

Volume 85 • Issue 2

2012

GEOGRAPHIA POLONICA



INSTITUTE OF GEOGRAPHY AND SPATIAL ORGANIZATION
POLISH ACADEMY OF SCIENCES

GEOGRAPHIA POLONICA

MACROECOLOGICAL PROCESSES

PUBLISHED by the Institute of Geography and Spatial Organization,
Polish Academy of Sciences, Warsaw, Poland

Geographia Polonica is co-financed
by the Ministry of Science and Higher Education
under the INDEX PLUS Programme (2012-2014)

EDITORIAL OFFICE:

Twarda 51/55, 00-818 Warsaw, Poland
Phone (48 22) 6978-858, Fax (48 22) 620-62-21.

**CONTRIBUTIONS and CORRESPONDENCE related to editorial matters
should be sent to the Editor: geographia.polonica@twarda.pan.pl**

© COPYRIGHT by the Institute of Geography and Spatial Organization,
Polish Academy of Sciences, Warsaw, Poland

Authors' submission of papers to the Geographia Polonica journal is tantamount to their
expressing consent for the free publication of their papers by the Institute of Geography
and Spatial Organization PAS both in print and electronic formats

SUBSCRIPTION INFORMATION: Geographia Polonica (ISSN 0016-7282 print)
is published quarterly by the
Institute of Geography and Spatial Organization,
Polish Academy of Sciences

SUBSCRIPTION ORDERS for Geographia Polonica can be placed with:
ARS POLONA, Obrońców 25; 03-933 Warsaw, Poland
www.arspolona.com.pl

ISSN 0016-7282

ACCESS TO THIS JOURNAL, information on the content
and forthcoming issues are available free online at:

<http://www.geographiapolonica.pl>

Volume 85 Issue 2 edited by Jacek WOLSKI, Bożenna GRABIŃSKA and Ewa ROO-ZIELIŃSKA

PREPARED FOR PRINT
by Elżbieta Giżyńska

PRINT

Poligrafia Inspektoratu Towarzystwa Salezjańskiego
Bałuckiego 8, 30-318 Cracow, Poland

CONTENTS

ARTICLES

BJÖRN BERG

Scots pine needle litter – can it offer a mechanism for carbon sequestration? Presentation of a theory 13

ANDRZEJ BYTNEROWICZ • WITOLD FRĄCZEK

Large-scale monitoring of air pollution in remote and ecologically important areas 25

RYSZARD LASKOWSKI

What determines forest litter decomposition? Global trends and local variance 39

KAZIMIERZ RYKOWSKI

The basics of sustainable forest management in Forest Promotional Complexes 47

KRZYSZTOF BŁAŻEJCZYK • ANNA BŁAŻEJCZYK

Changes in UV radiation intensity and their possible impact on skin cancer in Poland 57

EWA ROO-ZIELIŃSKA • BOŻENNA GRABIŃSKA

Ecosystem services – classification and different approaches at various levels of biosphere organisation
– a literature review 65

JERZY SOLON • MAREK DEGÓRSKI

Geographical patterns of selected features of the soil and herb layer in central
and north European scots pine forests 83

JACEK WOLSKI

Down dead wood in a forest – still an obstacle to forest management or already an ecological issue? 97

THIS VOLUME
IS DEDICATED TO PROFESSOR
ALICJA BREYMEYER
ON 80TH BIRTHDAY ANNIVERSARY



Professor Alicja Brey Meyer during field studies (June 1995).

Alicja,

It is my great pleasure to extend my congratulatory note to you, my very special friend and colleague, on this the occasion of your 80th birthday celebration.

As a former US project leader on cooperative international environmental research projects in various parts of the world, I can honestly say that our collaboration with you and your excellent Polish colleagues was one of the most productive and enjoyable in my experience. I will always remember our first meeting, nearly 25 years ago when you headed a Polish delegation to the US to engage in discussions with American experts on building US/Poland cooperative research projects of mutual interest. Members of our host American team quickly recognized your outstanding leadership attributes, as well as your scientific acumen, and concluded that you would be the perfect scientist with whom we could work in building a cooperative program.

As the collaboration flourished, our respect and admiration for you grew even stronger. Thanks to your leadership, that initial meeting led to many years of productive, cooperative research that expanded, due in large part to your efforts, to include collaborations (including field expeditions) beyond your country's borders in nearly a dozen other countries in your region.

Your brilliant mind, untiring dedication, and outstanding leadership are just three of your many attributes that make you worthy of the highest praise. You truly are a model for those who follow to emulate. I feel privileged to have had the opportunity to work with you and am proud to claim you as one of my most outstanding colleagues – and BEST FRIEND.

I hope you enjoy this occasion to the fullest and that you have many more years of good health, happiness and success.

Reg

Reginald D. Noble
Professor & Chair Emeritus
Department of Biological Sciences
Bowling Green State University
Bowling Green, Ohio 43402, USA
&
Retired, Director Center
for International Environmental Programs

To Professor Alicja Breymeyer: a summa on your 80th birthday

Professor Alicja Breymeyer, doctor habilitatus, is an ecologist who for nearly 40 years has been professionally connected with the Polish Academy of Sciences Institute of Geography and Spatial Organization. Though not a geographer by education, her research interests fall within the broadly defined area of macroecology, i.e. the identification of the mechanisms of functioning of ecosystems at various geographical scales and the assessment of an ecosystem's resilience to external factors, including anthropopression. Prof. Breymeyer's research has been invariably concerned with spatial analyses, and the results of her work place her among the most prominent macroecologists both in Poland and abroad.

Alicja Irena Breymeyer was born on 20 October 1932 in the town of Siedlce, where she spent her childhood and early youth, which was brutally interrupted by the war. The Second World War did not spare her family from its atrocities. Her father, the family's only bread-winner, died of typhoid fever in 1941. After his death, the family had to make ends meet by selling their estate. In Siedlce, Alicja Breymeyer attended primary school as well as the Queen Jadwiga Junior Secondary School and Comprehensive Secondary School. After taking her school-leaving exams in 1949, she went to Warsaw to read Biology at the University of Warsaw. Three years later, she moved to the Faculty of Philosophy, but still maintained an interest in the study of nature. Her academic endeavours led to the writing of her Master's thesis, which was a critical analysis of the views on competition and abundance control in animal populations which had been proposed by selected schools among American ecologists.

During her university studies, she not only acquired theoretical knowledge, but also began her professional career. She was just a second-year student in 1952 when she started working as a technician at the Polish Academy of Sciences' Department of Ecology, to become a technical assistant during her final year at university and, later, a scientific-technical assistant.

Following her graduation, Alicja Breymeyer started research in Kampinos Forest under the supervision of Prof. Kazimierz Petruszewicz. She set out to investigate the behaviour patterns of competing assemblages of epigeic predatory invertebrates in forest and meadow communities. She published her results in a paper titled "Relations between wandering spiders and other epigeic predatory arthropods", which she presented in 1965 as her doctoral dissertation.

Alicja Breymeyer then flung herself energetically into organising the Laboratory of Grassland Ecosystems, a new research unit with the PAS Department of Ecology. When the Department became the Institute of Ecology, Dr. Breymeyer stood at the head of the now Department of Grassland Ecosystems, with approximately 40 employees. Managing such a large team was a new experience for Alicja Breymeyer and she honed her organisational and science management skills.

The latter half of the 1960's was also a period in which she joined the international academic community and commenced active co-operation with numerous foreign centres. In 1965, Dr. Breymeyer attended a 6-month scholarship at Georgia State University, where she enjoyed the unique opportunity of working under Prof. Eugene Odum, the eminent founder of ecosystem ecology. Upon returning to Poland, the research work carried out at the Department became part of the International Biological Programme. In 1969, she took part in the Programme's seminar in Canada

and became a member of the Co-ordinating Committee for the Grassland Biome. She focused her investigations of grassland ecosystems on the meadows of the Vistula Valley and the pastures of the Pieniny Mountains, and later the Colorado prairie and savannas in Panama and Venezuela. The research was made possible by scholarships she was awarded by the Smithsonian Institution to finance her 9-month stay in Latin America in 1971, by the State University in Fort Collins for a 10-month stay in the USA in 1973, and by Universidad Central de Venezuela in Caracas for a year's stay in South America in 1974.

Following a re-organisation at the PAS Institute of Ecology in 1974, the Department of Grassland Ecosystems was disbanded. Alicja Brey Meyer moved to the Institute of Geography and Spatial Organization, also a unit within the Polish Academy of Sciences. Thanks to the kind attitude of the geographers' community, she was able to continue her research on ecosystem geography. She focused on comparative studies of pasture ecosystems in the Pieniny Mountains and the Balkan mountain range in Bulgaria. She used the results of her investigations of ecosystems of the South American savannas, Russian steppes, North American prairies and European pastures and meadows to present a tentative comparative synthesis of the structures and functioning of grassland ecosystems on a global scale. She published the fruits of her work as "An Analysis of the trophic structure of some grassland ecosystems", which she presented as the habilitation (higher doctorate) dissertation at the Faculty of Biology of the University of Warsaw, and was accordingly awarded the degree of doctor *habilitatus* in 1976.

Her last grassland ecosystem enterprise was a research expedition to Mongolia, which she organised in 1979 to study the production and decomposition of organic matter in the dry steppes. On returning to Poland, she changed the focus of her research for the decades to come to the ecosystems of forests, and particularly, coniferous forests. Her work as a scientist can thus be divided into two periods, when she chose to study different objects. Prof. Brey Meyer is still actively pursuing studies of coniferous forest ecosystems. A special place in her work is occupied by the evaluation of organic matter accumulation and degradation with regard to the geographical location of the ecosystem of interest. In the 1990's, when she became head of the Department of Geocology at the Institute of Geography and Spatial Organization, a post she held until 2002, Prof. Brey Meyer initiated and co-organised several international research projects that analyzed the functioning of pine forest ecosystems on a supraregional and continental scale. She carried out research in Sweden, Finland, Estonia, Latvia, Lithuania, Belarus, Germany, Poland and the USA. Prof. Brey Meyer and her colleagues published several papers representing supraregional synopses of the properties and functioning of pine forest ecosystems. The results of studies carried out in this period can still be found in the present volume.

In recognition of Alicja Brey Meyer's achievements in science, she was awarded the title of Professor Extraordinary in 1987, followed by that of Professor Ordinary, conferred by the President of Poland in 1997. She also received a Golden Cross of Merit.

Her scientific output includes being the author or editor of nearly 20 books and over 100 papers, most of which were published abroad.

Apart from research work, an important area of activity for Prof. Alicja Brey Meyer has been work in scientific organisations. In the early 1970's, she took up positions in the "Man and the Environment" Committee of the Polish Academy of Sciences, the PAS Committee of Ecology, and the Polish SCOPE Committee, ultimately rising to the posts of president or vice-president of these organisations. In the 1990's, she was also vice-president of the International Co-ordinating Council of UNESCO-MAB and vice-president and president of the EURO-MAB office. In the same period, she was a co-founder of the Polish Ecological Society and was its president for many years.

After her retirement in 2002, Professor Brey Meyer invested all her energy in her work for the Polish National Collaborating Committee of the Scientific Committee on Problems of the Environment (ICSU-SCOPE) and the "Man and Biosphere" International Programme (UNESCO-MAB) at

the Presidium of the PAS. Her committed involvement in the compilation of documentation regarding biosphere reserves being formed in Poland, and particularly transborder biosphere reserves situated in areas of natural value belonging to two or three neighbouring countries, were appreciated by the Polish authorities. In September 2012, she received an acknowledgement letter from the Undersecretary of State at the Ministry for the Environment, Chief Nature Conservator, for the work she had initiated and the many years of effort and profound commitment to the creation of domestic and transborder biosphere reserves, and the action that had been taken to protect the natural values and enable sustainable development of these areas.

This synopsis of the academic output and activity of Professor Alicja Breymeyer would not be complete without a few words about her personality. Prof. Breymeyer has an impressive passion for research and consistently accomplishes her goals. It was these personality traits that, when combined with her immense optimism, hard work and perseverance, have led her to numerous successes during her career.

On a more personal note, I have had the pleasure of collaborating with Professor Breymeyer since 1992 for a large number of research projects. She always displayed exceptional stamina and inexhaustible energy. When we were doing fieldwork, in the evenings, when everyone was tired after a hard day's work and dreaming of a good night's sleep, Professor Breymeyer would invite us to scientific debates that often ended after midnight. By participating in these projects, many of us were able to become acquainted with the latest techniques used in geographical environment analyses in the USA and European countries, as well as conducting research, the results of which later emerged in numerous valuable publications.

On the occasion of your Jubilee, we wish you many healthy years and more scientific and organisational work. May the positive energy that is so characteristic of you never leave you.

prof. Marek Degórski
Director, Institute of Geography
and Spatial Organization,
Polish Academy of Sciences

