Joseph Kestin (1913–1993)

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A Tribute to Joseph Kestin (1913–1993)

Joseph Kestin was born in Warsaw, Poland, on September 18, 1913, as the only child of Paul and Leah Kestin. His father, Paul, was a wholesale trader in clothing. After attending elementary school and gymnasium, the young Joseph embarked on a study in mechanical engineering at the Polytechnika in Warsaw, where he received his first academic award of the title of Dipl. Ing. in 1937.

Even in those early days of his association with science and engineering, Joseph Kestin displayed many of the characteristics that remained a part of him throughout his personal and professional life. They are illustrated by two anecdotes.

The first concerns the great dedication he showed to the proper design of experiments, which has been one of the abiding features of the part of his professional life concerned with measurement. Joseph was asked to determine the viscosity of steam using a very large pipeline in which the flow was rather easily shown to be turbulent, so that the measured variables were not particularly sensitive to the fluid viscosity and therefore not favorable to an accurate determination. Depending upon the occasion upon which Joseph related this story, the vehemence of Joseph's reaction to his professor's suggestion seems to have varied from mild inquiry as to the wisdom of the project work to outright condemnation of the futility of the exercise. The guiding principles for the correct design of experiments shown in this example remained with Joseph and were passed on to succeeding generations of students and collaborators with the same passionate conviction shown nearly 60 years ago. Indeed, it is quite safe to assert that the passion as well as the principles have been transmitted through those generations.

The second anecdote relates to a period that Kestin spent in England as part of his training in Warsaw, when he undertook in 1936 an industrial attachment at a Midlands company called Alfred Herbert, which was a machine-tool manufacturer. Following his arrival in England, Joseph took a train to Coventry, where the company was located, some 100 miles north of London. Upon arrival at Coventry station, Joseph showed both an independence of mind and a stubbornness of will by refusing to alight from

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the train despite the entreaties of his fellow passengers, because the station was labeled BOVRIL (a beef drink of the time) and not Coventry. This independence of spirit was one of Joseph's greatest attributes and was much respected by those who had the pleasure to converse and work with him.

Upon completion of his Dipl. Ing., Joseph returned to England to work at King's College, London, in research. He then made a singularly uncharacteristic error of judgment by choosing to return to his native Poland for a vacation during the summer of 1939. Hitler and Stalin then conspired to extend his absence from England, so that instead Joseph found himself as a prisoner of war in Russia. Once, in a prisoner-of-war camp, Joseph had been put in charge of building a bridge. With his professional judgment he knew the instructions of the Apparatchiks to be faulty; hence, he insisted that these instructions be put in writing in a book before he would implement any of them.

Fortunately, upon pressure of the Allies, Stalin acquiesced in the formation of a Polish foreign army. As a consequence, Joseph was released as a prisoner of war in February 1941 and transferred to Persia to be inducted in the Polish Army again. Being assigned to a group of men bound for England, Joseph embarked in the port of Abadan, Persia, on a modern-day Odyssey of 16 months or so on board the *Mauretania*, a ship of Cunard Lines chartered by the Allies. The Mauretania first headed to the Suez Canal. Characteristic of Joseph, the item he remembered about his visit to Egypt is that he was able there to purchase H. Lamb's book *An Elementary Course of Infinitesimal Calculus*. Instead of proceeding to England, the subsequent port of call was South Africa, where the Polish contingent spent 3 months in a camp in Pietermaritzburg awaiting further instructions. After this interruption the voyage on the *Mauretania* continued, heading this time for Rio de Janeiro in Brazil. The ship had a contingent of German prisoners aboard in the hope that it would deter U-boat attacks. Instead, they narrowly escaped a secret plot of the German prisoners to overwhelm the commander of the ship. After a stop in Bermuda, the ship arrived in Newport News in the United States. Joseph traveled overland to New York for a happy reunion with his uncle. He then was stationed in Fort Hamilton waiting for further transport, after which he proceeded to Canada to join a British–Canadian convoy headed for Scotland and, finally, arrived in London in 1942.

Joseph, of course never easily deflected from his chosen course of action, resumed immediately upon his return to London the pursuit of his scientific and engineering interests. He found that King's College had been completely evacuated, whereas Imperial College had not. Thus it was that Joseph joined Professor Sir Owen Saunders in his research at the Mechani-

cal Engineering Department at Imperial College, which at that time housed the Polish Board of Technical Studies. Joseph completed his Ph.D. studies in record time, partly, it is alleged, because his nightly duties in the civil defense provided frequent experiments in jet propulsion and gas dynamics. It was also during this period in London that Joseph met Alicja Drabienko, whose two brothers Joseph had known during his earlier years in Warsaw and whom he married in 1949.

In 1947, the Polish Board of Technical Studies became a part of the Polish University College in London and Joseph became the Head of its Mechanical Engineering Department, where he served until it merged with Battersea Polytechnic, now the University of Surrey.

Joseph took a 1-year sabbatical at Brown University, Providence, Rhode Island, USA, in 1952. That 1-year visit blossomed into an enduring relationship of 40 years, during which time Joseph contributed to that university as well as to science and engineering, generally in a variety of ways and always with the utmost dedication and integrity.

The areas of science to which Joseph contributed during his professional career are legion and are exemplified by the papers collected in this special issue of the *International Journal of Thermophysics.* His contributions to the measurement of the transport properties of gases and liquids, beginning with his pioneering work with G. F. Newell on the theory of oscillating-body viscometers and culminating with the definitive statement of the low-density transport properties of monatonic gases, are among his best-known contributions. It was here, particularly, that his obsession with careful experimental design was most obvious. His meticulous attention to detail and precision, the knowledge of mechanical design and of mathematical rigor were all brought to bear on each element of the experiment. These efforts were, in large measure, responsible for confirming the errors in earlier measurements of the viscosity of gases that had so confused the search for accurate representations of the intermolecular potentials for the monatonic species.

The laboratory in which these measurements were made was a magnet for aspiring scientists in the area of thermodynamics so that it was populated by a series of students and postdoctoral fellows from all over the world who came to learn. All of them left much wiser, and very many have gone on to develop successful careers themselves in the academic community, some of whom have contributed to the present issue. The debt which they owe Joseph is considerable and willingly acknowledged.

Outside of the laboratory during the 1960s and 1970s, Joseph pursued his other interests in thermodynamics and fluid dynamics. Within the former area, he wrote an erudite two-volume course on thermodynamics which is widely appreciated and he continued to make use of his very con-

siderable skill in six languages to translate into English five other seminal works, including those of E. Schmidt on *Thermodynamics* and that of A. Sommerfeld on *Thermodynamics and Statistical Mechanics*, as well as the many editions of the classic text *Boundary-Layer Theory* by A. Schlichting.

Later, when involved in the investigations launched in the United States on the Production of Electricity from Geothermal Energy, he was Director of Brown University's Center for Energy Studies. There he was involved with the initiation of debates that continue today on the relative merits of different forms of the generation of electrical power, which was an interest that stemmed jointly from his long-standing involvement with the International Association for the Properties of Steam (IAPS), of which he was President from 1974 to 1976, and his firm convictions with respect to the correct answer.

Still later, Joseph turned his interests to two-phase flow, a problem of considerable industrial importance, which poses challenging technical difficulties. He was a prime mover in the organization of workshops on the topic and rapidly became widely respected in the field.

In view of the outstanding volume and quality of his research, it is not surprising to discover that Joseph was the recipient of a very large number of awards. Most notable among the latter are membership in the U.S. National Academy of Engineering, foreign membership in the Polish Academy of Sciences, the James Harry Potter Gold Medal for Thermodynamics, and two centennial medallions from ASME. He also received prizes from the U.K. Institution of Mechanical Engineers and a Humboldt Prize from the German government. He was elected Fellow of Imperial College of Science, Technology, and Medicine and Honorary Fellow of IAPS. At the time of this writing we received word that Joseph Kestin was scheduled to receive the Yeram S. Touloukian medal of the Heat Transfer Division of the ASME at the 12th Symposium on Thermophysical Properties in June 1994.

It is equally to be understood that he was a much sought-after lecturer all over the world for plenary addresses as well as seminars. This fact owed as much to the meticulous preparation of such talks that Joseph always devoted to them and to his perfect style of delivery as it did to the sheer technical content. The fact that the lectures could be given in one of six languages is nothing short of remarkable.

Joseph was interested in creativity in teaching and learning and came to adopt the view of Arthur Koestler ascribing creativity to the bisociation of two universes of discourse. In an article in Volume 58 of the *American Scientist* (p. 250), he discussed his thoughts on this subject using jokes and a high-school experience as examples.

In the years after attaining formal retirement age at Brown University,

Joseph was scarcely less active than before and perhaps even more mobile. He was a Visiting Professor at the University of Paris, the Université Claude Bernard (Lyon), Imperial College (London), University of Maryland, and University of Delaware and a Fellow of the Institute for Advanced Study in Berlin. He was able in this later part of his career to pursue those things that interested him without the same pressure to satisfy external forces that were omnipresent earlier.

Joseph was also much involved with his profession. He served as Editor of the *Journal of Applied Mechanics* from 1956 to 1971 and was a member of the editorial boards of more than five journals. He was a member of the Executive Committee of the Division of Applied Mechanics of ASME, served on numerous panels and committees including those of the National Research Council, and served as Chairman of the Subcommittee on Transport Properties of IUPAC Commission I.2 from its inception in 1981 until 1991.

Joseph enjoyed his illustrious and busy career. His enthusiasm for his work was matched by his enthusiasm for people of the highest caliber in just the same way as his demand for exactitude in science was matched by a similar demand on himself and others in writing, debate, or even conversation. To some, this may have appeared as pedantry, but it truly represented a dedication to precision and accuracy (which must be carefully distinguished) that should be a lesson to us all in science. Indeed, there can be few connected with any of the areas of science with which Joseph was associated who have not been made aware of this most characteristic feature of Joseph's personality and work, and few who have not, occasionally grudgingly, admired it.

Those authors who have willingly contributed to this Festschrift are among those who collaborated most closely with Joseph and wish to acknowledge his work through the medium of their own. That the fields covered in this issue are diverse is beyond doubt, but the common thread of all should be that the qualities that Joseph promulgated are made clear.

Before closing we feel compelled to make one additional remark. While the accomplishments of Joseph are clearly visible for all to see, philosophers of all ages have emphasized that the ultimate value of the human person is not based on visibility. In the contemplative tradition it is firmly believed that a virtuous person is a blessing for all of mankind. For instance, Teresa de Ahumada y Cepeda, a 16th century Spanish woman of Jewish descent, has extolled the beauty of the virtues of humility, detachment, and love. One person in whom these virtues have come alive is Alicja Kestin, the faithful spouse of Joseph.

The intention of this Festschrift was to honor Joseph Kestin on the occasion of his 80th birthday. But after the Festschrift, including this

preface, had been prepared, we were informed that Joseph passed away on March 16, 1993. He kept an active interest in science until a week before his death. We are consoled that Joseph rejoiced in the knowledge that this Festschrift would appear. And we personally have renewed our intention to continue his legacy.

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