PERIGLACIAL PHENOMENA AND PALEOGEOGRAPHY OF THE PLEISTOCENE

THE INTERNATIONAL SYMPOSIUM
of the Commission on Periglacial Morphology of the I. G. U.
and the
Subcommission on Paleogeographical Maps and Atlasses of the INQUA

Yakutsk–Moscow, 1969

organized by

Commission on Quaternary Research, Academy of Sciences of the U.S.S.R.
Institute of Cryopedology, Siberian Branch of the Academy of Sciences of the U.S.S.R.
Institute of Geography, Academy of Sciences of the U.S.S.R.
Faculty of Geography, Moscow State University
Geological Survey of Central Regions, Ministry of Geology of the U.S.S.R.

The Committee:

JAN DYLIK, Chairman of the Commission on Periglacial Morphology of the I.G.U.
K. K. MARKOV, Chairman of the Subcommission on Paleogeographical Maps and Atlasses of the INQUA
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PERIGLACIAL PHENOMENA AND PALEOGEOGRAPHY OF THE PLEISTOCENE

THE INTERNATIONAL SYMPOSIUM HELD AT YAKUTSK AND MOSCOW FROM 28th JULY TO 14th AUGUST, 1969

Programme

28th July

Opening of the Symposium at the Institute of Cryopedology of the Siberian Branch of the Academy of Sciences of the USSR, Yakutsk – Chairman: P. I. Melnikov, corresponding member of the Academy of Sciences of the USSR, vice-president of the Organising Commtee

Opening adresses by P. I. Melnikov, N. E. Okhlopkov, M. A. Lavrentiev, A. Cailleux, J. Dresch, G. M. Richmond.

Paper session:

J. Dylik (Poland) – Esquisse de buts généraux et de tâches les plus urgentes des études périglaciaires au seuil du Symposium Yakoutsk–Moscou

29th July

Sailing down the River Lena – field study excursion: Turyj Vzvoz (fissure ice), Šamanskij Bereg (fissure ice, thermal erosion) and Maimaga (fissures partially filled with mineral and organic material)
Leaders: E. M. Katasonov and V. M. Barygin

30th July

Boat-trip up the River Aldan: Sections at Tettigi and Kuranakh (thermokarst phenomena)

31st July

Boat-trip up the River Aldan (cont.): Sections at Mamontova Gora (discussion on problems of stratigraphy, "thermokarst"), visit at the Yakutian village of Krest-Khaldzaj (alasses and baydzarakhs)

Paper session:

N. W. Kind (USSR) – Glaciations in the Verkhoyansk Mountains and their place in the absolute geochronology of the Upper Siberian Anthropogene

E. A. Vangengejm (USSR) – Sur la faune périglaciaire du Pléistocène

1st August

Boat-trip down the River Aldan: Ikhenen (Paleolithic implements), Čujskaya Gora (problems of stratigraphy, slope modelling)

Paper session:

V. L. Sukhodrovskij (USSR) – Particularités de l'évolution des versants dans les régions de pergélisol

V. A. Zubakov (USSR) – Oscillations of climate in the Pleistocene in Western Siberia

2nd August

Boat-trip up the River Lena: Pesčanaya Gora (involutions, thermokarst phenomena on the Pestyakh terrace)
Leader: E. M. Katasonov (USSR)

Paper session:

A. I. Popov (USSR) – Genetic systematics of periglacial formations

M. N. Alekseev (USSR) – Sur les formations périglaciaires du Pléistocène dans la partie Nord de l'Asie Orientale

E. M. Katasonov (USSR) – Classification of frost caused phenomena with references to the genesis of the sediments in Central Yakutia

3rd August

Field study excursion (by bus): Bestyakh – Maya (thermokarst relief of the Bestyakh terrace – allasses and alass lakes, baydzharakhs, bulgunnyakhs)
Leader: P. A. Soloviev (USSR)

4th August

Field study excursion (by bus): Bestyakh – Abalakh (thermokarst relief of the Bestyakh and Tyungyulun terraces)
Leader: P. A. Soloviev (USSR)

5th August

Yakutsk: Closing session of the Yakutian part of the Symposium – Chairman: J. Dylik (Poland)

Paper session:

T. L. Péwé (USA) – Ancient altiplanation terraces near Fabiranks, Alaska

J. Demek (Czechoslovakia) – Geomorphological field mapping

Closing adress by J. Dylik (Poland) and J. Dresch (France)

Visit at the Geological Museum and the Institute of Cryopedology of the Siberian Branch of the Academy of Sciences of the USSR; visit to the Šergin well

6th August

Departure for Irkutsk

7th August

Excursion: Irkutsk – Baikal Lake – Irkutsk

Departure for Moscow

8th August

Visit to Arkhangelskoye

9th August

Opening session of the Moscovian part of the Symposium at the Moscow State University – Chairman: K. K. Markov

Opening adress of welcome by K. K. Markov (USSR)

Paper session:

J. Büdel (West Germany) – Der Eisrinden-Effekt als Motor der Tiefenerosion in der exzessiven Talbildungszone

J. C. F. Tedrow (USA) – Soils of the polar region of North America

H. Richter (DDR) – Main lines of the regional structure of periglacial facies on the territory of the G.D.R.

A. Pissart (Belgium) – Résultats d'expériences sur l'action du gel dans le sol

10th August

Field study excursion: Moscow – Rostov Yaroslavskij

Leaders: S. L. Breslav and A. I. Spiridonov

Stop at Khotkovo (landscape and deposits of the border area of the Moscow glaciation), visit to Zagorsk and Pereslavl

Discussion on the origin and history of Lake Pleščevo

11th August

Field study excursion: Rostov – village of Čeremošnik (deposits overlying Moscow boulder clay, discussion on landforms) – Levina Gora (slope deposits of the valley of Sara, actual periglacial phenomena on the flood plain) – Rostov

Leaders: N. S. Čebotareva, N. G. Sudakova, A. G. Kostyaev

12th August

Field study excursion: Rostov – Uglič, sailing down the Volga from Uglič to Altynovo (structure of the valley of the Volga, discussion on the problem of age of 3 moraine horizons) – Uglič

Leaders: V. V. Daševskij, A. A. Veličko, V. V. Berdnikov

Excursion (cont.): Uglič – Kiryanovo (fossil polygonal nets in moraine clay revealed by geophysical methods) – Rostov

Leaders: A. A. Veličko, V. V. Berdnikov, V. A. Kosyukov

13th August

Rostov: Closing session of the Moscovian part of the Symposium – Chairmen: J. Dylik (Poland), S. A. Strelkov (USSR)

Discussion on main problems on: (1) the origin of loess-like deposits, (2) the nature of „involutions", (3) the origin of fossil polygons

Programme of the activities of the Commission on Periglacial Geomorphology of the IGU

Resolution concerning the publication

Departure for Moscow

14th August

Closing session of the Symposium at the State Moscow University – Chairman: K. K. Markov

Paper session:

A. Cailleux (Canada) – Répartition et signification des différents critères d'éolisation périglaciaire

K. K. Markov (USSR) – Basic profiles of Neogene deposits

A. G. Kostyaev (USSR) – The periglacial zone of western Eurasian plains

A. A. Veličko (USSR) – Paragenesis of cryogenic (periglacial) zone

R. F. Flint (USA) – Present knowledge of Late Cenozoic glaciation

Resolution concerning next Symposiums: Liège (Belgium) – in 1972, and Canada – in 1973

Note from the Editor: Papers dealing with the excursions in the region of Moscow could not be published in this volume because of editorial and technical reasons. These will be published in *Biuletyn Peryglacjalny,* no. 24.

OPENING SESSION

P. I. MELNIKOV
VICE-CHAIRMAN OF THE ORGANIZING COMMITTEE OF THE SYMPOSIUM

Honourable representatives of the Yakutian Republic, members of the International Symposium on Periglacial Phenomena and Paleogeography of the Pleistocene, Ladies and Gentlemen, Colleagues! On behalf of the Organizing Committee, whose chairman – professor Markov – could not come, because of illness, I welcome you all wholeheartedly.

Our Symposium includes members of two international organisations: the Commission on Periglacial Geomorphology of the International Geographical Union and the Subcommission on Paleogeographic Maps and Atlases of the INQUA. The members of these organisations gathered in Yakutia for the first time, following the decision taken in the course of the previous international symposium, held in Poland in 1967.

I extend my warm welcome particularly to our dear guests, eminent and world-famous scientists, chairmen of various international scientific organisations: Prof. J. Dylik (Poland), Prof. R. F. Flint (USA), Prof. G. Dresch and Prof. A. Cailleux (France), Prof. G. M. Richmond (USA) and other distinguished members of our Symposium.

The Symposium opens in the Yakut Autonomus Republic, where the cold pole of the northern hemisphere is situated, and where its whole area, of 3 million km^2, is covered with permafrost. It is here that was found the greatest in the world thickness (1500 m) of rocks with temperatures below zero.

In Yakutia there is the well-known Mammoth Mountain, containing exposures of various deposits which permit to observe the gradual cooling of the climate in Eastern Siberia since the Pliocene and the formation of the present-day natural environment.

In numerous regions there may be noticed cryogenic phenomena, processes

of thermokarst and solifluction, as well as other interesting land-forms, which will be shown to the participants during excursions.

I would like to draw your attention to the fact that Yakutia is the cradle of knowledge on permafrost. Here, 125 years ago, the prominent scientist, member of the Russian Academy of Sciences, A. F. Middendorf, had for the first time carried out detailed geotermic investigations, 116 m in depth, and found that the permafrost thickness in Yakutia is over 200 m. The discovery caused a great stir among European scientists and the period of studies on permafrost had started.

A. F. Middendorf had carried out his observations in a deep well, known in literature as "Shakht Shergina" (Shergin's Mine). The well has been preserved almost unchanged, and presents now a scientific monument which you will be able to visit.

Symposia of the Commission on Periglacial Geomorphology, organized by Prof. J. Dylik, have proved that their aims are achieved best through excursions. Therefore, out of the 9 days of Symposium in Yakutia as many as 7 days have been reserved for excursions. We shall sail in a boat along the shores of the Lena and Aldan, descending ashore to examin the most important exposures.

Honourable Colleagues, last week the whole world watched with great attention the flight of three American astronauts to the Moon. Two of them N. Armstrong and E. Oldrich put their feet on the Silver Globe and after having fulfilled their programme all three successfully came back to the Earth. I am sure that I will express the wishes of all members by congratulating our American colleagues who are among us on this magnificient achievement of their compatriots.

I have the great pleasure to open the International Symposium on Periglacial Phenomena and Paleogeography of the Pleistocene, and I wish you all a lot of success in your work.

N. S. OCHLOPKOV

PRAESIDIUM OF THE SUPREME COUNCIL AND THE COUNCIL OF THE MINISTERS OF THE YAKUTIAN SOVIET SOCIALIST REPUBLIC

Dear Colleagues, Honourable Guests,

On behalf of the Praesidium of the Supreme Council and the Council of Ministers of the YASSR, I have the honour to welcome heartily the scientists of the Soviet Union, Belgium, Canada, Czechoslovakia, East Germany,

Finland, France, Hungary, the Netherlands, Poland, Sweden, the United States, West Germany and all the participants of the International Symposium on permafrost.

Three years ago, in this hall, there was held the VIIIth All-Russian Congress devoted to permafrost. Today we are attending the opening session of the International Symposium on problems of periglacial phenomena and paleogeography of the Pleistocene. It is a great pleasure to state the fact that scientists from more than 10 countries came to Yakutia from all over the world.

Yakutia – an underdeveloped border of Tsarist Russia of the past has been transformed – in consequence of the Great Socialist October Revolution and under the guidance of the Communist Party of the USSR – into a republic with a highly developed economy and culture. This is an unshakable testimony to the victory of principles of Leninist national policy, as carried out by the Party of the USSR.

One of the problems to be discussed in this Symposium is the problem of permafrost. It is of interest both from the scientific and the practical point of view.

Without the knowledge of general natural laws ruling the structure and formation of permafrost, numerous problems, essential to the northern parts of our country, including Yakutia, could not be resolved. Yakut specialists apply various methods in their research on permafrost and its processes.

The workers of the Permafrost Institute of the Siberian Branch of the Soviet Academy of Sciences, which was decorated with the Order of Red Banner of Labour, have achieved great successes in their research on periglacial phenomena, particularly those which are associated with development of ground ice.

The ground ice which is common in Yakutia presents many difficulties to building, geological investigations, mining and other work. Further studies on this specific phenomenon are necessary to master new regions, rich in raw materials.

The programme of the International Symposium contains scientific excursions to Central Yakutia. Their participants will have the occasion to see for themselves, on the ground, present-day phenomena of permafrost. It is particularly important to those scientists whose countries had possessed severe climatic conditions in a not very distant geological past, and where now only traces of permafrost have been preserved.

We hope that the presentation and discussion of these problems will be high level, and that contacts of scientists from various countries will strengthen the friendship and ties between men and women who are at the service of one aim: the development of science.

On behalf of the Supreme Council and the Council of Ministers of the Yakut Autonomous Soviet Socialist Republic I wish all participants of the International Symposium creative and fruitful work, good health and much happiness.

M. A. LAVRENTIEV

CHAIRMAN OF THE SIBERIAN BRANCH OF THE ACADEMY OF SCIENCES OF THE USSR

The Siberian Branch of the Academy of Sciences of the USSR greets the participants of the International Symposium on Periglacial Phenomena and Paleogeography of the Pleistocene, wishing fruitful discussions and successful solutions of the problems discussed.

The Symposium is devoted to questions of natural development in the Quaternary Period (Pleistocene). In the Earth history this period had been marked by events extremely important for the development of all mankind: the climatic conditions became much severer, the earth surface was in some parts of Siberia frozen to the depth of 1500 m, and vast areas of Europe, Asia and America were the arena of the occurrence of permafrost containing ground ice. At present, permafrost covers 43% of the whole surface of the USSR. It influences essentially the economic effort directed towards mastering the inexhaustible natural riches of Siberia. The Praesidium of the Siberian Branch of the Academy of Sciences of the USSR is deeply convinced that the International Symposium held in Yakutia will help to solve important scientific problems and will contribute to a greater efficiency in the practical application of the results of scientific investigations.

The Praesidium of the Siberian Branch of the Academy of Sciences of the USSR greets with great satisfaction our guests – the foreign scientists who travelled long distances in order to come here and get acquainted with the actual cryogenic phenomena, to see Yakutia – the country of permafrost.

ANDRÉ CAILLEUX

CHAIRMAN OF THE FRENCH COMMITTEE OF THE INQUA

Mes confrères ont déjà dit de si bonnes choses, qu'on ne saurait dire mieux. Je suis très heureux de participer à ce Symposium. Déjà de l'avion nous avons pu observer des formes de relief périglaciaire: thermokarst, polygones. Iakoutie est le pays des diamants: il nous est très agréable de saluer, parmi vous, plusieurs auteurs de ces magnifiques découvertes.

G. M. RICHMOND

CHAIRMAN OF THE EXECUTIVE COMMITTEE OF THE INQUA, USA

On behalf of the Executive Committee of the INQUA, I welcome heartily the Praesident of the Symposium, the organizers and all the participants. This Symposium is really international.

There is a tendency to change the Paleogeographical Sub-Commission of the INQUA into the Commission. The Executive Committee is greatly interested in the further development of co-operation of the INQUA with other scientific organizations. We hope that the Commission on Periglacial Morphology may co-work in future with the INQUA.

I would like to express my deepest thanks to Professor P. I. Melnikov and to other members of the Organizing Committee for their efforts which enabled all the participants of the Symposium to get acquainted with Yakutian permafrost.

K. K. MARKOV

CHAIRMAN OF THE ORGANIZING COMMITTEE OF THE SYMPOSIUM

Our Symposium includes members of two international organisations: Commission on Periglacial Geomorphology of the International Geographical Union and Subcommission on Paleogeographic Maps and Atlases of the INQUA. Members of these two organisations have gathered in the Soviet Union for the first time. We welcome in our country the foreign guests

with much pleasure. We are anxious to acquaint the Soviet and foreign participants of the Symposium with the sites and research methods of which we dispose.

Immense distances of the Soviet Union make our task difficult. Because of shortness of time in which the Symposium is held we cannot show all the periglacial and paleogeographical sites in the European part of the USSR, in Siberia, Caucasus and Central Asia. We have chosen, therefore, only the European part of the USSR and Siberia where one could observe well-developed Pleistocene periglacial phenomena and many facts regarding paleogeography. Experience gained in the course of past symposia of the Commission on Periglacial Geomorphology, under guidance of prof. J. Dylik, has shown that the best way to realize the aims of the symposium are excursions. We shall have, however, to surmount the difficulty of demonstrating sites that are 6,000 km apart.

The Symposium starts in the remote Yakut Autonomous Republic. Yakutia is a country of the cold pole of the northern hemisphere, and it possesses the best developed permafrost, both of Pleistocene and present-time origins. The city of Yakutsk has the centre of permafrost research – the Siberian Parmafrost Institute of the Academy of Sciences ot the USSR. The participants of the Symposium will observe here different kinds of current permafrost processes. You will also see the immense profile in the Mammoth Mountain, whose deposits made possible the registration of gradual cooling of the climate since Pliocene in eastern Siberia and formation of conditions for the present permafrost and larch taiga. During the stay in the Permafrost Institute and on the boat, by which the Symposium participants will travel, there will be enough time to read papers on problems of periglacial geomorpology and paleogeography of Eurasia and North America. You will also be able to acquaint yourselves with the way of life in our far-off republic.

After the return to Moscow we intend to show you the area between Moscow and upper Volga. Of course, no periglacial present-day phenomena could be seen there, but some very interesting profiles contribute to the Pleistocene history of the region and bear evidence how the natural environment, characteristic of interglacial, changed into periglacial environment associated with the last glaciation. These profiles can be met between Moscow and an old Russian city Rostov Yaroslavsky, some 300 km north of Moscow. Those of us who will visit that city for the first time, might be interested in its history and architecture.

After return to Moscow there will be enough time for reading the rest of the papers and for visiting our capital.

Greeting our Soviet and foreign guests we say: "You are welcome whole heartedly".

THE RESOLUTION
passed during the Symposium of Periglacial Phenomena
and Paleogeography of the Pleistocene
Yakutsk–Moscow, 1969

During the period from 28 July to 14 August, 1969, according to the plan of meetings and conferences for 1969, a symposium was held on Periglacial Phenomena and Paleogeography of the Pleistocene, organized by the Commission on Quaternary Research of the Academy of Sciences of the U.S.S.R., Institute of Cryopedology of the Siberian Branch of the Academy of Sciences of the U.S.S.R., Faculty of Geography of the Moscow State University, Geological Survey of Central Regions, Ministry of Geology of the U.S.S.R.

The main task of the Symposium was to strenghten the leading position of the Soviet science in the investigations of the present and fossil permafrost and the accompanying phenomena against the background of the paleogeographical conditions of the Pleistocene.

The Symposium was held in Yakutsk and in Moscow and included meetings, paper sessions and excursions.

67 Russian and 36 foreign scientists representing 13 countries took part in the Symposium. There were four members of the Academy of Sciences, five persons were invited to attend the Symposium as the guests of the Academy of Sciences of the U.S.S.R.

Field study excursions to Central Yakutia and the region of Moscow were arranged and proper guides were edited for those who took part in the Symposium.

After having discussed the problem of paleogeography and periglacial phenomena which were presented in the papers, and, still more essential, the problems encountered during the actual field work, the participants of the Symposium concluded what follows:

1. The symposium, during which two the Commissions–the Commission on Periglacial Morphology (chairman: Professor Jan Dylik) of the International Geographical Union and the Sub-Commission of Paleogeographical Maps and Atlases (chairman: Professor K. K. Markov) of the INQUA worked together – proved very useful. The common subject-matter and joint

sessions of the scientists of both Commissions contributed to a better understanding of several problems (as, for example, whether the "ground veins" are *primary* forms or they are pseudomorphoses left by ice-wedges; whether the moraine formations overlying the interglacial sediments (Mikulino-Mgin) in the region between Moscow and the Upper Volga are *pseudo-moraine*[1] or the moraine proper, etc.)

2. The method of complex investigations of the Neogene formations, presented in the papers of the Soviet scientists (T. D. Boyarskaya, N. G. Sudakova, K. K. Markov) is very promising and should be used also in other countries.

The application of cryolithologic methods in the investigation of the present and fossil cryogenic forms and texture, introduced by the Soviet scientists (E. M. Katasonov) is also very promising.

3. It would be useful to arrange a similar meeting of the two Commissions and to invite members of one Commission to the symposia of the other. Paleogeography of the sub-tropical and tropical zones, for example, could be the subject of the future symposium of the Sub-Commission of the Paleogeographical Maps and Atlases. Symposium of this type could be organized in 1971–1972 in Senegal or in Mexico.

4. For the sake of the Symposium it would be desirable to publish the materials in Russian and in one or several foreign languages. It is, therefore, necessary to approach the Commission on Quaternary Research of the Academy of Sciences of the U.S.S.R. for the permission to publish the materials from the Symposium and to Professor J. Dylik for the permission to publish, in the *Biuletyn Peryglacjalny*, the materials dealing directly with the periglacial problems. Also, Professors A. L. Washburn, A. Cailleux, H. Richter should be approached for the permission to publish the materials on the general paleogeography in the magazine *Quaternary Research*, edited by Professor Washburn, next in the bulletins edited in Paris, and then in the well-known East German geographical magazine *Petermanns Geographische Mitteilungen.*

5. It is necessary to approach the Academy of Sciences of the U.S.S.R. with the following requests: (a) to take appropriate measures to preserve some of the unique sections demonstrated during the Symposium, (b) to enable their further investigation.

6. It is to be postulated that the 8th INQUA Congress in Paris should transfer the Sub-Commission of the Paleogeographical Maps and Atlases to the rank of a Commission (proposed by Professor G. M. Richmond, a representative of the Executive Committee of the INQUA).

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[1]Opinions of the majority of the Symposium participants are in *italics.*

Jan Dylik

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ESQUISSE DE BUTS GÉNÉRAUX ET DE TÂCHES LES PLUS URGENTES DES ÉTUDES PÉRIGLACIAIRES AU SEUIL DU SYMPOSIUM YAKOUTSK–MOSCOU

Résumé

La réussite du Symposium Yakoutsk–Moscou ne dépend pas seulement de son programme, bien qu'il soit esquissé avec un grand élan se manifestant dans le choix des sujets, de même que dans l'espace. Elle depend dans un degré considérable de nous tous, c'est à dire de notre attitude fondée sur la connaissance de l'état actuel des recherches périglaciaires, de leurs buts communs et de leur tâches les plus urgentes.

L'époque pendant laquelle les phénomènes périglaciaires actuels et les structures fossiles ont été traités en tant que curiosités et sujets d'intérêt scientifique pour eux mêmes, est passée depuis longtemps. Ces structures périglaciaires pourtant, ainsi que d'autres manifestations du climat froid du Pléistocène ont inspiré des recherches visant la définition d'un tas de prosessus morphogénétiques et paléogéographiques.

Les études stratigraphiques et poléogéographiques se fondent, en dehors de l'examen des sédiments organiques, surtout sur l'analyse des dépôts minéraux dûs aux périodes froides. Les études des unités lithologiques respectives ont fourni de données précieuses concernant les traits climatiques et même géographiques du milieu de leur sédimentation. Les structures périglaciaires occupent la place de tête parmi les indicateurs climatiques dont disposent les dépôts accumulés dans les conditions froides.

L'importance des structures périglaciaires en tant qu'indicateurs climatiques dépend pourtant d'une façon décisive du fait s'il s'agit des structures périglaciaires véritables. Cependant, dans un nombre de travaux on peut trouver des structures dont l'origine périglaciaire est douteuse et qui servent, malgré cela, à des conclusions fondamentales.

Les résultats des études portant sur les structures sédimentaires prouvent nettement qu'il y a des déformations des roches meubles n'ayant rien de com-

mun avec le milieu périglaciaire. C'est pourquoi les termes purement descriptifs paraissent périmés. D'autre part, c'est vrai que les représentants de l'opinion que la majorité des déformations sont indépendantes du milieu climatique, fortement exagèrent. Les explications des structures sédimentaires résultent pour la plupart des considérations basées sur les calculs mathématiques et des expériments de laboratoire à défaut de travaux de terrain. C'est un procédé rappellant la pratique des chercheurs qui se bornent à des observations directes et présentent l'interprétation des structures périglaciaires fossiles sans études plus détaillées des phénomènes périglaciaires actuels ou récents.

Les recherches stratigraphiques et paléogéographiques du Pléistocène ont démontré nettement l'importance de la classification génétique des structures périglaciaires; l'établissement de cette classification qui n'est pas encore achevée, devient une des tâches les plus urgentes. Parmi les facteurs qui mènent vers la réalisation de cette tâche il faut mentionner le développement des études portant sur les structures sédimentaires et surtout des études de plus en plus approfondies du pergélisol et des catégories de la glace de sol qui révèlent des perspectives nouvelles pour une classification génétique des structures. Il faut y ajouter que les réunions de la Commission de Géomorphologie Périglaciaire de l'UGI en offrant la possibilité des études de comparaison contribuent dans un degré considérable à l'élargissement de notre connaissance des problèmes périglaciaires. La réunion à Yakoutsk –Moscou présente d'un côte la continuation du Symposium alaskien parce qu'au début ses activités concernent le milieu à permafrost actuel, et de l'autre elle offre l'occasion de faire connaissance de dépôts et de structures périglaciaires pléistocènes aux environs de Moscou. La programme crée donc des conditions toutes particulières de larges discussions qui joueront sans aucun doute le rôle important dans le progrès de nos études prochaines.