

## In Memoriam

# A Look at the Life and Activity of a Prominent Polish Acoustician of the 20th Century Professor Ignacy MALECKI (1912–2004) on the Occasion of the Centenary Anniversary of His Birth

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(received October 24, 2012; accepted February 5, 2013)

Ignacy Malecki was born on November 18, 1912, at the family estate of Pokiewnia near Vilnius. After Poland regained its independence in 1918, the town was at the border of the Second Republic of Poland and Central Lithuania. The church and village were located in the Polish area, while the family estate on the Lithuanian side. It took some time before those parts could be reunited.

Father Jan was a wealthy landowner and a bank clerk (President of the Tax Chamber) in Vilnius. He was also Treasury Minister of Central Lithuania. He came from an old noble family whose genealogy papers dated from 1627. Mother Emilia came from the artistic family of Witkiewicz. Stanisław Witkiewicz – art theorist, painter, and architect, promoter of the Zakopane highland style – was her uncle.

In the years 1924–1930 Ignacy Malecki studied at the prestigious Joachim Leleweł State Gymnasium in Vilnius, where he lived with his family. After completing his education he took the final exam in mathematics and natural sciences with very good results. Then he passed difficult entrance exams to Warsaw University of Technology. Despite the large competition – seven candidates for a place – he became a student of the university, however, not at the desired Architecture but at the Division of Weak Electrical Currents. After two years of studies, in October 1932, he received the first certificate (Fig. 1). The first diploma exam consisted of 13 subject exams, completions of numerous exercises and laboratory tasks, as well as two factory practices – mechanical and electrical. These practices took place at railway workshops and the power plant in Vilnius. In the summer of 1934, he had foreign practices in Paris and Marseille. After having passed

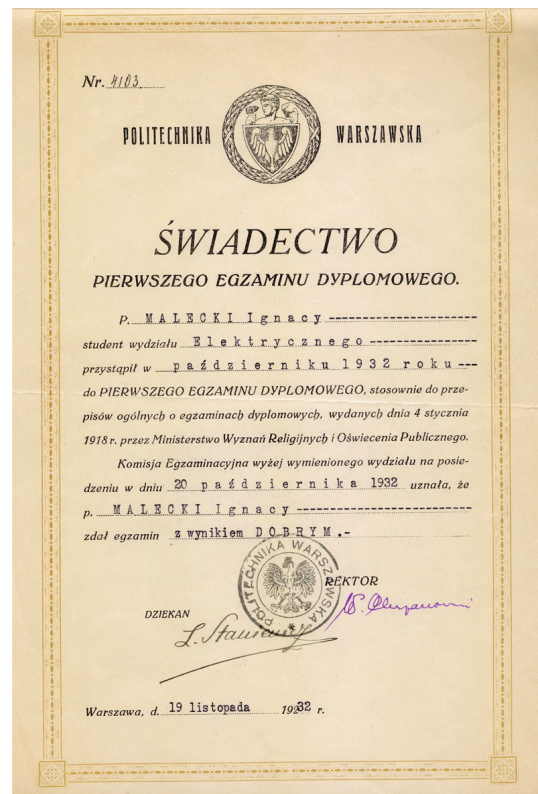


Fig. 1. Certificate of the first diploma exam of Malecki by Electric Department of Warsaw University of Technology, 1932.

with very good results the final exam he graduated from the Telecommunication Division of the Electrical Department of Warsaw University of Technology. He received the degree of electrical engineer (Fig. 2).



Fig. 2. Certificate of degree of Electrical Engineer obtained at the Faculty of Warsaw University of Technology, 1935.

His diploma thesis was prepared under the supervision of prof. Janusz Groszkowski, known worldwide as a radio communication and electronic specialist. The work concerned the radiation produced by rotating electromagnetic fields. After finishing the polytechnic studies in 1935, Malecki took a half year long training in AVA Radio Company. This firm designed and produced radio equipment for the army, as well as the encoding and decryption apparatus.

The prominent personality of prof. Groszkowski had a great influence on the choice of further scientific way of the excellently promising engineer. He persuaded Malecki to take part in the competition for the financial support of the National Culture Fund. A grant for further studies in Germany, which he then received, was an important moment in the life of Ignacy Malecki. It was the moment when he became devoted to acoustics for the rest of his professional life. At Heinrich Hertz Institute in Berlin, a young engineer gained the knowledge and experience in the field of ultrasound. His supervisor, prof. Edwin Mayer educated the entire generation of German acousticians. Malecki conducted studies of ultrasound vibrations of frequency of 200 kHz, high at that time. These vibrations were generated using a tourmaline crystal. Unfortunately, the stay in Berlin (January–August, 1936) coincided with the violent change of social attitudes

of the German society. Due to a growing nationalistic ideology, the name of Heinrich Hertz Institute was changed into Institut für Schwingungsforschung (Vibration Research Institute). The young Polish engineer was made to leave the Third Reich for fear of his own safety. Fortunately enough, he was offered to complete his foreign training at the laboratory of Philips firm in Eindhoven.

After returning to Warsaw, on the 1st of October 1936, he was appointed for his first responsible position. The Executive Director of the Polish Radio Stock Company employed him at the Study Office of the Polish Radio in Warsaw. The task of the engineer was to create an acoustic laboratory. From the 1st of June 1938, he became the head of the Technical Department of the company. The staff of the Department was engaged in measurements and improvement of conditions of the acoustic chambers in the building of a studio at 25, Zielna Street. In addition, measurements of the acoustic isolation, tests of microphones were conducted, as well as theoretical and experimental work in the field of room acoustics. New radio studios were organized in connection with launching, in March 1937, of another radio channel – Warsaw II.

Under the direction of engineer Malecki a full technical and acoustic design of recording chambers in the premises of the Polish Radio was prepared. The com-

plex of buildings, according to prof. Bohdan Pniewski project, was to be built at the corner of Batorego and Puławska Street. The works began in March 1939. However, before the war only foundation trenches were made.

While working for the Polish Radio, the engineer carried out research in the field of architectural acoustics at the Research Faculty of Construction of the Architecture Department at Warsaw University of Technology. The dean of the faculty was the famous constructor prof. Stefan Bryła. The study, started already in 1936 under the guidance of prof. Bryła, would constitute for many years the essential scientific and practical interests of Ignacy Malecki.

Apart from the scientific capacity, the young engineer revealed personal culture and a diplomatic talent. In the framework of the work for the Polish Radio he was appointed the representative of Poland in the *Union Internationale de Radiodiffusion* (International Union of the Radiophony). His efforts in this organization were concentrated on the allocation of the most favourable frequency bands for the rapidly expanding Polish radio broadcasting. As he recalled later, most disputes were with the representatives of the Third Reich.

Several years of commitment to the work on development of the Polish Radio had an unusual final when the war started. The engineer Malecki headed the technical work of the studio at 25, Zielna Street. After the Germans seized the long-wave radio station in Łazy near Raszyn on September 7, 1939, the regional station Warsaw II took over its responsibilities. It had at its disposal a 10 kW transmitter at Mokotów Fort. It was connected by an underground cable with the main building in Zielna Street. The transmitter was assisted by another, 1.5 kW power, one, located at Warsaw University of Technology. From September 8, using just these two transmitters, President of Warsaw Stefan Starzyński regularly communicated with the citizens of Poland. At noon on September 23, the Warsaw power plant in Powiśle district was bombed down. Since that time, the broadcast station went silent.

During the years of German occupation Malecki led an underground teaching and scientific work at the Department of Architecture, Warsaw University of Technology, under the supervision of prof. Bryła. This activity was carried out behind the facade of the research facility, and later a vocational school. An underground educational work was involved with a significant risk. Prof. Bryła, for participating in the conspiracy, was executed on December 3, 1943. In the first period – from 1940 – Eng. Malecki worked at the Research Institution of Technical Physics. Under the pretext of an official technical expertise, the works for the purpose of the conspiracy were carried out, including teaching activities. With the opening by the Germans in 1942 of the Public Higher Technical School in the buildings

of University of Technology he got employed in it. In the years 1942–1943 he was delivering underground lectures on room acoustics for the 3rd year students, Faculty of Architecture. Illegal activities, including teaching, were facilitated by Professor Gütinger who was at that time the German rector of the school. He pretended not to see the underground activities of the Polish employees.

In January 1942, Malecki defended his PhD thesis entitled *Physics of acoustic porous materials*. Its subject was the issue of sound absorption and especially the mechanisms of penetration of acoustic waves through materials of capillary structure. The defense was held up against the team of rector Kazimierz Drewnowski, with the participation of prof. Stefan Bryła as a scientific advisor and prof. Roman Trechciński (outstanding electrotechnician, teletechnician, and inventor in the field of telephony). The thesis originated from the research carried out at the Institute of Heinrich Hertz and was completed before the war began in 1939.

In May 1943, Malecki, PhD, defended his habilitation work (DSc thesis) entitled *Distribution of acoustic field in the closed space*. Professors Stefan Bryła, Roman Trechciński, and Mieczysław Wolfke (world-wide famous physicist, precursor of television and holography) were the reviewers of this work. In the work, the author applied an original statistical method to calculate acoustic non-stationary states in the closed acoustic volume. After the successful defense Malecki, PhD, obtained the right to deliver lectures at universities (*venia legendi*) as a docent, equivalent to associated professor. The received title was equivalent to the present-day post-doctoral degree (habilitation). The dissertation was extended and published 6 years later at Gdańsk University of Technology, under a modified title: *The mechanism of propagation of sound waves in the halls* (150 pages). Official recognition of the habilitation by the Senate of Warsaw University of Technology took place on 30 January 1946.

During the Warsaw Uprising Ignacy Malecki found the living extremely difficult. He needed food to support his young wife and a new born son Wojtek. Unfortunately his wife was shot down together with other residents of the apartment building by the soldiers of RONA – Russian National Liberation Army, brigade of Bronisław Kamiński. An unusual twist of fate saved the baby, lying under the body of his mother. Than Malecki and the baby were taken to the temporary camp in Pruszków, from where he escaped and hid from the Germans in the property of the writer Jarosław Iwaszkiewicz and his wife Anna in Stawisko, nearby Podkowa Leśna.

In the spring of 1945, he declared to be in disposition of the Provisional Government of the Republic of Poland. The new authority appointed him, as its representative, in the Lower Silesia. Soon he was di-

rected to Gdańsk, destroyed during the war, with the aim of rebuilding the electricity system of the region. He succeeded in this task very well and remained at that position till 1948 as the executive director of the Energy Division of the Pomeranian Union. In October 1945, he actively participated in the establishment of the branch of the Association of Polish Electrical Engineers (SEP). He was elected Chairman of the Board of the Baltic Sea Coast SEP Division for the 1945–1946 period. Apart from working for the electric power industry, he participated in reactivation of Gdańsk University of Technology. Since 1945 he gave lectures on electrical engineering to students of general faculties. A year later he was appointed Professor of Gdańsk University of Technology and organized the Department of Applied Electrical Engineering and Acoustics, where he was head up till year 1951.

At that time he established a well equipped acoustic laboratory with tools for measurements of absolute acoustic pressure using a Rayleigh disc and an echo-free chamber. A little later, the Professor organized, in cooperation with the Navy, research on German torpedoes steered with phase sensible acoustic systems and on acoustic and magnetic mines. The results of these studies were developed in the first PhD promoted by the Professor. The thesis of Zbigniew Zubelewicz was entitled *Some acoustic and magnetic devices in the sea telemechanics* (1949). The author used until 1948 the pseudonym of Jan Góra taken during the conspiracy times.

In 1950, Professor ended his activity in the field of electric power industry and gradually moved with his family back to Warsaw. The need for reconstruction of many damaged public buildings made Professor engage in the process of their reconstruction with regard to their acoustic properties. He promoted the modeling technique of closed spaces, the theory of a heterogeneous distribution of the acoustic field in halls, and optimization of the reverberation effect. He introduced the parameter of “distinctness” as an evaluation criterion of the acoustic quality of halls. Based on previous research and publications, he developed a method for determining the optimum profile of meeting halls using the method of “spatial sources” and the theory of application of perforated sound absorbing elements. The above issues were presented in a monograph, entitled *Architectural Acoustics*, published in 1949 (ed. Building Research Institute). A number of concert halls and theatres projects under the direction of Professor were designed. The principles established by Malecki were followed in the design of the National Theatre, the Parliament Hall, and government buildings in Aleje Ujazdowskie (at that time the building of the Council of State). Further works concerned the methods of increasing the acoustic insulation of prefabricated building constructions. Rules were developed to take into account the acoustic conditions in urban design. More-

over, the measurement systems of recording the acoustic shock wave were improved too. These issues were widely covered in the book *Fighting Noise in Industrial Plants* (PWT 1954).

From 1948, Ignacy Malecki was a permanent member of the Technical Council of the Polish Radio. The demand for professionals in the field of electroacoustics grew rapidly, especially from the Polish Radio, film studios and the Ministry of Posts and Telegraphs (now Ministry of Communication). It led to the establishment by the Minister of Higher Education, on the 1st of October 1949, the Chair and Institute of Electroacoustics at the Faculty of Communication, Warsaw University of Technology. Film and broadcasting technologies were the first directions of students’ education. The books and papers by Malecki became the first handbooks used in the teaching process (*Radio and Film Acoustics*, 1950, PWT and *The Technique of Recording and Playing Back Sounds*, 1953, PWT).

In the initial period of its activity the Faculty used the equipment of the Polish Radio and Polish Film and the Main Institute of Technical Physics, which was established in 1949. Prof. Malecki was its employee from February 1950. The Institute occupied the rooms in the building of Physics of Warsaw University of Technology. This made convenient to conduct a joint research. The Faculty of Electroacoustics was managed by professor from February 1950 till 1969. Witold Straszewicz and Stefan Basiński were his students and then coworkers. After the reorganization, the Faculty was incorporated into the Institute of Radioelectronics, which was headed by prof. Stanisław Ryżko. In 1950, Malecki was appointed professor at Warsaw University of Technology in the field of electroacoustics, and on April 3, 1951, became an ordinary professor. He was bound with Warsaw University of Technology, as a researcher and lecturer, up to 1983 (1973–1983 part-time professor). One of his closest colleagues then was Jerzy Narkiewicz-Jodko, PhD.

In the years 1951–1952 Professor served as the dean of the Faculty of Communication. During this time he was also prorector for science at Warsaw University of Technology. In the period 1950–1951 he organized an acoustic laboratory at the Main Institute of Technical Physics. Professor had some colleagues and collaborators at the laboratory. Among them were students and next PhD students like Leszek Filipczyński, Jerzy Wehr, and Waclaw Koltoński.

Professor Malecki took part in the 1st Congress of Polish Science which was held in the period of 29 June – 2 July 1951. During the Congress the decision to create the Polish Academy of Sciences (Polska Akademia Nauk – PAN) was made. Since that time PAN took over previous academy corporations, existing till then for science, as well as art and literature associations. In the range of the technical sciences, the idea was to organize an institute of the Polish Academy of Sciences





Fig. 3. Prof. Malecki among the collaborators on the plane during a business trip to Moscow (meeting of acousticians); engineers J. Ranachowski and Z. Pawłowski are standing, Eng. J. Wehr and Prof. I. Malecki are sitting, January 1962.

on the basis of already existing facilities. The Institute was formed gradually, as a result of a closer cooperation, and a formal merge of scientific units which differed among themselves in the number of research workers and the scope of studies.

At the turn of 1951/52 the Main Institute of Technical Physics, after less than three years of operation, was divided between Warsaw University of Technology and Jagiellonian University, Cracow. The acoustic laboratory was transformed into the Department of Examination of Vibration of the Polish Academy of Sciences. This division, headed by prof. Malecki, led a close cooperation with the Division of Continuous Media Mechanics (head prof. Waclaw Olszak) and with the Division of Electronics (head prof. Janusz Groszkowski). In the field of fundamental research, the subject of study was complementary to a large extent. The Scientific Secretariat of PAN promoted the cooperation, as the basis for the founding of a new institute. Professor Witold Nowacki, Secretary of Department of Technical Sciences PAN, played the essential role in the creation and development of the Institute. He gathered a strong group of researchers which constituted the core of the Division of Continuous Media Mechanics. They worked on problems of isotropic and un-isotropic elastostatics, thermoelasticity, elastodynamics, non-linear elasticity, elastic composites, and elasto-optics. In June 1952, the Scientific Secretariat of PAN appointed a joint Scientific Council for the three mentioned above units. In addition, the Division of Metals in Cracow was established at

the Department of Technical Sciences PAN, with prof. Aleksander Krupkowski as its head. By resolution of the Scientific Secretariat of PAN, in December 1952, four of these units along with a smaller Division of Theoretical Electrotechnics (head prof. Pawel Szulkin) and a Laboratory of Astronautics (head prof. Kazimierz Zarankiewicz), were combined to form the Institute of Fundamental Technological Research PAN (Instytut Podstawowych Problemów Techniki – IPPT PAN). Professor Ignacy Malecki was the first director of the Institute, until 1961. For the first 5 years the institute was located in the Staszic Palace in Warsaw. Resolution of the Government Presidium in September 1953 officially confirmed the establishment of the institute. New coworkers of professor Malecki in the institute were Janusz Kacprowski, MSc, Wincenty Pajewski, MSc, Jerzy Ranachowski, MSc, Stefan Czarniecki, MSc, and from 1962 Zdzislaw Pawlowski, MSc. The Professor was again appointed director of IPPT PAN from 1973 to 1982, when he retired.

In addition, professor Malecki held a series of other positions at the institute. In the period 1961–1962, he was head of the Division of Vibrations Research. As a result of a reorganisation in 1969 the Division of Physical Acoustics was established. Prof. Malecki became its head until 1972. After the retirement, Professor was still employed part-time at the mentioned above division until 1995. In the following years his longtime collaborator prof. Feliks Rejmund was the head of the division. Professor took an active part in scientific studies and research projects of the Commit-

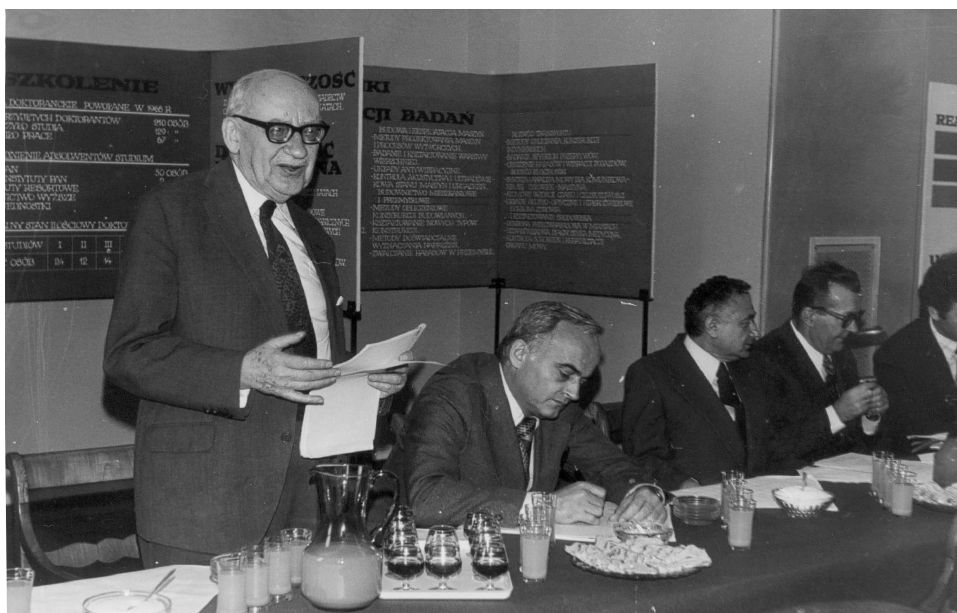


Fig. 4. The celebration of the 25th anniversary of the Institute of Fundamental Technological Research. Director of the institute, prof. Malecki has a speech. Next from the left: professors W. Gutkowski, J. Ranachowski, S. Kajfasz, 1977.

tee of Scientific Research. The last project in which he participated was the work *Corundum Ceramics of New Generation*. It was realized in cooperation with the Institute of Glass and Ceramics, in the years 2000–2002. The Professor was then 90 years old (!).

Prof. Malecki used to take an active part in the organization of cyclic conferences on the ceramic and composite materials, under the auspices of the Euro-

pean Materials Research Society (E-MRS) (Fig. 5). Prof. Jerzy Ranachowski, his friend and collaborator was their initiator. These conferences are still organised nowadays. For the rest of his life, Professor was a very friendly supervisor of postdoctoral and doctoral students, to whom he had always given great support and help. Shortly before his death, he delivered the review of the postdoctoral thesis by Jan Žera, PhD,



Fig. 5. The Conference *New Trends in Technologies and Materials Research* in Białowieża. From the left, professors: A. Rakowski, A. Śliwiński, I. Malecki, J. Ranachowski, A. Opilski, June 1998.

at the Council of the Faculty of Electronics and Information Technology of Warsaw University of Technology. The defense took place in 2004, after the death of the Professor.

Ignacy Malecki was the educator of two generations of the Polish acousticians. During the work at Warsaw University of Technology he supervised about 70 master theses in acoustics and electroacoustics. His most famous PhD students were: Leszek Filipczyński (1955) – an ordinary member of the PAN, director of the IPPT (1969–1974); Janusz Kacprowski (1957) – professor at the IPPT; Stefan Czarnecki (1959) – professor at the IPPT; Wacław Kołtoński (1959) – professor at the IPPT; Zenon Jagodziński (1960) – professor at Gdańsk University of Technology; Jerzy Wehr (1961) – professor at the IPPT; Andrzej Rakowski (1963) – an ordinary member of PAN, professor and rector of The Fryderyk Chopin University of Music in Warsaw (1981–1987); Witold Straszewicz (1965) – associate professor at Warsaw University of Technology, the recognized specialist in the field of the room acoustics, the designer of many concert halls, opera houses, and multifunctional objects; Ryszard Płowiec (1970) – professor at the IPPT, manager of the Division of Physical Acoustics (1996–1999). Among the 25 doctors promoted by Professor, 11 were employees of the IPPT. The first was Leszek Filipczyński, the last one was Przemysław Ranachowski (2001). Prof. Andrzej Nowicki, the longtime director of the IPPT, was also a student of prof. Malecki. He specialized in acoustics under Professor's care.

Apart from holding a number of positions at Warsaw University of Technology and at the IPPT, prof. Malecki carried out a wide activity at the Polish Academy of Sciences. In 1954, Professor became a Corresponding Member, in 1958 he was appointed an Ordinary Member of PAN. From 1962 to 1968 he was the Scientific Deputy Secretary of PAN, and since 1980, a member of the Presidium. In addition, he was an Ordinary Member of the Warsaw Scientific Society (Warszawskie Towarzystwo Naukowe – WTN, 1984) and a foreign member of New York Academy of Sciences.

Professor was also active in international organizations related to the evolution and development of the science policy. From 1963 to 1967 he was the Vice President of the International Council of Scientific Union (ICSU). In the years 1969–1973 he was the Director of the Department of Scientific Policy of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in Paris. Apart from this, he was a member of the Executive Council of the International Council for Science Policy Studies (ICSPS) in the period 1976–1998. The diplomatic passport facilitated Professor's frequent travels abroad.

Prof. Malecki was one of the founders of the Polish scientology. As a founder member of the Scientific So-

ciety of Praxeology, he contributed to the creation of the Committee of Scientology PAN, of which he was the Chairman in 1963–1968 and 1973–1989. Then from 1990 he was its Honorary Chairman. The professor analysed the impact of fundamental research on the socio-economic development and the perspective planning methodology in science. He developed methods for evaluation of results of research projects. He also participated in the global development of scientology, meant as a federation of scientific disciplines. His important achievement was the study of the evolution of the scientology conception. In addition, since 1987 he presided the Editorial Council of the “Scientology Issues”. He was lucky enough to put into practice the solutions of the problems that were the subject of interest to him. In the frames of the Polish Academy of Sciences he took part in the creation of a system of perspective research planning. At the Council for the Technique he participated in the application of research results for the technical progress. As it was mentioned above, he also acted at the international organizations associated with carrying out scientific policies.

Professor belonged to the founders of the Polish Acoustical Society (Polskie Towarzystwo Akustyczne – PTA). Countrywide meetings of acousticians (Open Seminars on Acoustics – OSA) were held since 1954, initiated by prof. Marek Kwiek from Poznań University. Cooperation and information exchange between national centres was at that time quite weak. It resulted from various sorts of administrative obstacles and limited the possibility of publication of research results. The thematic range of these seminars was fairly narrow and largely due to the personal interest of the organizers. However, with time, the thematic range and number of participants steadily grew. The process was nevertheless gradual and only after seven years the breakthrough came. It happened during the VIII-th Open Seminar on Acoustics in Szczecin, on August 22, 1961. The formal creation of the PTA was done by a group of 38 founder-members, connected with scientific or professional acoustics. Within this group, apart from Professor, were among others prof. Marek Kwiek, assistant prof. Leszek Filipczyński, Antoni Śliwiński, PhD, and Alexander Opilski, MSc. Despite the tragic death of prof. Kwiek (on December 19, 1962), the General Founding Assembly of PTA was held on March 4, 1963, in Poznań, where the first General Assembly of Delegates was prepared. They represented larger national centers dealing with acoustic research. The Congress was held on July 18, 1963, also in Poznań, which is the registered office of the organization up till now. The first four divisions of PTA: Poznań, Warsaw, the Upper Silesian and Wrocław were established. Polish Acoustical Society was affiliated at IV-th Department of Technical Sciences of the Polish Academy of Sciences. Later other divisions in Gdańsk (1966), Rzeszów (1973) and Cracow (1980) were cre-



ated. Prof. Malecki was awarded by the General Assembly of Delegates PTA, the highest dignity of Honorary Member of the organization in 1979. Regardless of the active engagement in the Society, from 1963 to 1969, he served as the Chairman of the Committee on Acoustics PAN. From 1989 he became its Honorary Chairman. In the years 1982–1987 he was Chief Editor of the quarterly journal *Archives of Acoustics*. In 2002 Professor participated at 49th OSA conference, organized by Warsaw Division of the Polish Acoustical Society in Stare Jabłonki (Fig. 6). Then, as the Honorary Chairman, he actively worked at the Scientific Committee of the seminar. The last conference in which Professor Ignacy Malecki participated, a year before passing away, was 50th Open Seminar on Acoustics. It was held in Szczyrk, in September 2003. During 59th OSA conference, in September 2012, on the occasion of the 100th anniversary of his birth, an opening session was devoted to the Professor.

The activity of Professor was not restricted only to the national acoustic organizations. In the years 1966–1972 he chaired the worldwide organization, the International Commission for Acoustics (ICA). He was also a member of the European Acoustics Association (EAA) and Acoustical Society of America (ASA). He received the title of a Honorary Member of the Federation of Acoustical Societies of Europe (FASE, 1982), of which he was the Vice President in the period 1978–1982, as well as Acoustic Societies: Latin American (1968), Spanish (1972), and Indian (1980).

Beyond the scientific, organizational, professional, and teaching activities prof. Malecki managed to

find time and strength for social activities, both at home and abroad. In the years 1963–1968 he was a member of the Constant Committee of the Pugwash Conference – activity of scientists and Nobel laureates for disarmament and peace. He was a member of the General Council of the Main Technical Organization (Naczelna Organizacja Techniczna – NOT, 1949–1963). He served as the Chairman of the Scientific Council of the Central Institute for Labour Protection (Centralny Instytut Ochrony Pracy – CIOP, 1953–1969). He was the Chairman of the Technical Sciences Section for State Awards (1978–1982), then the Chairman of the Scientific and Technical Council of the Radio and Television (1982–1988). In the years 1991–2002 he served as a member of the Council of the International Biography Centre (IBC – Cambridge). In addition, in 1954–1958, he was a Councilor of the Warsaw-Centre district. He was also a board member of the circle of the Combatants and Former Political Prisoners Association at PAN (1989–2001).

In the personal life Professor had some very severe experiences. His only son Wojtek died tragically at the age of 22 on 15 August 1966, during climbing together with a friend (Marysia Konopacka) on Hrubý Wierch in the Slovak High Tatra Mountains. The cause of the accident could be a sudden weather breakdown. Wojtek was passionate about mountaineering and spent a lot of free time hiking. He was of extraordinary intelligence and inherited his father's ability in the field of science. Two months earlier (June 10) he passed his MSc exam at the Faculty of Physics of Warsaw University. Thirteen years later, on 23 December 1979, the



Fig. 6. Prof. Ignacy Malecki surrounded by the members of Warsaw Division of PTA during 49th OSA seminar in Stare Jabłonki, September 2002.



second wife of the Professor – Maria Tomczycka, died after a long and severe illness. The professor was very attached to her. She looked after Wojtek, whom she officially adopted, as her own son.

Difficult experiences and numerous responsibilities did not deprive Professor of cheerfulness. He was known for the ability of a very accurate assessment of the situation. Till the end of his life he retained the clarity of thinking and an unusual sense of humor. In a joking way, he willingly recalled anecdotes from his rich biography. Seeing a nice, but neglected lady Doctor, he jokingly referred to his fellows – “What this science can do of a woman”. Several times Professor traveled by plane to the United States. Being really busy, he usually did not have time to collect and arrange things carefully into his suitcase. One time, at the airport in New York, Professor’s luggage disappeared, as the only one of a large group of passengers. The airport service apologized and promised to deliver the suitcase to the hotel as soon as it would be found. Indeed, after a few hours the lost luggage was brought to him. How surprised Professor must have been seeing all his things neatly folded and arranged in the suitcase. Nothing was missing. The employees of the US Secret Service apparently felt obliged to make order after searching his luggage. At an already advanced age (90 years old) he met in Świętokrzyska Street a younger, retired scientist, who, however, barely moved with the aid of crutches. He recognized Professor with difficulty, stopped and asked “Are you maybe professor Malecki?”. “It’s really me.” answered friendly Professor. “And are you still alive?” at last exclaimed the scientist with an undisguised astonishment. Professor did not feel offended and humorously retold the situation to his friends.

Scientific activities of prof. Malecki covered a number of fields of acoustics, theory of vibration, and scientology. His publications concerned above all: room acoustics, architectural acoustics, protection against noise, electroacoustics, ultrasonic technique, quantum acoustics, and acoustic emission. His scientific output embraces 11 books and monographs and more than 230 articles (in part as co-authoring). Among the most important books in the chronological order are the following: *Architectural Acoustics* (ed. Building Research Institute, 1949), *Radio and Film Acoustics* (PWT, 1950), *Technique of Recording and Playing Back Sounds* (under the editorship, PWT, 1953), *Fighting Noise in Industrial Plants* (together with W. Kołtoński and W. Straszewicz, PWT, 1954), *Problems of Coordination of Scientific Research* (PWN, 1960), *Theoretical Fundamentals of Quantum Acoustics* (PWN, Library of Applied Mechanics, 1972), *Contemporary Acoustics and its Quantum Presentation* (PAN – Ossolineum, 1975), *Acoustic Emission – Sources, Methods, Applications* (under the editorship, ed. IPPT PAN, 1994). The last of the above monographs was the first in

the country and one of the few in the world, containing an attempt of a comprehensive presentation of the acoustic emission (AE), treated on the one hand as a physical phenomenon and on the other hand, as the research method for a wide range of applications. The most important publication of the Professor is the large monograph *Theory of Waves and Acoustic Systems* (PWN, 1964, 675 pages). It includes a theoretical approach to all problems of technical acoustics. Apart from the classical theory of acoustic fields and mechanical systems, the book contains original considerations of the Author. They concerned the ultrasonic technique, molecular acoustics, room acoustics, and hydro-location. This work was translated into English and published under the title *Physical Foundations of Technical Acoustics* (Pergamon Press – PWN, 1969, 743 pages) – (Fig. 7).

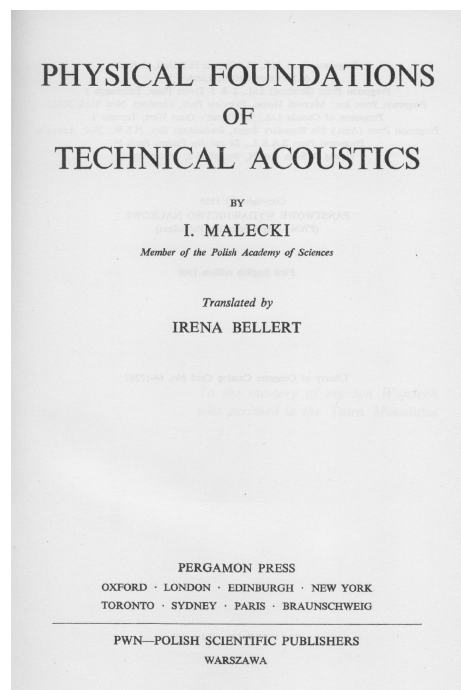


Fig. 7. View of the title page of the most important monograph by prof. I. Malecki, 1969.

A scientific activity has brought Professor a full recognition, both in the country and abroad. He received the honorable title of doctor *honoris causa* at Budapest University of Technology (8 September 1965), Academy of Mining and Metallurgy in Cracow (23 September 1982) and Gdańsk University of Technology (7 June 2002). The most important awards in the country included the individual Polish State Award of III degree for the experimental work on room acoustics (1952) and a II degree one for the group work in the field of ultrasonic waves propagation (1966, together with L. Filipczyński, Z. Pawłowski, and J. Wehr). In addition, Professor received the Golden Cross of Merit (1954), Crosses of the Order of the Restora-

tion of Poland: Officer's (1957), Commander's (1964), Commander's with Star (1973), as well as Golden Badges SEP (1959), NOT (1966), Warsaw University of Technology (1978), and the medals of various national institutions. The most important foreign awards are *French Order of Academic Palms* by the Prime Minister of France (1985), *Transenster* medal – for the scientific and technical achievements (University of Liège, Belgium, 1969), diplomas of International Societies of Non-destructive Testing – NDT (Tokyo, 1960 and Montreal, 1967), Honorary Diploma of the International Institute of Acoustics and Vibration – the IIAV (USA, Auburn University, 2003).

Professor Ignacy Malecki passed away suddenly on 12 June 2004 in Warsaw. He was buried in the Old Powązki Cemetery in Warsaw, place number 274, row 6 in the tomb of his second family Tomczyccy, together with his wife Maria Tomczycka, her relatives and the son Wojtek. The monument, made according to a special project, was chiseled out from granite after the tragic death of Wojtek in the Tatra Mountains. In 2005, Professor was commemorated with a special inscription on the board for the scientists of merit, placed at the second gate (of Saint Honorata) of Old Powązki Cemetery.

The authors would like to thank *Jerzy Narkiewicz-Jodko, PhD*, for collecting and arrangement of the materials for the biography and scientific activities of prof. Ignacy Malecki. At the same time, the authors point out that the source materials contain numerous inaccuracies and discrepancies. They concern primarily the biographical data, dates and titles of publications. Therefore, it was necessary to verify some of the data. Wherever a version was impossible to verify, the authors assumed the most probable one.

## References

1. *Who is Who in Poland*, Biographical Information (1984), [in Polish: *Kto jest kim w Polsce*, Informator biograficzny], Ed. I, p. 581, Wyd. Interpress, Warszawa.
2. RANACHOWSKI J. [Ed.] (1989), *Ignacy Malecki; The List of Publications of prof. I. Malecki, PhD; PhDs promoted under supervision prof. I. Malecki*, [in Polish: *Ignacy Malecki; Spis publikacji Prof. dra I. Maleckiego; Doktorzy promowani przez Prof. dra I. Maleckiego*], *Problemy i Metody Współczesnej Akustyki*, pp. 7–17, PWN, Warszawa – Poznań.
3. *Contribution of Prof. I. Malecki to the Polish School of Acoustics* (1993), *Archives of Acoustics*, **18**, 4, 487–505.
4. *The Golden Book of The Polish Science* (1999), [in Polish: *Złota Księga Nauki Polskiej*], p. 205, Wyd. HE-LION, Gliwice.
5. *Ignacy Malecki*, Professors and Docents of the Department of Electronics and Informational Techniques of Warsaw University of Technology, [in Polish: *Ignacy Malecki*, Profesorowie i Docenci Wydziału Elektroniki i Technik Informacyjnych Politechniki Warszawskiej 1951–2000], pp. 128–129, Oficyna Wyd. PW, 2000.
6. *Who is Who in Poland*, Biographical Information (2001), [in Polish: *Kto jest kim w Polsce*, Informator biograficzny], Ed. IV, p. 563, Wyd. PAI.
7. *Contemporary Polish Scientists*, Biographical Dictionary, [in Polish: *Współcześni Uczni Polscy*, Słownik Biograficzny], Wyd. Ośrodek Przetwarzania Informacji, Vol. III, pp. 61–62, Warszawa 2001.
8. *A Tribute from prof. Michał Białko – promoter of prof. Ignacy Malecki's honoris causa doctorate*, [in Polish: *Laudacja Prof. Michała Białki – promotora doktoratu honoris causa Prof. Ignacego Maleckiego*, Pismo Politechniki Gdańskiej, No. 6, pp. 4–6, 2002.
9. *The Department Book, on the 50th jubilee*, [in Polish: *Księga Wydziału, wydana z okazji Jubileuszu 50-lecia, 1952–2002*, Faculty of Electronics, Telecommunications and Informatics, Gdańsk University of Technology, Gdańsk 2002.
10. *50 years of the Institute of Fundamental Technological Research of the Polish Academy of Sciences 1952–2002*, [in Polish: *50 lat Instytutu Podstawowych Problemów Techniki Polskiej Akademii Nauk: 1952–2002*, Wyd. IPPT PAN, Warszawa 2002.
11. *Professor Ignacy Malecki – In memoriam* (2004), *Archives of Acoustics*, **29**, 3, 393–394.
12. AUGUSTYŃSKA D., ENGEL Z. (2004), *Prof. Ignacy Malecki, PhD – Recollections*, [in Polish: *Prof. zw. dr hab. Ignacy Malecki – Wspomnienie*], *Bezpieczeństwo Pracy – nauka i praktyka*, 7/8, 10–11.
13. *In Memory of Professor Ignacy Malecki (1912–2004)* (2004), *Acta Acustica united with Acustica*, **90**, 5, 994–995.
14. *MALECKI Ignacy (1912–2004)*, Biographical Dictionary of Polish Technicians, [in Polish: *MALECKI Ignacy (1912–2004)*, Słownik Biograficzny Techników Polskich], Wyd. Federacja Stowarzyszeń Naukowo-Technicznych, Vol. 18, pp. 92–95, Warszawa 2007.
15. *Ignacy Malecki (1912–2004)*, a website, [in Polish: *Ignacy Malecki (1912–2004)*, strona internetowa Instytutu Radioelektroniki Politechniki Warszawskiej, Nauczyciele Akademicy Wydziału Elektroniki i Technik Informacyjnych Politechniki Warszawskiej 1951–2011, biogramy: [http://www.elka.pw.edu.pl/pol/content/download/9539/63847/file/Malecki\\_Ignacy.pdf](http://www.elka.pw.edu.pl/pol/content/download/9539/63847/file/Malecki_Ignacy.pdf).
16. *Professor Ignacy Malecki*, Distinguished Polish Electricians, Directory of the Polish Society of Theoretical and Applied Electrotechnics, [in Polish: *Professor Ignacy Malecki*, Zasłużeni Elektrycy Polscy, Informator Polskiego Towarzystwa Elektrotechniki Teoretycznej i Stosowanej], No. 17, Poznań, December 2009.
17. ENGEL Z. (2012), *Recollections about Professor Ignacy Malecki at the centennial anniversary of his birth*, [in Polish: *Wspomnienie o Profesorze Ignacym Maleckim w setną rocznicę urodzin*], Proc. 59th Open Seminar on Acoustics, pp. 11–14, Poznań – Boszkowo.