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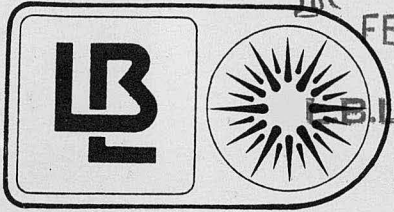
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# Applied Science Division Newsletter

Lawrence Berkeley Laboratory

January 1989

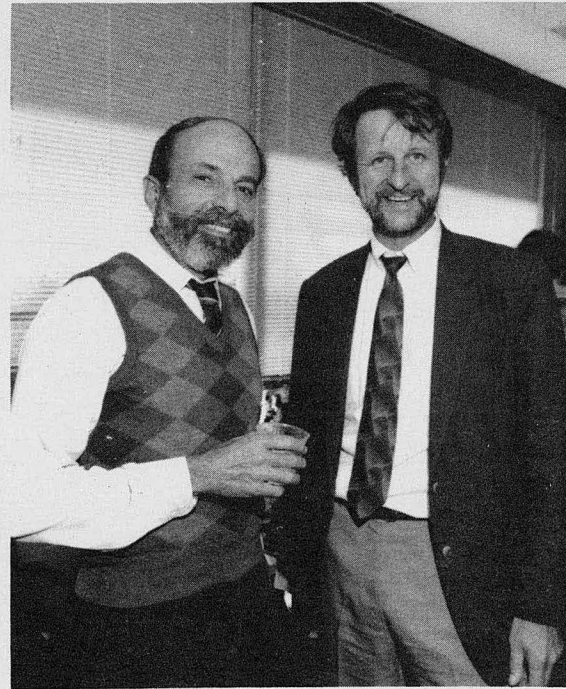
## ASD Honors Sam Berman

Late last year—only a few weeks ago—a good portion of the Applied Science Division turned out to congratulate Sam Berman, Leader of ASD's Lighting Systems Research Group, upon learning of his winning DOE's prestigious Sadi Carnot Award in Energy Conservation. The award—a citation, gold medal, and \$10,000—was presented to Sam at a Nov. 30 ceremony at DOE Headquarters in Washington, DC.

Since first release of the news, well-deserved congratulations have been pouring in. As a gesture of University recognition, UC President David Gardner is scheduled to announce the award at the next meeting of the UC Board of Regents.

Bestowal of this award recognizes Sam's accomplishments in energy and lighting technology. In 1976, Sam initiated the LBL program that removed the technical barriers to producing visually transparent, heat-reflective window films that would drastically reduce energy losses from buildings. As a result of this work—aided by colleagues such as Steve Selkowitz, leader of ASD's Windows and Daylighting Group—a multimillion-dollar U.S. industry now exists to produce these low-emissivity thin films. In 1987, U.S. industry produced more than 100 million square feet of the film for the U.S. buildings market; by 1991, more than half of all double glazing sold will contain these low-emissivity materials.

Working with Rudy Verderber, Deputy Leader of the Lighting Systems Research Group, Sam also developed a high-frequency solid-state electronic ballast for fluorescent lighting. Operating at higher frequencies, these fluorescent lamps save energy and allow flexible control of light levels. More than six industrial firms now produce these ballasts,



LBL Director David Shirley (left) with the guest of honor

opening up a multimillion-dollar market.

Another milestone invention attributed to Sam and his ASD colleague Don Levy is a new fluorescent light source, the surface wave lamp. This electrodeless lamp has been shown to be about 40% more energy-efficient than traditional fluorescent lamps. ASD's Lighting Systems Research Group is developing this technology to the point where it can be manufactured by the U.S. lighting industry.

Vision science has also been advanced by Sam's work. With Don Jewett of UCSF, Sam discovered that the pupil's perception of brightness cannot be predicted by light-meter measurements alone, as the pupil's spectral response differs from the brightness visual efficiency used for light meters and other photometric measuring devices.

The Sadi Carnot Award, instituted by DOE in 1987, is named after the French engineer who hypothesized that even under ideal conditions, a heat engine cannot convert into mechanical energy all the heat energy it receives. Carnot's hypothetical thermodynamic cycle (known today as the Carnot cycle) is used as a standard of comparison for actual thermodynamic cycles.

We congratulate Sam on his accomplishments and on this national recognition!

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## Overflow Crowd for Hollowell Lecture

The Applied Science Division's 1988 Hollowell Lecture, given last November 14, filled every seat in the Building 50 auditorium with people who came to hear **Art Rosenfeld**, Director of ASD's **Center for Building Science**, speak on "Energy Efficiency vs. Global Warming." Art had selected an extremely popular topic: Loudspeakers had to be set up outside the auditorium for those who could not find seats within; a Dutch journalist passing through the Bay Area used his only afternoon in Berkeley to cover the talk; and within several days after the lecture, requests for tapes of the speech began to arrive from as far away as Europe.

The talk was introduced by LBL Director David Shirley, ASD Director Elton Cairns, and UC Berkeley professor John Harte, who briefly surveyed the issue of global warming. Art Rosenfeld then regaled the audience with stunning illustrations of the need—and the possibilities—for saving precious energy resources. The lecture also included a show-and-tell demonstration of several energy-saving technologies developed at LBL that are at various stages of industrial production and public use.

... a Dutch journalist passing through the Bay Area used his only afternoon in Berkeley to cover the talk ...

Art's topic has been gaining widespread attention of late. Activities being planned for the near future include a joint UC/LHS/LBL symposium on global warming and a series of UC Davis workshops on "greenhouse" gas emissions.

The attention garnered by our 1988 Hollowell Lecture served as a fitting tribute to its namesake, the late **Craig Hollowell**, the talented, pioneering scientist who founded ASD's Indoor Air Quality Program.

Your suggestions for next year's lecture (e.g., topics, speakers, or both) are welcome and may be relayed to the 1989 Hollowell Lecture Committee via Lila Schwartz (ext. 4098, 90-3026).

### Publication Note

No ASD Newsletter was published for December, a short work month at the Lab.

## Invited Talks, Foreign Travel

- While visiting research laboratories at Texas A&M University and at Texas Instruments, Inc., **Elton Cairns** gave presentations to the North and South Texas sections of the Electrochemical Society (ECS). Elton also gave invited talks to the Oregon and Pacific Northwest ECS sections.

- **Carl Lampert** served as Subtask Chairman for the International Energy Agency activity on Solar Materials, which met in October at the Swedish National Testing Institute in Borås, Sweden. Carl led a meeting there on glazing materials, particularly those that involve studies on optical switching devices, low-emissivity coatings, and transparent insulation. In recent months, Carl has given other invited lectures on optical switching devices: at the Université de Pierre et Marie Curie, Paris; at the Chalmers University of Technology, Göteborg, Sweden; at the Central Glass Company, Tokyo, Japan; and at the Asahi Glass Company, Yokohama, Japan.

Last summer, Carl traveled to India as a United Nations consultant, advising a new Solar Energy Center on facilities for a new materials science laboratory. The laboratory will study plastics, coatings, and metals.

- At the very end of November, **Tony Nero** returned from leave, the last day of which he gave the introductory lecture at a Swiss national workshop on "Radon und die Strahlenbiologie der Lunge," held at the Paul Scherrer Institut, near Zurich. Tony's talk was entitled, "The Behavior of Radon and the Indoor Environment."

Also during his leave, Tony gave five talks in Italy: at the headquarters and nuclear research laboratory of ENEA (Italy's energy research agency); at Italy's national institute of health; at an atmospheric sciences laboratory of the national research council; and at the University of Chieti's medical school. All this after *LBL* had heard about his Szilard Award, but before *Tony* had!

- **Greg Traynor** was an invited speaker at a Yale University workshop on Advances in Assessing Human Exposures to Airborne Contaminants. Greg's talk at the workshop—sponsored by the National Research Council's Board on Environmental Studies and Toxicology—was titled "Macromodel for Assessing Indoor Concentrations of Combustion-Generated Pollutants."

- **Rudy Verderber** gave an invited lecture, titled "New Lighting Technology and Products," at *Energy Expo '88* in Milwaukee, Wisconsin.



## Congratulations

- The American Physical Society has selected Tony Nero as the recipient of the Society's 1989 Leo Szilard Award for Physics in the Public Interest. This prestigious award includes a trophy, certificate, and an honorarium of \$250.00.

Bestowal of the award recognizes Tony "for his outstanding research on a broad spectrum of problems" in the areas of physics, the environment, public health (including the identification of radon as a major health hazard), indoor air pollution, nuclear proliferation, and reactor safety. The award will be given to Tony in a ceremony to take place at the American Physical Society's May 1989 meeting in Baltimore, Maryland.

- **Joan Daisey** has been appointed Leader of ASD's Indoor Environment Program, effective January 1, 1989. Joan received her Ph.D. in Physical Chemistry from Seton Hall University and has held faculty positions in the Department of Chemistry, Mount St. Mary College; and in the Department of Environmental Medicine, New York University Medical Center.

Joan came to LBL in 1986 as Leader of the Indoor Environment Program's Organic Chemistry Group. Since that time, she has initiated work in such areas as indoor radon interactions with organic gases and identification of genotoxic polar organics in airborne particles. She serves on the Board of the American Association of Aerosol Research; on the Environmental Protection Agency's Science Advisory Board Committee on Indoor Air Quality and Total Human Exposure; on the National Academy of Sciences Committee on Advances in Assessing Human Exposure to Airborne Pollutants; and on the Editorial Advisory Board of *Environmental Science & Technology*, a journal published by the American Chemical Society. We look forward to working with Joan in her new position.

- Assistant Division Director **Alex Quintanilha** has co-edited (with Jaime Miquel of the NASA/Ames Research Center and Hans Weber of Syntex Corporation) the recently released *CRC Handbook of Free Radicals and Antioxidants in Biomedicine*, a comprehensive three-volume review of free-radical biochemistry and the basic/clinical aspects of free-radical scavengers and antioxidants. The volumes, published by CRC Press (Boca Raton, Florida), is designed for students and researchers in biology, physiology, biochemistry, and pathology—as well as for physicians concerned with the prevention and control of degenerative diseases and premature senescence.

## Goodbyes

At the end of December, we bade farewell and good luck to **Nancy Morrison**, who joined the Indoor Environment Program staff in 1981. When January comes to a close, we will reluctantly add **Steve Brown, Rich Prill, and Edie Canfield** to our goodbye list. Much success in your future endeavors, folks!

We issued parting good wishes also to **Dave Grimsrud**, who came to LBL in 1977, joined the Division scientific staff in 1979, and who led ASD's Indoor Environment Program since it was formed in 1986 (when the Division was restructured). Dave has now returned to Minnesota, where he is Director of the Minnesota Building Research Center at the University of Minnesota.

Throughout November and December, Dave graciously endured jocular warnings about the frosty Minnesota environment. As a bon voyage gift from the Division, he was given a color Bay panorama containing a stark black-and-white inset: a photo of a LBL tree laden with snow and icicles! The incongruous photo was taken several years ago on a day when Berkeley had a freak snowstorm.

ASD is pleased to announce that the leadership of the Indoor Environment Program has passed to Joan Daisey (see *Congratulations* column at left).

## ASD People in Print Refereed Publications

- **Chang S-G, Littlejohn D, Liu DK.** Use of ferrous chelates of SH-containing amino acids and peptides for the removal of NO<sub>x</sub> and SO<sub>2</sub> from flue gas. *I & EC Research* 1988;27:2156.

- **Dobson JC, McLarnon FR, Cairns EJ.** The corrosion of some metals in sulfur-polysulfide melts. *Corrosion Science* 1988;28:953.

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**ASD People in Print** (from previous page)

- **Fish RH, Dupon JW.** Regioselective carbon-oxygen bond cleavage reactions of aromatic ethers and esters with potassium metal/18-crown-6/THF as the electron-transfer reagent. *Journal of Organic Chemistry* 1988;53:5230.
- **Fish RH, Kim H-S, Babin JE, Adams RD.** Studies on the bonding of polynuclear heteroaromatic nitrogen ligands to (pentamethylcyclopentadienyl)rhodium dication: The role of nitrogen versus  $\pi$ -complexation on the regioselective hydrogenation of the nitrogen ring. *Organometallics* 1988;7:2250.
- **Hansen ADA, Bodhaine BA, Dutton EG, Schnell RC.** Aerosol black carbon measurements at the South Pole: Initial results, 1986-1987. *Geophysical Research Letters* 1988;15 (11):1193.
- **Liu DK, Chang S-G.** Removal of nitric oxide from flue gas using water-soluble iron(II) dithiocarbamates. *Environmental Science & Technology* 1988;22:1196.
- **Nero AV Jr.** Estimated risk of lung cancer from exposure to radon decay products in U.S. homes: A brief review. *Atmospheric Environment* 1988;22:2205.
- **Spear JD, Russo RE, Silva RJ.** Differential photothermal deflection spectroscopy using a single position sensor. *Applied Spectroscopy* 1988;42:1103.
- **Taha H, Akbari H, Rosenfeld A, Huang J.** Residential cooling loads and the urban heat island—the effects of albedo. *Building & Environment* 1988;23:271.
- **Traynor GW, Apte MG, Carruthers AR, Dillworth JF, Prill RJ, Grimsrud DT, Turk BH.** The effects of infiltration and insulation on the source strengths and indoor air pollution from combustion space heating appliances. *APCA Journal* 1988;38:1011.
- **Vincent JB, Huffman JC, Christou G, Li Q, Nanny MA, Hendrickson DN, Fong RH, Fish RH.** Modeling the dinuclear sites of iron biomolecules: Synthesis and properties of  $\text{Fe}_2\text{O}(\text{OAc})_2\text{Cl}_2(\text{bipy})_2$  and its use as an alkane activation catalyst. *Journal of the American Chemical Society* 1988;110:6898.

• **Winkelmann F.** Advances in building energy simulation in North America. *Energy and Buildings* 1988;10:161.

• **Winnick J, Lessner PM, McLarnon F, Cairns EJ.** Solution processes in photoelectrochemical cells. *Applied Physics Letters* 1988;53:1985.

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## For Reference

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