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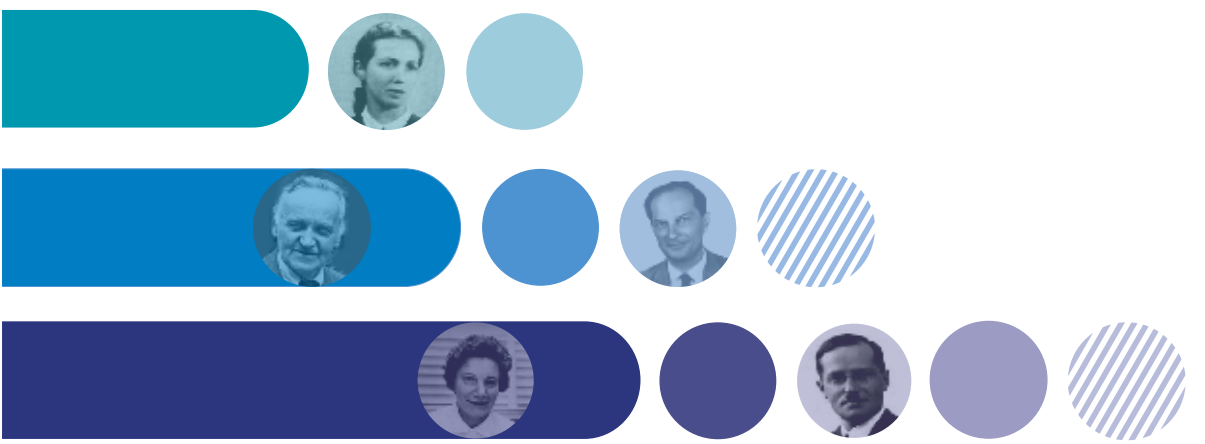
BIOGRAPHICAL NOTES



Warsaw 2018

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Dear Readers

Breakthroughs in the life of a nation always provoke thoughts on its past, economic, social and scientific achievements. This year's centenary of regaining independence by Poland and the 100th anniversary of the establishment of Statistics Poland provide an opportunity to remind and popularise pioneers and outstanding Polish statisticians. With this in mind, a publication entitled Polish statisticians was created.

The aim of the publication is to preserve the memory of the people who contributed to the organisation, development and popularisation of statistics in Poland and in the international arena. The publication presents biographies of thirty persons – eminent scientists and educators, discoverers of new methods and theories – who made a significant contribution to the development of statistics. Reading the biograms brings closer the evolution of statistical thought and helps to understand its universality, indicating the links with other disciplines of science.

We hope that this publication will be a valuable item in the library of every reader interested in statistics as a science describing the world around us and the phenomena occurring in it.

Chairman
Polish Statistical Association

Professor Czesław Domański

President
Statistics Poland

Dominik Rozkrut Ph. D.

Warsaw, June 2018

Editorial Board

Introduction

Achievements of Polish statistics have been significant in the international arena for several decades and we cannot forget about their creators. In order to preserve the memory of all the people who, by their scientific, didactic, publishing, organising and popularising work, created the basis for the development of statistics in Poland, we prepared a publication entitled "Polish statisticians".

By introducing this publication to the Readers on the hundred anniversary of the establishment of Statistics Poland, we hope that it will enrich the knowledge of the history of Polish statistics.

The characters, whose biographies are provided in this publication, were selected as a result of careful thought of the Editorial Board. The chosen ones are people known for their outstanding scientific and didactic activity, authors of research works and coursebooks, creators of new concepts, discoverers of new methods and theories, prominent organisers of official statistics as well as editors and publishers of statistical publications.

Careful attention was devoted to the selection of the authors of biograms also. Aiming at the credibility of provided information, the personal and environmental closeness of the author of the biogram to the described character as well as easy access to the source materials were considered as a priority.

The Editorial Board of the publication would like to thank all the people who contributed to the creation of this work, and, above all, the authors of the individual biograms.

We would like to separately express gratitude to Dr Dominik Rozkrut – the President of Statistics Poland, for his kindness and support, without which this publication could not have appeared.

EDITORIAL BOARD

Contents

Jerzy K. BAKSALARY
(1944–2005)

Jerzy K. Baksalary was born in Poznań on 25th June 1944. He studied mathematics at the Faculty of Mathematics, Physics and Chemistry of the Adam Mickiewicz University in Poznań, where he earned the master's degree in 1969. Immediately after his graduation, he was employed at the Mathematics at the Higher School of Agriculture (which changed its name to Agricultural University in 1972, and in 2008 – to the Poznań University of Life Sciences). In 1975, this chair was incorporated into the inter-faculty Department of Mathematical and Statistical Methods of the Agricultural University in Poznań. At that Department, currently a Chair, Jerzy K. Baksalary worked until 1988. In 1975, he earned a doctorate in mathematical sciences based on the dissertation titled *Possibility of estimation of parametric functions in linear models* (Estymowalność funkcji parametrycznych w modelach liniowych) written under the supervision of professor Tadeusz Caliński, Ph.D. He earned his degree of doctor habilitatus in mathematical sciences in the field of mathematics in 1984 on the basis of the dissertation titled *A study of the equivalence between a Gauss-Markoff model and its augmentation by nuisance parameters*, published in Series Statistics 15 (1984) 3–35; he earned both degrees at the Adam Mickiewicz University (at the Faculty of Mathematics, Physics and Chemistry and the Faculty of Mathematics and Physics respectively). At that time, i.e. until 1988, Jerzy K. Baksalary published 85 papers, including 53 before and 32 after the habilitation. Mathematics was not the only one area of Jerzy K. Baksalary activity – he also took part in civic activity. In 1980–1981, he was one of the organisers and activists of Solidarity at the Agricultural University and the Poznań region.

In 1988, Jerzy K. Baksalary moved to Zielona Góra, where he took up a post of docent at the Institute of Higher Mathematics of the Tadeusz Kotarbiński Pedagogical University (WSPTK). The academic year 1989/1990 was a significant year in Professor Baksalary's career. As a professor of the Finnish Academy of Science and Letters, he conducted research at the University of Tampere, which resulted in publication of 22 papers dated 1989 or 1990 (as the author or a co-author). In 1990, on request submitted by the Coun-

cil of the Faculty of Mathematics and Physics of the Adam Mickiewicz University, he was awarded the academic title of Professor of Mathematical Sciences.

Having returned from Finland, Professor Baksalary combined his academic work with administrative activities. In 1990, he became the rector of the WSPTK, and he held this honourable function for two subsequent terms (1990–1993 and 1993–1996). At that time, he strengthened the staff of the institution and expanded its offer for students e.g. by establishing the Institute of Management, the Institute of Philosophy, foreign language colleges, and new academic courses, not strictly related to pedagogy. His publication record between 1991 and 1996 includes 23 papers. The Pedagogical University became a place for annual meetings of mathematicians during the conferences titled *Zielona Góra's Coallitions* (Konfrontacje Zielonogórskie). At the WSPTK, Rector Baksalary laid foundations for a modern academic centre, which was important for the establishment of the University of Zielona Góra in 2001. In 1991, Jerzy K. Baksalary became a full professor at the Faculty of Mathematics, Physics and Technology of the WSPTK, and when his term of office as rector expired, he became the dean of that faculty in 1996–1999. Since 2001, i.e. since the University of Zielona Góra was established, he was the head of the Department of Linear Algebra and Mathematical Statistics at the Faculty of Mathematics, Computer Science and Econometrics.

Jerzy K. Baksalary supervised four doctoral students to completion: Paweł Pordzik (dissertation: *Testimators of parametric functions in linear models* – Testymatory funkcji parametrycznych w modelach liniowych), Zenon Tabis (dissertation: *Robustness and minimality of linear models due to possibility of estimation of parametric functions* – Odporność i minimalność modeli liniowych ze względu na estymowalność funkcji parametrycznych), Augustyn Markiewicz (dissertation: *Admissible linear estimators in linear models* – Dopuszczalne estymatory liniowe w modelach liniowych), and Idzi Siatkowski (dissertation: *Linear models with two groups of interrupt parameters* – Modele liniowe z dwiema grupami parametrów wtrąconych); all the dissertations were written at the Adam Mickiewicz University (in 1985, 1985, 1988, and 1990 respectively). In the final period of his academic career, he supervised three female doctoral students.

Professor Baksalary reviewed doctoral dissertations and habilitation theses, and motions for the academic title. He was a member of editorial teams of three well-known journals (in 1987–1990): "Journal of Statistical Planning and Inference", and since 2001: "Current Index to Statistics", and "IMAGE"), and a co-editor of a special volume of the "Journal of Statistical Planning and Inference" (36, No. 2–3 (1993)), and a special volume of "Linear Algebra and Its Applications" (176 (1992)). He took part in many international academic conferences and was often invited to give a plenary lecture.

Jerzy K. Baksalary conducted research at such academic centres as: Indian Statistical Institute (India), University of Tampere (Finland), McGill University and University of Waterloo (Canada), Universität Dortmund and Universität Augsburg (Germany), and Pittsburg University and Pennsylvania State University (USA). At those places, he gave public presentations, submitted his results and lectured.

In 1999–2005, professor Baksalary took active part in the workshop on the theory of matrices and application of linear algebraic methods, which was held at the Agricultural University in Poznań. Other participants included: Professor A. Markiewicz, Dr hab. T. Szulc, Dr O.M. Baksalary, Dr J. Hauke, and a group of doctoral students from the Adam Mickiewicz University, Agricultural University, and the State Higher Vocational School in Gorzów Wielkopolski. PLAG, as the workshop was called by Jerzy K. Baksalary (acronym of Poznań Linear Algebra Group) continues its meeting and keeps up to date with the main trends of world literature, as it was in 1999–2005.

Jerzy K. Baksalary is an author or co-author of 183 academic publications, the vast majority of which has been published in renowned global journals. He conducted his research in cooperation with a broad range of collaborators (18 people in Poland and 26 foreign partners).

Jerzy K. Baksalary's academic interests included various problems at the crossroads of matrix algebra and statistical inference in linear models. As regards matrix algebra, note the following research directions, which led to frequently cited results:

1. matrix equations (e.g.: *The matrix equation* AX – YB = C. "Linear Algebra and Its Applications" 25 (1979) 41-43 (co-author: R. Kala), *Nonnegative definite solutions to some matrix equations occurring in distribution theory of quadratic forms. Sankhyā*, Series A 42 (1980) 283-291 (co-authors: J. Hauke, R. Kala), *The matrix equation* AXB + CYD = E. "Linear Algebra and Its Applications" 30 (1980) 141-147 (co-author: R. Kala), *The pair of matrix equations* AX = B *and* A*Y + CX = D. "Atti Della Accademia Nazionale dei Lincei, Rendiconti della Classe di Scienze Fisiche, Matematiche e Naturali" 73 (1982) 81-88, *Nonnegative definite and positive definite solutions to the matrix equation* (AXA)* = B. "Linear and Multilinear Algebra" 16 (1984) 133-139).

2. Matrix ordering (e.g.: *Two properties of a nonnegative definite matrix*. "Bulletin de l'Academie Polonaise des Sciences, Serie des Sciences Mathematiques" 28 (1980) 233-235 (co-author: R. Kala), *Partial orderings between matrices one of which is of rank one*. "Bulletin of the Polish Academy of Sciences, Series Mathematics" 31 (1983) 5-7 (co-author: R. Kala), *The matrix inequality* M ≥ B*MB. "Linear Algebra and Its Applications" 54 (1983) 77-86 (co-authors: R. Kala, K. Kłaczyński), *Inheriting independence and chi-squaredness under certain matrix orderings*. "Statistics&Probability Letters" 2 (1984) 35-38 (co-author: J. Hauke), *A note on the matrix ordering of special C-matrices*. "Linear Algebra and Its Applications" 70 (1985) 263-267 (co-author: F. Pukelsheim), A *relationship between the star and minus orderings*. "Linear Algebra and Its Applications" 82 (1986) 163-167, *Partial orderings of matrices referring to singular values or eigenvalues*. "Linear Algebra and Its Applications" 96 (1987) 17-26; "Comments Ibid." 360 (2003) 279 (co-author: J. Hauke), *A note on comparing the unrestricted and restricted least squares estimators*. "Linear Algebra and Its Applications" 127 (1990) 371-378 (co-author: P. Pordzik), *A complete solution to the problem of robustness of Grubbs's test*. "The Canadian Journal of Statistics" 18 (1990) 285-287 (co-author: S. Puntanen), *Characterizations of the best linear unbiased estimator in the general Gauss-Markov mod-*

el with the use of matrix partial orderings. "Linear Algebra and Its Applications" 127 (1990) 363-370 (co-author: S. Puntanen), *Further relationships between certain partial orders of matrices and their squares*. "Linear Algebra and Its Applications" 375 (2003) 171-180 (co-authors: O.M. Baksalary, X. Liu)).

3. Properties of selected matrix classes (e.g.: *Idempotency of linear combinations of an idempotent matrix and a tripotent matrix*. "Linear Algebra and Its Applications" 354 (2002) 21-34 (co-authors: O.M. Baksalary, G.P.H. Styan), *A property of orthogonal projectors*. "Linear Algebra and Its Applications" 354 (2002) 35-39 (co-authors: O.M. Baksalary, T. Szulc), *Nonsingularity of linear combinations of idempotent matrices*. "Linear Algebra and Its Applications" 388 (2004) 25-29 (co-author: O.M. Baksalary), *On linear combinations of generalized projectors*. "Algebra and Its Applications" 388 (2004) 17-24 (co-author: O.M. Baksalary), Solution 31-7.1 (problem 31-7 "On the product of orthogonal projectors" presented by G. Trenkler). IMAGE 32 (2004) 30-31 (co-author: O.M. Baksalary), *Further properties of generalized and hypergeneralized projectors*. "Linear Algebra and Its Applications" 389 (2004) 295-303 (co-authors: O.M. Baksalary, X. Liu), Solution 31-2.1 (problem 31-2, "Matrices commuting with all nilpotent matrices" presented by H. Ricardo). IMAGE 32 (2004) 21-22 (co-authors: O.M. Baksalary, X. Liu), *A note on linear combinations of commuting tripotent matrices*. "Linear Algebra and Its Applications" 388 (2004) 45-51 (co-authors: O.M. Baksalary, H. Özdemir), *Properties of Schur complements in partitioned idempotent matrices*. "Linear Algebra and Its Applications" 379 (2004) 303-318 (co-authors: O.M. Baksalary, T. Szulc)).

As regards statistical inference, the most frequently cited results are related to:

1. Estimability and estimation of parametric functions in uni- and multidimensional models (e.g.: *Criteria for estimability in multivariate linear models*. "Mathematische Operationsforschung und Statistik" 7 (1976) 5-9 (co-author: R. Kala), *Extensions of Milliken's estimability criterion*. "The Annals of Statistics" 4 (1976) 639-641 (co-author: R. Kala), *An extension of a rank criterion for the least squares estimator to be the best linear unbiased estimator*. "Journal of Statistical Planning and Inference" 1 (1977) 309-312 (co-author: R. Kala), *Reconciliation of two different views on estimation of growth curve parameters*. "Biometrika" 65 (1978) 662-665 (co-authors: L.C.A. Corsten, R. Kala), *Best linear unbiased estimation in the restricted general linear model*. "Mathematische Operationsforschung und Statistik, Series Statistics" 10 (1979) 27-35 (co-author: R. Kala), *Covariance adjustment when a vector of parameters is restricted to a given subspace*. "SIAM Journal on Applied Mathematics" 37 (1979) 20-21 (co-author: R. Kala), *Estimation via linearly combining two given statistics*. "The Annals of Statistics" 11 (1983) 691-696 (co-author: R. Kala)).

2. Relations between estimators in general linear models (e.g.: *A bound for the Euclidean norm of the difference between the least squares and the best linear unbiased estimators*. "The Annals of Statistics" 6 (1978) 1390-1393(co-author R. Kala), *Relationships between some representations of the best linear unbiased estimator in the general Gauss-Markoff model*. "SIAM Journal on Applied Mathematics" 35 (1978) 515-520 (co-author: R. Kala),

A new bound for the Euclidean norm of the difference between the least squares and the best linear unbiased estimators. "The Annals of Statistics" 8 (1980) 679-681 (co-author: R. Kala), *Simple least squares estimation versus best linear unbiased prediction*. "Journal of Statistical Planning and Inference" 5 (1981) 147-151 (co-author: R. Kala), *On equalities between BLUEs, WLSEs, and SLSEs*. "The Canadian Journal of Statistics" 11 (1983) 119-123 (co-author: R. Kala), *Comparing stochastically restricted estimators in a linear regression model*. „Biometrical Journal" 26 (1984) 555-557, *Criteria for the equality between ordinary least squares and best linear unbiased estimators under certain linear models*. "The Canadian Journal of Statistics" 16 (1988) 97-102, *A comparison of two criteria for ordinary least squares estimators to be best linear unbiased estimators*. „The American Statistician" 42 (1988) 205-208 (co-author: A.C. van Eijnsbergen), *A note on comparing the unrestricted and restricted least-squares estimators*. "Linear Algebra and Its Applications" 127 (1990) 371-378 (co-author: P. Pordzik)).

3. Linear sufficiency, which was an issue that was later discussed by other authors and found its place in the linear inference theory (e.g,: *Linear transformations preserving best linear unbiased estimators in a general Gauss-Markoff model*. "The Annals of Statistics" 9 (1981) 913-916 (co-author: R. Kala), *Linear sufficiency with respect to a given vector of parametric functions*. "Journal of Statistical Planning and Inference" 14 (1986) 331-338 (co-author: R. Kala), *Linear sufficiency and completeness in an incorrectly specified general Gauss-Markov model. Sankhyā*, "Series A" 48 (1986) 169-180 (co-author: T. Mathew).

4. Admissibility of estimators (e.g.: *Admissible estimation by covariance adjustment technique. Sankhyā*, "Series A" 44 (1982) 281-285 (co-author: R. Kala), *Admissible linear estimators in restricted linear models*. "Linear Algebra and Its Applications" 70 (1985) 9-19 (co-author: A. Markiewicz), *Characterizations of admissible linear estimators in restricted linear models*. "Journal of Statistical Planning and Inference" 13 (1986) 395-398 (co-author: A. Markiewicz), *A comment on an admissibility criterion*. "Journal of Statistical Computation and Simulation (Comments, Conjectures and Conclusions)" 28 (1988) 345-347, *Admissible linear estimators in the general Gauss-Markov model*. "Journal of Statistical Planning and Inference" 19 (1988) 349-359 (co-author: A. Markiewicz), *Admissible linear estimation in a general Gauss-Markov model with an incorrectly specified dispersion matrix*. "Journal of Multivariate Analysis" 27 (1988) 53-67 (co-author: T. Mathew), *Mean square error matrix improvements and admissibility of linear estimators*. "Journal of Statistical Planning and Inference" 23 (1989) 313-325 (co-authors: E. P. Liski, G. Trenkler), *A matrix inequality and admissibility of linear estimators with respect to the mean square error matrix criterion*. "Linear Algebra and Its Applications" 112 (1989) 9-18 (co-author: A. Markiewicz), *Admissible linear estimators of an arbitrary vector of parametric functions in the general Gauss-Markov model*. "Journal of Statistical Planning and Inference" 26 (1990) 161-171 (co-author: A. Markiewicz)).

5. Block design theory (e.g.: *A necessary condition for balance of a block design*. "Biometrical Journal" 22 (1980) 47-50 (co-authors: A. Dobek, R. Kala), *Some methods for constructing efficiency-balanced block designs*. "Journal of Statistical Planning

and Inference" 4 (1980) 25-32 (co-authors: A. Dobek, R. Kala), *Existence and constructions of connected block designs with given vectors of treatment replications and block sizes*. "Journal of Statistical Planning and Inference" 12 (1985) 285-293 (co-author: Z. Tabis), *On bounds for the parameters of binary block designs*. „Journal of Statistical Planning and Inference (Statistical Discussion Forum)" 16 (1987) 134-1350 (co-author: P.D. Puri), *Conditions for the robustness of block designs against the unavailability of data*. "Journal of Statistical Planning and Inference" 16 (1987) 49-54 (co-author: Z. Tabis), Connectedness of PBIB designs. "The Canadian Journal of Statistics" 15 (1987) 147-150 (co-author: Z. Tabis), *Criteria for the validity of Fisher's condition for balanced block designs*. "Journal of Statistical Planning and Inference" 18 (1988) 119-123 (co-author: P.D. Puri), *A rank characterization of linear models with nuisance parameters and its application to block designs*. "Journal of Statistical Planning and Inference" 22 (1989) 173-179, *Pairwise-balanced, variance-balanced and resistant incomplete block designs revisited*. "Annals of the Institute of Statistical Mathematics" 42 (1990) 163-171 (co-author: P.D. Puri), *Minimum number of experimental units in connected block designs with certain additional properties*. "Journal of Statistical Planning and Inference" 30 (1992) 173-183 (co-author: J. Hauke)).

In 2004, a one-day session on the occasion of the 60th birthday anniversary of Jerzy K. Baksalary was held at the Mathematical Research and Conference Centre of the Polish Academy of Sciences in Będlewo. This session preceded the international conference titled "13th International Workshop on Matrices and Statistics in Celebration of Ingram Olkin's 80th Birthday" – the last conference that Professor Baksalary took part in.

Professor Baksalary had many interests not directly related to his career. His passion for jazz music dates back to his college days. Among his favourite musicians were: John Coltrane, Miles Davis, Oscar Peterson, and Sonny Rollins (the professor had an impressive record collection). He was also passionate about paintings, particularly the Dutch painters of the 17th century and French artists of the 19th century. He tried to implement his plan to see all of the 36 works by Johannes Vermeer with an admirable determination. Unfortunately, he managed to see only 20 of them. Professor Baksalary also had a remarkable memory, which allowed him to list International winners of the Fryderyk Chopin Piano Competition or places where Olympic games where held equally easily.

Professor Jerzy K. Baksalary died on 8th March 2005 and is buried at the Junikowo Cemetery in Poznań.

During the numerous conferences in which he participated, Professor Baksalary used to sit in the front row. Organisers of the fourteenth conference of the "International Workshop on Matrices and Statistcs" cycle, which was held in Auckland, New Zealand, from 29th March to 1st April 2005, commemorated Jerzy Baksalary by a special session: "The Jerzy Baksalary Memorial Session". A single seat in the front row was unoccupied throughout the event.

In June 2005, a symposium titled "Southern Ontario Matrices and Statistics Days", dedicated to the memory of Jerzy K. Baksalary, where he was originally invited as a speaker, was held at the University of Windsor, Canada.

The author would like to thank Professor Radosław Kala and Dr Oskar M. Baksalary for their help in preparing this biographical note.

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Szulc T., *Jerzy K. Baksalary*. "Wiadomości Matematyczne" 2005, XLI, pp. 189-205.

TOMASZ SZULC

Stefan BARBACKI (1903–1979)

Stefan Barbacki was born in Wieliczka on 1st September 1903. In 1913–1921, he attended the 5th Classical Gymnasium in Cracow, and then, in 1921–1925, studied at the Faculty of Philosophy and the Faculty of Agriculture of the Jagiellonian University. During his final year of studies, he was an assistant to Professor Edmund Załęski, the pioneer of agricultural biometry in Poland, and took part in the works on cereal and sugar beet breeding under the professor's supervision. In 1925–1945, Stefan Barbacki worked at the State Research Institute of Rural Husbandry in Puławy, first as a senior assistant at the Department of Cereal Breeding and Genetics, then as an assistant professor at the Department of Fodder and Industrial Crops, and, from 1944 on, the head of the Department of Plant Variety Studies.

He earned his doctoral degree at the Faculty of Agriculture of the Jagiellonian University in 1929, on the basis of a dissertation on the studies of winter wheat varieties. In the academic year 1935/36, as a Rockefeller Foundation scholarship holder, he underwent an academic apprenticeship in London, at the Galton Laboratory, University College London, under the supervision of the world famous Professor Ronald Aylmer Fisher. At that institution, Stefan Barbacki studied mathematical statistics and its applications in experimentation and genetics, and took the opportunity to visit some research institutes in England, France, Denmark, Sweden and Germany. In 1938, as the vice-chair of the Methodological Section of the Commission for Cooperation in Experimental Research at the Ministry of Agriculture, he contributed to the establishment of the scientific journal titled *Overview of Agricultural Experimentation (*Przegląd Doświadczalnictwa Rolniczego), and became its editor. This monthly, which had very ambitious goals, was intended to play an important role in improving the methodological level of experimental research agriculture.

During his pre-war career, he published a number of works on genetics, cereal breeding and cultivation, and methodology of agricultural experimentation (including a joint work with R.A. Fisher titled *A test of the supposed precision of systematic arran-*

gements published in "Annals of Eugenics", Cambridge 1936). Moreover, he wrote his basic methodological textbook *The general methodology of field experiments in outline* (Ogólna metodyka doświadczeń polowych w zarysie) (Puławy 1935), and monographs: *Polish wheat* (Pszenice polskie) (Puławy 1937; co-authored by S. Lewicki, K. Miczyński, and A. Słaboński) and *Analysis of variance in agricultural experiments* (Analiza zmienności w zagadnieniach doświadczalnictwa rolniczego) (Puławy 1939). Unfortunately, all copies of the latter book were destroyed in September 1939 due to the war. Only the proof copies miraculously survived. It might be worth quoting a fragment of this monograph concerning the role of statistical methods in research:

"The statistical methods are helpful not only in reducing the numerical data, but also transforming them in such a way that they receive their actual meaning in the reduced form. At present, these methods not only facilitate the interpretation and description, but also enter much deeper into the experiment and dictate its structure. It is strongly linked to the appropriate statistical approach, which is actually just a form of the logical approach. Any misadjustment of the structure of the experiments to the statistical approach and the other way round often has an adverse impact on the accuracy of information obtained from the experiment.

Statistical methods facilitate experimental studies, but they cannot create anything new. Topics and issues result from the observation of the phenomena around us and the germinating scientific thought. If a research subject in an experiment is formulated wrongly, the statistical methods will not change that. They might produce an accurate answer, but not to what we actually would like to know".

The series of his genetic works on barley, which he started in 1929, became the basis for the post-doctoral (habilitation) programme, which was initiated at the Warsaw University of Life Sciences in 1938, but was unfortunately interrupted by the outbreak of the war.

After the war, he moved to Poznań where he was awarded a post-doctoral (habilitation) degree in plant breeding and agricultural experimentation at the Faculty of Agriculture and Forestry in the University of Poznań. Soon afterwards, he became an docent at that faculty and the head of the Chair of Agricultural Experimentation and Biometry which was established on his own initiative.

The University of Poznań could not find a better candidate for this job than Stefan Barbacki. His enormous contribution to the methodology of agricultural experimentation and biometry, which he had already made in the 1930s, made him an unquestionable authority in this field. It suffices to say that the aforementioned 1935 textbook *The general methodology of field experiments in outline* (Ogólna metodyka doświadczeń polowych w zarysie) very clearly and convincingly presented most up-to-date contemporary views on planning, initiating, conducting and analysing agricultural field experiments. In that book, the reader will find not only a description of single experiments, but also complex, incomplete and multiple experiments. It is amazing how many new ideas that were only at their inception in Europe were thoroughly explained in this ex-

cellent textbook. It was just in 1935, but when Stefan Barbacki's textbook was already written, that Frank Yates's fundamental work *Complex experiments* was released, and Yates's 1933 publication *The analysis of replicated experiments when the field results are incomplete* was still a very fresh thing. Let us also add that R.A. Fisher's basic textbook *The Design of Experiments* was published at the same time as Stefan Barbacki's work, also in 1935. Therefore, it can be firmly stated that the work achieved an unrivalled success at that time. This textbook introduced modern methods of experiments and statistical analysis of experimental results to the Polish agricultural experimentation. Their popularity was also to a large extent the effect of the aforementioned *Overview of Agricultural Experimentation* (Przegląd Doświadczalnictwa Rolniczego), edited by Stefan Barbacki. Having gained the chair at the Faculty of Agriculture and Forestry, Stefan Barbacki could develop his academic interests and skills in Poznań. In particular, he founded the Poznań school of mathematical statistics and biometry.

Many of the future theorists and practitioners of agricultural experimentation studied under Stefan Barbacki's caring supervision at the chair that was established by him in 1945. A few years later, he promoted his first doctoral students, followed by postdoctoral (habilitation) degrees and further careers, including professor titles. His earliest doctoral students included: Kazimierz Saloni, Jerzy Brykczyński, Julian Jaranowski, and Regina Elandt.

Stefan Barbacki's talent, knowledge and both academic and organisational skills were soon appreciated. In 1947, he was elected a member of the Agriculture and Forestry Commission of the Polish Academy of Arts and Sciences and a member of the Faculty of Mathematics and Natural Sciences at the Poznań Society of Friends of Sciences. In March 1948, he received the title of associate professor, and became the dean of the Faculty of Agriculture and Forestry of the University of Poznań, and he held that office until 1951. After the Faculty of Agriculture and Forestry was separated from the University of Poznań, and the Higher School of Agriculture was established in 1951, he became its vice-rector for research. He held that post for two years. At the same time, he managed the Chair of Plant Genetics and Breeding, which in 1951 was transformed into the existing Chair of Agricultural Experimentation and Biometry, significantly expanding the scope of its activities. In 1952, he became a corresponding member of the Polish Academy of Sciences (PAN). Two years later, he earned a D.Sc. degree and the title of full professor. In 1955, he was elected the chairman of the Poznań Branch of the Polish Copernicus Society of Naturalists, in 1958 – the vice-head of the Poznań Society of Friends of Sciences (PTPN), and later its head. He also took up the post as chair of the Committee for Plant Breeding and Cultivation at the Division of Agricultural and Forestry Sciences of the Polish Academy of Sciences. In 1964, he became a full member of the PAN.

In his practical work for scientific research, particularly agricultural experimentation, Stefan Barbacki made great effort to instil his earlier achievements and reflections related to designing and conducting experiments in the scientific circles of Wielkopolska (Greater Poland). These achievements were used not only by the research and experimental facilities of the University of Poznań and then the Higher School of Agriculture

and the Agricultural University in Poznań (from 2008: Poznań University of Life Sciences), which was formed on its basis, but also various plant breeding and experimental stations of various research institutes and centres. His tireless work led to establishment of 18 specialised stations from scratch. Since 1951, he managed the Department of Legumes, which he organised himself at the Plant Breeding and Acclimatisation Institute (IHAR), and the Department of Papilionaceous and Forage Crops at the Institute of Soil Science and Plant Cultivation (IUNG). In 1955, he reorganised them into one Department of Forage Crop Production which became part of the latter institute. He remained its head for a few years afterwards. In 1954, he simultaneously organised a new unit of the Polish Academy of Sciences in Poznań –the Department of Plant Breeding which was later combined with the Department of Genetics of the Polish Academy of Sciences in Skierniewice and renamed to the Department of Plant Genetics. He managed that department until his retirement in 1973. Half a year before his death (30/07/1979), Professor Barbacki witnessed the transformation of the Department into the Institute of Plant Genetics of the Polish Academy of Science in Poznań, which he strived to achieve for many years. Nowadays, it is one of the leading institutes of the Polish Academy of Sciences. The institute established the Stefan Barbacki National Scientific Award in plant genetics.

Due to such an extensive organisational work, Stefan Barbacki could make a connection between the academic life of his chair – and, more broadly, the Poznań University of Life Sciences – with the activities of other research institutions and centres. He organised a number of nationwide and international academic symposia in Poznań in cooperation with the PAN, the Agricultural University (Poznań University of Life Sciences), and the PTPN. He founded and was the editor of several academic journals, particularly the first Polish journal in the field of genetics, "Genetica Polonica" (1960). He was the founder and the organiser of the Polish Genetics Society, established in 1966. As the head of the Poznań Branch of the Polish Copernicus Society of Naturalists (12 years) and the head of the Poznań Society of Friends of Sciences (12 years), the head of the Polish Genetics Society (5 years) he exerted much impact on the academic life of Poznań and Wielkopolska (Greater Poland), e.g. by making the fundamental contribution to the foundation of the Poznań Branch of the PAN. At this point, it is worth mentioning his extensive cooperation on the international forum, which he initiated both at his home university, and other research institutions. He made many academic trips abroad himself. He stayed, for example, in Canada and the USA in 1958, where he gave public lectures on Polish achievements in plant breeding at several American universities.

It is worth emphasising that Stefan Barbacki's extensive and multifaceted organisational work was closely related to his research activities and academic interests. His research resulted in numerous academic publications, 180 of which were printed, including several textbooks and monographs. His original work involved particular research on the variation and inheritance of a number of morphological and physiological traits of barley, issues related to the study of wheat varieties, genetics, breeding and cultivation of lupin, polyploids of clover and serradella, population studies of winter vetches, and,

last but not least, study of methodology of agricultural experimentation and biometry. At this point, I would like to add that though Stefan Barbacki significantly expanded the scope of his interest after the war and then focused on research on genetics and plant cultivation, he never ceased to be interested in experimental methodology and applications of mathematical statistics.

After the war, Stefan Barbacki wrote some more original works and academics papers where he promoted his methodological concepts, and he published a number of elaborations on the results of multienviroment and multiannual experiments on crop varieties in cooperation with the Department of Cultivar Testing at the Ministry of Agriculture. He also contributed to the foundation of the Research Centre for Cultivar Testing, and then presided over its Scientific Council. Above all, he wrote a beautiful monograph: *Combined experiments* (Doświadczenia kombinowane) (published by the State Agricultural and Forestry Publishing House in 1951), which is an unequalled example of how to write simply about complex issues. This was the basic textbook for the entire generation of Polish agricultural experimentation researchers and people who were eager to propagate statistical methods in this discipline. Many of them regret that the author's involvement in other research directions prevented him from writing more on the methodology of agricultural experimentation and biometry. In fact, Stefan Barbacki in a way returned to this topic, and to be more exact, the application of statistical methods in genetic research in the final years of his life. He was particularly fascinated by multidimensional statistical analysis methods whose usefulness in preparing results of materials related to genetics and breeding he appreciated. In 1978 ("Genetica Polonica", Vol. 19) the publication of two works on the issue by Stefan Barbacki and his co-authors. These were his last publications. He planned further work in the field, but he failed to carry it out.

This commemoration of the great Professor would be incomplete if there was no mention of his achievements in the field of educating students and the numerous professional and academic cadre, which are enormous. Stefan Barbacki devoted much time to didactic activities and was distinguished by his exceptional ability to find gifted and active people and develop their eagerness to carry out research and organisational work. During his long academic career, first at the University of Poznań and then the Agricultural University[1], he lectured on statistical methods, agricultural experimentation and its methodology, selected areas of plant genetics and cultivation, and held seminars on agricultural experimentation and plant cultivation. He supervised 113 M.Sc.Eng. students in agriculture and promoted 32 doctoral students in agricultural and natural sciences. Many of his students and collaborators received postdoctoral degree (habilitation), and then went on to achieve professorship.

Stefan Barbacki's research and didactic activities, and particularly the personality of the master who inspired his students to undertake grand tasks, contributed to creation of two important Poznań-based schools with great impact in the academic circles, the country, and the international forum based. One of them is the school of the

[1] from 2008: Poznań University of Life Sciences

biological basis for plant breeding and cultivations, which includes specialists in the field of plant genetics, physiology, biochemistry, breeding and cultivation, and the other is the aforementioned school of mathematical statistics and biometry, which includes mathematicians, statisticians, and biometricians in the broad sense of the terms. Both schools are actively represented at the Professor's home university, now named the Poznań University of Life Sciences in Poznań, but also in other academic institutions in Poznań, particularly the Adam Mickiewicz University, and the Polish Academy of Sciences. All people who are members of these schools due to the fact that they are Stefan Barbacki's students or his students' students, can say, quoting Julian Jaranowski, one of his closest collaborators, that they "thank Professor Stefan Barbacki with great respect and esteem for his effort and the work of his life, his legacy that has already borne beautiful fruit".

References

Speeches by Julian Jaranowski, Ignacy Wiatroszak and Tadeusz Caliński delivered on 21st November 1979 and published in: *Reports* (Sprawozdania) nr 97 za 1979 r. Wydziału Nauk Rolniczych i Leśnych PTPN, Poznań 1981.
Previous versions of this biographical note were published in *Academic News* (Wieści Akademickie), No. 27 (III) of December 1999, published by the August Cieszkowski Agricultural University in Poznań[2], and a special volume *Professor Stefan Barbacki 1903–1979 on the 100th anniversary of his birthday*, Poznań 2003, released by the publishing house of the same university.

TADEUSZ CALIŃSKI

[2] from 2008: Poznań University of Life Sciences

Robert BARTOSZYŃSKI (1933–1998)

Robert Bartoszyński was born in Warsaw on 9th July 1933. He studied mathematics at the University of Warsaw and graduated in 1955. Immediately afterwards, he started working at the Institute of Mathematics of the Polish Academy of Sciences, first as an assistant and then, after earning the doctoral degree, as an assistant professor. He defended his doctoral dissertation in 1960, soon after returning from a year-long apprenticeship at the famous Statistical Laboratory of the University of California, Berkeley, which was founded and then for many years managed by Jerzy Neyman. He received his post-doctoral degree (habilitation) at the Institute of Mathematics of the Polish Academy of Sciences in 1969, where he became an independent academic staff member in 1970, and continued his employment until 1985. In 1972, he became the head of the Department of Probabilistic Applications of the Institute of Mathematics of the Polish Academy of Sciences, which was established on the basis of the Department of Statistical Mathematics, founded and originally managed by Professor Marek Fisz. Robert Bartoszyński earned the title of associate professor in 1979. In 1960–1962 he was also employed as an assistant professor at the Faculty of Mathematics and Physics of the University of Warsaw (he resigned when the governing body of the Polish Academy of Sciences took the decision that its employees can only hold a single post). In 1980, he started travelling around US universities, which ended in 1983 at the Ohio State University in Columbus where he worked until his death. He died on 17th January 1998.

In 1951, Donsker published his invariance principle which made everyone aware of the important role the weak convergence of probability measures played in the probability theory. In 1956, Prokhorov presented the first theorems relating the compactness of measures families to their tightness. Thus, we gained an in-depth explanation, e.g., why weak convergence of finite-dimensional distributions of random processes with realisations (e.g.) in the space of continuous functions on the interval [0,1]

with a uniform invariant metric, C([0,1]), does not imply a weak convergencerrelation between these processes. Therefore, it was clear that the finite-dimensional distributions of a specific process unequivocally determine the distribution of the process. This gave rise to the question how to characterise the weak convergence of the sequenceries of processes on C([0,1]) using thoese finite-dimensional distributions, yet taking account of all the finite-dimensional distributions at the same time and imposing a relevant uniformity condition on their convergence. In 1961, "Annals of Mathematical Statistics" published Robert Bartoszyński's work solving this problem in a much more general case, namely for the probability measures on a complete and separable metric space (though, as the author observed, the completeness assumption could easily be removed, which required only a small modification of the proofs). Based on general theorems on measures on the C([0, 1]), Bartoszyński characterised the weak convergence of probability measures. His results have found a permanent place in the literature.

As a student, young Bartoszyński was supervised by Professor Marek Fisz, who recruited him to the Institute of Mathematics of the Polish Academy of Sciences, to the Department of Mathematical Statistics, which the latter managed. At the Institute, Bartoszyński met people who were the most interested in the application of mathematics – Professor Jan Oderfeld who, though he lived in Wrocław, took care of all mathematicians at the Polish Academy of Sciences working on the applications, and Professor Hugon Steinhaus. Thoese three scholars surely exerted impact on the promising young probabilist. The fourth one was William Feller, or to be more exact – his work, which indubitably contributed to the determination of Robert Bartoszyński academic path and his approach to didactics. Bartoszyński's unequalled skills, the ability to produce elegant calculations and the depth of his probabilistic thought were directed to work on the theory of stochastic processes, primarily probabilistic modelling of biological processes. The world has remembered Professor Bartoszyński as an outstanding "bio-probabilist".

His work on models was accompanied by important or even very important publications on stochastic processes, often inspired by research on biological models: e.g., the aforementioned characterisation of weak convergence; work related to modelling of epidemics and concerned with, asymptotics of branching processes; an invariance principle for random walks "observed from time to time for some length of time, possibly different each time, but commonly limited"; work on the convergence rate in the weak law of large numbers, a development of the earlier research by Erdös, Hsu and Robbins and Révész; analysis of supercritical linear birth and death processes with catastrophes leading to the partial extinction of the population (in accordance with the binomial distribution, where the probability of an individual being killed is proportional to the time since the last catastrophe); analysis of a queuing process with exponential time between customer arrivals, exponential service time with one active server, exponential server working time until breakdown, exponential server repair time, and constant probability of a customer departure during the server repair.

The first major work related to the modelling of biological phenomena by Robert Bartoszyński was the analysis of infectious disease epidemics. Classical models were based on Markov processes and assumed that the number of new infections in a short time interval was proportional both to the number of already infected individuals and the individuals at risk of infection. Such models offered no practical possibility of taking into account the geographic (or other) non-uniformity of the environment where the epidemic develops. In theory, it could be assumed that the individuals not only differ in their health status, but also belong to various "categories", but this produced models were too complex to draw any conclusions from them. Introduction of branching process-based models and initiation of research using methods relevant to such models allowed Bartoszyński to provide many new results describing extinction or a "triumph" (i.e. a situation where the infected population tends to infinity) of the epidemic. Bartoszyński also took account of inidividuals' migration in the environment or the change to the infectivity during the epidemic, or detection of the disease in an individual and its elimination from the population. The latter case involved the following assumptions:

– each infected individual passes through an incubation period of length X, which is followed by a period of length Y when the disease is infectious; given is the joint distribution of variables X and Y;
– during the disease, which lasts for the period of $X+Y$ (e.g. days), the infection can be detected and its carrier can be removed from the population; the conditional probability of detection on a given day, on condition that the infection has not been detected earlier, is equal to $1 - \alpha$ during incubation, and $1 - \beta$ during the infectious phase;
– during each day of the infectious phase, the undetected carrier meets K uninfected individuals, where K is a random variable with a known distribution and the mean r; the number of contacts on different days are independent and have the same distribution;
– each contact with a healthy individuals leads to infection with the probability of infection equal to γ, which is independent of other contacts;
– the above described events are independent for different individuals.

The given assumptions define the branching process $\{Z_n\}$ of the number of individuals in the nth generation of the epidemic development. For process, it is known process Z_n that:

$$P\{\lim Z_n = 0 \text{ or } \lim Z_n = \infty\} = 1$$

Proved in the publication titled Branching *Processes and Models of Epidemics* (Dissertationes Math., 61 (1969)) theorem states the the necessary and sufficient condition for the extinction of the epidemics ($P\{\lim Z_n = 0\} = 1$), which links the generating function for the joint distribution function of variables X and Y and constants α, β, γ and r. At this point, it is worth observing that these quantities, in whose language the said necessary and sufficient condition has been expressed, can be determined in practice. We have quoted this theorem to show that Bartoszyński always attached great importance to strict relation between his analyses and the actual problems, the absence of unjustified simplifying assumptions, and production of results that have practical significance.

It is impossible to provide at least a superficial discussion of all the disciplines where models proposed by Robert Bartoszyński found a permanent place in literature. For instance, when explaining a topic related to the development of epidemics, we omitted the model describing the spread of non-infectious diseases, which was presented and examined in a publication named in the above paragraph. However, let us mention processes which are now known in literature as *Bartoszyński's processes*, i.e. processes related to the analysis of the risk of rabies. This refers to a stochastic process describing the number of rabies viruses in the central nervous system of a person infected with that disease and the random moment when the first symptoms of the disease are manifested (it is possible that it will not occur). In short, realisations of the process for the number of viruses increase by leaps and decrease exponentially between the leaps, with the decrease rate changing at the moment of vaccination; the sizes of leaps are independent random variables with identical distribution; moments of leaps are also random variables with the leaps' intensity proportional to the value of the process at athe given moment. In one of the publications, the moment when the first symptoms were manifested is equal to the moment when the process for the number of viruses exceeds a specific threshold. In another one, this moment is the first event of a certain point process, whose intensity is proportional to the value of the process for the number of viruses. Professor Bartoszyński's fundamental results were related to the probability of a situation where the time of waiting for the manifestation of the first symptoms is longer than a prespecificed value.

Let us also mention Professor. Bartoszyński's work in the field of modelling interaction between predators and their prey (e.g. *Chances of Survival under Predation*, Math. Biosci., 33 (1977), 135-144) and the series of ground-breaking publications related to modelling development of malignant tumor (hereafter referred to as cancer, e.g., publications with his collaboratorso-authors *Nonparametric Techniques for Estimating the Intensity Function of a Cancer Related Nonstationary Poisson Process*, Ann. Statist., 9 (1981), 150-160, *On Estimating the Growth of Tumors*, Math. Biosci., 67 (1983), 145-166, *Estimation of Human Tumor Growth Rate from Distribution of Tumor Size at Detection*, J.N.C.I., 72 (1984), 31-39, *Some Stochastic Models on Cancer Metastases*, Stochast. Models, 1 (1985), 317-339). When modelling the interaction, Professor Bartoszyński examined two types of models in cooperation with Wolfgang Bühler. In the former one, the number of prey grew only at regularly repeating moments of reproduction, with each specimen reproducing independently and according to the same distribution of the offspring number, specified by such generating function f that $f(0) > 0$ and that derivative $f(1)$ has a known value, Between the moments of reproduction, the number of prey is a pure linear death process with an intensity that is a sum of two addends – the constant addend and the addend proportional to the number of predators. The process for predators is a linear birth and death process with constant intensities of births and deaths, and time-dependent intensity of immigration. The research was based on Markov properties and the observation that a certain function of the number of prey is a martingale. In the latter model, reproduction of a given prey population at a given moment was described by using the Galton–Watson process in a random environment (with the randomness of the "environment" resulting from the activity of the predators

before the moment of reproduction). In that latter model, the process for predators did not have to be the birth and death process with immigration, and that process could affect the number of prey differently than in the former model. The authors could solve the problem with the stationary and non-stationary environmental change processes. The basic subject of the reflection was the analysis of prey survival probability.

Professor. Bartoszyński started research on the development of cancer in cooperation with James Thompson and his co-workers from the Houston Cancer Institute (in their work, they also used a very good database at the Warsaw-based Institute of Oncology). In our attempt at presenting at least a very brief outline of this important and extensive research, we have to name at least the fundamental research directions: tumour growth modelling using a growth function common for all tumours (in one of the publications, however, with a different scale factor for different patients, described using the gamma distribution); non-stationary Poisson model for the moment of metastasis; modification of their earlier models resulting from the observed discrepancies between observations of the development of certain cancer types and conclusions from the application of those models; in cooperation with Prem S. Puri, analysis of the model of interaction between the number of cancer cells and the number of antibodies. Each of those directions greatly contributed to the better understanding of the development of cancer. And no doubt, it were Bartoszyński's calculation skills which made the derivation of interesting theorems from the assumptions obtainable.

Each of those directions of work on the development of cancer was exceptionally interesting. For example the first models of the origin of metastases by Bartoszyński et al. implied that metastases are very likely to originate shortly before the tumour becomes detectable. This in turn implied a relatively long time before the detection of the metastatic tumorgrowth (the secondary tumor had to grow) and at the same time stimulated research aimed at improving methods of primary tumor detection (by accelerating this detection). However at the same time, at least for some types of cancer, it appeared that theis time before tohe subsequent detection of a secondary tumor turned out to be surprisingly short. Therefore, new models were required, not only to provide better descriptions of such cancer types, but also suggest another method of fighting the decease, without overrating the early removal of the primary tumor.

At the end of this incomplete and strongly abridged outline of Professor Bartoszyński's work, which involved 73 publications, there is a need to raise at least two issues. First, his academic output includes also excellent publications on methodology, e.g., at the crossroads of mathematics and basic praxeology (from the early 1960s) and important strictly statistical works, e.g.,i.e. those dealing directly with the issue of estimation or testing. Other publications addressed the methodological foundations of statistics, such as the basic work on the reducibility of statistical structures released in 1980, or elegant works on the taxonomy based on subjective classifications (e.g., *On the Constructions and Evaluation of Subjective Classifications*, Appl. Math., 12 (1971), 1-21, and *On a Metric Structure Derived from Subjective Judgments: Scaling under Perfect and Imperfect Discrimination*, Econometrica, 42 (1974), 55-71. Still another publications were fundamental for statistics because

they provided better justification for the methods already applied by statisticians. These include one of the last works by Professor Bartoszyński, which he wrote in cooperation with Jen-Fue Maa and Dennis Pearl: *Reducing multidimensional two-sample data to one-dimensional interpoint comparisons*, Ann. Statist., 24 (1996), 1069-1074. Namely, the most popular technique used for comparing two distributions F and G on R^k on the basis of two samples of random vectors $\mathbf{X} \sim F$ and $\mathbf{Y} \sim G$ is the analysis of one-uni-dimensional distributions of distances h between elements. With very general assumptions concerning function h, the authors proved that both the equality of distributions within the sample, i..e, the equality of distance distributions $h(\mathbf{X}_1, \mathbf{X}_2)$ and $h(\mathbf{Y}_1, \mathbf{Y}_2)$, and the equality of distances between the samples, i.e. equality of distributions of distances $h(\mathbf{X}_1, \mathbf{X}_2)$ and $h(\mathbf{X}_3, \mathbf{Y}_3)$, is equivalent to the equality of distributions F and G.

Let the final issue discussed here be the Professor. Bartoszyński's activity in the field of popularisation and didactics, and particularly the Professor's *opus magnum* written in cooperation with Magdalena Niewiadomska-Bugaj, i.e., the textbook titled *Probability and Mathematical Statistics* (Wiley, New York, NY, 1996). Robert Bartoszyński was the editor-in-chief of "Applied Mathematics" ("Matematyka Stosowana") virtually from its inception, as started in 1972 (the first issue was published in 1973), until 1982. In 1975–1990, he was a member of the Editorial Committee of "Application of Mathematics" ("Zastosowania Matematyki"). It suffices to look at the list of his publications to see how many of them were printed in thoese two journals. Robert Bartoszyński was a true patron of those periodicals, and also of the Courses on Application of Mathematics (Kursy Zastosowania Matematyki), which used to be very well-known in Poland.

Professor Bartoszyński translated Feller's An Introduction to *Probability Theory and Its Applications*, vol. I and vol. II into Polish (the first volume was translated jointly with B. Bielecki) and Fisz's *Probability and mathematical statistics* (*Rachunek prawdopodobieństwa i statystyka matematyczna*) into English. He loved to teach and was an excellent academic teacher. The aforementioned textbook was the result of this love and the equal love of the probability theory. J.L. Teugels provided the following description of the textbook in the bulletin of the International Statistical Institute (ISI):

> This book is very different from the typical textbooks with definitions, theorems, proofs, and examples. Of course, all these can be found there, but its style makes it surprisingly unusual. Concepts and methods are illustrated with examples that essentially form the core of the book. Teachers looking for examples inspiring stochastic thinking will surely find something that particularly matches their tastes. It is shown "why" the methods work, not only "how" they work. To help a reader who is disposed to go on a technical adventure, the book includes chapters and sub-chapters marked by an asterisk and are intended only for him. This is a refreshing book which should be strongly recommended, even for self-study, because a great richness of inspiring problems can be found at the end of each chapter.

Readers sense the spirit of Feller and easily see the depth of the thought whose effect that book is.

Professor Bartoszyński enjoyed great and well-deserved esteem all over the world. It involved ISI membership and the membership of the Institute of Mathematical Statistics (IMS), numerous honours and invitations. Everybody respected and liked him, every meeting with him was a pleasure – both in the intellectual and the ordinary human sense. He delighted people with his delicate, mild, but somewhat ironic, it can even be said philosophical sense of humour. Whoever met Robert Bartoszyński, immediately knew how excellent "mathematical modeller" and teacher they encountered. He meant much to his colleagues as an illustrious, friendly and a kind-hearted human.

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JACEK KORONACKI

Jan CZEKANOWSKI (1882–1965)

Jan Czekanowski was born into a landowning family, on 6 October 1882 in Głuchów, near Grójec in the Masovia region. His father Wincenty (1836–1926) was the owner of the estates of Głuchów and nearby Kośmin. His mother, Amelia von Guthke, was German. Jan had four elder brothers and sisters: Natalia, Aleksander, Stanisław and Maria. He was initially educated at home, but in autumn 1894 he became a third-year pupil at the well-known "real school" run by Wojciech Górski in Warsaw. In autumn 1898 he moved to the real school in Libava (Liepaja) in Latvia, where he passed his matura school-leaving exam in June 1901. On 1 September 1901 he joined the army as a volunteer. Through an oversight, in contravention of an instruction of 1888, he was accepted – in spite of his Catholicism – into the defensive artillery of the then military port of Tsar Alexander III in Libava. Unable as a private to be moved to another unit without a Supreme Order, and unable as a Catholic to remain in the defensive artillery of the Vilnius district to which Libava belonged, on 6 December 1901 he was discharged from the army as unfit due to overstraining of the heart. He went abroad, leaving the Russian Empire without the appropriate documents, and with his heart in his mouth. He crossed the border in a saloon car occupied by a high- ranking imperial officer and his wife, which enabled him to avoid any border checks. After journey to Italy, in spring 1902 he was accepted into the mathematics and natural science section of the Philosophy Faculty at the Cantonal University of Zurich. There he studied anthropology under the superb anthropologist Rudolf Martin, anatomy under Georg Ruge, and mathematics under Heinrich Burghardt. To these subjects he would devote his long, hard-working life. He understood anthropology in a broad sense, from a humanist standpoint – as encompassing knowledge about man and his functions. Anatomy was a part of that knowledge, along with ethnography, anthropogenesis and typology, genetics, linguistics and statistics. Czekanowski saw the human being as a creature characterized by a large number of connected and correlated features. He understood that to study only a few of these features must necessarily lead to a

limited, fragmentary, one-sided picture which would obscure or even falsify the real human being as an object of study.

At the beginning of the 20th century, when Czekanowski was studying in Zurich, a multifaceted analysis of the human being was not yet feasible. The English statistical school (Pearson, Yule, Fisher, Student) was just beginning its activity. Czekanowski quickly appreciated the role that statistics could play for anthropology and the empirical sciences, and became a student and pioneer of the new discipline.

Jan Czekanowski's first academic work was a short monograph on statistics, written in the second semester of his university studies. It demonstrates the use of Pearson's correlation coefficient to evaluate various methods of measuring skull height. It should be noted that it was 1902, and Karl Pearson had introduced the correlation coefficient in 1901. With this initial work, Czekanowski travelled in 1903 to a congress of German anthropologists in Worms, accompanying his professor Rudolf Martin. He applied too late to be included on the list of speakers, but he made such an impression with his thorough knowledge of the latest methods of English mathematical statistics, which were not yet known among German anthropologists, that Felix von Luschan, director of the African and Oceanic departments of the Royal Anthropological Museum in Berlin, offered him a research assistant's position with prospects of being sent to Africa or Oceania. Czekanowski agreed to take up the position, but only after completing his studies in Zurich. The monograph, which had proved so significant for Czekanowski's future destiny, eventually appeared in print in *Archiv für Antropologie* in 1904.

In 1903 Czekanowski wrote a paper on the application of the correlation coefficient to the study of muscular anomalies, for which he collected material while working as deputy assistant in the anatomy laboratory. This attempt to apply modern statistical methods in anatomy was published in 1906 in a memorial volume to the American anthropologist Franz Boas.

Czekanowski's work to popularize biometrics is well known. While still a student in Zurich he wrote a paper on the subject, which appeared in 1904 as an introduction to Rudolf Martin's anthropology textbook *Lehrbuch der Anthropologie*, which is still widely known among anthropologists today, and in 1907 was published in Czekanowski's doctoral dissertation. In it he gives a short description of the statistical methods which had been introduced to anthropology by English biometricians. He completed his studies in July 1906, obtaining the degree of doctor of philosophy (his certificate is dated 1907).

In the following winter semester Czekanowski furthered his education by studying mathematics at Berlin University. As a fresh graduate from Zurich, starting from 1 November 1906 he took up the position of assistant at the Royal Anthropological Museum in Berlin. That post provided the possibility of travelling to Africa under a scholarship from the Prussian government. Thus his youthful dreams of an exotic trip to Africa were to be realized. The young Czekanowski was invited by Prince Adolf Frederick of Mecklenburg to join a scientific expedition to the Nile-Congo region in Central Africa. He spent more

than two years (from 1 May 1907 to 7 July 1909) in Sudan, the Congo, Uganda and German East Africa, returning to Berlin via Egypt, Syria and the Balkans. His duties included producing an ethnographic map. The enterprise was a huge one. A total of 2230 porters were employed, and seven stations were prepared along the route equipped with food, drink, medicines, tools, clothing, tents, camp beds, firearms, and even folding bathtubs made of a crumpling impermeable material – in short, everything that the explorers would need. Where possible, expedition members stayed with missionaries, at colonial borderland fortresses or at the courts of African rulers. Czekanowski crossed north-western Tanzania, Rwanda and two extensive borderlands: between Uganda and Zaire, and between Zaire and Sudan. The undertaking took place in quite exceptional conditions; the territory explored, with an area almost twice that of Switzerland, covered a region that had been inaccessible to European colonialists and to Arab, Indian and even African merchants. Both the times and the places visited remained politically unstable and of uncertain future. Spending more than two years on the expedition, Czekanowski collected vast amounts of sometimes unique materials from parts of Africa which at that time were entirely unknown. The materials were relevant to both anthropological and ethnological or ethnographic questions, and even to some extent to sociological topics. He published them over many years, some of them even after World War II, in 1951. The first five volumes were published in Leipzig from 1911 to 1927 in the form of a vast monograph titled *Forschungen im Nil-Kongo Zwischengebiet*.

For the results achieved on the African expedition he was decorated with the orders of the Belgian Crown and the Mecklenburg Griffon, and with a Mecklenburg Memorial Medal.

Czekanowski achieved his most important results in studies of racial classification and population structure. The revolution brought about by Jan Czekanowski in human classification was chiefly based on the introduction of a new taxonomic method for racial analysis. This was introduced in 1909 as Czekanowski's diagraphic method. It was published in Czekanowski's fundamental methodological paper *Zur differentialdiagnose der Neandertalgruppe*, which remained a standard work for his pupils for many years afterwards.

On 2 March 1910 Jan Czekanowski married Elizavyeta (Elizabeth) Sergiyevska, daughter of an Orthodox parish priest in Tula. The couple had met in Zurich, where Elizabeth was studying medicine. They had two daughters: Zofia Teresa (born 25 September 1927) and Anna Katarzyna (born 25 June 1929). On 1 October 1910 Jan Czekanowski was appointed curator of the Ethnographic Museum of the Imperial Academy of Sciences in St. Petersburg. He moved there at the beggining of 1911, and remained in the post until the end of September 1913. While he was at St. Petersburg the well-known zoologist Józef Nussbaum-Hilarowicz made a proposal to Czekanowski that he should complete his post-doctoral degree (habilitation) in anthropology and take a university chair at Lvov. After a fairly long period of hesitation and delay, he decided to move to Lvov. By a letter of the Imperial Ministry of Denominations and Enlightenment in Vienna, dated 11 August and with effect from 1 October 1913, he was appointed associate professor of anthropol-

ogy and ethnology in the Philosophy Faculty of Lvov University. He was appointed on his merits, without having gained his post-doctoral degree (habilitation). He began lecturing at the start of the 1913/1914 academic year, and would spend the longest period of his life in Lvov, until 1944. Apart from his lectures he also organized the anthropology and ethnology department and engaged in research on national anthropology.

However that work was suspended as a result of the outbreak of the First World War. As a Russian subject being in the state service of Austria, he was compelled to make a hasty escape from the Russian army. In late August 1914 he travelled to Krynica, and later to Busko. On 30 September 1914 he settled in Luhacovice in Moravia, where he continued writing up the materials collected during his African expedition. With the issuing of a decree recognizing citizens of the Polish Kingdom, he obtained a passport, and on 10 October 1916 he returned to Lvov. At the start of the 1916/1917 academic years he renewed his lectures at the university as a full professor. His work at the university was again interrupted on 1 November 1918, after Lvov had been captured by Ukrainian forces. On 10 December Czekanowski travelled to Paris via Warsaw and Prague. There he worked for the Polish Delegation at the Versailles peace conference, acting as an expert and later as a member of the Delegation Council. From 1 March to 1 May 1919 he served as political secretary on the Polish National Committee, from 1 May to 15 June he worked for the Polish Delegation, and from 15 June to 1 October 1919 he headed the offices of the Delegation, in September replacing the Delegation's secretary general Stanisław Koziekry. Recalled to Paris, he acted as scientific expert to the Polish Delegation until 15 March 1920.

By a decision of the Chief of State dated 9 April 1920, Jan Czekanowski was appointed full professor of ethnology and anthropology at Jan Kazimierz University in Lvov, with effect from 1 January 1920. He returned to Lvov, and on 15 April 1920 he again began lecturing at the university.

In 1913 the Warsaw Scientific Society had published a book by Jan Czekanowski titled *Outline of statistical methods in application to anthropology* (Zarys metod statystycznych w zastosowaniu do antropologii). This was the first statistical textbook written in Polish to describe modern methods of handling empirical data and proper interpretation of results. It was published just two years after the appearance of the world's first textbook of modern mathematical statistics, *An Introduction to the Theory of Statistics* by George Yule, and it played a great role in making biometrics better known among Polish scholars before World War I and in the interwar period. Besides descriptive statistics, this thoroughly modern and precise textbook covers the topics of reasoning based on the correlation coefficient, multiple regression with worked examples, as well as the diagraphic taxonomical method of Czekanowski. I would encourage any authors undertaking work on a modern textbook of statistics to study Czekanowski's example from almost a hundred years ago.

It is incontestable that Czekanowski made a huge contribution to statistics. This superb scholar also made a greater contribution than anyone else to the flourishing of Polish

anthropology, and caused it to gain worldwide renown. Professor Czekanowski was the founder of the Lvov School of anthropology, which set the tone for all research carried out in Poland over many years. It is therefore also referred to as the Polish School of anthropology, distinguished by a totally original approach to individual intrapopulational taxonomy of humans.

Professor Jan Czekanowski was a member of the Lvov Scientific Society. Active local members of the third section, devoted to mathematics and natural science, also included Stefan Banach and Hugo Steinhaus, while members active elsewhere included Marie Skłodowska-Curie (Paris), Wacław Sierpiński (Warsaw) and Stanisław Zaremba (Cracow).

In the years 1934–1936 Czekanowski held the post of rector of Jana Kazimierz University in Lvov.

After the arrival of German forces in Lvov, on 30 June 1941 Jan Czekanowski was deprived of the ability to continue work at his beloved Anthropology Department. Thanks to a Ukrainian doctoral student his name was removed from the list of Lvov professors who were shot by the Germans on 4 July 1941. Because he kept his most important materials and books at home, he was able to carry on intensive scientific work even during the occupation. He obtained formal protection from the *Arbeitsamt* by taking up the administration of the estates of Kośmin near Grójec, based on a notarized power of attorney. This also enabled him to place his family in the village of Głuchów and to travel there and also to Warsaw, where he took part in underground educational activities. The Kośmin estates were owned at that time by his elder brother Stanisław, who had formally received them from his father Wincenty in 1895.

On 8 May 1944, Jan Czekanowski and his family left Lvov and, until 14 September of that year, stayed as guests with Professor Jerzy Fuhrich at Broniszów near Ropczyce. Later, taking advantage of a change in situation caused by the movement of Soviet forces to the Wisłoka line, he moved to the village of Cmolas near Kolbuszowa, and taught at the secondary school in Kolbuszowa until the end of April 1945. (The primary school in Cmolas now bears the name of Jan Czekanowski as its patron.) Thanks to the intervention of the Education Ministry, and having received a truck from the Provincial Offices in Rzeszów, he moved to Lublin, where he lectured in anthropology at the Catholic University of Lublin – he had received an appointment from that institution in November 1944, but was not able to travel there earlier because of lack of means of transport.

By letter of the President of the National Council, Bolesław Bierut, dated 28 February 1946, Czekanowski was appointed full professor of anthropology in the Faculty of Medicine at Poznań University. He took up the duties of professor and the chair of anthropology on 1 March 1946. After that faculty was transformed into the independent College of Medicine, he joined the Faculty of Mathematics and Natural Science, and later, when that faculty was divided, the Faculty of Biology and Earth Sciences.

While holding his chair at Poznań he continued to lecture at the Catholic University of Lublin until 1949, when the Ministry refused to allow him to continue working at two universities.

Described below are a few episodes of interest from the career of Jan Czekanowski:

1. During World War I he produced statistics on nationality and religious denomination in the Polish lands for the use of the future Polish Delegation at the Versailles peace conference, which he attended as an expert and as head of its offices. He presented to President Wilson a concept for the positioning of the eastern border which would have placed the same number of Orthodox Christians on the Polish side of the border as Catholics on the Russian side.
2. In the German Nazi period, Czekanowski challenged as utopian the idea that in prehistory there existed pure racial types such as Germanic, Slav and Ugro- Finnish. He demonstrated this by making measurements on Polish army conscripts. He showed that the highest contribution of the Nordic element, and thus the greatest closeness to the Nazis' Aryan ideal, was found in young Jews who came from Warsaw.
3. The Karaim national minority was spared the fate of the Jews and Gypsies only because, when questioned by the Germans in 1942, Jan Czekanowski gave authoritative confirmation of their Turkish origins.

In 1960, on grounds of age, Jan Czekanowski went into retirement. However he continued to give a seminar in anthropology for master's degree students specializing in that field.

Professor Jan Czekanowski's scientific work was exceptionally wide-ranging. He had a multifaceted mind, interested in many different issues relating to human life and to human beings themselves. However he was able to achieve his greatest successes in theoretical anthropology, by applying statistical methods to anthropometric materials, in ethnography and ethnology, and in Slavic studies, where he provided strong justification for the theory that the original Slavic homeland was situated between the Vistula and Oder rivers. This view was opposed most strongly by German and to some extent by Czech scholars, and even by some from Poland, who were not convinced by the reasoning and documentation put forward by Czekanowski.

Poland recognized his achievements. He was a full member of the Polish Academy of Sciences. Two universities – Wrocław in 1959 and Poznań in 1962 – awarded him the highest available title, that of doctor honoris causa. The Polish government awarded him the honours of Commander's Cross of the Order of Polish Rebirth and the Order of the Standard of Labour, First Class.

He was an honorary member of the Polish Anthropological Society, and also honorary member of the anthropological societies of Brno and Zurich, and corresponding member of the Paris Anthropological Society and the Royal Anthropological Institute of Great Britain and Ireland. In 1923–1924 he chaired the Copernicus Polish Society of Natural Scientists. He was a member of the Polish Statistical Society, serving as its vice-chairman

in 1937–1939. He was member, vice-chairman and chairman of the Polish Folk Studies Society and a member of the Polish Orientalist Society. He was a founding member and chairman of the Scientific Council of the Polish Biometric Society, from the Society's founding in 1961 until his death.

Jan Czekanowski died on 20 July 1965 in Szczecin. He is buried on the Avenue of Distinguished Citizens in Warsaw's Powązki cemetery. As a result of efforts by the anthropology community, the name of Jan Czekanowski has also been given to one of Poznań's streets.

The following description of Czekanowski comes from an extensive article devoted to the history of anthropology in Poland (T. Bielicki, T. Krupiński, J. Strzałko, *Historia antropologii w Polsce*. Przegląd Antropologiczny 1987, 53(1– 2), pp.3-28):

Czekanowski was a scholar in the old, great, professorial style: a man of wisdom adored by some, admired by many and reviled by a few. This tall, grandly built man, with the penetrative gaze of his pale blue eyes, with an inseparable cigarette stuck to the corner of his mouth, could be seductively courteous and gentle-mannered, but also had a sharp tongue and could be caustic in polemics and discussions. He was a polyglot, who besides his native Polish had perfect mastery of German, French and Russian, and could also converse freely in English, Italian and Czech. Coming from the landowning classes, he was a "man of the world", close to a dozen European princes and princesses, and according to legend even to one crowned head. He was charming in company, and in his old age he liked to delight his listeners with spicy anecdotes, such as those about the parties held in private swimming baths in Zurich at the beginning of the century, or those about the revelries of the Russian cavalry stationed in Kalisz when it was a border town of the Russian Empire. He was an erudite person who was able in his time to speak authoritatively about matters of anthropology, Mendelian genetics, European archaeology, Slav linguistics, Slav and African ethnography, and mathematical statistics.

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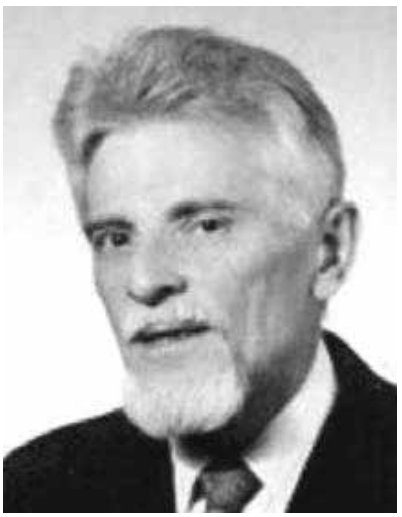
MIROSŁAW KRZYŚKO



Zbigniew CZERWIŃSKI (1927–2010)

Professor Zbigniew Czerwiński, Ph.D. (born 9th October 1927, died 22nd May 2010) was one of the greatest Polish economists of the 20th century. He represented quantitative economics, which includes mathematical economics, decision theory, economic cybernetics, economics and forecasting, quantification of economic phenomena, and such areas as research methodology, inductive inference and its relation to deduction. He received comprehensive education – he was an economist, philosopher, logician – he was an unquestionable authority in all these disciplines and greatly contributed to their foundation and development.

He was born in Warsaw to a family of a senior officer of the Polish Army (his father had served in the Polish Legions, then was a colonel of the Polish Army, and the military attaché in Prague and Bucharest for many years, his mother was a teacher). Just before World War II, Zbigniew Czerwiński lived in Poznań, where his father served as commander of a horse artillery regiment. During the war, he stayed in Vilnius, then in Warsaw, and then in Myślenice county where he took part in guerrilla operations of the Home Army. He passed his Matura exam in Warsaw in 1945. In 1945–1949, he studied economics at the Faculty of Law and Economics of the University of Poznań (his master's thesis was supervised by Professor Edward Taylor), and then, in 1950–1952, he studied logic at the Faculty of Philosophy and History of the same university (and his master's thesis was supervised by Professor A. Wiegner). Professor Czerwiński provided the following reasons for his interest in philosophical studies, particularly in logic and scientific methodology, in his book titled My struggles with economics (*Moje zmagania z ekonomią*) (Wydawnictwo AEP, 2002, p. 11):

During our studies, we studied classical economics – which was then called "bourgeois economics" – primarily on the basis of the A. Marshall's textbook, the theory of imperfect competition (by J. Robinson and E.H. Chamberlin), and, of course, the then-new and fashionable Keynesianism. It

could be easily observed that apart from the fundamental political and academic controversies between the Marxist and the classical economists, there were not a few disputes in the classical economics itself […]. The multitude of views and disputes induced me to ask myself: "who is right?", and this question led to further, more fundamental ones: how are scientific views justified?, how to resolve disputes between incompatible theories?, what is the role of experiment and reasoning in science? – and finally – what is science and how to do it? Such questions inspired me to start studying scientific methodology […]. Thus, I decided to start a second programme at the Faculty of Humanities, and then the Faculty of Philosophy and History of the University of Poznań.

In 1957, Zbigniew Czerwiński earned the degree of doctor of philosophy based on the dissertation titled *The problem of validity of induction in probability* (Zagadnienie prawomocności indukcji w ujęciu probabilistycznym) (supervised by Professor K. Ajdukiewicz). In academic year 1958/1959, Zbigniew Czewiński attended a specialist year-long programme at the Harvard University, USA (taught by Professor W. Leontief). Zbigniew Czerwiński earned the post-doctoral degree (habilitation) in economic sciences at the Faculty of Economics of the University of Warsaw in 1963, on the basis of dissertation titled *Mathematical approach to price planning* (Problematyka planowania cen w ujęciu matematycznym). He became an associate professor (which then meant receiving the title of professor) in 1973, and a full professor in 1977. In 1949–1961, he worked at the Adam Mickiewicz University, first at the Chair of Economic Sciences, then at the Chair of Logic and Scientific Methodology.

From 1961 until his final days, i.e. for nearly 50 years of his exceptionally busy life, the professor was affiliated with the current Poznań University of Economics and Business (formerly, the Higher School of Economics and the University of Economics). He initially worked at the Chair of Planning, then he moved to the Department of Econometrics, which he established himself, incorporated into the Institute of Economic Cybernetics, which he managed continuously from 1978 until his retirement. The Department of Econometrics, managed by Professor Czerwiński in 1965–1991, gave rise to three departments which are currently part of the Faculty of Computer Science and Electronic Economy – Operations Research, Econometrics, and Mathematical Economics,

The Professor authored 11 books, over 100 academic articles and many translations of monographs and academic textbooks, mainly from English. His professional career took place during the period of the initial heyday of the application of mathematical methods to economy all over the world. In Poland, he pioneered mathematical research on economic optimisation. He also initiated the dynamic development of Polish mathematical economics. In cooperation with his friends, Professor Z. Hellwig from Wrocław, Professor Z. Pawłowski from Katowice, and Professor W. Welfe from Łódź, he established Polish econometrics. However, he was less interested in econometric techniques (which he knew perfectly), more in the methodology of econometrics. As regards the methodological basis of econometric research, the Professor's comprehensive education and innate talent have made him a unrivalled model, and his publications were and still are a rich source of creative academic inspiration.

*Mathematical approach to price planning (*Problematyka planowania cen w ujęciu matematycznym) (PTPN, „Prace Komisji Nauk Społecznych" („Works of the Social Sciences Committee") 1963, Vol. 12) was a ground-breaking work that initiated research in the field of mathematical economics in Poland. His paper titled *Investment rate and maximization of consumption* (Stopa inwestycji a maksymalizacja spożycia) ("Ekonomista" 1965, 1) was written nearly simultaneously with the global foundations of the optimal control theory and incited the use of this mathematical apparatus in the economic growth theory in Poland. This trend in research naturally gave rise to another ground-breaking work – *Mathematical foundations of economic growth models* (Podstawy matematycznych modeli wzrostu gospodarczego) (PWE, 1973), which consolidated the Professor's position as an unquestionable leader in the Polish mathematical theory of growth. His strictly econometric publications, which are dominated by methodological issues, include such articles as: *On interpretation of econometric equations* (O interpretacji równań ekonometrycznych) ("Przegląd Statystyczny""Statistical Review" 1966, 3), *Forecast, plan, probability* (Prognoza, plan, prawdopodobieństwo) ("Ekonomista" "Economist" 1975, 1), or *Different regression concepts* (O różnych koncepcjach regresji) ("Przegląd Statystyczny" "Statistical Review" 1980, 3-4). The first part of (*Econometric forecasting. Foundations and methods* (Prognozowanie ekonometryczne. Podstawy i metody) (PWE, 1980), which was cited many times, has similar nature. The second part was written by the late Professor Bogusław Guzik who was Professor Czerwiński's student.

This creativity characterising the Professor's academic temperament is also manifested in his interest in the optimisation of economic decisions, which is part of the operations research. The Professor was the author of the first original Polish textbook on linear programming titled *Introduction to theory of linear programming with elements of higher algebra* (Wstęp do teorii programowania liniowego z elementami algebry wyższej Wstęp do teorii programowania liniowego z elementami algebry wyższej) (PWN, 1961), which, apart from the formal (methodological) layer, points to the economic interpretation of the solutions. This research direction naturally resulted in publications related to the determination of price system in the light of the duality of linear programming, This was discussed in such works as: *Linear programming and prices* (Programy liniowe a ceny) ("Ekonomista""Economist" 1964, 3) and A Mathematical Model of Optimal Price System in Centraly Planned Economy ("Colloquia Matematica Societatis Janos Bolyai", 1974).

A parallel field in which Professor Zbigniew Czerwiński was interested is the use of formal apparatus of discrete mathematics and mathematical programming for modelling and algorithmisation of complex organisational tasks (undertakings): *Pert networks and linear programming* (Sieci pert a programowanie liniowe) ("Przegląd Statystyczny" "Statistical Review" 1967, 4, in cooperation with E. Ignasiakiem), *Method of building networks describing a project* (O sposobie budowy sieci opisujących przedsięwzięcie) ("Organizacja i Kierowanie",„Organization and Management" 1977, 2, jointly with W. Jurek and W. Śledziński), or contribution and scholarly editing of the book titled *Optimal organization of complex activities* (Optymalna organizacja złożonych działań) (PWE, 1983, collaborative work by: W. Borucki, Z. Czerwiński, Z. Rzemykowski, W. Sikora). This publication continues to inspire the development of the art of supporting management decisions.

The rare ability to synthesise all research trends related to the application of statistical and mathematical methods to economics was manifested by the Professor's well-known book titled *Mathematics in service of economics* (Matematyka na usługach ekonomii) (PWN, six editions in 1969–1987), the most outstanding methodological work in Poland and one of the few publications in the world to integrate all the areas in quantitative economics.

This holistic nature is shared with: *Modeling and planning of national economy* (Modelowanie i planowanie gospodarki narodowej) (PWN, 1982, jointly with: B. Guzik, W. Jurek, E. Panek, et al.), *Mathematical modeling of economic processes* (Matematyczne modelowanie procesów ekonomicznych) (PWN, 1982), *Econometrics – hopes, achievements, shortcomings* (Ekonometria – nadzieje, osiągnięcia, niedostatki) (PWN, 1987, in cooperation with W. Maciejewski, A. Smoluk, and K. Zadora).

The Professor's impressive vitality and creative passion is greatly illustrated by his book *Economic dilemmas* (Dylematy ekonomiczne) (PWE, 1992) which earned him Edward Lipiński Award of the Polish Economic Society in 1993. It is a collection of dozen or so essays on the fundamental problems that trouble both economic theorists and practitioners to which no satisfactory solutions have been found so far. Only a scholar of such class, with such extensive knowledge and so professionally well-prepared as Professor Zbigniew Czerwiński could undertake writing a book not about what is known, solved and beyond doubt, but about unsolved, controversial problems, where the disagreement between specialists is so great that there can be no recourse to communis opinio doctorum. This book also received the Award of the President of the Council of Ministers in 1994.

Another book by the Professor – *My struggles with economics* (Moje zmagania z ekonomią) (Wydawnictwo AEP, 2002) – perfectly shows his talent, broad scope of his academic interest, and his career in science – from logic, through operations research, mathematical economics, econometrics, to philosophy.

The Professor lectured at the University of Poznań, the Poznań University of Economics, the University of Economics in Katowice, the Lund University, the Kharkiv Engineering-Economic Institute, the University of Glasgow, the University of Aix-en-Provence, the University of Tsukuba (Japan), and the University of Tizi-Ouzou (Algeria). His lectures covered such fields as econometrics, operations research, mathematical models of economic growth, mathematical statistics, logic, and methodology of economic sciences. His academic charisma, inquisitiveness and creative activity, combined with profound sensitivity to the ethics of academic teaching, made him a person that was always particularly respected and trusted. During public debates on social, economic, educational and higher education-related issues, he could incisively, and wherever necessary, critically analyse events, yet always stay moderate, impartial, and independent in his opinions. He was an active participant in the Solidarity movement which opposed the regime at that time. He managed the team that prepared the first fully democratic statute of the Poznań University of Economics.

What is also worth stressing, is the Professor's very active contribution to academic journals: "Studia Logica", "Przegląd Statystyczny" ("Statistical Review") (whose scholarly editor he was in 1981–1993), "Ekonomista" ("Economist"), and "Ruch Prawny, Ekonomiczny i Socjologiczny" ("Legal Movement, Economic and Sociological").

For many years, the Professor was also a member of: the Central Commission for Academic Title and Degrees, the Committee for Statistics and Econometrics of the Polish Academy of Sciences, the Committee for Economic Sciences of the Polish Academy of Sciences, the Poznań Society of Friends of Sciences (PTPN), and the Polish Economic Society. He supervised seventeen doctoral students to completion. Eight of his immediate students earned their post-doctoral degrees (habilitation), and four earned the academic title of professor.

The Professor always taught respect to scientific views and love of truth. Research and didactic work formed the meaning of his life. He had inborn tact and kindness, was very tolerant, could listen to arguments opposing his views patiently and carefully. The Professor's humility was equal to his greatness. He avoided "grand displays", crowds, and cheap applause. He was distinguished by his exceptional ability to formulate scientific problems clearly, logically and objectively, which allowed him to defend his views by speaking to the point and at the same politely on any occasion. In a debate, he never pursued his own interest. He considered search for the truth the superior goal of science. He strongly appreciated practical application of scientific achievements.

He was interested in the nature of scientific understanding, scientific methodology and the meaning of progress in science throughout his life. Here are some of his publications on these issues: *In the issue of fight against nominalism* (W sprawie walki z nominalizmem) ("Myśl Filozoficzna"„Philosophical Thought" 1956, Vol. 24, No. 4), *Concept of „whole"* (Zagadnienie „całości") Materials of Polish Science Problems (Zeszyty Problemowe Nauki Polskiej) 1956, Vol. 12), On the concept of deductive inference (*O pojęciu wnioskowania dedukcyjnego*) *Philosophy studies* (Studia Filozoficzne) 1960, 4 (19)), *On the concept of the cause and canons of Mill* (O pojęciu przyczyny i kanonach Milla) ("Studia Logica" 1960, Vol. 9), *Relations between statistical inference and deduction and mathematical induction* (O stosunku wnioskowania statystycznego do dedukcji i indukcji matematycznej) (in: *Problems of the science theory* (Zagadnienia teorii nauki), PWN, Warszawa 1966), *Cybernetics and economics on the margins of Oskar Lange's book, Introduction to Economic Cybernetics* (Cybernetyka a ekonomia na marginesie książki Oskara Langego, Wstęp do cybernetyki ekonomicznej) *Economic Yearbooks* (Roczniki Ekonomiczne) 1966/67, Vol. 19), *Achievements and Directions of Econometrics Development* (Osiągnięcia i kierunki rozwoju ekonometrii) *Statistical News Library* (Biblioteka Wiadomości Statystycznych) 1973, Vol. 21), *Science, econometric models, truth and probability* (Nauka, modele ekonometryczne, prawda i prawdopodobieństwo) (in: *Spatial and temporal modelling and forecasting of economic phenomena*) (in: *Spatial and temporal modelling and forecasting of economic phenomena* (Przestrzenno-czasowe modelowanie i prognozowanie zjawisk gospodarczych), KSiE PAN i AE w Krakowie, Kraków 1995), *Statistics vs Truth* (Statystyka a prawda) *Statistical News Library* (Biblioteka Wiadomości Statystycznych) 1995, Vol. 44), *Is economics science?* (Czy ekonomia jest nauką?) *Legal Movement, Economic and Sociological* (Ruch Prawniczy,

Ekonomiczny i Socjologiczny) 1996, issue 1), *Computer science and Economics* (Informatyka a nauka ekonomii) ("Informan" 1999, No. 4), *Economics – half a century ago and today* (Nauka ekonomii pół wieku temu i dziś) (lecture delivered at the Poznań University of Economics at the inauguration of academic year 2007/2008, in: *Human capital and knowledge in the economy, Challenges of the 21st century* (Kapitał ludzki i wiedza w gospodarce. Wyzwania XXI wieku). Wydawnictwo AEP, Poznań 2007).

At the Department of Econometrics, which the Professor managed for over 25 years, Thursday afternoons were always the time for academic seminars. Afternoons were chosen on purpose because at that time seminars sometimes ended late at night. Many of my friends and older co-workers still recall them with great pleasure. This good custom was adopted by the Professor's students, so the academic seminars continue to be held at the Department of Mathematical Economics on Thursdays. The Professor went on to take an active part in the work done at this department even after his retirement, until the very end of his beautiful, creative life.

For his service in the field of didactics and research, the Professor received Medal of the National Education Commission and the Knight's Cross of the Order of Polonia Restituta.

Whenever I recall the old times, I always see quotes from three great people in the Professor's office:

K.I. Gałczyński, a poet:
It is forbidden to use such words as: issue and concept.
One has to work…

Professor T. Kotarbiński, a philosopher:
Human! In all your life, from the cradle to the grave,
Respect to relativity of opinion you shall have.
I insult no donkey, though people taught me that *en masse*,
It's good for an ass to be an ass, bad for an MP to be an ass.

and R. Descartes, a mathematician and philosopher that the Professor held particularly dear:
Le premier (précept) était…
dene comprendre rien de plus en mes jugements,
que ce qui se présenterait si clairement et si distinctement á mon ésprit,
que je n'eusse aucune occasion de la mettre en doute…
(René Descartes Discours, *Discours de la Méthode*, II, 7).

These principles guided the Professor throughout his life and provide an excellent depiction of his temperament, passion, humility, and scrupulousness in research. He gave his own example of their application and instilled them in his students.

EMIL PANEK

Regina C. ELANDT-JOHNSON (1918–2011)

Regina C. Elandt was born in Nowogród – "a beautiful small town located on a hill overlooking the river Narew and its tributary Pisa" (to quote her own words) – on 22nd November 1918. She completed gymnasium education in Łomża. She always enjoyed mathematics, that arithmetic she was taught at the primary school. She virtually "fell in love with" mathematics in gymnasium, "when the algebra started and then was followed by functions". She selected mathematics as her academic major when she started her studies at the Faculty of Mathematics and Natural Science of the Stefan Batory University in Vilnius in 1937. Lecturers at that faculty included such excellent mathematicians as S. Kempisty, M. Krzyżański, J. Marcinkiewicz, and A. Zygmund. When referring to that period in her life, she recalled her teachers and professors and wrote:

"I would like to […] honour the names and pay a tribute to my late teachers and professors to whom I owe my knowledge […]. My gymnasium mathematics teacher – Mrs Kędzierska, who taught me to organise my thinking while solving mathematical problems; professors of the University in Vilnius: – Professor A. Zygmund, who managed to fascinate me with his lectures on calculus; Doc. J. Marcinkiewicz, who impressed us by his extraordinary mathematical talent [He was appointed a professor at the age of 29, but he did not live to receive that honour – his body rests at Katyn.]; Professor K. Jantzen, who supervised my studies and instilled in me the interest in meteorology. After the war, I was introduced to statistics by Professor S. Barbacki. He also taught me the basics of Mendelian genetics".

The outbreak of the war and the closure of the Stefan Batory University in 1939 interrupted her studies. She completed them at the Poznań University (now the Adam Mickiewicz University) earning the degree of master of philosophy in mathematics (on the basis of the thesis titled *Fourier Integral* written under the supervision of Professor Władysław Orlicz) in 1946. She was interested in the applications of mathematics since she had started her studies. During her second year at the university in Vilnius, she started working at the

Chair of Meteorology at the Stefan Batory University under Professor Kazimierz Jantzen, an astronomer and mathematician (he lectured on geometric analysis and mathematical statistics). She continued to pursue her interest in Poznań and, even as a student, started working first at the State Hydrological and Meteorological Institute (PIHM), and then (in February 1946) at the Chair of Agricultural Experimentation and Biometry of the Poznań University, under Professor Stefan Barbacki. The work at that department provided her with an opportunity to become familiar with a new discipline, the application of methods of mathematical statistics to the analysis of agricultural experiments, and more broadly, with biometry. It was here that her scientific career started. She quickly started to cooperate with the academics at what was then the Faculty of Agriculture and Forestry of the Poznań University and agricultural research workers. After a few years of such cooperation and of her own studies and research on statistical methods, she started publishing original works and academic papers on the application of mathematical statistics to agricultural experiments. These publications were printed in "Annals of Agriculture Sciences" ("Roczniki Nauk Rolniczych"), "News in Chemistry" ("Wiadomości Chemiczne"), and "Bast Fibers Institute's Papers" ("Prace Instytutu Włókien Łykowych"). In 1955, she earned the degree of doctor (candidate) of mathematical sciences, granted by the Council of the Faculty of Agriculture of the Higher School of Agriculture in Poznań (which had been a part of the University of Poznań until 1951) on the basis of the thesis titled *On certain interaction tests in multiannual and multiple experiments. The problem of regionalization (O pewnych testach interakcji w doświadczeniach wieloletnich i wielokrotnych. Zagadnienie rejonizacji*), written under the supervision of Professor Stefan Barbacki.

After completing her doctoral procedure activity, she started intense research, which produced interesting results published in: "Acta Agrobotanica", Application of mathematics" ("Zastosowania Matematyki"), "Bulletin de l'Académie Polonaise des Sciences", and "Annals of Agricultural Sciences" ("Roczniki Nauk Rolniczych"). The originality and practicality of these results were strongly appreciated by representatives of various disciplines. This contributed to the Central Selection Commission for Academic Cadre decision of granting her an academic degree of assistant professor (docent) in 1958. At the same time, she received a scholarship entitling her to stay in the United Kingdom, at the Department of Statistics, University College London, for a year, where she studied under the supervision of an outstanding scholar, Professor Egon S. Pearson. There she met her future husband, Professor Norman L. Johnson.

Having returned from abroad, she continued her research on the methods and applications of mathematical statistics in agricultural experimentation and plant genetics and breeding, with twice as much enthusiasm. This was the time of her first publications printed in renowned foreign journals: "Acta Agronomica Academiae Scientiarum Hungaricae", "Techno-metrics", "Annals of Mathematical Statistics", "Biometrics", and and also in "Sankhyā: The Indian Journal of Statistics". She continued to publish in Polish periodicals: "Annals of Agricultural Sciences" ("Roczniki Nauk Rolniczych") and "Genetica Polonica". Furthermore, she translated Yu Linnik's book from Russian into English, which was then published as *Method of Least Squares and Principles of the Theory of Observations* by the London-based Pergamon Press in 1960. Her work in that period and field of research was

completed by the textbook titled *Mathematical statistics and its application in agricultural experimentation (Statystyka matematyczna w zastosowaniu do doświadczalnictwa rolniczego)*, which was published by Polish Scientific Publishers PWN in Warsaw in 1964. This book was welcome by statisticians and the broad group of people working in agricultural experimentation in Poland. It is still used by many scientists and students.

In 1963, she was appointed the head of the newly formed Chair of Mathematical Statistics at the Faculty of Agriculture of the Higher School of Agriculture, which was formed on the basis of the Department of Agricultural Experimentation and Biometry, formerly part of the Chair of Plant Genetics and Breeding. She held that office for a short time, because she married Professor Norman L. Johnson in January 1964 and then moved permanently to the University of North Carolina at Chapel Hill, USA, where they both were granted professorships.

After moving to Chapel Hill, Mrs Regina C. Elandt-Johnson (the name she would publish under henceforth) became an associate professor at the Department of Biostatistics, University of North Carolina. This marked the beginning of a new stage in her research. She continued to be interested in plant genetics, but expanded the scope of this interest by including human genetics. This was related to her new post at the Department of Biostatistics, which was part of the School of Public Health at the local university. She was particularly interested in such topics as the application of the methods of mathematical combinatorics to genetics, gene segregation, and testing genetic compatibility in relation to tissue transplants, which was a very up-to-date issue at that time. She published her results in this regard in "Bulletin of Mathematical Biophysics", "Annals of Human Genetics, London", "The American Journal of Human Genetics", "Transplantation", and "Biometrics", which published her extensive overview publication titled *Survey of histocompatibility testing*, which was a Biometrics invited paper. This period in her academic publishing activities is concluded by the book titled *Probability Models and Statistical Methods in Genetics* which was published by John Wiley & Sons, New York, in 1971. It is still regarded a classic work on the applications of the probability theory and mathematical statistics to genetics. In recognition, she was appointed a full professor at the Department of Biostatistics in 1971.

The third stage of her career in research, which started in 1973, involves research on the application of mathematical statistics to survival analysis and issues in the field of epidemiology, with particular emphasis on survival time distributions and the concurrent causation theory. Her results were published in: "Journal of Chronic Diseases", "American Journal of Epidemiology", "Scandinavian Actuarial Journal", "Naval Research Logistics Quarterly", "Journal of Multivariate Analysis", "Journal of the Royal Statistical Society", "The Actuary", "Aligarh Journal of Statistics", "Biometrical Journal", "Statistics in Medicine", and in books: *Contributions to Statistics* (ed. P.K. Sen), and *Biostatistics: Statistics in Biomedical Public Health and Environmental Sciences* (ed. P.K. Sen). Her principal achievements in that research are concluded in the monograph titled *Survival Models and Data Analysis*, which was written jointly with her husband, and then published by John Wiley & Sons in 1980. The second edition of this book was released in 1999 as part of the Wiley Classics Library Edition series.

The above synthetic overview of Professor Elandt-Johnson's academic output shows that the results of her research in all the three main areas of academic interest were published in excellent global journals, and each of these areas was concluded by a book. This is a sufficient evidence of how high Mrs Regina C. Elandt-Johnson ranks in the global science. Her contribution to the agricultural, natural and medical science is unquestionable. Both the value of her results and the broad scope of interest are impressive. What is also important for these achievements, is the depth of the studies under the supervision of great scholars and the level of the academic milieu in which she started her career.

Her position can also be demonstrated by a mention that she was invited to give papers, seminar talks and lectures on various conferences, symposiums, academic meetings, training courses, summer schools, etc. These events were organised by various scholarly societies and research institutions in Poland, then also in various states in the USA, as well as in Australia, Canada, South Africa, the United Kingdom, and Germany.

Professor Regina C. Elandt-Johnson's academic work was always accompanied by serious involvement in didactics. In Poznań, she gave lectures and classes on mathematics for first year students of agriculture, horticulture, and animal science, on higher mathematics for students of certain master's programmes, on mathematical statistics and basic agricultural experimentation for students of many years and programmes at the Higher School of Agriculture in Poznań. She lectured at several courses on statistical methods for academic staff members.

At the School of Public Health of the University of North Carolina at Chapel Hill, she gave lectures on the basics of statistics for students of various medical specialities as part of the so-called "service courses" and lectures on the basics and applications of mathematical statistics for master's and doctoral studies specialising in biostatistics as part of the so-called "graduate school" at the Department of Biostatistics. She also supervised master's theses in the field of statistical survival theory and applications of statistical methods to epidemiology. She supervised two doctoral dissertations in the field of statistical survival theory. She was a member of several doctoral committees.

To supplement this overview of Professor Regina C. Elandt-Johnson's achievements, it is worth mentioning her activities as a scientific consultant and adviser. Many members of academic staff took advantage of her assistance while designing experiments and analysing their results, both during the 18 years of her work in Poznań and then at Chapel Hill (at the former place in regard to agricultural research, in the latter – medical research). Moreover, she was a consultant at several American institutions, e.g. in relation to an international lipid research programme. These consultations and contacts with scientists active in many fields were usually mutually beneficial and contributed to initiation of new research.

It is also worth mentioning that though Professor Regina C. Elandt-Johnson left Poland and moved to the USA for good in 1964, she never severed her connections with the university where her academic career started, i.e. the Higher School of Agriculture

(since 1972 – the Agricultural University, now University of Life Sciences) in Poznań and Polish academic circles in general. She visited her *alma mater* on many occasions when visiting Poland, or contacted some of its employees. Professor Regina and her husband supported the Chair of Mathematical and Statistical Methods of that university and the Institute of Plant Genetics of the Polish Academy of Sciences in Poznań (which she had cooperated with at some point) with collections of valuable books and academic journals that were hard to obtain at that time. She also took care of scholarship holders from Poland who came for academic apprenticeships at Chapel Hill or visited the University of North Carolina. An example of the contacts with Polish academics is her participation in the Third International Seminar on Statistical Methods in Variety Testing, which was held at the Research Centre for Cultivar Testing in Słupia Wielka in 1988. At that occasion she also participated in the public defence of a doctoral dissertation which was organised at the Faculty of Agriculture of the Agricultural University in Poznań. It is also worth mentioning her participation in the reunion of Faculty of those persons who completed their Agriculture studies in 1959, which in June 1999 the participants recalled with great respect and affection the Professor's lectures and classes that took place over forty years earlier. During that visit to Poznań, the Professor took another opportunity to visit her home institutions at the Agricultural University: the Chair of Plant Genetics and Breeding, and the Chair of Mathematical and Statistical Methods.

So, while abroad Professor Regina C. Elandt-Johnson remembered the country of her birth and the university where she was taught the basis for her later research and didactic activity. At that university, she contributed greatly to the *Poznań school of mathematical statistics and biometry*. In the preface to one of the aforementioned books (published in 1971), she expressed her gratitude to Poland and the universities that had impact on her mathematical education. In particular, she thanked Professor Stefan Barbacki, who had managed the Chair of Agricultural Experimentation and Biometry (later the Chair of Plant Genetics and Breeding), and colleagues with whom she had worked, for introducing her to the field of biological problems and the possibilities to solve them using mathematical methods. It was no accident that the university, which was at that time called the August Cieszkowski Agricultural University in Poznań, awarded Professor Regina C. Elandt-Johnson the splendid degree of doctor honoris causa. The ceremony when she was handed the diploma of doctor honoris causa was held on 21st June 2001.

Finally, among her numerous activities, there is one more that deserves some discussion. Regina and Norman Johnson supported, through the Podlasie Branch of the Polish Community Association, various actions for the benefit of Poles living beyond Poland's eastern border. It is hard to list all the actions that Mrs. Regina and her husband took in this field, but it is worth mentioning at least a few. They provided financial aid to teachers of the Polish language in Belarus, to students from the East, families of persons exiled to Siberia, repatriates from Kazakhstan, and many Roman-Catholic parishes: in Belarus, Sapotskin, Astryna, Ros, Iwye, and Shchuchyn. Due to their support, a Polish language laboratory was established at the Polish school in Vawkavysk. Without their help, Polish orphans at orphanages in Vilnius, Šalčininkai, Naujoji Vilnia and Pabradė in Lithuania would not have clothes and school equipments. They also provided financial aid to Polish

diaspora circles in Tyumen and Smolensk in Russia. What deserves particular attention is the construction projects that Mr and Mrs Johnson supported. They helped to build two churches: in Lida, Belarus, and Łomża, Poland. In cooperation with the Piarist Order, they renovated and refitted the "Refuge" ("Ostoja") charity centre, dedicated to Our Lady of the Gate of Dawn, in Shchuchyn, Belarus. It was named in honour of Stanisława Berzanowska, the Professor's grandmother. Another important project was the "Homeland" ("Ojczyzna") centre in Hodyszewo in the Białystok region. Mrs Elandt-Johnson had had an idea of establishing a home for Poles from the East and the West who visit their homeland to allow them to find a place to study, rest, have fun and pray. After much joint effort with the mentioned Polish Community Association, this idea could be implemented at the Shrine of Our Lady of Reconciliation in Hodyszewo managed by Pallotines who co-financed the construction of the centre. Regina and Norman Johnson attended the cornerstone ceremony initiating the construction of the "Homeland" ("Ojczyzna") Centre in Hodyszewo on 30th June 2001. The centre was opened on 15th September 2004, and on 4th June 2006 the centre was renamed in honour of Regina and Norman Johnson (Norman L. Johnson did not live to see that, he had died on 18th November 2004). In Hodyszewo, the Johnsons also provided financial aid to the Pallotines that allowed them to renovate the local village school, which is attended by the children from the area. These are only the most important initiatives by Regina and Norman Johnson. The list of all their charitable deeds and magnanimous acts for the downtrodden is very long. These activities were accepted with great gratitude in the East and elsewhere. The Johnsons also provided support for education of children in India and Africa. They also helped build a school in El Salvador.

Professor Regina C. Elandt-Johnson retired in 1985, but remained affiliated with the University of North Carolina as a professor emeritus. She died on 31st May 2011 in Chapel Hill where she lived until her very last day. Her funeral was held there on 8th June 2011.

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TADEUSZ CALIŃSKI

Marek FISZ
(1910–1963)

Marek Fisz was born in Szydłowiec on 15 January 1910, into a Jewish family. His mother Sura née Rozenbaum and his father Kojfman Fisz lived in Ostrowiec Świętokrzyski. His father was a private clerk (among other posts, he worked as a writer in the local mill). Marek Fisz was originally given the name Mojżesz (Moses) – this was changed to Marek on 19 July 1950 by decision of the Presidium of the National Council for Warsaw West District. His childhood and youth are shrouded in mystery. It is known only that in May 1934 he obtained his school-leaving certificate as an external student. In the curriculum vitae accompanying his application for the right to pursue a doctoral degree, he wrote that he had begun his course of high-school studies at the age of 22. In the autumn of 1934 he began studying mathematics at the Faculty of Mathematics and Natural Science of Warsaw University. During the period of his studies, in 1936–39, he worked as a mathematics teacher in a school for adults run by a Tenants' Mutual Help Association at the Warsaw Housing Cooperative in the city's Żoliborz district. He wrote his master's dissertation, entitled *"Conformal Transformations of Simply Connected and Biconnected Spaces"*, under the supervision of Professor Stanisław Saks. Passing his examination on 28 June 1939 with a good grade, he obtained the title of Master of Philosophy in Mathematics.

He spent the whole period of the Second World War in the Soviet Union. On 29 January 1944 he married Olga Gukov. Their only son, Alexander, was born on 24 September 1946.

In 1946 Marek Fisz returned to Poland, and worked for a year as a tutor at a children's home in Otwock. From autumn 1947 until the end of September 1951 he worked as an "academic employee" at the Central Statistical Office in Warsaw. It should be noted that his first contact with academic work in mathematics came when he was over 37 years old. His duties there included directing the planning and execution of the

first post-war national census, which aimed to reflect the state of affairs at midnight between 2 and 3 December 1950.

On 20 May 1950, Marek Fisz applied to the Council of the Faculty of Mathematics, Physics and Chemistry of Wrocław University and Polytechnic *"to accept my paper 'Quality Control of Mass Production by Variables' as a doctoral thesis and, if found to be sufficient, to admit me to the examination for the degree of Doctor of Philosophy in Mathematics (additional subject: theoretical mechanics)"*. Marek Fisz passed his doctoral examination on 19 December 1950, in front of a committee chaired by Professor Jan Nikliborc and also composed of Professors Hugo Steinhaus, Edward Marczewski and Władysław Ślebodziński. The supervisor for his doctoral thesis *"Quality Control of Mass Production by Variables"*, published in the journal *Studia i Prace Statystyczne*, vol. 2 (1950), pp. 123–160, was Professor Hugo Steinhaus. He took his doctorate on 23 June 1951 in the Senate Hall of Wrocław University. Starting from June 1950 he collaborated with the Mathematical Statistics Department at the State Mathematical Institute in Warsaw, and in October 1951 he became an employee of that Institute. From the 1951/52 academic year he also began giving lectures and seminars for the Faculty of Mathematics, Physics and Chemistry at Warsaw University. On 1 April 1954 he became a permanent employee of that faculty, when the Minister of Higher Education appointed him head of its Mathematical Statistics Department. A resolution of the Central Qualifications Committee for Academic Employees dated 30 June 1954 awarded Dr Marek Fisz the academic title of *docent*. On 28 March 1957 another resolution of the same committee gave him the title of associate professor. At a meeting on 20 March 1957, the University Studies Section of the Central Higher Education Council appointed him to the Mathematical Experts Team. On 15 March 1958 he was appointed head of the Mathematical Statistics Department at the Mathematical Institute of the Polish Academy of Sciences (PAN) in Warsaw.

He attended the first Congress of Polish Science, held in Warsaw between 29 June and 2 July 1951, which brought together around 1800 academics from all over Poland, and at which the Polish Academy of Sciences was founded. From 1949 onwards he was a member of the Polish Mathematical Society, and in 1953–55 he served as treasurer to the Society's central management board. He attended an organizational meeting of the Biometrics Section of the Nicolas Copernicus Polish Natural Scientists' Society, which took place on 19–21 February 1959 at the PAN Mathematical Institute in Wrocław, also attended by J. Czekanowski, B. Knaster, J. Łukaszewicz, W. Oktaba, M. Olekiewicz, J. Perkal, H. Steinhaus, S. Zubrzycki and others. At the start of 1961 that Section was transformed into the Polish Biometrical Society, whose first president was Julian Perkal.

Among the meetings at which Professor Marek Fisz gave papers were:
– All-Poland Mathematicians' Congress,1953
– Probability conference in Berlin,1954
– Conference on stochastic processes in Wrocław,1954
– Probability Conference in Leningrad,1955
– Fourth Berkeley Symposium,1960
– Annual Meeting of the Institute of Mathematical Statistics in Seattle, 1961.

In 1955 Marek Fisz spent three months at Moscow University, and in spring 1957 he lectured at the University of Beijing.

He made continual attempts to be allowed to settle in Israel, but failed to gain the required permission from the Polish authorities.

In 1960 he left on a one-year academic visit to the United States, after which he never returned to Poland. He held posts at the University of Washington in Seattle, Stanford University, Columbia University and New York University.

Marek Fisz died on 4 November 1963 at the Metropolitan Hospital of New York City, at just over 53 years of age. It is notable that no Polish academic journal printed even a single sentence recording his death.

In his short 16-year career Marek Fisz obtained many significant results. His first works, including his doctoral thesis [4], concerned sampling methods and production quality control ([1], [2], [3], [5], [6], [14], [18]). A further set of works relate to distributions of limiting functions of discrete random variables, with particular focus on the Poisson and multinomial distributions ([7], [8], [9], [11], [17], [19], [20], [20], [21]). The modern nature of his research was evident in a series of his papers published in 1957–58 ([25], [26], [27], [32]) relating to limiting distributions of non-parametric statistics of Kolmogorov-Smirnov type. In these papers he made use of a 1956 result of Prokhorov on weak convergence of measures to multinomial empirical processes. Even today these results are fully applicable in mathematical statistics. These papers were written during his visits to Moscow and Beijing. Marek Fisz also devoted a significant amount of attention to researching the properties of sampling functions of stochastic processes. In his paper [22] he gave conditions expressed in terms of absolute probabilities at which almost all process sampling functions are jump functions with a finite expected number of discontinuities. He significantly generalized these results in his paper [39], which he presented at the Fourth Berkeley Symposium in 1960. On 16 June 1961 in Seattle, Washington, Professor Marek Fisz gave a special invited paper [40] at the Annual Meeting of the Institute of Mathematical Statistics. He spoke on infinitely divisible distributions, a subject to which he remained devoted until his death (e.g. [42], [43], [44], [45]). Pyke (1967) wrote: *"This excellent expository address [40], together with its extensive bibliography of 104 references, will continue to be very useful for many years to come"*.

The best known contribution of Professor Marek Fisz to the theory of probability and mathematical statistics is his textbook *Rachunek prawdopodobieństwa i statystyka matematyczna (Probability Theory and Mathematical Statistics)*, whose first edition, of 374 pages, was published in 1954. He had begun working on the book in 1950, before he had obtained his doctorate. The textbook proved extremely popular, all copies selling out within a few months. In 1958 a second edition was published by the State Academic Publishing House (PWN), corrected and expanded to 530 pages, as Volume 18 of the Mathematical Library series. For many years Fisz's book set the standards for the teaching of probability and mathematical statistics. Its third edition, in English, was

published by Wiley in 1963. It was translated from Polish by Professor Robert Bartoszyński. (It should be mentioned in passing that Robert Bartoszyński's supervisor for his doctoral thesis *"On Weak Convergence of Measures"*, defended on 23 January 1960 at the PAN Institute of Mathematics in Warsaw, was Professor Marek Fisz. In turn Bartoszyński was one of the reviewers of the post-doctoral degree (habilitation) and professorship theses of the present author.) The third edition of Marek Fisz's textbook in Polish, published by PWN, did not appear until 1967, after the author's death. The delay was a result of the turbulent events of Fisz's life. This edition contained 694 pages. Pyke (1967) wrote of the book: *"This text was written for either senior undergraduate or first-year graduate students. It covers both probability theory and statistical inference, and includes introductions to stochastic processes and sequential analysis in addition to the more usual topics. There is a large collection of 317 problems and complements in the book, which, together with its considerable historical and bibliographical information, make it an excellent reference book as well as a textbook".* Apart from four editions in Polish, the book has appeared in three editions in English (one in India and two in the US) and 11 editions in German.

In his comparatively short career Professor Marek Fisz contributed a great deal to the development and teaching both of probability theory and of mathematical statistics.

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MIROSŁAW KRZYŚKO

Zdzisław Henryk HELLWIG
(1925–2013)

Zdzisław Hellwig was born on 26 May 1925 in a small town Dokszyce not for away from Wilno. Both of his Parents were teachers. His father Henry Hellwig taught the German Language, and his mother taught the mathematics.

Zdzisław Hellwig was educated at King Zygmunt August Gimnasjum in Wilno. The secondary school graduation certificate (Matura, in Polish) he obtained however after the Second World War in Wrocław in 1947. In the same year he entered the University of Economics (Wyższa Szkoła Ekonomiczna) in Wrocław, which he graduated in 1950 with the bachelor degree.

In 1952 he received his Master Degree (magister, in Polish) in theory of statistics at The Principal School of Planning and Statistics (SGPiS) in Warsaw.

Being the student of the second year in the Higher Commercial School (Wyższa Szkoła Handlowa in Polish) he started to work at this School as a younger assistant.

On the basis of the work *Linear regression and its applications in economics* he defended in 1958 his Ph.D. degree in economic sciences (officially, in these times, the name of this degree was *Kandydat Nauk Ekonomicznych* i.e. Candidate of Economic Sciences).

In 1967 he became the professor in economics, and since 1972 he is the full professor in economics.

In 1962 Professor Zdzisław Hellwig was nominated to Head of Department of Statistics and took this post till 1995, this is to the year when he was retired.

Many ideas, concepts and methods bears the name of Hellwig. The most famous of them are mentioned below.

1. Information capacity or the information measure conveyed by a set of economic variables (in Polish: *pojemność informacyjna*), published in 1968.

The information measure conveyed by the m-element subsets $\{X_{k_1}, X_{k_2},...,X_{k_m}\}$ of the set of potential variables $\{X_1, X_2,...,X_n\}$ has been defined by the following formula (instantly recognizable by any Polish statistician):

$$H(m,k,) = \sum_{i=1}^{m} \frac{r_{k_i}^2}{\sum_{j=1}^{m} | r_{k_i k_j} |}$$

where $k = (k_1, k_2,...,k_m)$

r_{kikj} is the correlation coefficient between X_{ki} and X_{kj},

r_{kj} is the correlation coefficient between Y and X_{ki}.

Index of stochastic dependence (published in 1969)

2. The other significant Hellwig's achievement is the measure of stochastic dependence. For the case of two dimensional random vector this measure has been defined as follows:

$$d = (1 - \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} \min[f(x,y), f_1(x) \cdot f_2(y) dxdy)^{1/2} .$$

For the discrete case this measure has been defined by the following formula:

$$d = \left(\frac{1 - \sum_{i=1}^{r}\sum_{j=1}^{s} \min(p_{ij}, p_i q_s)}{1 - (\min(r,s))^{-1}} \right)^{1/2} .$$

Both of them were further investigated in a number of papers by many scholars.

3. Distance random variable

In 1967 Zdzisław Hellwig introduced a new statistical concept, and namely, the concept of distance variable. It has been defined as follows.

Let $X^0 = (X_1^0, X_2^0,..., X_n^0), X^1 = (X_1^1, X_2^1,..., X_n^1),..., \quad X^m = (X_1^m, X_2^m,..., X_m^m\}$

be a simple random sample from the distribution given by *cdf* $F(x_1,...,x_n)$ or by the density function $f(x_1,...,x_n)$.

The distance random variable, denoted by symbol $C_{m,n,}$ is defined as follows:

$$C_{m,n,} = \min(Y_1, Y_2, ..., Y_m)$$

Intuitively, variable $C_{m,n,}$ means the shortest distance between a random vector X^0 and a

$$Y_j = \left(\sum_{i=1}^{n} (X_i^0 - X_i^j)^2 \right)^{1/2} \quad \text{j = 1,2,..., m.}$$

set of random vectors X_2^1, X^2,..., X^m.

4. Index of socio-economic development

Suppose there is given vector $x_i = (x_{i1}, x_{i2},...,x_{in})$ which contains the values of *n* features charactering the evaluated countries with respect to their level of socio-economical development. There is given the reference vector $x_0 = (x_{01}, x_{02},...,x_{0n})$ which has been called "the pattern of economic development", characterizing an ideal country.

The level of development of each country is calculated according to the following formula:

$$d_i = 1 - \frac{c_i}{c_o}, \; i = 1,2,..., N$$

where *N* is the number of countries evaluated with respect to their status of development, and the quantities and are defined as follows:

$$c_i = \left[\sum_{j=1}^{n} (x_{ij} - x_{oj})^2 \right]^{1/2}$$

$$c_o = \overline{c} + 2\left[\frac{1}{N} \sum_{i=1}^{N} (c_i - \overline{c})^2 \right]^{1/2}$$

$$\text{with } \overline{c} = \frac{1}{N} \sum_{i=1}^{N} c_i$$

Professor Hellwig passed away on 5. November 2013.

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WALENTY OSTASIEWICZ

Jerzy Zdzisław HOLZER (1930–2001)

Director of the Institute of Statistics and Demography at the Warsaw School of Economics in 1978–1999, Dean of Division I: Social Sciences of the Polish Academy of Sciences for the 1999–2002 term; corresponding member of the Polish Academy of Sciences since 1991, member of Academia Europaea since 1995.

Jerzy Zdzisław Holzer was born in Bydgoszcz on 24th July 1930. In 1948, he started studying at the Warsaw School of Economics, which was renamed to Central School of Planning and Statistics. In 1951, he earned the economic planner diploma at the Faculty of Industry, and in 1953, the master's degree in economics at the Faculty of Statistics.

J.Z. Holzer earned further academic degree at his home university – doctoral degree in economic sciences at the Faculty of Finance and Statistics in 1963 on the basis of the dissertation titled *The impact of natality and mortality on the population structure of Poland by sex and age* (Wpływ urodzeń i zgonów na kształtowanie struktury ludności Polski według płci i wieku), and the post-doctroral degree (habilitation) in economic sciences in 1968 by presenting the Council of the Faculty the post-doctoral degree (habilitation) thesis titled *A Model of stable population* (Model ludności ustabilizowanej). In March 1969, he earned the academic title of assistant professor, in March 1979, the Council of State awarded him the academic title of associate professor of economic sciences, and in June 1989 – professor of economic sciences.

Career

J.Z. Holzer started his career as a junior assistant at the Chair of Statistics of the Central School of Planning and Statistics in September 1950. Two years later, he was appointed senior assistant, and in September 1954, he became an assistant professor.

He started lecturing on general and economic statistics on his own in 1955, and in 1958 he began lecturing on demography. In 1954–1956, he taught classes on statistics that accompanied lectures by Professor Stefan Szulc given at the Faculty of Geography of the University of Warsaw. In 1958–1963, he also lectured on demography with elements of statistics for students of the Faculty of History and Sociology of the Higher School of Social Sciences in Warsaw.

In 1956–1963, he also worked half time at the Central Statistical Office as the head of Demographic Survey Team. At that time, he initiated a number of analytical surveys and publications, which are continued to date. He worked on methods for estimating population by territorial units, validation of the method for calculating infant mortality rate (he introduced the principle of alpha coefficient variability), construction of mortality tables.

On the proposal by Professor Doctor Jan Drewnowski, the then-incumbent dean of the Department of Economics of the University of Ghana, Legon, Jerzy Z. Holzer was posted to work on the Institute of Statistics, which was at that time being established. He gave lectures and seminars on demography, and research related to assessment of demographic processes in Ghana. The research resulted in the Institute publishing a monograph on the seasonality of births and deaths in selected cities in Ghana, and a paper and a chapter in the post-doctoral thesis on the application of the stable population model.

Having returned to Poland, he worked at the Central School of Planning and Statistics in 1966–1971 and lectured on general statistics and gave lectured, conducted a master's and a doctoral seminar on demography.

Between September 1971 and September 1973, the Professor worked at the Population Programme Centre of the UN Economic Commission for Africa based in Addis Ababa (Ethiopia) as the regional demographic adviser. In total, he took 17 missions to 7 African countries on the invitations by their governments. The advice involved assistance in preparing censuses, formulating research and survey plans related to demography for academic centres or institutes cooperating with the UN. At that time, he actively participated in training African demographers. In 1972, he lectured on demography for the students of the Faculty of Statistics of the Haile Selassie University, Addis Ababa, for a semester as part of the UN aid for Ethiopia. In 1972 and 1973, he conducted monthly intense cycles of lectures on demography for the students of the UN School of Statistics at the University of Dar-es Salaam in Tanzania. In 1973, he trained demographers at the Regional Institute of Population Studies at the University of Ghana in Legon.

In October 1973, the Professor accepted the offer to work as a demographer at the Geneva-based UN Department of Social Affairs. The research work consisted in preparing comparative analyses of various population issues in Europe. It resulted in the following publications: "Recent Trends in Family Setting Patterns in European Countries"; this was an opening speech at the UN seminar titled "Youth and Responsible Parenthood", which was held in Lillehammer, Norway, in May 1974, and "Expected Trends in Popula-

tion Size and Sex-Age Structure, 1970-2000", which formed chapter VII in the publication titled "Post-War Demographic Trends in Europe and Outlook Until the 2000", which in turned formed the second part of the "Economic Survey of Europe in 1974" by the UN Economic Commission for Europe.

Furthermore, he was involved in organising the work of the UN Working Group on Social Demography under the European Social Development Programme in 1973–1977. Seminars on various topics related to the reproduction of the European population were held every year. In May 1976, he organised the Working Group session in Poland. The purpose of the meeting was the preparation of methodological assumptions for a comparative study on low fertility rate countries as part of the World Fertility Survey (WFS). He took part in the work done by the Advisory Board of the Fertility and Family Surveys of the ECE Region programme which was implemented in various countries in the 1990s.

In 1977, after the European UN Department of Social Affairs had been dissolved, J.Z. Holzer started working at the Central School of Planning and Statistics in Warsaw. He lectured on demography and gave master's and doctoral seminars. In 1978, he became the director of the SPIS Institute of Statistics and Demography, which he managed until 1999. In 1981, he was elected the vice-rector for research of the Central School of Planning and Statistics for the 1981–1984 term.

Research

J.Z. Holzer started publishing his earliest research results on the methods of demographic analysis in 1957–1958. Then, he wrote monographs based on his own research as part of the Demographic Survey Team of the Central Statistical Office. They concerned both the mortality and fertility. The scope of his academic interest was also extended by including the issue of migration and analysis of the reproduction process. This was concluded by the book titled *Fundamentals of demographic analysis* (Podstawy analizy demograficznej) written in 1963 (published by PWE).

This book received favourable reviews in both Polish and foreign academic journals, and was accepted as an academic textbook. The results of the further, more in-depth studies on the methods for analysis and assessment of demographic processes were published in 1970 in the book titled *Demography* (Demografia) (published by PWE). Apart from the didactic material, this textbook includes a synthetic presentation of demographic processes in Poland. Further editions, which were amended and extended by including the overview of the most important theories concerning underlying conditions of the demographic processes, were published in 1980, 1989, 1994, and 1999. The last edition, released in 2003, was prepared by the team of his co-workers from the Institute of Statistics and Demography.

A separate field in which J.Z. Holzer was interested was the study on mortality, particularly the construction of mortality tables. He is the author of both a portion of the methodological assumptions and the results in the publications titled *Polish mor-*

tality tables 1955/56 (Polskie tablice wymieralności 1955/1956), *Polish mortality tables 1960/61* (Polskie tablice wymieralności 1960/61), and the earliest post-war mortality tables of Warsaw of 1958/1959. These are works of timeless cognitive value. These tables were used in preparing demographic forecast for Poland in the 1960s. The The results of his research on mortality were published as a chapter in the book titled *Sex Differentials in Mortality, Trends, Determinants and Consequence*s (co-authored by J. Mijakowska) which was released by the Australian National University in Canberra in 1983. The Professor was particularly interested in the method for projecting and forecasting demographic processes and assessing reproduction of the population. His research on the issue resulted in the book titled *The demographic projection for Poland until 1975* (Prognoza demograficzna Polski do roku 1975) which was published by PWE in 1959. The following years saw more in-depth studies in this regard. The doctoral dissertation titled *Natality and mortality and the Population structure of Poland 1950-2000* (Urodzenia i zgony a struktura ludności Polski, 1950-2000), published by PWE in 1964, which was another step leading to the Professor's affiliation with the *Poland 2000* (Polska 2000) Committee for Surveys and Forecasts of the Polish Academy of Sciences. The Committee's publication titled *Projections for the demographic development of Poland* (Prognozy rozwoju demograficznego Polski) No. 3/1971, included two studies: *Critical evaluation of the principles of constructing contemporary demographic projections in Poland* (Krytyczna ocena zasad budowy współczesnych prognoz demograficznych w Polsce) and *The demographic projection for Poland until 1990 as the basis for employment and education policy. A project of expertise* (Prognoza demograficzna Polski do roku 1990 jako podstawa polityki zatrudnienia i kształcenia, projekt ekspertyzy). Particularly the former was a critical, synthetic assessment of the previous rules for constructing demographic forecast. The first volume of the publication titled *Strategy of development of Poland until 2020* (Strategia Rozwoju Polski do roku 2020), which the *Poland 2000 Plus* (Polska 200 Plus) Forecast Committee published in 2000, included the Professor's study (co-authored by R. Serek) titled: *The demographic situation of the world and Poland in the period until 2020* (Sytuacja demograficzna świata i Polski w okresie do roku 2020).

In 1986–1987, the Professor managed a team preparing forecasts of the development of the Polish population. In January 1987, the *Poland 2000* (Polska 2000) Committee for Forecasting Development of the Country published a study titled *Three variant projection of the size and structure of the population of Poland until 2000 – preliminary study* (Trzywariantowa prognoza stanu i struktury ludności Polski do roku 2000 – opracowanie wstępne) which was co-authored by the Professor. In 1990, he published a monograph titled *Demographic perspectives for Poland until 2030. Study projections – assumptions, numerical results, conclusions* (Perspektywy demograficzne Polski do roku 2030, Projekcje studialne – założenia, wyniki liczbowe, wnioski) which was released as part of the editorial series of the Central School of Planning and Statistics.

The extension of the scope of the research by including the theoretical correlation between the age and sex structure of the population and the vital statistics is related to the application of the stable population model. This issue was the topic of the

habilitation thesis titled *A model of stable population* (Model ludności ustabilizowanej) and a cycle of articles. The most important ones include the papers published in *Demographic Studies* (Studia Demograficzne): *Apportion the singular age groups of demographic boom and demographic decline in Poland. Range of fluctuation in size of selected age groups* (Wyznaczanie roczników wyżu i niżu demograficznego w Polsce. Zakres falowania liczebności wybranych grup wieku) (No. 3/4 (61/62), 1980, co-authored by B. Mlącki, *An attempt to determine the optimal number of births in order to achieve in Poland a structure of population stable by sex and age in 2060* (Próba wyznaczenia optymalnej liczby urodzeń dla osiągnięcia ustabilizowanej struktury płci i wieku ludności Polski w roku 2060) (No. 1/63, 1981, co-authored by J. Jóźwiak), *Cognitive values and limitations of the model of stable population in solving optimization problems* (Wartości poznawcze i ograniczenia modelu ludności ustabilizowanej w problematyce optymalizacyjnej) (No. 3/65, 1981), and *Demographic booms in Poland. Comparative analysis* (Wyże demograficzne w Polsce, Analiza porównawcza) (No. 4/78, 1984). These publications both introduce new analytical propositions and form a significant contribution to the assessment of demographic processes.

Studies on the methodology for measuring the impact of demographic processes on the age and sex structure of the population were presented in a few publications. In March 1977, at the international conference held in Washington, DC, the Professor presented an adaptation of a certain method for measuring the impact of selected factors on the change to the number of births and their structure by the mother's age. This paper was published as the chapter titled "Components of change in number and structure of births by age of mothers in urban and rural areas of Poland, 1950-1975" in the book titled "Social, Economic and Health Aspects of Low Fertility", NIH, Washington, DC, 1980. The Polish version was printed in Demographic Studies Studia Demograficzne in 1977. It is a ground-breaking work in the Polish literature.

1978 was the year of the publication of the study titled *Application the analysis model enabling the estimation of the potential impact of internal migration on vital statistics indices* (Zastosowanie modelu analizy umożliwiającego szacowanie potencjalnego wpływu migracji wewnętrznych na poziom współczynników ruchu naturalnego) *Demographic Studies* (Studia Demograficzne) No. 53 of 1978. This work is an original contribution to the methodology of constructing the so-called indirect methods for assessing the impact of migration on demographic processes.

A large portion of the aforementioned work was carried out as part of keynote problems. Their synthesis is included in the study titled *Demographic, social and economic determinants of population reproduction* (Demograficzne, społeczne i ekonomiczne uwarunkowania reprodukcji ludności) *Monographs and Studies of the Central School of Planning and Statistics* (Monografie i Opracowania SGPiS), No. 111/4 of 1982. His original final report from the 1976–1980 survey was submitted to the Government Commission for Population which implemented a number of conclusions to the planning policy of central state administration bodies.

What gains particular importance among the contemporary demographic issues is the process of population ageing. In 1984, Professor J.Z. Holzer was invited by the Demographic Unit of the UN Economic Commission for Europe in Geneva to prepare a concept of a comparative study on population ageing in developed countries. After a series of session of the Working Group managed jointly by the Professor and the head of the Demographic Unit at the UNECE in Geneva, this concept served as a basis for a monograph that discussed primarily the demographic implications of population ageing and selected socio-economic consequences of the process. The chapter on Poland, titled *The Aging of the Population in Poland, 1950-2020*, was published in 1987.

Another stage of the work on the topic was a synthetic assessment of the economic activity of the elderly population, which resulted from the invitation by the UN Population Division in New York. The synthesis was presented at the international academic symposium in Tokyo in 1986, and the Polish version of this paper was published in *Demographic Studies* (Studia Demograficzne), No. 2 1987).

The changes to the demographic structure in the context of reproduction, and particularly population ageing, were the subjects of J.Z. Holzer's academic interest in the final years of his life. They were set against a broader background of demographic changes around the world and in Europe, their social and economic consequences. This was related to his work on demographic policy, understood as an element of social policy.

An important area of his demographic research was the demographics of African countries. His earliest results in this regard were published in the monograph titled "Seasonality of Vital Events in Selected Towns of Ghana, An Analysis of Registration Data Relating to the Period 1956-1960". An abridged version of this study was included in a the book titled "The Population of Tropical Africa", published in London in 1968 (Longmans, Green, co. ltd.), The results of his own research on demographic processes in the African country were presented in the first part of his post-doctoral thesis and also in the materials from the population conference organised by the International Union for the Scientific Study of Population (IUSSP) in Sydney. The study titled: *Estimate of the Age Structure of Ghana's Population. An Application of the Stable Population Model*, Sydney, IUSSP, 1967) is listed among selected recommended reading in the most extensive American textbook titled *The Methods and Materials of Demography* of 1971 (chapter: *Some Methods of Estimation for Statistically Underdeveloped Areas*).

In 1979, Economic Papers published at the Central School of Planning and Statistics released the work titled "Some Demographic and Socio-economic Aspects of Urbanization in Africa". It was translated into German and published as part of the series titled *Beiträge zur Demographie* in Berlin (East Germany) in 1979. The issue of developing countries is also related to the issue of population in the People's Republic of China , published in *Demographic Studies* (Studia Demograficzne) No. 2 of 1983.

Taking account of the experience related to his work in Africa, the UN Population Fund (UNFPA) entrusted J.Z. Holzer with the organisation of a seminar for experts from devel-

oping countries on the use of demographic forecasts for planning socio-economic development. The first seminar was held in 1987 and the next editions in 1988 and 1989.

Professor J.Z. Holzer cooperated with the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, near Vienna. He was a member of the Polish Team for Cooperation with the IIASA at the Polish Academy of Sciences (in 1996–1998 and 1999–2002).

The results of his long-term research works were published in 25 books and over 150 publications of other times, nearly half of which was published abroad.

Organisation of and participation in demographic surveys.

1976 was the year when the Polish government initiated central management of research in most academic disciplines, which was combined with its special funding. The priority disciplines were referred to as keynote problems, and in the latter half of the 1980s, the central problems of basic research. In September 1978, J.Z. Holzer became the manager of the Keynote Problem *Optimisation of Demographic Structures and Processes in the Polish People's Republic*, in September 1980 – manager of the Keynote Problem *Influencing Demographic Processes and Socio-Economic Development in Poland*, and in June 1986, he was entrusted with the management of the research problem *Demographic Conditions of the Socio-Economic Development of Poland*.

The results of works under successive programmes, which involved both studies on population theories, methodology of population studies, and empirical studies on population processes, were published in 61 volumes in three editorial series titled *Monographs and Studies* (Monografie i Opracowania) of the Central School of Planning and Statistics, then the Warsaw School of Economics.

Professor J.Z. Holzer continuously cooperated with the Central Statistical Office, though the form of this cooperation varied. He was consulted in relation to assumptions for successive censuses, took part in debates on the assumptions for successive demographic forecasts, provided his opinion on the calculation of certain demographic indices. On many occasions, he reviewed the content of demographic publications, particularly the demographic yearbooks. In 1978, he became a member of the Scientific Statistical Council at the President of the Central Statistical Office. For his contribution to the development of population statistics and demographic surveys at Statistics Poland, the President of the Central Statistical Office awarded him a diploma and a memorial badge *For Long and Devoted Work in Polish Statistics* in 1968, on the 50th anniversary of the statistical office. Thirty years later, in 1998, the president of the Central Statistical Office awarded him the honorary badge *For Service for Statistics in the Republic of Poland*.

Activity in academic organisations

Professor J.Z. Holzer was an active member of committees at the Polish Academy of Sciences. He was a member of the Committee for Demographic Sciences of the Pol-

ish Academy of Sciences since its inception, i.e. since 1963. In 1967–1971, he was the scientific secretary of the Committee, and in 1977–1981, its vice-head. In 1981, he was elected the head of the Committee for Demographic Sciences. He held that office for two successive terms. In total, he did organisational work for 14 years, when he strived for the creation of an academic milieu of demographers.

In 1981, the Presidium of the Polish Academy of Sciences appointed him a member of the *Poland 2000* (Polska 2000) Committee for Forecasting Development of the Country, and in 1984 – a member of the Presidium. Since 1987, the Professor was the vice-head of that Committee. In 1987, he was also appointed a member of the Committee for Spatial Economy and Regional Planning at the Presidium of the Polish Academy of Sciences for the 1987–1989 term.

Since 1999, J.Z. Holzer was the vice-head of the Government Population Council, and he had been its member since the Council (formerly, the Commission) was established.

He was also actively involved in international organisations. In 1966, he became a full member of the International Union for Scientific Study of Population (IUSSP). In 1979, he was appointed a member of the Organisational Committee of the 19th General Conference. He was an elected member of the Scientific Council of the Union for the 1981–1985 term. He was a full member of the International Statistical Institute (ISI) since 1974. He was also a founding member of the European Association for Population Studies (EAPS) and its member since its establishment in 1985. In 1981–1985, J.Z. Holzer was a member of the Scientific Council of the Paris-based Committee for International Cooperation in National Research in Demography (CICRED).

Since 1981, he was part a member of the Polish delegation to the sessions of the UN Population Commission held in New York on many occasions. In 1981–1983, he was elected the chairperson of the UN Population Commission. Many times, he was also a vice-chairperson and the rapporteur of the Commission. He was also elected the vice-chairperson and the rapporteur of the Committee Preparing the International Conference on Population and Development in Cairo in 1994.

Prepared on a basis of: I.E. Kotowska, *Professor Jerzy Zdzisław Holzer, 1930–2001*, published in *Demographic Studies (*Studia Demograficzne) No. 2/140, 2001, 9–19.

IRENA E. KOTOWSKA

Karolina IWASZKIEWICZ-GINTOWT (1902–1999)

Karolina Iwaszkiewicz was born in Vilnius on 17 February 1902, the daughter of Antoni, an electrical engineer, and Antonina née Błaszkiewicz. She was christened on 24 February in the Roman Catholic parish church of Ostra Brama in Vilnius.

She attended the city's Marian Institute, and after completing the third year was accepted into the Eliza Orzeszkowa eight-year girls' secondary school. She passed her matriculation examination on 1 June 1920, and her examination certificate, made out on 12 June 1920, shows a very good grade for mathematics.

In the school years of 1919/20 and 1920/21 she worked as a teacher at a technical school in Vilnius. From 1 June 1921 she became a junior assistant in the Astronomy Group atthe Mathematics and Natural Science Faculty of the city's Stefan Batory University, under Professor Władysław Dziewulski. She worked there until she commenced studies at the Horticultural Faculty of Warsaw Agricultural University in the 1926/27 academic year.

During her first year of studies she attended mathematics lectures given by Antoni Przeborski, and on 25 June 1927 took an examination in that subject, gaining a distinction. In the 1927/28 academic year she attended Jerzy Neyman's lectures in the theory of statistics, again gaining a distinction in the examination on 23 June 1928. In 1929/30 she attended Neyman's lectures on special applications of statistics, as well as his statistics seminars. She specialised in the area of fruit cultivation. She wrote a dissertation titled "Application of Poisson's law to counting the molecules of a virus", under the supervision of Neyman in conjunction with Marian Górski, dean of the Horticultural Faculty. Professors Neyman and Górski graded the dissertation as worthy of distinction. After passing her final examination, she received a first degree in horticultural engineering on 30 June 1931.

From 1 December 1929 until 28 February 1938 she was employed at Warsaw Agricultural University. She held the following posts:
– From 1 December 1929 to 30 September 1930, deputy junior assistant in the Meteorology and Climatology Group at the Agricultural Faculty, teaching 30 hours per week;
– From 1 November 1930 to 30 September 1932, deputy junior assistant in the Mathematical Statistics Group at the Horticultural Faculty, teaching 9 hours per week;
– From 1 October 1932 to 30 September 1934, senior assistant in the same Group, teaching 6 hours per week;
– From 1 October 1934 to 28 February 1938 she gave lectures and ran practical classes in the theory of statistics and higher mathematics for students of the Horticultural and Agricultural Faculties, and classes in the methodology of design of field experiments (she was released from these duties at her own request).

In the 1936/37 academic year she headed the Mathematical Statistics Group. At the same time, from 1928 to 1937, she worked in the Biometrics Group of the M. Nencki Institute directed by Jerzy Neyman, who was her academic supervisor. She wrote five joint papers with him.

On 12 November 1932 she applied to the Council of the Horticultural Faculty of Warsaw Agricultural University to be admitted to an examination for the degree of doctor of horticultural sciences, presenting a thesis titled *A generalisation of the method of multiple correlation to the case where the eliminated variable is not measurable* (Uogólnienie metody korelacji wielorakiej na przypadek, gdy eliminowana zmienna jest niemierzalna). Her work was assessed positively by professors Michał Korczewski (dean of the Horticultural Faculty) and Stefan Mazurkiewicz (dean of the Mathematics and Natural Sciences Faculty of Warsaw University). She took and passed her final examination in statistics and genetics on 5 July before a committee consisting of professors Michał Korczewski (chairing), Stefan Mazurkiewicz and Edmund Malinowski. On 5 July 1934 the Dean of the Horticultural Faculty, acting on behalf of the Faculty Council, awarded Karolina Iwaszkiewicz the degree of doctor of horticultural sciences. The degree was confirmed by the Academic Senate of Warsaw Agricultural University at its meeting on 20 January 1938, and the doctoral degree award ceremony took place on 29 January 1938.

Karolina Iwaszkiewicz was a member of the Polish Statistical Society. From 1 March 1938 to 30 April 1943 she worked in the Central Statistical Office of the Executive Board of the City of Vilnius.

In 1940 she married the veterinarian Julian Wiłunas. From 16 March 1947 to 31 July 1952 she worked for the city's horticultural section as a specialist in flower cultivation.

From 1 August 1952 to 30 June 1959 she worked as a senior lecturer at the Botany Department of the National Pedagogical Institute in Vilnius, and between 10 October 1953 and 31 August 1957 also directed the Biological Station of the sameInstitute.

In 1958 she and Julian Wiłunas divorced.

On 15 August 1959 she took up the post of assistant professor in the Biometry Laboratory of the Research Methodology and Organization Group at the Institute of Cultivation, Fertilization and Soil Science in Puławy.

On 22 January 1963, in Gliwice, she married Romuald Gintowt, son of Aleksander and Adolfina née Krupowicz.

On 15 May 1963 she was transferred from Puławy to a post at the Economics Laboratory of the Institute's Vegetable Cultivation Group in Warsaw.

She retired on 1 June 1964. In retirement she remained in Warsaw, and from 1 June 1964 to 30 June 1966 she worked as a part-time assistant professor at the Institute's Biometry Laboratory in Puławy, working one quarter of the hours of a full-timepost.

From 1 July 1966 to 31 August 1967 she took an equivalent part-time position at the Institute of Vegetable Cultivation in Skierniewice.

Karolina Iwaszkiewicz-Gintowt was the sister of Maria Ulińska, who before World War II worked with the Biometry Group at the Nencki Institute, and from 1954 also worked at the Biometry Laboratory of the Institute of Cultivation, Fertilization and Soil Science in Puławy. They wrote two books together (see [14] and [15]).

She died in Warsaw on 30 July 1999.

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– *Interim report on studies of occupational illness in workers in certain industries* (Sprawozdanie tymczasowe z badań nad chorobowością techniczną robotników w niektórych przemysłach), Sprawy Ubezpieczeniowe i Statystyczne No. 6, Warsaw 1934, p. 55, jointly with J. Neyman (this is an expanded version of[10]).
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MIROSŁAW KRZYŚKO

Janina JÓŹWIAK
(1948–2016)

Professor Janina Jóźwiak, the head of the Institute of Statistics and Demography in the Collegium of Economic Analysis of the Warsaw School of Economics (SGH) since 1999 and the Rector of SGH in the years of 1993–1999, passed away on 19 July 2016. She was not only an eminent and internationally renowned representative of the Polish academic and scientific circles as a researcher of population processes, statistician, expert involved in the development of higher education systems, research development and organisation, and education of researchers but also an expert on the collaboration between research and business practice. Some of numerous manifestations of her outstanding achievements in each and every of these areas are significant publications in Poland and abroad, participation in and management of many Polish and international research projects, as well as the responsible and prestigious positions she was entrusted with. More than once, she was elected for these positions.

Apart from that, Professor Jóźwiak was a highly regarded educator, immensely popular with students. Among others, she used to teach statistics, advanced statistical methods, demography, demographic modelling and forecasting. She educated several generations of Polish demographers and reissues of the textbook on statistics she wrote together with Doctor Jarosław Podgórski have served subsequent generations of students.

In 1970, Janina Jóźwiak graduated from the Department of Econometry at the Central School of Planning and Statistics (SGPiS). She worked as an assistant lecturer at Warsaw School of Life Sciences for one year and then got enrolled in a doctoral program at the SGPiS. When she graduated from the program, she got employed in the Department of Statistics and Demography at the Faculty of Finance and Statistics. In 1976 she was granted the PhD degree in economics based on the dissertation about aggregation in Markov chains, which she completed under the supervision of profes-

sor Ira Koźniewska. Having gained the doctoral degree, Janina Jóźwiak took interest in population issues. In the late 1970s, centrally coordinated research of population processes was undertaken and the coordination body was the Institute of Statistics and Demography (ISiD) founded in 1978 and managed by professor Jerzy Z. Holzer. As the head of the Demography Unit, Janina Jóźwiak was involved both in the organisational work related to the coordination, and the research work. At that time, her work focused on modelling population dynamics and structure, demographic forecasting, applications of models in the analysis of demographic processes. The 1970s and 80s saw the development of demographic modelling, including multi-state models of population dynamics. The research conducted in centrally coordinated projects and supervised by Janina Jóźwiak related to this trend in the demographic research. There is no doubt that it let Poland make significant progress in the application of quantitative tools to the analysis of demographic processes. This stage of Janina's scientific development was crowned by the "Mathematical Models of Population" habilitation thesis (1985, Monografie i Opracowania no. 176, SGPiS). It included a review of projection models in the classic, multi-state and stochastic version, as well as new, proposed analytical solutions. The thesis served as the basis to grant Janina the post- doctoral degree (habilitation) of economics in 1986.

In the 1980s, the collaboration between ISiD and the European demographic community intensified. In 1983, professor Jerzy Z. Holzer was actively involved in the foundation of European Association for Population Studies (EAPS), an organisation that has integrated population processes researchers in Europe. Professor Dirk J. van de Kaa, the President of EAPS and a director of the Netherlands Interdisciplinary Demographic Institute (NIDI) in the Hague, offered scholarships to the Institute staff members. It was Janina's first academic trip abroad and the two months yielded closer working relations and more. In 1992 NIDI published the „Mathematical Models of Population" monography based on Janina's habilitation thesis. The book piqued the interest of the demographic circles and contributed to Janina Jóźwiak's recognition by the community. At the same time, the collaboration of a team of Polish demographers with professor Frans Willekens, who frequently visited ISiD to lecture in the International Training Workshop on the Use of Population Projection for Socio-Economic Planning – a UNFPA program implemented in the ISiD, increased the interest in demographic modelling in Poland, including multi-state models.

Still in the 1980s, Janina Jóźwiak was interested not only in the application of mathematical and statistical methods to research on population processes, but also noticed demographic behaviours in the changing socio-economic context and implications of changes in the demographic structures. Apart from dealing with theory, she worked with applications of projection models, particularly to the research on population ageing – its demographic determinants and consequences for the retirement benefits plan in Poland, ahead of the coming debate around the topic, by the way. Publications on the dynamics of demographic behaviours became a part of the European debate on the changing paradigm of demographic research, i.e. transition from the macro to a micro scale, which contributed to the modification of research approaches and wid-

ened the spectrum of methods to study the course of a person's life. This resulted in the development of surveys related to demographic behaviours on the one hand, and in the improvement of analytical techniques used in the analysis of individual data, on the other hand. The last publications by Professor Jóźwiak on population issues relate to the identification of the mechanics of changes to demographic behaviours in Poland and the impact of social and economic factors on these changes.

Janina Jóźwiak's academic achievements and her active role in the promotion of demography and economics development were rewarded with the title of professor in economics in 1993.

Diversity of research topics and the evolution of Professor Jóźwiak's academic interests were a part of the most significant trend in contemporary demographic research, which indicates her ability to notice important problems in succeeding stages of their development. Participation in international research projects and conferences, as well as the work for the international demographic community made her recognizable in the international arena. Her position as a demographer was acknowledged when the members of European Association for Population Studies (EAPS) chose her to serve as a Vice-president (1999–2003) and then President (2003–2008). When her term expired, she was appointed EAPS's Honorary President. Due to her efforts, the world-renowned demographer Professor Dirk J. van de Kaa received SGH's honorary doctorate in 2003. Since 2009, Janina served as a Vice-president in the Presidium of Council of Advisors for the European Population Partnership, an institution that integrates and propagates demographic research in Europe. At the same time, she was committed to the education of population research students, working with EAPS's Committee on Education on the master and doctoral degree learning programs for demography specialists in Europe. She was a member of the International Max-Planck Research School in Demography (2000–2004). Professor Jóźwiak took part in the establishment of the European Doctoral School of Demography in 2005 and served on the school's Scientific Board.

Professor Janina Jóźwiak was also actively involved in the growth of the demographic community in Poland and served as an expert on the demographic issues. In the years of 1990–1993, she served as a Vice-Chairwoman of the Demographic Science Committee by the Polish Academy of Sciences (PAN), to end up as its Chairwoman between 1993 and 2003. In 2004, she got the status of an Honorary Chairperson of the Committee. Since 2007, she had presided the Editorial Board of *Demographic Studies*. She co-authored the expert opinion commissioned by the National Development Council, which was a part of the RP President Lech Kaczyński's administration. She was also invited to an expert task force on pro-family policy launched by the RP President Bronisław Komorowski's office.

The parallel stream in Professor Janina Jóźwiak's research activity, which emerged in the 1990s, touched on the issues of higher education and research management. She was an active member of both the official team for the higher education reform in Poland, and the informal reform team at the Central School of Planning and Statistics. The work

of the team resulted in a fundamental reformation of the alma mater. The efforts were crowned by the restoration of the original name of the university – the Warsaw School of Economics. Professor Janina Jóźwiak was the second rector elected in free elections. Only 45 at the time, she faced a challenge of restructuring the university, radically reforming the curricula, and intensifying academic collaboration with foreign and business entities. Against all odds, she succeeded and created a school responsive to the changing needs of the environment. The Professor was the one to initiate the SGH Partners' Club, serving as an institutional liaison between the academic and business circles.

Professor Janina Jóźwiak's long-standing work to transform higher education targeted both Poland's and the European higher learning systems. She was a Vice-President of the Conference of Rectors of Academic Schools in Poland (1997–1999). As she was able to share her achievements and experience with international community, she was elected to CRE-Association of European Universities (an association of rectors of European universities) Management Board to actively promote educational reforms in Europe.

Between 2007 and 2011, Professor Jóźwiak sat on the Central Commission for Academic Degrees and Titles and was a member of the committee for the Prime Minister's awards. Another manifestation of activities related to the development of higher learning was her work in Polish and international committees dealing with the quality of higher education.

This area of activity also included her work to develop management education and collaboration between research and business practice. Professor Janina Jóźwiak served as a Chairwoman of Polish Higher Education-Business Forum (1998-2002) and the Association of Management Education FORUM (2003-2014), she presided the Chapter of the President's Business Awards (1998–2005) and was the Chapter's member (2011–2014). She coordinated the work in the "Knowledge and Innovation for Development" segment of the Polish Lisbon Strategy Forum (2004–2005). Apart from that, she was a member of the Banking Ethics Committee by the Polish Bank Association and the Council of Ludwik Kronnenberg Banking Foundation.

At the same, the Professor was involved in activities fostering research organisation and management in Poland: she lead the Academic Research Committee's unit for Economics, Social Sciences and Law, served as a Vice-Chairwoman on the Academic Research Committee (2000-2004), and chaired the Cross-functional Team on International Collaboration in the Ministry of Science and Higher Education (2005–2008). She was a Vice-Chairwoman of the "Poland in the United Europe" Committee by the Polish Academy of Sciences (PAN) Presidium (2003–2006). The important stage in these activities was the involvement in the Foundation for Polish Science – Professor Jóźwiak was a member of the Foundation's Board (2000–2004) and then she was elected the Board's Chairwoman (2004–2008). In the years of 2007–2008 she was the Vice-Chairwoman of the Main Panel in the "Poland 2020 Foresight" national program by the Ministry of Science and Higher Education. One of the chief goals of the program was to identify

the top research priorities in selected sciences and respective application areas. She used the experience later, as an SME leader of the regional foresight for Warsaw and Mazovia universities "Academic Mazovia 2030" project, whose purpose was to develop alternative scenarios for the development of higher education with a view to the needs of a knowledge-based economy.

In the years of 2008–2010, Professor Janina Jóźwiak was entrusted with the function of a Vice-chairwoman in the Committee for National Academic Policy and the Council for Science and Technology. In 2010, she was appointed a member of the National Science Centre and she had chaired the Humanities, Social Sciences and Arts Committee by the National Science Centre since 2012. She became a member of the PAN Science Studies Committee in 2007.

The knowledge and experience of Professor Jóźwiak was appreciated worldwide. She was a designated expert in the efforts to foster the structuring of research in Europe. She was the Polish delegate to the Programme Committees of the 6th and 7th European Commission Framework Programmes and an expert in international research institutions, including the European Commission. Since 2008, she had participated in SH-3 "Environment and Society" Starting Grants panel in the European Research Council. Since 2012, she had been a member of the Network Board in the New Opportunities for Research Funding Agency Co-operation in Europe. It is an institution that funds research in Europe and the Polish National Science Centre is its member.

Undoubtedly, Professor Janina Jóźwiak was a world-class scholar. Her position resulted from her ability to address up-to-date, important research topics and place the results in internationally circulated publications, as well as to initiate new currents in research. In every area of her activity – research and science, work for organisations and research promotion, development of researchers and academics, improvement of the higher education system or the collaboration between research and business practice – her achievements and works gained enormous recognition across the community. The evidence includes awards and distinctions. She was honoured with high state decorations for her achievements in Poland and abroad. To honour her contribution to the development of academic collaboration, the President of France awarded her with the National Order of the Legion of Honour in 1996. Among other decorations, she received the Order of Polonia Restituta Commander's Cross (1998) and Commander's Cross with Star (2011). In 2015 she received the highest individual award granted by the Minister of Science and Higher Education for her career achievements in science and research, education, and organisation. On the occasion of SGH's 110th anniversary in April 2016, the Mazovia Voivodeship Marshal awarded her with a certificate of merit to acknowledge her substantial contribution to the dynamic growth of the Warsaw School of Economics and the improvement of educational standards, as well as her work for the Mazovia voivodeship.

The tremendously active professional life of Professor Janina Jóźwiak makes it difficult to grasp its scope and scale of her achievements even for her friends, relatives and colleagues. It's hard to believe that the list of numerous activities and achievements re-

lates to a single person, even extremely hardworking; nevertheless, the list still doesn't exhaust all the forms of Janina's involvement in pro bono work.

Professor's Janina Jóźwiak's ability to spot and take on strategic challenges showed not only in the SGH reforms. In the 1990s, the Professor lead the TEMPUS programme, which fundamentally changed the curriculum of the ISiD and allowed us to network for contacts we used in research in the following years. Her involvement in the work for the European demographic community and scholarly authority substantially reinforced ISiD's position – owed to the efforts of Professor Jerzy Z. Holzer – in the international arena. This resulted in the Institute's staff being regarded as a partner in international research projects and entrusting the Institute with responsible actions on behalf of the European demographers' community. In 1997, the Institute and Cracow University of Economics co-organised the *Intermediate Population Conference* under the auspices of the European Association for Population Studies. In 2003, the Institute was entrusted with organising the *European Population Conference* EAPS, which came to Central-Eastern Europe for the first time. Lately, in the years of 2013–2015 the Institute lead two editions of the European Doctoral School of Demography, which was established in 2005.

We have lost an unusual person, who seamlessly combined the characteristics of a scholar, charismatic leader, kind teacher, demanding and attentive boss, warm-hearted colleague or a faithful friend. She also was a wise and kind teacher, willing to offer support to research and education goals of her peers and colleagues, including unconventional ideas. She was and will remain an unquestioned moral authority. Her life is best described by professor Frans Willekens, who in response to the news about her death has written: *"Janina contributed significantly to a better world. We need people like her"*.

Source

I.E.Kotowska (2016), *Profesor Janina Jóźwiak (1948–2016)*, Studia Demograficzne nr 2/170, 17-23.

IRENA E. KOTOWSKA

Witold KLONECKI
(1930–2012)

Witold Klonecki was born on 28th September 1930 in Tczew. His parents, Tekla and Leon, ran a specialty store with imported goods that was well-known in the city. His childhood was marked by the German occupation, his father's hiding during the war and the subsequent Stalinist repressions against his parents. At the end of the 1950s, he met his future wife Kazimiera Tymieniecka in Poznań, with whom – with great care – he raised four sons – Jerzy, Paweł, Andrzej, and Kazimierz.

In 1955 he graduated from the University of Poznań with a master's degree in mathematics. He received his PhD in mathematics in 1963 on the basis of his dissertation *On Phenotypic Functions* (*O funkcjach fenotypowych*) presented before the Scientific Council of the Institute of Mathematics of the University of Wrocław. It was written under the supervision of Julian Perkal and published in *Application of mathematics* (Zastosowania Matematyki). In 1970 he received his post-doctoral degree in mathematics by resolution of the Scientific Council of the Institute of Mathematics of the Polish Academy of Sciences for his habilitation dissertation *On Identifiability of Mixtures Composed of Poisson Distributions and Certain Chance Mechanisms of Carcinogenesis* (O identyfikowalności mieszanych rozkładów złożonych rozkładów poissonowskich i pewnych losowych mechanizmów karcinogenezy).

In 1983 he received the title of associate professor. He was successively employed as an assistant at the University of Poznań (1954-56) and the University of Wrocław (1956-62), adjunct professor (1963-69), assistant professor (1970-82) and professor (1983-1992) at the Institute of Mathematics of the Polish Academy of Sciences. In 1992 he took up a position at the Institute of Mathematics of the Wrocław University of Technology as a professor, and from 1996 as a full professor. He retired in 2000. Continuing to work part-time until 2005, he conducted a seminar on statistical methods in genetics and a special lecture on the mathematical aspects of genetics.

Witold Klonecki's scientific specialization was mathematical statistics and its applications, mainly the application of experimental theory to quality control in production processes and the application of statistics in genetics. His works have contributed to such fields as biology, probabilistics, history of mathematics and biographies of scientists, and above all – to statistics. His results concerning linear models are particularly valuable. He has collaborated and published joint papers with such mathematicians as: Z. Cylkowsi, Roger H. Farrell, Stanisław Gnot, Alvin D. Wiggins, Roman Taberski, Roman Zmyślony and Stefan Zontek. These interests resulted from the cooperation with prestigious universities in the United States, established at the end of the 1950s. Contacts, among others, with Jerzy Spława-Neyman from the University of Berkeley, a co-creator of contemporary mathematical statistics, helped greatly in the development of mathematical statistics in Poland. He also had interesting contacts with chemists – Jerzy Schroeder and Jerzy Zabrzeski from the Institute of Inorganic Chemistry and Mineral Fertilisers – at the Wrocław University of Technology, where he also worked for several years. He led scientific discussions with astronomer Włodzimierz Zonn. Professor Klonecki published 36 papers in scientific journals. In 1978, he received an award from the Secretary of the Department of the Polish Academy of Sciences for his overall scientific achievements. He was also awarded the Silver Cross of Merit (1977) and the Knight's Cross of the Order of Polonia Restituta (1988). In 2012, the Polish Statistical Association, on the occasion of its 100th anniversary, awarded him the Jerzy Spława-Neyman medal. He was invited to the U.S. several times to do research at the University of California in Berkeley, Davis, and Riverside. He supervised 14 PhDs – the last one in 2007. Many of the PhDs promoted by Professor Klonecki earned post-doctoral degree (habilitation) and now work in renowned international institutions and universities all over the world. There are already full professors among his former students.

Professor Witold Klonecki was, together with Professors Kazimierz Urbanik and Czesław Ryll-Nardzewski, the founder of the international journal "Probability and Mathematical Statistics" (funded by the Wrocław University of Technology and the University of Wrocław) and one of its editors. He initiated and organized annual statistical conferences in Poland with the participation of foreign guests. He was a member of the International Statistical Institute, the Institute of Mathematical Statistics and the Bernoulli Society.

He devoted a lot of his energy to the teaching and training of his staff. He conducted lectures and seminars on statistics and probability calculus for PhD students of the Institute of Mathematics of the Polish Academy of Sciences, students of the Wrocław University of Technology, as well as students of the universities in Poznań and Wrocław, and of the University of California. He conducted monograph lectures on the theory of experiment planning and quality control for PhD students at the Wrocław University of Technology. He was a supervisor and reviewer of many master's theses. His handbook *Statistics for Engineers* (Statystyka dla inżynierów, 1999) has been used by students and engineers to date. Together with Roman Taberski, he developed a very good script *Geometry with Trigonometry* (Geometria z trygonometrią, 1956-1957, vol. 1-3).

Professor Witold Klonecki, a distinguished academic teacher, devoted to scientific and didactic work, noble and righteous Man, died on 10th August, 2012. He is buried at the Holy Family Cemetery in Wrocław.

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ZDZISŁAW POROSIŃSKI I KRZYSZTOF SZAJOWSKI

Oskar Ryszard LANGE (1904–1965)

World famous economist, statistician, econometrist, social and political activist. He was born in Tomaszów Mazowiecki to a family of a textile factory owner. After graduating from the Łódź School of Commerce and the Philological Gymnasium in Tomaszów Mazowiecki, he started studying economy at the University of Law and Economics of the University of Poznań in 1922. After the first year of his studies, he left for Cracow, where he continued the studies at the Faculty of Law and Administration of the Jagiellonian University. In 1924, he presented a paper titled *An attempt at the theory of production limits* (Próba teorii granic produkcji), where he applied mathematical formulas to explain economic phenomena for the first time, at professor Adam Krzyżanowski's seminar. In 1925, he published a work titled *Location of towns in the main Wielkopolska region under German law in the Middle Ages* (Lokacja miast Wielkopolski właściwej na prawie niemieckim w wiekach średnich), which became the basis for his master's degree a year later. His supervisor was professor Stanisław Kutrzeba who conducted a seminar on the history of the Polish law. Having graduated in 1926, he worked at the Ministry of Labour and Social Assistance in Warsaw for a few months. Then he returned to Cracow, where he became an assistant to professor Adam Krzyżanowski at the Chair of Economics of the Jagiellonian University. He published articles on the monopolistic capitalism and economic policy. In 1928 he published the book titled *Sociology and social ideas of Edward Abramowski* (Socjologia i ideespołeczne Edwarda Abramowskiego). In the same year, he published his doctoral dissertation titled *Business cycles in the economic life of Poland 1923-27* (Koniunktura w życiu gospodarczym Polski 1923–27), which earned him the academic degree of doctor of laws. In the dissertation, he used statistical methods to illustrate the business cycle and the policy of its stabilisation, he analysed wage and pricing policy stimulating domestic demand, as well as he proposed to restructure the economy. Encouraged by his academic supervisor, he continued to improve his skills in the "politically neutral" field of statistics, which contrasted with Lange's definite socialist outlook – he was a member of the Polish Socialist Party since 1927. In 1929, he

was a scholarship holder of Fund for National Culture, and chose to start complementary studies on economics, statistics and mathematics in England. He then supplemented his knowledge of quantitative methods by attending professor Tadeusz Ważewski's lectures on the differential equation theory, and professor Leon Chwistek's lectures on logic in Cracow. In 1931, he defended his post-doctoral (habilitation) thesis titled *Statistical analysis of economic cycles* (Statystyczne badanie koniunktury gospodarczej) which was two years later recognised as the best academic work on economics in Poland by the Józef Mianowski Fund.

Lange's leftist political views were the reason why the Ministry of Religious Denominations and Public Enlightenment did not allow him to become an assistant professor, so in years 1931–1932, he was still an assistant. He obtained the right to lecture on statistics and a post of assistant professor at the Jagiellonian University in 1932. At that time, he conducted a joint seminar on the economic theory at the Jagiellonian University with Adam Heydel and Janusz Libicki. He also improved his research skills related to economics and the most recent achievements of statistical and mathematical analysis. He was faithful to his socialist ideals, and in 1933, he wrote the study titled *On the road to the socialist planned economy (*Droga do socjalistycznej gospodarki planowej), co-authored by Marek Breit, which was published in a collaborative work titled *Economy – politics – tactics – organisation of the socialist system* (Gospodarka – polityka – taktyka – organizacja socjalizmu) a year later. The difficulties in becoming an associate professor in economics induced him to continue his studies abroad, which became possible after he obtained a Rockefeller Foundation scholarship. In 1934, he studied at the Harvard University, Cambridge, MA, where he had an opportunity to attend Joseph Alois Schumpeter's seminars, and then at the University of California, Berkeley, where he studied mathematical methods used in economics by attending C. C. Evans's lectures. In April 1935, he left the USA for a semester to lecture on statistics at the Jagiellonian University and the College of Commerce in Cracow. In October 1935, he went to the USA again in order to continue his research at the Harvard University. In 1936, he became a lecturer in economics at the University of Michigan. There, he gave lectures on economic statistics and business cycles. In March 1936, due to a decision of the minister of religious denominations and public enlightenment, Lange was granted the right to become an assistant professor in economics in Poland, which thus extended his rights of post-doctoral degree (habilitation) by giving him the right to lecture on political economy.

From November 1936 to the summer of 1937, he stayed in England and extended his knowledge at the London School of Economics and in Cambridge. Having returned to Poland, he unsuccessfully applied for a post of a lecturer at the Jagiellonian University, College of Commerce in Cracow, University of Vilnius, University of Warsaw, and the Free Polish University in Łódź. His involvement in socialist movement prevented his academic career in Poland. He accepted the proposal to become a lecturer at UC Berkeley, which he received in August 1937, where he gave lectures on basic and advanced economic theory, and conducted a seminar on the history of economic thought. In the winter semester of academic year 1937/1938 he also became a lecturer at the Economics Department of the Stanford University, Palo Alto, CA.

In July 1938, he became an associate professor at the Chair of Statistics and Economics of the Department of Economics at the University of Chicago, where he stayed until 1945. In 1939, he was promoted to professor and at the same time he rejected a competing offer to become a professor in Berkeley. In Chicago, he continued his research on the business cycle theory using statistical methods to verify the description from the economic theory, on basic mathematical economics (he cooperated with Jacob Marschak), as well as on mathematical statistics, on advanced economic theory and on imperfect competition.

In January 1939, he became the editor of a book commemorating Henry Schultz, an outstanding economist and a co-founder of econometrics, who died tragically in November 1938. In that book, he published his paper titled *Say's law. New formulation and critical approach* (Prawo Say'a. Nowesformułowanie i krytyka), where he showed the conditions in which Say's law stops working. The reflection on the changes to the assessment of the mathematical conditions of independence of the system and thus the possibility of identifying a relative price system that satisfies the conditions of general balance, which Lange included in the paper, is now seen as a forerunner to the idea for which Robert Clower received the Nobel Prize in 1987.

In early 1939, Lange was appointed vice-director of the Cowles Commission for Research in Economics in Colorado Springs. This commission released the earliest publications in econometrics. Due to his works, Lange became a co-founder of a new discipline of knowledge, a member of the Econometric Society, the editor-in-chief of the "Econometrica" journal, a member of the editorial committee of "The Review of Economic Studies" and a member of the American Economic Association. In October 1943, he became a naturalised American citizen. When the war ended, he was involved in political activity for peace and helped refugees from Poland in finding a job in the USA. In April and May 1944, he stayed in the USSR on a special political mission. He met the activists of the Union of Polish Patriots, the British ambassador to the USSR and talked to Joseph Stalin and Vyacheslav Molotov. He was proposed the post of the minister of foreign affairs in the Provisional Government of National Unity, but he rejected the offer after the Russians refused to support the Warsaw Uprising. When the war had ended, he was given a proposal to become the Polish ambassador to the USA. He renounced the American citizenship and started his diplomatic service in Washington in December 1945, and he remained at that post until January 1947. He also held other important state offices. Since March 1946, he was the Polish delegate to the UN, and the delegate to the Security Council and was its president from 17th August to 16th September. He presided over the Economic and Financial Committee of the UN General Assembly, in February and March 1948, he took part in the session of the UN Socio-Economic Council in New York, in March that year he returned to Poland, but he later continued work as part of experts' committees and participated in UN conferences.

In Poland, he was a political and party activist, member of the Central Committee of the Polish United Workers' Party, since 1957, the deputy chairman of the Council of State, the chairman of the parliamentary club of the Polish United Workers' Party. In

1957, he became the chairman of the Economic Council at the Council of Ministers. In 1952–1955, he was the rector of the Central School of Planning and Statistics in Warsaw. Since 1956, he lectured at the University of Warsaw. In years 1955–1956 and in 1959, he stayed in India, Egypt and Ceylon as a government adviser on planning.

After his return to Poland, he conducted a course titled *Issues of reconstruction of the economic system* (Zagadnienia przebudowy ustroju gospodarczego) at the Warsaw School of Economics, and since the nationalisation of the institution and change of its name to the Central School of Planning and Statistics in 1949, he was appointed a professor and the head of the Department of Theoretical Statistics. Since 1950, he managed the Chair of Statistics at the Central School of Planning and Statistics, where he worked until 1956. In 1950, he published the academic script titled *Theory of statistics* (Teoria statystyki), which was then released as a book in 1952. Since 1954, he was the professor of political economy at the Institute for the Training of Scientific Cadre at the Central Committee of the Polish United Workers' Party, where he lectured on the history of the economic thought. In January 1955, upon an invitation from the Indian Statistical Institute in Calcutta, he went to India and gave lectures and seminars on statistics and economics at the Delhi School of Economics and the Statistical Institute in Calcutta. In 1956, he published the book titled *Issues of economically underdeveloped countries* (Zagadnienia krajów gospodarczo nierozwiniętych). In July 1956, he was proposed to become the head of the Chair of Political Economy at the Faculty of Political Economy of the University of Warsaw. 1958 was the year when *Introduction to econometrics* (Wstęp do ekonometrii), the first textbook of econometrics in Poland, was published. It was a ground-breaking publication on the use of econometric method in planning and managing socialist economy in the Central and Eastern Europe. In academic year 1957/1958, he lectured on the theory of economic development, and a year later he conducted a seminar on economics and gave lectures on the theory of production and accumulation. They were then published in the form of the book titled *Theory of production and accumulation* (Teoria produkcji i akumulacji) in which he applied mathematical methods to elaborate on the Marxist theory of reproduction and accumulation, he analysed the input–output model, as well as he studied the impact of investment on production and income growth. In 1959, the first volume of *Political economy* (Ekonomia polityczna) was released. The author intended it to be a synthesis of the neoclassical and Marxist economics. Since academic year 1961/1962, he lectured on the theory of programming, and in 1964, he released *Optimal decisions. Principles of programming* (Optymalne decyzje. Zasady programowania). In the 1960s, he co-founded the basis for the economic cybernetics. 1962 was the year when *The whole and development in the light of cybernetics* (Całość i rozwój w świetle cybernetyki) was published, and 1965 saw the publication of *Introduction to economic cybernetics* (Wstęp do cybernetyki ekonomicznej).

Aside from the research on the application of mathematics to economic science, he developed his knowledge on pure mathematics. Since 1950, he was a member, and since 1951 an independent academic staff member of the State Mathematical Institute, since 1952 – the head of the Mathematical Statistics Section at the Institute of Mathematics of the Polish Academy of Sciences, and in 1953, he participated in the 8th Congress of

Polish Mathematicians in Warsaw. He worked, for example, on the probability theory as a research tool in the theory of production, mutual relations between variance analysis, Lexis's analysis and correlation analysis, the possibility to apply input–output analysis in socialist economic planning.

Oskar Lange was a member of the Polish Academy of Learning, the president and the vice-president of the Polish Economic Society, the Warsaw Scientific Society, a full member and the chairman of the Committee for Economic Sciences of the Polish Academy of Sciences, member of the Committee for Mathematics of the Polish Academy of Sciences, Institute of Social Studies in the Hague, the International Statistical Institute in the Hague, Royal Statistical Society, and the chairman of the Polish Cybernetics Society. He founded *Statistical Review* (Przegląd Statystyczny), which he then co-edited, and was also a member of the editorial college of *Economist* (Ekonomista) and *Polish Science* (Nauka Polska).

In the winter semester of academic year 1964/1965, he lectured on the selected issues in political economy at the University of Warsaw. He finished work on the second volume of *Political economy* (Ekonomia polityczna). He died at Westminster Hospital in London, where he was transported after he had stayed at Cortina d'Ampezzo resort in Italy.

Lange's academic output consists of 848 titles, including 144 monographs. He earned global renown for his publications of the 1930s and the early 1940s. *On the economic theory of socialism* (O ekonomicznej teorii socjalizmu), his polemic with Hayek's and Mises's concepts, and *Price flexibility and employment* (Giętkość cen i zatrudnienie), a synthesis of the neoclassical and the Keynesian economics published by the Cowles Commission in 1944, are still analysed at many of the leading American universities. His academic publications were not limited to the field of economics, but also concerned related disciplines, and though this output is less extensive, it is not less important. Lange attached importance to scientific statistics since the start of his career. In his post-doctoral degree (habilitation) thesis, he applied statistical methods to examine the business cycles. He dissected and critiqued the contemporary empirical and statistical methods for studying them, yet what he addressed was not the mathematical and statistical technique used for such research, but the extent to which the empirical and statistical research on business cycles solve the problems in the economic theory. Lange found new aspects in statistical studies of business cycles and approached the economic life as a whole composed of interdependent elements, at the same time criticising the Harvard method. He made an attempt at answering the question when price dispersion is a symptom of economic imbalance, and when it is just a symptom of economic balance shifting to new positions without any significant imbalance. He determined the economic imbalance coefficient, measured using the ratio of dispersion of actual price movement to dispersion resulting from diverging trend lines. He indicated how to carry out statistical studies in the field of economic phenomena. He believed that the statistical apparatus may not be used in separation from the theoretical basis for the studied economic phenomenon, and therefore the construction of statistical tools should take account of the specific nature of the analysed phenomena resulting

from economic theories. Lange's reflection then became the basis for the foundation of econometrics and other quantitative methods for analysing economic phenomena. Lange co-founded econometrics with the first Nobel Laureates – Ragnar Frisch and Jan Tinbergen.

His studies in statistics, however, did not result in a finished work on theoretical statistics. The 1952 book is the first part of a monographic textbook, further parts were presented as lectures, but they did not become part of a complete publication. What was characteristic, Lange started with the commonly accepted definition of statistics as the study of mass phenomena and gave quite a specific meaning to the concept of mass phenomenon. He defined it as a regularity that could be determined only on the basis of a mass despite the impossibility to identify it in an individual case. Lange called a regularity present in mass a statistical regularity, and stated that it occurred when the same general combination of causes acted in all cases. At the same time, each individual case involves additional causes, which are characteristic for individual cases and only proper to them. These are incidental causes, as opposed to the main cause, which is a general combination of causes. In Lange's approach, statistical inference consists in analysing causes shaping the population, and thus influencing the course of the mass process, which occurs in the statistical population. It is a stochastic analysis of the sample population randomly selected from a general population, which is either a hypothetical or an existing population. Where the studied statistical population results from the use of a representative method, the general population from which the sample was randomly selected actually exists. However, if the population results from a complete survey, the general population is a hypothetical population. It is a depiction of the statistical population from which the effects of incidental causes has been removed. Therefore, it provides a picture of the systematic component of the observed population. Such an interpretation of mass processes is not commonly accepted in theoretical statistics. It enables studied populations to be portrayed synthetically despite their internal diversity and complexity. Such an approach to the study of reality fits the entirety of Lange's academic output, which shows him as a person who always sees the whole analysed phenomenon with all its complexity and seeming contradictions. Feedback between elements that are decisive for the emergence of the entire system different from its elements is also a constant theme in reflections that were continued as part of the concepts in the field of cybernetics.

For Lange, statistics became a science which allowed him to study the secret underlying logic of economic disturbances. It was his intellectual pillar in the difficult period in his life when he was prevented from lecturing on his principal academic profession, namely political economy. This happened twice – once at Adam Krzyżanowski's seminar, and the second time, under drastically different conditions, after 1949. In the former case, he showed how economic theory can be analysed using statistical methods, which then became the basis for pioneering econometrics and quantitative methods in global economics. He became one of the leading economists using tools from the field of mathematical statistics in his research. This is confirmed by the fact that the book published to honour his 60th birthday includes articles written for the occasion

by his friends, colleagues and students from the period when Lange worked in Chicago, including numerous later laureates of Nobel Prize in economics. The second contact with statistics resulted in a textbook on descriptive statistics, which is seen as a separate discipline dealing with the study of mass phenomena. Lange's *Theory of statistics (Teoria statystyki)* was the basis for studying descriptive statistics in higher education in economics for many years. In the introductory comments, Lange differentiated between the systematic and the incidental factor. That book includes the characteristic of descriptive parameters of statistical phenomena. The dynamic approaches presented there take account of time series analysis to a large extent. Lange understood the necessity to continuously improve statistical methods from the beginning and stated it as early as the 1930s, when his career had just started. His work on theoretical statistics was interrupted, which prevented him from fully demonstrating all consequences of such an interpretation of mass phenomena. The second edition of the book was published in 1970. It included the theory of correlation and linear regression added by Antoni Banasiński.

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DANUTA DRABIŃSKA

Antoni ŁOMNICKI (1881–1941)

Antoni Łomnicki was born in Lviv in the family of/ as the son of Marian Łomnicki, a professor at a gymnasium, and Maria, née Szczucka, on 17th January 1881. Antoni had two younger brothers: Jarosław (1873–1931) and Maksymilian (1877–1947). He attended the primary and secondary school in his home town, and he passed his Matura exam at the IV State Gymnasium and then started studying mathematics at the Philosophy Faculty of the University of Lviv. His professors were: Józef Puzyna (1856–1919), Jan Rejewski (1857–1906), Stanisław Kępiński (1867–1908), Marian Smoluchowski (1872–1917), and Kazimierz Twardowski (1866–1938). He was an active member of the University of Lviv Students' Mathematical and Physical Workshops. In September 1903, he became a deputy teacher at the VI Gymnasium in Lviv, and from the next year to September 1907, he was a full teacher at I Gymnasium in Tarnów. On 8th November 1903, he earned the degree of doctor of philosophy on the basis of the dissertation titled *On molecular mapping of hypergeometric functions* (O odwzorowaniach cząsteczkowych funkcyj hypergeometrycznych), written under the supervision of Józef Puzyna, whose modern title would be: *On conformal mappings* (O odwzorowaniach konforemnych). He became a certified secondary school teacher on 23rd November 1903 by earning the certificate authorising him to teach mathematics and physics as main subjects at gymnasiums and real schools where the language of instruction was Polish.

In 1905, Łomnicki married Władysława, née Baecker, and on 29th August 1906, their first daughter, Irena was born. In the school year 1906/1907, he stayed with his wife and daughter in Göttingen to study mathematics further. This stay was sponsored by a scholarship from the Ministry of Religious Denominations and Public Enlightenment in Vienna. In Göttingen, he attended lectures by Hermann Minkowski (1864–1909), David Hilbert (1862–1943), Felix Klein (1849–1925), Gustaw Herglotz (1881–1953), and Carl Runge (1856–1927). He participated in a seminar on the automorphic function theory, minimal surfaces, integral equations, and calculus of variations.

From 1st September 1907 to the end of August 1920, he was a professor at the VII Gymnasium in Lviv, and in the school year 1916/1917, he served as its director. On 18th–22nd July 1911, Łomnicki took part in the 11th Congress of Physicians and Naturalists in Cracow, where he gave the lecture titled *O pewnikach geometrycznych Hilberta w nauczaniu w szkołach średnich (On Hilbert's geometry postulates in secondary education)* at the mathematical section of natural sciences. In January 1922, he gave lectures at a further training courses for mathematics teachers titled *O równoważności figur płaskich (On the equivalence of flat figures)* in Lviv. In the academic year 1913/1914, he lectured as a private docent at the Faculty of Machine Building at the Polytechnic School in Lviv.

During the Russian offensive of 1914–1915, he worked on the probability theory and insurance mathematics, and then he lectured on insurance mathematics at the course for secondary school certificate candidates at the School of Commerce in Lviv.

In years 1918–1919, he joined up as a private to take an active part in the defence of Lviv, for which he was awarded the Lviv Defence Cross. He also became a second lieutenant. He served in the Lviv Rifle Regiment.

In 1917–1918, he published two works, one in the field of axiomatics: *On the necessary and sufficient rules to define the concept of size* (O układach zasad koniecznych i dostatecznych służących do definicji pojęcia wielkości) *Mathematical News* (Wiadomości Matematyczne, No. 23/1919, pp. 37-70), and another in the field of theory of function of a real variable: *On uniform multiperiodic functions of a real variable* (O wielookresowych funkcjach jednoznacznych zmiennej rzeczywistej) *Reports of the Warsaw Scientific Society* (Sprawozdania Towarzystwa Naukowego Warszawskiego, R. XI, 1918, pp. 807-846). On the basis of these publication, he earned veniam docendi (post-doctoral degree (habilitation)) in mathematics at the Polytechnic School in Lviv on 19th August 1919 (resolution of the body of professors of 17th June 1919; approval by the Ministry of Religious Denominations and Public Enlightenment of 19th July 1919). Two years later, he was appointed a deputy professor at that school for 1919–1920 to replace doctor Zdzisław Krygowski Ph. D., and at the same time he was granted a leave at the gymnasium to lecture on mathematics. He conducted the following courses: Mathematics I, Revision course in elementary mathematics, and Exercises in mathematics. He was also the secretary of the Mathematical Society in Lviv.

On 9th June 1920, Łomnicki's second daughter, Ewa, was born. She later married Jerzy Broszkiewicz (1922–1993), a famous writer.

On 1st August 1920, Łomnicki became an associate professor of the Lviv Polytechnic and the head of Chair of Mathematics II Faculty. In 1920, he took part in the Polish-Soviet war as a second lieutenant.

In the same year, Łomnicki, induced by Hugo Steinhaus, accepted Stefan Banach as his assistant, though Banach had not completed his studies (due to the outbreak of World War I in 1914, Banach had managed to complete only two years of studies at the Lviv Polytechnic in years 1911–1913.

On 27st August 1921, Łomnicki became a full professor at the Lviv Polytechnic. Since then, all his academic, didactic and organisational activities were related to that university and the local mathematical circles. In 1922, he was elected an adoptive member of the Lviv Scientific Society (he became an active member in 1928). Robert Szewalski (1903–1993), who later became a professor at the Lviv Polytechnic and then Gdańsk University of Technology after World War II, attended Antoni Łomnicki's lectures in academic year 1922/1923, and remembered him as follows:

> Łomnicki, who was elegant and who lectured brilliantly and interestingly, said that the classes accompanying the lectures will be conducted by doctor Stefan Banach, an outstanding mathematician, who would be famous in the future.

In academic years 1922/1923 and 1937/1938, Łomnicki was the dean of the Faculty of Mathematics of the Lviv Polytechnic, and in academic years 1922/1923, 1923/1924 and 1939, the head of the Lviv Branch of the Polish Mathematical Society.

On 7th–10th September 1927, Łomnicki took part in the First Polish Mathematical Congress, was held in Lviv. At the session on the didactics of mathematics, he gave the lecture titled *On education programs in secondary schools* (O programach nauczania w szkołach średnich). On 3rd–10th September 1928, he participated in the 8th International Congress of Mathematics at Bologna, Italy, though he did not give any lecture there. Łomnicki also took part in the Congress of Mathematicians of Slavic Countries in Warsaw (23rd–27th September 1929). As part of division I, Basic Mathematics, History and Didactics of Mathematics, he gave the lecture titled *Notes on geometric analysis of structural tasks* (Uwagi o geometrycznej analizie zadań konstrukcyjnych), and as part of Division V, Applied Mathematics – *On conformal map and equal-area projections of the spheroid* (*O wiernokątnych i wierno powierzchniowych odwzorowaniach elipsoidy obrotowej)*.

In 1929, Banach and Steinhaus founded the "Studia Mathematica" journal, whose editors they became. As Władysław Orlicz wrote in his article titled *Lviv School of Mathematics in the interwar period* (Lwowska Szkoła Matematyczna w okresie międzywojennym), *Mathematical News* (Wiadomości Matematyczne, 23 (1981)), pp. 222-231, the title of the periodical was proposed by Antoni Łomnicki.

On 24th June 1929, Antoni Łomnicki was granted a fully paid leave for the summer semester of academic year 1929/1930 to carry out his research, and on 30th January 1930, the Fund for National Culture awarded him a non-repayable benefit of 6,000 zloty to spend six months in Italy and France to carry out research there. Since February 1930, Łomnicki spent eight months studying in Rome (February–May 1930), Paris (May–June 1930), Göttingen (June–July 1930), and Berlin (July–September 1930).

In the academic year 1930/1931, Łomnicki was the dean of the Faculty of General Studies of the Lviv Polytechnic, and in 1933 he ran for the office of the rector. He was elected at the delegates' meeting on 23rd May 1933, but this decision was not approved by the President of Poland (decision of 7th June 1933). In academic years 1938/1939 and

1939/1940, he was also a vice-rector of the Lviv Polytechnic (during the latter term, however, he was removed from the office in September 1939, after the Russians had entered Lviv). He was also the president of the Lviv Branch of the Polish Mathematical Society in 1922–1924 and 1939, and a corresponding member of the Warsaw Scientific Society (since 24th November 1933), and the Faculty of Mathematics and Physics of the Polish Academy of Learning (since 19th December 1938).

The Mathematical Statistics Section of the Polish Statistical Association was established on 1st November 1937, Antoni Łomnicki became its head, and doctor Jan Wiśniewski became its secretary. At its inception, the section had 26 members, and on 31st December 1938 – 37. People who gave papers on the meeting of the section included Jerzy Neyman: *The problem of estimation (statistical estimation)* (Zagadnienie estymacji (szacowania statystycznego) – 11th April 1938, and Tadeusz Banachiewicz: *Cracovian solving systems of linear equations* (Krakowianowe rozwiązywanie równań normalnych) – 21st November 1938. On 25th March 1939, in the Yellow Room at the Lviv Chamber of Industry and Commerce, the decision was taken to establish the Lviv Branch of the Polish Statistical Association, which joined by 15 people. Antoni Łomnicki became the president of the branch, and Dr Henryk Lepucki its secretary. An important thing done by the Polish Statistical Society was the foundation of the academic journal *Statistical Review* (Przegląd Statystyczny) in 1938. The editorial board appointed by the Council of the Association included Antoni Łomnicki.

He received a number of medals and decorations, e.g. Independence Medal (1932), and the Lviv Defence Cross. On 3rd September 1938 and on 11th November 1938, he was awarded first the Bronze and then the Silver Medal for Long Service for the Lviv Polytechnic.

Łomnicki climbed in the Tatra Mountains. He participated in climbing new routes to Štrbské sedlo (in 1917) and Slavkovský štít (in 1921). He was also famous for rescuing a wounded tourist at Mręguszowiecki Szczyt Czarny in 1924.

In 1935, he married his second wife, Maria (1906–1979), née Turowicz. They had no children together.

On 12th September 1939, the Germans attacked Lviv, and the siege started. After a week, the German troops were replaced by the Soviet army (under the Ribbentrop–Molotov pact on the division of the spheres of influence in Europe). The Lviv Polytechnic was renamed to the Lviv Polytechnic Institute. After the academic staff had been verified by a commission from Moscow, 80 members were allowed to teach. The Poles taught in Polish, the Ukrainians taught in Ukrainian, and Marxism–Leninism was taught in Russian. Only 25% of the students were Poles. On 30th June 1941, after the war had broken out between the Soviets and the Germans, the Germans came again. On the night of 3rd–4th July 1941, Łomnicki was arrested by the Gestapo with a group of Lviv scholars and shot on Wuleckie Hills in Lviv on the morning of 4th July.

The scope of Antoni Łomnicki's interest was years wide – it included analysis, probability theory, statistics, cartography, and didactics. In 1911–1941, Antoni Łomnicki wrote the total of 23 books, including 12 gymnasium textbooks and 4 academic textbooks. They were published in 1911–1947. He authored popular school textbooks: *Geometry* (Geometria) (part I and II, then part III and IV, which had three editions in 1911–1920), *Tables of Mathematics and Physics* (Tablice matematyczno-fizyczne) (13 editions), *Trigonometry and analytic geometry* (Trygonometria i geometria analityczna). These textbooks served as a basis for teaching entire generations of youth. He actively participated in reforming mathematical education, both in the Austrian partition and in independent Poland. The title that deserves particular attention among the textbooks he authored is the modern textbook titled *Differential and integral calculus for natural and technical sciences* (Rachunek różniczkowy i całkowy dla potrzeb przyrodników i techników) (Kraków 1935 and 1936, Vol. I-III; Katowice 1947 and 1948, Vol. I-III; Katowice 1949, Vol. I-II). This was such a well written book, that an update of the symbols and the language could allow it to be used as an academic textbooks even now, and even by students of mathematics. He was the great specialist and expert on the issues related to mathematical cartography. He published the dissertation titled *Mathematical foundations of cartography* (Podstawy matematyczne kartografii) (Tarnów 1905), in which discussed the application of the surface theory to project a ball onto a plane. This problem, on which he continued to work later, was also the topic of the textbook titled *Mathematical cartography* (Kartografia matematyczna) (Warszawa 1927). Łomnicki introduced new correct projection methods in the international map of the world in the publication titled: *Mathematical analysis of the international map projection on a scale of 1:1 000 000 (*Matematyczna analiza projekcji mapy międzynarodowej w skali 1:1 000 000) (1927). He also described a simple method of measurement using radiogoniometer signals and the network, which he created himself. The method was presented in the work titled *Projections with two highlighted points* (Projekcje o dwu punktach wyróżnionych). His activity in the field of cartography resulted in his appointment as an expert at the International Commission on Air Navigation (CINA).

Antoni Łomnicki published about 30 academic works. Among them, there are two important examples. In his work *Nouveaux fondements du calcul des probabilités (Definition de la probabilité fondée sur la théorie des ensembles)*, ("Fundamenta Mathematicae", 4 (1923), pp. 34-71), he presented an attempt, as one of the first mathematicians, at defining probability on the basis of the general measure theory. This publication was submitted for printing on 19th Novemeber 1920. Hugo Steinhaus's work on the same topic was also published in the same volume of "Fundamenta Mathematicae", but it was submitted later, namely on 22nd June 1922. Łomnicki's success in using theory of measure in probability theory, to be more exact to make the term "probability" the measure of a set, was noticed by his contemporaries. This work is cited e.g. by de Finetti, Dodd, Vivanti, and Kolmogorov. Łomnicki's another achievement in the field of mathematics was his theorem on periodic functions. It was proved by Burstin in 1915, but this proof was incorrect. Łomnicki discovered and proved it independently in his publication titled *On uniform multiperiodic functions of a real variable* (O wielookresowych funkcjach jednoznacznych zmiennej rzeczywistej), "Sprawozdania z Posiedzeń Towarzystwa Naukowego Warszawskiego", Wydział III Nauk Matematycznych i Przyrodniczych 11 (1918), pp. 807–846.

Łomnicki eagerly promoted statistical and probabilistic methods, which was demonstrated by his lectures at the Faculty of General Studies of the Lviv Polytechnic, his activity in the Polish Statistical Association, and overview publications in the "Kosmos" journal (which was published by the Polish Copernicus Society of Naturalists in Lviv since 1876), in series B titled "Przegląd Zagadnień Naukowych"("Review of Scientific Issues"). Probability theory and its applications are discussed in *Mathematics. IV. Probability and its applications* (Z zagadnień matematyki. IV. Rachunek prawdopodobieństwa i jego zastosowania), "Kosmos", Series B, Vol. 53, issue 3 (1928), pp. 325–339. In *Mathematical statistics. Vol. I. One-variable statistics* (Zagadnienia statystyki matematycznej. Cz. I. Statystyka jednej zmiennej), "Kosmos", Series B, Vol. 53, issue 4 (1928), pp. 477–506 and *Mathematical Statistics. Vol. II. Statistics of two and more variables. Correlation theory* (Zagadnienia statystyki matematycznej. Cz. II. Statystyka dwóch i więcej zmiennych. Teoria korelacji), "Kosmos", Series B, Vol. 55, issue 2-3 (1930), pp. 165–240, which were works of informative nature, he presented the state of research in the field of mathematical statistics by showing a number of examples and original approaches to various issues, e.g. theory of correlation and theory of covariance. The former of these two publications was the subject of his lecture during the Scientific and Didactic Course for secondary school mathematics and physics teachers, which he gave on 22nd October 1928. On the other hand, *Sulla necessita di distinguere due Negeri di dipendenza nella statistica a due variabili*, "Giornale Instituto Italiano d. Attuari", 1 (1930), pp. 165–240, contains the lecture that Łomnicki gave at the University of Rome during a course conducted by Castelnuovo. Łomnicki stated that the statistics of two or more variables should clearly distinguish between two types of dependence and independence, namely stochastic and correlation independence. He used simple examples to demonstrate that these two types of independence differ in nature and were the source of various errors and ambiguities.

Wladysław Orlicz, who, was a senior assistant and an assistant professor at the Chair of Mathematics II at the Faculty of Mathematics of the Lviv Polytechnic under Antoni Łomnicki in years 1930–1937, used the following words to characterise his superior *Speech at the award of the honorary doctorate of Poznan University of Technology*, "Mathematics News" (Przemówienie wygłoszone przy nadaniu doktoratu honorowego Politechniki Poznańskiej), "Wiadomości Matematyczne", 22 (1980), pp. 279–284:

> Professor Łomnicki always strived to acquire the outstanding mathematicians for the mathematical circles of Lviv. E.g.: Stefan Banach started his career as Łomnicki's assistant in Lviv. People who found their place at Łomnicki's chair also included Stefan Kaczmarz, and then one of the leading representatives of Banach's School, Stanisław Mazur. [further] Łomnicki as a great specialist in didactics. Students liked him very much, and he was an excellent lecturer. He was the author for the first Polish textbook written for naturalists and technoscientists. He also authored a considerable number of gymnasium textbooks, from which entire generations of our youth learned, and my own interest in mathematics developed due to the fact that I studied from his textbooks. He was an ardent promoter of probabilistic and statistical methods. He was a pioneer of the idea of axiomatic approach to probability theory, and formulated such ideas as early as 1923 in a publication in Fundamenta Mathematicae. He devoted an entire series of works to the study and critique of

the projection used for the International Map of the World (the Milionth Map). He was an expert on such issue as an author of the excellent "Kartografia matematyczna". In 1935, he started lecturing on applied mathematics and worked on organising the course properly. Stefan Kaczmarz and I conducted classes accompanying that lecture. This was one of the reasons Kaczmarz and I became interested in applied mathematics.

Stefan Banach wrote the following passage in 1944 *Polish scientists murdered by the Nazis. Antoni Łomnicki-Włodzimierz Stożek* (Uczeni polscy zamordowani przez hitlerowców. Antoni Łomnicki–Włodzimierz Stożek), "Czerwony Sztandar", Lwów 1944, No. 87 and *Memory of murdered scientists* (Pamięci zamordowanych uczonych), Tygodnik „Wolna Polska" dated 18th December 1944, p. 2):

On that fateful night, Nazi murderers came for Professor Antoni Łomicki. This native of Lviv had worked at the Lviv Polytechnic as a professor of mathematics for twenty years. He prepared hundreds of engineers for their careers. He took care to ensure that his students knew maths. I was his assistant. He was the first to show me how grand and responsible the task of a professor is. He was an outstanding pedagogue, one of the greatest I knew, an author of many popular secondary school textbooks, including one of the best higher analysis mathematics for technical schools, which was superior to foreign ones. His book on cartography is at a high level. Professor Łomnicki's research activity was as splendid as his pedagogical work. His most important publication is known and cited in academic circles, it describes the relation between probability theory and the Lebesgue measure. Professor Łomnicki was a person of great energy and work. Many of his former assistants, who are now professors at higher education institutions, owe their preparation to do their job to him. Professor Łomnicki was commonly liked and esteemed, he had many friends who highly appreciated his spiritual virtues. Germans murdered Professor Łomnicki because – though he was a scholar – in their dumb and degenerate heads, he was as dangerous as a soldier wielding a rifle and grenades.

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MIROSŁAW KRZYŚKO

Jerzy NEYMAN (SPŁAWA) (1894–1981)

The Russian period, 1894–1921

Jerzy Spława-Neyman was born on 16 April 1894, into a noble family, in the town of Bendery on the Dniester river. He disliked the prefix Spława, and except for some early works he published under the name Neyman. Out of respect for that decision, we use only the shortened form of his surname here. Klonecki (1995) reports that, according to his sources, the Neyman family came to Poland in the 17th century from German or Dutch lands.

Neyman was the grandson of a participant in the January Uprising 1863. For his part in the insurrection his grandfather had been burned alive in his own house, his property confiscated, and his ten sons sent to Siberia. Only his youngest son Czesław – who would be Jerzy's father – was allowed to settle in Bendery in the European part of Russia. Czesław Neyman graduated in law in Kiev. There he also married Kazimiera Lutosławska. Jerzy Neyman, whose father was a successful man, was initially educated at home. He had a governess, and also attended an unofficial Polish school which operated in private homes. When at the age of ten he went to the secondary school in Simferopol, he knew five languages (French, German, Polish, Russian and Ukrainian) and was ahead of his colleagues with his knowledge in many fields, with the exception of Russian history and geography.

In 1906 Neyman's father died, and his family moved to Kharkov, where they had relatives. After he completed secondary school in 1912 his mother sent Jerzy with a group of students on a rail journey around Europe. In autumn of 1912 Neyman began his studies at Kharkov University. At first he was interested in physics, which was a result of the publication at that time of the theory of relativity and the recent Nobel Prize awarded to Marie Curie. In 1914 he went on a students' academic expedition to Mongolia.

However, because he had no talent for manual laboratory work, he dropped physics that same year and began to study Lebesgue's book *Legons sur l'integration et la recherche des fonctions primitives*. This resulted in a paper on the Lebesgue integral (530 pages of tiny dense manuscript in the Russian language), for which Neyman received a gold medal in 1916. During his studies Neyman attended S. Bernstein's lectures in probability and mathematical statistics. In his introduction to *Early Statistical Papers – of J. Neyman* (University of California Press, 1967), their author began by giving thanks to Bernstein, from whom he had learnt to concentrate on genuinely difficult problems. In 1917 Neyman completed his studies and became a research assistant in the university's mathematics department, as well as a lecturer at Kharkov polytechnic and assistant to A. Przeborski.

The years 1917–1919 were extremely difficult. The First World War, the Bolshevik revolution and the civil war were not conducive to work and led to a marked deterioration in living conditions. In 1919 Neyman was diagnosed with tuberculosis and sent to the Caucasus. There he met the Russian painter Olga Solodovnikova, whom he married in 1920. Ten days after the wedding Neyman was arrested by the Russians and imprisoned for several weeks. In 1920 Neyman passed his master's degree exam and became a university lecturer. He also worked with Professor M. Yegorov in the field of agricultural experimentation.

The Polish-British period, 1921–1938

Following the Riga Treaty of 1921, under an exchange of families, Neyman went with his mother and grandmother to Poland. Thus he saw that country for the first time at the age of 27. They settled in Bydgoszcz, in the house of Neyman's brother Karol. His wife, who had typhus, remained for the time being in Russia. Neyman made contact with Professor W. Sierpiński, who studied the results from Neyman's aforementioned manuscript, and suggested sending one of them, which turned out to be a new result, to the journal *Fundamenta Mathematicae*. The paper was accepted and appeared in 1923 under the title *Sur un theoreme metrique concernant les ensembles fermes*. Sierpiński hoped that, starting from the new academic year, it would be possible to find a post for Neyman at a Polish university. The most likely institution was the university in Lviv (Lwów). However Neyman wanted to begin working straight away, and became a senior statistical assistant at the National Scientific Agricultural Institute in Bydgoszcz, which was headed by Professor K. Bassalik. Initially he engaged in intense statistical studies of agricultural experimentation. Around the end of 1921 he obtained funds for a journey to Berlin and for the purchase of statistical journals and books there. Neyman spent more than a year in Bydgoszcz, and while there wrote several papers on applications of probability theory to agricultural experimentation.

In December 1922 Neyman began working for the National Meteorological Institute in Warsaw, where he looked after equipment and collected data. Also, in 1923, probably thanks to A. Przeborski, who had also come to Poland from Kharkov, Neyman be-

came his assistant at Warsaw University. At the same time he began giving classes as a lecturer in mathematics and statistics at the Central Agricultural College (SGGW). He then had a total of 25 teaching hours a week at those two institutions. From 1924 he gave additional classes at the Jagiellonian University in Cracow, and from 1927 he also worked for the beet producers K. Buszczyński and Sons. In 1928 he organized a Biometrical Laboratory at the M. Nencki Institute. In order to enable his pupils and colleagues to publish their work, and to popularize his own ideas, he founded the journal Statistica and published it from 1929 to 1938. He also worked with the Institute of Social Affairs, the Central Statistical Office and other institutions.

Based on his papers on agricultural experimentation written in Bydgoszcz, in 1924 Neyman received the title of doctor of mathematics from Warsaw University. His examiners were the professors T. Kotarbiński, S. Mazurkiewicz, A. Przeborski and W. Sierpiński. It should be noted that a part of his doctoral thesis, which was published in *Annals of Agricultural Sciences* (Roczniki Nauk Rolniczych) in 1923, was translated into English and published in 1990 with extensive commentary in the journal *Statistical Science*. In 1928 Neyman gained his post-doctoral degree (habilitation) at Warsaw University.

In 1924, thanks to K. Bassalik and W. Sierpiński, Neyman received a one- year Polish government scholarship for visiting University College London, to work with Karl Pearson. Among the results was the publication of versions of three earlier works of Neyman in the journal *Biometrika*. Next, with the support of Pearson and Sierpiński, Neyman received a scholarship from the Rockefeller Foundation, which he used for a year's stay in Paris, with Borel at the Sorbonne and with Lebesgue at the College de France. In 1926 he began working with Egon Pearson, the son of Karl. Their contacts were intensive, and in 1934 Neyman gained the post of lecturer at University College London, which solved his problem of having no permanent employment and no real prospects of obtaining a professorship in Poland, which had made his material situation very difficult. In spite of living and working in London, Neyman maintained contact and cooperation with his Polish team. He worked at University College until 1938. It should be pointed out that Neyman wanted to work in Poland. Reid (1982, p. 127) cites dramatic fragments of Neyman's correspondence in the matter of finding a suitable post for him at any institution in Poland.

In the course of those 18 very difficult years, Neyman managed to achieve an unimaginably great amount of publications. A list of his works, included in the above-mentioned volume of early works of J. Neyman, includes 65 papers from 1923–1938, one textbook giving an introduction to probability theory, and two monographs written in Polish in 1933 and 1934. And these are not all of his publications, as can be seen from the bibliography drawn up by B. Łazowska (1995). Many of the works are extremely substantial, which sometimes even led to problems with publishing them.

The list of his works naturally includes publications motivated by current application problems arising in connection with Neyman's work at the institutions mentioned earlier. They included in particular agricultural experimentation, biometrics, sampling methods and problems related to insurance.

As a result of questions asked by E. Pearson, Neyman became interested in the issue of hypothesis testing. In 1928 his first joint work with Pearson appeared, titled *On the use and interpretation of certain test criteria for purposes of statistical inference*, published in the journal *Biometrika* in two parts (pages 175–240 and 263–294). The work concerns mainly the likelihood ratio test, and introduces the concept of a set of alternatives, errors of the first and second type, the power function, and a definition of the likelihood ratio statistic. It is then shown that different known tests can be obtained by this general method, and an investigation is made of the asymptotic equivalence of the likelihood ratio test and the chi-squared test. As a result of further discussions with Pearson, Neyman formulated a problem of testing in the language of optimization, and in 1930 proved the basic Neyman-Pearson lemma. This was included in 1932 in a paper of Neyman and Pearson concerning uniformly most powerful and uniformly best tests in a class of similar tests. That work, titled *On the problem of the most efficient tests of statistical hypotheses*, was accepted by the Royal Society, presented by Karl Pearson at the Society's meeting in November 1932, and published in 1933 in *Philosophical Transactions of the Royal Society* (pp. 289–337). The paper is of fundamental importance in the theory of the testing of hypotheses given a fixed sample size. As is noted by Le Cam and Lehmann (1974), by introducing tests as solutions to clearly defined optimization problems, Neyman and Pearson provided a model for general decision theory, later developed by A. Wald, and for mathematical statistics in general. In 1992 that work was selected for inclusion in a volume of the most important achievements in fundamentals of statistics in the 20th century (*Breakthroughs in Statistics,* Vol. I, Springer). A similar distinction went to Neyman's work *On the two different aspects of the representative method: the method of stratified sampling and the method of purposive selection,* presented in 1934 at a meeting of the Royal Statistical Society and published in the *Journal of the Royal Statistical Society* (1934, pp. 558–625), which was included among the greatest 20th-century achievements in statistical methodology (*Breakthroughs in Statistics,* Vol. II, 1992, Springer). This work was based on a monograph of 1933, written in Polish and resulting from Neyman's work for the Institute of Social Affairs. In 1935, in *Annals of Mathematical Statistics* (pp. 111–116), Neyman published the paper *On the problem of confidence intervals*. In the summer of 1936 he continued to work intensely on confidence intervals, and presented his result on the duality of interval estimation and testing. E. Pearson rejected it for *Biometrika* as being too long and mathematical, but the work appeared under the title *Outline of a theory of statistical estimation based on the classical theory of probability* in 1937 in *Philosophical Transactions of the Royal Society* (pp. 333–380). It was presented at a meeting of the Royal Society by Jeffreys. In 1935, at a meeting of the Industrial and Agricultural Section of the Royal Statistical Society, Neyman presented a joint paper written with K. Iwaszkiewicz and S. Kołodziejczyk on orthogonal designs and randomized blocks. This was printed in 1935 in a supplement to the *Journal of the Royal Statistical Society* (pp. 107–180). The paper, along with the work of R.A. Fisher, had great importance in the development of experimental planning. In 1937 Neyman published a paper in *Skandinavisk Aktuarietidskrift* (pp. 149–199) titled, *Smooth' test for goodness of fit,* which proved another milestone in the development of statistics. In it he gave an asymptotically optimal solution to the problem of testing the fit of a set of observations

to a fully known continuous distribution. In this work Neyman introduced sequences of local alternatives (contiguous distributions), which in the 1960s became a standard tool of asymptotic statistics. The test introduced in that paper remained almost completely forgotten for years, although that has changed radically in recent decades.

In 1935 Neyman and E. Pearson founded a new journal called *Statistical Research Memoirs*. In 1936 Neyman's son Michael was born. In 1937 Neyman was invited to an international probability congress in Geneva. In addition S. Wilks invited him to give a series of lectures in the United States. On his travels in the States his work aroused much enthusiasm, and the visit itself was a huge success. In November 1937 G. Evans sent Neyman an invitation to set up a statistical centre in Berkeley, California. He was also offered a professorship at Ann Arbor, Michigan. In 1938, a few days after his 44th birthday, Neyman accepted the Berkeley offer. Among other things, this decision meant that he would escape the consequences of the Second World War in Europe. It should be remembered that many of Neyman's Polish colleagues and students died during the war. E. Scott (2006) writes that in 1952 Neyman dedicated to them an extended edition of a volume of his thoughts on statistics, titled *Lectures and Conferences on Mathematical Statistics and Probability,* listing their names and how each of them died. The first edition of the volume (edited with the assistance of W. Deming) had appeared in 1938 under the title *Lectures and Conferences on Mathematical Statistics*. The book gained great renown in the United States, and helped to popularize Neyman's ideas and results.

The American period, 1938–1981

On 12 August 1938 Neyman arrived in Berkeley and set to work with great vigour. He worked on setting up the Statistical Laboratory and giving numerous lectures (for example, in 1939-1940 he lectured for 25 hours a week). He began gradually to assemble a team. Elizabeth Scott, an astronomy graduate, became his assistant. He also employed E. Fix, but unfortunately was not able to obtain a post for A. Wald, who had escaped from Nazi persecution in Europe. Neyman gained his first distinctions from the American statistics community: he was invited to give a lecture at a joint conference of the American Statistical Association and the International Statistical Institute, and became a member of the organizing committee of the 10th Mathematical Congress and an editor of the journal *Annals of Mathematical Statistics*. The outbreak of war and German invasion of Poland distressed him deeply. He made efforts to help his fellow Poles. Among other things, through the Kosciuszko Foundation, he arranged a scholarship for A. Zygmund, which enabled the latter to emigrate with his family to the United States and probably saved his life. In 1942 E. Lehmann became Neyman's assistant. However racial problems meant that he was not able to employ D. Blackwell. Neyman not only set up the Laboratory, but also began to work closely with many university faculties at Berkeley (Genetics, Geology, Hygiene, Agriculture), and this activity was valued very highly.

In February 1942 Neyman was engaged to solve optimization problems for the military. The project was carried out at the Berkeley Statistical Laboratory, with varying intensi-

ty, until the end of the war. In October 1944, together with a group of American mathematicians, he was sent to England for the purpose of researching the effectiveness of certain bombs. Also in 1944 he gained American citizenship. He was also able to bring P. Hsu to work for a time at Berkeley.

In 1945 Neyman organized a symposium in statistics and probability, at which he presented a paper titled *Contribution to the theory of the chi-square test,* which among other things introduced the class of best asymptotically normal (BAN) estimators, which are much more convenient to use than the classical estimators obtained by the method of maximum likelihood, and are useful in many complex problems. The symposium was a great success. The holding of the symposium was motivated by a desire to celebrate the end of the war and to facilitate a return to theoretical research following several years of work on applications for the American military. In 1946 Neyman was invited by President Truman to join a team of international observers for the Greek elections. That summer he was invited to spend a semester at Columbia University, where A. Wald worked, and where Neyman was offered a professorship and numerous privileges. These offers proved effective as a means of applying pressure to gain significant advantages for his Laboratory at Berkeley. In particular, posts were found there for M. Loeve and C. Stein. In 1947 Neyman was elected vice-president of the American Statistical Association, and in 1948 he became president of the International Statistical Institute. Recognition for his achievements can also be seen in the fact that most of the papers appearing in *Annals of Mathematical Statistics* at that time related to problems which had been set and considered in earlier works by Neyman. In 1948 Neyman and Pearson renewed publication of *Statistical Research Memoirs;* the series continues to be published today under the new title *University of California Publications in Statistics.* After ten years of Neyman's activities Berkeley had become one of the two strongest centres for statistics in the United States, the other being Columbia University.

In 1949 Neyman took his first sabbatical to Europe. First he visited London, where he gave lectures and had discussions with Pearson. Next he lectured in Paris. While there he met L. Le Cam, and recruited him to the Laboratory. He also received a great distinction while in Paris: he became the first non-French author to be asked to work on a volume in the Borel Series. After Paris he visited Warsaw and many other Polish cities. He also met with his brother Karol.

In 1950, after Neyman's return from Europe, a second Berkeley Symposium took place. Neyman was constantly fighting for the Laboratory's funding and position. The situation was so difficult that Neyman gave up his work on his contribution to the Borel Series. Problems were multiplied by the death of A. Wald in an air crash, and the consequent attempts by Columbia University and other institutions to take over part of Neyman's group. In 1951, in response to questions put by the astronomer C. Shane, Neyman and Elizabeth Scott began a long period of intense collaboration on the dynamics of galaxies. This led to a series of around twenty papers, which are regarded as being among Neyman's most important works on applications. For several months in the academic year 1952/1953 Neyman worked in Bangkok, helping P. Sukhatme to organize

a centre for training in sampling methods. In 1953 Neyman employed D. Blackwell and H. Scheffe. Also in 1953 he separated from his wife Olga.

In 1954 a decision was taken to set up a Department of Statistics at Berkeley. Neyman prepared the third Berkeley Symposium, where alongside work on probability and statistics there were papers presented in the fields of astronomy, physics, biology and health issues, econometrics, industrial mathematics and psychometrics. This trend was continued at subsequent Symposia. In the same year Neyman, A. Tarski and three other American mathematicians were invited to the Mathematical Congress in Amsterdam to give lectures on the future of mathematics. In 1955 the Department of Statistics began its work, under Neyman's direction. A year later Neyman resigned from that position, while retaining the lifetime post of head of the Statistical Laboratory.

In 1958 he took another sabbatical. He travelled widely, including to Poland. He also wrote his fundamental work on C(α) tests, which appeared in a volume dedicated to H. Cramer. Until the end of his life Neyman remained bitter that this work had not gained due recognition. Reid (1986, pp. 251–252) quotes a diplomatic statement of Neyman on that subject. The construction of C(α) tests, initiated by a modest publication by Neyman in 1954 in *Trabajos de Estadistica (*pp. 161–168), was key to the development of adaptive methods and asymptotically efficient semiparametric statistics. Unfortunately, most works on these subjects make no mention of the originator of the significant idea behind them. E. Scott (2006) notes that during Neyman's lifetime his fundamental results quickly came into practice and found a place in basic textbooks, becoming "classical knowledge" in a sense, and for many it was no longer clear who their originator was. Neyman reconciled himself to the situation.

In 1960, although he had reached retirement age, Neyman continued to work intensively and obtained significant funds for further projects. He was awarded an honorary doctorate by the University of Chicago, became an honorary member of the Royal Statistical Society, and together with Elizabeth Scott received a prize from the American Association for the Advancement of Science. In 1960 the fourth Berkeley Symposium took place. In the following year Neyman spent much time travelling; he visited Leningrad, went to Moscow for a meeting with Bernstein, and also reached Kiev and Kharkov. A direct result of that visit was the arrangement of the translation into English of E. Dynkin's book on Markov processes.

In 1963 Neyman travelled in the southern states of the USA. Moved by the problems of race, he organized a collection of funds for scholarships, and wrote a letter to H. Cramer in the matter of a Nobel Peace Prize for Martin Luther King.

In 1964 Neyman celebrated his 70th birthday. In recognition of that occasion he was given an entry in the Great Book of the National Academy of Sciences, and received an honorary doctorate from Stockholm University. In 1965 a volume of papers dedicated to Neyman was published, edited by F. David. In 1966 he became the first non-Briton to be awarded the gold medal of the Royal Statistical Society, and the University of Berke-

ley published three volumes of work by Neyman and Pearson. Also in 1966 he became an overseas member of the Polish Academy of Sciences. We should also note that the fifth Berkeley Symposium took place in 1965.

In 1968 Neyman and Le Cam organized protests against the war in Vietnam. In spite of this, in 1969 Neyman became one of twelve Americans to receive the country's highest scientific award, the Medal of Science, "for laying the foundations of modern statistics and devising tests and procedures that have become essential parts of the knowledge of every statistician."

The year 1970 saw the holding of the sixth Berkeley Symposium, with an extensive programme related to biology and environmental pollution. The symposium was supplemented by three conferences held in spring 1971. It should be remembered that proceedings were printed for each of the six symposia, and Neyman was the editor or co-editor of each one of these ever more voluminous works. Also in 1971 Neyman and A. Zygmund began work on a collection of essays on various revolutionary changes in science, which they referred to as "Copernican". The volume, prepared for the 500th anniversary of the birth of Copernicus, and titled *The Heritage of Copernicus: Theories "More Pleasing to the Mind",* was published in 1974 on the occasion of Neyman's 80th birthday.

In 1974 a meeting *To honour Jerzy Neyman* took place in Warsaw, and a collection of the papers presented there was published in 1977. Neyman received honorary doctorates from Warsaw University and the Indian Statistical Institute. Volumes of *Annals of Statistics* and *International Statistical Review* were dedicated to him. There was also founded a "Jerzy Neyman Lectureship in Mathematical Statistics". In 1979 Neyman became an overseas member of the Royal Statistical Society.

Neyman's American period produced several works of great importance for the development of asymptotic statistical methods, such as BAN estimators and C(α) tests. However the main topic of interest for Neyman in that period was the building and verification of probabilistic models for a number of natural phenomena. The first paper in that series was published in *Annals of Mathematical Statistics* in 1939 (pp. 35–57) with the title *On a new class of, contagious' distributions, applicable in entomology and bacteriology,* and concerned the modelling and analysis of clusters. Subsequent work concerned matters of the formation of clusters with regard to modelling of the spread of epidemics and modelling of the distribution of galaxies in the universe. For more than twenty years Neyman worked on problems of weather modification. He was also interested, among other things, in carcinogenesis, the dynamics of population growth, and analysis of competing risks. Analysing his papers written in Poland and during the American period, we find that more than a half of Neyman's approximately 200 publications relate to matters of applications. More details concerning the entirety of Neyman's work can be found in reports by Klonecki and Zonn (1973), Le Cam and Lehmann (1974), Le Cam (1995) and Scott (2006).

J. Neyman died at Berkeley on 5 August 1981. He had remained active until the very end of his life. In June 1981 he had attended a conference on cancer, organized jointly with Le Cam. Even the day before his death he was working in hospital on a book on the subject of weather modification.

Finally we recall the view expressed by Elizbeth Scott (2006), who knew Neyman well – she wrote that Neyman always spoke of Poland with tenderness, and that he was proud of its heritage, although sometimes he could be critical of the actions of the Polish authorities.

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TERESA LEDWINA

Wiktor OKTABA
(1920–2009)

Wiktor Oktaba was born in Kyiv on 16th April 1920. His mother, Salomea, came from an impoverished Polish noble family living near Vilnius, and his father, Franciszek, from the vicinity of Warsaw (from Waliszewo). Five years later, Wiktor's parents and their two sons moved to Legionowo, near Warsaw. Wiktor started his primary education there. He graduated from the Col. Leopold Lis-Kula City's Boys' Humanistic Gymnasium in 1938 as the best student.

He became interested in mathematics at the age of fifteen. As he wrote in the book titled *Academic tales and morals* (Opowieści akademickie i morały) (LTN Lublin 2008, p. 21), the death of his mother, aged forty, was such a great misfortune for a fifteen-year-old boy that he started to "escape into the world of mathematics – solve problems". He developed that interest by becoming a student of mathematics at the University of Warsaw in academic year 1938/1939. He had the opportunity to attend lectures by famous mathematicians: Karol Borsuk, Narcyz Łubnicki, Kazimierz Kuratowski, Wacław Sierpiński, Edward Marczewski, or Zygmunt Charzyński.

The outbreak of the Second World War prevented him from continuing his studies and forced him to look for a job and earn a living. In the first years of the war, he worked as a labourer at the railway siding, as a lumberjack in woods near Warsaw, and as a labourer in the Warsaw sewer company. He also gave private lessons. On 1st April 1941, he started work at the Water Directorate Puławy, to be more exact, at the Nasiłów quarry, as a clerk and storekeeper. In June that year, he was transferred to the Water Directorate office in Kazimierz Dolny. It was also a place where stone was quarried. His responsibilities included preparing payrolls, dispatching barges and scows loaded with stone, and determining the amount of the cargo. He worked in Kazimierz until the end of 1943. There he met Janeczka, who later became his wife (they married in Lublin on 17/01/1945). He spent the final years of the war and the German occupation by

interchanging his place of residence between Warsaw, Legionowo and Kazimierz and contacting Professor Borsuk and cultivating his interest in problems in mathematical analysis, to which he was encouraged by the professor.

The first information on the Maria Curie-Skłodowska University (UMCS) being established in Lublin induced him to start studying mathematics there, and he became a first year student once again. In October 1944, the further academic classes were still not available. Mathematics was taught at the Faculty of Natural Sciences. Other faculties established at the university were the Faculty of Medicine, the Faculty of Agriculture, and the Faculty of Veterinary Medicine.

Wiktor Oktaba earned his master's diploma, dated 3rd December 1947, based on the thesis titled *On Riccatie's differential equation* (O równaniu różniczkowym Riccatiego), written under the supervision of Professor Jan Mikusiński. As a second year student of mathematics, he was employed as a junior assistant at the Chair of Mathematics by Professor Mieczysław Biernacki on 15th November 1945. The chair was part of the Faculty of Natural Science of the Maria Curie-Skłodowska University. At that time, he conducted classes for students of various faculties.

In 1948, MSc Wiktor Oktaba was employed as a senior assistant by Professor Mikołaj Olekiewicz, a probabilist and a statistician, who had returned from the USA and was the head of the Chair of Mathematical Statistics at UMCS. It is he who aroused the young assistant's later interest. On the other hand, Wiktor Oktaba became familiar with the practical applications of statistical theories when he stayed at the Nencki Experimental Institute in Łódź in September 1948 as a scholarship holder of the Ministry of Education and Higher Education.

In 1952, a new higher education institution was established in Lublin – the Higher School of Agriculture, and its Chair of Mathematical Statistics was formed as a part of the Faculty of Agriculture. MSc Wiktor Oktaba was entrusted with the task of organising that chair. He was also employed as an assistant professor. Two years later, Wiktor Oktaba was appointed a deputy professor and the head of that chair. His further promotion depended on him earning the research degree – at that time, the degree of candidate of sciences. He earned that degree on 24th June 1959, at the Faculty of Mathematics, Physics and Chemistry at UMCS. His dissertation was supervised by Professor M. Olekiewicz, and reviewed by Professor Marek Fisz, Professor Wiesław Sadowski, and Professor Zygmunt Nawrocki. The reviewer appointed by the Polish Academy of Sciences was Professor Oskar Lange *Unexpected Journal and Memories* (Nieoczekiwany Dziennik i Wspomnienia, 2007, Publ. AR w Lublinie, p. 51). The dissertation was titled *On the linear hypothesis in the theory of normal regression* (O hipotezie liniowej w teorii normalnej regresji).

In March 1959, Witkor Oktaba was employed as a docent (until 1966).

Having won the contest, he was a Rockefeller Foundation scholarship holder and stayed at the Iowa State University of Science and Technology in Ames from 1st October 1959

to 30th September 1960. His academic supervisor was Professor Oscar Kempthorn, and the Statistical Laboratory was then managed by Professor Theodore Bancroft. Wiktor Oktaba had an opportunity for establishing academic contact with other famous statisticians dealing with the theory of experiment design, such as: Babuchai Shah, Brian Hartley, Klaus Hinkelman, George Zyskind, J.N.K. Rao, W.G. Cochran.

During his stay in the USA, Wiktor Oktaba was informed by the dean of the Faculty of Agriculture of the Higher School of Agriculture that the Council of the Faculty elected him as the pro-dean and entrusted him with the management of affairs related to extramural studies. It was the beginning of his activity as part of the institution's authorities. He was the pro-dean of the Faculty of Agriculture in 1960–1962, the dean in 1962–1966, and the vice-rector for didactics in 1968–1969. He was also the chairman of the University Senate Committees for Student Affairs, for Scholarships, and for Employment of Alumni, and the delegate of the Council of the Faculty to the Senate of the university in 1970–1975 and 1981–1984. In 1970–1976, Wiktor Oktaba was a member of the Commission for Computer Science attached to the Minister of Education, and in 1982–1983, a member of the Statute Commission.

The academic contacts he had established in the USA were then expanded through his travels related to his duties as the pro-dean, dean and vice-rector, which often involved presentation of his results, but also through participation in numerous conferences. The Professor was also invited to give papers by foreign universities and academies of sciences in various countries (over 20 visits to 18 countries). The countries he visited included: Hungary, Germany, the USA, Czechoslovakia, France, the UK, Greece, USSR (Lithuania, Ukraine, Uzbekistan), Finland, Sweden, Austria, Italy, and Bulgaria. What helped Wiktor Oktaba establish such contacts was his good command of French and German, which he had learned at school, as well as of English and Russian. His knowledge of foreign languages also allowed him to study literature on statistics from around the world. He took part in numerous conferences in Poland, where he presented his results.

His active work in research and his organisational and didactic activities gave him the academic title of associate professor of mathematical sciences, which he earned in 1966, and full professor, which he was awarded in 1971. This involved Wiktor Oktaba being employed as an associate professor at the Chair of Mathematical Statistics of the Faculty of Agriculture in 1966–1971, and as a full professor at the Institute of Mathematical Applications of the Faculty of Agricultural Technology in 1971–1990. At that time, the chair was reformed as an institute, renamed and transferred to the newly established Faculty of Agricultural Technology at the same university. On 1st October 1990, Professor Wiktor Oktaba retired after 45 years of his career, but he remained active. He published academic papers, wrote books on the history of statistics and experimental agriculture, biographies of their founders, and also diaries and memoirs, where he included many interesting pieces of information on his life and work.

Aside from his research that he had done for all those years, Professor Wiktor Oktaba worked on preparing dictionaries of terms in mathematical statistics, theory of ex-

perimental design, and biometry, and there were six of them. They included entries in many languages, e.g. there was a dictionary in six languages prepared by specialists from various countries. It was published in Berlin.

He was also a very active member of many Polish and foreign scholarly societies. Such organisations include: the International Biometric Society (since 1992), the International Statistical Institute (Netherlands, since 1976), the Biometric Society (USA, since 1974), the American Institute in the Division of Administrative Research (since 1984), and the Institute of Mathematical Statistics (USA, in 1962–1982).

He was among the organisers of the Polish Biometric Society and, since 1976, the chairman of its Scientific Council. He was the editor-in-chief of the Society's journal titled *Colloquium Biometricum,* which, at its earliest stage, when it was published under the title *Materials of Methodological Colloquium from agro-biometry* (Materiały Colloquium Metodologicznego z Agrobiometrii), published papers given at the conference by the same name. These conferences were organised in cooperation with Division V, Agricultural and Forestry Sciences of the Polish Academy of Sciences, and the organisers included Professor Oktaba. These conferences are organised every year, and the series continues even now as International Biometrical Colloquium, and attracts statisticians, biometricians and people interested in the theory of experimental design, analysis of experimental results who represent various disciplines.

The Professor was member of the Polish Mathematical Society, the treasurer (for a single term) and the vice-president of the Lublin Branch of the Association (also for a single term), and in 1972–1975, a member of the Commission for Mathematical Applications of that association in Warsaw. Since 1961, he was also a member of the Lublin Scientific Society. Professor Wiktor Oktaba was also a member of the Committee for Mathematical Sciences of the Polish Academy of Sciences and Commission for Development of Mathematical Statistics at that Committee in Warsaw since 1972, and: a member of the Scientific Councils of the Research Council for Cultivar Testing (COBORU) in Słupia Wielka, Institute of Soil Science and Plant Cultivation (IUNG) in Puławy, a member of the scholarly editor team at the Institute of Organisation and Management of WSI in Lublin (1973–1975). In 1971, he organised the Mathematical Laboratory at the Medical University of Lublin.

The Professor skilfully combined such activity with extensive didactic work. He lectured on mathematics – higher algebra, mathematical statistics, experimental design and probability theory – to students of his home university, but also at all the other universities in Lublin (the Maria Curie-Sokładowska University, 1945–1955, the Catholic University of Lublin, 1948–1949, the Lublin University of Technology and the Medical University of Lublin, 1973–1981). He also gave lectures at the State Veterinary Institute in Puławy (1961–1962). The Professor also lectured on statistics during courses organised by the Polish Academy of Sciences in Warsaw and the consultation point of the doctoral school at WSI in Lublin and during training sessions for specialists in various disciplines who applied statistical methods, which were organised by the Higher School of Agri-

culture in Lublin. He conducted seminars on mathematical statistics for academic staff of his chair and the entire academic milieu of Lublin. They were also attended by academic staff members from other cities (Białystok, Cracow).

In 1973, he led a group of statisticians who prepared the paper titled *Mathematical Statistics* (Statystyka matematyczna) for the 2nd Congress of Polish Science.

Professor Wiktor Oktaba's academic publication output consists of about 200 publications, which apart from works printed in Polish and foreign journals, include 5 academic textbooks that had many editions, 6 multilingual dictionaries of statistics, probability theory, theory of experimental design, and biometry. The Professor also wrote numerous (about 150) reviews of academic publications, doctoral dissertations, post-doctoral degree (habilitation) theses, and other works related to promotion of academic staff.

He also trained a group of mathematicians and statisticians. He supervised 39 master's theses, 17 doctoral dissertations and 3 post-doctoral degree (habilitation) theses.

He is also the author of seven books that include diaries and memoirs, but also such titles as: *Probabilists, mathematical statisticians, econometricians and biometricians. From antiquity to 2000* (Probabiliści, statystycy matematycy, ekonometrycy i biometrycy. Od starożytności do 2000 r.), LTN, 2002, or *The history of the experiment's theory* (Historia teorii eksperymentu), LTN 2002.

The broad thematic scope of Professor Wiktor Oktaba's research resulted in important and original achievements. The topics of his research included: analysis of regression and variance of one or more variables, estimation of variance components, estimation of parameters and verification of hypotheses in random and mixed variable model, theory of missing observations, various problems in the Gauss–Markov model with full rank and non-full rank covariance matrix and in the Zyskind–Martin model. That model was introduced to statistical literature by Professor Wiktor Oktaba. Many of his publications concerned matrix algebra, with particular emphasis on the eigenvalues and eigenvectors.

What went down in history is the matrix approach to variance models and analysis using Kronecker matrix products and the observation of correspondence between the degrees of freedom and the sum of squares for individual sources (the so-called method M), which Wiktor Oktaba introduced.

It is also worth mentioning that the Zyskind–Martin model was included in the *Encyclopedia of Statistical Science*, edited N.L. Johnson and S. Kotz, and published by J. Wiley.

Such numerous achievements were not unnoticed. In total, he received 56 orders, medals, decorations, and awards, including: Commander's Cross of the Order of Polonia Restituta (1990), Officer's Cross of the Order of Polonia Retituta (1979), Knight's Cross of the Order of Polonia Restituta (1976), medals of the 10th anniversary of People's Poland and

40th anniversary of the Polish People's Republic, Millenium of the Polish State badge (1966), Michał Oczapowski Medal of the Polish Academy of Sciences (1995), 10 awards of the Minister of Education, and a dozen or so of awards of the Rector of the Higher School of Agriculture and the Agricultural University. He was also awarded a Gold Record for his achievement in mathematical statistics by American Biographical Institute, Raleigh, North Carolina, USA.

Professor Wiktor Oktaba's achievements and merits were also appreciated in biographical notes released abroad (e.g. in the USA and in the UK) and in a Polish publication – *Who is who in Poland* (Kto jest kim w Polsce).

Professor Wiktor Oktaba was married and had a daughter, Hania, and a son, Andrzej.

He died in Lublin on 6th September 2009. He was buried in his favourite town, Kazimierz Dolny, where he stayed, worked and relaxed on many occasions, and often recalled in his final years.

It can be also added, that the Professor passed away on the eve of the 39th International Biometrical Colloquium, organised by the chair he had established, which was just about to start in Kazimierz Dolny. All the participants in that conference had the opportunity to bid farewell to him and express their respect and gratitude for his great contribution to the development of mathematical statistics and biometry.

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MIROSŁAWA WESOŁOWSKA-JANCZAREK

Mikołaj OLEKIEWICZ (1896–1971)

Mikołaj Olekiewicz was born in Minsk, Belarus, on 7th September 1896. His father, Paweł, was a pharmacist, his mother, Wiktora, née Zawadzka, was a housewife. In Minsk he completed the primary school and the eight-grade gymnasium (in 1916). After a gap due to the war and the revolution, he entered the University of Warsaw, where he studied mathematics and logic. Due to the Kościuszko Foundation scholarship, he could continue his studies at the Columbia University in New York since 1924. He also studied statistics and psychology there. He completed his studies in 1925, and passed his doctoral exam in 1926. He then stayed in the USA for some years and extended his knowledge of statistics and its practical applications. In 1929–1930, he was employed at the Statistical Research Bureau at the Columbia University as a statistician. He was then invited by the Mexican government and worked at the Mexican Ministry of Social Welfare in 1930–1932. He was responsible for organising statistical surveys and psychotechnical tests. He stayed in America at the time of the intense development of mathematical statistics, with particular emphasis of its practical applications. At that time, such outstanding specialists as R.A.F. Fisher, K. and E. Pearson, G.W. Snedecor, C. Spearman, and many others, were active in the Anglo-Saxon countries. This allowed the young statistician to acquire thorough knowledge of the fields he was interested in. It was also appreciated after he had returned to Poland in 1932.

In 1932, he was employed at the Central Institute of Physical Education (CIWF, now the University of Physical Education – AWF), then subordinate to the Ministry of Military Affairs, as a lecturer and consultant in mathematical statistics and its applications in psychology. He started close cooperation with great psychologists, S. Baley, S. Szyman and M. Kreuz, and anthropologists, J. Czekanowski and J. Mydlarski, which then continued for many years. He also carried out his own research, where he used the experience he had earned in America. The interesting and innovatory matter of this research is confirmed by the titles of his publications at that time: *Intelligence of the recruit* (Inteligencja

rekruta) in "Infantry Review" (1936) and *The cavalryman's mind in the light of comparative research* (Umysłowość kawalerzysty w świetle badań porównawczych) in "Cavalry Review" (1937). At that time, psychological tests utilising new statistical techniques started to be used on a large scale. Olekiewicz had both knowledge and practical experience in this regard. He acquired them at the source by learning from the inventors of such methods, and the duties of specialists of CIWF, as an institution working for the army, included organising experimental research centres operating in the field of applied and experimental psychology.

This multifaceted activity was interrupted by the outbreak of World War II in 1939. In 1939–1942, he stayed in Lviv, where he was employed at the Academy of Foreign Trade as a senior lecturer of English. He returned to Warsaw in 1942, and at that point, it turned out that his library and his manuscripts had been destroyed during the bombardment at the early stage of the war. It was a great loss, specially given that he used to carefully prepare and continually improve his materials for publications, without rushing to submit them for printing. He was involved in underground education until the end of the war, he gave English and mathematics lessons, and worked on reconstruction of some of the lost manuscripts.

After the fall of the Warsaw Uprising, he escaped from transport during the evacuation of civilians. He stayed in the countryside until the liberation of Warsaw. His flat was destroyed once again during the Uprising.

In April 1945, he came to Lublin and was employed at the Maria Curie-Skłodowska University (UMCS) as a lecturer of English, and then, since 12th July 1945, as a deputy professor of mathematical statistics. In the same year, he took part in the UNESCO conference in London as a member of the Polish delegation. In 1946–1948, he stayed in the USA as a representative of the Ministry of Education. There, he organised help for Polish higher education institutions and other research institutions organised by the Committee for Reconstruction of Polish Science in New York and the UN Relief and Repost-doctoral degree (habilitation) Administration (UNRRA). His responsibilities included collecting academic literature, particularly missing issues of journals published during the war, for the Polish collections, which were being reconstructed after the war. Having returned to Poland, he started working at the Chair of Mathematical Statistics at the Maria Curie-Skłodowska University, which he managed until his retirement in 1966. On 6th May 1954, he became an associate professor. What was interesting, in its motion to appoint Mikołaj Olekiewicz as an associate professor, the university's Senate requested skipping the post-doctoral degree (habilitation) procedure because the country lacked specialists who could be the reviewers of his academic achievements in the field whose pioneer he was in Poland.

His years at the Maria Curie-Skłodowska University were the time of his most efficient work. His academic output is at the crossroads of mathematics and natural sciences. Though he was a mathematician by education, his rich in experience and diverse professional career abounded in contacts with other disciplines: psychology, anthropolo-

gy, biology, medical sciences, genetics, etc. This is shown by the list of nearly seventy research institutions he cooperated with. They include numerous departments and chairs of medical universities and the Polish Academy of Sciences, agricultural universities, universities, and other research centres. Specialists in various fields who worked with him could count on the adequate choice of and reasons for the statistical method, but also on an in-depth perspective of the essence of the issue in natural science. If Mikołaj Olekiewicz could not find an appropriate method, he tried to develop such a method himself. This resulted in some of his theoretical works, which were a valuable contribution to the theory of mathematical statistics.

When he cooperated with J. Dembowski, an animal psychology expert, he prepared a new runs test and calculated the relevant critical value tables. His cooperation with anthropologists and biologists, which lasted for many years, resulted in his interest in the discriminant analysis theory and taxonomy. He demonstrated some weaknesses of the classical methods and proposed his own sequential discrimination method. The discriminant analysis theory deals with the selection of the lowest possible number of characteristics that allow two or more populations to be distinguished from each other. The sequential methods starts with the selection of the two best characteristics, then three, four, etc., and each step is followed by an analysis of the increase in the discriminatory power. The procedure ends if the increase in the number of selected characteristics does not lead to a growth in the discriminatory power that is of practical significance. In the field of taxonomy, Olekiewicz developed the three components method and demonstrated its advantage over the existing ones.

His important contribution to the theory of mathematical statistics is his work on point estimation, interval estimation, and statistical hypothesis testing. In his 1949 publication, *On the efficiency of biased estimates* (O wydajności ocen obciążonych), he demonstrated that the use of biased estimators is not less justified in certain experimental situations than the commonly recommended unbiased estimators. He also pointed to the fact that the idea of confidence levels in Neyman confidence intervals is based only on the weak law of large numbers. He proposed using nearly certain confidence intervals resulting from the strong law of large numbers, particularly from the law of iterated logarithm. He provided such an interval for probability. He also developed a test based on the maximum value of Student's t-test statistics, which can be used when several values of such statistics from several independent samples are known.

As a consultant in the field of statistical methods, he thoroughly studied experimental design problems and methods of planning of statistical surveys, as well as methods for interpreting experimental results. He took part in the fora where results of surveys or experiments were presented and actively joined the debate. His reflection on methodology is included in several extensive publications: *Statistics as a cognitive method* (Statystyka jako metoda poznawcza) in "Investigating Journals of «Cosmos»" (1956), *Methods of testing regularity* (Metody badania prawidłowości) in "Issues of Creative Darwinism" (1952) and, a book written jointly with J. Dembowski, *Regularity and randomness* (Prawidłowość i przypadkowość), "Books and Knowledge" Publishing House, Warsaw 1951.

He lectured on probability theory and mathematical statistics at the Faculty of Mathematics, Physics and Chemistry of the Maria Curie-Skłodowska University. He also worked to train the young cadre. His two co-workers and doctoral students, Wiktor Oktaba and Dominik Szynal, became professors and heads of chairs of mathematical statistics at the University of Life Sciences and the Maria Curie-Skłodowska University in Lublin, where a few tens of academic staff members still work on mathematical statistics and probability theory.

Professor Mikołaj Olekiewicz died in Lublin on 30th June 1971. He was buried in the cemetery at Lipowa Street in Lublin.

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EDWARD NIEDOKOS

Julian PERKAL
(1913–1965)

The early 1960s were an unfortunate time for many scholars of the older generation. The then-incumbent authorities decreed that all employees above seventy years of age had to retire. Hugo Steinhaus, who managed the Department of Natural, Economic and Technical Applications at the State Mathematical Institute in Wrocław, had not appointed a successor. The pretenders to the office, Kazimierz Florek, Józef Łukaszewicz, Julian Perkal, Stefan Zubrzycki, and also some students, gathered in solemn moods. The senior spoke: "As we gathered here, were are like an Austrian railways train. We are an operational and well-oiled mechanism: a train that can go no further without the engine driver". The person who soon became Hugo Steinhaus's successor was Julian Perkal. The authorities' decision was good, the best they could make at that point.

Julian Perkal was born in Łódź on 24th April 1913. He passed his secondary school certificate in Sieradz in 1932 and studied mathematics at the University of Warsaw in 1932–1937. He was a topologist, his master's thesis, *On convex sets in the Euclidean space* (O zbiorach wypukłych w przestrzeni euklidesowej), was supervised by Karol Borsuk. After the graduation, he worked as a technician at Eng. E. Helfenbaum's private land surveying business in Warsaw. During the war, he ended up in Uzbekistan, where he also worked as a surveyor. He returned from there in 1946, settled in Wrocław and started working at the Faculty of Mathematics, Physics and Chemistry, which at that time was shared by the University and the University of Technology.

When he took the role of the leader in mathematical application in Wrocław, Julian Perkal had worked at the then-newly established State Mathematical Institute since 1949, had earned his doctorate in 1950, and his experience as the head of the Chair of Mathematical Statistics at the Higher School of Agriculture (now the Wrocław University of Environmental and Life Sciences), where he had worked as a deputy professor in

1951–1953. Since 1953, he was employed at the University of Wrocław as a deputy professor at the Chair of Mathematical Applications. In 1955, he was appointed a docent. In 1956–1958, he held the office of the dean of the Faculty of Mathematics, Physics and Chemistry of the University of Wrocław. In 1957, he earned the degree of doctor of mathematical sciences (which corresponds to the modern post-doctoral degree (habilitation)), on the basis of the thesis titled *On the sets of material and abstract points in nature research* (O zbiorach punktów materialnych i abstrakcyjnych w badaniach przyrodniczych) ("Reports of Wrocław Scientific Society" 12 (1957) pp. 1–14), and in the same year, he was nominated as an associate professor. It should also be mentioned that Julian Perkal was a member of the Editorial Committee of Applicationes Mathematicae ("Zastosowania Matematyki") since the journal had been founded in 1953.

His doctoral thesis titled *Notes on the determination of the volume of wood trunks* (Uwagi o oznaczaniu objętości pni drzewnych) was presented by Hugo Steinhaus during a joint session of the Department of Mathematical and Natural Sciences and the Department of Medical Sciences of the Wrocław Scientific Society on 22nd April 1948 ("Works of Wrocław Scientific Society" 31 (1950) B). In a way, this was a model thesis perfectly fitting Steinhaus's programme for applied mathematics. The declared aim of the work was to determine the area of a cross-section of a tree trunk, evaluation and determination of the volume of the trunk, and construction of measurement instruments. The problem was the diversity of tree trunk shapes, which precluded selection of a solid approximating actual trunks. Julian Perkal contrasted formulas then in use with the optimum empirical formulas derived by applying statistical methods to comparative material, a portion of which he had collected himself.

A discussion of Julian Perkal's academic achievements, the list of the offices he held and a complete list of publications can be found in a note by J. Łukaszewicz published in "Colloquium Mathematicum" (17 (1967) pp. 153–159.) The first item on the list, *Sur la subdivision des ensembles en parties de diamètre inférieur* ("Colloq. Math." 1 (1947), p. 45) is a report on the fact that Julian Perkal solved a certain topological problem posed by Karol Borsuk. His further publications were usually inspired by specific problems in natural sciences. They were distinguished by presentations of mathematical methods in a form that made them ready for direct and convenient application, which often formed a part of such works.

An important area in the research conducted by the Wrocław group studying mathematical applications was multidimensional analysis. The intention to reflect a cloud of individual points in a multidimensional space using the Czekanowski diagram, distances between the points, encouraged Hugo Steinhaus to look for the minimum length graph connecting the points. The algorithm for devising such a graph and the proof of its optimality were provided by Kazimierz Florek, so it was called the Florek diagram for some time. Soon afterwards, however, many diagrams were found in numerous disciplines, and Julian Perkal provided a new proof of the optimality of the algorithm. That diagram, now known as *dendryt wrocławski* (Wrocław tree), became intellectual property of a group of co-authors (see: K. Florek, J. Łukaszewicz, J. Perkal, H. Steinhaus,

S. Zubrzycki, *Taksonomia wrocławska (Wrocław taxonomy),* "Anthropological Review" 17 (1952) pp. 193–211). Julian Perkal, who was an eager proponent of the new graphic taxonomic method, wrote a few publications discussing its applications and reviewed tens of others. In the work cited here, we find trees based on W. Stęślicka-Mydlarska's data from 22 sites were the crania of the Ngadong early human, which were classified on the basis of six characteristics, were found; J. Czekanowski's data on 42 anthropological groups characterised by the proportion of the Armenoid, Lapanoid, Nordic and Mediterranean races; I. Rejment-Grochowska on 31 forest sites characterised by the abundance of Marchantiophyta. The third case also involves tree graphs for forests built on the basis of Marchantiophyta,

Julian Perkal was a naturalist among mathematicians. Apart from dendrometry and taxonomy, he wrote many publications on medical models for solving issues related to diagnosis and therapy. He proposed and co-authored original height-for-age and weight-for-age tables. In pediatrics, these tables were a global innovation. He initiated numerous studies on child development and contributed to them by proposing a new approach, which consisted in emphasizing the development of specific individuals and confronting individual growth curves instead of analysing the cross-sectional distribution of characteristics of individuals at a specific age. The issue of medical diagnosis inspired him to pay much attention to discrimination methods. His last work, which presents a generalisation of the Fisher discriminant method, which enables determination of a plane, instead of a line like in Fisher's original method, such that projections of multidimensional populations onto it are separated in the best way. He did not restrict himself to providing the method itself, but demonstrated its application to the observation of globulin fractions in human blood. Julian Perkal's work on geometric field indicators includes definitions of indices that are useful for characterising shapes, sizes and distributions of tufts of grass on cultivated grasslands. This resulted in a new debate on the shape and length of empirical objects by introducing new definitions of generalised shape, area and lengths of curves based on the concept of convex sets. He found an application for them in determination of the area and perimeter of tufts of grass, length of the edge of leaves, lengths of the sea coast, etc. He provided theoretical and practical elaboration of the idea in a series of publications, which included a description of a wheel measuring tool (*longimetr kółkowy*) for determining the proposed length of empirical curves.

Julian Perkal's name is attached to mathematical objects: natural indices known as Perkal indices (*wskaźniki Perkala*) and the Bogdanik–Perkal cybernetic scheme. What is important for research in natural sciences, but also in medicine or psychology, is statistical study of a set of characteristics known as factor analysis. At that time, however, Spearman's or Thurstone's methods entailed great difficulties related to calculation, and their users could not interpret the results. Therefore, Julian Perkal proposed a computationally simpler way of determining factors.

Let X_{ij}(i=1,2, ..., N; j=1,2, ..., n) be values of characteristic j of object i. Perkal's indices are:

$$\xi_{ij} = \frac{x_{ij} - \bar{x}_j}{s_j} - m_i, \quad j = 1, 2, \ldots, n,$$

where

$$\bar{x}_j = \frac{1}{N} \sum_{i=1}^{N} x_{ij}$$

is the average value of the j^{th} characteristic;

$$s_j^2 = \frac{1}{N} \sum_{i=1}^{N} (x_{ij} - \bar{x}_j)^2$$

is the variance of the j^{th} characteristic, and

$$m_i = \frac{1}{n} \sum_{j=1}^{n} \frac{x_{ij} - \bar{x}_j}{S_j}$$

The indices were welcomed by naturalists, who appreciated their computational simplicity and ease of interpretation, particularly where characteristics form a concordant set, i.e. where each characteristic is positively correlated with each other.

The Bogdanik–Perkal cybernetic scheme was described in "Polish Medical Weekly (Polski Tygodnik Lekarski)" in 1961. For number of granulocytes x in a sample of human blood at moment after sulfathiazole is administered, the authors introduce sinusoidal dynamic $x=a\sin(bt+c)+d$ and provide the manner of estimating parameters *a, b, c, d*. Empirical data confirmed the assumptions, and the results were used to diagnose granulocytosis associated with sulfathiasole in cases of neoplasms.

The period of 1960–1965, was a time of great success for Julian Perkal as a scholar, teacher and populariser of mathematics, the head of the Department of Natural, Economic and Technical Applications at the Institute of Mathematics of the Polish Academy of Sciences, and the head of the Chair of Mathematical Applications at the Institute of Mathematics of the University of Wrocław. At the Institute of Mathematics of the Polish Academy of Sciences, he was responsible for cooperation with naturalists and physicians, and all his appointment times were reserved for few weeks in advance. He exerted impact on hundreds of studies as a tireless consultant. He organised studies on mathematical applications at the University of Wrocław, and his numerous students

worked at various research and economic institutions. His cooperation with naturalists was concluded by the monograph titled *Mathematics for naturalists and farmers* (Matematyka dla przyrodników i rolników) (parts 1–3, PWN 1958–1963). An organisation that owes particularly much to him is the Polish Biometric Society, which he founded, and whose he was the first president in 1961–1965. He was also the editor-in-chief of "Listy Biometryczne" (Biometrical Letters) – the journal that the Society published since 1964. He also organised congresses and training conferences of the Society, which were very popular among naturalists and physicians. In 1962, he stayed at the University of California, Berkeley, where he had been invited by Jerzy Spława-Neyman.

Many works by Julian Perkal required demanding calculations, which at that time were done using arithmometers. Calculations for one of his last works, *About the sex sequence of chickens, II* (O sekwencji płci kurcząt) (co-authored by B. Kopociński and L. Szopa, "Reports of Wrocław Scientific Society" 20 (1965) B, pp. 6–9), were done using Elliot 803, a professional computer installed at the Chair of Numerical Methods of the University of Wrocław. At that time, Julian Perkal observed that he had previously made much effort to avoid calculations, and this was the beginning of an era when thinking was not hindered by calculation. His premature death prevented him from implementing that plan.

Julian Perkal died in Wrocław on 17th September 1965. He was buried in Communal Cemetery in Grabiszyn.

BOLESŁAW KOPOCIŃSKI

Edward ROSSET (1897–1989)

Edward Rosset, the Nestor among Polish demographers, was born in Łódź in 1897. Two days are stated as the day of his birth: one in the official documents (4th November), and another by the Professor himself in his biographies (1st November). Łódź was also the place of his death on 2nd June 1989. During his long life, Edward Rosset spent less than ten years outside his home city. It was the time of his studies in Warsaw and the time when he hid there from the Nazi occupant, which he then named the most dramatic years in his life.

Edward Rosset's childhood and youth was in the period when the textile industry developed very rapidly, and this was the sector where his father was employed. He earned his living by selling goods produced by several private enterprises and companies from Łódź on the Russian market. Edward Rosset's mother, a graduate of the Warsaw Music Conservatory, was a pianist and a composer. The future scholar grew among his five siblings (a brother and four sisters, all of whom died during the Nazi occupation).

In 1969, he passed the Matura exam (secondary school matriculation exam) in the Bogumił Braun Philological Gymnasium and then studied at the Faculty of Law and Political Sciences of the University of Warsaw. As a student, Edward Rosset had an opportunity to meet the outstanding representatives of legal and political sciences of his time. His academic teachers included Professors: Ludwik Krzywicki, Leon Petrażycki, Adam Kostanecki, Alfons Parczewski, and Zygmunt Cybichowski. "I was particularly interested in statistics" – as Edward Rosset wrote many years later – "which at the University of Warsaw, was taught by Ludwik Krzywicki". As a consequence, after his graduation and return to Łódź in 1922, Edward Rosset, then aged 25, started working at the Department of Statistics of the local city council. He soon became the head of that institution and managed it until the end of 1940s, except the period of the Second World War. At the Department of Statistics, his début in the field of statistical surveys (not including

minor works) was co-authorship of the study titled *Statistics of the city of Łódź (*Statystyka m. Łodzi) 1918–1920. This extensive publication was edited by Edward Grabowski, the professor of statistics at the Free Polish University, and Edward Rosset's predecessor as the head of the Department.

The second important project, which was a continuation of the above one, was the preparation and publication of *Statistical yearbook of the city of Łódź (*Rocznik statystyczny miasta Łodzi), the city's statistical yearbook, first for 1922, then for further years.

Until 1929 [Professor Rosset recalled], these were extensive volumes, which included text not only in Polish, but also in French. In 1930, due to the impact of the Great Depression, Łódź transitions to *Concise statistical yearbooks Małe roczniki statystyczne*, a concise statistical yearbooks, which stopped being published only after World War II broke out. I relaunched this publication after the end of the war by publishing the *Statistical yearbook of the city of Łódź* (Rocznik statystyczny miasta Łodzi) for 1945, 1946, 1947. I put the maximum effort into the preparation of the statistical yearbooks since the start because I knew that they would constitute an invaluable historical document.

Nowadays, it can be said that these publications testify to how much importance was attached to the collection of statistical data on various areas in the life of a large city during the interwar period and immediately after World War II. As regards population statistics, these publications often include a broader range of information than their modern counterparts. This also pertains to *„Statistical Bulletin of the city of Łódź"* "Biuletyn Statystyczny Miasta Łodzi", published in 1948–1950, which Edward Rosset edited. It was a source and analytical publication. In total, about 300 issues of the bulletin were released.

Following his own motto: stating that "behind each number, there is a problem, one only has to see it", Edward Rosset did not restrict himself to editing source literature. He used the data collected by the Department of Statistics to prepare analytical publications1 in the form of books and articles, where he presented various issues of a large industrial city. As a city council employee, he felt obliged to point to difficult, sometimes painful, problems, related primarily to the living conditions in Łódź.

When systematised, the issues that Edward Rosset addressed in his publications from the interwar period can be grouped as follows:
– symptoms of social maladies in large cities,
– living conditions and health status of the population of Łódź,
– political attitudes of the residents of Łódź.

Separate research topics outside the issues related to Łódź arose from Edward Rosset's interest in the impact of war on population characteristics and processes and in the Baltic countries, which re-emerged after the war, particularly Estonia.

[1] The list of Edward Rosset's publications is included in the biography written by his son, Stefan O. Rosset, published in *Profiles of scientists of Łódź, Professor Edward Rosset Sylwetki uczonych łódzkich, Profesor Edward Rosset,* issue 37, Scientific Society of Łódź Łódzkie Towarzystwo Naukowe, Łódź 1997.

Among the publications on the symptoms of social maladies, the one that deserves particular attention is *Alcoholism in Łódź in the light of statistical surveys* (Alkoholizm w Łodzi w świetle badań statystycznych), which was released in 1925 and then elaborated on in the study titled *Alcoholism in Polish cities* (Alkoholizm w miastach polskich), prepared on the basis of surveys in 58 larger Polish cities. The same thematic area is covered in the 1931 publication titled *Prostitution and venereal diseases in Łódź* (Prostytucja i choroby weneryczne w Łodzi), whose preparation involved use of sources provided by the Police. When discussing the issue of sexually transmitted diseases, Edward Rosset expressed the view that they reduce the reproductive capability, and could therefore be a significant depopulation factor.

The 1926 book *Issues of the local government economy in the city of Łódź* (Zagadnienia gospodarki samorządowej miasta Łodzi) gained much renown. The list of chapters is a kind of a catalogue of the most important population and socio-economic problems of the city, some of which are still relevant. The author demonstrated how the then civic authorities tackled such important issues as housing, municipal infrastructure, child care, high mortality, and alcoholism. Edward Rosset discussed the common occurrence of such diseases as tuberculosis, typhoid fever, and neoplasms, in other publications of that period, which were then and are still now an important contribution to epidemiological studies.

The works that might be particularly interesting to historians are: *The political face of the city of Łódź in the light of election statistics* (Oblicze polityczne miasta Łodzi w świetle statystyki wyborczej, 1927), *The proletariat of Łódź in the light of demographic research* (Proletariat łódzki w świetle badań demograficznych, 1930), and *Łódź in the years 1860–1870. Historical and statistical outline Łódź w latach 1860–1870.* (Zarys historyczno-statystyczny, 1928). The first of these studies contains an analysis of statistics related to elections to the four successive State Dumas in 1906–1912 and elections to city councils, the Sejm and the Senate in independent Poland. Years later, the author wrote: "This work was an attempt at drawing conclusions from the kaleidoscope of the electoral moods changing again and again".

The second publication, released by the Institute of Social Economy in Warsaw due to a recommendation by Ludwik Krzywicki, is an example of a pioneering, model demographic monograph of the largest social group, prevalent in the social structure of the city. In the preface to this study, Edward Rosset wrote:

> If we want to emphasise the demographic image of a large city, if we want to identify population phenomena occurring in this environment, we have to break with the traditional study of general population characteristics and look for answers to the questions that are interesting to us in the demographics of separate social classes.

Edward Rosset's socio-demographic research on Łódź was crowned by the publication prepared for the tenth anniversary of Poland's independence titled *Łódź. The city of work Łódź. Miasto pracy.* It was one of the monographs of large Polish cities showing

their achievements in independent Poland and their existing defects and prospects for development.

It follows from the comments that social statistics by region were Edward Rosset's principal area of study when he was the head of the Department of Statistics in Łódź in the interwar period. What deserves particular attention is his exceptional ability to interpret numbers and results, which he excelled in until the end of his career.

An important event in Edward Rosset's this career was his participation in the international demographic congress that was held in Rome in 1931. It was a great meeting of demographers organised by the Italian Committee for the Study of Population Problems under Professor Corrado Gini. At that forum, Edward Rosset gave two papers, namely: *Demographic rules of the war time* (Prawa demograficzne wojny) and *Venereal diseases and war* (Choroby weneryczne i wojna). Years afterwards, he wrote:

> The former of the two papers caused a great commotion at the Congress… The attendees were stirred by the originality of the approach to the issue, namely by my generalisation of the demographic phenomena resulting from the war and the formulation of regulates, which I called demographic laws of war, on this basis. This work left an equal impression in the world statistical and demographic literature.

Therefore, the cited paper was a recommendation that introduced Edward Rosset to the European circles of demographers.

As a practitioner of statistics, Edward Rosset missed contact with a university very much in the 1920s, and expressed his regret that the second largest city in Poland had no such institution. Therefore, he was happy that the Free Polish University established its branch in Łódź, which then appointed him as its collaborator in academic year 1929/1930. He initially worked as an assistant and lectured on statistics, demography, and population policy, and just before the war, Professor Zofia Daszyńska-Golińska formally requested that the university's authorities should appoint him docent (associate professor).

After the outbreak of World War II, Edward Rosset lost his job and his flat and was forced to leave his home city. With his wife, Zofia, and two children, daughter, Irena, and son, Stefan, he illegally moved to Warsaw, were he hid throughout the occupation period and suffered the greatest poverty.

> In research. [Edward Rosset recalled] I found salvation from the risk of nervous breakdown that I faced. Andrzej Gródek, a professor at the Warsaw School of Economics, made the book collection of that institution available to him regardless of the personal risk.

Let us add that Edward Rosset could freely read literature in five foreign languages (English, Russian, German, French, and Italian).

Motivation for working intensely while in hiding during his wartime exile can be found in another thread in Edward Rosset's memoirs:

> I had little hope that I would survive the war, but I told myself that if I were fortunate enough to see liberation, I would have to be prepared to start employment as a professor of statistics at the University of Łódź, which existed in my dreams.

Professor Edward Rosset began very intense organisational, didactic and research activities after the war had ended. In the 1940s, he organised two chairs of statistics. One at the newly established University of Łódź, the other at the Higher School of Economics. When both institutions merged in 1961, the Chair of Demography and Statistics was created as part of the Faculty of Economics and Sociology of the University of Łódź. The Professor managed that chair until his retirement in 1968. There, he gather his numerous students – demographers and statisticians. When commenting on his own organisational work of the early 1950s, he wrote:

> I am satisfied to state that all the statistical institutions active in Łódź (Chair of Statistics at the University of Łódź, Chair of Statistics at the Higher School of Economics, and the City Department of Statistics), where built by me.

Professor Edward Rosset's formal career can be divided into the following stages: the said assistantship at the Chair of Statistics of the Free Polish University in 1929–1939, work as a deputy professor at the University of Łódź, awards of the doctoral degree in 1947 based on the dissertation titled *Demographic rules of the war time* (Prawa demograficzne wojny), appointment as a docent (assistant professor) at the Higher School of Economy and the University of Łódź in 1954, and the award of the title of associate professor in 1958, and full professor in 1963. At the Higher School of Economics, the Professor held the office of pro-dean, and then dean, vice-rector, and rector. In 1961–1965, he was also a vice-rector of the University of Łódź.

While working at higher education institution in Łódź, Professor Rosset combined his didactic and research activities with the education of young cadre in the field of demography. He supervised a dozen or so doctoral dissertations.

Professor Rosset's service related to organisation of higher education go beyond the institutions based in Łódź. During several terms, he took part in the work done by the Chief Council attached to the Minister of Higher Education as a member of the Economic Section. There, he dealt, for example, with issues related to curricula. He also represented the Polish higher education on the international forum by participating in conferences defining the role of universities in the modern world.

Professor Edward Rosset made invaluable contribution to the organisation and development of demographic surveys in Poland. As a promoter of such surveys, he acted primarily on behalf of the Polish Academy of Sciences, whose corresponding member he became in 1962, and full member in 1976. In 1978–1983, he held the office of deputy president

of the Łódź Branch of the Polish Academy of Sciences. He initiated the establishment of the Committee for Demographic Sciences of the Polish Academy of Sciences, which he chaired for several successive terms. In his final years, he was the honorary chairman of that Committee. Professor's effort resulted in the foundation of *„Demographic Studies"* "Studia Demograficzne" in 1963, the organ of the Committee for Demographic Studies and the forum where Polish and foreign demographers could publish. For 25 years, Edwart Rosset was the editor-in-chief of that periodical, which is still being released.

What is also worth noticing when considering Professor Edward Rosset's activities in the field of publishing is the fact that he was the editor-in-chief of the series of *"Scientific Papers"* "Zeszyty Naukowe", published by the Higher School of Economics and then by the University of Łódź, for many years, and promoted articles related to demographics written by his colleagues from his university chair. The Professor also organised the Demographic Laboratory of the Polish Academy of Sciences which was active in Łódź in 1966–1969.

Edward Rosset's post-war publication output is very rich and diverse. Contemporary demography virtually lacks issues of fundamental significance that the Professor would not examine academically. The total number of his publication (articles, monographs, reviews, reports, expert's opinions) exceeds 300 including sixteen books.

The topics that the scholar studied included issues related to the ageing of the population, demographics of modern Poland, and the demographic prospects for our country, selected processes and phenomena (e.g. demographic explosion) in the field of population reproduction, regional demographics, demographic theory.

The 1959 publication *Aging process of population* (Proces starzenia się ludności) discusses the causes and various consequences of population ageing. The work has maintained its fundamental significance. Being aware of the importance of the problems examined in that study, Professor Edward Rosset saw it as his opus magnum in demographic surveys, which he stated in the preface to the book. As it happened, this monographs was a very good starting point for the Professor's achievements and publication output in the 1960s, 1970s, and 1980s. After a short time, that publication gained international renown, which is still manifested by numerous citations and translations into English (*Aging Process of Population,* 1964) and Russian (*Process starienia nasielenia,* 1968). Earlier biographies of the Professor and the reviews of the book emphasised that the timeless value of the book is based e.g. on the fact that it outlines various problems that will affect societies of the future and will be the consequence of the contemporary increase in the percentage of the elderly people in human populations.

Many of the issues from *Aging process of population* (Proces starzenia się ludności) can be found in the extensive demographic study titled *Elderly population Ludzie starzy* (1969). The analyses contained in that book let its author to conclusion that the Polish society was approaching the boundary of an ageing population with all the social, medical and economic consequences of such state of affairs. The book *Life expectancy*

(Trwanie życia ludzkiego, 1979) deals with the issue of population ageing by providing a comprehensive explanation for the causes of lengthening human lifespan which results in the increased percentage of elderly persons in societies. On the other hand, the work can also be classified as a direct discussion on population reproduction.

The current state of demographic processes and structures on the national scale was presented in several books by Professor Edward Rosset. The ones that deserve particular attention are: D*emography of Poland Demografia Polski* (1975), *The demographic face of the Polish People's Republic* (Oblicze demograficzne Polski Ludowej, 1965), *Poland's demographic prospects* (Perspektywy demograficzne Polski, 1962), and *Poland in 1985 – a demographic vision* (Polska roku 1985 – wizja demograficzna, 1965).

In these works, the author used the demographic data in Polish and foreign publications and statistical sources concerning demographic structures and natural movement in Poland, as well as forecasts prepared by the Commission for Planning and then the Central Statistical Office to present the current population trends and predicted, with great caution, social and economic consequences of the ongoing demographic change.

The population reproduction process, which is discussed in the second volume of *Demography of Poland Demografia Polski*, as a topic studied exclusively in the context of marriages and divorces was continued in the Professor's last major monograph published during his life titled *Divorces Rozwody* (1986). In that work, Edward Rosset, though he did not fully reject the divorce as a manner of solving extreme marital conflicts, was a proponent of lasting marriages and viewed the soaring numbers of divorces in the modern world as a symptom of a social malady.

Professor Edward Rosset also affirmed the invaluable importance of the family in his private life, and the persons that had known him viewed him from some distance as a benign patriarch of a multigenerational family.

Apart from issues pertaining to Europe and entire Poland, Edward Rosset appreciated the significance of smaller-scale demographic surveys. In this field, he had a faithful ally, Professor Wincenty Kawalec, who, as the Presidents of the Central Statistical Office, organised several conferences on regional demographics in the 1960s. As regards Professor Edward Rosset's publication output, they resulted in two works: *Balance of population reproduction in the western and northern lands of Poland* (Bilans reprodukcji ludności na Ziemiach Zachodnich i Północnych) and *Demographic picture of the Kielce region* (Obraz demograficzny ziemi kieleckiej) – both released in 1970.

The Professor also kept the problems of his home city in mind. He was the editor of the monograph titled *Łódź in the years 1945–1960* (Łódź w latach 1945–1960), which was published in 1962. He was also the author of the chapter titled Population profile *Stosunki ludnościowe.* It included e.g. an original estimation of the population losses sustained by Łódź during World War II. Regional topics are also covered by the 1964 monograph *Textile workers of Łódź* (Włókniarze łódzcy), [...] published under his own editorship.

A separate field of Edward Rosset's research involved issues related to the theory of demography. The first clear hints can be found in the aforementioned *Demographic rules of the war time* (Prawa demograficzne wojny). In the extensive monograph titled *Demographic explosion Eksplozja demograficzna* (1978), the reader will notice signs of the Professor's interest in the theory of demographic transition, which is extensively elaborated on in *The theory of demographic transition – its logic, techniques and perspectives* (Teoria przejścia demograficznego – jej logika, techniki i perspektywy, 1987). The last research area also includes the book titled *Historical development of the theory of optimal population* (Doktryna ludności optymalnej w rozwoju historycznym, 1983) which presents the understanding of optimum population in various periods in history and takes account of different criteria for the concept.

Professor Edward Rosset received many awards for his academic publications. These awards included: Award of the City of Łódź, First Degree Awards of the Minister of Higher Education, Honorary Award of the Łódź Scientific Society, Award of the Scientific Secretary of the Polish Academy of Sciences for the *Historical development of the theory of optimal population* (Doktryna ludności optymalnej w rozwoju historycznym), and the First Degree State Awards for the two volume work titled *Demography of Poland* (Demografia Polski).

While studying Edward Rosset's publications, one can appreciate his erudition reflected in numerous references and aptly chosen citations which allow the reader following the author's reasoning to become familiar with the world literature on the issue from all over the world. His works are written in studious and beautiful Polish.

The Professor's research was accompanied by participation in numerous Polish and international conferences as a speaker or organiser. Apart from the aforementioned 1931 International Congress for Studies on Population in Rome, the events that Professor Rosset took part in include the International Demographic Symposium in Smolenice (the present day Czech Republic, 1961), Budapest (1962), Zakopane (1964), and Liège (1973). He was also an organiser of the 1st National Demographic Conference in Zakopane.

Professor Edward Rosset's enormous academic output was largely a result of his skills and extraordinary diligence, the two traits which amazed his students and colleagues.

At various stages of his life, Professor Edward Rosset was a member of numerous Polish and international societies, commissions, committees and scientific councils. He actively worked as a member of the committees of the Polish Academy of Sciences and the Łódź Scientific Society.

Throughout the period he worked at the Higher School of Economics and then at the University of Łódź, and then after his retirement, Professor Edwart Rosset kept in touch with numerous demographers from Eastern and Western Europe, who held him in high esteem. Some of them even referred to themselves as his students and thought of it as an honour. As a visiting professor, he lectured, for example, at the University of Vien-

na, and higher education institutions in Belgrade, Berlin, Bucharest, Florence, Moscow, Prague, Pécs, Rome, and Sophia.

In 1978, the University of Łódź awarded Edward Rosset the title of doctor honoris causa in recognition of his service to the university and to science. The cause was promoted by his students and long-term collaborated – Professor Władysław Welfe.

The fact that Professor Edward Rosset's achievements were appreciated by the circles he worked with and by the authorities was evidenced by the decorations that he was awarded during his long life. He valued highly the Officer's Cross of the Order of Polonia Restituta, which he received in 1929 on the occasion of the tenth anniversary of Polish independence. In the interwar period, he also received: Defender of Poland 1918–1921, Medal for Long-term Service (1928), Medal of Tenth Anniversary of Poland's Independence (1928) and the Estonian Officer's Cross of the Red Cross. After the war, he received such honours as: the Golden Cross of Merit (twice: 1946, 1955), the Order of the Work Flag First Class (1976), and the Commander's Cross with the Star of the Order of Polonia Restituta (1986).

This attempt at portraying an outstanding demographer, scholar and humanist, can be concluded with his own words that he spoke in 1980 on the university day at the University of Łódź, whose co-founder he was:

Non omnis moriar, writes Horace in his Odes. I think that anyone who takes part in creating material or spiritual goods can say it of himself. An academic worker has double the right to that claim: the persistence of his achievements is decided by conveying knowledge and experience to a broader audience in the form of classes with students or publications[2].

JERZY T. KOWALESKI
WŁODZIMIERZ OBRANIAK

[2] His most complete biography among ones published to date, Edward Rosset – an old school scientist, a contemporary man Edward Rosset – uczony odchodzącej generacji, człowiek współczesny, was written by M. Okólski and W. Welfe and published in"Economist" "Ekonomista" No. 1, 1987, on the occasion of the Professor's 90th birthday.
Posthumous biographies were published e.g. by W. Obraniak in „Polish Science" "Nauka Polska" No. 3/1992, and C. Domański in„Statistical Review" "Przegląd Statystyczny" issue 2/1991. Biographical notes on Edward Rosset by S. Kwiatkowski can be found in the publication Profiles of Polish statisticians Sylwetki statystyków polskich, PTS, GUS, Warszawa 1993, and L. Miastkowski's book Profiles of Łódź scientists Sylwetki uczonych łódzkich, University of Łódź publishing house Wydawnictwo UŁ, Łódź 1995.
Professor Edward Rosset's academic curriculum vitae prepared by Jerzy T. Kowaleski and W. Obraniak was published on the hundredth anniversary of the scholar's birth as part of the series Profiles of Łódź scientists, Professor Edward Rosset Sylwetki uczonych łódzkich, Profesor Edward Rosset, issue. 37, Łódź Scientific Society Łódzkie Towarzystwo Naukowe, Łódź 1997. The same issue also includes C. Domański's article Edward Rosset - a precursor of the history of statistics Edward Rosset – prekursor historii statystyki.

Wiesław SADOWSKI (1921–2010)

Professor Wiesław Sadowski is indubitably one of the greatest Polish statisticians and econometrists, whose contribution to the development of statistics and econometrics is invaluable.

Wiesław Sadowski was born in Warszawa on 21st December 1921. He graduated from the Stefan Batory Secondary School in Warszawa. During the German occupation, he studied at the underground Warsaw School of Economics, which he was then affiliated with throughout his whole professional career (in 1949–1991, it was named the Central School of Planning and Statistics). Soon after the war ended, he started working there as an assistant to Professor Aleksy Wakar. Professor Wakar supervised his master's thesis to completion in 1946, and in 1948 – his doctoral dissertation. In 1945–1949, Wiesław Sadowski supplemented his knowledge of mathematics by studying it at the Faculty of Mathematics of the University of Warsaw. In 1949–1965, he also worked at the Institute of Mathematics under Professor Kazimierz Kuratowski. He also lectured on mathematical statistics at the Faculty of Mathematics of the University of Warsaw. Until 1948, he worked at the Chair of Statistics of the Central School of Planning and Statistics under Professor Stefan Szulc. In 1954, he earned the academic title of docent (associate professor), as the post doctorol degree (habilitation) was not awarded at that time, based on the dissertation on nonparametric tests. In 1955, he organised the Department of Mathematical Statistics at the Chair of Statistics and became its head (some years later, the Department was reorganised into the Chair and then the Institute of Econometrics, which he managed until 1980). In 1960, he earned the academic title of associate professor of economic sciences, and in 1969 – the title of professor (full professor) of economic sciences. In the same year, he became a corresponding member of the Polish Academy of Sciences. In 1955–1959 and 1963–1965, he was a Vice-rector, and in 1965–1978 the Rector of the Central School of Planning and Statistics. From 1969 to 1980, he was an independent (non-party) deputy to the Sejm of the Polish People's Republic. In

1980–1989, he was the President of Statistics Poland. He received the Award of the Minister of National Education for his research, didactic and organisational activities, seven times. He received numerous state decorations, including the Commander's Cross of the Order of the Reblrthof Poland (*Polonia Restituta*), and the Commander's Cross of the Order of the Lion of Finland. In 1997, he was awarded the degree of *Doctor Honoris Causa* of the University of Łódź.

Professor Wiesław Sadowski published nearly 100 monographs, academic articles and textbooks. The most important ones include publications on nonparametric statistics, linear programming, decision theory, and forecasting, which have been cited in the best Polish and foreign journals on many occasions. One of his early research results, related to the so-called assortment problem, not only has found a permanent place in operationl research textbooks, but was continued by numerous scholars and inspired several doctoral dissertations at US universities. The academic textbooks form an equally valuable portion of Professor Wiesław Sadowski's publication output. They are distinguished by their high quality content and the extraordinarily reader-friendly style. Two textbooks: *Mathematical Statistics* (Statystyka matematyczna) and *Statistical Inference* (Wnioskowanie statystyczne), are still recommended to students in spite of the fact that they were written about 50 years ago, and it would be very difficult to suggest equally valuable literature that would allow prospective economists to familiarise themselves with mathematical statistics. *Mathematical Statistics* (Statystyka matematyczna), released in 1965, was the first Polish textbook of mathematical statistics written specially for economists. It was translated into English and published by Pergamon Press. It was also translated into Italian and Slovak. *Decision Theory* (Teoria podejmowania decyzji), which contains the first course on operational research in Polish, also gained wide recognition. It had numerous Polish editions and was also published in English (Pergamon Press, 1965) and German (Verlag Die Wirtschaft, 1963).

Professor Wiesław Sadowski, who was very gifted academically, surrounded himself with people characterised by their uncommon intellectual abilities. His collaborators included: Tadeusz Czechowski, Wiesław Grabowski, Jerzy Greń, Michał Kolupa, Ira Koźniewska, Ireneusz Nykowski, Zbigniew Pawłowski, and Ryszard Zasępa. He supervised nearly 40 doctoral students to completion, and many of them achieve academic success in the field of qualitative analysis of economic processes and phenomena at Polish and foreign universities.

Prof. Wiesław Sadowski was a consistent promoter of academic research following global trends in Poland and strived for maintaining connection between Polish and foreign academic circles. It would not have been possible without the unquestionable importance of his research results and the respect he had among the greatest representatives of econometrics, statistics and operational research around the world.

In 1955–1958, he was a scholarship holder of the famous Cowles Foundation at the Yale University. Since then, he closely cooperated with the Cowles Commission, Herman Wold's school in Uppsala, and Leonid Kantorovich's school in Novosibirsk. He

was a member of prestigious international scientific organisations, i.a.: Econometric Society, Academie des Sciences, des Arts et des Lettres, New York Academy of Sciences, International Statistical Institute (ISI), Conference of European Statisticians at the United Nations Economic Commission for Europe (UNECE). Owing to Professor Wiesław Sadowski's effort, the Econometric Society European Meeting was held in Warsaw in 1965, and a session of the International Statistical Institute was held there in 1975. In 1969, the Professor was elected a Fellow of the Econometric Society. He was a member of the Fellow Nomination Committee of the Econometric Society under Professor T.C. Koopmans for several years.

Professor Wiesław Sadowski spent many years working for the benefit of Polish circles studying statistics, econometrics, and operational research. He participated in the reactivation of "Przegląd Statystyczny"(Statistical Review) in 1974 and was its editor-in-chief in 1974–1980, and then the chairman of the editorial council. He was a member and the chairman of the economic section of the Central Qualification Commission. He organised first nationwide conferences on econometrics and operational research. He took part in establishing the Committee for Statistics and Econometrics of the Polish Academy of Sciences and was its chairman for many years from 1972 and then the honorary chairman from 1993. In the 1960s, he was a member and then the chairman of the Scientific Council of Statistics Poland and the Council of the Research Centre for Economic and Statistical Studies of Statistics Poland and the Polish Academy of Sciences. He was an active member of the Polish Economic Society and, for many years, a member of the Board of the Polish Mathematical Society.

Professor Wiesław Sadowski was still active after his retirement in 1992. He carried out research and presented new results related to the econometric problem of data mining, economic aspects of dynamic consumer choice, modelling of inventories. He became involved in new initiatives in the statistical and econometric circles. He always agreed to review a doctoral dissertation or provide a review in a habilitation procedure or procedure for awarding the academic title of professor. He lectured at the private Maria Skłodowska-Curie Warsaw Higher School. He expressed his satisfaction at the post-1989 changes at the Warsaw School of Economics. He was happy to see the success of the Institute of Econometrics, which he founded a few decades earlier. He was a model of good manners, scholar's authority and academic teacher for the next generation of statisticians and econometrists.

When thinking of the nearly sixty years of econometrics, operational research and mathematical statistics in Poland, Professor Sadowski is seen as the inspirer of research, organisation of the academic milieu, and education of economists at higher education institutions.

Professor Wiesław Sadowski died in Warszawa on 7th August 2010.

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MARIA PODGÓRSKA

Hugo Dyonizy STEINHAUS (1887–1972)

Hugo Dyonizy (two given names) Steinhaus was born in Jasło on 14th January 1887. His father, Bogusław, was a merchant with the title of court councillor and was an active citizen of his city, and his mother, Ewelina, née Lipszyc, was a housewife. Young Hugo first took classes at home, then at a primary school in Jasło, and in 1897–1905, at the local classical gymnasium. After passing his Matura (secondary school matriculation) exam with honours, he started studying mathematics and philosophy at the University of Lviv. However, Stanisław Jolles (1857–1942), who then worked at the Technical University of Berlin (Charlottenburg), advised him to move to Göttingen which was then the capital of the mathematical world, for further studies. Steinhaus followed this advice and spent the period of 1906–1911 studying in Göttingen. He was taught by the greatest mathematicians of that time: D. Hilbert, F. Klein, E. Landau, H. Minkowski, H. Weyl, E. Zermelo, etc. In 1911, he was awarded the degree of doctor of philosophy, *summa cum laude,* in mathematics on the basis of the dissertation [1*][1*] about the Dirichlet problem. He returned to Galicia, and being without an academic post, he spent the period of 1911–1914 as a "private scholar" (to use Steinhaus's own term) travelling between Jasło and Cracow. At that time, he published a few works, played tennis and rowed on the Vistula river. He also travelled to Italy and France. When World War I broke out, his family moved to Vienna, where Steinhaus joined the Polish Legions, and then took part in the Volhynia campaign as a gun crew commander in the 1st Regiment of Legionary Artillery. Following his discharge, he was a public servant in the National Reconstruction Office, first in Cracow, then in Lviv. In 1917, he earned a post-doctoral degree (habilitation) at the University of Lviv based on his thesis on trigonometric series and Fourier series. After the Polish–Ukra-

[1*] Numbers in square brackets refer to the list of works by H. Steinhaus in [I]. The asterisk means that the particular work is included in that collection.

inian war broke out, he went to Jasło, but returned in 1920 and became an associate professor at the Jan Kazimierz University in Lviv. In 1923, he had already been a full professor and the head of one of the four chairs of mathematics. In cooperation with Stefan Banach (1892–1945), whom he induced to move to Lviv, he created the Lviv School of Mathematics" [B]. In 1927, they founded the organ of that school – "Studia Mathematica (whose first volume, however, was published two years later). It is still published nowadays and still is among the leading periodicals in the field of functional analysis. Hugo Steinhaus was not involved in politics, but in 1930, he signed a protest against the imprisonment of representatives of the political opposition in Brześć. He was the dean of the Faculty of Mathematics and Natural Science of the Jan Kazimierz University. When World War II started, he became a professor and the manager of a chair at the Ukrainian university in Lviv. When the Germans entered Lviv, he faced the risk of death due to his Jewish roots, so he destroyed all his personal documents and together with his wife left their flat for good. They roved for some time and stayed at their friends' homes in the city, then hid in Osiczyn, near Zimna Woda, and in July 1942, Hugo Steinhaus moved to Berdechów near Stróże (Gorlice county) under the name Grzegorz Krochmalny (an authentic name of a deceased forestry worker). There, he took part in underground education (he signed school certificates using the name Stanisław Melon) and lived to see the end of the war. Lviv had already been incorporated into the Soviet Union, so he did not think about return. In Cracow, he met S. Kulczyński, who induced him to go to Wrocław, where they went in the autumn of 1945. He was the organiser and the first dean of the Faculty of Mathematics, Physics and Chemistry of the newly established university named the University and Polytechnic in Wrocław, and S. Kulczyński became its first rector. Hugo Steinhaus stayed in Wrocław until his death.

H.S.'s brilliance and vivid intelligence allowed him to make original discoveries in various fields of mathematics, but it made it difficult for him to keep working on just one of them (this was the difference between him and Banach who could focus on the theory of measure and functional analysis). He did not like exaggerated abstraction and did not appreciate set theory, "to which too much attention is paid in Poland" ([H], p. 126). He combined his admiration for the power and beauty of mathematics with his writing talent, which resulted in his popular mathematics articles and books being widely read. He was strongly attracted to the problems in the world of nature and technology, which directed his attention more and more towards applications of mathematics that possessed him totally during his stay in Wrocław.

When trying to understand the place of statistics among Steinhaus's academic interests, one needs to start by looking at the entire picture. Even a brief glance of his publications shows the multitude of fields he worked on. These include: Dirichlet's principle (differential equations), trigonometric series, orthogonal series, generalised concept of limit, functional analysis, theory of measure, probability theory, game theory, and starting in the last years he spent in Lviv, mathematical applications. He saw mathematics everywhere, starting with tessellation and chess, to sunflowers and laws of nature. This perspective on the world is expressed in his famous book *Mathematical Snapshots* (Ka-

lejdoskop matematyczny [F]), which was published in a dozen or so languages and is definitely the world's best known book on mathematics by a Polish author.

In a way, this book is very personal. A student of his wrote the following about him:

> […] when trying to understand and assess Steinhaus's mathematical style, one needs to read (or at least browse) *Mathematical Snaphots* (Kalejdoskop matematyczny) [...], which is intended for 'the scholar in a child and the child in a scholar' [...] it expresses, not always explicitly and sometimes even unconsciously, what mathematics is for Steinhaus and what it should be in his opinion. Mathematics is for him a mirror of reality, similarly to poetry, and Steinhaus liked to 'play' with numbers, sets and curves, just like a poet plays with words, phrases and sounds [C].

Steinhaus liked novelties, read much, and referred to the newest results in his works, often reinforcing or generalising them. Using Oswald's classification, it can be said that his academic output in the field of mathematics shows characteristics of a "butterfly". Like a butterfly, he moved from a discipline to a discipline, formulated new ideas (theorems, concepts, hypotheses), but did not participate in their further development. His doctoral dissertation basically dealt with differential equations, but it included noticeable portion that discussed set-theoretical methods, which were new then, and applications in geometry; Steinhaus did not return to differential equations later on. In his youth, he worked on trigonometric series, primarily as a tool for creating counter-intuitive examples (he constructed many of them himself), and he often made references to the newest publications by N.N. Łuzin, W. Sierpiński, et al. He early identified functional analysis as the promised land of mathematics, he made a significant contribution to it himself, and, jointly with Banach, made it the cornerstone of the Lviv School of Mathematics, but eventually lost interest in it some time afterwards. In the first decades of the 20th century, probability theory did not have sound mathematical basis, and therefore some scholars, e.g. Hilbert, contested it. A. Łomnicki and H. Steinhaus [29*] were the first to propose basing it on theory of measure, which is now standard due to work done by W. Feller. They always promoted this point of view, but did not continue the research in this regard. Steinhaus did not like Kolmogorov's axioms of 1933, and he later elaborated on a different perspective based on the concept of independent functions [J]. Many more of his "butterfly-like" actions can be cited here, e.g. study of game theory [32*, 198, 204, 232*, 248], axiom of determinacy [215*] (joint work with J. Mycielski), or numerous mathematical applications. A great illustration of his approach to mathematics is the aforementioned book *Mathematical Snapshots* (Kalejdoskop matematyczny [F]).

For Steinhaus, mathematics was present in the world he lived in. With such a perspective on the place of mathematics in the description of the world, probability theory and its derivative, mathematical statistics, were simply bound to appear among his interests. The former appeared early on, around 1920, in [29*], and though the latter. however, was hinted in Steinhaus's final years in Lviv, in the work on leukocyte dispersion [79], but was fully elaborated on during his time in Wrocław, when Steinhaus promoted statistical methods in mathematical applications. He published a dozen or so works on the

issue himself and taught it to many master's students and several doctoral students. For him, however, this was never "statistics itself" but "statistics as a cognitive method", as stated by the title of a conference he took part in. Steinhaus himself said the following at that conference: "as stars are more important than astronomy and roses than botany, so are applications of statistics more important than itself" ([G], p. 163).

Let us name some of the statistical issues he worked on (some of them were extensively discussed in article [K]).

One of such important problems found in statistics is the ignorance of what is called prior distribution. In the statistical quality control, where a random check of larger batches of goods is used to decide whether the batch should be allowed on the market or rejected, the issue takes the following form: having randomly selected (with replacement) a sample of n elements from the analysed batch, we have to determine the fraction of defective items throughout the batch. If this fraction is equal to p, the probability of finding k defective items in the sample of n elements is $(n_{k)}\, p^k\, (1 - p)^{n-k.}$ If we knew the prior distribution of defectiveness p, i.e. if for every a the probability that the defectiveness of the studied batch is $p<a$ was known before the random sampling, the quality controller could calculate, based on the Bayes principle, the posterior probability of defectiveness lower than a if k defective items were found in the sample. However, the prior distribution is usually unknown. In such a situation, the Bayes principle recommends calculating the posterior distribution of defectiveness p assuming that defectiveness p has a uniform distribution within the interval $0<p<1$. Nonetheless, there were people who fiercely criticised this point of view. In spite of the criticism, H. Steinhaus defended the Bayes principle [104*, 123*], and he returned to this topics in [219*] (English version of this work: [146]), [180*, 181] (both written jointly with S. Zubrzycki) and other publications. A similar debate on the applicability of the Bayes principle took place in the west and [219*] restated Steinhaus's arguments.

Publications defending the Bayes principle by Steinhaus and his co-workers (primarily J. Oderfeld and S. Zubrzycki), which included somewhere between ten and twenty papers published in "Colloquium Mathematicum" since 1948 and *"Applicationes Mathematicae"* („Zastosowania Matematyki") now titled since 1954, were related to and had impact on the work on the statistical control quality standards done by the Polish Committee for Standardisation. The most complete presentation of H. Steinhaus's point of view on the issue can be found in the overview article *Statistical quality control* (Statystyczna kontrola jakości, [G], pp. 166–178).

In O. Morgenstern and J. von Neumann's book *Theory of Games and Economic Behaviour* (Princeton, 1944), there appears the idea of treating statistical issues as a game between the statistician and nature. Steinhaus, who appreciated game theory and had original ideas in this field before the war, was endeared by this idea, which can be expressed as follows: for unknown parameter p, it is assumed that given is the loss function $L(p,p')$ expressing the loss sustained when p is the value of the parameter, and

the statistician accepts *p'* as its value. Estimator is the name of the function that assigns the approximate value of the estimated parameter to the results of the observation.

Steinhaus used this idea when addressing the issue of statistical quality control. In [124], he discussed the relation between the cost of the test and the achieved accuracy of estimation in a case where the value of the batch is the sum of the value of its elements. In [142], on the other hand, he compared various proposals related to the acceptance regulation in statistical quality control in terms of risk. The ideal that a statistician pursues in his game with nature is finding is the estimator (statistician's strategy) that ensures the lowest risk. Such estimators, however, are rare, and then game theory recommends using the minimax principle, i.e. looking for such an estimator for which the maximum risk would be possibly low for various values of the parameter. Starting with the lecture [170], Steinhaus initiated a number of publications on this topic, which included a publication by himself [176*] and his co-workers (S. Trybuła, S. Zubrzycki, et al.).

A problem that is present in natural sciences is classification and assignment of studied objects to particular groups, for example people in anthropology. Making reference to research done by Jan Czekanowski, H. Steinhaus and his colleagues (K. Florek, J. Łukaszewicz, J. Perkal, S. Zubrzycki) proposed another method for representing similarities using a tree graph connecting individuals with numerous characteristics, which they called *Wrocław taxonomy*. Using a defined method of measuring distances between individuals, the method shows how to find such shortest connected set of edges (i.e. a tree) connecting all the individuals [129*, 135]. It turned out that there had been attempts at finding such shortest trees earlier, but the Wrocław taxonomy found numerous original applications, for example studying star chains (S. Zubrzycki), human populations in regard to frequency of blood types (A. Kelus, J. Łukaszewicz), wheat cultivars (F. Szczotka), etc. Steinhaus also examined issues related to defining distances between individuals [188*, 195] (both works co-authored by F. Marczewski).

In various statistical surveys, there is a problem of determining the possibly most random sample. A tool that is very useful in this regard is a random number table, and H. Steinhaus enjoyed constructing them. In his attempts at coping with various disadvantages associated with sampling, he designed a table containing all the natural numbers from 0000 to 9999, with each number being included exactly once, created by mixing the numbers using a special and clearly defined algorithm. One, quite convoluted, algorithm of this type is described in paper [149], and it was used to construct a table of "shuffled" numbers [150]. Another algorithm, using the remainder from the division of the golden number $a=(\sqrt{5}-1)/2 = 0.618...$ by 1, was used to construct tables of "golden" and "iron" numbers [166*, 168] (the tables are cited in [E]).

The 1950s saw the popularity of a number lottery called "Liczyrzepka" where a participant had to select 5 numbers out of 90 arranged in a 9x10 rectangle. Therefore, 5 numbers were randomly drawn each week. Studying the numbers submitted by the players, Steinhaus and his collaborators (B. Gleichgewicht, J. Kucharczyk) noticed and examined various predilections, e.g. from selection of numbers at the centre of the rectangle

to selection of number separated by the distance a chess knight would move, etc. This combined psychology with random choice, which led to interesting conclusions (see [178, 202]).

Due to numerous appeals by single mothers to specific men for acknowledging paternity, H. Steinhaus started working on the issue of determining the probability of such paternity based on the study of the mother's, the child's and the presumed father's blood types. His work in this regard [145] (English version: [151*]) was believed to be the best Polish publication in the field of civil law for a long time, but Steinhaus also returned to the matter later on (see [184]; English version: [185]* and article *On establishing paternity* (O dochodzeniu ojcostwa) [G], pp. 179–191). The methods he proposed were used in Polish courts for a long period until they were replaced by methods based on DNA tests.

Having been recognised as an excellent statistician, Hugo Steinhaus was elected the president of the Commission of Anthropometry of the Polish Academy of Sciences, whose task was to carry out an anthropometric survey of the Polish population and design typical sizes for clothes. Steinhaus commented on this appointment in his usual humorous manner: "The Polish Academy of Sciences entrusted me with the Poles' style". However, his commission carried out its task so well (see [217]) that bespoke tailoring virtually disappeared later on, and the vast majority of the population could easily find clothes of appropriate sizes in shops.

Hugo Steinhaus's seminar on mathematical applications was often attended by medical researchers. Close cooperation with them led e.g. to a series of joint publications by H. Steinhaus and H. Kowarzyk and S. Szymaniec on the layout of chromosomes in human cells (see [234–238, 241]) and similar works (see [111], a joint publication with L. Fleck and H. Kowarzyk) and [242] (co-authored by O. Mioduszewska). This cooperation was described more extensively by J. Perkal [D].

Steinhaus's partiality for combining statistics with life is also shown in publications: [104*] on interpretation of statistical results in medicine, on basic issues in mathematical statistics – [170], and on the issue of estimation [176]*. He also wrote encyclopaedia entries on this topic, e.g. [240].

The presented Hugo Steinhaus's academic output in the field of statistics clearly demonstrates that in his opinion, this discipline was ancillary in nature. He was interested in it only when he needed it for the time being, yet he never was a mere passive user of the earlier methods, but he always modified them very originally to suit his needs. He had significant impact on statistics in Poland, both due to his attitude and the fact that he trained a large group of people for whom statistics became a lifelong passion and vocation, including several doctoral students of his and people who later became professors.

Hugo Steinhaus was very active in Poland's academic life. He was the president of the Lviv Branch of the Polish Mathematical Society and the Wrocław Branch of that so-

ciety in the 1937–1938 and 1946–1948 terms respectively, and also the vice-president of the society. He was a corresponding member of the Polish Academy of Learning (elected in 1945). He was also among the founders of the Wrocław Scientific Society, which was established in 1946, its secretary general until 1947, and its president in 1956–1958. He also took part in organising the State Mathematical Institute (established in 1947–1948, later transformed into the Institute of Mathematics of the Polish Academy of Sciences), was its vice-director until 1952, and later the head of the Department of Natural and Economic Applications. He was the chairman of the Commission of Anthropometry of the Polish Academy of Sciences. Since 1951, he was an ordinary member of the Warsaw Scientific Society, and since 1951, a full member of the Polish Academy of Sciences. He participated in the foundation of the Wrocław-based periodical "Colloquium Mathematicum" (published since 1947), in 1948, he re-established the previously Lviv-based "Studia Mathematica", and in 1953, he founded "Zastosowania Matematyki" in Wrocław (now titled "Applicationes Mathematicae"). He received many awards, e.g.: from the Polish Mathematical Society (the Stefan Banach Award – 1946, the Stefan Mazurkiewicz Award – 1951), the Award of the Polish Academy of Learning (1948), the First Degree State Award (1951), the City of Wrocław Award (1960), from the editorial team of "Problemy" (1960), the Alfred Jurzykowski Award. He was a honoris causa doctor of the universities of Warsaw, Poznań and Wrocław, and the Wrocław Medical Academy. He was awarded the Officer's Cross of the Order of Polonia Restituta, the Commander's Cross with Star (1957), Order of the Work Flag First Class (1959), etc.

He supervised many doctoral students (e.g.: S. Banach (1920), A. Rajchman (1921), J. Schauder (1923), M. Kac (1937), M. Warmus (1949), J. Perkal (1950), S. Zubrzycki (1954), J. Łukaszewicz (1957), S. Trybuła (1960)). Among the doctors he supervised, Warmus, Zubrzycki and Trybuła became first-rate statisticians.

He published over 250 works (including 84 before the war), some of which are included in Selected Papers [I] (see note 1) and in [G].

At the Wrocław University of Science and Technology, there is the Hugo Steinhaus Centre for Stochastic Methods (established in 1990). One of the awards of the Polish Mathematical Society is named after Steinhaus.

He was married to Stefania, née Smosz. They had a daughter, Lidia, who married Jan Kott.

Hugo Dyonizy Steinhaus died in Wrocław on 25th February 1972 and was buried in the Holy Family Cemetery. His gravestone reads: "Between spirit and matter, there is mathematics".

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ROMAN DUDA

Andrzej TOMASZEWICZ (1938–1991)

Andrzej Tomaszewicz was born in Bydgoszcz on 17th April 1938. He died in Łódź on 24th April 1991.

In 1950, he completed his primary education, and passed the Matura exam (secondary school matriculation) at the Technical Secondary School of Finance in Radom in 1953. He studied econometrics and statistics at the Faculty of Finance and Statistics of the Central School of Planning and Statistics in Warsaw in 1954–1957. He started studying mathematics at the University of Warsaw in 1960. He continued these studies at the Faculty of Mathematics, Physics and Chemistry of the University of Łódź in 1960–1965 and specialised in probability theory and mathematical statistics. In 1971, the Council of the Faculty of Economics and Sociology of the University of Łódź awarded him the degree of doctor of economic sciences based on his dissertation titled *Stochastic structure of consumption demand models* (Stochastyczna struktura modeli popytu konsumpcyjnego), written under the supervision of Professor Władysław Welfe. In academic year 1974–1975, he served a research and didactic apprenticeship at the University of North Carolina at Chapel Hill (USA) under Professor Norman Johnson. In 1985, the same Council of Faculty awarded him the title of doctoral depree (habilitation) of economic sciences in econometrics based on the thesis titled *Single-equation econometric models with non-classical assumptions* (Jednorównaniowe modele ekonometryczne przy nieklasycznych założeniach). In 1986, he became a docent (associate professor), and in 1990 an associate professor at the University of Łódź.

He started his work in academia at the Chair of Econometrics at the Faculty of Economics and Sociology of the University of Łódź in 1965, first as an apprentice assistant, and in 1966, as an assistant. In 1967–1971, he was a doctoral student and at the same time conducted classes. In 1971–1986, he was an assistant professor at the Institute of Econometrics and Statistics of the University of Łódź, where he established the Numer-

ical Calculations Laboratory, which he managed from 1978 to 1990. He was the founder and, since 1990, the head of the Department of Operations Research at that institute, co-organiser of the economic cybernetics and computer science programme, initiator of the introduction of computers to the didactics of courses on quantitative methods at the Faculty of Economics and Sociology of the University of Łódź.

He organised and personally carried out much of the work related to computer programming – from the GIER and ODRA computers to microcomputers. He wrote over 200 computer programmes and routines, including a system for scheduling classes for the Faculty of Economics and Sociology of the University of Łódź.

He supervised 25 master's students and 3 doctoral students to completion.

Apart from his work in higher education, he was also an economist at the Thermionic Valve Production Plant in Warsaw in 1957–1960.

He was a member of the Committee for Statistics and Econometrics of the Polish Academy of Sciences (1987–1991), member of the Polish Statistical Association, the president of the Łódź Branch of that association in 1988–1990, a member of the editorial college and editor of a column in "Statistical Review" (Przegląd Statystyczny) since 1980, member of the Łódź Scientific Society, and the Bernoulli Society of Mathematical Statistics and Probability.

Andrzej Tomaszewicz's research primarily dealt with econometric methods determining correlations between economic and social phenomena. They are described using an equation or a system of equations.

Apart from the formal description of the studied relations between socio-economic phenomena, an econometric model includes a number of assumptions about the relations between the parameters of such relations and empirical data available to the researcher. These are assumptions about the stochastic structure of the model.

These assumption usually concern the structural characteristics of the model and are related to their estimation or tests of statistical hypotheses concerning their values. Estimation of structural parameters or tests of relevant hypotheses can be the ultimate goal of an econometric study or a stage whose results are to be used to predict or simulate the studied phenomena.

The conclusions depend on the adopted econometric inference procedure. The choice of optimum inference procedure was one of the key problems in the methodology of econometric research that Andrzej Tomaszewicz worked on. Optimality of the procedure based on a selected optimality criterion (it is usually the efficiency of the estimator or the statistical power of the test) depends on the assumptions. A specific procedure, however, can turn out to be highly suboptimal (inefficient) if one of the assumptions is not satisfied. When selecting a procedure, one needs to secure the possibility of ef-

ficient inference in such a case as well. The extreme importance of the verification of assumptions, which should be seen as an integral part of econometric inference, was emphasised by Andrzej Tomaszewicz in his monograph *Single-equation econometric models* (Jednorównaniowe modele ekonometryczne, 1985).

An econometric model can be written as a set of equations $y_t = f_t(x_{t1}, x_{t1}, ..., \varepsilon_t)$ $t=1,2,..., n$ that relates the value of observed variable y_t to values k of explanatory variables x_{tj} and a random element ε_t. According to the well-established tradition, values $x_{tj,}\, y_{t,}\, \varepsilon_t$ are treated as elements of matrix X, y, ε.

Andrzej Tomaszewicz formulated 10 assumptions concerning the econometric model: stability, linearity, $x_{tj,}$ are not random, rank of matrix of elements $x_{tj,}$ is less than n, the expected value of random component is zero, no autocorrelation, no homoscedasticity, random vector ε has an n-dimensional normal distribution, information from the sample are the only data used for estimation f_t matrix S is nonsingular.

He provided many proposition related to the verifications of these assumptions.

Statistics of econometric tests are usually functions of the empirical residual vector e=y–Xa, where a is estimator α obtained using the classical least squares method $\alpha=(X^TX)^{-1}X^Ty$.

Most of the known statistics of econometric tests were constructed on the basis of analogy with the most popular tests of hypothesis that the sample $z_1, z_2, \ldots, z_n$ is an unclustered sample, i.e. the values are independent and have the same distribution.

If the alternative hypothesis allows for dependence, it is usually assumed that distributions of variables are identical. And the other way round, when testing the hypothesis about the uniformity of distributions, it is assumed that they are independent. This kind of analogy is impossible for an econometric model without allowing for some error. It is known that when the classical assumptions are satisfied, elements of vector $e_1, e_2, \ldots, e_n$ are not independent and do not have the same distribution.

As regards the construction of econometric tests, Andrzej Tomaszewicz presented three approaches:

1.º As the sample grows both the dependence between rests e_t decrease and the differences in the variances of their distribution diminish, so for a sufficiently large n, the error resulting from the fact that e_t are dependent and heteroscedastic is arbitrarily low. This justifies the use of statistics analogous with those for unclustered samples. The authors proposing such tests usually restrict themselves to the proof of the asymptotic equivalence of both statistics and forgo the assessment of error for small samples.

2.º Transformation of residuals $e_1, e_2, \ldots, e_n$ into orthogonal residuals.

3.º The author of the test tries to determine or at least estimate the distribution of the statistic of the test. For classical t- or F-tests,. the distribution boils down to a known distribution.

Andrzej Tomaszewicz extensively analysed the choice of econometric tests. Where the distribution is known, tables are sufficient for practical purposes, though it is often more convenient (particularly in computer calculations) to use approximation formulas. If the exact distribution is not tabulated (or the algorithm is not available), it is worth knowing at least the approximate error using a "substitute" distribution.

Tests based on nonparametric statistics are among the simplest methods for verifying the classical assumptions. The advantages of nonparametric statistics include their independence from the distribution of variables that form the basis for their calculation. This statement, however, is true only for the unclustered sample, possibly also for orthogonal residuals. Of course, a statistic based on residual et in general does not satisfy this property. Independence of a statistic from the distribution of a variable makes it unaffected by outliers and distributions with a long tail.

In his research, Adam Tomaszewicz strived for showing applications of the methods he examined.

Econometric research, usually based on a small sample, usually involves the choice of a single parameter class of hypotheses including hypothesis H_o from many possible alternative hypotheses.

For autocorrelation tests, it is an autoregressive model of the first order for random elements.

There are certain classes of single parameter heteroscedasticity models or heteroscedasticity tests.

For linearity tests, the problem is more complex because non-linearity can take various forms. What seems to be the simplest alternative to the linear model is the parabolic (square) model. Tests of model parameter stability are related to the form of generalisation onto a model with unstable parameters. In most cases, alternative hypotheses define discrete or continuous changes to parameters.

It is most difficult to choose hypotheses that are alternative to the normality of the distribution of the random element. They can describe special cases of asymmetric distributions (e.g. the log-normal distribution) or general cases – Fisher's distributions. The most popular ones, however, are the alternative distributions showing the possibility of outliers – heavy-tailed distributions and mixed distributions.

Satisfaction of additional conditions is rarely verified in practical studies. In this case, alternative hypotheses are well defined.

The Professor's most important achievements include:

– methods for determining distributions of nonparametric statistics,
– simulation methods for determining critical values of econometric tests,
– methods for assessing power and efficiency of econometric tests.

Andrzej Tomaszewicz worked on the application of inventory theory and obtained interesting results related to inventory optimisation under uncertainty.

In the academic circles, Professor A. Tomaszewicz was also an expert consultant on methodology of empirical studies, and a benevolent adviser on dissertations aimed at earning an academic degree or title. It would be very difficult to count all the people, not only economists, but also sociologists, naturalists, and physicians, consulted him about research programmes or experimental results.

Since the beginning of his work at the University of Łódź, Andrzej Tomaszewicz continuously gave classes for students. He was one of the co-founders and pillars of the Economic Cybernetics and Computer Science programme. He conducted diverse courses that required specialist knowledge, but were constantly varied. They included lectures on linear algebra, theoretical econometrics, theory of forecast, numerical methods, and finally microcomputers and their applications. These classes attracted particular interest among students. He was the initiator of the introduction of computers to the courses on quantitative methods. He took part in the preparation of academic scripts and monographs intended for use as textbooks (e.g. *Econometric methods, Metody ekonometryczne,* PWE 1977).

Throughout his career, he was a tireless organiser of research, particularly under large-scale programmes. The respect for his position in academia was shown by the fact that he was the scientific secretary in ministerial programmes for three terms and then in the Central Programme of Basic Research (10/09) promoting the development of econometric research. His service in this capacity was highly beneficial for inclusion of econometric modelling and forecasting into the academic interest in all the important centres of research in Poland and maintenance of high academic level of work under the programme. He also conducted the "microcomputer revolution" under the programme, which resulted in the radical modernisation of research methods, both theoretical (computer simulation) and empirical ones.

He received many awards for his research activities (e.g. Award of the Ministry of National Education, Award of the President of Statistics Poland, Award of the Rector of the University of Łódź). He was awarded the Gold Badge of the University of Łódź (1986), the "University of Łódź for Society and Science" medal (1987), and the Golden Cross of Merit (1990).

He authored or co-authored over 150 academic publications, including about 70 monographs, articles, and conference papers. He took an active part in the international

academic life by publishing numerous works in English and Russian. He systematically participated in Polish and international conferences.

Selected publications by Andrzej Tomaszewicz:

Regression analysis on the digital machine GIER (Analiza regresji na maszynie cyfrowej GIER ZNUŁ, Series III, 1968, issue 19), *Econometric methods for estimating the income elasticity of demand based on surveys of household budgets* (Ekonometryczne metody szacowania elastyczności popytu względem dochodu na podstawie badań budżetów gospodarstw domowych) "Statistics Poland Methodological Handbook" 1972, No. 29), *Inverse moments of a random variable with a truncated normal distribution* (Momenty odwrotności zmiennej losowej o uciętym rozkładzie normalnym ("Statistical Review, 1974, No. 21), *Numerical Evaluation of the Officiency Efficiency of Estimation Methods for the Models with Autocorrelation* ("Working Papers of the Institute of Econometrics and Statistics of the University of Łódź, Series D, issue 8, 1975), *About the Yates correction for small samples* (O poprawce Yatesa dla małych prób "Statistical Review" 1977, nr No. 24), co-author of *Econometric market models. Estimation – Forecasting –Simulations* (Vol. 1, 1977, Vol. 2, 1978), (Ekonometryczne modele rynku. Estymacja – Prognozy – Symulacje) co-author of the academic script *Inter-industry input-output flows, elements of the theory* (Przepływy międzygałęziowe, elementy teorii, 1979), *Single-equation econometric models with non-classical assumptions* (Jednorównaniowe modele ekonometryczne przy nieklasycznych założeniach 1985), *Econometric Tests* (Testy ekonometryczne 1993).

CZESŁAW DOMAŃSKI

Stanisław Marcin ULAM (1909–1984)

The year 2009 was the centenary of the birth, and the 25th anniversary of the death, of the outstanding Polish mathematician Stanisław Marcin Ulam. I will try to present you with a brief portrait of this extraordinary scientist.

Stanisław Marcin Ulam was born on 13 April 1909 in Lviv, and gained his education in that city. His father, Józef Ulam, was a lawyer, and his mother Anna (nee Auerbach) was the daughter of an industrialist. It was a wealthy, Polonized Jewish family which had arrived from Venice three generations earlier. After the outbreak of the First World War the Ulams moved to Vienna. During the war Ulam's father was a staff officer in the Austrian army, which meant that his family was freąuently on the move. For a time they lived in Ostrava, where Stanisław went to school. After that he had only private teachers – the family was travelling too much for him to attend school regularly. In 1918 the Ulams returned to Lviv, and in 1919, at the age of 10, Stanisław passed the entrance exam to the city's 7th *Gimnazjum* – a secondary school which pupils would attend for eight years. In 1927 he passed his school-leaving exams, and in autumn of that year began studying at the General Faculty of Lviv Polytechnic, where he studied in the mathematical group. At set theory lectures he met the young Professor Kazimierz Kuratowski, recently arrived from Warsaw, a former student of Sierpiński, Mazurkiewicz and Janiszewski. From the start Ulam participated more actively than his colleagues in the discussions led by Kuratowski. Kuratowski quickly came to regard him as one of the best students, and often talked with him after lectures. In this way, thanks to Kuratowski's encouragement, Ulam's mathematical career began. Between lectures he would usually sit in the room of one of the mathematics lecturers. It was in one of these rooms that he first met Stanisław Mazur, a young doctoral student at the university, who had come there to work with Orlicz, Nikliborc and Kaczmarz, who were a few years older than he. Through his conversations with Mazur, Ulam began to learn about the problems of functional analysis, which was being developed by Banach. At the start of

the second semester of his studies, Kuratowski told Ulam about a certain problem in set theory relating to transformations of sets. Ulam succeeded in solving this problem, and his paper appeared in *Fundamenta Mathematicae*, a leading Polish mathematical journal edited by Kuratowski, in 1929. By the end of his first year of studies Ulam had written his second paper, again published in *Fundamenta Mathematicae*. In a very long paper which appeared one year later, Alfred Tarski obtained the same result. When Kuratowski pointed out to him that it followed from Ulam's theorem, Tarski mentioned the fact in a footnote. This event was described by Ulam (1976, p. 30) as follows: „In view of my youth, this seemed to me a little victory – an acknowledgment of my mathematical presence."

In 1932 he was asked to present a paper at an international mathematical congress in Zurich. After the congress ended he paid a short visit to Montreux with Kuratowski and Knaster, and then he returned to Poland to pass some remaining exams and write his master's thesis. Ulam (1976, p. 46) recalls: „I had an almost pathological aversion to examinations. For over two years I had neglected to take the examinations which were usually necessary to progress from one year to the next. My professors had been tolerant, knowing that I was writing original papers. Finally, I had to take them – all at once."

The last academic year of Ulam's regular four-year course was that of 1930/31, but he passed his last four course exams only in November and December of 1932. In order to obtain a degree it was necessary, as well as passing the reąuired course exams, to present a thesis and to pass a written and oral finał exam. Ulam's application to the Degree Examinations Committee at the General Faculty of the Polytechnic was accompanied by a list of 12 of his papers, nine of which had already appeared in print. Ulam's master's thesis was titled „On the Theory of Combinatorial Products". His supervisor, Professor Kazimierz Kuratowski, assessed it thus: „The work is a study of the ‚product' operation, which has been little researched until now, but is playing an increasingly important role in mathematics. The author analyses this concept in relation to problems in set theory, group theory, topology, metric space geometry, combinatorics and measure theory in connection with probability. Since the author has demonstrated complete mastery of the subject and due knowledge of the relevant literature, that moreover the work contains a number of original results, and finally that the author presents many interesting problems in this work, I consider this thesis to be perfect "(In the original the word excellent" was underlined). On the subject of his master's thesis Ulam (1976, p. 46) recalls: „I wrote my Master's thesis on a subject which I thought up myself. I worked for a week on the thesis, then wrote it up in one night, from about ten in the evening until four in the morning, on my father's long sheets of legal papers. I still have the original manuscript. (It is unpublished to this day). The paper contains general ideas on the operations of products of sets, and some of it outlines what is now called Category Theory. It also contains some individual results treating very abstractly the idea of a general theory of many variables in diverse parts of mathematics. All this was in the fall of 1932 upon my return from Zurich ."

Ulam passed his final oral exam on 15 December 1932, gaining the highest grade, in front of a committee consisting of Włodzimierz Stożek (chairing), Antoni Łomnicki and Kazimierz Kuratowski. Consequently the Council of the General Faculty of Lviv Polytechnic awarded him a master's degree.

In 1933 Ulam defended his doctoral thesis, titled "*On the Theory of Measure in General Set Theory",* („O teorii miary w ogólnej teorii mnogości") which was published by Ossolineum of Lwów in the same year. In this work the author combined several of his earlier papers, theorems and generalizations in measure theory. The most important results in the thesis had already been published by Ulam in *Fundamenta Mathematicae* in 1930. This was the first doctorate awarded by the new General Faculty created at Lviv Polytechnic in 1927 – it was the only faculty in which master's and doctor's degrees were awarded (the others gave engineering qualifications).

The circumstances in which Ulam's doctoral thesis came into being are recalled by Kazimierz Kuratowski (1981, p. 95): „Returning to the portrait of Ulam as a scientist, it may be worth recalling his doctoral thesis, which was a typical product of the atmosphere holding sway in the Lviv mathematical community. As I remember, it was sometime in 1928/29 during one of my numerous conversations with Banach at the Scottish Cafe that we took an interest in the ‚measure problem' which had been posed by Hausdorff many years earlier, and then remained unsolved. During a conversation lasting several hours we tried different ways of attacking the problem, but without effect. I returned home around midnight. However I could not sleep until (to my great joy) I found a solution. The next day I met Banach and said „You know what, Stefek, I've solved Hausdorffs problem.', So have I,' Banach replied. What's more, it turned out that Banach's method of reasoning and mine were almost identical: it was essentially a continuation of our discussion at the cafe. Naturally we decided to publish our result in the form of a joint paper (in *Fundamenta*). In that paper we posed a certain problem which had not been solved (and which in fact we had not tried to solve). I told Ulam about it. After some time Ulam came to me with a ready solution. For me, naturally, this was a great satisfaction, and since I considered the result to be of great value, I encouraged Ulam to base his doctoral thesis on it. As it turned out, Ulam's doctoral thesis aroused great interest in the academic world, remaining relevant even today, while for my part I had acquire ‚my' first doctor." In the same memoirs, on page 93, Kuratowski writes: „Stanisław Ulam is the most outstanding of my students. I could speak of him as Steinhaus did of Banach: Ulam is my great scientific discovery."

Mathematics embraced the whole of Ulam's life. Stanisław Mazur, Kazimierz Kuratowski and Stefan Banach introduced him to the secrets of mathematical thinking and the process of discovery. Ulam recalls the long hours they spent together at the Scottish Cafe in Lwów, over a sheet of paper with a single symbol or function on it. They would pore over it and exchange thoughts and suggestions. For them it was a crystal bali, making it easier to concentrate on some problem. These meetings came at Banach's initiative. Ulam was the youngest of those present. While still a student, he and his friend Józef Schreier attained the honor of being admitted there among

the mathematical geniuses. Professor Andrzej Alexiewicz has said that being invited to the Scottish Cafe was considered like being dubbed a knight. Banach regarded some of Ulam's approaches to mathematical problems and proofs as strange, but admitted that they led to correct results. This was a great compliment to Ulam – he considered Banach (rightly) as a real born genius with a subconscious ability to discover „hidden paths". Hugo Steinhaus (1961, p. 257) describes the atmosphere at the Scottish Cafe thus: „Banach, Mazur and Ulam made up the most important table at the Scottish Cafe in Lviv. There was even a session that lasted 17 hours – it resulted in a proof of a certain important theorem in Banach spaces, but no-one wrote it down, and today no-one is able to recreate it. Probably the tabletop covered in the chemical traces of the pencil was wiped clean after that session, as always, by the cafe's cleaning woman. Thus a great service was done by Banach's wife Łucja – now at rest in a cemetery in Wrocław - when she bought a thick notebook in hard covers and entrusted it to the barman of the Scottish Cafe. There problems were written down, on the first side of each sheet, so that any answers could at some time be entered on the blank sides next to the text of the questions. The original ‚Scottish Book' was available to any mathematician at the cafe who demanded it; some problems were announced there with the promise of a prize for a solution – prizes ranged from a small black coffee to a live goose."

The notebook bought by Łucja Banach quickly became known as the Scottish Book, and throughout its several years of existence played a great part in the life of Lviv's mathematicians. The first problem was entered in the Book by Stefan Banach with the date 17 July 1935, and the last by Hugo Steinhaus on 31 May 1941. In total 198 problems were written in the book. The record-holder in terms of the number of problems entered was Stanisław Ulam, who wrote 40 himself and 22 jointly with others, including with Stefan Banach (5), Józef Schrereier (6) and Stanisław Mazur (7).

After the war and after her husband's death, Łucja Banach brought the Book to Wrocław, where Professor Hugo Steinhaus copied it out by hand (exactly word for word) and in 1956 sent the copy to Stanisław Ulam at Los Alamos. Ulam translated it into English, and then made 300 copies (at his own cost) which he sent to friends and to various universities in different countries. The Book became famous, and many mathematicians asked Ulam for additional copies. There were so many such requests year after year that it was decided at Los Alamos that a new edition would be produced (with various corrections included), no longer at Ulam's own cost, which happened in 1977. In May 1979 at North Texas State University "Scottish Book Conference" took place (attended by Ulam, Kac and Zygmund among others), after which, with updated information on solutions to the problems and on related problems, the Book (supplemented with several papers from the conference, reminiscences in particular) was published in 1981 by Birkhauser (edited by R. Daniel Mauldin).

Today the original Scottish Cafe Book is in the possession of Banach's family. There is a copy of the original in the library of the PAN (Polish Academy of Sciences) Institute of Mathematics in Warsaw.

In 1934, not having much chance of finding teaching work, he travelled (at his father's cost) to Vienna, Zurich, Paris and Cambridge, in order to attend and give mathematical lectures. Ulam recalled that these journeys were an attempt to make an impression in the world with his mathematical results – and not without reason. The situation in Europe had changed dramatically since Hitler's coming to power, and augured the worst, particularly for Jews. In Poland, through mild analogy, aggressive anti-semitism appeared. Ulam's uncle, Michał Ulam, encouraged him to take up a career abroad. At the end of 1934 Ulam began corresponding with John von Neumann, a very young professor at the Institute for Advanced Studies in Princeton. Ulam wrote to him about several problems in measure theory. In reply, he invited Ulam to come to Princeton for a few months. In autumn 1935 Elam met Neumann in person in Warsaw. Von Neumann, returning from a topology conference in Moscow, stayed in Warsaw for several days and gave a lecture at the Warsaw Polish Mathematical Society. In December 1935 Ulam left the French port of Le Havre, aboard the English ship *Aquitania*, on his first voyage to New York. At Princeton Ulam got to know (among others) Bochner, Birkhoff and Weyl. However the greatest authority and model for most scientists was Albert Einstein. Ulam (1976, p. 72) recalls the following event: „A cousin of mine, Andrzej Ulam , a banker, came to New York on business about two months after my arrival, and I invited him to visit me in Princeton. It happened that during that week I was giving a talk in some seminar, and my name was listed on the same page of the Institute's Bulletin as the announcement of Einstein's regular weekly seminar. This impressed him enormously; he mentioned it in a letter home, and my reputation among friends and family in Poland was made."

In view of the worsening situation in Europe and the increasing threat to Poland, and as a Jew, Ulam sought means by which he could remain in the United States. With the support of George David Birkhoff, Ulam obtained a nomination to the post of junior fellow at Harvard, for three years starting in autumn 1936. The conditions were extremely attractive: $1500 a year plus board and lodging, as well as travel allowances. In those days it seemed a lavish offer. He began working with John Oxtoby, leading to a joint publication on statistical mechanics in 1941, which Ulam later regarded as one of the most important in his mathematical career. He lectured at Harvard and at Brown University in Providence, Rhode Island. Between 1936 and 1939, he always spend the three summer months in Poland with his family. In 1937, together with Banach, he played host to von Neumann in Lviv. Next year Ulam made a return visit to von Neumann in Budapest. In 1938 Ulam's mother died of cancer, and he himself obtained an American immigrants visa from the US consulate in Warsaw. A few months later this would have been virtually impossible.

In August 1939, his father Józef and uncle Szymon took Ulam and his 17 year-old brother Adam to the passenger quay at Gdynia. The Ulam brothers sailed aboard the *Batory* to America. Adam, 13 years Stanisław's junior, whom the latter helped during many years at Brown University, later became a well- known historian, author of one of the first books about Stalin in the West, and director of the Centre for Russian Studies at Harvard University. They would never see their family again. Ulam's entire family, including his sister Stefania (but apart from two cousins), died during the war.

In 1939 Ulam's three-year contract with the Society of Fellows expired, and it could not be renewed because he was over the age limit. Thanks to Birkhoff, then the guru of American mathematics, he obtained permission to remain at Harvard for a year as a lecturer in the Mathematics Faculty. After that, in 1940, he gained the post of lecturer at Wisconsin State University in Madison. There he became friends with Cornelius Everett, with whom he wrote many joint papers on group theory and projection algebras.

In 1941 Ulam acquired American citizenship and tried to join the air force as a volunteer, but his application was rejected due to his poor vision. At Madison in 1942 he married the French student Françoise Aron, whom he had met at Cambridge, Massachusetts. In 1944 their only daughter, Claire, was born. When Claire was asked by her friends why her father didn't play ball with her, she answered „My daddy just thinks, thinks and thinks! Nothing else, just thinks." Thinking was Ulam's principal activity. In late spring 1943 he wrote to von Neumann to ask about the possibility of doing work for the army. The whole world was engrossed in war, and Ulam wanted to make his contribution to the war effort. In early autumn 1943 he received a reply, proposing a meeting at Union Station in Chicago during von Neumann's journey westward from Princeton. At the meeting, Von Neumann informed him of the existence of an important secret military project. Shortly afterwards Ulam received an official invitation from Los Alamos, which is about 40 miles north-east of Santa Fe in New Mexico, to join an unspecified military project. It was signed by the renowned physicist Hans Bethe (who would soon become the joint discoverer of the Bethe-Feynman formuła, fundamental for calculations on yield of fission reactions). Stanisław Ulam and his pregnant wife found themselves at a secret laboratory in Los Alamos, where he was assigned to Edward Teller's group, working on a project to create a „superbomb". This was the first attempt to construct a hydrogen (thermonuclear) bomb. Apart from Teller's small group, all the scientists at Los Alamos were working on the atomie bomb project, using the energy released by the fission of uranium or plutonium nuclei. Work on this project involved many leading scientists: John von Neumann, Enrico Fermi, Hans Bethe, Niels Bohr, Richard Feynman, Edward Teller, Robert Oppenheimer, Otto Frisch, Victor Weisskopf, Emilio Segre. The intellectual potential of this group was astounding. In the entire history of science there is nothing that comes even close to such a concentration of great minds. It was Ulam's first encounter with practical problems of physics, directly relating to experimental data. A friend of Ulam's, Otto Frisch, in an article for the Bulletin of the Atomic Scientists, described his first impressions of Los Alamos, from which he had arrived from besieged Great Britain (quoted from Ulam (1976), p. 6), as follows: „I also met Stan Ulam early on, a brilliant Polish topologist with a charming French wife. At once he told me that he was a pure mathematician who had sunk so Iow that his latest paper actually contained numbers with decimal points!". The first task which Teller gave Ulam on his arrival involved investigating the exchange of energy between free electrons and radiation in the extremely hot gas which was expected to form during a thermonuclear bomb explosion. Ironically, it was this first problem given to Ulam in 1943 which would later be the main subject of his joint work with Cornelius Everett which proved Teller's version of the „superbomb" project to be impossible to realize.

Ulam's contribution to the work on construction of the atomic bomb involved performing statistical investigations on neutron branching and breeding. This process maintains the chain reaction and leads to the release of energy from uranium or plutonium. More precisely, in 1944 Ulam and David Hawkins were interested in the pure model problem of the „genealogical tree" of a neutron, which may produce zero (is absorbed and ends its life), one (simply continues to exist) or two, three or four neutrons (meaning that new ones appear), each of these events having a defined probability. The task is to track the evolution of the system and the chain of possible events through many generations. Ulam and Hawkins quickly found a method which helped in the mathematical analysis of such branched chains. Laplace's characteristic functions, which were used in investigations of the distributions of sums of independent random variables, proved to be an ideal tool for investigation of multiplicative processes, later called branch processes. A theory of such processes was described by Ulam and Hawkins in the Laboratory's 1944 report. They achieved this earlier than Andrey Kolmogorov and other Russians.

A long discussion between Ulam and von Neumann at the beginning of 1944 revealed the need for a more accurate method – rather than the approximate method proposed by von Neumann – for calculating the hydrodynamic course of the implosion needed for ignition of a nuclear bomb. It was necessary to use „brute force" – mass numerical computations – which was impossible using the existing mechanical calculating devices. It was the need for these precise computations that began the development of electronic computers (initially based on vacuum tubes). These came into being as a result of a combination of scientific and technological advances, by way of analogy with the operations performed by the brain. In 1952 the MANIAC arrived at Los Alamos – the second model, after Princeton's, of the first reprogrammable computer. The idea of programming was invented by John von Neumann, deriving it from mathematical logic.

On 16 July 1945 the first atomic bomb test was carried out. Then came Hiroshima and the victory over Japan. The war ended, and the world re-emerged from the ashes. Many members of the team left Los Alamos to return to their universities or take up new academic posts.

In autumn 1945 the Ulams moved to Los Angeles, where Ulam became a professor at the University of Southern California. In January 1946 he became seriously ill with encephalitis, which he survived thanks to his skull being opened and his brain sprayed with penicillin. These were the early days of penicillin, which was used then without restriction. Ulam's first publication following his illness was an article dedicated to the memory of Stefan Banach, who had died of lung cancer in Lviv on 31 August 1945, aged just 53. The article appeared in the Bulletin of the American Mathematical Society, issue 52 (1946), pp. 600–603.

In mid 1946 Ulam returned to the Los Alamos National Laboratory. At a seminar shortly after his return he gave two lectures containing good, productive ideas. Further devel-

opment of these concepts led to many successes. One of them related to what would come to be called the Monte Carlo method, and the second concerned certain new methods of calculation in hydrodynamics. Both lectures provided a foundation for very concrete applications of probability theory and continuum mechanics. Ulam (1976, pp.196–199) said the following of the Monte Carlo method: „The idea for what was later called the Monte Carlo method occurred to me when I was playing solitaire during my illness. I noticed that it may be much more practical to get an idea of the probability of the successful outcome of a solitaire game (like Canfield or some other where the skill of the player is not important) by laying down the cards, or experimenting with the process and merely noticing what proportion comes out successfully, rather than to try to compute all the combinatorial possibilities which are an exponentially increasing number so great that, except in very elementary cases, there is no way to estimate it. This is intellectually surprising, and if not exactly humiliating, it gives one a feeling of modesty about the limits of rational or traditional thinking. In a sufficiently complicated problem, actual sampling is better than an examination of all the chains of possibilities.(...) The Monte Carlo method came into concrete form with its attendant rudiments of a theory after I proposed the possibilities of such probabilistic schemes to Johnny in 1946 during one of our conversations. It was an especially long discussion in a government car while we were driving from Los Alamos to Lamy.(...) After this conversation we developed together the mathematics of the method. It seems to me that the name Monte Carlo contributed very much to the popularization of this procedure. It was named Monte Carlo because of the element of chance, the production of random numbers with which to play the suitable games."

However, Ulam's most noteworthy accomplishment at Los Alamos was his contribution to post-war work on the hydrogen bomb. First he and Everett showed that Teller's idea for the construction of a hydrogen bomb was impossible to realize, and then in February 1951 Ulam proposed a new method, using the propagation of the mechanical shock wave caused by the atomic explosion to bring about strong compression of the thermonuclear fuel, eventually causing a massive explosion. When Ulam told Teller about his idea for using an atomic bomb to compress deuterium just before ignition, Teller immediately appreciated its value. However he suggested that, instead of using the mechanical shock wave as proposed by Ulam, implosion could be achieved in a better way: by a so-called radiation implosion. The plan for the new hydrogen bomb, called the „Teller-Ulam design", was quickly accepted by Los Alamos scientists and government officials. From that time on all thermonuclear bombs would use a mechanism based on the use of an atomic explosion to trigger a secondary thermonuclear explosion caused by implosion.

On 1 November 1952 the new weapon was tested for the first time. It made fission nuclear weapons look like pistol shots in comparison with a cannon salvo.

After completing theoretical work on the hydrogen bomb, Ulam considered his task complete, and decided to change his surroundings for a time. He took a sabbatical, and spent the winter semester of 1951/52 at Harvard. He was given another sabbatical in

1956/57, and became a visiting professor at the Massachusetts Institute of Technology. On returning to Los Alamos he took up the post of scientific adviser to the director of the Laboratory. In 1965 Ulam began to make regular visits to the dynamically developing University of Colorado in Boulder. In 1967 he retired from Los Alamos, staying on as consultant to the Laboratory for one dollar a year. In the same year he moved permanently to Boulder, where he became professor and dean in the faculty of mathematics. In 1968-1975 he was also professor of biomathematics at Colorado Medical School. In 1975 Ulam retired from the University of Colorado and returned to Santa Fe, close to Los Alamos. He continued to work there, using the Laboratory's computers and library. He lectured for several months at Harvard and at the Massachusetts Institute of Technology, and also visited Paris, as well as the University of California campuses in San Diego and Davis. Moreover, each year from 1974 to 1984 he spent two months at the University of Florida in Gainesville.

Stanisław Ulam was a member of the National Academy of Sciences in Washington, the American Academy of Arts and Sciences, the American Philosophical Society, the American Mathematical Society, the Polish Mathematical Society and several others societies. He was a member of the board of the Jurzykowski Foundation in New York. He was given honorary doctorates by universities in New Mexico, Wisconsin and Pittsburgh. He received the Polish mathematical August Medal. In 1973 he briefly visited Warsaw to lecture at the Banach Centre. From 1950 onwards the Ulams spent their nual vacations in France, where his brother-in-law lived.

Stanisław Ulam died suddenly from a heart attack on 13 May 1984 in Santa Fe, after returning from England, where he had been visiting the Polish mathematician Zbigniew Łomnicki. Françoise Ulam had her husband's ashes buried at Montmartre Cemetery in Paris.

Stanisław Ulam was a man gifted with an exceptionally fertile imagination and creativity, an almost visionary talent. He wrote more than 150 papers and three books. His work led to the emergence of many new areas of academic research.

Ulam provided a superb description of himself in the widely-read book *Adventures of a Mathematician*. I have a copy of this book with the following author's dedication: „To Mirosław Krzyśko with best wishes. Stanisław Ulam. Gainesville, 3, XII, 1980."

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MIROSŁAW KRZYŚKO

Egon VIELROSE (1907–1984)

Egon Vielrose was born in Dąbrowa Górnicza on 30th December 1907 to a family of a mining engineer. After graduating from a gymnasium in his home town in 1925, he spent the period of 1925–1930 studying mathematics at the University of Warsaw and then the Higher School of Commerce and choosing insurance as his specialisation. He earned the professional diploma at that institution in 1933 for his thesis *The financial system of social insurance in Poland* (System finansowy ubezpieczenia społecznego w Polsce), written under the supervision of Prof. Władysław Strzelecki; in 1939, it was recognised that the level of that work fully justifies the award of master's degree in economics and commerce to its author. As early as in 1940, he earned the degree of doctor of economic sciences based on the work *Prognosis of developmental series* (Prognoza szeregów rozwojowych) (unpublished), supervised by Prof. Zygmunt Limanowski. Egon Vielrose received a postdoctoral (habilitation) degree at the University of Warsaw in 1960 based on the earlier publication *Sketch of potential demography* (Zarys demografii potencjalnej)[1]. He was a member of Polish student fraternity Chrobatia.

He started his career as an insurance technician at the Vita Insurance Company in 1934. His subsequent employments included: clerk at the Department of Studies at the Main Office of the Labour Fund in Warsaw in 1934–1938, accountant at the Pakulski brothers' Wanda factory in Warsaw in 1934–1944. He stopped working when the war broke out. He spent some time in Pława, near Radomsko, and earned his living by giving private lessons. In 1946–1951, he worked as a senior consultant on statistics at the Ministry of Finance. In 1951–1961, he was an editor at the National Scientific Publishers (PWN). In 1962, he started working at the Institute of Labour in Warsaw, first as a consultant, then as the head of the Department of Living Conditions.

[1] *Zarys demografii potencjalnej*. Warszawa 1958.

He started his career in higher education at the Warsaw School of Economics in 1935, where he was an assistant at the Chair of Statistics until 1939. In 1940, he earned the degree of doctor of economic sciences based on the dissertation titled *Prognosis of developmental series* (Prognoza szeregów rozwojowych). In 1945–1949, he lectured on statistics at the Warsaw School of Economics, and in academic year 1945/1946, at the University of Łódź. In 1959, he started working at the University of Warsaw as an assistant professor at the Chair of Statistics and then as a docent (associate professor). In 1960, he received a postdoctoral (habilitation) degree at the Faculty of Political Economy of the University of Warsaw by presenting his thesis titled *Sketch of potential demography* (Zarys demografii potencjalnej). In 1964–1967, he worked at the University of Łódź, at the Chair of Econometrics, which he managed (1964–1965). In 1967–1978, he returned to the University of Warsaw. He also gave lectures and conducted research in Nigeria, at the University of Ibadan. He presented these results in "Studia Demograficzne" and "Africana Bulletin". He was a member of the Committee for Demographic Sciences of the Polish Academy of Sciences and foreign organisations: the Econometric Society and the International African Institute. In 1967–1984, he took part in editing the periodical titled "Przyszłość Demograficzna Polski" and at the same time was its editor-in-chief. He was also a consultant at the Research Centre for Economic and Statistical Studies of the Central Statistical Office and an active member of the Mathematical Commission of the Central Statistical Office.

In 1962, he went to London for a six months' scholarship related to the demographic issues of Sub-Saharan Africa, which resulted in invitation to the University of Ibadan, Nigeria, a few years later, where he carried our research and gave lectures on national income and planning at the Nigerian Institute of Social and Economic Research in 1967–1974.

Egon Vielrose's academic output includes over 200 publications, including 6 books and over 130 articles. His academic interests were focused on demographic issues, particularly: historical demography, mathematical statistics, econometrics, and socio-economic statistics. His most important publications in the field of demography include: monograph *Elements of natural movement* (Elementy ruchu naturalnego), *Sketch of potential demography* (Zarys demografii potencjalnej), and *The population of Poland from the X to the XVII century* (Ludność Polski od X do XVII wieku). As regards mathematical statistics, the work that needs to be mentioned is *Distribution of income by size* (Rozkład dochodów według wielkości). When managing the econometric section of the Committee for Demographic Sciences of the Polish Academy of Sciences, he promoted use of mathematical methods in demography. Since 1966, he was a member of the historical demography section. He was also interested in didactics. He wrote the first Polish textbook with exercises from the field of mathematical statistics titled *Tasks of mathematical statistics* (Zadania statystyki matematycznej). In cooperation with Stefan Szulc, he prepared a statistical math workbook titled Statistical methods (Metody statystyczne) and *Calculations on approximate numbers* (Działania na liczbach przybliżonych). He was also a valued translator of works on statistic, econometrics and demography.

Since his return to Poland, he lectured on demography at the University of Warsaw until his retirement in 1978.

An important part of his academic output consists of studies in the field of historical demography, particularly on natural movement, which determines the development of the population[2]. In two nearly simultaneous works of the pre-war period, he attempted at using rolls of arms in statistics seeing them as substitute sources for the study of natural movement in the relevant period due to absence of direct sources[3].

Egon Vielrose's short stay in Pława in late 1944 and early 1945 allowed him to study the local parish registers, which was concluded by the then revelatory statement that the doubling number of baptismal records in 1720–1800 did not mean the doubling of the population, but merely a correction of the register[4]. In 1955, he joined the historian's debate on the value of Peter's Pence as a source for evaluating the population of Polish lands in the 14th century and surprised them with the originality of research projects and the familiarity with the state of preservation of quantitative sources on the economic history of Poland[5]. Two years later, he presented his own vision of the demographic development of pre-partition Poland[6]. He entered the field of 19th century demographics with his publication on statistics of Galicia in 1828–1842, where he wrote that the data on child mortality rate had been understated, the number of deaths of elderly people had been exaggerated, and there had been unreasonable discrepancies between the data on natural movement and successive statements on the population, particularly on the county scale[7].

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[2] See: J. Górska, W.Folman, *Bibliography of Polish demographic literature (Bibliografia polskiego piśmiennictwa demograficznego).* Główny Urząd Statystyczny, Warsaw 1985; *Index of persons (Indeks osobowy),* p. 543.

[3] *The mortality of outstanding people in the years 1000–1799 (Umieralność ludzi wybitnych w latach 1000–1799).* "Przegląd Statystyczny" 1938, pp. 87–101; *A contribution to the demography of the Polish nobles (Przyczynek do demografii szlachty polskiej).* "Przegląd Statystyczny" 1939, pp. 328–342.

[4] *A contribution to the demography of the Polish rural areain 17th century (Przyczynek do demografii wsi polskiej w XVIII w.).* "Roczniki Dziejów Społeczno-Gospodarczych" 1952, 14, pp. 122–136. Pławno was a rural settlement despite its legal status as a city in 1544–1870, see: *Polish cities in the millennium (Miasta polskie w tysiącleciu),* Vol. II. Warszawa 1967, p. 67 ff.

[5] *An attempt to estimate the population St. Peter's pence payments in Poland in the 14th-16th century (Próba szacunku wpłat ludności na świętopietrze w Polsce w wieku XIV–XVI).* "Kwartalnik Historyczny" 1955, No. 4–5, pp. 204–209.

[6] *Population of Poland from 10th to 18th century (Ludność Polski od X do XVIII w.)* "Kwartalnik Historii Kultury Materialnej" 1957, 5, pp. 3–49; "Kwartalnik Historii Kultury Materialnej" 1958, 6, pp. 45–60; polemic between I. Gieysztorowa and T. Ładogórski.

[7] *Some remarks on the intensity of natural population movement in Poland in the 17th and 18th century (Kilka uwag o natężeniu ruchu naturalnego ludności w Polsce w wieku XVII i XVIII).* "Kwartalnik Historii Kultury Materialnej" 1962, 10, pp. 77–79.

Egon Vielrose's participation in the debate on A. Szczypiorski's first more extensive publication based on parish registers (now the leading trend in research on historical demographics) consisted in providing a warning against studies on insufficiently large communities and encouraging comparative studies leading to results based on more correct population registers in other countries or later periods, and indicating theoretical relations between the basic demographic parameters[8].

His experience related to the contemporary demographics of developing countries showed numerous analogies with the findings of the Polish historical demography and thus supported its research capabilities[9]. The Professor's return to the country was marked by the publications covering less extensive thematic areas on the Kingdom of Poland in the 19th century: two of them discussed education[10], and the third one religion – it concerned Jewish communities in Łomża Governorate in the late 19th century[11]. A bit earlier, he published theoretical reflection on population growth in Europe from the Middle Ages to the end of the 18th century[12]. This publication compels admiration for the scale of research, but there are also doubts about the reasonableness of the assumptions, findings and results. It is known, however, that controversies and polemics are drivers of progress in research, therefore Prof. Egon Vielrose can still be credited with providing the historical demography circles with dynamic and extending their methodological perspectives. Due to his fluent English, he also made several fundamental publications in the fields of economics, statistics and demography available to Poles by translating them.

In his relations with other people, Prof. Egon Veilrose was a humble and benevolent man. He was characterised by great diligence, tireless academic passion, extraordinary brevity, care for use of statistical methods in demographic and social surveys. He tried to adjust the sources used in historical demography, which he was critical of due to their imperfection, to the needs of research on the basic parameters of demographic development of Poland compared to the rest of Europe and their mutual connections:

[8] *Some remarks on the intensity of natural population movement in Poland in the 17th and 18th century* (Kilka uwag o natężeniu ruchu naturalnego ludności w Polsce w wieku XVII i XVIII). "Kwartalnik Historii Kultury Materialnej" 1962, 10, pp. 77–79.

[9] *Populations natural movement in Sudan* (Ruch naturalny ludności w Sudanie). "Studia Demograficzne" 1964, 4, pp. 47–54; (Urodzenia w Nigerii). "Studia Demograficzne" 1969, 19, pp. 23–39; *Infant and children mortality in Nigeria* (Umieralność niemowląt i dzieci w Nigerii). "Studia Demograficzne" 1972, 39, pp. 3–26; *Fertility in Egypt, in the Greek-Roman period* (Dzietność w Egipcie, w epoce grecko-rzymskiej). "Studia Demograficzne" 1976, 43, pp. 51–57.

[10] E*stimation of illiteracy in the Russian partition* (Szacunek analfabetyzmu w zaborze rosyjskim). PDP 9, pp. 3–16; *Primary education in the former Lomza Governorate in 1889* (Szkolnictwo podstawowe w byłej guberni w łomżyńskiej w 1889 r.) "Studia Demograficzne" 1984, 75, pp. 43–60.

[11] *Jewish population of the former Lomza Governorate at the end of the 19th century* (Ludność żydowska byłej guberni łomżyńskiej w końcu XIX w.) "Studia Demograficzne" 1983, 73.

[12] *Natural movement in European countries from the Middle Ages to the end of the 18th century* (Ruch naturalny w krajach Europy od średniowiecza do końca XVIII w.)., ibidem, 70, 1982, pp. 27–34.

life expectancy, fertility rate and mortality rate, by processing these sources using professional statistical methods.

He died suddenly on 21st October 1984 and was buried at the Evangelical-Augsburg Cemetery in Warsaw.

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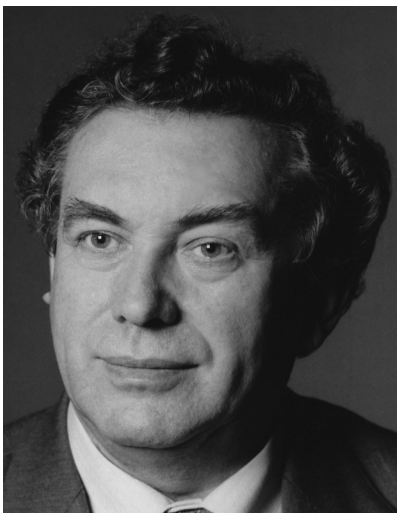
JAN KORDOS



Władysław WELFE
(1927–2013)

Professor Władysław Welfe is undoubtedly one of the best known Polish statisticians and econometricians in the world. His scientific achievements and international co-operation paved the way for the development of modern econometric modelling in Poland.

Władysław Welfe was born on 20 May 1927 in Kolbuszowa. His grandparents, who belonged to the local small-town elite, lived there: from the mother's (Zofia) side – Edmund Kiełbiński, the head of the Tax Office, from the father's (Mieczysław) side – Henryk Welfe, a Polish language teacher, the head of the Common School. The first years of his life (until 1930) passed in Kraków, where Mieczysław Welfe (father), an assistant at the Faculty of Medicine of the Jagiellonian University, was becoming a specialist in a new field – radiology. An internship in Paris under the supervision of Maria Skłodowska-Curie (her letter of recommendation remains in the family archive) and his first publications heralded a brilliant scientific career. Unfortunately, financial problems caused that the father resigned from work at the Jagiellonian University and moved to Sosnowiec, where he took the position of an X-ray specialist. It was there that Władysław Welfe began attending the Common School. In 1934, the family moved to Łódź, where the father was entrusted with the heading the new Radiology Institute at the Mościcki Hospital (currently the Barlicki Hospital). After the outbreak of the war, Mieczysław Welfe was drafted and reached Łuck together with the entire hospital, where he was taken captive by the Soviet Army, then transported to the camp in Kozielsk, and executed in Katyń in May 1940. For several decades, the circumstances of his father's death were unknown to his family, which certainly cast a deep shadow on Władysław Welfe's youth.

Before the war, Władysław Welfe graduated from the Merchant Assembly School in Łódź and began his education at the Merchant Assembly General Secondary School in September 1939. After the school was closed down, he continued his education in

secret classes, which were attended mainly by his former classmates. At the age of 14, he was forced to work at K. Eisert Wool Industry Plant in Łódź, where he went through many positions – from weaver, locksmith's assistant, to finally become an electrician. Malnutrition and very poor housing conditions made him develop pulmonary tuberculosis. Only the help of his father's former colleagues, doctors, saved him from death.

These traumatic experiences had a decisive impact on the development of his personality. They made him strong-willed, independent, responsible towards family, friends, and acquaintances.

In 1945, immediately after the end of the war, Władysław Welfe began his studies in law and economics, which he completed after 4 years as a Master of Economics.

Due to the idealization of economics and contacts with Professor E. Rosset, Władysław Welfe's main interests were redirected to quantitative subjects, i.e. statistics, demography, and mathematics. Since October 1, 1949, he was an assistant lecturer at the Department of Statistics, headed by Professor Rosset, and held courses in statistics. A year later he became an adjunct professor and began to specialize in economic and social statistics, on which he wrote papers and his doctoral thesis. He remained faithful to this subject until the mid-1960s.

At the turn of 1949 and 1950, Władysław Welfe attended PhD studies at the Central School of Planning and Statistics in Warsaw as part of a course conducted by Oskar Lange entitled *"System of Economic Indicators in Planned Economy"* (System wskaźników gospodarczych w gospodarce planowej). In 1952, Władysław Welfe began to teach statistics. It was as a result of these classes that the *"Statistics of Trade"* (Statystyka handlu), PWG, 1957 was developed – the first academic handbook in the field of economic statistics in Poland. He rejected the proposal of moving to the CSP&S to work as a deputy professor at the Department headed by Kazimierz Romaniuk, despite receiving a tied apartment, and decided to return to the Higher School of Economics in Łódź. This was one of the most important decisions of his life.

He wrote his PhD thesis *"Demand and Supply on the Socialist Market as a Subject of Statistical Research"* (Popyt i podaż na rynku socjalistycznym jako przedmiot badania statystycznego) under the supervision of Kazimierz Romaniuk and defended it at 1961 at the CSP&S. Its extended version was published by PWE in 1962 under the title of *Demand and Supply* (Popyt i podaż).

Between 1963 and 1964, Władysław Welfe completed a nearly one-year internship at the Department of Applied Economics at Cambridge University under the direction of Professor Richard Stone (later Nobel Prize winner in economics). There, for the first time, he encountered the macro-econometric model (of the British economy) using the input-output methodology. This allows him to generalise the concept of output and price indices and to link it to macroeconomic mechanisms. This is how the final version of the postdoctoral dissertation was developed.

Three years after obtaining his PhD, in 1964, he defended his post-doctoral degree (habilitation) thesis entitled *"Problems of the Theory of Production Indices"* (Problemy teorii indeksów produkcji) at the then Faculty of Finance and Statistics of the CSP&S. The monograph *"Indices of Production"* (Indeksy produkcji), published by PWE in 1966, is the summary of scientific knowledge at that time. In 1969 he was awarded the academic title of associate professor.

In the 1960s, Professor Władysław Welfe co-founded the Faculty of Economics and Sociology of the University of Łódź, of which he was the Vice-Dean and then Dean over the years 1965–1969. Thanks to his initiative, the Department of Econometrics, which he headed in 1965–1996, and later – the Institute of Econometrics and Statistics, of which he was the director in 1970–1997, were both established at the Faculty. Professor Władysław Welfe's involvement in teaching led to the launch of specialist fields of study: Economic Cybernetics and Computer Science (which lasted from 1967 to 1991) and Computer Science and Econometrics (from 1992 to this day).

In 1971/1972, Professor Władysław Welfe completed a six-month internship at the Department of Economics of the University of Pennsylvania, USA, which at that time was the world's centre of econometric modelling. The cooperation with Professor Lawrence R. Klein (Nobel Prize winner in Economic Sciences in 1980), continued as part of Project LINK until his death, affected the entire further scientific path of Professor Władysław Welfe. The first direct result was the W-1 macro model of the Polish economy, which allowed to generate both demand and supply. It was the first such model describing the functioning of the socialist economy. It was presented in 1973 as a paper at the Econometric Society European Meeting in Oslo.

The achievements in the field of macro-modelling were honoured in 1974 with the academic title of full professor awarded to Professor Władysław Welfe.

In 1972–1978, Professor Władysław Welfe held the position of Vice-Rector for Research at the University of Łódź. The result of his activity is the conclusion of over 30 direct cooperation agreements enabling the employees of the University of Łódź to stay at foreign research centres within the framework of pre-financed foreign exchange, which was invaluable at that time. At the same time, he established and managed the National Economy Modelling Team. This resulted in subsequent W-series models (W-2 and W-3 in different variations) and the related PhD dissertations (more than 30). In 1974, thanks to his efforts, an international conference devoted to econometric modelling and the use of models for forecasting and analysis was organized for the first time, called (sometime later) "Macromodels". It is organized to this day (this year it will be held for 45th time). In the first 25 years of its existence, for many researchers, particularly young ones, from socialist countries, "Macromodels" was the only opportunity to meet and interact with scholars from behind the Iron Curtain. The attendants of this conference included the most famous econometrics: two Nobel Prize winners – L. R. Klein and R. Engle, as well as H. Wold, D. Hendry, G. Mizon, R. Quandt, W. Krelle, H. Luetkepohl, S. Johansen, M.H. Pesaran, G. Koop, and many others.

Professor Władysław Welfe was tirelessly seeking funding for econometric research which would involve large teams of people working in various academic centres, believing it to be the most effective and scientifically inspiring formula. In this way, the R.III.9 and later CPBP.10.9 ministry programmes were launched, which he became the head and coordinator of. Believing that there is no such thing as a "Polish economy" or "Polish statistics", he made efforts to ensure that the younger employees under his care could travel abroad and interact with global science. In many cases, this was only possible thanks to his personal recommendations and efforts. He himself has presented numerous speeches at the congresses of the Econometric Society, European Economic Association and other international conferences.

Professor Władysław Welfe's international position is reflected in his 1978 honorary doctorate from Uppsala University, the most prestigious Scandinavian university.

Based on J. Kornai's theory of shortages and M. Kalecki's theory of growth barriers, Professor Welfe formulated the basic hypotheses concerning the characteristics of the functioning mechanisms of such economies, which he continued to further verify empirically. This results in one of the most methodically advanced macro models – the W5 model. It allows to formulate concepts and quantify the supply accelerator, the bottleneck multiplier, and the Barro-Grossman supply consumption multiplier. Additionally, new measures of the degree of market and supply imbalance, with the use of appropriate imbalance indicators, are proposed. A summary of these works is found in a special chapter written by Professor Władysław Welfe on modelling socialist economy and published in the monograph "Lectures in Econometrics" penned by L. R. Klein (North-Holland 1983).

The Polish economy's trends transitioning to a market economy observed in the second half of the 1980s were reflected in the construction of the W-5 model in its demand version. As a result, the academic centre in Łódź was the only one that did not stop working on improving econometric models and systematically using them for forecasting and performing simulation analyses. They were published not only in scientific journals (e.g. in *"Wiadomości Statystyczne" ("Statistical News")*, *Prace IEiS UŁ (Works IEiS UŁ))*, but also in economic press, among others in *Polish State, Economic Life, Banking Newspaper, Trading Floor, New Economic Life, Our Capital Market* (Rzeczpospolita, Życie Gospodarcze, Gazeta Bankowa, Parkiet, Nowe Życie Gospodarcze, Nasz Rynek Kapitałowy).

At the beginning of the 1990s, Professor Władysław Welfe made an effort to build new models: the annual W-8 model and WK-91 – the first model for Poland based on quarterly data, which were to be used for analysing the economy in the period of political transformation. The models of the WK series are being developed and used intensively to this day.

The book "Principles of Macroeconometric Modeling" published in 1999 by North-Holland, co-authored by L. R. Klein and A. Welfe is a unique publication in Professor Władysław Welfe's scientific output, returning to his views on econometric macro-modelling.

At the end of the 1990s, which coincided with his retirement, Professor Władysław Welfe delved into a new field of research, namely the construction of empirical growth models, in which knowledge capital plays a fundamental role. In this way, the W-8D series of models was developed, containing interesting proposals for specification of, among others, the function of consumer demand, investment demand, and the total productivity of production factors.

In 1995, Professor Władysław Welfe was awarded an honorary doctorate by the Krakow Academy of Economics, and in 1997, by the Lumière University Lyon 2.

In 1998, Professor Władysław Welfe became a member of the Polish Academy of Sciences.

In 2005, the University of Łódź awarded him an honorary doctorate.

Professor Władysław Welfe devoted his last years to working on the book "Macroeconometric Models" (Springer-Verlag 2013). This over 500-page monograph describes and critically analyses most of the major macro models that have been developed around the world. The parcel containing the first copies arrived two days after Professor's death.

For his scientific, social, and organizational activities, Professor Władysław Welfe was awarded, among others, the Commander's Cross with Star of the Order of Polonia Restituta, the City of Łódź Merit Badge, the Medal for the 75th Anniversary of the CSO and the Medal of the National Education Commission.

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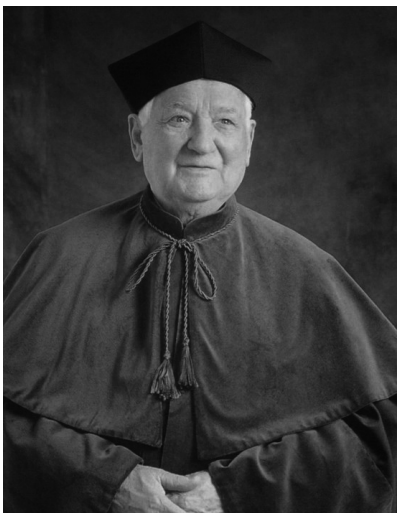
ALEKSANDER WELFE



Kazimierz ZAJĄC
(1916–2012)

Kazimierz Zając was born on 20 September 1916 in Krosno, during the still ongoing World War I, into a working-class and peasant family, as a son of Filip and Maria Kubal. He attended the Primary School and the State Coeducational Secondary School in Krosno, where he was awarded a Secondary School Diploma in 1937. After finishing his secondary school-leaving examination, he completed one-year military service at the Reserve Officer Cadet School in Kielce and obtained the military rank of reserve corporal. In 1938 he began studies at the Academy of Trade in Krakow.

He survived World War II in Krosno. Afterwards, he found employment at the Municipal Public School of Trade in Krosno as a teacher of accounting. At the same time, he secretly conducted teaching courses and was involved in the activities of the Polish Red Cross, organizing aid for Polish officers and soldiers in prisoner-of-war camps. He was sworn in as a Home Army soldier – Krosno Circuit, under the pseudonym "Konrad". During the war he was appointed captain by the commander of the Home Army.

Kazimierz Zając bound his entire adult life to Krakow. He studied at the Academy of Trade in Krakow at the Faculty of Consular Studies in the years 1938/39 and 1945–1946, associating his studies and scientific interests after the war with Professor Jerzy Fierich, the then head of the Department of Economics of the Academy of Trade in Krakow. Already in his student days, he was interested in statistical research and presented his master thesis on the *Movement of nominal and real wages and salaries of oil industry workers in Krosno in 1927–1945* (Ruch płac nominalnych i realnych robotników przemysłu naftowego w Krośnie w latach 1927–1945). On 31 May 1947, having presented the above-mentioned thesis and passed exams with a grade of "very good" in: economics, economic policy and public finance, mathematical statistics and scientific methods of studying the economic cycles, economic statistics, cooperative activity, the system and tasks of self-government, and economic geography, he received the degree of Master

of Economic and Commercial Sciences at the Faculty of Consular Studies of the Academy of Trade in Krakow.

While still a student, in 1946 he started working as an assistant teacher-volunteer in the Department of Economics and became an assistant lecturer after graduating in 1947. Immediately after completing his master's studies, he took up PhD studies at the Warsaw School of Economics, attending Professor Edward Lipiński's doctoral seminar in economics over the years 1947-1948. In 1949 he submitted his doctoral dissertation to Professor Edward Lipiński, but unfortunately it was a work on classical economics which, as a non-Marxist "bourgeois economy", could not be presented for defence in the beginning of the Stalinist period.

In 1950, in the face of harassment addressed at Professor Jerzy Fierich, who was perceived as a proponent of "unjust bourgeois economic theory", together with the Professor he left the Department of Economics, which had become the Department of Marxist Economics, and moved to the newly established Department of Statistics. He worked there as a deputy professor from 1954 to 1961.

The turn of "October 1956" brought a departure from "the time of errors and deviations" of the Stalinist period. There was a return to conducting statistical research. Kazimierz Zając, MEcon, who – in his doctoral thesis – conducted the previously-forbidden statistical analysis of workers' wages, thus referring to the subject of his master's thesis, was in the forefront of young statisticians. On 26 June 1958, Kazimierz Zajac received the degree of Candidate (Doctor) of Economic Sciences based on exams taken and his dissertation *Analysis of workers' wages in industry on the basis of statistical research* (Analiza płac robocych w przemyśle na podstawie badań statystycznych), awarded by the Council of the Faculty of Commodity Science of the University of Economics in Krakow by way of resolution of 17 February 1958, and approved by the Central Qualification Committee for Science Employees. His dissertation was supervised by Professor Jerzy Fierich, PhD, Eng.

Five years after obtaining his degree of Doctor of Economic Sciences, Kazimierz Zając earned a post-doctoral degree (habilitation) degree with his paper on *Econometric methods in household budget surveys* (Ekonometryczne metody badania budżetów domowych), Zeszyty Naukowe WSE w Krakowie (Research Papers, WSE Krakow, special series: Monographs No. 3, 1963). In 1965, after the death of Professor Jerzy Fierich, he became Head of the Department of Statistics, a position he held until his retirement in 1986. He received the title of Associate Professor in 1971, and the title of Professor (full) in 1976.

Professor Kazimierz Zając's contribution to the development of statistical and econometric research can be summarized in four main threads of his scientific work. Undoubtedly, he was a pioneer in statistical and econometric studies of income and expenditure of the population as well as wages and salaries in Poland, after the Stalinist period. In these years, the Professor was an unquestionable authority in the field of research on the population's standard of living. The theme of socio-economic research continues

throughout the whole of the scientific career of Professor Kazimierz Zając, resulting in, among other things, the following books published after his postdoctoral thesis: *Econometric methods of delimitation consumption areas* (Ekonometryczne metody ustalania rejonów konsumpcyjnych); co-author: B. Podolec, 1978, *Methods of researching market services (*Metody badania usług rynkowych); collective work edited by K. Zając, 1982 and numerous scientific articles.

The second research area developed by Professor Kazimierz Zając involved demographic research. He was one of the pioneers of micro-demographic historical research, as shown by his work titled *Study of the vital statistics in the town of Rymanów in the light of parish records from 1850–1950*, (Studium nad ruchem naturalnym miasta (Rymanowa w świetle ksiąg parafialnych z lat 1850–1950, 1969); ("Demographic Past of Poland", 1969). He is a recognized authority in the field of historical demography. In turn, the combination of demographic research and socio-economic studies gave rise to a monograph entitled *Demographic growth and economic development,* (Rozwój demograficzny a rozwój gospodarczy) co-author: A. Sokołowski, 1987) and to many other of the Professor's works on demographic and socio-economic development.

A third theme of his statistical study, closely linked to socio-economic and demographic research, involved the development of methodologies and applications for taxonomic procedures. This is reflected in many of the Professor's publications, written mainly in collaboration with his younger colleagues. It is exemplified in the book *Taxonomic methods in socio-economic research* (Metody taksonomiczne w badaniach społeczno-ekonomicznych); co-authors: J. Pociecha, B. Podolec, A. Sokołowski, 1988, as well as a number of other publications in this field, including ones co-authored by T. Grabiński.

The fourth area constitutes the Professor's research in the field of statistical methods of quality control, which is reflected in a number of scientific papers on these subjects, in particular in his book: *Statistical methods of quality control* (Statystyczne metody kontroli jakości); co-authors: J. Cyran, J. Steczkowski, 1973.

When recalling the Professor's scientific achievements, one should emphasise his personal contribution to the development of statistical and econometric research methodology and empirical research, especially in the areas of social statistics, demography, and statistical quality control. His extensive scientific activity spanned a long period of over 40 years, from the mid-1950s to the mid-1990s.

The historical achievement of Professor Kazimierz Zając is his contribution to training the scientific staff of his parent University as well as to educating Polish statisticians and econometricians. According to the publication of the former Rector of the Academy of Trade in Kraków, Professor T. Grabiński, on research schools at Kraków's University of Economics, understood as consecutive links between thesis supervisors and their doctoral students, Professor Kazimierz Zając's statistical and econometric school is in the first place, and the Professor himself, as the founder of the school after Jerzy Fierich's

death, supervised 24 PhDs at the University, not including numerous persons at other Polish universities, as well as reviewed more than 80 doctoral dissertations.

The Professor made a great contribution to promoting independent academic researchers. He supervised 22 post-doctoral degree (habilitation) students and submitted more than 60 reviews of post-doctoral degree (habilitation) theses. He also submitted 70 promotion opinions on awarding the title of Professor (full) or Associate Professor. There is no exaggeration in stating that the vast majority of Polish professors of statistics, econometrics, and related fields, currently active or retired, were evaluated and encouraged by Professor Kazimierz Zając at least at one stage of their scientific careers. To this day the Professor enjoys great authority and respect of the nationwide scientific community of Polish statisticians and econometricians and the people who were evaluated by him at that time remember him and repeatedly express gratitude for his kindness and constructive advice he gave them.

During his many years at his University, Professor Kazimierz Zając held many different functions, contributing greatly to its development. Already in the years 1954–1958 he was Deputy Dean of the then Faculty of Commodity Science at the Higher School of Economics in Krakow and in 1964–1968 served as Deputy Dean of the then Faculty of Production and Trade in Goods. In 1980–1986, he was Dean of the Faculty of Trading Economics of the Krakow Academy of Economics.

Since 1965, since the death of Professor Jerzy Fierich, the first head of the Department of Statistics, he was the head of the Department, contributing immensely to its scientific development and the development of its staff. From 1969 to 1986, until his retirement, in connection with the reorganisation of the University's organizational structure, he was the head of the new Department of Statistics and in the years 1969-1984 – the director of the Institute of Economic Accounting Methods. Thanks to the Professor's efforts and inspiration, the Institute developed its personnel and continued gaining an increasingly stronger position in the Polish quantitative economic research community. The new Department of Statistics itself was created in place of the previous Department, which in 1969 was employing a single independent research and teaching employee (Asst. Prof. K. Zając). At the time of his retirement, he was employing six independent research and teaching employees (Prof. K. Zając, Prof. J. Steczkowski, Prof. A. Zeliaś, Asst. Prof. A. Iwasiewicz, Asst. Prof. S. M. Kot, Asst. Prof. J. Pociech) in the Department, as well as in related departments established in the meantime – i.e. in the Statistical Quality Control Department and the Forecast Theory Department.

It should be stressed that Professor Kazimierz Zając's efforts to achieve scientific development and, consequently, staff development did not concern only the Department of Statistics, but also the entire Institute. The Institute of Computer Science was established during his management of the Institute of Economic Accounting Methods, and Cz. Kulik, PhD, former Adjunct Professor at the Institute of Statistics was its first manager. Many of the later employees of the Department of Computer Science completed

their doctoral theses on quantitative methods under Professor Kazimierz Zając's supervision. He also contributed to the development of the Department of Mathematics of the Institute of Economic Accounting Methods, inspiring the scientific development of many scientific and didactic employees of this department. He also integrated the Department of Econometrics with the research conducted by the entire Institute.

The fact that the Kraków's school of economics developed intensively between the 1960s and the 1990s in terms of its scientific and didactic potential, which was formally reflected in the change of its name from the Higher School of Economics to Academy of Economics and then to University of Economics, was largely due to Professor Kazimierz Zając's work in managerial positions at the University.

Through his organizational and expert work Professor Kazimierz Zając influenced the development of the theory and practice of statistical research in Poland. Among the many functions held outside the university, one should mention the chairmanship of the Section of Historical Demography of the Committee of Demographic Sciences at the Polish Academy of Sciences in the years 1975–1979, and the chairmanship of the Section of Statistics of the Statistics and Econometrics Committee of the Polish Academy of Sciences in the years 1978–1981. From 1978 he chaired the Commission of Economic Sciences at the Krakow branch of the Polish Academy of Sciences and since 1990 – the Commission of Statistics and Demography at the Krakow branch of the Polish Academy of Sciences. As chairman of these bodies he was part of the editorial and programme boards of scientific journals such as: "Demographic Past of Poland", "Demographic Studies", "Statistical Review". In the years 1986–1990 he was an elected member of the Central Admissions Committee by the Prime Minister, thus contributing to the promotion of the development of independent scientific staff in the field of statistics and econometrics.

Professor Kazimierz Zając also made a meaningful contribution to functioning of Statistics Poland. During the long period 1965–1995 he was a member of the Scientific Council of Statistics Poland, contributing to the setting the directions of statistical research and to the development of methodology and practice of Poland's official statistics. For many years he was a member of the Scientific Council of "Statistical News". One should also acknowledge his role in the Polish Statistical Association, where, for many years, he was a member of the Association's Main Council and the chairman of the Association's branch in Krakow.

The Professor always attached great importance to the learning process. During the first Conference of Statisticians, Econometricians and Mathematicians of Southern Poland he was the primary presenter of methodological problems in teaching quantitative subjects. He is the author and co-author of many scripts and manuals for statistics. Among them there is a textbook entitled *An outline of statistical methods* (Zarys metod statystycznych); PWE, Warsaw, which has gone through 5 editions, used by numerous generations of students of the Krakow University and many other Polish universities.

Professor Kazimierz Zając was known and appreciated by the students as an interesting lecturer. He was able to speak about statistical methods and their applications in a way that gained the attention of listeners, who then often chose them as the subject of their specializations and the topics of their master's theses. Professor Kazimierz Zając supervised a huge number of graduate students who, even after many years, remember him as an outstanding professor of the Kraków University of Economics. Professor Kazimierz Zając was also a long-time lecturer at the Jagiellonian University, teaching sociology and psychology, as well as a lecturer in statistics at the Pontifical Academy of Theology. These students also remember him as an interesting lecturer.

Formally retired in 1986, he was coming to work in the Department every day for many years, participated in national and Krakow scientific life, and took part in scientific conferences almost until the end of his life.

For his services in the field of scientific research and organization of science and staff training, the Academy of Economics in Katowice awarded him with the title of Doctor Honoris Causa in 1995, while in 2011 the University of Economics in Kraków solemnly renewed his academic degree of Doctor of Economic Sciences first awarded 53 years back.

Professor Kazimierz Zając died on May 6, 2012 and was buried at the Salwator Cemetery in Krakow.

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JÓZEF POCIECHA

Ryszard ZASĘPA
(1915–1994)

Ryszard Zasępa was born in Warsaw on 16th March 1915. After his graduation from the Prince Józef Poniatowski V State Secondary School, he enrolled in the University of Warsaw, where he studied mathematics. In Februrary 1938, he earned the degree of master of philosophy in mathematics. Some time before before his graduation, he started working at the Department of Studies of the State Aviation Works at Okęcie, Warsaw, where he worked as a mathematician in 1937–1938. Since 1938, he served in the army. He took part in the defence of Poland in September 1939 as a lance sergeant and was taken prisoner by the Germans. He returned to Warsaw from captivity in 1946.

After his return, he started working at the Central Statistical Office in 1946, and co-founded Polish demographic statistics and sample surveys.

The Professor's two publications in the field of demographics that deserve a mention are his article titled *Polish complete mortality for urban and rural population 1952/1953* (Polskie tablice wymieralności ludności miast i wsi 1952/195) ("Statistical Review" 1957, 4, 1–2, pp. 43–3) and a joint study with Jerzy Z. Holzer: *Assumptions for the prognosis of size and structure of Polish population by sex and age in 1955–1975* (Założenia przyjęte przy prognozie stanu i struktury ludności Polski według płci i wieku w latach 1955–1975) ("Notes on Labour Economics" 1957, 1, pp. 5–10).

He worked at the Central Statistical Office until 1960s, but he took part in the work done by the Mathematical Commission of the Central Statistical Office, established in 1949, since its inception and was its chairman in 1954–1961 and 1971–1972. He participated in Prof. Jerzy Neyman's consultations held during his visits to Poland in 1950 and 1958. In 1958, he was the chair of that commission during Prof. J. Neyman six

weeks' consultation on the sample survey method for the Central Statistical Office[1]. He conducted intense courses on sampling for employees of the Office.

Simultaneously with his career, the Professor developed his academic interests by giving classes and lectures and also delegated lectures at the Warsaw University of Technology and the University of Warsaw.

In 1957, he started working at the Central School of Planning and Statistics, where he was appointed deputy professor.

In 1957, being invited by Prof. J. Neyman, he served a year-long apprenticeship at the University of California, Berkeley, where he worked on his doctoral dissertation. Having earned the degree of doctor of economic sciences in 1961, he started employment as an expert statistician at the Food and Agriculture Organisation of the United Nations in Rome, and a year later, he was promoted to the head of the census section.

The Professor's name was mentioned in numerous FAO studies and publications, also in the preface to the English language textbook on sampling by P.V. Sukhatme[2], the former director of the FAO Statistics Division.

The 1962 scientific event of national significance was the publication of the first sampling textbook, authored by Ryszard Zasępa, titled *Statistical sample surveys* (Badania statystyczne metodą reprezentacyjną) by PWN (Państwowe Wydawnictwo Naukowe). It was not merely an academic textbook, but also a basis for training employees of Central Statistical Office in regard to the said method. It had significant impact on the extension of sample-based surveys carried out by Statistics Poland after World War II.

During his work at FAO, the Professor wrote a monograph on the use of sampling during agricultural censuses in various countries: *Use of sampling methods in agricultural censuses* (Zastosowanie metody reprezentacyjnej przy spisach rolnych), which was published in "Studia i Prace Statystyczne" by Central Statistical Office in 1968. This monograph demonstrated that sampling can be successfully used as a replacement for complete agricultural censuses. In Poland, both the 2010 agricultural census and the 2011 population and housing census were carried out using sampling.

After his return to Poland in 1967, Ryszard Zasępa continued his work at the Central School of Planning and Statistics, where, having earned post-doctoral degree (habilitation), he became a docent at the Chair of Econometrics.

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In 1972–1975, he started working for the United Nations as an expert at the Regional Institute of Population Studies in Ghana. He was the director of the institute for a year. He also represented the institute at international conferences where he gave papers on population studies, which extensively used sampling.

Since 1975, he was again affiliated with the Central School of Planning and Statistics. He managed the Department of Mathematical Statistics at the Institute of Econometrics and was the director of the Institute of Cybernetics and Management (1984–1985). In 1983, he was awarded the title of professor.

In 1975, he started working at the Research Centre for Economic and Statistical Studies of the Central Statistical Office and the Polish Academy of Sciences as a consultant and greatly contributed to the scientific basis for and improvement in empirical studies on the use of sampling in statistical surveys carried out by the Office. He worked there until his death. In 1949–1993 (apart from the time spent abroad), he took part in the work done by the Mathematical Commission of the Central Statistical Office and was its chairman for many years.

He was a member of the Committee for Statistics and Econometrics and the Committee for Demographic Sciences of the Polish Academy of Sciences.

He was the vice-president of the Main Council of the Polish Statistical Association. In that association, he was primarily active as a lecturer on sampling. He made video recordings of many of his lectures, which are still used to conduct training sessions in the field. He also took an active part in the foundation of the English language periodical published by the Polish Statistical Association, "Statistics in Transition", and published a very important article on sampling in its first issue: *Zastosowania metody reprezentacyjnej w spisach ludności*[3].

Ryszard Zasępa is the author of many academic publications (including books), primarily on demography and statistical sampling. Apart from the aforementioned 1962 textbook, he published the second, improved, textbook titled *Sampling method* (Metoda reprezentacyjna) published by PWE (Państwowe Wydawnictwo Ekonomiczne), and in 1991, *Outline of sampling method* (Zarys metody reprezentacyjnej) GUS (Central Statistical Office).

In 1994, the Polish Statistical Association and other Polish institutions prepared an international conference celebrating the 100th anniversary of Prof. Jerzy Neyman's birth. Prof. Ryszard Zasępa took an active part in the preparation as the vice-president of the association. He was a co-organised of the conference and also the author of one of the more important papers on Prof. Jerzy Neyman's impact on the development of the theory and practice of sampling in Poland.

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The Professor died on 7th August 1994 and was buried in the Powązki Cemetery in Warsaw. He died several months before the international conference[4], which was held in Jachranka, near Warsaw, on 25th–26th November 1994. His paper was presented at the conference by Jan Kordos, who also discussed Prof. Ryszard Zasępa's contribution to the development of sample surveys in Poland[5].

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JAN KORDOS

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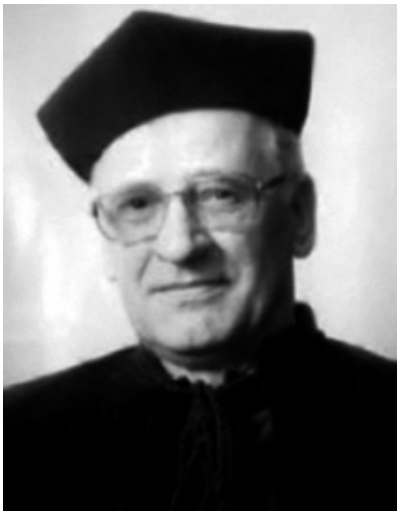

Aleksander Józef ZELIAŚ (1939–2006)

Aleksander Józef Zeliaś was born in Oleśnica, now in Świętokrzyskie Voivodship, on 14th September 1939. He completed his primary education in that village in 1952. Then he attended a secondary school in Busko-Zdrój, where he passed his matriculation examination (the Matura exam) in 1956. In 1956–1962, he studied at the Faculty of Commerce of the Higher School of Economics in Cracow. His master's thesis, titled *An attempt at determination of production function exemplified by Krakowskie Zakłady Sodowe Solvay* (Próba ustalenia funkcji produkcji na przykładzie Krakowskich Zakładów Sodowych), was written under the supervision of Professor Dr Inż. Jerzy Fierich and defended it on 21st March 1962, scoring a very good grade (with honours).

On 1st April 1962, he started apprenticeship as an assistant at the Chair of Statistics while living at the Fafik hall of residence at ul. Racławicka 9. On 1st April 1963, he was appointed assistant at the Chair of Statistics at the Faculty of Production and Trade in Goods of the Higher School of Economics in Cracow. On 29th April 1963, his doctoral procedure started with Professor Dr. Jerzy Fierich as his supervisor, and, after the professor's death in 1965, Doc. Dr. hab. Kazimierz Zając. On 1st January 1965, Aleksander Zeliaś was awarded doctoral scholarship. His first academic article titled *The use of the production function in agriculture* (Zastosowanie funkcji produkcji w rolnictwie) was published in "Statistical Review" No. 1/1964. On 1st October 1964, he was appointed senior assistant.

On 30th June 1966, he defended his doctoral dissertation titled *The use of the production function for economic productivity account of peasant farms* (Zastosowanie funkcji produkcji do rachunku efektywności ekonomicznej gospodarstw chłopskich).

On 1st October 1966, he was appointed assistant professor at the chair of statistics. A.J. Zeliaś's post-doctoral degree (habilitation) procedure was initiated at the Higher

School of Economics in Poznań in 1970 based on the thesis titled *Econometric methods of prediction (exemplified by crop production),* (Ekonometryczne metody budowy prognoz (na przykładzie produkcji roślinnej), Academic journal of Higher School of Economics in Cracow, special series: monographies, No. 20, Cracow 1970. His post-doctoral degree (habilitation) colloquium at the Faculty of Economics of Production of the Higher School of Economic in Poznań took place on 25th November 1970. The reviewers of his post-doctoral degree (habilitation) thesis and academic output were: Professor Dr. hab. Stanisław Borowski, Professor Dr hab. Zbigniew Pawłowski, Professor Dr Stefan Schmidt, Doc. Dr hab. Kazimierz Zając. In 1971, A. Zeliaś received the Award of the Minister of Higher Education for his post-doctoral degree (habilitation) thesis. Professor Aleksander Zeliaś became an independent academic staff member at the age of 31.

The early stage of his academic career has been described here quite extensively to prove that even in that economically and politically difficult era it was possible for a gifted, hard-working person with sympathetic academic supervisors to become an independent academic staff member quickly.

On 1th October 1971, Aleksander Zeliaś was appointed docent at the Department of Statistics at the Institute of Economic Accounting Methods at the Higher School of Economics in Cracow. On 1st March 1973, he became the deputy director of the Institute of Economic Accounting Methods at the Faculty of Trade Economics. On 1st October 1973, Doc. Dr. A. Zeliaś became the head of the newly established Department of Statistical Forecasting of that institute, which was renamed to the Department of Forecasting Theory in 1978. Professor Zeliaś held that office until his death. On 21st July 1974, he went to the USA for a year-long academic apprenticeship at the Department of Economics of the Massachusetts Institute of Technology, Cambridge, MA, and returned on 30th June 1975.

In 1977, Doc. Aleksander Zeliaś earned the academic title of associate professor of economic sciences. The latter half of the 1970s saw Professor Zeliaś and his team joining the scientific research organised under the Central Programme of Basic Research and Ministerial Research coordinated by Professor Władysław Welfe working intensely as part of the programme. Research on the methods for selecting variables in econometric models under ministerial programme R.III.9 resulted in the Zakopane Nationwide Academic Seminar, which was held for the first time on 19th–20th April 1977, and for the 28th time, after Professor Zeliaś's death, on 18th–21st April 2006. The organisation of these annual academic meetings in Zakopane, later on the only nationwide forum for statisticians and econometrists, is the Professor's lasting contribution to the development of statistics and econometrics in the last quarter of the 20th century.

At that time, Professor Zeliaś started cooperating with Miastoprojekt, which implemented large-scale housing projects in Iraq. Professor Zeliaś carried out research and analyses for Miastoprojekt, which resulted in his travels to Iraq and cooperation with the Al-Mustansiriya University in Baghdad. It also led to him supervising a few Iraqi

doctoral students to completion in Poland in the 1980s. This was also the time when he wrote his fundamental monograph *Theory of forecasting* (Teoria prognozy), published by PWE (Państwowe Wydawnictwo Ekonomiczne) in 1979, which then had further editions that were released later on.

In 1982, Aleksander Zeliaś earned the academic title of full professor of economic sciences. The 1980s were the time of his service to the university, further work on the topics assigned by the central authorities, important publications and foreign contact. Professor Zeliaś was never member of a political party, and in 1980, he was elected the chairman of the Works Council of the Polish Teachers' Union. In the autumn of that year, he called a meeting of the employees of the Academy of Economics where the university-level organisation of the Solidarity trade union was established, and the majority of the Polish Teachers' Union members, including himself, transitioned to Solidarity. In 1981, he was democratically elected vice-rector for research at the Academy of Economics in Cracow, and he held that office for two terms, until 1987. As the vice-rector, he developed the university's cooperation with western institutions.

In 1982, he stayed in Pittsburgh and took care of the direct cooperation between the Academy of Economics and the Pittsburgh University. In 1986, he visited Germany, namely universities in Bonn, Marburg and Göttingen. In 1988, he stayed at the Tilburg University in the Netherlands, where he also developed the direct cooperation with that university.

The 1980s were the period of further intensification of research and management of work on the topics assigned by the central authorities. It resulted in important publication co-authored by the Professor. The most significant one is *Methods of variable selection in econometric models* (Metody doboru zmiennych w modelach ekonometrycznych), PWN (Państwowe Wydawnictwo Naukowe), Warszawa 1982, but also: *Statistical methods of analysing quantitative features* (Statystyczne metody analizy cech jakościowych), PWE, Warszawa 1981, *Variation and covariation analyses in economic surveys* (Analiza wariancyjna i kowariancyjna w badaniach ekonomicznych), PWN, Warszawa 1982, *Methods of forecasting socio-economic growth* (Metody prognozowania rozwoju społeczno-gospodarczego), PWE, Warszawa 1983, *Global forecasts of socio-economic growth* (Globalne prognozy rozwoju społeczno-gospodarczego), PWN, Warszawa 1983, *Methods of international statstics* (Metody statystyki międzynarodowej), PWE, Warszawa 1988, *Methods of numerical taxonomy in modelling socio-economic phenomena* (Metody taksonomii numerycznej w modelowaniu zjawisk społeczno-gospodarczych), PWN, Warszawa 1989.

As regards the 1990s, it should be noted that Professor Zeliaś contributed to the development of higher education in Poland and was active primarily in organisation of research in the field of statistics and econometrics. Since 1992, after the institute-level structure was abolished at the Academy of Economics in Cracow, he was the head of the Chair of Statistics. In 1988, he was elected to the Main Council of Higher Education, and in 1991–1996, was the head of the Section of Economic Universities at that council.

In 1995–1996, he was a vice-rector of the Chrzanów School of Entrepreneurship and Marketing and its rector in 1996–2005.

One of Professor Zeliaś's most important contributions to the development of statistics and econometrics was his works since 1993 as the chairman of the Committee for Statistics and Econometrics of the Polish Academy of Sciences. His personal contribution to research and organisational activities and the improvement to the prestige of the committee cannot be overrated. Professor Zeliaś was also active in the Cracow Branch of the Polish Academy of Sciences as a member of the Commission for Economic Sciences, Commission for Statistics and Demography, and the Commission of Organisation and Management Sciences at the Cracow Branch of the Polish Academy of Sciences.

From 1994 to his death, he was also a member of Central Commission for Academic Title and Degrees, and since 1999, the chairman of Section II of Economic Sciences of the Central Commission. His activity in that commission aimed at maintaining high level of dissertations submitted in order to earn the academic title and degrees, but he was benevolent to the candidates for the academic degrees and the title of professor of economic sciences.

Professor Zeliaś also made significant contribution to the improvement of statistical information and organisation of statistical surveys as a member of the Scientific Statistical Council of the Central Statistical Office and a member of the presidium since 1994 and the vice-president of the Polish Statistical Association since 2000.

In order to honour Professor Zeliaś's achievements in the field of research and organisation, the Academy of Economics in Wrocław awarded him the degree of doctor honoris causa on 26th November 1996. Professor Zeliaś's was also held in high esteem on the international forum, which was manifested by his election as an ordinary member of the International Academy of Computer Science and Systems in 1997, and an ordinary member of the International Statistical Institute in 1999.

In the 1990s, Professor Zeliaś and his team continued their research, this time under State Committee for Scientific Research grants, and published their results in successive books. The most important ones include: *Spatial econometrics* (Ekonometria przestrzenna), PWE, Warszawa 1991 and *Statistical methods of risk assessment in entrepreneurship* (Statystyczne metody oceny ryzyka w działalności gospodarczej), AE w Krakowie, Kraków 1998. In that period, he focused particularly on academic cooperation with neighbouring countries, namely Germany, Slovakia, and Ukraine.

In 2000s, he continued his organisational, research and didactic activities, which had developed in the 1990s. It led to further recognition on the international forum. It was shown by the fact that he was awarded the degree of doctor honoris causa by the University of Economics in Bratislava on 16th October 2002. His particular achievements at that time include also publication of the nationwide statistics textbook *Statistical methods* (Metody statystyczne), PWE Warszawa 2000, and another one, written jointly

with his students, *Statistical methods. Exercises and tests* (Metody statystyczne. Zadania i sprawdziany), PWE Warszawa 2002.

Another important achievement is the fact that Professor Zeliaś taught numerous Polish statisticians and econometrists, many of whom are now known professors in Poland and abroad. Professor Zeliaś supervised 19 doctoral dissertations to completion, reviewed 50 doctoral dissertations and post-doctoral degree (habilitation) theses. He was also a reviewer of 14 applications for the title of professor of academic sciences and the author of many opinions related to promotions prepared for the Central Commission for Academic Title and Degrees and related to promotions to associate professor, commissioned by numerous higher education institutions.

Professor Zeliaś was also a member of the Econometrics, Statistics and Demography Section (H02B) of the Social, Economic and Legal Sciences Unit at the State Committee for Scientific Research during many research project competitions.

Another important field of his activity was involvement in editorial committees and programme councils of many academic journals. He was e.g.: the editor-in-chief of "Kwartalnik Statystyczny" (Statistics Quarterly), member of the Editorial Committees of "Statistics in Transition", "Badania Operacyjne i Decyzje" (Operational Surveys and Decisions), member of the programme councils of "Argumenta Oeconomica", "Journal of Economics and Management" and "The Scientific Journal of Economics and Management".

The recognition for Professor Zeliaś's academic and organisational work resulted in numerous state decorations and honours. The most important ones include: Golden Cross of Merit (1979), Knight's Cross of the Order of Polonia Restituta (1984), Officer's Cross of the Order of Polonia Resitituta (1999), Medal of the National Education Commission (1982). He was also received many honours awarded by universities, regional authorities, ministries and civil society organisations. He also received over 20 individual and group awards and over 30 awards of the Rector of the Academy of Economics in Cracow for research, didactic and organisational work for his home institution.

Professor zw. Dr. hab Aleksander Zeliaś died on 14th February 2006, before his 67th birthday. The widespread respect and recognition among econometrists and statisticians resulted from his achievements in research, his role as an organiser, and above all, from his personal traits, diligence, reliability, and benevolence.

JÓZEF POCIECHA

Ryszard ZIELIŃSKI (1932–2012)

Ryszard Zieliński was born on July 1, 1932 in Warsaw, where he lived until the fall of the Warsaw Uprising. After the Uprising, together with his mother and younger siblings he found himself in a resettlement camp in Pruszków near Warsaw. After World War II, he settled in nearby Piastów. In 1950 he began his studies at the Central School of Planning and Statistics and completed the first degree of in Statistical Quality Control in 1953. In 1955 he defended his master's thesis at the CSP&S entitled *"The Power of Control Chart for Individual Observations"* (Moc karty kontrolnej indywidualnych wartości). It was written under the supervision of Professor Wiesław Sadowski. Shortly after his studies, Ryszard Zieliński took up a job at the Rosa Luxemburg Electric Lamps Production Plant as a senior engineer in the Technical Control Unit, and afterwards – as a specialist in the field of quality control. In 1961, he defended his doctoral thesis at the CSP&S under the direction of Wiesław Sadowski. At that time, he also took up extramural studies at the Faculty of Mathematics and Physics of the University of Warsaw. He graduated in 1963 with a master's degree in mathematics.

On 30 June 1959, at his own request, he left the Rosa Luxemburg Plant, and from 1 July 1959 to 30 October 1963 he worked at the Mathematical Machines Experimental Manufacturing Plant. From November 2, 1963 to September 30, 1965, he was employed at the Air Force Technical Institute. Simultaneously he worked at the Institute of Mathematics of the Polish Academy of Sciences, initially (from March 1, 1960) part-time, and from October 1, 1965 – full-time. He maintained close ties with the Institute until the end of his life. In 1976, he received his post-doctoral degree (habilitation) in mathematics, and in 1988 – the title of professor of mathematics. In 1997 Ryszard Zieliński was appointed professor at the Institute of Mathematics of the Polish Academy of Sciences.

Ryszard Zieliński's scientific activity focused on mathematical statistics (Monte Carlo methods and random number generators; stochastic approximation; robust-

ness; non-parametric estimation of quantiles of distribution, and applications of statistics).

Ryszard Zieliński's scientific works include almost 150 papers. These include original publications, application works, books, translations, and others. His first published work dates back to 1956, while the last one was published in print in 2012. The list of Ryszard Zieliński's works was published in *"Mathematica Applicanda"* (no. 40(2) of 2012).

The research done by Ryszard Zieliński was motivated by his curiosity and inquisitive mind. It seems that the opinion he received in 1959 when leaving the Rosa Luxemburg Plant: *"he was a very thorough, conscientious, and disciplined man with great creative initiative and organizational mind"* is an excellent description of his approach to work.

Apart from scientific activity, Ryszard Zieliński cooperated with students and young researchers. Throughout his career, he supervised the dissertations of fourteen PhD students, including eleven in Poland and three abroad.

Ryszard Zieliński was one of the co-creators of the Conference of Mathematics in Applications and the "Mathematical Statistics" Conference (known among statisticians as the "Vistula"). For many years he was very active in the programme and organizational committees of these conferences, having a strong impact on their forms. He was also one of the initiators of the Commission of Mathematical Statistics of the Committee of Mathematics of the Polish Academy of Sciences. For several terms he held the position of its chairman He was a member of editorial boards of many scientific journals, among others, *Applied Mathematics* (Matematyka Stosowana), *Applicationes Mathematicae, Statistics.*

Educational activity was an integral element of Ryszard Zieliński's work. Since the 1960s, he was a lecturer of Mathematics Application Courses organized by Institute of Mathematics of the Polish Academy of Sciences at the University of Warsaw, Warsaw University of Technology and the School of Science. He was always prepared for classes. His lectures were organized in a logical and coherent manner. The Professor's didactic activity resulted in his book *"Seven Introductory Lectures to Mathematical Statistics"* (Siedem wykładów wprowadzających do statystyki matematycznej), PWN, 1990, which is perceived in Poland as one of the best, although challenging, textbooks on mathematical statistics. In recent years Ryszard Zieliński conducted lectures at the Centre for Advanced Studies of the Warsaw University of Technology.

In the 1970s Ryszard Zieliński was one of the people working on introducing probability calculus into the curriculum of secondary schools. This resulted in the textbook *"Probability Theory and Elements of Mathematical Statistics"* (Rachunek prawdopodobieństwa z elementami statystyki matematycznej), *PZWS, 1973*, which had three editions. The book extended the standard course in probability and was addressed to students who attended extracurricular classes. Ryszard Zieliński was also a populariser of mathematical statistics. His series of articles published in *Delta* from 1975 to 1978 is the best example of his activity in this area.

Ryszard Zieliński had very broad interests, reaching far beyond statistics. He was interested in literature, film, theatre, music, and tourism.

He was married once, with one son, three grandchildren and two great-grandchildren.

Professor Ryszard Zieliński died on 30 April 2012. He is buried at the Powązki Military Cemetery in Warsaw.

References

Zieliński family archive
Catalogues of the National Library

WOJCIECH ZIELIŃSKI

Stefan ZUBRZYCKI (1927–1968)

Stefan Zubrzycki's name was first mentioned in mathematical circles in the spring of 1948 on the list of students taking part in a junior seminar conducted by Hugo Steinhaus. It was held at the Faculty of Mathematics, Physics and Chemistry, which was then shared by the then-combined University of Wrocław and the Wrocław University of Science and Technology. The seminar was attended by twenty four students, who had been carefully selected from the entire faculty. On 7th October that year, Hugo Steinhaus's seminar on applied mathematics was inaugurated, and its core was formed by students of the junior seminar and a few people who had graduated before World War II. Many excellent scholars who then took part in managing mathematical research in Wrocław in the following decades came from that group. The seminar was continued until the 1970s, and 752 sessions were held. Stefan Zubrzycki was soon honoured by being entrusted with preparing minutes of the meetings. The surviving records make it possible to outline the issues discussed there but also to see the precision and concision of the style.

When conducting the seminar, Hugo Steinhaus observed the custom requiring the division of the room into the Greek part for professors and the Latin part for students. He also had a custom of restating various definitions to students, e.g. the definition of game theory or statistics, and Stefan Zubrzycki was usually called to the blackboard for that purpose. The students sometimes failed to comprehend the concise definitions and asked for explanations. He responded by repeating the sentence verbatim and responding that a thought can be formulated well in only one particular manner and a good work is spoilt in many ways.

The notes from the seminar show Steinhaus's way of thinking. He implemented the agenda set out in the manifesto known as the ways of applied mathematics. It was a specific cognitive process starting from a certain practical report, which was followed

by preliminary attempts at formulating a problem, which then led to a solution. This unrestricted train of thought did not always go straightly towards the goal. Stefan Zubrzycki was indubitably one of Hugo Steinhaus's most talented students, but his reputation was similar to that of Attila's, *flagellum Dei*, a bungle buster who spared no one. Thus, e.g., in December 1956, a guest came to the seminar and presented the problem now known as the division of labour problem. It concerned division of work among many employees whose efficiency differed and who held various posts. Julian Perkal soon found the solution to the problem and, jointly with Jerzy Battek, designed a mechanical device that implemented that solution. Jan Oderfeld then reported that the problem was known in operations research as a linear programming problem. Stefan Zubrzycki concluded that debate with his presentation on operations research and became an expert in that field.

Stefan Zubrzycki was born in Zawichost, in Sandomierz area, on 26th March 1927. He passed his matriculation examination (Matura exam) in Kielce in 1946 and studied mathematics in Wrocław in 1946–1950. In 1948, he became an assistant at the Faculty of Mathematics, Physics and Chemistry of the University of Wrocław. In 1949, he started working at the State Mathematical Institute (which later became the Institute of Mathematics of the Polish Academy of Sciences). In 1958–1963, he worked as a docent and the head of the Chair of Mathematics at the Higher School of Economics in Wrocław (the modern University of Economics). In 1964–1965, he was employed as a docent at the Higher School of Agriculture (now named Wrocław University of Environmental and Life Sciences), where he managed the Chair of Statistics. In 1965, he was appointed associate professor and head of the Department of Natural, Economic and Technical Applications at the Institute of Mathematics of the Polish Academy of Sciences. In academic year 1964/1965, he lectured at the University of Washington, Seattle, WA.

Stefan Zubrzycki's master's thesis, *An attempt at mathematical treatment of relief as an erosion factor* (Próba matematycznego ujęcia rzeźby terenu jako czynnika erozji), which was written in 1950 and published in Annals of Agricultural Science ("Roczniki Nauk Rolniczych") (71-F-1, 1955, pp. 45–5) and "Applicationes Mathematicae" (2 (1954), pp. 390–398) is characterised by great originality. The starting point was based on experts' assessments of the susceptibility of plots shown on 1:25000 scale maps with contour lines every 10 metres to erosion. Stefan Zubrzycki supplemented the data by reading such characteristics as the number and length of contour lines of various elevations and the terrain elevation above sea level, and then estimated the experts' opinions using regression. The analysis of the experts' opinion showed their variability, and the variance of estimates confirmed the accuracy of the approximation. This work can serve as a pattern for analysis of innumerable similar situations.

Stefan Zubrzycki earned the doctoral degree in 1954 based on the dissertation titled *Exchangeable random variables in de Finetti sense* (Zmienne losowe równoważne w sensie de Finettiego), written under the supervision of Hugo Steinhaus. He was awarded the degree of doctor of mathematical science (equivalent to the modern post-doctoral degree (habilitation) based on the dissertation on probabilistic methods for estimating

geological deposits, and as a result, was appointed docent at the University of Wrocław in 1957.

The complete list of Stefan Zubrzycki's publications can be found in a note by B. Kopociński and J. Łukaszewicz, which was published in "Wiadomości Matematyczne", (13 (1971), pp. 63–65). The work of his life concerned mathematical modelling of geological deposits. As regards studying deposits, Stefan Zubrzycki proposes assuming that deposit thickness at every point p of the analysed area is a random variable (*p*). Then the assumption is made about random variables *y(p)* that they form a stationary, isotropic and continuous stochastic process, namely they have the same expected value $E(y(p))=m$ and the same variance $D^2(y(p))=\sigma^2$ and that correlation *R (y(p), (y(q)* of random variables *(y(p)*, *(y(q)* depends only on the distance *d=d(p,q)* of points *p* and *q*: *R(y(p), (y(q) = f(d)*, with the function *f(d)*, called the covariance function of the process, is continuous at 0. The issue of estimating the reserve of the deposit consisted in estimating the average reserve in area *D*:

$$y = \frac{1}{|D|}\iint_D y(p)dp,$$

where $|D|$ means the area of *D*.

y is estimated by drilling probe holes at selected points in area *D*. This results in observations $y(p)_i$, where $p_i (i=1,2,...,n)$ are points within area *D*. Of course, the estimation error depends on the choice of the estimator for the random variable, the locations of observation points in area *D*, and on the covariance function of the deposit, which here characterises its variability.

In his extensive publication *On Estimating Gangue Parameters* (O szacowaniu parametrów złóż geologicznych) ("Applicationes Mathematicae" 3 (1958) pp. 105–153), Stefan Zubrzycki examines the efficiency of various estimators in the class of estimators that are linear functions of observation with in cases where probe hole locations are fixed. He also solves the problem related to estimation of the covariance function of the deposit based on observations biased with random error. He uses the example of the Upper Silesian zinc deposits to find empirical covariance functions and approximates them using several theoretical covariance functions, and as it turned out, the exponential function was the best match.

In his further reflection, Stefan Zubrzycki assumes that the estimator for the deposit thickness is the arithmetic mean of the observations and sought the locations for probe holes. As the covariance function of a stochastic process can in practice be merely approximated, it is natural to ask whether it is possible to compare the basic sampling methods, namely random, stratified and systematic sampling, in certain classes of covariance functions. A similar issues for stochastic processes on a line had previously been examined by many authors, and the answer to the question is quite general, namely for stationary process with a convex covariance function, systematic sampling

is the most efficient in the class of ways to locate observations where their expected number on every line segment is proportional to the length of that segment. For a stochastic process on a plane, Stefan Zubrzycki proved that random sampling is less efficient than stratified sampling and that it cannot be a general proof of whether systematic or stratified sampling is better, even with far-reaching restrictions on the form of the covariance function and the shape of the strata.

Zubrzycki studied the impact of regular sample networks on sampling efficiency jointly with Tore Dalenius and Jaroslav Hájek. In order to avoid the influence of the margin of the area *D* on the shape of the network of points where the observations are made, marginal assessments of the network on the area stretching to the entire plane are examined. Consideration of the network of points *N=(p1,p2,...)* with specific density *g(N)* defined by formula:

$$g(N) = \lim_{R\to\infty} \frac{n_R}{\pi R^2},$$

where $\overline{n}_R$ is the number of points of network N in disc *K*(0,*R*) with the centre at point 0 and radius *R*. The efficiency of a specific network of samples is defined by the limiting value of the estimator

$$s^2(N) = \lim_{R\to\infty} n_R D^2(\bar{y}_R),$$

where y_R is the arithmetic mean of observations within disc *K*(0,*R*). Counter-examples described in the next publication show that there is no generally best network because the shape of the optimum network depends on the covariance function of the process and also on the density of the network.

The issue of estimation is raised in the next publication titled *Large Sample Analysis Of A Problem In Ecology Or The Hunting For Snails* (Wielkopróbkowa analiza pewnego zadania ekologicznego, czyli pogoń za ślimakami) ("Applicationes Mathematicae" 11 (1970), pp. 377–389). The problem was presented by Adam Łomnicki, who suggested the use of the capture and mark method. Stefan Zubrzycki presented a method for studying a population of animals that can move and hide in the ground, thus disappearing from an observer's field of view. The issue of estimating populations formed a starting point for more general statistical reflection on estimating parameter $\beta=1/\alpha$ of random variable *X* with a gamma distribution in the form:

$$g(x|\lambda) = \frac{\lambda^s}{\Gamma(s)} x^{s-1} e^{-\lambda x}, \quad x > 0,$$

where it is known that the parameter satisfies inequality $0 < \alpha \leq \alpha_0 < \infty$. Adopting the function:

$$L(\beta, \beta') = (\beta - \beta')^2 / b^2$$

as a loss if β is estimated through β', Stefan Zubrzycki proved that estimators

$$\widehat{\beta}\,(X) = \frac{X}{s+1} + b,$$

where

$$0 \leq b \leq \frac{2}{\lambda_0(s+1)}$$

are minimax estimators that only these estimators are minimax in the class of linear estimators and that only those are admissible in the class of linear estimators for which the following inequalities are satisfied:

$$\frac{1}{\lambda_0(s+1)} \leq b \leq \frac{2}{\lambda_0(s+1)}.$$

In two publications on statistical quality control, Stefan Zubrzycki discussed the approval methods for water meters. These works include proposals for improvements to the methods then in use by considering an analysis of two kinds of water meter errors: systematic and random errors. Another issue in the field of statistical quality control, which he analysed jointly with Hugo Steinhaus, was comparison of two Poisson streams and building on the authors' earlier observations regarding the relation between probability and reliability.

In a series of works by many authors, Stefan Zubrzycki looks for the best distribution of sampling points in a solid of amorphous commodity in order to make the best possible estimation of the average value of that commodity. In doing so, he assumes that there is known information on the function describing the distribution of the studied characteristic within the solid filled with the commodity. For a broad class of functions describing the values of the studied characteristic, he determined the minimax formulas of approximate integrals, which provided the solution to the problem.

Stefan Zubrzycki's didactic activities at the Institute of Mathematics of the Polish Academy of Sciences consisted in conducting a seminar where a large group of students and graduates of various universities earned experience in research on mathematical applications. Stefan Zubrzycki also organised other seminars, including a seminar on mathematical statistics, which was taken over by Witold Klonecki after Zubrzycki's death. Even in the period when Stefan Zubrzycki worked only at the Institute of Mathematics of the Polish Academy of Sciences, he lectured on mathematical statistics, variance analysis and experimental design and supervised master's theses at the University of Wrocław. His lectures at that university served as the basis for the textbook titled *Lectures on probability and mathematical statistics* (Wykłady z rachunku prawdopodobieństwa i statystyki matematycznej), published as part of the „Biblioteka Matematyczna" series (Vol. 27, PWN (Państwowe Wydawnictwo Naukowe) 1966). Based on the lectures given during the operations research

course at the Institute of Mathematics of the Polish Academy of Sciences, Stefan Zubrzycki wrote an academic script on game theory, which was then extended and made into a chapter in a joint publication titled *Elements of modern mathematics for engineers* (Elementy nowoczesnej matematyki dla inżynierów) (PWN 1971, pp. 185–231).

In 1958, Stefan Zubrzycki became a member of the Editorial Committee of "Applicationes Mathematicae". He was also a member of the Editorial Committee and the secretary of the editorial team of "Colloquium Mathematicum". After Julian Perkal's death, he edited "Biometrical Letters" since 1965.

Stefan Zubrzycki died on 18th December, at the age of 41. He is buried in St. Lawrence Cemetery in Wroclaw.

KOPOCIŃSKI BOLESŁAW

Authors of biographical notes

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22. **Zieliński Wojciech**, professor, Warsaw University of Life Sciences.