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POLAR ECOSYSTEMS

Polar regions of the Earth are still not sufficiently explored. Frozen lands and stormy seas are hostile areas, despite their fascinating beauty. But in the past these regions were not so cold. Their climate, flora and fauna changed during millions of years. Studies of polar regions allow us to understand these changes and therefore are of global importance.

Unknown phenomena and unknown organisms attract the scientists of the whole world. Also Polish scientists for many decades participated in the studies of polar regions. Our country established two permanent polar stations — on Spitsbergen in the Arctic and on King George Island in the Antarctic. Polish Academy of Sciences and many other scientific institutions organize Arctic and Antarctic expeditions every year.

Polish polar researchers have already significant achievements, especially in the fields of life and Earth sciences, our publications are more and more recognized and cited (see KOSMOS 32, 2, 1983). The Committee on Polar Research of the Polish Academy of Sciences, acting for more than 20 years, publishes a scientific quarterly "Polish Polar Research" and a popular-scientific journal "Biuletyn Polarny".

Years 1997–1999 are full of anniversaries marking Polish polar activity: centennial of participation of Poles H. Arctowski and A.B. Dobrowolski, in the Antarctic "Belgica" Expedition (see Polish Polar Research 19, 1–2, 1998), 40th anniversary of the Polish Arctic Station on Spitsbergen (Svalbard) (see Pol. Polar Res. 18, 3–4, 1998) and 20th anniversary of the Polish Antarctic Station H. Arctowski on King George Island (South Shetland Islands) (see Pol. Polar Res. 17, 3–4, 1996).

The aim of this issue of KOSMOS is an attempt at the popularization of the actual knowledge on the past and the contemporary

polar ecosystems. The authors of particular articles are experienced members of polar expeditions who have had the opportunity to visit the Arctic and the Antarctic and whose scientific interest lie in these very regions of the Earth.

Permian strata of Spitsbergen in the Arctic contain significant geological and paleontological record. K. MAŁKOWSKI has been interested in this problem for some time, in his review paper on the Arctic marine Permian ecosystem this author suggests that paleoecological and isotopic data may lead to the development of the nonactualistic stratified ocean hypothesis. Antarctica is an important source of information on the Cenozoic cryosphere and events which led to its development about 50 million years ago. The contribution by K. BIRKENMAJER deals with the Antarctic Cenozoic glacial record and paleoclimatic history. The Cretaceous-Tertiary floras of South Shetland Islands and Antarctic Peninsula are discussed by E. ZASTAWIAK in the light of climatic changes during this time period. The Seymour Island explored by the Swedish South Polar Expedition at the beginning of this century has proved to be one of the key fossil localities in Antarctica, the Eocene La Meseta Formation is the principal fossiliferous unit. The results of paleobiological studies of this formation is the subject of A. GAŹDZICKI'S paper. Rich information on Cenozoic Antarctic brachiopods and bryozoans are reviewed in papers by M. A. BITNER and U. HARA.

Further eleven articles are discussing the contemporary polar ecosystems. Some of these papers present very wide spectra of Arctic or Antarctic ecological problems, some other deal mainly with the ecosystem of Admiralty Bay, the region where biological processes occurring in the Southern Ocean can be thoroughly investigated in smaller scale.

M. OLECH and E. DUBIEL are presenting plant associations of Arctic tundra, whereas J.M. WESŁAWSKI discusses main problems related to biological and ecological studies on marine organisms inhabiting the Arctic Ocean. An article of M. ZDANOWSKI and J. VOSJAN gives a review of psychrofilic bacteria of the Southern Ocean with notes on the influence of UV-radiation on these organisms. R. LIGOWSKI presents an ample review of the key role of the diatoms in the Antarctic marine ecosystem, indicating that along with the pelagic realm also the sublittoral bottom and the sea ice undersurface are habitats where diatoms are the source of a considerable primary production. K. JAZDZEWSKI and J. SICIŃSKI, basing on the ample literature, are discussing the actual knowledge of the bottom fauna of the Southern Ocean. It is a highly endemic fauna, very diverse and rich in terms of abundance and biomass. Considerable contribution of Polish biologists to the Antarctic benthos studies is presented. K. OPALIŃSKI and K. MACIEJEWSKA with eloquence and in light style are presenting the key ecological role of krill played in the Antarctic ecosystem. Their views on the composition of the krill diet and on its position in the Antarctic trophic web are rather non-conventional. Antarctic fishes, a group with an especially high level of endemism, are presented by J. KULESZ. The author concentrates upon important contribution of

Polish ichthyologists to the Southern Ocean biology. P. CIAPUTA discusses the results of long-term monitoring, mostly based on Polish observations on the breeding colonies of three pygoscelid penguin species nesting every year on the shores of Admiralty Bay, whereas K. SALWICKA summarizes information on the Antarctic pinnipeds, based principally on the data gathered by Polish scientists who have monitored these mammals in the Admiralty Bay region. M. OLECH presents the plant cover of Antarctic land biota; this tundra is much poorer than the Arctic one. An article by S. RAKUSA-SUSZCZEWSKI is an attempt at the synthesis of long lasting observations of anthropogenic changes in the Antarctic ecosystem. As a model for presenting these changes Admiralty Bay region was chosen; this region is very well known owing to the activity of Polish H. Arctowski Station, founded there more than 20 years ago.

We hope that this issue of KOSMOS, appearing in this polar jubilee time 1997–1999 will popularize Polish contributions to the knowledge of the past and of the present of polar regions.

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