transfer seminars, under the United States-Japan Cooperative Science Program. The first gathering was held in Tokyo in October 1980. The proceedings of the joint seminar were published in 1982 by the Hemisphere Publishing Corporation under the title *Heat Transfer in Energy Problems.* The book title reflects the major theme of the meeting. Five years have passed since then, with a shift in research efforts. During this period, the world has experienced a decline in oil prices and a glut in oil supply. Although efforts on energy savings remain unabated in Japan, which imports over 90 percent of its energy needs, the interest in energy research in the United States has obviously diminished. Instead, high technology has attracted the attentions of the public and government in both the U.S. and Japan during the last several years. In order to keep up with the times, the second binational heat transfer seminar was held, with the emphasis on heat transfer in high technology and power engineering, in San Diego on September 17–20, 1985. This book is the proceedings of the second meeting.

The first chapter introduces current heat transfer research in Japan, which represents a concerted effort of academia, government, and industry. Emphasis is directed toward energy and high technology fields.

The text is divided into four parts: I, Heat Transfer in High Technolgy; II, High Heat-Flux Technology; III, High-Performance Heat Exchange Devices; IV, Radiative Heat Transfer and Solar Energy Utilization.

In Part I, the role of thermocapillary flow in heat transfer is studied in view of its importance in space processing, such as superpure crystal growth under reduced-gravity environment. Techniques of heat transfer and flow control in space machinery in Japan during the past five years are surveyed. These include thermal control in satellites, electric propulsion, and materials processing in space; flow behavior under microgravity; and space cryogenics. The application of heat pipes in cooling is extended to devices in space and terrestrial uses. Heat transfer related to materials processing, a subject of current interest, is represented by three articles dealing with heat bonding processes, molecular clustering, and the growth of large-single crystals. Another subject of current importance is heat transfer in electronic equipment. Amazing enough, the articles on electronic equipment cooling are contributed by three giants in the electron industry: IBM, TI, and NTT.

Part II deals with high heat-flux technology, typically boiling and condensation. Recent advances in boiling heat transfer are covered in the articles on critical heat flux, post dryout heat transfer prediction, boiling on high temperature materials, high heat-flux flows boiling, and boiling enhancement techniques. A review on the status of condensation heat transfer is also presented. The applications of high flux heat transfer cover nuclear power systems, very high temperature gas-cooled reactor (VHTR), aeropropulsion systems, and hazardous waste incineration.

High performance heat exchange devices are discussed in Part III. Naturally, high performance can be achieved by applying various enhancement techniques. Recent development in heat transfer enhancement is summarized, specifically for high-temperature heat exchangers. Details are available for the enhancement by mist flow, turbulence promoters, and electric fields. Two important problems in heat exchanger applications, namely fouling and flow-induced vibrations, are reviewed comprehensively. Also presented are the articles on automotive heat exchangers, heat exchanger simulation, optimum design of compact heat exchangers, and turbulent heat transfer.

The fourth part of the text is concerned with radiative heat transfer and solar energy utilization, which are essentially high-temperature technology. In radiation heat transfer enthalpy-radiation energy conversion, plasma-surface interation, and application of the Monte Carlo method are presented. Some recent developments have been made in high temperature solar thermal energy systems for possible industrial applications. Recent work on numerical simulation of turbulent natural convection in solar application is summarized. The last article deals with natural convection on solar energy utilization as well as high technology applications.

Wen-Jei Yang
Yasuo Mori
(from Editor's Preface)

Heat Transfer and Fluid Flow in Rotating Machinery, ed., W.-J. Yang, Hemisphere Publishing Corp., New York, 1987.

This book consists of six parts, with 43 chapters. Blade cooling, in Part 1, is one subject that interests thermal science researchers and includes both external surface cooling and internal cooling. The state-of-the-art review on turbine blade cooling is thorough and impressive. Major efforts are also directed toward various aspects of film cooling and heat transfer enhancement in internal convection. Part 2 covers the experimental studies of transport phenomena by flow visualization techniques and flow measurements. Flow visualization results are presented for secondary flow in curved, heated, and rotating channels, as well as for internal flow in rotating machinery. Measurement methods unique to flow in rotating devices are also introduced. Rotating tubes, channels, and heat pipes are the subjects of Part 3, which treats phase changes, turbulence, and hysteresis in flow transition. Flow and heat transfer from rotating surfaces and enclosures are grouped together in Part 4. General topics in Part 5 concern items of current interest, such as electronic generators, impinging jets, and numerical methods. Part 6 discusses the ultimate rotating devices of industrial applications, including steam and gas turbines, compressors, pumps, and wind turbines. The subjects are widespread, including lifting lines, water film behavior, thermal stress, the Wilson point, wave mechanics, stall, and work performance.

Wen-Jei Yang
(from Editor's Preface)

High Temperature Equipment, ed., A. E. Sheindlin, Hemisphere Publishing Corp., New York, 1986.

At the present time the application of high temperature heat exchangers has been spreading to energetics, metallurgy, and different areas of chemical technologies. That is why it was chosen as the subject of the Advanced Course, organized by the International Centre for Heat and Mass Transfer, in Dubrovnik, Yogoslavia.

At the meeting 12 lectures were submitted which covered the whole spectrum of the problems regarding design, manufacture, and operation of heat exchangers of this class. These lectures taken as a set, serve as an excellent introduction into the problem of high temperature heat exchangers for new users and reseachers. At the same time they open a wide panorama of the problems encountered by researchers and point out ways to further technical progress in this field.

A. E. Sheindlin
(form Editor's Preface)