

35th Annual

*Once Upon a
Christmas Cheery in
the Lab of Shakhashiri
2004*



December 4th & 5th - 1:00 & 4:00 pm
Farrington Daniels Chemistry Building
University of Wisconsin-Madison

www.scifun.org

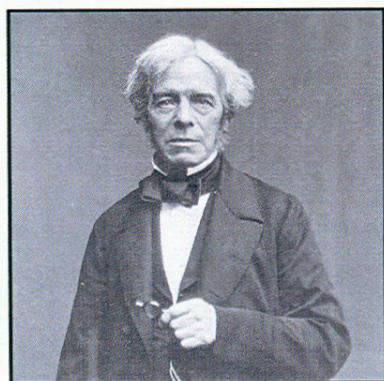
Wisconsin Public Television telecast:
4:30 pm, Friday, December 24, 2004
9:00 am, Sunday, December 26, 2004



The Origin of the Christmas Lecture

Michael Faraday, the noted English physicist and chemist, lived from 1791 to 1867. He was a gifted lecturer, and he began giving his Christmas Lectures for children at the Royal Institution of Great Britain in the 1840s.

Faraday loved simplicity, and he had a strong sense of the dramatic. His audience entered wholeheartedly into the world of science with him as guide. His ideas were still considered very unorthodox at that time, and children, who had not yet adopted conventional ideas, would react enthusiastically to the ones he



presented. Eventually, the lectures became very popular, and even the Prince of Wales attended and learned about the mysteries of electricity. Faraday sought to awaken the sense of wonder in his listeners. He knew that once a person could be made to wonder about the world, it was only a short step to studying it. He strove to point out that if you looked closely at the most ordinary thing, such as the force of gravity, it ceased to be ordinary and became somehow miraculous. Faraday did all he could to urge his listeners to see and judge for themselves, to experiment—to question nature directly—whenever anyone discovered something out of the ordinary.



35

Br

Bromine

Bromine is the chemical element with an atomic number of 35. For this reason, it is appropriate that it be featured in the 35th Anniversary presentation of "Once Upon a Christmas Cheery in the Lab of Shakhashiri." Bromine is unique among the chemical elements as the only non-metallic element to be a liquid at room temperature. The liquid is dark, reddish-brown, as is its vapor, which has an irritating odor, similar to that of chlorine bleach. In fact, the element's name comes from the Greek *bromos* which means a bad smell.

Bromine compounds have many uses, from disinfectants to rocket fuel. Bromine compounds were once very popular in over-the-counter medicines. In the 1930s, bromine compounds were second only to aspirin in drug sales. Potassium bromide was used as a sedative, which led to the coining of the term "bromide," referring to a boring person or hackneyed statement. The most heavily advertised drug was Bromo Seltzer, which contained sodium bromide, and which was sold as a headache remedy. However, too much bromine causes a condition known as bromism, which can cause psychiatric and nerve disorders and skin eruptions similar to acne. Drugs containing bromide were taken off the market by 1975, and the Bromo Seltzer sold today contains no bromine (it's acetaminophen, sodium bicarbonate, and citric acid).

In ancient times a dye called Tyrian Purple was highly prized, because it was one of the few natural dyes that did not fade. The source of the dye was a Mediterranean sea snail, which takes bromine from sea water and binds it to indigo, forming dibromoindigo. If dibromoindigo is exposed to sunlight before being applied to cloth, it loses its bromine atoms and becomes pure indigo, a dye known as royal blue. Tyrian Purple was a rare dye, and it became a symbol of wealth and power. Roman emperors wore togas dyed entirely purple, and a new emperor was said to "take the purple." Modern chemical industry has produced many synthetic dyes that do not fade, and Tyrian Purple has lost its status. Synthetic indigo has replaced natural indigo, and royal blue has become the color of everyone's blue jeans.

Because bromine reacts strongly with many other elements, it's useful in various different compounds as a bleach, as a disinfectant, as an explosive, as an oxidant in rocket fuel, and as an insecticide and fungicide. In addition, silver bromide is the light-sensitive material in photographic emulsions. Chances are that you have used something today that contains bromine or that involved bromine in its manufacturing process.

BASSAM Z. SHAKHASHIRI
William T. Evjue Distinguished Chair
for the Wisconsin Idea

“Scientist by training, teacher and public servant by trade, advocate by conviction, optimist by nature”—that is the way Bassam Z. Shakhshiri describes himself. As Professor of Chemistry at the University of Wisconsin-Madison, Dr. Shakhshiri finds outlet for all four attributes, to which he might add a fifth: entertainer by avocation.

Dr. Shakhshiri is probably best known to the public at large for his annual program, “Once Upon a Christmas Cheery/In the Lab of Shakhshiri,”; that attracts enthusiastic live and television audiences across the country. The one-hour show as well as two half-hour shows are featured year round on PBS and on other stations. The Christmas Lecture, which is in the tradition of the great British scientist Michael Faraday, is only one demonstration of Dr. Shakhshiri’s attachment to hands-on science.

Dr. Shakhshiri is a guest on TV and radio talk shows across the country and is a regular guest on the Larry Meiller Show of Wisconsin Public Radio. He has been featured in newspaper, magazines, national and local radio and television including the *New York Times*, the *Washington Post*, *Newsweek*, *Time*, NBC Nightly News, CNN, and the Larry King Show.

A native of Lebanon, Dr. Shakhshiri came to the United States in 1957 when he was 18 years old with one year of college (at the American University of Beirut) behind him. He completed undergraduate work at Boston University (Class of ’60) with an A.B. degree in chemistry, served as a teaching fellow at Bowdoin College for one academic year and then earned master’s and Ph.D. degrees in chemistry at the University of Maryland (’64 and ’68 respectively).

After a year of post-doctoral research and two years as a chemistry faculty at the University of Illinois, Urbana, Dr. Shakhshiri joined the faculty of the University of Wisconsin in 1970, a position he has held since. In 1977 he was the founding chair of the University of Wisconsin System Undergraduate Teaching Improvement Council. In 1983 Dr. Shakhshiri founded the Institute for Chemical Education (ICE) and served as its first director.

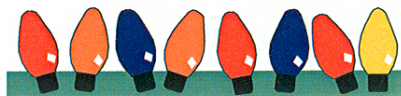
Dr. Shakhshiri has given over 1000 invited lectures and presentations in the US and other countries. He has co-authored several publications including *Workbook for General Chemistry*; *Chemical Demonstrations: A Handbook for Teachers of Chemistry, Volumes 1, 2, 3 and 4*; and *semi-programmed booklets on equilibrium, kinetics, and organic chemistry*. Another of his pioneering efforts is an interactive chemistry exhibit on permanent display since 1983 at the Chicago Museum of Science and Industry.

From 1984 to 1990 Professor Shakhshiri served as Assistant Director of the National Science Foundation for Science and Engineering Education. As the NSF chief education officer he presided over the rebuilding of all the NSF efforts in science and engineering education after they had been essentially eliminated in the early 1980's. His leadership and effectiveness in developing and implementing national programs in science and engineering education became legend and have helped set the annual NSF education budget at its current level of \$900 million. His NSF strategic plan launched the systemic initiatives and most of the other NSF education programs of the last decades.

Among his over 25 awards are the 1977 Kieckhefer Distinguished Teaching Award from UW-Madison, and the 1979 Manufacturing Chemists Association Catalyst Award. He is the youngest recipient of two of the American Chemical Society's most coveted recognitions—the James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry (1983) and the ACS Award in Chemical Education (1986). In 1995 he was cited in the *Year Book of Encyclopaedia Britannica* as the “dean” of lecture demonstrators in America. He is the recipient of five honorary doctoral degrees.

The American Association for the Advancement of Science, which is the world's largest general scientific organization, has just announced that Dr. Shakhshiri will receive the 2003 AAAS award for "Public Understanding of Science and Technology" for his tireless efforts to improve public understanding and appreciation of science and technology and for his outstanding contributions to the “popularization of science.”

Dr. Shakhshiri currently directs the Wisconsin Initiative for Science Literacy (WISL) and its various programs including Science in the City; Science, the Arts, and the Humanities; Women in Science; Science on the Road; and Conversations in Science. For more information about the goals and scope of WISL, please visit our web site at www.scifun.org



Wisconsin Initiative for Science Literacy

The Wisconsin Initiative for Science Literacy sponsors many programs in addition to the **Holiday Lecture**. Among its offerings are **Science Saturdays** and **Science Is Fun** presentations. Science Saturdays are a series of Saturday morning activities for middle school students accompanied by a parent or guardian. At these sessions, each student and parent work together on a set of hands-on experiments dealing with one of a wide range of science topics, such as energy, sound, polymers, light, or ecology. A set of Science Saturdays activities will be offered again during the coming months. In the Science Is Fun presentations, a group of UW students travel to a school or other civic organization and demonstrate a series of educational and entertaining scientific phenomena. If you like the Holiday Lecture, you'll also like the Science Is Fun presentations. If you are interested in participating in either Science Saturdays or Science Is Fun presentations, please check the Science Is Fun Web site at www.scifun.org. There you will find a schedule of upcoming Science Saturdays and how to register for them. You will also find information about how to request a Science Is Fun presentation for your school or group.

Support the Holiday Lecture



For over 30 years, audiences have been entertained and edified by Professor Shakhkashiri's Holiday Lecture. Even people who have not attended a Holiday Lecture have been able to enjoy the show through television broadcasts across the country. Presenting the annual Holiday Lecture requires the combined efforts and support of many collaborators and friends. You can join Professor Shakhkashiri and his friends in supporting the Holiday Lecture by making a gift to the *Shakhkashiri Science Education Fund* at the University of Wisconsin Foundation. You may send your tax-deductible contribution to:

Shakhkashiri Science Education Fund (attn Wendy Richards)
University of Wisconsin Foundation
P.O. Box 8860
Madison, WI 53708-8860



Your gift, no matter the amount, is greatly appreciated.

ORDER YOUR CHRISTMAS LECTURE VIDEO

You can have your very own copy of this year's Christmas Lecture on DVD or videocassette! The 35th Anniversary Presentation, as well as those from previous years, are available from **Educational Innovations**. The cost is \$30.00 for one, \$25.00 each for two or more.

Educational Innovations, Inc.
362 Maine Avenue
Norwalk, CT 06851

Phone: 1-888-912-7474 (toll free)

Fax: 203-229-0740

E-mail: info@teachersource.com

Web site: www.teachersource.com

Also available from **Educational Innovations** are **SCIENCE IS FUN** buttons, shirts, hats, mugs, Chem Time Clocks, periodic-table cups, and the 4-volume set of *Chemical Demonstrations: A Handbook for Teachers of Chemistry*. They also have videos of last year's production by University Theatre of the play *Oxygen*. The full catalog is available on the Web at www.teachersource.com.





Acknowledgements

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