INTRODUCTION

The Polish scientific exploration of the Arctic had started in the 19th century, long before Poland regained its independence in 1918. Several generations of Polish scientists — imprisoned by tsarist oppressors for their patriotic activities and deported to Siberia, especially after unsuccessful upsurges of 1830–31 and 1863, contributed enormously to geographical discoveries and pioneer biological and geological research in the Siberian Arctic and Subarctic. Earth scientists, Aleksander Czekanowski (1833–1876) and Jan Czerski (1845–1892), should be listed among the most famous ones.

The Polish Antarctic tradition goes back to participation of Henryk Arctowski (1871–1958) and Antoni Boleslaw Dobrowolski (1872–1954) in the famous Belgian Expedition in Belgica to West Antarctica (1897–1899) led by Adrien de Gerlache de Gomery. H. Arctowski, a geophysicist and geologist, was in charge of the expedition's scientific program, A. B. Dobrowolski, then a university student, was first employed as a sailor, later – during wintering in Antarctica, turned meteorologist and specialist on snow and ice.

ARCTIC

Expeditions to Svalbard, 1932–1938

Four Polish expeditions were sent to Svalbard in the Arctic prior to the World War II. The first one was organized by J. Lugeon, director of the State Meteorological Institute in Warsaw, to Bear Island (Björnøya), in connection with the 2nd Polar Year (1932–1933). Its program included research in meteorology, geomagnetism, aurora borealis, solar radiation and radio noise. The expedition consisted of five men, three of whom, led by C. Centkiewicz, stayed for the wintering.

Experience gained on Bear Island helped to organize in 1934 the first Spitsbergen expedition of 7 men (leader S. Bernadzikiewicz) by the Polish Mountaineering Club. Scientific tasks of the 2-month long summer expedition to north-west Torell Land were: trigonometric and photogrammetric surveys, geological studies, botanic and ornithological observations. During that expedition, S. Zagrajski and A. Zawadzki prepared a detailed topographic map, 1:50,000 scale, covering some 500 square kms, which was used by S. Z. Rozycki as a base for his geological and periglacial studies. His geological monograph of the area (published in 1959) is among classic pieces of geological studies of Svalbard. Numerous peaks were climbed for the first time.

The 1936 expedition to Spitsbergen was a sportive one. A three-man party Bernadzikiewicz, K. Jodko-Narkiewicz and S. Siedlecki) crossed the island on skis from south to north in six weeks, covering a distance of more than 800 kms. Although no scientific research was made, two of the expedition members, already veterans of the previous Polish expeditions to Svalbard, gained further experience, invaluable for future Polish exploration in the Arctic.

The 4-man expedition to Oscar II Land, north-west Spitsbergen, in 1938 (leader S.
Bernadzikiewicz) studied glaciology and geomorphology along eastern coast of Forlandsundet from a summer camp at Kaffiöyra. The most important scientific result was a geomorphological monograph of the area by M. Klimaszewski (published in 1960).

**Expedition to West Greenland, 1937**

The 7-man expedition to West Greenland (leader A. Kosiba) worked for three summer months in the area of Arfersiorfik. They carried out photogrammetrical survey, meteorological observations, glaciological, geological, geomorphological and botanic studies.

**IIIrd IGY/IGC expeditions to Spitsbergen, 1956–1962**

Polish expeditions to Spitsbergen were resumed in connection with the IIIrd International Geophysical Year (IGY: 1957–1958), and continued during the International Geophysical Co-operation (IGC: 1959–1960). The expeditions were sponsored by the Polish Academy of Sciences (PAS). In 1957, a scientific station was built at Isbjörnhamna, Hornsund, south Spitsbergen, which provides a permanent base for Polish expeditions to this day. The leader of the expeditions was S. Siedlecki, a geologist – a veteran of the Polish expeditions to Bear Island (1932–3), Spitsbergen (1934, 1936) and West Greenland (1937).

During six seasons: 1956 (summer, 5 men); 1957–1960 (four summer expeditions, 25–36 participants); 1957/8 (wintering, 10 men); 1962 (summer, 3 men), scientific investigations were carried out mainly around Hornsund, in Wedel Jarlsberg Land, Torell Land and Sörkapp Land, moreover at Van Keulenfjorden (central Spitsbergen). They included: meteorology; geomagnetism; aurora borealis; ionospheric studies; ozone measurements; radioactivity of atmospheric fall-out; geodetic survey; astronomic observations; limnology; oceanography; botany and zoology; glaciology (leader A. Kosiba); geomorphology and periglacial studies (leaders J. Dylik and A. Jahn); geology and palaeontology (leader K. Birkenmajer). More than 300 original scientific papers were published as a result of these expeditions. The geological studies included i.a. geological mapping to 1:50,000 scale of about 800 square kms in Wedel Jarlsberg Land, Torell Land and Sörkapp Land – a direct continuation of S. Z. Rozycki’s work from 1934. In 1960, the Polish station hosted scientific excursions of the International Geological Congress (Copenhagen) and the International Geographical Congress (Stockholm).

**Poles in Norwegian expeditions to Svalbard, 1962–1990**

Several Polish Earth scientists (4 geologists and 1 geomorphologist) participated in the expeditions of the Norwegian Polar Institute to south and central Spitsbergen (between Sörkapp Land and Van Keulenfjorden) and Bear Island, as leaders or members of field parties, in 1962, 1964, 1965, 1966, 1970 and 1990.

**Expeditions to Spitsbergen, 1970 to present**

After a 10-year break, summer scientific expeditions to the Polish Station at Isbjörnhamna, Hornsund, were resumed. Sponsored by the Polish National Committee on Geodesy and Geophysics, PAS, they were organized by the Wroclaw University in cooperation with the Institute of Geophysics, PAS, from 1970 to 1974 under leadership of S. Baranowski. The scientific research included mainly climatology, glaciology and glacial seismology, geomorphology and periglacial studies, but also geology and palaeontology, zoology and botany, mainly around Hornsund, partly also in Isfjorden. The expeditions of 1974 and 1975 were organized jointly with the institutes of Palaeozoology and of Geological Sciences, PAS (co-leaders G. Biernat and K. Birkenmajer).

In 1978, the Polish Station at Isbjörnhamna was renovated by an expedition of the Institute of Geophysics, PAS (leader J. Szupryczynski). Since then, scientific research is carried at the station on a yearly basis (base commander S. M. Zalewski). It includes mainly geophysical observations (seismicity, Earth magnetism, climatology, glaciology), but also
geology and paleontology, geomorphology and periglacial studies, zoology and botany, special environmental research, oceanology etc.

Two Polish summer field stations are in operation in the Hornsund area: the Baranowski Glaciological Station at Werenskioldbreen, and the Paleontology Hut at Treskelen.

Numerous, separate research expeditions using, at least partly, logistic support of the Polish Scientific Station at Isbjörnhamna, were organized since 1978 by the Institute of Geological Sciences PAS (leader K. Birkenmajer) and the Institute of Palaeobiology, PAS (leaders G. Biernat and H. Szaniawski), the Jagiellonian University, Cracow (leader Z. Czeppe), the universities of Wrocław (leaders A. Jahn and J. Persyma) and Silesia (leader M. Pulina), the Academy of Mining and Metallurgy in Cracow (leaders J. Chrząstowski and A. Manecki), the Association of Polish Geodesists (leader C. Lipert), and others.

The University of Torun resumed in 1975, during summer months, glaciological, climatological, hydrological and geomorphological research (leaders J. Szupryczynski and G. Wojcik) in Oscar II Land (NW Spitsbergen) at Kafføoya – site of the Polish 1938 expedition. Since 1995, their own small station at Kafføoya is being used on a yearly basis (leader M. Grzes).

Since 1978, geomorphological and glaciological research has been carried out during summer in central Spitsbergen by the universities of Warsaw (in western part of Nordenskiöld Land, leader A. Musial), Poznan (in inner Isfjorden, leader W. Stankowski), and Lublin (Bellsund and NW Wedel Jarlsberg Land, leader K. Pekala). An important component of these studies is a detailed geodetic/topographic survey of selected areas.

Oceanographic and oceanobiological research was carried out by marine expeditions to south Spitsbergen (mainly Hornsund) in 1977, 1979, 1980 and 1981, organized by the Gdansk University and the Maritime Academy in Gdynia. Training courses in oceanography were carried out by an expedition to Bellsund in 1977, organized by the Maritime Academy and the Academy of Agriculture in Szczecin.

Poland–USA scientific co-operation in Spitsbergen, 1974–1979

A joint research program of the Institute of Geophysics, PAS, and the University of St Louis (USA), concerned palaeomagnetism of Spitsbergen rocks, and seismology. The field work was carried out at Hornsund (1974: leader K. Birkenmajer), Agardhbuikta (1977: leader Birkenmajer) and at Isfjorden (1979: leader M. Jelenska).

Geophysical expeditions in 1976 and 1978 on board R/V Kopernik (leader A. Guterch), carried out deep seismic sounding of the Earth's crust along western Spitsbergen shelf and adjoining part of Greenland Sea. Institute of Geophysics, PAS (in co-operation with the Geophysical Enterprise in Torun, Poland), and the universities of St Louis (USA), Bergen (Norway) and Hamburg (FRG) were the participants.

Expeditions to Iceland, 1968–1972

Two scientific expeditions, organized by the Geographical Society of Poland in 1968 (leader R. Galon), and by the Lodz University in 1972 (leader S. Jewtuchowicz), have initiated Polish glaciological and geomorphological research in southern part of Iceland. More research and student expeditions followed.

Jan Mayen, Greenland, Alaska, Arctic Canada and Siberia

A brief volcanological study, following eruption of the Beerenberg volcano on Jan Mayen in 1970, was carried out by K. Birkenmajer. He was also one of leaders of geological mapping parties during the Danish NorthEast Greenland expeditions of 1971 and 1976.

In 1973, an expedition from the Wroclaw University (leader J. Cegla) studied geomorphology and periglacial phenomena in Nordre Isortoq, West Greenland, close to the work area of the Polish 1937 expedition.

It should be added that geomorphology and periglacial phenomena were studied
individually or within programs of foreign expeditions or institutions in Alaska (by A. Jahn), Arctic Canada (by R. Gajda and A. Jahn), North Norway and Siberia (by A. Jahn), and Kola Peninsula (by K. Pekala and co-workers); geological mapping was carried out by A. Siedlecka and S. Siedlecki on Varanger Peninsula, North Norway; botanic studies in Canadian Arctic by M. Kuc included living and subfossil mosses.

Fig.1. Main areas of Polish scientific research in the Arctic (north of Polar Circle). 1 – W Torell Land; 2 – Oscar II Land; 3 – Hornsund; 4 – E Torell Land; 5 – Bellsund; 6 – Bear Island (Björnöya); 7 – Isfjorden; 8 – Agardhbuoka; 9 – Arfersiorfik; 10 – Scoresby Land and Jameson Land; 11 – Kong Oscars Fjord – Clavering Ö; 12 – Jan Mayen

ANTARCTIC

East Antarctica: Bunger Hills expeditions, 1957–1979

The first Polish expedition to Antarctica organized by the Polish Academy of Sciences (PAS) took place during the Austral summer 1958–59 (7 participants, leader W. Krzeminski). On agreement between the Soviet and the Polish Academies of Sciences, the expedition took over the Soviet Oazis Station at Bunger Hills (K Knox Coast) in January, 1959, and renamed it the A. B. Dobrowolski Station.

The expedition carried out a time-limited research program in gravimetry, Quaternary geomorphology and geology.

Between 1959 and 1979 no Polish expeditions to the Dobrowolski Station were organized. The station was, however, visited by Polish scientists – members of the Soviet Antarctic expeditions. Individual Polish scientists and scientific teams did also winter in Antarctica at the Soviet Base Molodezhnaya.

The second expedition of 14 men to the Dobrowolski Station in 1978/79 (leader W. Krzeminski), carried out investigations in meteorology and climatology, glaciology, geomorphology and Quaternary geology, moreover astronomical, gravimetric and magnetic observations, and geodetic-photogrammetric survey. Since then, the station has been inactive.
**West Antarctica: oceanobiological expeditions, 1974–1976**

Three oceanobiological expeditions to Antarctic seas on board Polish research vessels were organized between 1974 and 1976: the reconnaissance cruise in 1974 (R/V *Profesor Siedlecki*) was organized by the Sea Fisheries Institute (SFI), Gdynia; the main expeditions of 1975 and 1976 – by the Institute of Ecology, PAS, in cooperation with the SFI and the Academy of Agriculture in Szczecin. Since 1976, the Polish fishing fleets (fishing companies: *Odra*, *Dalmor*, and *Gryf*) have been operating in the Atlantic sector of Antarctic waters, south of the convergence.

**West Antarctica: expeditions to King George Island, 1977 to present**

In 1977, a second Polish scientific Antarctic station – the H. Arctowski Station at Admiralty Bay, King George Island (South Shetland Islands) was built by an expedition sent by the Institute of Ecology, PAS (leader S. Rakusa-Suszczewski). Since then, the station has been operating on a yearly basis, carrying out a variety of scientific research which includes, i.a.: meteorology and climatology; oceanography and oceanobiology; limnology; terrestrial and marine biota; geomorphology; geology and palaeontology (leader K. Birkenmajer); geodetic and photogrammetric surveys; seismicity and Earth's magnetism. Several institutes of the Polish Academy of Sciences (I. of Ecology; I. of Geological Sciences; of Palaeobiology; I. of Geophysics; I. of Parasitology), the universities of Lodz, Szczecin, Gdansk, Poznan, Warsaw, Białystok and Cracow, and many scientific institutions at home and abroad cooperate with the station in joint research programs.

**West Antarctica: BIOMASS (1981–1987) and ASIZ (1988/9) expeditions**

Poland took an active role in the international research project BIOMASS (Biological Investigations of Marine Antarctic Systems and Stocks), organizing three expeditions on board R/V *Profesor Siedlecki* to West Antarctic seas, mainly Bransfield Strait, Drake Passage and Scotia Sea: in 1981 (leaders S. Rakusa-Suszczewski and P. Bykowski); in 1983/4 (leaders S. Rakusa-Suszczewski and P. Bykowski); and in 1986/7 (leader S. Rakusa-Suszczewski). The fourth expedition on board the same research vessel in 1988/9 (leader S. Rakusa-Suszczewski), organized as part of an international research project ASIZ (Antarctic Sea-Ice Zone), worked in the northern part of Weddell Sea.

**West Antarctica: geodynamic expeditions, 1979–91**

Four marine geodynamic expeditions on board Polish ships were organized by the Institute of Geophysics, PAS (leader A. Guterch). A wide area along west coast of Antarctic Peninsula, between Drake Passage in the north and Adelaide Island in the south, including offshore islands (South Shetlands, Palmer and Biscoe archipelagoes, and Adelaide Island) was surveyed. Deep seismic sounding of the Earth's crust was carried out mainly along transects between Drake Passage and Antarctic Peninsula, crossing Bransfield Strait, several deep-seismic transects were also surveyed farther south, particularly along Gerlache Strait, and between Bismarck Strait and Marguerite Bay.

Geological and palaeontological studies (leader K. Birkenmajer) during these expeditions were carried out at many land sites along Antarctic Peninsula (Hope Bay, Paradise Harbour, Adelaide Island), and in the South Shetland Islands (King George Island, Deception Island). Joint Argentine–Polish geological and palaeontological studies on Seymour (Marambio) and Cockburn islands, NE Antarctic Peninsula, were carried out in 1985/6, 1987/8, 1991/2 and 1993/4. A joint project of Brazil and Poland (1984) included study of Tertiary glacial deposits on King George Island.

Fig. 2. Location of the Polish scientific stations in Antarctica: A. B. Dobrowolski Station (Bunger Hills) and H. Arctowski Station (King George Island)
Fig. 3. Polish station in Hornsund Fiord

Fig. 4. A. B. Dobrowolski Station (Bunger Hils)
Selected bibliography


