

Professor Warren M. Rohsenow On the occasion of his 65th birthday



WARREN Max Rohsenow celebrated his 65th birthday this year. He was born on February 12, 1921 in Chicago, the son of Fred and Selma (Gorss) Rohsenow. His German grandparents had emigrated to the United States in the second half of the 19th century.

He attended Northwestern University where he received his B.S. degree in Mechanical Engineering in 1941. He then entered Yale University where he received his M.Eng. degree in 1943 and D.Eng. degree in 1944. At Yale, as Teaching Assistant in Mechanical

Engineering, he taught laboratory courses in Steam Power and Automotive Engineering. From 1943 to 1944, as Instructor in Mechanical Engineering, he gave classes in Thermodynamics and Heat Power.

From 1944 to 1946 he served as a LTJG in the U.S. Navy and was assigned to the Gas Turbine Division, U.S. Navy Engineering Experiment Station in Annapolis, Maryland. He was also consultant to the National Defense Research Council/Columbia University group on aircraft component design from 1943 to 1945. This early work involved gas turbine

performance, heat transfer measurements, and conduction heat transfer. He currently holds the rank of LCDR USNR (Ret.).

In July 1946 he joined the Massachusetts Institute of Technology as Assistant Professor of Mechanical Engineering, where his appointment marked the beginning of a new era for that department in the field of heat transfer. The previous emphasis under Professor Gordon Wilkes was on thermal insulation. Professor Rohsenow quickly became involved with convection problems, beginning his association with boiling heat transfer in 1947 under sponsorship of the Office of Naval Research. MIT Heat Transfer Laboratory Report No. 1, 'A Study of the Mechanism of Boiling Heat Transfer', co-authored with J. A. Clark, was issued in February 1950. Over 100 reports have documented subsequent studies in the laboratory. The laboratory's work on two-phase flow and heat transfer has been at the forefront of this field, and many of the results have found widespread application in industry. Doctor Rohsenow was named Professor of Mechanical Engineering and Director of the Heat Transfer Laboratory in 1956. He has always emphasized the partnership of students and faculty as the basis of the international reputation of the MIT Heat Transfer Laboratory.

Over the years Professor Rohsenow's courses have placed great stress on fundamentals and practice-oriented problems. The pioneer text by Professor William McAdams was used initially, supplemented by extensive notes and problems. Most of this supplemental material was published in the book *Heat, Mass and Momentum Transfer*, co-authored with H. Y. Choi (Prentice-Hall, 1961). The book is still one of the texts used at MIT for the popular undergraduate heat transfer course.

Professor Rohsenow has authored or co-authored over 100 journal papers as well as hundreds of conference papers and technical reports. He is senior editor of the *Handbook of Heat Transfer* (McGraw-Hill, 1973) and its successor, *Handbook of Heat Transfer Fundamentals* and *Handbook of Heat Transfer Applications* (McGraw-Hill, 1985). He also edited *Developments in Heat Transfer* (MIT Press, 1964), and has contributed chapters to many other handbooks and books on heat transfer.

His most important contributions to heat transfer have been in boiling. The analysis and correlations presented in his two early papers 'A method of correlating heat transfer data for surface boiling of liquids', *Trans. Am. Soc. mech. Engrs* 74 (1952) and 'Heat transfer with boiling under natural and forced convection', *Heat Transfer, A Symposium* (University of Michigan Press, Ann Arbor, 1952) are landmarks in the study of nucleate boiling. Additionally, he has made outstanding contributions to the understanding of dispersed flow film boiling, condensation, metal-to-metal contact resistance and nuclear reactor heat transfer.

Beyond being an outstanding leader in heat transfer

research, Professor Rohsenow is a mechanical engineer with deep insight into all types of engineering problems and matters involving technology development. He has been a consultant to many major corporations and is a co-founder of Dynatech Corporation (1957), currently serving as Chairman of the Board of Directors. He has served on a number of U.S. government committees and has lectured all over the world on various aspects of heat transfer. His long-running summer short course on Modern Developments in Heat Transfer set a high standard for information transfer.

All of Professor Rohsenow's work at MIT has been intimately connected with education. Most of his research was organized to involve graduate students working towards their degrees. He has supervised over 150 graduate theses, including many in Nuclear Engineering and Ocean Engineering. He is known as an outstanding educator capable of developing the individual talents of his students while at the same time instilling in them the self-confidence necessary for professional success. This is reflected in the list of students who completed their doctorates under his direction over the past 30 years: J. A. Clark, E. L. Foster, D. B. Harper, P. Griffith, R. J. Nickerson, V. S. Arpaci, W. E. Stewart, J. C. Chato, M. M. Chen, R. A. Kruger, H. Y. Choi, A. E. Bergles, H. Fenech, R. S. Dougall, S. P. Sukhatme, J. J. Henry, W. F. Laverty, P. J. Marto, N. E. Todreas, R. P. Forslund, D. G. Kroger, B. B. Mikić, I. Shai, L. Katz, M. M. Yovanovich, S. J. Hynek, S. J. Wilcox, C. W. Deane IV, S. Bae, C. R. Bell, R. K. Sakhuja, J. J. Lorenz, D. P. Traviss, D. N. Plummer, O. C. Iloje, E. U. Khan, W. M. Mack, E. N. Ganic, C. Chiu, G. E. Kendall, M. Corradini, G. L. Yoder, A. W. Reed, L. M. Hull, W. S. Hill, P. D. Symolon, R. W. Bjorge, and T. J. Jasinski. Nearly half of these former students have gone on to professorships at leading institutions, not only in the U.S., but around the globe. Others have moved into leadership positions in industry and government.

Professor Rohsenow served as Graduate Registration Officer for 25 years. With skill and compassion, he provided general guidance to several thousand graduate students in mechanical engineering. His kindness is particularly remembered by students from other countries.

Professor Rohsenow has been a very active member of the ASME since 1943. He was Chairman of the Boston Section (1955-56) and Chairman of the Heat Transfer Division (1961-62). He was one of the early advocates of the Assembly for International Heat Transfer Conferences, founded in 1966, which organizes the International Heat Transfer Conference held every four years. It is, therefore, fitting that a special dinner to honor Professor Rohsenow is part of the Eighth International Heat Transfer Conference. Also, he was one of the founders of the International Centre for Heat and Mass Transfer in Yugoslavia, now serving as Vice President of the Centre. He is a

founding member of the Editorial Advisory Board of the *International Journal of Heat and Mass Transfer* and serves on the advisory boards of several other journals. He has been a member of U.S. delegations involved with cooperative programs with other countries.

His outstanding contributions to the field of heat transfer have not gone unnoticed. His major awards are

Pi Tau Sigma Gold Medal Award
(1951)

Yale Engineering Association Award
for
Advancement of Basic and Applied Science
(1952)

Junior Award of ASME
(1952)

Alumni Merit Award, Northwestern University
(1955)

Fellow
American Academy of Arts and Sciences
(1956)

Heat Transfer Division Memorial Award
of ASME
(1967)

Fellow, ASME
(1968)

Max Jakob Memorial Award of AIChE
and ASME
(1970)

Member, National Academy of Engineering
(1975)

Centennial Medallion of ASME (1980)

Although occupied with MIT and many other professional responsibilities, Professor Rohsenow has

been a devoted husband, father and grandfather. He and his wife, Towneley, raised five children: John, Brian, Damaris, Sandra and Anne. The Rohsenows will celebrate their 40th wedding anniversary in September of this year.

Professor Rohsenow displays a truly unique warmth to everyone he meets, but especially to young children. His house is always open for visits from his former graduate students and their families. Perhaps the most striking characteristic about him is that, even with his international stature, he can still be so human as to romp and play with tiny tots in his living room. This is done not because it is expected of him or to impress anyone, but simply because he loves children and their laughter.

Professor Rohsenow is also well-known for his musical talents. He and Towneley have always loved jazz and he has displayed a rare combination of rhythm and creativity on the piano, the drums and, most recently, the vibes. With Towneley's vocal accompaniment, they have delighted many audiences throughout the years.

By his example, he has given us more than technical knowledge; he has taught us about human values and their importance in our technological society, and for this we are deeply indebted.

Professor Rohsenow retired from full-time duties at MIT on July 1, 1985. He continues his research and teaching on a part-time basis as Professor Emeritus. An endowment has been established for a Graduate Fellowship Fund in his name.

On behalf of Professor Rohsenow's former students, his colleagues, and his friends from all over the world, we wish him many happy returns and respectfully dedicate this Festschrift in his honor.

J. P. HARTNETT
A. E. BERGLES
P. J. MARTO
M. M. YOVANOVICH