## FIFTY YEARS OF THE ARCHIVE OF MECHANICAL ENGINEERING

In 1954, the quarterly "Archiwum Budowy Maszyn" was brought to life, and its origination was the fulfilment of resolution of the Division IV of Technical Sciences of the Polish Academy of Sciences. The magazine was dedicated to publishing scientific works on mechanical engineering, i.e. research on fundamental theoretical problems of design and construction of machines and mechanisms. Time goes fast, and this year we initiate the fifty-first year of existence of the Quarterly, published now under its present title "The Archive of Mechanical Engineering". The anniversary creates a good occasion for recapitulation and considerations on the future of the Quarterly, and for reminding achievements of the persons whose efforts made it possible to continue the publishing endeavour for half a century.

Trying to recapitulate the first ten years of existence of the Quarterly (1954-1964), the Editorial Board noted down the following facts: 226 papers were published in that period, consisting of works of 122 authors printed on over 6000 pages. Now we can say that, in the period of fifty years, 1357 papers have been published, which has taken more than 27 thousands of pages.

In the period of fifty years, there have been several changes at the positions of the Editor-in Chief, the Editorial Boards have also changed, and various Advisory Boards have been appointed. The magazine has invariantly been kept under the auspices of the Committee of Mechanical Engineering of the Polish Academy of Sciences. Only in early seventies, in the years 1971-72, the Committees that supervised the Quarterly were the Committee of Hydro-Thermodynamics of Machines and Chemical Engineering and the Committee of Machine Construction and Technology of the Academy. Table 1 presents the names of persons to whom we owe the foundation of the Quarterly, and whose efforts contributed to its regular publishing in the period of the first eighteen years. Undoubtedly, Professor Bohdan Stefanowski,

a Professor of Warsaw Technical University was the motive power that time; he assumed the standards and decided upon the directions of actions. Professor Stefanowski was given the rank of Full Member of the Polish Academy of Sciences already at the moment when the Academy was constituted in 1953. He was the main initiator of creating the Committee of Mechanical Engineering, and for several years held the position of its President. In Professor Stefanowski's view, publication of the Quarterly was an indispensable form of activity of the Committee. In the initial period, Professor Franciszek Misztal was the Quarterly's Deputy Editor-in-Chief. Professor Misztal was also a member of the Academy, and the President of its Division IV in the tenure of 1960-65. Later, the position of Deputy Editor-in-Chief was taken over by Professor Stanisław Król from Warsaw Technical University. Professor Król was, at the same time, a Vice-Rector of the University and the Dean of the Faculty of Automobile and Heavy Machinery Engineering. Many well-known, distinguished professors were members of the Advisory Board that time. One can mention Professor Jerzy Bukowski, the Rector of Warsaw Technical University (in the tenures 1952-55 and 1959-65), and a Member of the Polish Parliament during four terms. He was a person passionately engaged in many commendable actions, actively involved in the PUGWASH movement - the association of intellectuals campaigning for disarmament and international co-operation. Anotherr distinguished person to be mentioned is Professor Jan Odrefeld, who has been a close associate of the Quarterly since its origination. Professor Oderfeld, now a professor emeritus of Warsaw Technical University, is the creator of a new scientific discipline, the Theory of Machines and Mechanisms, which he originally developed in Poland. He was actively engaged in works of Polish Institution for Mathematics, Polish Standarizing Committee, Polish Association for Mechanics and took part in many other scientific and organizational enterprises.

In 1973, a Professor of Warsaw Technical University, Zbigniew Brzoska, was nominated the Editor-in-Chief. He was an expert of strength of the structures, specializing in aviation constructions, a member of the Committee of Mechanical Engineering, and since 1969 a Correspondent Member of the Polish Academy of Sciences. The composition of Editorial Boards in the period 1973-1984 is presented in Table 2. The position of the Deputy Editor-in-Chief was still occupied by Professor Stanisław Król. The Advisory Board was not appointed that time, however, there appeared three Branch Editors in the persons of Professors: Włodzimierz Prosnak, Jerzy Rutkowski, and Wiktor Jungowski. Since 1983, Professor Jan Oderfeld became the Deputy Editor-in-Chief.



Professor Bohdan Stefanowski



Professor Stanisław Król



Professor Zbigniew Brzoska



Professor Jan Oderfeld



Professor Marek Dietrich

Fig. 1. Persons who contributed most to the Quarterly

Table 1.

PERIOD	EDITORIAL BOARD	ADVISORY BOARD
1954÷1957	Editor-in-Chief Prof. Bohdan Stefanowski Deputy Editor-in-Chief Prof. Franciszek Misztal Assistant-to-the-Editor Dr Włodzimierz Prosnak	Professors Jerzy Bukowski Jan Oderfeld Zdzisław Rytel Robert Szewalski Witold Szymanowski
1958	Editor-in-Chief Prof. Bohdan Stefanowski Deputy Editor-in-Chief Prof. Franciszek Misztal Assistant-to-the-Editor Dr Jerzy Kacprzyński	Professors Jerzy Bukowski Jan Oderfeld Zdzisław Rytel Robert Szewalski Witold Szymanowski
1959	Editor-in-Chief Prof. Bohdan Stefanowski Deputy Editor-in-Chief Prof. Stanisław Król Assistant-to-the-Editor Dr Andrzej Jaworski	Professors Jerzy Bukowski Jan Oderfeld Zdzisław Rytel Robert Szewalski Witold Szymanowski
1960 1961	Editor-in-Chief Prof. Bohdan Stefanowski Deputy Editor-in-Chief Prof. Stanisław Król Assistant-to-the-Editor Dr Andrzej Jaworski	Professors Jerzy Bukowski Franciszek Misztal Jan Oderfeld Zdzisław Rytel Robert Szewalski Witold Szymanowski
1962÷1968	Editor-in-Chief Prof. Bohdan Stefanowski Deputy Editor-in-Chief Prof. Stanisław Król Assistant-to-the-Editor Dr. Rościsław Aleksandrowicz	Professors Jerzy Bukowski Franciszek Misztal Jan Oderfeld Zdzisław Rytel Robert Szewalski Witold Szymanowski
1969	Editor-in-Chief Prof. Bohdan Stefanowski Deputy Editor-in-Chief Prof. Stanisław Król Assistants-to-the-Editor: Dr. Rościsław Aleksandrowicz and Dr. Wiesław Łucjanek	Professors Jerzy Bukowski Franciszek Misztal Jan Oderfeld Zdzisław Rytel Robert Szewalski Witold Szymanowski
1970	Editor-in-Chief Prof. Bohdan Stefanowski Deputy Editor-in-Chief Prof. Stanisław Król Assistant-to-the-Editor Dr. Wiesław Łucjanek	
1971 1972	Editor-in-Chief Prof. Bohdan Stefanowski Deputy Editor-in-Chief Prof. Stanisław Król Assistant-to-the-Editor Dr. Wiesław Łucjanek	

Table 2.

PERIOD	EDITORIAL BOARD
1973	Editor-in-Chief Prof. Zbigniew Brzoska Deputy Editor-in-Chief Prof. Stanisław Król Assistant-to-the-Editor Dr. Wiesław Łucjanek
1974÷1976	Editor-in-Chief Prof. Zbigniew Brzoska Deputy Editor-in-Chief Prof. Stanisław Król Assistant-to-the-Editor Dr. Jacek Kapkowski
1977	Editor-in-Chief Prof. Zbigniew Brzoska Deputy Editor-in-Chief Prof. Stanisław Król Prof.Włodzimierz Prosnak Prof. Jerzy Rutkowski Assistant-to-the-Editor Dr. Jacek Kapkowski
1978	Editor-in-Chief Prof. Zbigniew Brzoska Deputy Editor-in-Chief Prof. Stanisław Król Prof. Jerzy Rutkowski Assistant-to-the-Editor Jacek Kapkowski
1979	Editor-in-Chief Prof. Zbigniew Brzoska Deputy Editor-in-Chief Prof. Stanisław Król Prof. Wiktor Jungowski Prof. Jerzy Rutkowski Assistant-to-the-Editor Dr. Jacek Kapkowski
1980	Editor-in-Chief Prof. Zbigniew Brzoska Deputy Editor-in-Chief Prof. Stanisław Król Prof. Wiktor Jungowski Prof. Jerzy Rutkowski Assistant-to-the-Editor MSc. Wiesław Opaliński
1981 1982	Editor-in-Chief Prof. Zbigniew Brzoska Deputy Editor-in-Chief Stanisław Król Prof. Jerzy Rutkowski Assistant-to-the-Editor MSc. Wiesław Opaliński
1983 1984	Editor-in-Chief Prof. Zbigniew Brzoska Deputy Editor-in-Chief Jan Oderfel Prof. Jerzy Rutkowski Assistant-to-the-Editor MSc. Wiesław Opaliński

In 1985, Professor Marek Dietrich was appointed the Editor-in-Chief of the Quarterly. At that time, Professor Dietrich, specialist of machine dynamics, biomechanics, safety and reliability of machinery, was a Vice Rector of Warsaw Technical University. He was also, since 1989, a Correspondent Member of the Polish Academy of Sciences, and a Member of the Committee of Biocybernetics and Biomedical Engineering of the Academy. Simultaneously, Professor Zenon Mróz, Professor Jan Oderfeld and Professor Jerzy Rutkowski were the Editorial Board members as the Branch Editors.

Table 3.

PERIOD	EDITORIAL BOARD
1985÷1991	Editor-in-Chief Professor Marek Dietrich Branch Editors Professor Zenon Mróz Professor Jan Oderfeld Professor Jerzy Rutkowski Assistant-to-the-Editor Dr. Witold Mirski

In 1991, Professor Marek Dietrich was elected the Rector of Warsaw Technical University, and this fact resulted in yet another change at the position of the Editor-in-Chief. The author of this essay was nominated for this post, and has been holding the position of the Editor-in-Chief of the Quarterly since then. There was also a change of one of the Branch Editors; Professor Jan Oderfeld was replaced by his disciple and collaborator, Professor Andrzej Olędzki. The composition of the Editorial Board in the period 1992÷1997 is shown in Table 4.

Table 4.

PERIOD	EDITORIAL BOARD
1992÷1997	Editor-in-Chief Professor Jacek Stupnicki Branch Editors Professor Zenon Mróz Professor Andrzej Olędzki Professor Jerzy Rutkowski Assistants-to-the-Editor: Dr. Witold Mirski, 1992÷1996 Teresa Marta Ludwikowska 1996—

In 1998, following the suggestion of Division IV of the Polish Academy of Sciences, the Committee of Mechanical Engineering passed a resolution that called for appointing a new, more numerous Advisory Board. The Board was formed, in majority, from the members of the Committee of Mechanical Engineering, who were employed in various Polish scientific centres. The main task of this body was to stimulate the activity of scientific circles, thus boosting the inflow of works submitted to the Quarterly, and to ensure that these would meet the criteria of high level and topicality. This, in consequence, would increase the interest in subscribing the Quarterly. Professor Marek Dietrich became the President of the Advisory Board. In the following year, some distinguished, well-known scientists from abroad were invited to join the Board. Among them we could find: Professor E. E. Gdoutos from the Democritos University of Trace in Greece, an expert specialising in construction theory of structures and experimental mechanics, Professor Masateru Ohnani from the Kyoto University in Japan, a recognised specialist of fundamentals of machine

design and theory of machines, Professor Fernand Ellyin from the University of Alberta in Canada, and Professor Grzegorz Glinka, a specialist of fracture mechanics from the Woaterloo University in Canada.

Table 5.

PERIOD	EDITORIAL BOARD	ADVISORY BOARD
1998 1999	Editor-in-Chief Prof. Jacek Stupnicki Branch Editors Professor Zenon Mróz Prof. Andrzej Olędzki Prof. Jerzy Rutkowski Assistant-to-the-Editor Teresa Marta Ludwikowska	Professors Marek Dietrich (President), Henryk Hawrylak, Ewald Macha, Andrzej Neimitz, Jan Ryś, Józef Szala, Edmund Wittbrodt, Stanisław Wojciech, Maciej Zarzycki E.E.Gdautos, Masateru Ohnani, Fernand Ellyin, Grzegorz Glinka
2000	Editor-in-Chief Prof. Jacek Stupnicki Branch Editors Prof. Tadeusz Ryszard Fodemski, Prof. Zenon Mróz Assistant-to-the-Editor Teresa Marta Ludwikowska	Professors Marek Dietrich (President), Henryk Hawrylak, Ewald Macha, Andrzej Neimitz, Jan Ryś, Józef Szala, Edmund Wittbrodt, Stanisław Wojciech, Maciej Zarzycki E.E.Gdautos, Masateru Ohnani, Fernand Ellyin, Grzegorz Glinka
2001÷2004	Editor-in-Chief Prof. Jacek Stupnicki Branch Editors Prof. Krzysztof Arczewski, Prof. Józef Knapczyk, Prof. Tadeusz Ryszard Fodemski, Prof. Zenon Mróz Assistant-to-the-Editor Teresa Marta Ludwikowska	Professors Marek Dietrich (President), Henryk Hawrylak, Ewald Macha, Andrzej Neimitz, Jan Ryś, Józef Szala, Edmund Wittbrodt, Stanisław Wojciech, Maciej Zarzycki E.E.Gdautos, Masateru Ohnani, Fernand Ellyin, Grzegorz Glinka

Since 2000, some of the positions of Branch Editors have been given to professors from Polish scientific centres out of Warsaw. This was a sign of the times. Previously, because of irresolvable communication problems, the condition of effective co-operation of the Editorial Board required that only the local scientists should be employed for this duty. The development of telecommunication, the Internet and the reliable electronic mail, caused that this requirement could be neglected, because the Editors from remote towns could effectively co-operate. Professor Jerzy Rutkowski was then replaced by

## THE ARCHIVE OF MECHANICAL ENGINEERING

ARCHIWUM BUDOWY MASZYN

Adres Redakcji: Instytut Techniki Lotniczej i Mechaniki Stosowanej PW ul. Nowowiejska 24, p. LOT-134, 00-665 Warszawa tel. 660-7448, fax: 628-25-87, E-mail: marta@meil.pw.edu.pl

Prof. dr hab. inż. Jacek Stupnicki Redaktor Naczelny Warszawa, 31.03.2004 r.

Szanowny Pan Profesor Krzysztof ARCZEWSKI Instytut Techniki Lotniczej i Mechaniki Stosowanej Politechniki Warszawskiej w miejscu

## Szanowny Panie Profesorze

W bieżącym roku mija 50 lat od chwili ukazania się pierwszego zeszytu kwartalnika Archiwum Budowy Maszyn, obecnie pod tytułem The Archive of Mechanical Engineering.

Uprzejmie zapraszam Pana Profesora na organizowane z tej okazji uroczyste posiedzenie Redakcji z udziałem Profesora Władysława Włosińskiego Przewodniczącego Wydziału IV PAN, członków Rady Redakcyjnej, Redaktorów oraz zaproszonych gości związanych z pracą Redakcji.

Spotkanie będzie okazją do podsumowania minionych 50 lat istnienia kwartalnika i sposobnością do dyskusji na temat spraw bieżących i przyszłości.

Spotkanie odbędzie się we wtorek 11 maja 2004 r. o godzinie 13<sup>00</sup> w sali seminaryjnej im. Prof. Brzoski (p. 135), w Gmachu Nowolotniczym Wydziału MEiL, ul. Nowowiejska 24, 00-665 Warszawa.

Pozostaję z poważaniem

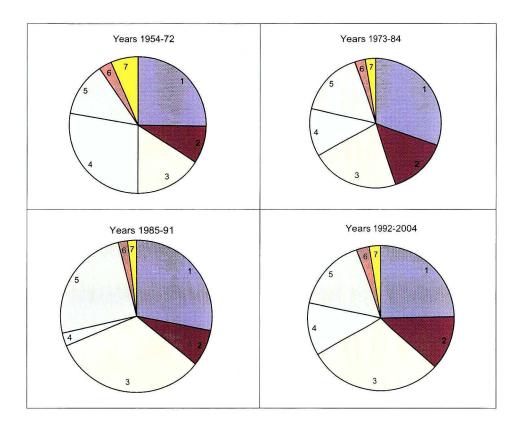


Fig. 3. Percentage representation of thematic groups in annual volumes of the Quarterly.

- 1. Mechanics of solid, strength of the structures
- 2. Fluid and gasdynamics, aerodynamics, flight mechanics
- 3. Fundamentals of machine design (fatigue strength of the structures, machine dynamics, wear, lubrication, transmissions, normalization, reliability, safety)
- 4. Thermodynamics, heat exchange, heat machinery
- 5. Theory of machines and mechanisms, vibrations
- 6. Production engineering
- 7. Other subjects (occasional reports, soil mechanics, biomechanics, economy)

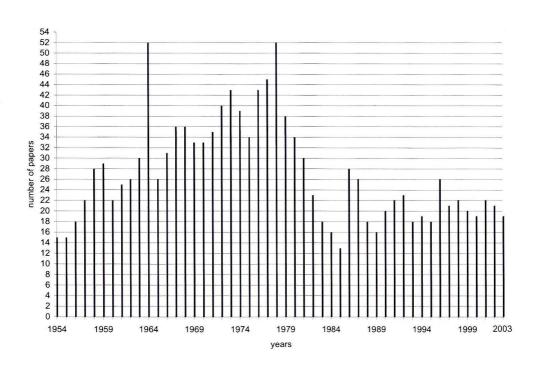


Fig. 2. The number of papers published in consecutive years

Professor Tadeusz Ryszard Fodemski from Technical University of Łódź, and, after Professor Andrzej Olędzki passed away, two new Branch Editors were appointed: Professor Krzysztof Arczewski from Warsaw Technical University, and Professor Józef Knapczyk from Technical University of Kraków. The composition of the Quarterly's Advisory Board and the Editorial Board in the period from 1998 till present is shown in Table 5.

During half a century of its work, the Editorial Board of the Ouarterly has acted in changeable and uneasy conditions. It is worth mentioning that for many years each issue of the Quarterly had to be approved by the Office for Inspection of Press and Publications, and without the censor's signature laid on each page of the manuscript, the article could not be submitted to print. Moreover, the authors had to obtain permission from the local authorities in their institutions for publishing results of research works. These rules were severe impediments, often causing a significant delay in the publishing process. In order to get the censor's approval, and to make the permission from the author's institution authorities easier to obtain, the authors sometimes opened their articles with the sentences like these: "Acting in accordance to the lines of the Party..." or "Referring to the pronouncement of Comrade Stalin....". When we read it now, it may all look ridiculous, and the sincerity of the authors seems apparently doubtful. However, there were positive aspects of the situation in the communist era, too. The authors were paid a fee for each paper in proportion to the size of the publication, and the Quarterly had a privilege of exclusiveness, to some extent. It followed on the fact that the number of Polish scientific magazines was limited, and publication of papers in foreign magazines required permission from high-level authorities, which was difficult for the authors to obtain. On the other hand, the libraries had reasonable subsidies for subscription of magazines, so the circulation of the Quarterly was high.

The graph in Figure 2 shows the number of papers published in consecutive years. It can be seen that the number of papers systematically increases in the years 1954-1978, starting from 15 papers published in the initial year, up to 52 papers in 1978. A record of 52 papers was first reached in the jubilee volume of 1964, on the tenth anniversary of the Quarterly's origination. The annual volume of 1978 again reached the same record amount of 52 papers. This issue was prepared for the fifties anniversary of the Institute of Aerodynamics. On this occasion, Professor Jerzy Bukowski wrote a special editorial, and 26 other authors from the Institute contributed with their papers reporting on the research on mechanics of fluids and gases, aerodynamics and flight mechanics.

The crisis of the early eighties brought about a breakdown of scientific production in Poland, in result of which only 13 works were published in 1985. The following years, when system transformations and the formation of marketd economy were under way, were not favourable for publishers of Polish scientific magazines, either. The factors that made the situation even more difficult for us were the possibilities of publishing in foreign magazines, opened again for Polish authors, and an explicit declaration by the Committee for Scientific Research that publications in foreign journals would have preferences in evaluation of scientific units, and in the assessment of Grant results. The result was that Polish authors became less interested in publishing their papers in the Quarterly. The data presented in Figure 2 show that presently we are able to publish, on average, about 20 papers per year. According to the Editorial Board records, about 70% of the submitted papers are accepted for publication, usually with numerous corrections due to the remarks of the reviewers.

Figure 3 presents a percentage distribution of papers belonging to the seven thematic groups. The graphs were drawn for the four periods of existence of the Quarterly, during the tenures of the four above-mentioned Editors-in-Chief. The periods were all different, because of different conditions of scientific research and the changing situation on the publishing market. When we analyse the graphs in Fig. 3, we should remember that the qualification of papers to specific groups was done subjectively, and often some papers could have been qualified to several different groups. However, the analysis of the graphs could reveal how the fields of interest of the authors changed in time, and how the personality of the Editor-in-Chief influenced the profile of the Quarterly. In the first period, when Professor Bohdan Stefanowski reigned over the Editorial Board, there were many papers belonging to the fourth thematic group, i.e. those associated with the area of thermodynamics, heat exchange, heat machinery (over 27% of papers). In the following periods, the papers classified to this thematic area flowed away to the Archives of Thermodynamics and to the Archives of Combustion, and in nineteen eighties they represented barely 3% of all published works. However, in the years 2000-2002, the heat-related thematic area started growing again, and now it constitutes 12% of the Quarterly's content.

In the period when the Editorial Board was lead by Professor Zbigniew Brzoska, one observed an increasing number of papers belonging to group 1, associated with mechanics of solids and strength of the structures (over 31% of published works), while the papers of group 3 (fundamentals of machine design) constituted 22% of the Quarterly's content. In the period when

Professor Marek Dietrich held the post of the Editor-in-Chief, the amount of papers belonging to group 3 (fundamentals of machine design) increased to 32%, and those related with group 5 (theory of machines and mechanisms) raised to 24%. Recently, we observe a relative balance between the main thematic groups (i.e. we have the following distribution: group 1-24%, group 2-12%, group 3-29%, group 4-12% and group 5-16%). Another fact that must be assessed positively is the increasing number of works submitted by authors from scientific centres out of Warsaw, and those of by foreign authors.

In the initial period of existence of the Quarterly, most of the papers were written in Polish, and were provided with short abstracts in English and Russian. On request of the authors, the works could be published in congress languages, i.e. in English, German French or Russian, and foreign authors normally choose this option. In 1989, Professor Marek Dietrich, the acting Editor-in-Chief of the Quarterly, following to the suggestions of Prof. Jan Oderfeld took the decision to change the language of all publications to English, with short abstracts in Polish. It was an important decision. Although the number of potential authors was reduced, but, at the same time, the range of influence of the Quarterly was widened, and the magazine gained the possibility of access to libraries abroad, thus becoming more interesting for foreign readers and authors.

The Quarterly, similarly as most of scientific technical magazines in Poland, can be published owing to the subsidies which the Ministry of Scientific Research and Information Technology transfers to Division IV of the Polish Academy of Sciences. The Quarterly's existence, however, would not be possible without neither the commitment of the Editors, who do their work gratuitously, nor without the permission of the authorities in universities and research units, who allow the Editors to use freely the premises, equipment, telephones, computers, e-mail, etc. These institutions, namely the Technical Universities of Łódź, Kraków and Warsaw, and the Institute of Fundamental Technologicalical Research of the Polish Academy of Sciences, are in fact the co-sponsors of the Quarterly. The funds obtained from the Ministry, which are included into the budget of Division IV of the Academy, cover the expenses of language verification, computer typesetting, printing, costs of paper, and the fee for the Assistant-to-the-Editor. The contribution of the co-sponsors is, in the opinion of the Editorial Board, at least comparable to that offered by the Ministry.

In its fifty-year history, the Quarterly has had to adapt to changing conditions of its environment. Presently, we witness revolutionary changes on the market of scientific publications, resulting from the possibility of producing publications in an electronic form. This form of publication has many advantages, which are consist in, first of all, fast proliferation and wide access to information. An article, immediately after being accepted for publishing, may appear on the web without waiting for the completion of the whole volume of the magazine. The readers may also have access on the web to all references quoted by the author. The number of readers of a paper can be registered automatically, which is an important information for the author, and can be a basis for accounting the copyright fees. These possibilities are so fascinating that probably most of the magazines will soon assume this form of publication, without paying attention to fundamental dangers that accompany it, such as: diminishing the role of the Editorial Board, difficulties in maintaining the character of the magazine, commercialisation of the access to scientific information, and unclear rules of how to divide the copyrights benefits between the author and the publisher.

The Editorialing Board is aware of these dangers. Nevertheless, we have to consider the world trends, and we undertake negotiations about the possibility of publishing the Archives of Mechanical Engineering in two parallel forms, printed and electronic one, starting from the beginning of 2005. We will inform the Readers about the resolutions of the talks with the Division IV and the Committee of Mechanical Engineering of the Polish Academy of Sciences on this matter.

Finally, as an acting Editor-in-Chief of the Quarterly, I would like to express my gratitude to the sponsors, the Ministry of Scientific Research and Information Technology, and Division IV of the Polish Academy of Sciences for the financial support of our enterprise. I convey my thanks to all Editors, who have worked for many years in behalf the Quarterly. I would like to praise all Reviewers, on whom we can always count, and who have devoted a lot of effort in evaluating the works, detecting errors and criticising imperfections, in order to show the ways of improvement of the publication. I give thanks to the Authors, who have entrusted us with the effects of their work, and might often have moments of frustration when they had to face the criticism from the Reviewers. Although some of the authors had to introduce numerous corrections to their papers, they later often felt grateful, as they realised that, by revealing the week points, the criticism helped them to improve the quality of publication.

Thanks to the competent work of the Editors and the Reviewers, the Quarterly enjoys a good opinion reputation among the readers, and is highly valued by the assessing bodies of Division IV of the Polish Academy of Sciences and the Ministry of Scientific Research and Information Technology. I would like to thank the President and the Members of the present

Advisory Board for their efforts to maintain the standard of the Quarterly. Finally, I would like to express my gratitude to all Assistants-to-the-Editor. In the period of fifty years, they have played an often-stressing role of intermediaries between the Editorial Board, the authors, the reviewers, the printers and the authorities of the Academy.

Jacek Stupnicki
Editor-in-Chief
of The Archive of Mechanical Engineering

English translation by Dr. Lech K. Śliwa