

## John Prausnitz of Berkeley

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**J**OHAN PRAUSNITZ'S ASEE Chemical Engineering Division Award Lecture is published elsewhere in this issue. In it, John illustrates the utility of molecular thermodynamics for solving a number of key problems in the chemical processing industries. This is a concept which has guided his entire academic career. His goal has been to span the wide gap between the theories of physical chemistry, molecular physics and statistical mechanics, on the one hand, and the real needs of the design engineer, on the other.

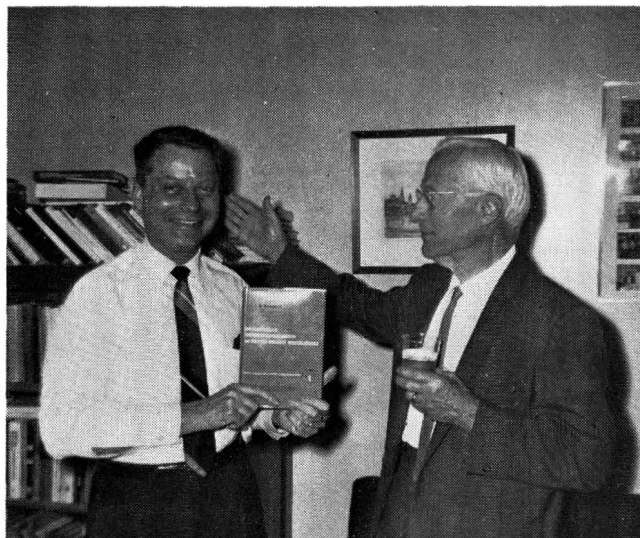
How well John has succeeded in this mission is attested by the considerable impact his work

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has had on the petroleum and chemical industries. Most large companies in those fields have now based their phase-equilibrium prediction methods on his extensive publications and on approaches which he and his co-workers have developed. Two books by John and his colleagues—*Computer Calculations for Multicomponent Vapor-Liquid Equilibria* and *Computer Calculations for High-Pressure Vapor-Liquid Equilibria*, give predictive methods suitable for the computer.



**John and Joel Hildebrand celebrate the publication of "Molecular Thermodynamics of Fluid Phase Equilibria".**

They have been widely used and adapted in industry. John has himself been a regular consultant to a number of industrial companies, including Air Products and Chemicals Corp. (for 16 years), Union Carbide Corporation, and Fluor Corporation.

Table 1 shows the current affiliations of 40 Berkeley graduates who have received the Ph. D. during the period from 1959 to the present while carrying out research with John. The large number of petroleum, chemical and design and construction companies represented on the list is no accident, for many of these graduates are serving as principal sources of expertise on phase-equilibrium prediction and related problems. An estimate says that ten now have such roles, while most of the rest are carrying out functions that draw on their Prausnitz background in other ways. Some of those listed hold high managerial-level positions.

### IMPACT ON EDUCATION

**I**T IS ALSO APPARENT from Table 1 that John has had great impact upon education, with graduates on the faculties of ten universities. Several of these professors have spread their activities into other areas, but all have an element to their work that clearly stems from Berkeley and molecular thermodynamics. Further, numerous visiting professors and post-doctoral fellows, many from Europe, have carried "the mes-

**TABLE 1. Graduates Whose Ph.D. Theses were Supervised by John Prausnitz**

**UNIVERSITY FACULTY**

Robert F. Blanks	Michigan State University
Alan L. Myers	University of Pennsylvania
Charles A. Eckert	University of Illinois
Henry M. Renon	Ecole des Mines, Paris
John P. O'Connell	University of Florida
H. Gordon Harris, Jr.	University of Wyoming
Clayton J. Radke	University of California, Berkeley
David C. Bonner	Texas A&M University
Juan H. Vera	McGill University, Montreal
Enrique R. Bazua	National University of Mexico

**IN INDUSTRY**

Elton J. Cairns	General Motors Corp.
Robert W. Hermsen	United Technology Corp.
Stephen A. Shain	Shell Development Co.
Newell K. Muirbrook	Exxon Research & Engineering Co.
Robert F. Weimer	Air Products & Chemicals Corp.
William J. Lawrence	United Technology Corp.
John F. Heil	Stauffer Chemical Corp.
Frank B. Sprow	Exxon Company, U.S.A.
Ping-Lin Chueh	Shell Development Corp.
Raymond N. Fleck	Union Oil Company
Constantine Tsonopoulos	Exxon Research & Engineering Co.
George T. Preston	Occidental Petroleum Corp.
Edward W. Funk	Exxon Research & Engineering Co.
Peter M. Cukor	Teknekron Corporation
Richard D. Newman	Gulf Oil Chemicals Co.
Cecil Chappelow III	Pfizer Corp.
Denis S. Abrams	Buffalo Salt Works, South Africa
Kwang W. Won	Fluor Corp.
Dennis P. Maloney	Exxon Research & Engineering Co.
Samil Beret	Union Carbide Corporation

**IN GOVERNMENT**

R. Norris Keeler	Chief Scientist, U.S. Navy
Albert E. Sherwood	Lawrence Livermore Laboratory
Sadok E. Hoory	Israel Atomic Energy Commission
William R. Parrish	National Bureau of Standards

**OTHER**

Ralph Anderson	Construction Business
Morton Orentlicher	Biomedical Research, Columbia Medical School
Robert V. Orye	Dental School
Gerrit J. F. Breedveld	Research Associate, UCB
Bryan L. Rogers	Sculptor
Kevin K. Tremper	Medical School

sage" back to their home institutions. *Molecular Thermodynamics of Fluid-phase Equilibria*, the Prausnitz text on molecular thermodynamics and ways of utilizing it, is found in classes at many universities both in the U.S. and abroad.

Many of John's publications are based on research done as independent projects by graduate students whose Ph. D. theses were directed by other faculty members. One example is the well-known gas-solubility correlation, co-authored by Fred Shair, now professor at Cal Tech; another one is the UNIFAC activity coefficient correlation co-authored by Professor Aa. Fredenslund (Denmark) and Russell Jones, now with Union Carbide.

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**... John is probably the one engineering professor anywhere to have produced a Ph.D. graduate (Bryan Rogers) with a joint degree in Chemical Engineering and Art, with ChE principles actually having been used as the basis for fluid kinetic sculptures.**

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John grew up in Forest Hills, N. Y., at that time a still-green, crime-free and pleasant part of New York City with open fields and wooded areas between ever-increasing urbanization. He attended Cornell as an undergraduate, in the Dusty Rhodes heyday. From this experience, he emerged a "pro" at technical writing, with a talent for clarity and standards still forcefully transmitted to students, and to faculty colleagues as well! He uses a red pencil for "ordinary" errors and a green one for those that are particularly offensive to his aesthetic sensibilities. He has a passion for hyphenating compound adjectives and has a running battle with copy editors who keep trying to take the hyphen out. With Robert Reid and the late Tom Sherwood, John recently completed the third edition of "Properties of Gases and Liquids," now in press. Will any hyphens remain in the final text?

After a year for a Master's at Rochester, John entered the Ph. D. program at Princeton. Although he already was intrigued by physical chemistry and by the broad power, universality and intellectual beauty of thermodynamics, he chose to work in the field of chemical reactor design for his Ph. D. research, so as to broaden his outlook and to enable a close association with Richard Wilhelm. John credits Wilhelm as one of the two great technical motivating forces in

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his career; the other one is Joel Hildebrand. After two years as Instructor at Princeton, John came to Berkeley as Assistant Professor in 1955, and has been there ever since.

Married in 1956, Susie and John live in the Berkeley Hills with their children, Stephanie and Mark.

During his reactor-design days at Princeton, John's interest in thermodynamics was rekindled by his almost accidental discovery of the books, "Solubility of Non-Electrolytes" by Hildebrand and Scott and "Mixtures" by Guggenheim. The fascination of those two books, so different in style and yet so similar in purpose, set the goal of his career—to apply physico-chemical principles for the development of efficient procedures for property estimation, vapor-liquid equilibria, solvent selection, etc., as needed for chemical engineering design. John has had a particularly close relationship during his years at Berkeley with Joel Hildebrand, who at age 94 remains active in thermodynamics and interpretation of liquid-state properties.

Responding to a challenge from Ted Szabo, a friend from Union Carbide and a connection made through former student Bob Blanks, John has devoted much of his recent efforts to the problem of understanding the complex phase behavior of polymer-solvent systems, especially at high pressures. This is a universal problem in polymer industries, and provides hopes for design modifications to minimize the considerable energy consumption of manufacturing processes for poly-

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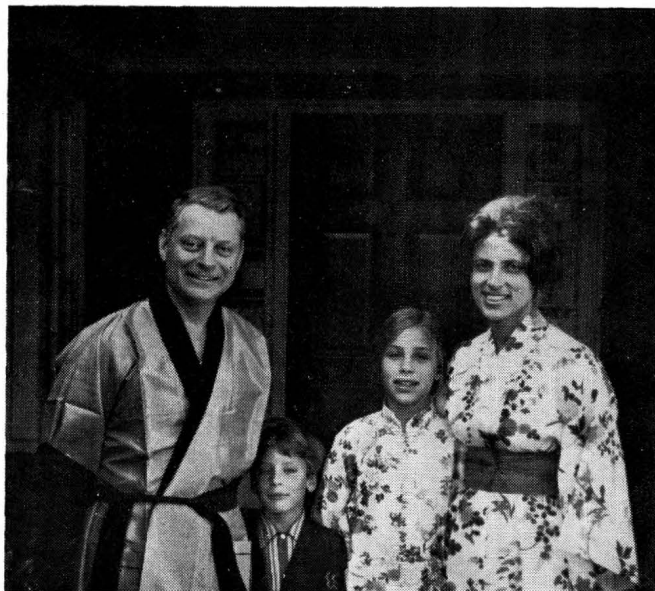
ethylene and other polymers.

John's many accomplishments were fittingly recognized by the Colburn and Walker Awards of AIChE and by election, in 1973, to the National Academy of Sciences.

Stemming from his German background, John is a sausage-loving Germanophile and Swissophile, having spent sabbatical leaves through Guggenheim Fellowships in Zürich (ETH) and Karlsruhe (Inst. für phys. chem.). He has this spring departed for another leave at the Technical University of Berlin, financed through the Alexander von Humboldt fellowship.

#### SATURDAYS WITH THE MET

HE IS A LOVER of classical music, stemming from WQXR in New York, and has maintained strong interests in the history of science (from



"Germanophile" Prausnitz occasionally travels westward as well. Here he is after returning from Japan, along with Susie, Stephanie and Mark.

Henry Guerlac at Cornell) and in philosophy and theology, stemming from encounters with Reinhold Niebuhr, Paul Tillich and Martin Buber at Princeton and in New York. Recently he served on the Ph. D. thesis committee of a student at the Berkeley Theological Union whose dissertation connected the thought of Jung, Kierkegaard and Niels Bohr. It is also no accident that John is probably the one engineering professor anywhere to have produced a Ph. D. graduate (Bryan Rogers) with a joint degree in Chemical Engineering and Art, with Chemical Engineering principles actually having been used as the basis

for fluid-kinetic sculptures.

On Saturdays, John is usually in his office, ostensibly to catch up on his voluminous correspondence. But intimates know the real reason is to hear the Metropolitan Opera broadcasts from New York.

Persistent rumors within the Department at Berkeley have it that John is a tennis player. Unfortunately his regular and obviously accomplished efforts on the courts seem to be carried out *sub rosa*, and the noontime Chem. E. faculty hackers league has yet to do him battle!

John is a lover of the outdoors, but only in moderation. His real preference is for Swiss-style hiking where, after a few miles in the woods, one can find a cozy restaurant. An annual event—most recently on the 100th anniversary of J. Willard Gibbs' great publication—is the grand trek and picnic of his research group and confrères to one of the more bucolic locations near the San Francisco Bay Area.

#### INSPIRATION AND CONSOLATION

**T**HE JIMINY CRICKET of the Berkeley campus, John is one to keep colleagues, and particularly harassed Chairmen, well reminded of the

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more philosophical and idealistic sides of their university endeavors. With great skill, he manages to avoid administrative positions. However, he maintains a close watch on the progress of younger colleagues, offering an interested ear, discussions, probing questions and occasional hints on possible sources of research funds.

In his office he maintains a well-worn couch. It was intended to put students at ease but in fact it is used primarily by fellow faculty members who are in need of inspiration or, more often, consolation.

The Berkeley Chemical Engineering Department is only 30 years old. Much of what it has become is the result of the perceptive and able efforts and accomplishments of John Prausnitz. □

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## ChE news

#### PROFESSOR T. M. REED, UNIVERSITY OF FLORIDA

Dr. Thomas M. "Tim" Reed, III, Professor of Chemical Engineering, University of Florida, died of injuries from a car-bicycle accident, March 5, 1976. He was 54. He was co-author with K. E. Gubbins of the University of Florida of the book, "Applied Statistical Mechanics", McGraw-Hill, 1973 and papers in statistical mechanics and fluorocarbon chemistry. He received his Ph.D. from Pennsylvania State University and came to Florida in 1952. A memorial scholarship has been established in his name by the Chemical Engineering Department of the University of Florida. Contributions should be made payable to the University of Florida Foundation.

#### BARLAGE NAMED CLEMSON DEPARTMENT HEAD

William B. Barlage Jr., a native of Philadelphia, Pa., has been named head of the chemical engineering department at Clemson University.

Barlage, who began his Clemson teaching career in 1958, has directed six research projects totaling more than \$174,000 since 1961.

He is a former member of the advisory committee for chemical engineering technology at Greenville Technical College. In 1956 he was on the staff at North Carolina

State University, where he taught chemical engineering aspects of nuclear engineering to students visiting the United States under the Atoms for Peace program.

Barlage received the bachelor's degree from Lehigh University (1954), master's from the University of Virginia (1956), Ph.D. from North Carolina State University (1960), and completed post-doctoral study at the University of North Carolina at Chapel Hill (1962).

### CALL FOR PAPERS FOR GRADUATE EDUCATION ISSUE

IN A LETTER DATED APRIL 19, 1976 EACH DEPARTMENT CHAIRMAN WAS ASKED TO SUGGEST FACULTY MEMBERS IN HIS DEPARTMENT WHO MIGHT BE INTERESTED IN PREPARING A PAPER FOR THE SPECIAL FALL 1976 ISSUE OF CEE GRADUATE EDUCATION ISSUE. THIS ISSUE CONSISTS MAINLY OF ARTICLES ON GRADUATE COURSES WRITTEN BY PROFESSORS AT VARIOUS UNIVERSITIES, AND OF ADVERTISEMENTS PLACED BY DEPARTMENTS OF CHEMICAL ENGINEERING DESCRIBING THEIR GRADUATE PROGRAMS.

IF YOU WOULD LIKE TO PREPARE A PAPER FOR THIS ISSUE PLEASE WRITE RAY FAHIEN, EDITOR, CEE C/O CHEMICAL ENGINEERING DEPARTMENT, UNIVERSITY OF FLORIDA, GAINESVILLE, FL 32611 OR CALL (904) 392-0861.