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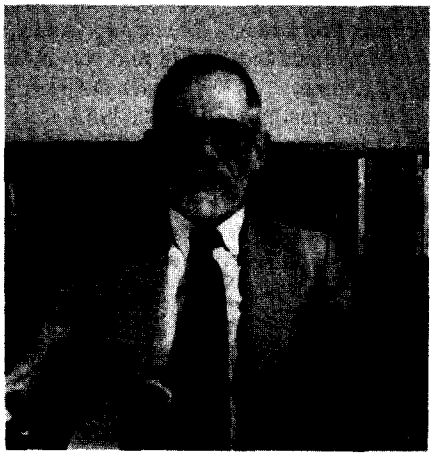
Professor Benjamin Gebhart on his 65th birthday



PROFESSOR Benjamin Gebhart celebrated his 65th birthday earlier this year. On this occasion, it is a pleasure to remember and honor his many achievements in the field of heat transfer.

Professor Gebhart was born in Cincinnati on 2 July 1923 and was raised in southwestern Ohio. After one year as an apprentice tool maker in Detroit, he served as a Marine in World War II, returning to undergraduate work at the University of Michigan in Fall 1945. He obtained a Bachelor's degree in Mechanical Engineering in 1948 and a Master's degree in 1950 from Michigan. He then joined Cornell University, receiving his Ph.D. degree in Mechanical Engineering in 1954. He stayed at Cornell University as a member of the faculty of Mechanical Engineering till 1975, when he joined the State University of New York at Buffalo as Leading Professor and Chairman. He accepted his present position of Samuel Landis Gabel Professor of Mechanical Engineering at the University of Pennsylvania in 1980.

Professor Gebhart has been an outstanding and a very active researcher over the past three decades. He has contributed more than 150 papers on various aspects of heat transfer and the associated fluid flow. He is an internationally recognized authority in areas such as natural convection, mixed convection, optical instrumentation, instability, radiative transport in enclosures, convective flows in the environment, transport in cold water, ice melting in cold water, transition and turbulence, combined heat and mass transfer, transient convection and buoyant jets. His first book *Heat Transfer* was published in 1961, with an extensively revised version appearing in 1971. This book had a major impact on the analysis of convective flows and became an important reference for research in this area since it laid down the physical and fundamental basis for studying thermal convection. More recently, Professor Gebhart has published, with three co-authors, a substantial reference work entitled *Buoyancy-induced Flows and Transport*. This book brings out the essential aspects of these flows along with the extensive work done on various flow configurations.

Throughout his distinguished career, carefully-planned, precision experimental work has been a hallmark of his research. He developed and perfected interferometric techniques for non-intrusive studies of buoyancy-driven plume flows and wall boundary layers. In a series of truly elegant experiments, he and his students obtained interferometric photographs which documented the selective amplification of disturbances in natural convection flows. These experiments unequivocally verified the results of his concurrent theoretical studies of the disturbance amplification characteristics in such flows based on stability theory. More recently, he has turned his experimental energy to buoyancy driven flows in cold water which exhibit complex buoyancy-force reversals. His innovative use of flow visualization and hot film anemometry techniques in laboratory studies has made possible a clearer understanding of the complicated transport mechanisms in flows of this type.

Never being timid about venturing from the laboratory, he also has undertaken an expedition to the north polar ice pack, where he made experimental measurements of the temperature fields in sea water near the ice for subsequent comparison with theoretical predictions. (Avoiding the polar bears was just another experimental problem to overcome.) Professor Gebhart's perspective on experimental work is perhaps best reflected in some advice he once gave a graduate student regarding some unexpected experimental results: "When nature talks, you have to listen." Experimental work is a conversation with nature. One can learn the most from the conversation by asking the right questions in a precise manner and by interpreting the response with an open mind.

A special mention must be made of the tremendous physical insight that Professor Gebhart brings to his research. His abilities to dissect a complex physical process into its basic elements and to physically interpret the sometimes abstract results of transport analyses in a clear and insightful manner have helped advance our understanding of the science of heat transfer. Another distinguishing characteristic of his research is the high standard of quality that he has set for himself and expects from the students who have worked with him over the years. His papers are well known for the care with which the analysis or experiment is carried out and for the fundamental aspects often researched in these studies. The result has been many widely cited papers in journals such as the *Journal of Fluid Mechanics*.

Professor Gebhart has received accolades from his students, past and present, for being an outstanding teacher, who brings his deep physical understanding and insight to his class. He has the rare gift of putting the intricate mechanisms that govern thermal transport into simple terms so that a student can follow the basic features of the process without getting lost in the complexities of the mathematics. He has guided more than 28 students for their Ph.D. thesis. Of these 11 are in academia and most of the others in industrial research positions, carrying on the research and teaching traditions set by their mentor.

The work done by Professor Gebhart has had quite an impact on the research in thermal sciences throughout the world. He has himself been involved with the efforts in many countries such as China, France and Norway. He participated in NORSEX V, a Norwegian Research Expedition into the Arctic Ice Pack in 1978, to carry out transport and thermodynamics measurements. He has held Associated Professor appointments in France and has visited China several times to lecture on heat transfer and to evaluate the program at Nanjing Institute of Technology. He has also given invited lectures at a NATO Advanced Study Institute on Natural Convection in Turkey. He has contributed many review papers on different topics of interest to him over the years in many different journals. In recognition for his contributions to heat transfer, he was named the ASME Freeman Scholar of 1978 and was awarded the prestigious ASME Heat Transfer Division Memorial Award in 1972. He was the NAVSEA Research Chair Professor at the Naval Postgraduate School, Monterey, in 1980–81. He is also on the Editorial Advisory Board of many journals such as *International Journal of Heat and Mass Transfer*, *Numerical Heat Transfer*, *International Communications in Heat and Mass Transfer*, *Heat Transfer—Japanese Research* and *Heat Transfer—Soviet Research*.

An important element in Professor Gebhart's life is his love for nature. Besides carrying on research in many areas related to our environment, he has been developing a large 340 acre nature preserve in upstate New York. He has also worked ceaselessly to support the preservation of the forest and the animal life in this region. He is extremely knowledgeable on natural processes and has carried out detailed experimental investigations on the flow and transport stemming from these, including the flow over corn fields and transport in arctic regions.

On the occasion of his 65th birthday, it is indeed a pleasure for his students, friends and colleagues, along with the editors of this journal, to honor his outstanding and remarkable achievements and to wish him success and happiness for many years to come.

Y. JALURIA
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N. LIOR
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