

Flowing Through Time . . .

In 1950 I passed my final exams at the Grammar school and gained my matriculation from the Lyceum No. 5 in Gdańsk Oliwa (named after the famous Polish writer Stefan Żeromski). This school afforded me not only a good education, but also a lesson in life, organization, and democracy. There was time for sport (basketball and volleyball) and scouting activities. Many friendships from school have lasted to the present day. In 2000, we celebrated the 50th anniversary of our matriculation, which was a very good occasion to recall not only our good school days, but also to discuss our life and work, as well as achievements. These school years have been an important period in my life affording numerous experiences and friendships.

After passing the entrance examination I began studies at the Gdańsk Technical University in the Faculty of Civil Engineering. One year later the Faculty was divided into two separate faculties: Land Constructions (Budownictwa Lądowego) and Hydraulic Constructions (Budownictwa Wodnego). I was directed to the Faculty of Hydraulic Constructions. In 1954 I received my first degree – Hydraulic Structures Engineer and continued my studies in inland hydro-engineering which I completed in 1956 with a Master's degree. During these two years of studies I was employed as assistant in the Department of Geodesy in the same faculty. My diploma thesis concerned the project of a pumped-storage powerplant. This project was carried out together with my two colleagues (R. Dunikowski and J. Faustman) and was estimated as being very good. The supervisor of our diploma thesis was Prof. Waclaw Balcerski excellent lecturer and outstanding civil engineer. He has always been my highest authority, which I tried to follow during my work as assistant and in the future as professor. The time of studies was a difficult one in many respects, however, now looking back I regard them as very interesting and important.

I devoted a considerable amount of time to sport, playing basketball in a sports club, most of the players being students. We achieved a good level, playing in the first national division. We also very often represented Gdańsk Technical University with success. Sport gave me great pleasure, but also taught me discipline and teamwork. I learned that one should not give up in very difficult and even hopeless situations. Sport also gave me the opportunity to visit numerous countries (Czechoslovakia, Rumania, Yugoslavia, Bulgaria, and China), which was not so easy during those years. We formed a very good team, not only during practicals and sports competitions, but also playing bridge, dancing and skiing. Most of

my sporting friends completed university studies and became valuable scientists and civil servants. Here I would like to mention some names Prof. Z. Gruca, Prof. J. Młynarczyk, A. Tomaszewski, Z. Broda, H. Broda, A. Jezierski.

After completing my studies I took up employment in 1956 with the Institute of Hydroengineering (IBW PAN) of the Polish Academy of Sciences in Gdańsk in the Department of Inland Hydraulic Structures. Initially I was involved in hydraulic model investigations of various hydraulic structures. My first study was the hydraulic model investigation of Tresna Dam on the Soła River, a tributary of the Vistula. In the summer months of 1956 I was a member of the team which carried out field measurements of siltation of the Rożnów Reservoir on the Dunajec River. My knowledge of geodetic measurements was here very valuable. Compared with present-day techniques, measuring equipment and methods – our work now looks very primitive. However, we obtained good results. With great pleasure I recall now collaboration during these studies with Prof. J. Onoszko, Dr. T. Basiński, Dr. W. Robakiewicz, and Prof. M. Sieradzki.

In 1960 I traveled abroad for the first time as an employee of the Institute and participated in the Congress of IAHR in Dubrovnik (Yugoslavia). During a very interesting study tour after the Congress I met J. Cotillon (future General Secretary of ICOLD) who was employed with Electricité de France. We spent a lot of time on discussions concerning engineering and social problems. Thanks to his assistance I received an invitation for two months training with Electricité de France. One month I spent in the Hydraulics Laboratory Chatou near Paris, and one month visiting constructions of various dams in France. Needless to say, I appreciated this interesting and valuable engineering training, as well as knowledge of my first western country. Later, J. Cotillon became my very good friend and we met many times in France and Poland.

In 1962 I definitely finished with my professional sports career, as it was not possible to combine sport with scientific work. A definite incentive to do this was the obtaining of the British Council Scholarship in 1962. I went to Glasgow to the Royal College of Science and Technology (at present Strathclyde University) for ten months scientific training. My supervisors were Prof. D. I. H. Barr and Prof. W. Frazer. My study embraced laboratory experiments of the arrested wedge in a hydraulic flume. During my laboratory work Prof. Frazer proposed that I present my work in the form of a thesis at the Civil Engineering Department of Glasgow University for the degree of Master of Science in Engineering. This was possible, as I obtained my degree at the Gdańsk Technical University with honours. Thanks to the kind assistance of the British Council my scholarship was extended for three months and in November 1963 I received the degree of Master of Science in Engineering from Glasgow University. The title of my thesis was *Density Difference Phenomena with Special Reference to the Arrested Wedge*.

During my stay in Glasgow I met many people who were of great assistance to me. Apart from Profs. W. Frazer and D. I. H. Barr who were my scientific

supervisors I received considerable help from the hydraulic laboratory staff of the Royal College of Science and Technology. David Rachman, senior lecturer in the Faculty of Mechanical Engineering became my very good friend. He was of Polish origin and his parents were killed in Warsaw during World War II. Afterwards we met many times in Glasgow and in Poland.

My great thanks and appreciation go to the British Council Office in Glasgow. Their social activities (weekend excursions, visits to theatres, meeting various interesting people) was of great value to me. This way I learned a lot about beautiful Scotland and its people, their life and culture. During my stay in Glasgow I spent much time studying English on special courses for foreign students. Good command of this language later became of great value in my scientific work. Laboratory experiments, which I carried out for my MSc. thesis at Glasgow Royal College, afforded me valuable material for my doctor's thesis.

After returning to Gdańsk I was involved in numerous laboratory model investigations of hydraulic structures and on the preparation of my doctor's thesis which I completed in 1966. The title of my thesis was *Methods of studies of cooling water systems in view of laboratory research of thermal and hydraulic phenomena*. Successful public defense of my thesis was in 1967 and I was awarded the degree Doctor of Technical Sciences and became assistant professor at the Institute of Hydroengineering.

In the same year, my application for a postdoctorate fellowship of the National Research Council (NRC) of Canada was successfully accepted and I went to Ottawa where NRC had a very well equipped hydraulics laboratory. The head of the Hydraulics Section at this time was Dr. S. Ince. My laboratory research work concerned thermally stratified flows and mitigation of ice phenomena on the St. Lawrence River by means of heated discharges from thermal or nuclear powerplants. My stay in Canada was very interesting and valuable. Apart from Canadian research institutions I was able to visit several hydraulic laboratories in the USA and attend conferences concerning hydraulic and civil engineering problems. I wish to mention several names of persons with whom I was in close contact: E. Funke, B. Pratte, J. Ploegh and B. Kamphuis.

After returning to Gdańsk, my scientific orientation changed from applied hydraulics to problems of the thermal regime of rivers and reservoirs, as well as ice formation on rivers and river flow with ice cover. These issues became more and more important as people recognized numerous environmental problems. In 1970 in recognition of my scientific achievements I was awarded the title of associate professor and became head of the Department of Inland Water Hydraulics in the Institute (IBW PAN).

Recent international contacts clearly indicated that in the near future, new research areas will become more important e.g. the thermal regime of rivers, lakes and reservoirs, formation of ice cover and hydraulics of ice-covered flow, dispersion of pollutants and sediment transport in rivers and reservoirs. Part of

our basic research became directed towards solving these problems. As before, hydraulic model investigations constituted the main part of our applied research. Here also new questions arose e.g. energy dissipation, flow aeration, application of loose boundary models, models of intakes and discharges and forces acting on the barges in navigation locks during filling and emptying processes.

During the following years, numerous laboratory hydraulic model studies were completed in the Department of Inland Water Hydraulics of IBW. These constituted model studies of the Solina dam, comprehensive studies of the Włocławek hydraulic project, and training work on the Middle Vistula. We also carried out several model investigations of weirs in Iraq and water intake for a thermal power-plant in Libya. Significant progress in our research work was possible thanks to the very good and efficient work of engineers and technicians. I wish to mention here the names of Dr. T. Manthey, Dr. A. Tarnowski, Mgr. W. Nobis, Mgr. P. Walczak, Mgr. F. Loose technicians and craftsmen: M. Kuczkowski, S. Wysiński, J. Dudek, S. Orłowski and many others.

In 1963 I became a member of IAHR (International Association for Hydraulic Research) and participated in ten IAHR congresses and several special symposia presenting papers. For four years I was member of the IAHR Section Hydraulic Laboratory Instrumentation.

In 1976 I was appointed Chairman of the Working Group in the International Hydrological Program of UNESCO. Our task was the preparation of a Report on *The Influence of once-through cooling on aquatic systems*. The group consisted of 5 scientists: myself, two from the USA, one from the GDR and one from France. After three years of hard work, and several meetings in Paris, USA and Berlin our report was completed and published by UNESCO in Paris. I was one of two chief editors.

During 1974–87 I was employed as consultant for hydraulic model studies in the new Hydraulics Laboratory of the Design Office Hydroproject in Włocławek. I would like to mention the very good and fruitful collaboration with Dr. L. Biegała – Director of Włocławek Hydroproject.

I was part time lecturer on graduate and postgraduate studies at the Gdańsk Technical University and Gdańsk University. My subjects were: river hydraulics, applied hydraulics, and theory of hydraulic modelling. For six years (1977–83) I was reviewer of the Applied Mechanics Reviews, and reviewer of the Analytical Bibliography of Mechanics (1970–93).

In 1970 I was elected member of the Water Resources Management Committee of the Polish Academy of Sciences and appointed head of the Physics of Inland Waters Section. This activity gave me considerable satisfaction, coming up against new research and engineering problems, as well as meeting new people. In 1980, the Water Resources Management Committee decided to establish the National School of Hydraulics. The aim of the School was to organize a weekly meeting for scientists and engineers every year, to provide them with the new achievements in

science and hydraulic engineering in the form of lectures by eminent specialists, as well as afford the possibility for participants to present their studies. I was appointed Scientific Leader of this School. In 2002 the XXIIth School of Hydraulics was organized in Lubniewice near Szczecin. Since 1990 the Institute of Hydroengineering has published the proceedings of the School of Hydraulics. During each School there was a study excursion to a hydraulic structure (dam, weir, navigation lock or hydraulic powerplant). Numerous scientific institutions collaborated with the Institute of Hydroengineering in the organizing of Schools and in particular, the Institute of Hydroengineering and Water Resources Management of the Technical University Kraków, Maritime Institute–Szczecin Branch and Agricultural Academy Wrocław. I would like to mention some persons who were of special assistance in the organization of Schools of Hydraulics. These were: Associate Prof. B. Utrysko, Prof. W. Buchholz, Doc. E. Jasińska, Dr. T. Jarzębińska, Dr. P. Jeż, and Prof. R. Rogala. All organizational work was in the hands of the administrative staff of the Institute of Hydroengineering. In this organizational work I would like to acknowledge the kind assistance of M. Świczkowski and J. Kwinta.

In 1993 I was elected Vice-Chairman of the Water Resources Management Committee, which post I held for two 4-year terms. In 1999 I was elected chairman of the Committee. Here I would like to mention several names with whom I had the pleasure to cooperate: Prof. Z. Kaczmarek, Prof. M. Ozga-Zielińska, Prof. J. Skibiński, Associate Prof. B. Utrysko, Prof. M. Maciejewski, Associate Prof. E. Jasińska, Prof. L. Radczuk and Prof. R. Szymkiewicz.

In 1996 I was also elected member and vice-chairman of the Scientific Council of the Institute of Meteorology and Water Management in Warsaw for a four-year term, in 2000 I was reelected for further term. This was a very interesting activity, as it afforded me an insight into new scientific and engineering problems. I wish here to acknowledge my close collaboration with the Chairman of the Scientific Council Prof. K. Rózdzyński, Prof. J. Zieliński – Director of the Institute, Prof. H. Słota – Deputy Director, Prof. M. Maciejewski and Dr. H. Kostrzewa – Secretary of the Scientific Council.

In 1982 due to a extreme hydrological and meteorological conditions severe flood occurred on the Włocławek Reservoir on the Lower Vistula. This reservoir was formed in 1970 as the result of the construction of the Włocławek Hydraulic Barrage. Side dams and dykes in the upper part of the reservoir were breached in 6 places, which resulted in the inundation of 100 km² of land. 2230 farms were flooded. From the hydraulic point of view it was very interesting to find out the cause of this flood, while the maximum discharge was only 3900 m³/s (maximum design flow for hydraulic project Włocławek is 8680 m³/s). This resulted in long studies on the flow in rivers and run-of-the river reservoirs with ice cover. The study was based on theoretical considerations and extensive field measurements. I was deeply involved in this. In 1987 I presented the publication: *The influence*

of ice cover on hydraulic characteristics of run-of-river reservoirs on the lowland rivers basing on the example of Włocławek Reservoir. This publication formed the basis of my habilitation which I received from the Faculty of Hydraulic Engineering of the Gdańsk Technical University in 1988. These studies were carried out by a large team of engineers and technicians, and here I would like to mention the names: P. Walczak, M. Bagińska, W. Jakimowicz, R. Kołodziejski, M. Świeczkowski, S. Wysiński, A. Wierzchowska, and W. Łosowska.

In 1984 at the VII IAHR Ice Symposium I presented the paper: *Backwater profiles on hydroelectric reservoir with ice cover.* During this Symposium I was elected member of the IAHR Section on Ice Research and Engineering. This began my long activity in the realm of ice hydraulic engineering. During two Ice Symposia (1986 – Iowa City, USA and 1990 – Espoo, Finland) I was invited to present introductory lectures. In 1990 during the Navigation Congress of PIANC in Osaka, Japan, I was general reporter on the topic "Navigation in Ice Conditions". In 1988 during the Ice Symposium in Sapporo I was elected chairman of the IAHR Section Ice Research and Engineering and again re-elected for a second term in 1990 during the IAHR Ice Symposium in Espoo. I participated in several subsequent Ice Symposia (1992 – Banff, Canada; 1994 – Beijing, China; 1996 – Trondheim, Norway) presenting papers and being a member of the scientific committee. During my activity in the Ice Research and Engineering Section I had especially close collaboration with Prof. K. I. Hirayama and H. Saeki (Japan), G. Frankenstein and Prof. H. T. Shen (USA). In 2000 the Section of Ice Research and Engineering asked me to organize the XV Ice Symposium in Gdańsk. This was a very successful event with participants coming from twelve countries. It gave me considerable satisfaction. Organization of the Symposium was carried out by the Institute of Hydroengineering. The IAHR Ice Symposium was organized in Poland for the first time, this being my crowning achievement in the realm of ice research and engineering.

In 1973 the Institute was commissioned with the study of Lake Żarnowiec in connection with the design of a nuclear and pumped-storage powerplant. Lake Żarnowiec was assumed as the lower reservoir of the pumped-storage powerplant and simultaneously as the cooling water reservoir of the nuclear powerplant. I was appointed the person responsible for the whole study, which was carried out by teams from Gdańsk Technical University, Institute of Meteorology and Water Resources, Gdynia, Fishery Institute from Olsztyn and Institute of Hydroengineering. The whole study concerned hydrological and meteorological conditions of the lake and nearby region, water balance of the lake, hydrodynamic conditions (currents and waves) and water quality of the lake, fishery and biological state of the lake. The whole study was based on extensive field measurements and theoretical considerations. Finally, a very interesting hydraulic model study of the breach of the upper reservoir of the pumped-storage powerplant and its possible consequence on damage to the nuclear powerplant was carried out in the hydraulic

laboratory of Hydroproject in Włocławek. The study of Lake Żarnowiec gave me considerable engineering experience and the possibility of working with scientists of various specialities and disciplines. For this work I received an award of the Scientific Secretary of the Polish Academy of Sciences and an award of the Vojvod of Gdańsk. Here I would like to mention my close collaborators during this study: Mgr. Z. Dziadziuszko and Prof. A. Majewski from IMGW and Mgr. J. Kaźmierski, Mgr. F. Loose and M. Świeczkowski.

In 1984 I received a 3 months scholarship from the Deutscher Akademischer Austauschdienst to studies in Germany. I spent this time in Karlsruhe Technical University collecting material for my habilitation thesis. I would like to acknowledge valuable discussions with Prof. P. Larsen, who carried out numerous studies concerning the flow in open channels with ice cover. During this stay I also had interesting contacts with the Institute of Hydraulic Engineering in Stuttgart. Here I would like to mention Prof. H. Kobus, with whom we had interesting discussions on hydraulic modelling problems.

In 1990 I received nomination for Professor of Technical Sciences specializing in river and reservoir hydraulics, environmental engineering and water resources management.

In 1991 I was offered the post of professor in the Faculty of Hydraulic Engineering of Gdańsk Technical University. I was appointed head of the Department of Hydraulic Structures. This was a new challenge for me. New people and completely different work – lectures, diploma seminars, supervision of diploma theses. I was employed at the Gdańsk Technical University until 1997. This work gave me a considerable amount of new experience and satisfaction, although not all my scientific plans could be realised. I would like to acknowledge fruitful collaboration at Gdańsk Technical University with Prof. R. Szymkiewicz, Prof. P. Kowalik, Prof. B. Mazurkiewicz, Doc. S. Mackiewicz, and Dr. T. Jarzębińska.

I had very good scientific collaboration with the Technical Universities of Kraków and Szczecin. During that time I received several awards from the Rector of Gdańsk Technical University and three special medals from Gdańsk, Kraków and Szczecin Technical Universities. In 1997 I was offered the position of deputy director for scientific matters in the Institute of Hydroengineering, which I accepted. I am still in close contact with Gdańsk Technical University where I have lectures on Water Resources Management in the Chemistry Faculty with Speciality – Environment of Protection and Management. These lectures are in English.

During the years of my scientific activity I have been supervisor of four completed theses for the degree of doctor of technical sciences. Twelve diploma theses at Gdańsk Technical University were completed under my supervision. I have been reviewer of numerous doctor theses, doctor habilitated theses, and reviewer of scientific achievements for the title of professor. The last five years of my work in the Institute (as deputy of Prof. P. Wilde and subsequently as managing director) afforded me considerable satisfaction. This was a very difficult time, as apart from

managing work I tried to continue scientific research. It is not for me to judge how successful it was.

Most of my scientific and engineering activities were closely connected with the Institute of Hydroengineering of the Polish Academy of Sciences in Gdańsk. Here in 1956 I began my work as assistant. Then I completed my doctor's degree and doctor's habilitation and became assistant professor, in 1970 associate professor, and finally in 1990 full professor. I have been head of the Department of Inland Hydraulics (1970–1982), deputy director for scientific matters (1986–92 and again 1997–2000), and since 2000 managing director of the Institute. During this time I had the pleasure of working with many people. First, I would like to mention the first Director and founder of the Institute Prof. R. Cebertowicz. Next two directors of the Institute were Prof. W. Tubielewicz and Prof. S. Hueckel. During the directorship of Prof. Hueckel I was already head of the Department of Inland Hydraulics. Valuable work was conducted with Prof. R. Molisz who was the deputy of Prof. Hueckel. Later, there was close collaboration with Prof. S. Maszel, Director of the Institute as his deputy. Again similar collaboration was with Prof. P. Wilde, Director of the Institute, as his deputy. During my many years of research work in the Institute I recall with great pleasure, collaboration with Prof. A. Hoffman, Associate Professor T. Manthey and Mgr. Ing. P. Walczak who was successive head of the Department of Inland Hydraulics, and also Associate Professor W. Robakiewicz who for several years was the deputy director of IBW.

Since 2000 when I became Managing Director of the Institute, the group of people with whom I worked in close collaboration increased significantly. I must mention here all the heads of the Departments: Associate Prof. E. Jasińska, Prof. P. Wilde, Prof. A. Sawicki, Prof. H. Zaradny, and Prof. Z. Pruszek. Working together with them afforded me considerable pleasure. The position of director requires, apart from scientific work, also substantial administrative duties. Here I would like to acknowledge valuable collaboration with my deputy for administrative matters W. Joachimowska, and chief accountant H. Rak. It would be difficult to mention here numerous researchers and administrative personnel with whom I had the pleasure of close co-operation. However, I would like to mention in particular Dr. M. Robakiewicz for her valuable work and assistance in the preparing of proposal and contract documents for the Centre of Environmental Engineering and Mechanics of the EU. Here, I would like to express my sincere thanks and appreciation to all those mentioned, for their assistance and valuable collaboration. I would like to acknowledge also close and fruitful collaboration with the Scientific Council of the Institute and in particular with its Chairman Prof. B. Mazurkiewicz.

Finally, I would like to mention my family. My father was a Polish Railways officer and mother a primary school teacher. I owe them a great deal. First, during World War Two, when we lived in Wilno, they managed not only to secure us (my brother and I) with food and home, but also organized secret education

(officially there were only four classes of primary school). In 1945 we emigrated from Wilno, leaving all our property. For one year we stayed in Bydgoszcz and in 1946 we arrived in Gdańsk where my father was employed in the Regional Board of Polish Railways. My parents gave my brother and I not only an education and opportunity to complete university studies, but also taught us respect for work, duty and justice.

In 1965 I married Halina, a dentist. We have one son Jerzy who was born in 1967. After finishing primary and secondary school, in 1990 he completed studies in the Faculty of Mechanical Engineering at Gdańsk Technical University. In the same year he commenced work at the Institute of Fluid Flow Machinery of the Polish Academy of Sciences. In 1997 he received the degree doctor of technical sciences in mechanical engineering for which he obtained the Special Award of the Prime Minister. He did not continue research activity and moved to automotive business.

Gdańsk, October 2002.

W. Majewski