Professor Sándor Endrényi on his 90th birthday



IN SEPTEMBER 1986, Professor S. Endrényi, well known for his contributions in the field of heat and mass transfer, celebrated his 90th birthday. It gives us great pleasure to be able to report that this elder statesman among the practitioners in the field is still fully active, both in teaching and in research. In the following short note, only a brief review can be given of his illustrious career and achievements.

Sándor Endrényi was born in 1896 in Budapest, Hungary, where he commenced his studies at the Technical University in 1914, the year World War I broke out. He obtained the diploma of a mechanical engineer in 1918. In those early years he was already drawn to a scientific career, and recognizing his abilities, several of his professors invited him to become their assistant. He had been working for Professors Banki (the inventor of a well-known type of water turbine and co-inventor of the carburetor), Schimanek, Rethy and Wittmann; Professor Banki had also employed him in his consulting office. In 1919, he helped L. Szilard (later of atomic bomb fame) to organize a series of historic lectures with Theodore von Karman as the principal lecturer; other participants included I. Brody and K. Polanyi.

In the aftermath of World War I, and indeed until

the end of World War II, circumstances did not allow him to engage in scientific work. Only after 1945 could he gradually return to his primary interests, research and teaching. Over the years, he made many contributions to the development in Hungary of technologies based on heat transfer processes, and also to the state-of-the-art internationally. He was the first in Hungary to introduce a curriculum on climatic control, and to organize a research committee and a graduate course on drying processes. From 1948 until this day he has been regularly lecturing at the Technical University of Budapest. In 1962, the Hungarian Academy of Sciences awarded him the degree of Candidate of Technical Sciences, and in 1976, that of Doctor of Technical Sciences.

Outside Hungary, he has been active, as a contributor or an organizer, at many international events. He was a member of the Advisory Committee of the All-Union Conferences on Heat and Mass Transfer in 1961, 1964, 1968 and 1972 (Minsk, U.S.S.R.) and a Division Chairman of the Fourth International Heat Transfer Conference in Paris in 1970. He is a member and the Hungarian Representative of the International Centre for Heat and Mass Transfer, and is on the editorial boards of

several journals of international repute. He was invited to present seminars at universities in many countries, including the United States (Princeton University, State University of New York, University of Minnesota, etc.).

Professor Endrényi's main area of interest, within the area of heat and mass transfer, is the study of drying processes. His outstanding results in psychometry, and in the drying of sorptive and porous materials (documented in the bibliography below) are well known by researchers in the field. But his interests and activities go far beyond the confines of his specialties-he is equally at home in such areas as thermodynamics, hydrodynamics, chemical processes, process control, physics of colloids, or the protection of the environment. He has been involved in the design of a whole range of equipment and systems; examples include thermal plants for industrial consumers, heating and ventilation systems, electric power distribution networks, equipment for paper and textile manufacture, industrial energy systems and industrial processes.

Today, at the age of 90, he is still fully active in research, consulting, teaching and committee work. In addition, he is always ready to share his knowledge and experience and advise younger (and that includes all) colleagues. He will discuss, with equal enthusiasm, technical topics, music, literature, or international affairs. On behalf of his students and former students, co-workers and many admirers, we wish him the best of health and many more years of active life, rich in results, friendship and rewarding experiences.

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BIBLIOGRAPHY OF SÁNDOR ENDRÉNYI

- Heat Engines (lecture notes in Hungarian), Technical Books and Notes Publ., pp. 336, Budapest (1st edn 1918, 2nd edn 1920).
- Industrial Heat Technology (lecture notes in Hungarian), University Lectures and Notes Publ., pp. 143, Budapest (1st edn 1950, 2nd edn 1951).
- Drying (monograph in Hungarian), Ministry of Mining and Energy Publ., Budapest (1952).
- New directions in the theory of drying (in Hungarian), Proc. 1st Hungarian Drying Conference, Budapest, Hungary (1952).
- Approximating methods for the determination of drying output of paper machines (in Hungarian), Papir- es Nyomdatech. (Paper Print. Technol.) 5, 196-201 (1953).
- Theoretical problems of drying: energy and heat recovery (in Hungarian), Magy. EnergGazd. (Hung. Econ. Energy) 7, 413-416 (1954).
- Economy of energy and its application to drying (in Hungarian), Mérnöktovábbképző Intézet (Postgraduate Education in Engineering), pp. 39, Budapest (1954).
- Scientific research, and directions of the light industry (in Hungarian), Commun. Hung. Acad. Sci., Div. Engng Sci. 14, 1-3 (1954).
- On the selection of a boiler system during design (in Hungarian), Gépészeti Értesitö (Commun. mech. Engng) 10, 3-13 (1954).

- Heat transfer during surface drying (in Hungarian), Papir- es Nyomdatech. (Paper Print. Technol.) 7, 9-16 (1955).
- Temperature curves on the drying parts of paper machines (in Hungarian), Papir- es Nyomdatech. (Paper Print. Technol.) 7, 350-354 (1955).
- Current state of the theory of drying (in Hungarian), Magy. EnergGazd. (Hung. Econ. Energy) 8, 52-58, 135-143 (1955).
- The technology of drying with particular attention to surface drying (in Hungarian), Mérnöktovábbképzö Intézet (Postgraduate Education in Engineering), pp. 52, Budapest (1955).
- Charactéristiques de séchage des différentes pâtes. Application à la fabrication du papier (with G. Vámos), A.T.I.P. Bull. No. 4, 113-124 (1956).
- Drying output of paper machines (in Hungarian), Papiripar (Paper Ind.) 2, 164-168 (1958).
- Investigation of the drying capacity of paper machines (in Hungarian), Energia Atomtech. (Energy nucl. Technol.) 11, 517–522 (1958).
- Temperature characteristics of convective drying (in Hungarian), Paper Research Institute, pp. 26, Budapest (1959).
- Basic thermodynamical and physico-chemical research in the paper industry (with J. Bindis and Gy. Homonnay, in Hungarian), Paper Research Institute, pp. 33, Budapest (1960).
- Drying of pulpy substances (in Hungarian), Élelm. Ipar (Food Ind.) 14, 274–275 (1960).
- Coefficients of evaporation (in Hungarian), Paper Research Institute, pp. 33, Budapest (1960).
- Theoretical and practical problems of the pulp and paper industry (in Hungarian), Papiripar (Paper Ind.) 4, 1-4 (1960).
- Principles of the economic design of hoods of paper machines (in Hungarian), Technical Institute of the Paper and Printing Industry, pp. 35, Budapest (1960).
- Heat and mass transfer conference in Minsk (in Hungarian), Papiripar (Paper Ind.) 11, 235–236 (1961).
- Heat and mass transfer in the hygroscopic stage of drying (in Russian), Teplo Massoper. 4, 7-14 (1963).
- Richtlinien für die wirtschaftliche Auswahl der Haubensysteme von Papiermachinen, Zellstoff Pap., Berl. 7, 260-264 (1960).
- The State of Drying in Hungary (monograph in Hungarian), Scientific Institute for the Economy of Energy, Vol. 1, pp. 182; Vol. 2, pp. 93, Budapest (1962).
- Methoden zur Erhöhung der Trockenleistung von Papiermaschinen, Proc. 4th Techn. Sci. Conf., Technischer Verein der Papier- und Polygrafischen Industrie, Budapest, pp. 1-11 (1962).
- Studies about the Fundamental Problems of Mass and Energy Transfer (with I. Fenyes, monograph in Hungarian), Scientific Institute for the Economy of Energy, pp. 152, Budapest (1963).
- The State of Drying in Four Industrial Areas (report in Hungarian), Scientific Institute for the Economy of Energy, pp. 109, Budapest (1963).
- Heat and mass transfer during the drying process of hygroscopic materials, Acta tech. Acad. scient. hung. 45, 225-241 (1964).
- R. Mollier und das i-x Diagramm, Int. J. Heat Mass Transfer 7, 15-22 (1964).
- Drying Technology in the Paper Industry (monograph in Hungarian), Documentation Centre of the National Technical Library, pp. 187, Budapest (1965).
- Fundamental Laws of Classical and Irreversible Thermodynamics (monograph in Hungarian), Scientific Institute for the Economy of Energy, pp. 53, Budapest (1965).
- Recent investigations on the "hygroscopic field" of porous materials (in Russian), *Teplo Massoper.* 5, 338-352 (1966). Wärme- und Stoffaustausch bei Konvektions und

Kontakttrocknung, Chemie-Ing. Tech. 38, 892-893 (1966).

- Some problems of heat and mass transfer processes of sorptive materials, Proc. Semi-Int. Symp., Tokyo, Japan, Vol. 1, pp. 269–275 (1967).
- The possibilities of drying using geothermal water: a technical and economical investigation (report in Hungarian), Committee for National Technical Development, Budapest (1968).
- A convective non-adiabatic drying process (in Russian), Teplo Massoper. 6, 232-246 (1968).
- The Theory of Spray-Drying and the New Direction of Dimensioning Equipments (monograph in Hungarian), Scientific Institute for the Economy of Energy, pp. 109, Budapest (1969).
- Temperature course of porous-sorptive materials in the unsteady stage of drying, *Proc. CHISA*'69, Marianske-Lazne, Czechoslovakia, E410-428 (1969).
- Review of the Hungarian economy of energy 20 years ago (in Hungarian), Bull. Inst. Econ. Energy No. 2 (1969).
- Desorption processes in molecular sieves, Inzh.-fiz. Zh. 19, 476-481 (1970).
- The steam and heat technology of drying machines (in Hungarian), MTA-Müsz. Tudomány (Hung. Acad. Sci., Engng Sci.) 43, 457–472 (1970).
- The possibility of instruments based on fiber optics (report in Hungarian), Committee for National Technical Development, Budapest (1970).
- Simultaneous convection and diffusion in the drying process of porous materials of high sorptivity, *Proc. 2nd Conf. Appl. Phys. Chem.*, Budapest, Hungary, pp. 461-466 (1971).
- Desorption processes of porous-sorptive substances, Proc. 1st National Heat Mass Transfer Conf., Madras, India, Vol. 2, pp. 59-64 (1971).
- Desorption processes of porous-sorptive substances in the dispersed phase, Proc. 3rd Conf. Drying, Budapest, Hungary, No. A24, pp. 1-9 (1971).
- Interpretation of the Lewis law for a binary gas mixture along the surface of porous materials (in Hungarian), Proc. Anniv. Conf. Res. Inst. Techn. Chem. Hung. Acad. Sci., Veszprém, Hungary, pp. 213-217 (1972).
- Anleitung zur Erweiterung der Anwendung psychrometrischer Methoden auf Verdunstungsvorgänge besonderer Art, Verfahrenstechnik 6, 63–67 (1972).
- Die Verdunstung einer Feststoff-Flüssigkeitsbindung sorptiver Phase, Proc. 4th All-Union Heat Mass Transfer Conf., Minsk, U.S.S.R. (1972).
- Desorption of porous, sorptive materials of dispersed phase (in Hungarian), Energia Atomtech. (Energy nucl. Technol.)

26, 61-62 (1973).

- Mathematical modelling of the application of psychrometric methods to surface phenomena of porous bodies at simultaneous heat and mass transfer, *Proc. 5th Int. Heat Transfer Conf.*, Tokyo, Japan, pp. 108-112 (1974).
- Mathematical model for multicomponent spray drying (with B. Paláncz), Proc. CHISA'75, Prague, Czechoslovakia (1975).
- Mathematical model for the combustion of coal in fluid bed (with B. Paláncz). In Future Energy Production Systems, Heat and Mass Transfer Processes, Vol. 2, pp. 579–587. Academic Press, New York (1976).
- Equilibrium problems of steady evaporation of porous surfaces (with B. Paláncz), Proc. 5th All-Union Heat Transfer Conf., Minsk, U.S.S.R. (1976).
- Calculation of transport coefficients during the falling rate of drying (with B. Szentiványi), Proc. 5th All-Union Heat Transfer Conf., Minsk, U.S.S.R. (1976).
- Injection effect in multicomponent boundary layer (with B. Paláncz), Int. J. Heat Mass Transfer 18, 1117-1120 (1976).
- Numerical evaluation of transfer coefficients for the drying processes of porous bodies during the falling rate period (with D. Szentiványi), *Proc. 1st Drying Conf.*, Montreal, Canada, pp. 48-51 (1978).
- Mathematical modelling of heat and mass transfer processes of drying, porous materials with sorptive properties, *Proc. 1st Drying Conf.*, Montreal, Canada (1978).
- Effect of the stochastic perturbation on the heat and mass transfer process (with B. Paláncz), *Proc. 6th Int. Heat Transfer Conf.*, Toronto, Canada, pp. 359-369 (1978).
- Non-steady state surface evaporation from porous bodies with non-uniform pore distribution, *Proc. 2nd Int. Symp. Drying*, Montreal, Canada, Vol. 1 (1980).
- Surface phenomena of porous capillary bodies with nonuniform and uniform pore distribution during heat and mass transfer processes, *Proc. Phys.-Chem. Hydrodyn. Conf.*, Madrid, Spain (1980).
- Contribution to the theory of surface phenomena of porous bodies occurring due to heat and mass transfer processes, Int. J. Heat Mass Transfer 25, 1457-1460 (1982).
- Surface phenomena of porous, capillary bodies, Proc. 7th Int. Heat Transfer Conf., Munich, F.R.G., pp. 57-59 (1982).
- Surface evaporation on capillary-porous bodies, Proc. CHISA'84, Prague, Czechoslovakia (1984).
- Contribution to the theory of sorption isotherms, *Phys.-Chem. Hydrodynam.* 6, 691-698 (1985).
- Evaporation and condensation phenomena of capillaryporous bodies, Proc. 7th Int. Heat Transfer Conf., San Francisco, U.S.A. (1986).