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MEMORIES FROM THE 1096's S. JAN DYLIK  
AND PERIGLACIAL RESEARCHIN SPITSBERGEN  
AND LAPPLAND

INTRODUCTION

At the 19th International Geographical Congress held in Stockholm in 1960 a pre-congress symposium was arranged at Abisko in the period July 28 to August 5. The topic was "The high mountain region, glacial morphology and periglacial processes". It became a very inspiring international meeting, where former refugees and soldiers from the battlefields and prisons of the Second World War in Europe could meet as colleagues in geomorphology. They continued the scientific recovery of the 1950's re-building a post-war international network for research on mountain environments and geomorphology. The field groups from meetings in Abisko and other sites then met at the main Congress in Stockholm.

That was the first time I met about 50 post-war pioneers in geomorphology. Among them were leading scientists as JAN DYLIK and A. JAHN from Poland, JEAN DRESCH and P. BIROT from France, H. LOUIS and J. HÖVERMANN from Germany, W. LEWIS, D. LINTON and R. SAVIGEAR from England, R. BLACK, T. PÉWÉ and SID WHITE from USA, JACK IVES, B. BIRD and others from Canada.

The IGU Congress of 1960 gave me and Scandinavian colleague doctoral students in geomorphology – e.g. R. DAHL, G. ÖSTREM, J. L. SOLID and T. STENBORG – excellent opportunities to become involved in international scientific networks in geomorphology. Through the Polish pioneers J. DYLIK and A. JAHN I was later invited to become a corresponding member of the Periglacial Commission of the IGU and also of the network for information and invitations to the 1961 Congress of INQUA in Poland. At the IGU Congress 1960 I was suggested as Secretary of the IGU Commission on the Study of Slopes for the period 1960–1964 (London), and later re-elected for 1964–1968 (New Delhi Congress of IGU).

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## THE IGU SYMPOSIUM AT ABISKO, SWEDEN, IN 1960

I quote from J. DYLIK's introductory chapter in *Biuletyn Peryglacjalny*, no. 11, 1962 (p. 168), a special issue of papers presented at the Abisko meeting in 1960: "Abisko itself is, without doubt, an ideal site for a conference on glacial and periglacial problems. The surrounding landscape, though showing a conspicuous predominance of landforms produced under the powerful action of glacial morphogeny, exhibits throughout fresh traces of intensive periglacial processes which are not merely present, but still developing today. The Symposium was thus held within a periglacial environment, overlying recently extinct glacial events. Moreover it seems worth emphasizing that these characteristic landscape features in the immediate neighbourhood of Abisko appeared to have, in addition to their vital scientific significance, also a sort of emotional appeal which was felt by all the participants... Although no longer assembled, those who met in Abisko will remain "participants" in a common experience, and the companionship of Abisko will grow and develop in the form of a continuous exchange of letters, experiences and views. That will certainly mean a lot of additional work for numerous post-offices but will no doubt stimulate the advancement of science and bring nations closer to one another".

When I now, 38 years later, look back it is clear that the spirit of Abisko 1960 united many friends of mountain studies in deep friendship and cooperation through the years, as JAN DYLIK predicted in the text quoted above.

In 1960 the main building of the Research Station at Abisko was the old red-painted wooden house built in 1913. It had only 4 double-bed guest-rooms for scientists on the second floor and nearby in the woodland of mountain birch were some rather primitive wooden military barracks for student groups. It was too small to our large group of about 50 people, so we lived and worked at paper sessions in the Abisko Tourist Hotel, which was rebuilt and opened in 1952 after a devastating fire in 1950. From that base we made several one-day excursions in the mountains, combining railway journeys and hiking and climbing in mountain valleys and slopes.

We enjoyed warm, sunny summer weather during all the excursion days which contributed very much to interesting and enjoyable hiking and discussions in the field. DYLIK's comment on the excursions was very positive in the volume of the symposium proceedings published in *Biuletyn Peryglacjalny* in 1962. I quote: "In the writer's opinion, the excursions of the Abisko Symposium contributed immensely to a better and fuller understanding of the periglacial environment and the morphogenetic events that took place within it. Any scholar who seeks in distant polar regions e.g. in Spitsbergen, some explanation of the periglacial



*Photo by L. Johansson, Abisko, 1960*

Pl. 1. Group picture of the participants of an IGU Symposium at Abisko Tourist Hotel in August 1960. Professor J. DYLIK, Poland, at centre, 3rd line, in front of a lady, with D. LINTON, UK and P. BIROT, France, at his right side. Front line, from left side are G. HOPPEE and S. RUDBERG, C. G. HOLDAR and A. RAPP, Sweden, then W. V. LEWIS, UK., H. LOUIS, Germany, M. LEWIS, UK, J. IVES, Canada, R. PEEL, UK and J. GJESSING, Norway. Among the standing persons in the back line are, from the right BOB and NELDA BLACK, USA, F. GUILLIEN, France, V. SCHYTT, Sweden and BAUER and GELLERT, DDR

events which in the main part of continental Europe came to an end in Pleistocene times, usually returns home with the queer feeling of missing something vital. The present writer thinks that just Lappland – the region of Abisko in particular – provides that “missing link”, for it presents the observer with pictures of such events, which are either quite recent or still coming into existence and, which being here more widespread than in Spitsbergen – are at the same time much more closely related to those, whose traces are found in the Pleistocene deposits of Central Europe (DYLIK, 1962, p. 167).

REFLECTIONS ON THE PROBLEM OF GLACIAL REFUGIA  
AND MT. TEMPLET, SPITSBERGEN

Professor DYLIK had in 1957 spent a field season in Spitsbergen with an expedition group at the Polish field research station at Hornsund. His lecture at Abisko was "Une carte détaillée des phénomènes périglaciaires de NO-Sörkappland, Spitsbergen". I had a small photo exhibition at Abisko in the so-called "Hobby room" where the title of my poster was "Picture comparisons showing recent development of steep slopes". Some of my photographs were from Mt. Skansen and Mt. Templet in central Spitsbergen, where I had been working in the field season of 1954. Other photos were from the valley Kärkevage, west of Abisko, where I had been working each year since 1952. My doctor's thesis on slope processes in Kärkevage was published in spring 1961.

I felt very proud, privileged and grateful at the 1960 meeting in Abisko that professors DYLIK, BIROT, HOPPE and other prominent geomorphologists gave me good advice and much encouragement for my continued studies. I remember many helpful discussions in the field and at paper sessions. I got good advice e.g. on contents and interpretations for my forthcoming papers on the slope process studies in Lappland and on corrections in my reports on our expedition in Spitsbergen in 1954 (RAPP, 1960). I was there with a team of two biologists, A. HOLM and T. ROS from Uppsala, and our field assistant H. E. DAHL, from Elvegard, Norway.

JAN DYLIK was leader of a Polish group at the field base of Hornsund at the southern part of Spitsbergen in 1957 (DYLIK, 1958). His co-workers were L. DUTKIEWICZ and T. KLATKA. Their field work was mainly concentrated on such problems as the differentiation of periglacial conditions, weathering, patterned ground, slope development and modelling of recent forms of glacial accumulation.... The area investigated .... displays many of the characteristics of BÜDEL's detrital zone (or "block-field zone") as DYLIK (1958) pointed out in his Summary: "The northern part is almost entirely overgrown with a continuous cover of tundra vegetation while the southern one assumes the aspect of a stony desert ... due mainly to climatic conditions which are severe in the southern part ...". He groups his interests and discussions under the sub-headings Stone deserts ...; Weathering, Patterned ground, Slope developments and Other problems (DYLIK, 1958). These are actual periglacial topics of the post-war time which many of the geomorphologists and mountain lovers which met at Abisko in 1960 carried in their minds and hearts.

In my publication on Mt. Templet, Spitsbergen (RAPP, 1960) I began the Preface with the following confession "... I ... begin with a declaration of love for Spitsbergen and particularly for Tempelfjorden and Tempelfjället ... the area is a combination of Polar sea and Arctic mountain into a unity



*Photo by A. Rapp*

Pl. 2. Mt Templet, Gips Bay, Spitsbergen, with cirque glacier, talus slopes and rock glaciers. H. E. DAHL, member of the 1954 Swedish Spitsbergen Expedition and the expedition's motor boat in the foreground

of infinite, free expanses of sea, of mountain and of glacier. I do not believe there exists a fresher, freer and fairer range of natural scenery."

One topic which was discussed on many occasions at Abisko in 1960, with particularly J. DYLIK, P. BIROT, J. DRESCH, G. HOPPE, H. LOUIS, S. WHITE, J. IVES and others was the problem of glacial erosion and impact on the high mountains in north Scandinavia and in Spitsbergen. This was the so-called "nunatak and refugium problem" which was very difficult to grasp, in those days, when most of us did not know or consider the concept of cold-based glacier ice, and its protective effect on a permafrost basis, instead of the strong glacial erosion caused by the wet-based ice of maritime glacial conditions, e.g. like in western Norway's deeply ice-scoured fjords.

J. DYLIK and the continued discussions with him by correspondence and at meetings in 1960 to 1964, the years of the IGU Congresses in Stockholm and in London, stimulated my interest in two problem areas of periglacial geomorphology: (1) the glacial nunatak and refugium problem

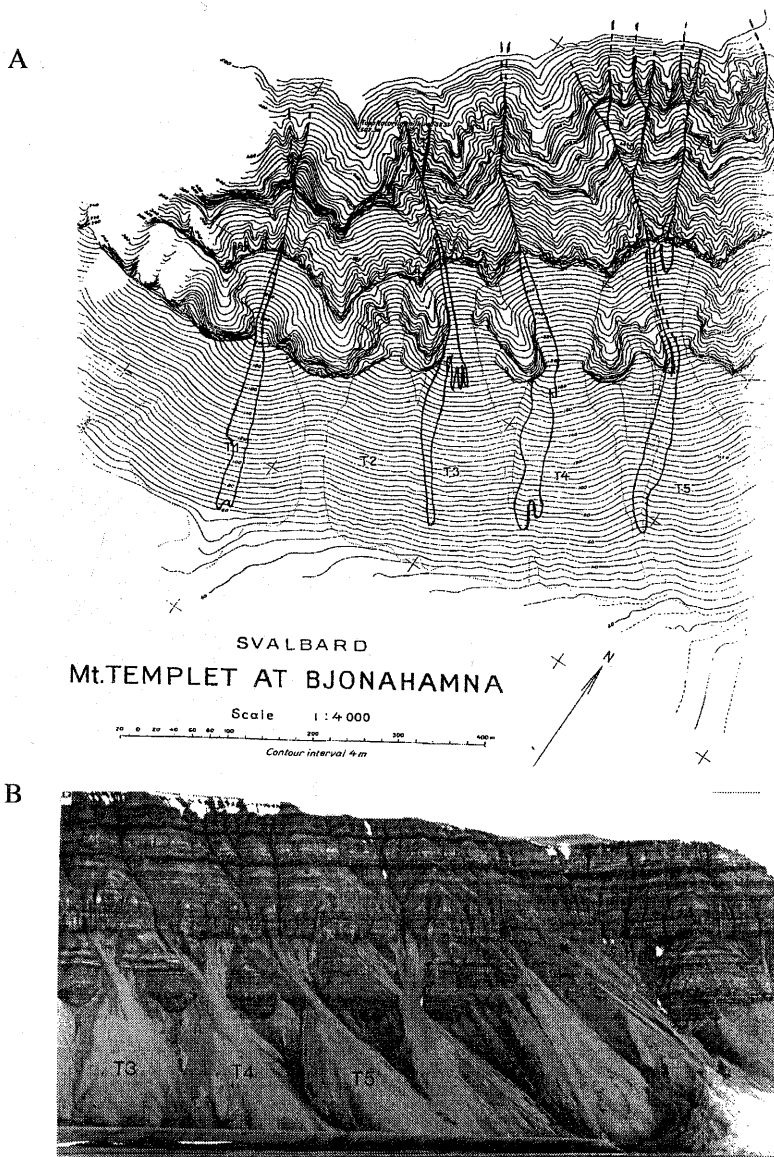


Fig. 1 Detail map (A) and photograph (B) of Mt. Templet at Bjona Harbour, central Spitsbergen. The effects of an extreme event of intense rainfall, triggering debris flows of maximum size since July 1882 (photographs by G. DE GEER) is seen as lobes of dark gray angular rock rubble on three talus cones. Analysis of mass movement by photo comparisons and proxy mapping by A. RAPP. Photograph by JONAS ÅKERMANN, Lund, on 9 August 1981, two days after the extremely intense rainfall. It had also triggered debris flows of maximum size on permafrost slopes at Longyearbyen, Spitsbergen (J. ÅKERMANN, personal information). The fresh, redeposited debris lobes are up to 300 m long and up to 40 m wide, e.g. on talus cones T3–T5 on the photo and on the map. This case is the largest extreme erosional event monitored at the site in the period 1882–1981. Cf. discussion on slope erosion by summer rainfall versus snowmelt floods in Spitsbergen (DYLIK, 1958; JAHN, 1960; RAPP, 1960a)

and (2) the problem of ice-wedging and formation of tundra polygons in permafrost.

The problem of glacial nunataks, lack of glacial scour and till deposits at high levels in Arctic and continental mountains, and slow weathering of block-fields and some talus slopes in Spitsbergen were high priority topics in my comparisons between geomorphology in Spitsbergen and in the mountains of north Lappland. In my early correspondence with JAN DYLIK, his interests were more directed to comparisons between the Polish plains and the northern valley bottoms and lowland deltas and the reconstructions of permafrost landforms and processes in those environments. They included ice wedge exposures in river banks, pingos, palsas, and cryoturbation features. Some of these features will be mentioned in the following section.

PERMAFROST, FOSSIL ICE WEDGES AND TUNDRA POLYGONS.  
DISCUSSIONS AT INQUA CONGRESS IN POLAND IN 1961  
AND DISCOVERIES IN SWEDISH LAPPLAND IN 1962

The complex mentioned above was a central topic at the INQUA symposium in Łódź, Poland, guided by JAN DYLIK and his enthusiastic group of collaborators and students. Many of the international colleagues in periglacial geomorphology which I had met in Abisko, Sweden, in August 1960, also came to the INQUA meetings in Łódź and in Warsaw in August and early September 1961. We admired the impressive and colorful exposures prepared and dug by our Polish guides and students. We all agreed that what they showed us was the world's most striking and convincing fossil ice wedges, cryoturbations, polygons, cover sands, wind-polished pebbles and other evidence of the harsh earlier permafrost conditions in the sandy soils of Central Poland. The guide-books and other publications were also of highest scientific and technical standard and the hospitality and pioneering spirit of our Polish colleagues was indeed very moving and impressive.

No wonder that we from Scandinavia and also other international colleagues felt both encouraged and very stimulated by the meeting and the colleagues in Poland. So we went home after the INQUA, ignored the Berlin Wall and continued to work in close collaboration with our many friends and colleagues from countries both in the East and the West, as DYLIK had predicted already in Abisko in 1960. Several young Polish colleagues came to Swedish universities for one or two terms of research or training in glacial, periglacial or fluvial geomorphology. They came e.g. to Uppsala with its new laboratory or to Stockholm, with its very attractive field station at Tarfala in the northern mountains.

A joint interest which kept me busy with many letters and manuscripts to JAN DYLIK was the printing of the volume of *Biuletyn Peryglacjalny* with papers from the Abisko IGU Symposium of 1960. It appeared in 1962 edited by DYLIK and co-edited by G. Östrem. He was at that time in Stockholm, later in Oslo.

The other event of mutual interest was the discovery, documentation and interpretations of tundra polygons as indicators of sub-recent permafrost and as indicators of cold climate conditions in the Swedish mountains of Lappland (RAPP, GUSTAFSSON, JOBS, 1962).

During field research by GUSTAFSSON and JOBS, they noticed localities with possible permafrost at depths of 1–1.5 m in late August 1962 in Lappland's Padjelanta mountain tundra. Later we used magnifications of aerial photographs, interpreted these for ice-wedge polygons and sent to several experts for comments, including J. DYLIK (Poland), T. L. PÉWÉ (Alaska), R. F. BLACK (Madison, USA) and Swedish colleagues G. HOPPE, S. RUDBERG and H. SVENSSON. Most of the consulted experts confirmed that the photographs showed features typical to high-centered ice-wedge



Pl. 3. Air photo of sub-fossil tundra polygons in fine-grained till and silty sediments of Vistulian deglaciation. Padjelanta, Swedish Lappland. From RAPP, GUSTAFSSON, JOBS (1962)



polygons, probably sub-fossil ones. We made field investigations on the polygons, remaining ice and permafrost in the exposures, and podzol profiles indicating a sub-fossil genesis (RAPP, ANNERSTEN, 1969) and with earlier studies and consultations with J. DYLIK, G. HOPPE, L. ANNERSTEN and the American colleagues M. CLARK and S. WHITE in joint field work and in correspondence.

Our Swedish colleagues at Lund University GUNNAR JOHNSON (1956), ÅKE MATTSOON and H. SVENSSON (1962) had earlier and before our group discovered and described fossil ice-wedges and tundra polygons in south Sweden (Skane and Halland) and in northern Norway (SVENSSON, 1962). These findings were very encouraging and informative for comparisons with our work and discoveries in Swedish mountain valleys. Many new localities were later found by the teams doing geomorphological mapping of the northern Swedish mountains (*cf.* HOPPE, 1983, final report). Strong wind effects and thin snow cover was typical to the sites with tundra polygons, facilitating the growth of local permafrost and thin ice wedges. The dating is still an open question. Maybe some of the sites of blockfields with tundra polygons can even have survived as surfaces of interglacial permafrost tundra, protected and not eroded by cold-based ice in the Late Vistulian glaciation culminations.

A later shift of paradigm in the interpretation of the geomorphological history of the mountain landscape both in Spitsbergen and in North Scandinavia was the concept of cold-based ice and its weak effects of glacial erosion (*cf.* LAGERBÄCK, 1988; KLEMAN, BORGSTRÖM, 1990; RAPP, 1992, and others).

#### CONCLUDING REMARKS

After World War II large parts of Poland and Central Europe were in ruins. Its universities and other institutions had to be reconstructed as well as the international networks of scientific cooperation. For international cooperation in geomorphology the Congress meetings of the international Geographical Union (IGU) in 1960 in Sweden and the 1961 INQUA Congress in Poland were important events of reconstructing scientific networks. Professor JAN DYLIK had a leading role as mentor, commission chairman and inspiring colleague in these years in the shadow of the Iron Curtain separation of Europe. Periglacial research in northern mountains and tundra lands of Lappland and Spitsbergen became areas of great attraction to geo-scientists from the West and from the East, for reconstructions of climate history and for environmental protection.

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His series of documentary photographs are of great value for reconstruction of long-term slope development at Mt. Templet as a representative site of Arctic plateau mountain, with documentary photographs from 1882, 1908, 1954 and 1981.

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