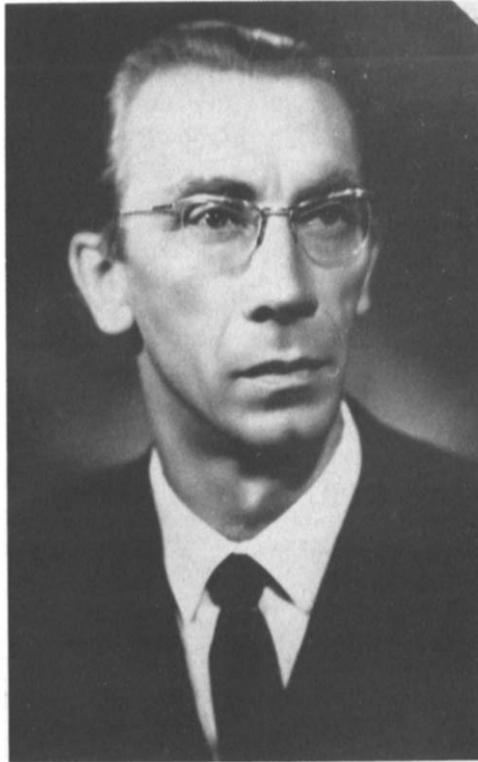


Yurii Ananiyevich Mikhailov on his 60th birthday



PROFESSOR Yu. A. Mikhailov, U.S.S.R. Honorary Editorial Advisory Board member of the *International Journal of Heat and Mass Transfer*, Full Member of the Latvian Academy of Sciences, Honoured Worker of Science and Technology of the Latvian SSR, distinguished Soviet scientist in the areas of thermal physics, theoretical thermal engineering and magnetic hydrodynamics, author of well-known books and monographs on the theory of interrelated heat and mass transfer in electrically conducting, polarizable, heterogeneous and other media in electromagnetic fields, celebrated his 60th birthday in 1987. His interests are wide ranging and include the following :

creation of the physical and technical foundations for the method of using raw peat for direct power production ;

development of theoretical principles and experimental techniques of high-rate drying by means of superheated steam and pressure release ;

development of the general theory of heat and mass transfer in dispersed media ;

study of the problems of liquid-liquid extraction ;

investigation of heat and energy transfer in the pres-

ence of phase and chemical conversions in multiphase flows of a low-temperature plasma ;

investigation of heat and mass transfer in a magnetic field (in two-phase and multicomponent electrically conducting systems, magnetically polarizable media and magnetic liquids included) ;

development of the non-linear analytical theory of interrelated phenomena of transfer.

Yu. A. Mikhailov was born in Moscow and received his higher education in Riga. While a student at the Physico-Mathematical Department of the Latvian State University, he showed a great aptitude towards scientific investigations. It is during this period that his work *Specific Features of the Passage of Particles through a Potential Barrier in the Case of Pseudoscalar Interaction* was written. In 1951 the working activity of a young physicist-theorist began at the Institute of Energetics and Electrical Engineering of the Latvian Academy of Sciences (now the Physical and Power Engineering Institute), where theoretical and experimental investigations were carried out into drying and physico-engineering justification of a fundamentally new method of using raw peat for direct

power production. The method consisted essentially of the use of steam, produced by moisture vaporization from peat and process sustainment by the heat of burning of the dehydrated peat. He took part in the design and then in the construction and testing of a pilot plant. The work on the physical aspects of this problem led Yu. A. Mikhailov to the necessity of undertaking a more thorough study of the processes of interrelated heat and mass transfer.

From 1953 to 1956 Yu. A. Mikhailov was a post-graduate student, and in 1957 he defended his candidate thesis on the subject of "Analytical Investigations of Heat and Mass Transfer in Convective Drying". During his work on the thesis, he met A. V. Luikov, a Full Member of the Byelorussian Academy of Sciences. The acquaintance developed into a long standing creative friendship which became the source of many great scientific initiatives and achievements. Based on the methods of irreversible thermodynamics, generalization was made of a wide range of investigations into the processes of interrelated heat and mass transfer, the general phenomenological theory was developed for molar-molecular energy and substance transfer in dispersed media, capillary-porous bodies, multicomponent heterogeneous systems, solutions, and gaseous mixtures. In contrast to other analogous investigations of that time, the use of the methods of irreversible thermodynamics was not confined exclusively to the derivation of mathematical expressions for fluxes and corresponding thermodynamic forces. A logically closed analytical theory of interrelated transfer processes was created: from the substantiation of the initial system of equations to the analysis of the process and the resulting effects under different conditions of heat and mass transfer interaction with the surrounding medium. For this purpose, it was necessary to refine the techniques of the analysis. Thus, for the first time it became possible to logically consistently show, on the examples of specific media, the force of the method and to bring the analysis to final relations and practical conclusions. Because of this, one of the originators of irreversible thermodynamics, Prof. S. R. de Groot stated at the 1st All-Union Heat and Mass Transfer Conference in 1961 that the analytical theory of irreversible thermodynamics and its practical applications had been first developed in the Soviet Union and detailed in the book by A. V. Luikov and Yu. A. Mikhailov. The results of investigations were generalized in his monographs written together with A. V. Luikov: *Theory of Energy and Substance Transfer* (Minsk, 1959) and *Theory of Heat and Mass Transfer* (Moscow, 1963). Soon these books became world renowned and were translated and published in the U.S.A., U.K., China, and Israel. Concurrently with this, Yu. A. Mikhailov continued and supervised the works which were begun earlier. In 1964 he defended his doctoral thesis on "The Kinetics and Dynamics of Highly Intensive Methods of Drying". The complexity of the problems studied were culminated by

the publication of his monograph *Drying by a Superheated Steam* (Moscow, 1967) where he generalized investigations into drying by a pressurized superheated steam and depressurization drying, providing the background for the method of direct use of moist peat for power production.

New ideas formed a basis for many modern Soviet physico-technological investigations in the field of drying technology and thermal treatment of materials. The works on the theory of heat and mass transfer also made a certain impact on the development of theoretical investigations in Czechoslovakia, Hungary, Poland, Romania and also in Japan and India. The creation of the analytical theory of heat and mass transfer gave the stimulus for the development of a number of new trends: the search for new integral transformations, for the methods of solving inverse heat and mass transfer problems, approximate methods for solving the systems of transport equations, methods for modelling heat and mass transfer phenomena, and methods for solving non-linear problems.

In subsequent years Yu. A. Mikhailov extended the general theory of heat and mass transfer to a number of new processes, in particular chemical engineering, and developed the problems of non-linear analytical theory of heat and mass transfer. Together with N. V. Korolov he published the book *Mass Transfer Processes of Chemical Engineering. Liquid Sorption* (Riga, 1976) and with Yu. T. Glazunov the book *Variational Methods in the Theory of Nonlinear Heat and Mass Transfer* (Riga, 1985).

Beginning in 1961, Yu. A. Mikhailov carried out concurrent investigations into the phenomena of transport and of heat/mass transfer in the presence of magnetic and electric fields. These investigations connected his works with the current problems of magnetic hydrodynamics. Attention was paid not only to condensed electrically conducting media, but also to multicomponent and multiphase systems: emulsions, suspensions, magnetic liquids, and ionized gases. As a result of complex investigations made by Yu. A. Mikhailov and his colleagues, there originated new trends of magnetic hydrodynamics: thermal physics of conducting and magnetizable media (including magnetic fluids), thermal physics of high-temperature multiphase media in the presence of phase and chemical conversions. A part of these investigations is represented in monographs written by Yu. A. Mikhailov together with his pupils: *Heat and Mass Transfer in an Electric Magnetic Field* (Riga, 1967), *Heat and Mass Transfer in a Magnetic Field* (Riga, 1980), or edited by him: *Transport of Heat and Charge on the Surface of Metal in Chemically Active Flows* (Riga, 1980).

Yu. A. Mikhailov is an active organizer of science. He was advisor for 19 completed Candidate and Doctoral theses. From 1967 Yu. A. Mikhailov became Director of the Institute of Physics of the Latvian Academy of Sciences and in 1968 was elected a Full

Member of the Latvian Academy of Sciences. From 1970 to 1983 he was Academician-Secretary of the Department of Physical and Technical Sciences of the Latvian Academy of Sciences. From 1970 Yu. A. Mikhailov has been a member of the Presidium of this academy. He is also head of the Department of Thermal Physics and head of a laboratory at the Institute of Physics. From 1968 Yu. A. Mikhailov has been the Editor-in-Chief of the All-Union Journal *Magnetic Hydrodynamics* which is translated and published in the U.S.A., and also has been a member of a number of Soviet scientific publications, and a member of a number of All-Union *ad hoc* and scientific councils.

For the series of works on the theoretical foundations of heat and mass transfer in dispersed media

Yu. A. Mikhailov was awarded, in 1976, the State Prize of the Latvian SSR and in 1971 was awarded the Fridrich Tsander Prize of the Latvian Academy of Sciences for the development of the theory of heat and mass transfer in MHD processes.

The public activities of Yu. A. Mikhailov are very extensive. For many years he was on the Soviet and Republican Committees of Peace Supporters. He often writes for papers and journals on the history and philosophy of science, its moral, ethical and public aspects. Yu. A. Mikhailov is full of creative ideas and organizing abilities. We wish him all the best and further successes in his work.

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