the national level, serving on AESF's Research Board, the Technical Education Board and the Publications Board.

A prolific author (a complete listing of his numerous published works would encompass several pages), he's also written and reviewed lectures in the Society's *Illustrated Lecture* series, and is currently a contributing technical editor to *Plating and Surface Finishing (P&SF)*. In 1990, he received *P&SF*'s Silver Medal, Outstanding Paper award for "The Interaction Between Electrogalvanized Zinc Deposit Structure and the Forming Properties of Sheet Steel."

Summary of Accomplishments
In addition to holding five U.S. patents, Dr. Lindsay's many industry-related accomplishments include:

- Graduate work shed light on the effect of hydrogen evolution on cobalt—important information during the nickel shortage of the early 1970s, when cobalt was touted as a substitute for nickel in copper-nickel-chromium systems.
- Developed a process and plating cell for the continuous plating of a babbitt alloy for engineering bearings.

- Studied the effect of high-speed solution flow on the product and economics of copper electrowinning.
- Early work involving the use of nickel underlayers in nickel-black chromium systems for solar energy applications.
- Developed an alternative to the chemical preplate process for plated plastics, based on vacuum technology—philosophy involved the best of both vacuum and plating technologies; developed a process for ABS, ABS alloys and mineral-filled nylon resins.
- Developed an understanding of the relation between surface roughness and drawing performance of stamping dies, plated with engineered chromium. Results indicated that high friction is found when the plated surface is too rough and too smooth.
- Undertook a comprehensive study of the changes encountered by the manufacturing process with the introduction of zinc electrogalvanized sheet steel in automotive body panels. Developed an understanding of the effect of operating conditions on crystal orientation, as well as the effect of coating orientation on the various manufacturing processes, including stamping, spot-welding, phosphating and painting.
- Developed proprietary processes for wear- and friction-reduction coatings in various automotive applications.

AESF Activities

Jim is an active participant in the Society, and has held numerous positions within his various Branch affiliations over the years. His 1995–1996 AESF responsibilities included:

- Publications Board
- Research Board, ex-officio member
- Continuous Steel Strip Plating Committee, advisor
- Meetings and Symposia Committee
- Technical Specialist
- Contributing Technical Editor, *P&SF*
- Delegate, Detroit Branch

He is also a member of the American Society for Metals, and is a past member of the Society of Vacuum Coaters and the Electrochemical Society. Honorary society memberships include Sigma Xi and Alpha Tau Iota.

Although quiet and soft-spoken, Jim has a solid reputation for his knowledge of the finishing industry and plating systems. His love of traveling has made him a willing and excellent ambassador for GM, the finishing industry and the AESF all over the U.S., Japan and Australia. This abbreviated look at the 1996 Scientific Achievement Award recipient's accomplishments illustrates why he is a definite stand-out in the industry. Congratulations, Dr. Lindsay! *P&SF*

Oops!

We left out an author's bio. In a feature about electroplated metallic glasses by John Donaldson, appearing on page 16 of the July 1996 issue of *Plating and Surface Finishing*, we inadvertently omitted information about the author. After having this pointed out by a couple of readers, here is the scoop on the author:

John Donaldson has 40 years' experience in electroplating management and engineering. He has worked as a consultant since 1986, specializing in plant and equipment design; plating for electronics and precious metals conservation; trouble shooting; and process and product development.

Donaldson is the author of more than 40 papers for various technical publications, and served as a feature editor for *Plating and Surface Finishing* and *Metal Finishing* magazines. He was a contributing author for the *Metal Finishing Guidebook*, the *Electroless Plating Manual*, and the AESF *Illustrated Lecture Series*.

Donaldson is a Past National President and Honorary Member of the AESF.